Soil Survey Investigations Report No. 28

# Soil Survey Laboratory Data and Descriptions for Some Soils of...

# ..ARIZONA

SOIL CONSERVATION SERVICE • U.S. DEPARTMENT OF AGRICULTURE
In cooperation with
ARIZONA AGRICULTURAL EXPERIMENT STATION

Soil survey investigations reports already published:

SSIR No. 1 Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples

Soil Survey Laboratory Data and Descriptions for Some Soils of:

SSIR No. 2 North Dakota
SSIR No. 3 Iowa
SSIR No. 4 Kansas
SSIR No. 5 Nebraska
SSIR No. 6 Arkansas, Louisiana, and Missouri
SSIR No. 7 Montana
SSIR No. 8 Wyoming
SSIR No. 9 Minnesota
SSIR No. 10 Colorado
SSIR No. 11 Oklahoma
SSIR No. 12 Puerto Rico and the Virgin Islands
SSIR No. 13 Mississippi
SSIR No. 14 Kentucky
SSIR No. 15 Tennessee
SSIR No. 16 North Carolina, South Carolina, and Georgia
SSIR No. 17 Wisconsin
SSIR No. 18 Indiana
SSIR No. 19 Illinois
SSIR No. 20 New England States
SSIR No. 21 A Toposequence of Soils in Tonalite Grus in the Southern California Peninsular Range

Soil Survey Laboratory Data and Descriptions for Some Soils of:

SSIR No. 22 Alabama and Florida
SSIR No. 23 Nevada
SSIR No. 24 California
SSIR No. 25 New York
SSIR No. 26 New Jersey
SSIR No. 27 Pennsylvania

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August 1974

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# METHODS CODE SYMBOLS

1. SAMPLE COLLECTION AND PREPARATION
   - A. Field sampling
     1. Site selection
     2. Soil sampling
        - a. Stony soils
        - b. Marsh and swamp soils
   - B. Laboratory preparation
     1. Standard (airdry)
        - a. Square-hole 2-mm sieve
        - b. Round-hole 2-mm sieve
     2. Field moist
     3. Carbonate-containing material
     4. Carbonate-indurated material
2. CONVENTIONS
   - A. Size-fraction base for reporting
     1. <2-mm
     2. < size specified
   - B. Data sheet symbols
     - tr: trace, not measurable by quantitative procedure used or less than reportable amount
     - -: analysis run but none detected
     - blank: analysis not run
     - nd: analysis not run
     - <: less than reported amount or none present
3. PARTICLE-SIZE ANALYSES
   - A. Particles <2-mm (pipet method)
     1. Airdry samples
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        - b. Fine clay
        - c. Water-dispersible clay
     2. Moist samples
        - a. Carbonate and noncarbonate clay
        - b. Fine clay
        - c. Water-dispersible clay
   - B. Particles >2-mm
     1. Weight estimates
        - a. By field and laboratory weighing
        - b. From volume and weight estimates
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   - A. Bulk density
     1. Saran-coated clods
        - a. Field state
        - b. Airdry
        - c. 30-cm absorption
        - f. 1/3-bar desorption III
        - g. 1/10-bar desorption
        - h. Ovendry
     3. Cores
        - a. Field moist
   - B. Water retention
     1. Pressure-plate extraction (1/3 or 1/10 bar)
        - a. Sieved samples
        - b. Soil pieces
        - c. Natural clods
        - d. Cores
     2. Pressure-membrane extraction (15 bars)
        - a. Field-moist samples
     4. Field state
     5. Airdry
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     2. 1/10 bar to 15 bars
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     1. Dry to moist
   - F. Plasticity index
     1. Liquid limit
     2. Upper plastic limit
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   - A. Cation-exchange capacity
     1. $NH_4OAc$, pH 7.0
        - a. Direct distillation
     2. NaOAc, pH 8.2
        - a. Centrifuge method

5. ION-EXCHANGE ANALYSES (contd.)
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     - a. Acidity by $BaCl_2$-TEA, pH 8.2; bases by $NH_4OAc$, pH 7.0
     - b. Sum of bases plus Al
   - 6. $NH_4OAc$, pH 7.0, leaching tube
     - a. Direct distillation
   - B. Extractable bases
     1. $NH_4OAc$ extraction
        - a. Uncorrected
        - b. Corrected (exchangeable)
        - c. See 5B4
     3. KCl-TEA, pH 8.2 (revised)
        - a. Uncorrected
        - b. Corrected (exchangeable)
     4. $NH_4OAc$, pH 7.0 (modified)
        - a. Uncorrected
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   - C. Base saturation
     1. $NH_4OAc$, pH 7.0
     2. NaOAc, pH 8.2
     3. Sum of cations
   - D. Sodium saturation (exchangeable Na pct.)
     1. NaOAc, pH 8.2
     2. $NH_4OAc$, pH 7.0
   - E. Sodium-adsorption ratio
   - F. Calcium saturation
     1. $NH_4OAc$, pH 7.0
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   - A. Organic carbon
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        - a. $FeSO_4$ titration
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        - a. Ammonia distillation
   - C. Iron
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        - a. Dichromate titration
        - b. EDTA titration
     2. Dithionite-citrate extraction
        - a. Orthophenanthroline colorimetry
        - b. Atomic absorption
     5. Sodium-pyrophosphate extraction
        - a. Atomic absorption
     6. Ammonium oxalate extraction
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        - b. Manometric
     3. $H_2SO_4$ treatment
        - a. Weight gain
   - F. Gypsum
     1. Water extract
        - a. Precipitation in acetone
        - b. Indirect estimate
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     1. KCl extraction I, 30 min.
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     3. Ca to Mg (extractable)
     4. Estimated clay percentage
     5. Estimated total salt
   - E. Soil resistivity
     1. Saturated paste

* "Solution" or "resin" pretreatment

# PREFACE

The Soil Survey Investigations Report (SSIR) series was established to preserve and make available technical information resulting from soil survey investigations. SSIR No. 1 "Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples," revised April 1972, describes in detail the methods used in the soil survey laboratories. Most of the remaining reports are a collection of pedon descriptions and laboratory data for pedons from individual states and groups of states. SSIR No. 21 is a technical report on a specific study. The reports already published are listed on the inside front cover.

This report contains data from soil survey investigations in Arizona. These investigations have been going on since 1956 but most of the data have been accumulated since 1966. Some of the data and descriptions have appeared in technical journals, in regional bulletins, in USDA technical bulletins, and in the text of published soil surveys. But most have been distributed in unpublished form to those immediately concerned and were not available to all who might use them.

This report contains all the data from the soil survey laboratories that form reasonably complete characterization of soils in Arizona. While these data were being accumulated there were some changes in laboratory methods. Consequently, laboratory data for different soils cannot always be directly compared without allowance for the method. The methods used are identified by symbol in the column headings of the data tables. The codes are identified briefly on the opposite page.

Ways of describing soils have also changed. The soil descriptions published here were prepared as working documents. The soil scientist who wrote them had no idea they would be published. Editing has been limited for the most part to that necessary for conformance to the "Soil Survey Manual" USDA Handbook No. 18. Field estimates of texture have been retained, even though some are at variance with laboratory data, because the field estimates themselves are important data.

Many pedons are no longer representative of the soil series with which they were identified at the time of sampling. Hence, during the winter of 1973-1974 all pedons for Arizona were classified in existing series and in families and higher categories. Taxonomic criteria were applied rigorously, and a pedon was considered outside a given series if it failed to meet the limits of this series as defined now by a few tenths of 1 percent. If the departures are small, the pedon is listed as taxadjunct to the series it resembles most closely. If it differs significantly from any series as defined now, it is classified at the family but not at the series level.

Soil Survey
Soil Conservation Service

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1/ County numbers (the number following "Ariz" in the Soil No.) are as follows:

1. Apache
2. Cochise
3. Coconino
5. Graham
7. Maricopa
9. Navajo
10. Pima
11. Pinal
12. Santa Cruz
13. Yavapai

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Cryoboralf, fine-loamy, mixed
SOIL McVickers very fine sandy loam (taxadjunct) SOIL Nos. S62Ariz-3-18 LOCATION Coconino County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62258 - 62264

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: >2* Pct | 2–19 Pct. of <76 mm | 19–76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | | | |
| 0- 1 | A1 | 69.8 | 28.2 | 2.0 | 0.8 | 1.0 | 1.1 | 13.9 | 53.0 | 20.4 | 7.8 | 85.8 | 16.8 | | | 1 | | |
| 1- 4 | A21 | 63.1 | 33.1 | 3.8 | 1.1 | 1.0 | 0.8 | 11.4 | 48.8 | 21.5 | 11.6 | 81.0 | 14.3 | | | 15 | | |
| 4-15 | A22 | 64.4 | 30.2 | 5.4 | 0.6 | 1.0 | 1.1 | 12.1 | 49.6 | 20.0 | 10.2 | 81.1 | 14.8 | | | 26 | | |
| 15-20 | B1 | 56.7 | 19.2 | 24.1 | 0.6 | 1.6 | 2.7 | 14.4 | 37.4 | 10.7 | 8.5 | 61.8 | 19.3 | | | 3 | | |
| 20-28 | B2t | 51.4 | 19.4 | 29.2 | 0.4 | 1.2 | 2.2 | 8.6 | 39.0 | 9.8 | 9.6 | 56.8 | 12.4 | | | 4 | | |
| 28-40 | B3t | 46.3 | 24.3 | 29.4 | 0.6 | 0.9 | 0.5 | 5.6 | 38.7 | 11.7 | 12.6 | 55.5 | 7.6 | | | 4 | | |
| 40-60+ | C | 58.2 | 27.6 | 14.2 | 4.1 | 4.9 | 2.4 | 7.6 | 39.2 | 13.1 | 14.5 | 58.5 | | | | 11 | | |

| Depth (In.) | 6A1a Organic carbon Pct | 6B1a Nitrogen Pct | C/N | | 6E1b Carbonate as $CaCO_3$ Pct | 3A1a Carbonate in <0.002 mm Pct. | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven-dry g/cc | | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct | Pct. | 4D1 Extensibility in./in. | | pH: 8C1b Sat. Paste | pH: 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 1 | 1.16 | 0.057 | 20 | | | | | | | | 3.1 | | | | 5.9 | 6.1 |
| 1- 4 | 0.33 | | | | | | 1.58 | 1.58 | | 11.1 | 1.7 | | - | | 6.1 | 6.3 |
| 4-15 | 0.11 | | | | | | 1.52 | 1.54 | | 9.0 | 1.8 | | 0.003 | | 6.2 | 6.3 |
| 15-20 | 0.24 | | | | | | 1.48 | 1.70 | | 19.7 | 8.8 | | 0.045 | | 5.6 | 6.4 |
| 20-28 | 0.13 | | | | | | 1.61 | 1.84 | | 18.9 | 11.5 | | 0.042 | | 5.5 | 6.4 |
| 28-40 | 0.11 | | | | | | 1.75 | 1.90 | | 14.1 | 11.8 | | 0.027 | | 6.5 | 7.0 |
| 40-60+ | 0.04 | | | | 9 | tr. | 1.47 | 1.76 | | 23.6 | 6.6 | | 0.056 | | 7.7 | 8.4 |

| Depth (In.) | Extractable bases 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 6H2a Ext. Acidity | Cation Exch Capacity 5A2a NaOAc | | Water extract from saturated paste: Ca | Mg | Na | K | | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0- 1 | 2.3 | 0.5 | 0.1 | 0.2 | 2.6 | 6.1 | | | | | | | | | | | |
| 1- 4 | 1.7 | 0.5 | 0.1 | 0.1 | 1.5 | 4.7 | | | | | | | | | | | |
| 4-15 | 1.5 | 0.6 | 0.1 | 0.1 | 0.6 | 4.0 | | | | | | | | | | | |
| 15-20 | 7.5 | 2.9 | 0.2 | 0.3 | 3.2 | 14.5 | | | | | | | | | | | |
| 20-28 | 10.0 | 4.0 | 0.3 | 0.3 | 3.4 | 18.6 | | | | | | | | | | | |
| 28-40 | 12.1 | 6.0 | 0.3 | 0.2 | 1.7 | 19.0 | | | | | | | | | | | |
| 40-60+ | 16.2 | 1.8 | 0.2 | 0.1 | - | 9.9 | | | | | | | | | | | |

| Depth (In.) | Water at Saturation Pct. | Atterberg limits: Plastic limit | Liquid limit | Plastic index (Pct. of <0.4 mm) | 5C3 Base Sat. (sum) Pct. | | |
|---|---|---|---|---|---|---|---|
| 0- 1 | | | | | 53 | | |
| 1- 4 | | | | | 62 | | |
| 4-15 | | NP | NP | NP | 79 | | |
| 12-20 | | | | | 77 | | |
| 20-28 | | 12 | 45 | 33 | 81 | | |
| 28-40 | | | | | 92 | | |
| 40-60+ | | 11 | 33 | 22 | 100 | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## McVICKERS VERY FINE SANDY LOAM (taxadjunct) 1/
S62Ariz-3-18

Location: Long Valley Area, Arizona. NW 1/4 of Sec. 31, T14N, R10E, Coconino County, Arizona, Photo DGJ-8-178. 18 miles E. 45 miles S. of Flagstaff, Arizona. Date of Sampling: June 4, 1962.
Collectors: J.E. Jay, Truman Anderson, M.S. James, Y.H. Havens, R.E. Nelson, Stanley Buol and L. H Grant.
Classification: Typic Cryoboralf, fine-loamy, mixed.
Vegetation: Ponderosa pine with gambel oak and western wheatgrass, three-awn, Arizona fescue, muttongrass and yarrow. Use: Grazed forest land. Climate: 20-22" precipitation - subhumid. Mean annual temperature 45°F. Parent Material: Calcareous fine grained sandstone - member of Kaibab Formation. Elevation: 6850 feet. Relief: Gently sloping, 3 percent slope to N-Northwest. Drainage: Well drained, slow permeability.
Remarks: Site is in small opening, so lacks normal O1 horizon. Is modal otherwise.

| HORIZON | DESCRIPTION |
|---|---|
| | Thin covering of pine needles and partially decayed grass. Few angular sandstone cobbles and stones on surface. |
| A1<br>RSL<br>62258 | 0 to 1 inch, light brownish gray (10YR 6/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium platy structure breaking to weak fine crumb structure; slightly hard, very friable, nonsticky and nonplastic; abundant very fine roots; few fine tubular and many fine interstitial pores; common fine gravel, few cobbles and stones; strongly acid (pH 5.5); abrupt smooth boundary. |
| A21<br>RSL<br>62259 | 1 to 4 inches, light gray (10YR 7/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; massive structure breaking to weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; plentiful fine and very fine roots; few fine tubular and many fine interstitial pores; common fine gravel, few cobbles and stones; medium acid (pH 6.0); clear smooth boundary. |
| A22<br>RSL<br>62260 | 4 to 15 inches, very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; massive breaking to weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; plentiful fine and very fine roots; few fine tubular and many fine interstitial pores; common fine gravel, few cobbles and stones; medium acid (pH 6.0); clear wavy boundary. Thickness of A2 is 10-18" in pit. |
| B1<br>RSL<br>62261 | 15 to 20 inches, light brown (7.5YR 6/4) loam, yellowish red (5YR 5/6) moist; weak fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine and plentiful medium roots; few fine tubular and many fine interstitial pores; common fine gravel, few cobbles and stones; medium acid (pH 6.0); clear wavy boundary. Discontinuous horizon. |
| B2t<br>RSL<br>62262 | 20 to 28 inches, reddish brown (5YR 5/4) light clay, reddish brown (5YR 4/4) moist, with many fine distinct reddish yellow (7.5YR 7/6) and pale yellow (2.5Y 7/4) mottles; mottles are reddish yellow (7.5YR 7/6) and light yellowish brown (2.5Y 6/4) moist; moderate to strong fine, medium subangular and angular blocky structure; very hard, friable, sticky and plastic; thin clay films on ped faces; few small slickensides; few fine and abundant medium and coarse roots; common fine tubular and common fine interstitial pores; common fine gravel, few cobbles and stones; medium acid (pH 6.0); clear irregular boundary. |
| B3t<br>RSL<br>62263 | 28 to 40 inches mottled reddish brown (5YR 5/4), white (10YR 8/2) and reddish yellow (7.5YR 7/8) clay, reddish brown (5YR 4/4), yellowish red (5YR 5/6), light yellowish brown (10YR 6/4) and light gray (10YR 7/2) moist; pseudo structure which appears to be coarse platy; structure is controlled by weathered rock fabric; clay films on ped faces; very hard, friable, sticky and plastic; few fine and medium roots; few fine tubular and common fine interstitial pores; common fine gravel, few cobbles and stones; neutral (pH 7.0); noneffervescent; gradual irregular boundary. |
| C<br>RSL<br>62264 | 40 to 60 inches, mottled reddish yellow (7.5YR 7/6), yellow (10YR 7/6) and white (10YR 8/1) weathered bedded calcareous sandstone with tongues of clay soil material, reddish yellow (7.5YR 6/8) white (7.5YR 8/0) and yellow (10YR 7/6) moist; mottles are many fine and medium faint and distinct; massive; extremely hard, extremely firm, nonsticky and nonplastic; few fine roots; few old root channels; many fine interstitial pores; common fine gravel, few cobbles and stones; moderately alkaline (pH 8.0); strong effervescence. |

1/ The McVickers series is in a fine, montmorillonitic family of Typic Cryoboralfs. This pedon has less than 35 percent clay.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Cryoboralf, fine, montmorillonitic

SOIL McVickers very fine sandy loam SOIL Nos. S62Ariz-3-17 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62251 - 62257

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: >2* Pct. | 2 – 19 Pct. of <76 mm | 19 – 76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | | | |
| 1- 0 | O1 | Organic Matter | | | | | | | | | | | | | | | | |
| 0- 4 | A21 | 47.7 | 45.6 | 6.7 | 0.7 | 2.9 | 1.2 | 7.8 | 35.1 | 26.6 | 19.0 | 68.6 | 12.6 | | | 9 | | |
| 4-12 | A22 | 46.1 | 47.4 | 6.5 | 0.9 | 2.7 | 1.3 | 8.0 | 33.2 | 30.3 | 17.1 | 70.7 | 12.9 | | | 19 | | |
| 12-14 | B1 | 52.5 | 34.5 | 13.0 | 0.7 | 2.6 | 1.1 | 8.7 | 39.4 | 20.6 | 13.9 | 67.8 | 13.1 | | | 25 | | |
| 14-24 | B21t | 37.4 | 24.1 | 38.5 | 0.0 | 0.3 | 0.2 | 7.7 | 29.2 | 11.1 | 13.0 | 47.5 | 8.2 | | | 3 | | |
| 24-31 | B22t | 38.1 | 23.8 | 38.1 | 0.2 | 0.3 | 0.2 | 7.4 | 30.0 | 12.4 | 11.4 | 49.3 | 8.1 | | | 3 | | |
| 31-43+ | B3t | 51.8 | 26.5 | 21.7 | 0.4 | 0.7 | 0.6 | 11.0 | 39.1 | 14.8 | 11.7 | 64.0 | 12.7 | | | 4 | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6C2a Ext. Iron as Fe Pct. | Carbonate as $CaCO_3$ Pct. | | Atterberg limits: Plastic limit Pct. of <0.4 mm | Atterberg limits: Liquid limit Pct. of <0.4 mm | Atterberg limits: Plastic index Pct. of <0.4 mm | | Water content: 4B2 15 bar Pct. | Water content Pct. | | pH: 8C1b Sat. Paste | pH: 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1- 0 | | Organic Matter | | | | | | | | | | | | | |
| 0- 4 | 1.79 | 0.080 | 22 | 0.6 | | | | | | | 4.7 | | | 6.3 | 6.8 |
| 4-12 | 0.45 | 0.027 | 17 | 0.6 | | | NP | NP | NP | | 2.8 | | | 6.2 | 6.6 |
| 12-14 | 0.25 | | | 0.7 | | | | | | | 5.2 | | | 6.1 | 6.5 |
| 14-24 | 0.27 | | | 1.7 | | | 14 | 55 | 41 | | 15.9 | | | 5.7 | 6.6 |
| 24-31 | 0.21 | | | 1.6 | | | | | | | 16.3 | | | 5.9 | 6.6 |
| 31-43+ | 0.07 | | | 0.8 | | | 13 | 45 | 32 | | 9.2 | | | 6.2 | 6.7 |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca meq/100 g | 6O2c Mg meq/100 g | 6P2a Na meq/100 g | 6Q2a K meq/100 g | 6H2a Ext. Acidity meq/100 g | Cation Exch Capacity 5A2a NaOAc meq/100 g | Water extract from saturated paste: Ca meq/liter | Mg meq/liter | Na meq/liter | K meq/liter | $CO_3$ meq/liter | $HCO_3$ meq/liter | Cl meq/liter | $SO_4$ meq/liter | Electrical conductivity mmho/cm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1- 0 | | Organic Matter | | | | | | | | | | | | | |
| 0- 4 | 6.6 | 1.9 | 0.1 | 0.6 | 5.4 | 15.0 | | | | | | | | | |
| 4-12 | 3.2 | 0.8 | 0.1 | 0.2 | 1.8 | 7.2 | | | | | | | | | |
| 12-14 | 4.4 | 1.6 | 0.1 | 0.2 | 1.9 | 8.6 | | | | | | | | | |
| 14-24 | 15.8 | 6.2 | 0.3 | 0.5 | 3.8 | 27.0 | | | | | | | | | |
| 24-31 | 17.2 | 7.0 | 0.2 | 0.5 | 3.5 | 28.5 | | | | | | | | | |
| 31-43+ | 10.2 | 4.3 | 0.2 | 0.3 | 1.2 | 18.0 | | | | | | | | | |

| Depth (In.) | Water at Saturation Pct. | Exchangeable Na Pct. | | Gypsum Pct. | 5C3 Base Sat. (sum) Pct. | Clay Mineralogy (<0.002 mm) X-ray: Montmorillonite | Vermiculite 7A2 | Mica | | Kaolin % DTA 7A3 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1- 0 | | Organic Matter | | | | | | | | |
| 0- 4 | | | | | 63 | t | - | x | | 7 |
| 4-12 | | | | | 70 | | | | | |
| 12-14 | | | | | 77 | | | | | |
| 14-24 | | | | | 86 | xx | - | xx | | 11 |
| 24-31 | | | | | 88 | | | | | |
| 31-43+ | | | | | 93 | xxx | - | xx | | 13 |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## McVICKERS VERY FINE SANDY LOAM
S62Ariz-3-17

Location: Long Valley Area, Arizona. SW 1/4 Sec. 24, T14N, R9E, Coconino County, Arizona, Photo DGJ-8-178. 18 miles E, 42 miles S of Flagstaff. Date of Sampling: June 4, 1962.
Collectors: J.E. Jay, Truman Anderson, M.S. James, Stanley Buol, R.E. Nelson, L.H Grant and Y.H. Havens.
Classification: Typic Cryoboralf, fine, montmorillonitic.
Vegetation: Ponderosa pine with understory of western wheatgrass, muttongrass and yarrow. Use: Grazed forest land. Climate: 20-22" - subhumid, mean annual temperature 45°F. Parent Material: Calcareous, fine grained sandstone - member of Kaibab Formation. Elevation: 6800 feet. Relief: Gently sloping. 3 percent slope to northwest. Drainage: Well drained, slow permeability.
Remarks: Modal profile.

| HORIZON | DESCRIPTION |
|---|---|
| | Thin covering of pine needles, twigs and some grass. Moist soil, few to many angular sandstone cobbles and stones scattered over surface. |
| 01<br>RSL<br>62251 | 1 to 0 inches, very dark grayish brown (10YR 3/2) partially decayed pine needles and grass, very dark brown (10YR 2/2) moist; strongly acid (pH 5.5); abrupt smooth boundary. |
| A21<br>RSL<br>62252 | 0 to 4 inches, pale brown (10YR 6/3) very fine sandy loam, brown to dark brown (10YR 4/3) moist; moderate medium and coarse platy structure breaking to weak fine platy structure; slightly hard, very friable, nonsticky and nonplastic; plentiful fine and medium roots; few fine tubular and many fine interstitial pores; common fine gravel; medium acid (pH 60); clear smooth boundary. |
| A22*<br>RSL<br>62253 | 4 to 12 inches, pinkish gray (7.5YR 7/2) cobbly very fine sandy loam, brown (7.5YR 5/4) moist; massive; hard, friable, nonsticky and nonplastic; plentiful fine and medium roots; common fine and few medium tubular pores; many fine interstitial pores; 15-40 percent angular sandstone and chert cobbles; medium acid (pH 6.0); abrupt wavy boundary. Thickness of A2 ranges from 10 to 20" in pit. |
| B1<br>RSL<br>62254 | 12 to 14 inches, reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; plentiful fine and medium roots; few fine tubular and many fine interstitial pores; common fine gravel; slightly acid (pH 6.5); abrupt broken boundary. This horizon is discontinuous. |
| B21t*<br>RSL<br>62255 | 14 to 24 inches, yellowish red (5YR 5/6) clay, yellowish red (5YR 5/6) moist; few fine weathered reddish yellow (7.5YR 7/6) sandstone fragments, reddish yellow (7.5YR 6/6) moist; strong fine medium and coarse angular blocky structure; very hard, firm, sticky and very plastic; continuous clay films on ped faces; common slickensides; plentiful fine and medium roots; few coarse and very coarse roots; common fine tubular and few fine interstitial pores; few to common gravel; slightly acid (pH 6.5); gradual irregular boundary. |
| B22t<br>RSL<br>62256 | 24 to 31 inches, yellowish red (5YR 5/6) clay, yellowish red (5YR 5/6) moist, with many medium and coarse distinct reddish yellow (7.5YR 7/8) mottles, reddish yellow (7.5YR 7/8) moist; mottles are weathered angular sandstone fragments; strong medium and coarse angular blocky structure; continuous thin clay films; common slickensides; very hard, firm, sticky and very plastic; few fine roots; few fine tubular and common fine interstitial pores; slightly acid (pH 6.5); gradual irregular boundary. |
| B3t*<br>RSL<br>62257 | 31 to 43 inches +, mottled yellowish red (5YR 5/6), reddish yellow (7.5YR 7/8) and white (10YR 8/1) clay, yellowish red (5YR 5/6), reddish yellow (7.5YR 7/8) and very pale brown (10YR 7/3) moist; pseudo structure which appears to be moderate to strong fine and medium angular blocky structure; weathered sandstone makes up approximately 50 percent of mass; rock structure is platy; very hard, firm, sticky and plastic; few fine and medium roots; few fine tubular and common fine interstitial pores; few unweathered flat stones; continuous clay films; common slickensides; slightly acid (pH 6.5).<br>This horizon contains many fragments of weathered horizontally bedded sandstone less than 1" across with clay in all seams; few unweathered flat sandstone cobbles and stones; sandstone when broken is white (10YR 8/1), very pale brown (10YR 7/3), moist. |

* These horizons were sampled for BPR.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Glossic Cryoboralf, clayey-skeletal, mixed

SOIL Soldier cobbly loam SOIL Nos. S62Ariz-3-25 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62303 - 62307

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (<0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt (0.05–0.02) | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: >2* | Coarse fragments: 2–19 | Coarse fragments: 19–76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | Pct | Pct. of <76 mm | |
| 0- 3 | A1 | 32.3 | 56.2 | 11.5 | 1.9 | 1.9 | 1.1 | 6.4 | 21.0 | 33.4 | 22.8 | 59.2 | 11.3 | | | 26 | | |
| 3-17 | A2 | 34.4 | 50.0 | 15.6 | 1.7 | 1.7 | 1.0 | 6.0 | 24.0 | 26.8 | 23.2 | 55.6 | 10.4 | | | 35 | | |
| 17-36 | B2t | 14.3 | 24.7 | 61.0 | 3.0 | 2.0 | 0.8 | 2.2 | 6.3 | 16.3 | 8.4 | 24.1 | 8.0 | | | 55 | | |
| 36-50 | B31 | 18.9 | 23.4 | 57.7 | 3.1 | 2.1 | 0.7 | 2.3 | 10.7 | 13.5 | 9.9 | 25.9 | 8.2 | | | 35 | | |
| 50-65 | B32 | 28.0 | 14.9 | 57.1 | 0.1 | 0.1 | 0.1 | 3.8 | 23.9 | 5.9 | 9.0 | 33.3 | 4.1 | | | 6 | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | Carbonate as $CaCO_3$ | | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | | | Water content: 4B1c 1/3 bar | Water content: 4B2 15 bar | | 4D1 Extensibility | | pH: 8C1b Sat. Paste | pH: 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct | | Pct. | Pct. | | g/cc | g/cc | g/cc | | Pct. | Pct. | Pct | in./in. | | | |
| 0-3 | 4.55 | 0.194 | 23 | 1.4 | | | 1.09 | 1.16 | | | 22.5 | 10.4 | | 0.020 | | 5.9 | 6.4 |
| 3-17 | 1.51 | 0.087 | 17 | 1.5 | | | 1.23 | 1.30 | | | 21.4 | 8.3 | | 0.017 | | 5.7 | 6.2 |
| 17-36 | 0.38 | | | 2.8 | | | 1.20 | 1.57 | | | 29.6 | 24.0 | | 0.088 | | 5.6 | 6.5 |
| 36-50 | 0.21 | | | 2.8 | | | | | | | | 25.0 | | | | 5.7 | 6.4 |
| 50-65 | 0.19 | | | 1.9 | | | 1.36 | 1.63 | | | 31.3 | 24.6 | | 0.060 | | 6.5 | 7.0 |

| Depth (In) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 6H2a Ext. Acidity | Cation Exch. Capacity 5A2a NaOAc | | Water extract from saturated paste: Ca | Mg | Na | K | | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0-3 | 11.0 | 2.5 | 0.1 | 0.6 | 13.6 | 26.4 | | | | | | | | | | | |
| 3-17 | 8.5 | 2.0 | 0.1 | 0.3 | 9.9 | 20.5 | | | | | | | | | | | |
| 17-36 | 20.4 | 9.4 | 0.2 | 0.5 | 9.2 | 38.8 | | | | | | | | | | | |
| 36-50 | 19.7 | 10.9 | 0.3 | 0.4 | 10.0 | 40.6 | | | | | | | | | | | |
| 50-65 | 25.2 | 8.6 | 0.4 | 0.4 | 4.2 | 37.3 | | | | | | | | | | | |

| Depth (In) | Water at Saturation | Atterberg limits: Plastic limit | Atterberg limits: Liquid limit | Atterberg limits: Plastic index | 5C3 Base Sat. (sum) | | |
|---|---|---|---|---|---|---|---|
| | Pct. | Pct. of <0.4 mm | | | Pct. | | |
| 0- 3 | | | | | 51 | | |
| 3-17 | | 20 | 28 | 8 | 52 | | |
| 17-36 | | 21 | 95 | 74 | 77 | | |
| 36-50 | | 18 | 79 | 61 | 76 | | |
| 50-65 | | | | | 89 | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## SOLDIER COBBLY LOAM

S62Ariz-3-25

Location: Long Valley Area, Arizona. SE 1/4 of SW 1/4, Sec. 22, T13N, R10E, Coconino County, Arizona, photo DGJ-8-131. 19 miles E, 48 miles S. of Flagstaff. Date of Sampling: June 7, 1962.
Collectors: Stanley Buol, Truman Anderson, R.E. Nelson, L.E. Grant, Capito and Y.H. Havens.
Classification: Glossic Cryoboralf, clayey-skeletal, mixed.
Vegetation: Ponderosa pine, gambel oak, Arizona fescue, yarrow and stipa. Use: Grazed woodland.
Climate: 24 in. precipitation, subhumid. Mean annual temperature 45°F. Parent Material: Cherty limestone of Kaibab formation. Elevation: 7400 ft. Relief: Gently sloping. Convex slope of 5 percent to west. Drainage: Moderately well drained, slow permeability.
Remarks: Modal profile.

| HORIZON | DESCRIPTION |
|---|---|
| | Thin covering of partially decayed pine needles, twigs and some grass. |
| A1 | 0 to 3 inches, grayish brown (10YR 5/2) gravelly and cobbly loam, very dark brown |
| RSL | (10YR 2/2) moist; weak medium coarse platy structure breaking to moderate fine granular |
| 62303 | structure; slightly hard, friable, nonsticky and slightly plastic; plentiful fine roots; many fine interstitial pores; 40 percent cherty gravel and cobbles; slightly acid (pH 6.5); abrupt wavy boundary. |
| A2 | 3 to 17 inches, light brown (7.5YR 6/4) very gravelly and cobbly loam, dark brown |
| RSL | (7.5YR 3/2) moist; tongues of A1 material extend into A2 along large root channels; |
| 62304 | weak fine subangular blocky and moderate fine granular and rock structure; slightly hard, friable, nonsticky and slightly plastic; plentiful fine, medium and coarse roots; many fine interstitial pores; 70-80 percent cherty gravel and cobbles; slightly acid (pH 6.5); abrupt wavy boundary. (20 percent by volume of rock material greater than 3/4 inch in diameter discarded from characterization and BPR samples.) |
| B2t | 17 to 36 inches, reddish brown (5YR 5/4) gravelly and cobbly clay, dark reddish brown |
| RSL | (5YR 3/4) when moist, with common to many fine faint light brown (7.5YR 6/4), brown |
| 62305 | (7.5YR 5/4) mottles, strong brown (7.5YR 5/6) and dark brown (7.5YR 4/4) when moist; rock and moderate fine angular blocky structure; very hard, very firm, sticky and very plastic; common small slickensides; common black N 2/ concretions; manganese coatings on ped faces; few fine and medium roots; few fine tubular pores; 30-50 percent cherty gravel and cobbles; neutral (pH 7.0); noneffervescent; clear irregular boundary. Note: Lower boundary of B2 horizon varies from 25-52" in depth in this pit. (25 percent by volume of rock material greater than 3/4" in diameter discarded from characterization and BPR samples.) |
| B31 | 36 to 50 inches, mottled reddish yellow (7.5YR 7/8) and reddish brown (5YR 5/4) |
| RSL | gravelly and cobbly clay, reddish yellow (7.5YR 6/8) and dark reddish brown (5YR 3/4) |
| 62306 | moist; mottles are many medium and coarse and distinct; rock and moderate medium angular blocky structure; extremely hard, extremely firm, sticky and very plastic; clay tongues of B2 horizon extend into the B3 horizon; common large slickensides; many black (7.5YR N 2/) concretions and black manganese coatings on ped faces; few fine and medium roots; few fine tubular pores; 30-50 percent cherty gravel and cobbles; neutral (pH 7.0); noneffervescent. (15 percent by volume of rock material greater than 3/4 inch in diameter discarded from characterization and BPR samples.) |
| B32 | 50 to 65 inches +, same as 36-50" horizon described above. B3 horizon split for |
| RSL | characterization sample. (10 percent by volume of rock material greater than 3/4 inch |
| 62307 | discarded from characterization and BPR samples.) |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Glossic Cryoboralf, clayey-skeletal, mixed

SOIL Soldier cobbly loam SOIL Nos. S62Ariz-3-26 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62308 - 62312

| Depth (In) | Horizon | 1B1b Size class and particle diameter (mm) 3A1 Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2 ≥ 2* Pct. | 2 – 19 Pct. of < 76 mm | 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 1- 0 | O1 | Organic Matter | | | | | | | | | | | | | | | | |
| 0- 4 | A1 | 26.2 | 62.2 | 11.6 | 2.9 | 1.8 | 0.9 | 4.4 | 16.2 | 36.9 | 25.3 | 56.1 | 10.0 | | | 19 | | |
| 4-15 | A2 | 25.4 | 58.2 | 16.4 | 2.1 | 1.8 | 0.9 | 3.7 | 16.9 | 31.5 | 26.7 | 51.3 | 8.5 | | | 37 | | |
| 15-28 | B2t | 29.4 | 17.5 | 53.1 | 1.8 | 1.0 | 0.4 | 1.9 | 24.3 | 11.6 | 5.9 | 37.3 | 5.1 | | | 17 | | |
| 28-44+ | B3 | 42.7 | 22.9 | 34.4 | 13.9 | 8.2 | 2.6 | 4.2 | 13.8 | 15.1 | 7.8 | 31.3 | 28.9 | | | 28 | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | | Carbonate as $CaCO_3$ Pct. | | Atterberg limits Plastic limit Pct. of <0.4 mm | Liquid limit | Plastic index | | Water content Pct. | 4B2 15 bar Pct. | Pct | | | pH 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1- 0 | | Organic Matter | | | | | | | | | | | | | | | |
| 0- 4 | 4.85 | 0.206 | 24 | | | | | | | | | 10.9 | | | | 5.5 | 5.8 |
| 4-15 | 1.89 | 0.089 | 21 | | | | 19 | 24 | 5 | | | 8.9 | | | | 5.4 | 5.7 |
| 15-28 | 0.50 | 0.039 | 13 | | | | 17 | 81 | 64 | | | 21.1 | | | | 4.4 | 5.4 |
| 28-44+ | 0.31 | | | | | | 18 | 79 | 61 | | | 15.5 | | | | 4.5 | 5.1 |

| Depth (In.) | Extractable bases 5B1a 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 6H2a Ext. Acidity | Cation Exch Capacity 5A2a NaOAc | | | Water extract from saturated paste Ca | Mg | Na | K | | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 1- 0 | | Organic Matter | | | | | | | | | | | | | | | | |
| 0- 4 | 11.2 | 2.0 | 0.1 | 0.7 | 17.8 | 30.9 | | | | | | | | | | | | |
| 4-15 | 5.6 | 1.4 | 0.2 | 0.5 | 13.4 | 22.5 | | | | | | | | | | | | |
| 15-28 | 9.7 | 4.9 | 0.2 | 0.5 | 16.2 | 30.5 | | | | | | | | | | | | |
| 28-44+ | 4.4 | 2.2 | 0.2 | 0.3 | 13.4 | 19.8 | | | | | | | | | | | | |

| Depth (In.) | Water at Saturation Pct. | Exchangeable Na Pct. | | Gypsum Pct. | 5C3 Base Sat. (sum) Pct. | Clay Mineralogy (<0.002 mm.) Montmorillonite 7A2 X-ray | Vermiculite 7A2 X-ray | Mica | Kaolin % DTA 7A3 |
|---|---|---|---|---|---|---|---|---|---|
| 1- 0 | | Organic Matter | | | | | | | |
| 0- 4 | | | | | 44 | xx | x | x | 12 |
| 4-15 | | | | | 36 | xx | xx | x | 12 |
| 15-28 | | | | | 49 | xx | - | x | 17 |
| 28-44+ | | | | | 35 | xxx | - | xx | 14 |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## SOLDIER COBBLY LOAM
S62Ariz-3-26

Location: Long Valley Area, Arizona. SW 1/4, Sec. 4, T12N, R10E, Coconino County, Arizona, photo DGJ-8-137. 21 miles E and 51 miles S of Flagstaff. Date of Sampling: June 7, 1962.
Collectors: Stanley Buol, Truman Anderson, R.E. Nelson, L. H. Grant and Y.H. Havens.
Classification: Glossic Cryoboralf, clayey-skeletal, mixed.
Vegetation: Ponderosa pine, gambel oak, Douglar fir and Arizona fescue. Use: Grazed forest.
Climate: 26" precipitation; subhumid, mean annual temperature 45°F. Parent Material: Gray dense cherty limestone. Elevation: 7700 feet. Relief: Gently sloping, convex slope of 2 percent to northwest. Drainage: Moderately well drained. Slow permeability.
Remarks: Modal profile.

| HORIZON | DESCRIPTION |
|---|---|
| | Thin covering of pine needles and twigs. Cobbly and gravelly surface - 50 percent gravel, 10 percent cobbles. |
| O1<br>RSL<br>62308 | 1 to 0 inches, gray partially decayed pine needles, leaves and grass. |
| A1<br>RSL<br>62309 | 0 to 4 inches, grayish brown (10YR 5/2) gravelly and cobbly loam, very dark brown (10YR 2/2) moist; weak medium platy structure breaking to moderate fine granular structure; slightly hard, friable, nonsticky and nonplastic; few fine roots; many fine interstitial pores; 25-50 percent cherty gravel and cobbles; medium acid (pF 6.0); abrupt smooth boundary. |
| A2<br>RSL<br>62310 | 4 to 15 inches, brown (10YR 5/3) very gravelly and cobbly loam, dark brown (7.5YR 3/2) moist; rock and weak medium subangular blocky and moderate fine granular structure; slightly hard, friable, nonsticky and slightly plastic; many fine and medium roots; few coarse roots; many fine interstitial and few fine tubular pores; 60-80 percent cobbles and gravel; strongly acid (pH 5.5); abrupt wavy boundary. (30 percent by volume of rock material greater than 3/4" in diameter discarded from characterization samples. Coarse fragments discarded from BPR samples were all greater than 6" in the longest dimension. They are estimated to be about 30 percent by volume.) |
| B2t<br>RSL<br>62311 | 15 to 28 inches, brown (7.5YR 5/4) clay, with common fine distinct red (2.5YR 4/6) and brown (10YR 5/3) mottles, brown-dark brown (7.5YR 4/4) moist, with common fine distinct dark red (2.5YR 3/6) and brown (10YR 4/3) moist, mottles; moderate fine and medium angular blocky structure; very hard, firm, sticky and very plastic; few manganese coatings and few manganese concretions; common small slickensides and pressure faces; few fine and plentiful medium and coarse roots; few fine tubular pores; few gravel and cobbles; strongly acid (pH 5.3); clear wavy boundary. Common white (10YR 8/2) dry, (10YR 6/3) moist, silt coatings on macro ped faces. Coatings are continuous around peds. |
| B3<br>RSL<br>62312 | 28 to 44 inches +, mottled yellow (10YR 7/8), very pale brown (10YR 7/3) and red (2.5YR 5/6) very gravelly and cobbly clay, brownish yellow (10YR 6/8), red (2.5YR 4/6) and grayish brown (10YR 5/2) moist; mottles are many fine faint and distinct; common large slickensides; rock and moderate fine angular blocky structure; very hard, firm, sticky and very plastic; few manganese coatings and concretions; few fine and medium roots; few old root channels; few fine tubular pores; 50-70 percent cherty gravel and cobbles; very strongly acid (pH 5.0). (35 percent by volume of rock material greater than 3/4 inch in diameter discarded from characterization samples. Silt coatings as in B2. No coarse fragments discarded from BPR samples.) |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Eutroboralf, fine, montmorillonitic

SOIL Wildcat stony loam SOIL Nos. S62Ariz-3-22 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62286 - 62291

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: >2 * Pct. | 2 – 19 Pct. of <76 mm | 19 – 76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | | | |
| ½– 0 | O1 | Organic Matter | | | | | | | | | | | | | | | | |
| 0– 2 | A21 | 52.6 | 40.6 | 6.8 | 0.5 | 11.8 | 14.6 | 18.6 | 7.1 | 28.2 | 12.4 | 45.4 | 45.5 | | | 2 | | |
| 2– 7 | A22 | 38.6 | 49.3 | 12.1 | 0.7 | 8.5 | 10.1 | 13.5 | 5.8 | 30.7 | 18.6 | 44.3 | 32.8 | | | 3 | | |
| 7–14 | B2t | 21.7 | 31.6 | 46.7 | 0.2 | 5.2 | 6.7 | 6.8 | 2.8 | 16.2 | 15.4 | 22.7 | 18.9 | | | 2 | | |
| 14–24 | B3 | 20.0 | 25.8 | 54.2 | 0.1 | 5.5 | 7.5 | 5.2 | 1.7 | 12.3 | 13.5 | 16.8 | 18.3 | | | 2 | | |
| 24+ | R | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | Atterberg limits: Plastic limit | Liquid limit | Plastic index | Bulk density: 4A1f 1/3 bar | 4A1h Oven dry | | Water content: 4B1c 1/3 bar | 4B2 15 bar | | 4D1 Extensibility | | pH: 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct | | Pct. of <0.4 mm | | | g/cc | g/cc | g/cc | Pct. | Pct. | Pct. | in./in. | | | |
| ½– 0 | Organic Matter | | | | | | | | | | | | | | | |
| 0– 2 | 1.55 | 0.066 | 23 | | | | | | | | 4.3 | | | | 6.3 | 6.4 |
| 2– 7 | 0.86 | 0.041 | 21 | 17 | 20 | 3 | 1.52 | 1.58 | | 16.2 | 4.9 | | 0.014 | | 5.6 | 6.2 |
| 7–14 | 0.76 | 0.038 | 20 | | | | 1.34 | 1.91 | | 30.5 | 20.4 | | 0.112 | | 4.9 | 6.1 |
| 14–24 | 0.64 | 0.033 | 19 | 15 | 82 | 67 | 1.38 | 1.94 | | 29.8 | 25.3 | | 0.108 | | 5.0 | 6.2 |
| 24+ | | Rock | | | | | 2.16 | 2.22 | | 5.0 | | | 0.010 | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 6H2a Ext. Acidity | Cation Exch. Capacity 5A2a NaOAc | | Water extract from saturated paste: Ca | Mg | Na | K | | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| ½– 0 | Organic Matter | | | | | | | | | | | | | | | | |
| 0– 2 | 5.7 | 1.6 | 0.1 | 0.2 | 3.3 | 10.4 | | | | | | | | | | | |
| 2– 7 | 5.4 | 1.8 | 0.1 | 0.2 | 3.7 | 12.1 | | | | | | | | | | | |
| 7–14 | 17.1 | 8.4 | 0.3 | 0.4 | 7.9 | 35.2 | | | | | | | | | | | |
| 14–24 | 21.7 | 11.3 | 0.4 | 0.4 | 8.0 | 43.2 | | | | | | | | | | | |
| 24+ | | Rock | | | | | | | | | | | | | | | |

| Depth (In.) | Water at Saturation Pct. | Exchangeable Na Pct. | | Gypsum Pct. | 5C3 Base Sat. (sum) Pct. | | |
|---|---|---|---|---|---|---|---|
| ½– 0 | | Organic Matter | | | | | |
| 0– 2 | | | | | 70 | | |
| 2– 7 | | | | | 67 | | |
| 7–14 | | | | | 77 | | |
| 14–24 | | | | | 81 | | |
| 24+ | | Rock | | | | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## WILDCAT STONY LOAM
S62Ariz-3-22

Location: Long Valley Area, Arizona. SW 1/4 of Sec. 10, T12N, R8E, Coconino County, Arizona, photo DEN-6-60, 9 miles E and 51 miles S. of Flagstaff. Date of Sampling: June 6, 1962. Collectors: Truman Anderson, Capito, L. H. Grant, Stanley Buol, R. E. Nelson, and Y. H. Havens. Classification: Aquic Eutroboralf, fine, montmorillonitic.
Vegetation: Ponderosa pine, gambel oak, alligator juniper with some western wheatgrass. Use: Grazed forest lands. Climate: 22" precipitation, subhumid, mean annual temperature 45°F. Parent Material: Fine grained Coconino sandstone. Elevation: 6875 feet. Relief: Gently sloping, 5 percent slope to north. Drainage: Somewhat poorly drained, very slow permeability.
Remarks: Modal profile.

| HORIZON | DESCRIPTION |
|---|---|
| 01<br>RSL<br>62286 | 1/2 to 0 inches, thin covering of partially decayed pine needles and twigs. 50-60 percent of surface covered with sandstone, stones and cobbles. |
| A21<br>RSL<br>62287 | 0 to 2 inches, light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse platy structure breaking to moderate fine granular; slightly hard, friable, nonsticky and nonplastic; few fine roots; many fine interstitial pores; neutral (pH 6.7); abrupt smooth boundary. |
| A22 *<br>RSL<br>62288 | 2 to 7 inches, light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; massive structure breaking to weak fine subangular blocky and moderate fine granular structure; hard, friable, nonsticky and slightly plastic; few fine and medium roots; few fine tubular and many fine interstitial pores; slightly acid (pH 6.2); abrupt wavy boundary. |
| B2t<br>RSL<br>62289 | 7 to 14 inches mottled yellowish red (5YR 4/6), light brown (7.5YR 6/4) and light brownish gray (2.5Y 6/2) clay, yellowish red (5YR 4/6), brown (7.5YR 5/4) and grayish brown (2.5Y 5/2) when moist; mottles are many fine and medium and distinct; moderate fine and medium angular blocky structure; extremely hard, extremely firm, sticky and very plastic; continuous clay films on ped faces; common small slickensides; plentiful fine and abundant medium and coarse roots; few fine tubular and interstitial pores; neutral (pH 6.6); clear wavy boundary. |
| B3 *<br>RSL<br>62290 | 14 to 24 inches mottled light brownish gray (2.5Y 6/2) and light yellowish brown (10YR 6/4) clay, grayish brown (2.5Y 5/2), dark yellowish brown (10YR 4/4) moist; mottles are many fine to coarse and faint; common large slickensides; massive in places where breaks to weak to moderate medium angular blocky structure; extremely hard, extremely firm, sticky and very plastic; few fine and plentiful medium and coarse roots; few fine tubular and few fine interstitial pores; slightly acid (pH 6.4); abrupt irregular boundary. |
| R<br>RSL<br>62291 | 24 inches +, very pale brown (10YR 7/3) and red (2.5YR 4/6) dense fine grained noncalcareous sandstone; massive; extremely hard, extremely firm, neutral (pH 6.6 to 7.0); clay tongues extend into the fractured bedrock - bedrock ranges in depth from 22-36" in this hole - A horizon ranges from 4-17" thick in this pit; gravel, cobbles and stones range from few to many throughout the solum; cobbles and stones range in size from 4-24" across. |

* Sampled for BPR.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Eutroboralf, very-fine, montmorillonitic

SOIL Wildcat stony silt loam (taxadjunct) SOIL Nos. S62Ariz-3-21 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62280 - 62285

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.2) | | | Coarse fragments 2A2: > 2* | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct | Pct. of < 76 mm | |
| ½– 0 | O1 | Organic Matter | | | | | | | | | | | | | | | | |
| 0– 2 | A21 | 28.5 | 63.5 | 8.0 | 0.7 | 3.9 | 5.9 | 12.5 | 5.5 | 35.2 | 28.3 | 47.9 | 23.0 | | | 11 | | |
| 2– 7 | A22 | 30.0 | 58.8 | 11.2 | 1.4 | 3.8 | 6.4 | 13.6 | 4.8 | 32.1 | 26.7 | 45.0 | 25.2 | | | 9 | | |
| 7–17 | B2t | 9.3 | 17.1 | 73.6 | 0.1 | 1.1 | 2.4 | 4.4 | 1.3 | 8.4 | 8.7 | 12.3 | 8.0 | | | 6 | | |
| 17–32 | B3 | 11.1 | 17.2 | 71.7 | 0.1 | 1.8 | 3.1 | 4.8 | 1.3 | 8.9 | 8.3 | 13.0 | 9.8 | | | 12 | | |
| 32+ | R | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | Carbonate as $CaCO_3$ | Atterberg limits: Plastic limit | Liquid limit | Plastic index | Water content 4B2 15 bar | | pH 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct | Pct. of <0.4 mm | | | Pct. | Pct. | | |
| ½– 0 | | Organic Matter | | | | | | | | | | |
| 0– 2 | 1.48 | 0.063 | 23 | 0.7 | | | | | | 4.4 | 6.1 | 6.4 |
| 2– 7 | 0.65 | 0.032 | 20 | 0.7 | | 17 | 19 | 2 | | 4.4 | 5.7 | 6.2 |
| 7–17 | 0.78 | 0.043 | 18 | 1.8 | | | | | | 32.5 | 4.7 | 5.8 |
| 17–32 | 0.56 | 0.033 | 17 | 1.3 | | 21 | 99 | 78 | | 33.8 | 4.3 | 5.5 |
| 32+ | | Rock | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 6H2a Ext. Acidity | Cation Exch. Capacity 5A2a NaOAc | Water extract from saturated paste: Ca | Mg | Na | K | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | meq/liter | | | | | | | | mmho/cm |
| ½– 0 | | Organic Matter | | | | | | | | | | | | | |
| 0– 2 | 6.0 | 1.5 | 0.1 | 0.2 | 4.2 | 12.3 | | | | | | | | | |
| 2– 7 | 4.5 | 1.4 | 0.1 | 0.2 | 3.0 | 9.2 | | | | | | | | | |
| 7–17 | 24.0 | 12.7 | 0.6 | 0.5 | 17.2 | 51.5 | | | | | | | | | |
| 17–32 | 21.5 | 12.3 | 0.7 | 0.5 | 23.0 | 53.3 | | | | | | | | | |
| 32+ | | Rock | | | | | | | | | | | | | |

| Depth (In.) | Water at Saturation | Exchangeable Na | | Gypsum | 5C3 Base Sat. (sum) | Clay Mineralogy (<0.002 mm) Montmorillonite | Vermiculite | Mica | | Kaolin % DTA 7A3 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct | | Pct | Pct. | 7A2 X-ray | | | | |
| ½– 0 | | Organic Matter | | | | | | | | |
| 0– 2 | | | | | 65 | xx | xx | x | | 8 |
| 2– 7 | | | | | 67 | | | | | |
| 7–17 | | | | | 69 | xxx | - | - | | 24 |
| 17–32 | | | | | 60 | | | | | |
| 32+ | | | | | | | | | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## WILDCAT STONY SILT LOAM (taxadjunct) 1/
S62Ariz-3-21

Location: Long Valley Area, Arizona. NE 1/4, SW 1/4, Sec. 11, T12N, R8E, Coconino County, Arizona, photo DEN-6-73. 10 miles E., 51 miles S. of Flagstaff. Date of Sampling: June 6, 1962. Collectors: Truman Anderson, L.H. Grant, Stanley Buol, R.E. Nelson, Capito and Y.H. Havens. Classification: Aquic Eutroboralf, very-fine, montmorillonitic. Vegetation: Ponderosa pine, gambel oak, alligator juniper and some western wheatgrass. Use: Grazed woodland. Climate: 22" precipitation, subhumid. MAT 45° F. Parent material: Fine grained Coconino sandstone. Elevation: 6950 feet. Relief: Gently sloping, 3 percent slope to northeast. Drainage: Somewhat poorly drained, very slow permeability.
Remarks: Modal profile. A horizon ranges in depth from 5-14". Depth to bedrock ranges from 2-5 feet. Cobbles and stones range from 4-24" across.

| HORIZON | DESCRIPTION |
|---|---|
| 01<br>RSL<br>62280 | 1/2 to 0 inches, thin layer of partially decayed pine needles and leaves. 50 percent surface covered with stones and cobbles. |
| A21<br>RSL<br>62281 | 0 to 2 inches, light brownish gray (10YR 6/2) gravelly very fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse platy structure breaking to moderate fine granular structure; slightly hard, very friable, nonsticky and slightly plastic; plentiful fine roots; many fine interstitial pores; 50 percent gravel, cobbles and stones; neutral (pH 6.6); abrupt smooth boundary. |
| A22<br>RSL<br>62282 | 2 to 7 inches, light gray (10YR 7/2) loam, dark grayish brown (10YR 4/2) moist; massive breaking to weak fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; plentiful fine and few medium roots; many fine interstitial and few fine tubular pores; common to many gravel, cobbles and stones; neutral (pH 6.7); abrupt wavy boundary. |
| B2t<br>RSL<br>62283 | 7 to 17 inches, mottled brown (7.5YR 5/4), red (2.5YR 4/6) and light brownish gray (2.5Y 6/2) clay, brown-dark brown (7.5YR 4/4), dark red (2.5YR 3/6) and grayish brown (2.5Y 5/2) when moist; mottles are many fine and medium and distinct; weak medium prismatic structure breaking to strong medium and coarse angular blocky structure; common slickensides 2-4" across; continuous clay films on ped faces; extremely hard, very firm, sticky and very plastic; plentiful fine, medium and coarse roots; few fine tubular pores; few gravel and cobbles; medium acid (pH 5.6); gradual wavy boundary. |
| B3<br>RSL<br>62284 | 17 to 32 inches, mottled light brownish gray (2.5Y 6/2), yellowish red (5YR 5/6) and reddish yellow (7.5YR 6/6) clay, grayish brown (2/5Y 5/2), yellowish red (5YR 4/6) and dark brown (7.5YR 4/4) moist; mottles are many fine and medium and distinct; massive in place breaking to weak coarse angular blocky structure; extremely hard, extremely firm, sticky and very plastic; common large slickensides; few fine, medium and coarse roots; few fine tubular pores; few gravel and cobbles; strongly acid (pH 5.4); abrupt irregular boundary. |
| R<br>RSL<br>62285 | 32 inches +, very pale brown (10YR 7/3) and red (2.5YR 4/6) dense fine grained non-calcareous sandstone; massive; extremely hard, extremely firm; few fine roots; slightly acid (pH 6.5); clay tongues extend into fractures of R horizon. |

1/ The Wildcat series is in a fine, montmorillonitic family of Aquic Eutroboralfs. This pedon has more than 60 percent clay.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Mollic Eutroboralf, fine, montmorillonitic

SOIL Hogg loam SOIL Nos. S62Ariz-3-23 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62292 - 62296

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: > 2* | 2 – 19 | 19 –76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct | Pct. of < 76 mm | |
| 1- 0 | 01 | Organic Matter | | | | | | | | | | | | | | | | |
| 0- 3 | A1 | 56.9 | 26.3 | 16.8 | 2.3 | 12.5 | 14.4 | 16.4 | 11.3 | 19.2 | 7.1 | 39.7 | 45.6 | | | 18 | | |
| 3-20 | B2t | 37.6 | 13.0 | 49.4 | 1.8 | 8.6 | 9.8 | 10.4 | 7.0 | 7.2 | 5.8 | 20.2 | 30.6 | | | 26 | | |
| 20-25 | B3 | 61.8 | 18.4 | 19.8 | 11.0 | 12.3 | 11.6 | 17.1 | 9.8 | 9.8 | 8.6 | 28.5 | 52.0 | | | 46 | | |
| 25-40 | R | 68.7 | 20.6 | 10.7 | 14.0 | 16.4 | 10.8 | 15.3 | 12.2 | 12.1 | 8.5 | 32.8 | 56.5 | | | 52 | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | 3A1a Carbonate in <0.002 mm | Bulk density | | | Water content: 4B2 15 bar | | | pH: 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct | | Pct. | Pct. | Pct. | g/cc | g/cc | g/cc | Pct. | Pct. | Pct. | | |
| 1- 0 | | Organic Matter | | | | | | | | | | | | |
| 0- 3 | 2.70 | 0.124 | 22 | 0.8 | | | | | | | 7.3 | | 5.9 | 6.3 |
| 3-20 | 0.76 | 0.033 | 23 | 1.6 | | | | | | | 23.2 | | 5.6 | 6.5 |
| 20-25 | 0.26 | | | 0.6 | 45 | tr. | | | | | 9.5 | | 7.5 | 8.3 |
| 25-40 | 0.15 | | | 0.3 | 61 | 1 | | | | | 5.0 | | 7.7 | 8.5 |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 6H2a Ext. Acidity | Cation Exch. Capactiy 5A2a NaOAc | Water extract from saturated paste: Ca | Mg | Na | K | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | meq/liter | | | | | | | | mmho/cm |
| 1- 0 | | Organic Matter | | | | | | | | | | | | | |
| 0- 3 | 11.3 | 1.5 | 0.1 | 0.4 | 7.3 | 18.6 | | | | | | | | | |
| 3-20 | 31.6 | 3.4 | 0.2 | 0.6 | 6.6 | 41.1 | | | | | | | | | |
| 20-25 | 27.5 | 1.3 | 0.1 | 0.3 | - | 18.2 | | | | | | | | | |
| 25-40 | 19.6 | 0.7 | 0.1 | 0.2 | - | 9.7 | | | | | | | | | |

| Depth (In.) | Water at Saturation Pct. | Exchangeable Na Pct | | Gypsum Pct. | 5C3 Base Sat. (sum) Pct. |
|---|---|---|---|---|---|
| 1- 0 | | | | | |
| 0- 3 | | | | | 65 |
| 3-20 | | | | | 84 |
| 20-25 | | | | | 100+ |
| 25-40 | | | | | 100+ |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## HOGG LOAM
S62Ariz-3-23

Location: Long Valley Area, Arizona. SW 1/4 of NE 1/4, Sec. 12, T14N, R9E, Coconino County, Arizona, photo DGJ-8-180. 15 miles E, 42 mi. S. of Flagstaff. Date of Sampling: June 7, 1962.
Collectors: Truman Anderson, Stanley Buol, R.E. Nelson, L.H. Grant and Y.H. Havens.
Classification: Mollic Eutroboralf, fine, montmorillonitic.
Vegetation: Ponderosa pine and gambel oak with understory of western wheatgrass. Use: Grazed woodland. Climate: 20-22" precipitation, subhumid. MAT 45° F. Parent material: Hard calcareous conglomerate. Elevation: 4950 feet. Relief: Gently sloping, 4-5 percent slope to west. Drainage: Well drained, slow permeability.
Remarks: Modal profile. Thin discontinuous B1 horizon is present in places (less than 1" thick), not sampled and not described.

| HORIZON | DESCRIPTION |
|---|---|
| | Thin covering of pine needles. Common to many fine and medium gravel on surface. |
| 01<br>RSL<br>62292 | 1 to 0 inches, decayed pine needles and grass. |
| A1<br>RSL<br>62293 | 0 to 3 inches, grayish brown (10YR 5/2) loam, very dark gray (10YR 3/1) moist; moderate medium and coarse platy structure breaking to moderate fine granular structure; slightly hard, friable, nonsticky and slightly plastic; plentiful fine roots; many fine interstitial pores; common fine and medium gravel; medium acid (pH 5.7); abrupt wavy boundary. |
| B2t<br>RSL<br>62294 | 3 to 20 inches, dark red (2.5YR 3/6) clay, dark reddish brown (5YR 3/4) moist; moderate fine and medium angular blocky structure; extremely hard, extremely firm, sticky and very plastic; gravel is coated with thin clay films; common small slickensides; common old root channels; root channels and ped faces are coated with organic stains and A1 materials; plentiful fine medium and coarse roots; few fine interstitial pores; common fine and few medium gravel; medium acid (pH 6.0); abrupt wavy boundary. |
| B3<br>RSL<br>62295 | 20 to 25 inches, dark red (2.5YR 3/6) and yellowish red (5YR 4/6) very gravelly clay, dark reddish brown (5YR 3/3) and yellowish red (5YR 4/6) when moist; massive; extremely hard, extremely firm, sticky and very plastic; few fine roots; few fine interstitial pores and few fine voids; 60-70 percent gravel; mildly alkaline (pH 7.5); strong effervescence; abrupt wavy boundary. Thickness range of 2 to 7" in pit. |
| R<br>RSL<br>62296 | 25 to 40 inches, pinkish white (7.5YR 8/2), extremely hard, calcareous conglomerate with small thin pockets of dark reddish brown (5YR 3/3) clay embedded in it, pinkish gray (7.5YR 7/2) when moist; massive; extremely hard, extremely firm; common fine voids; moderately alkaline (pH 8.0); violent effervescence. |

*Sampled for BPR.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Mollic Eutroboralf, fine, montmorillonitic

SOIL Hogg loam SOIL Nos. S62Ariz-3-24 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62297 - 62302

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: >2* Pct. | Coarse fragments 2A2: 2 – 19 Pct. of <76 mm | Coarse fragments 2A2: 19–76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | Pct. | | |
| 0- 1 | A11 | 42.1 | 37.4 | 20.5 | 1.3 | 3.4 | 4.5 | 10.7 | 22.2 | 24.9 | 12.5 | 54.7 | 19.9 | | | 14 | | |
| 1- 4 | A12 | 35.3 | 31.7 | 33.0 | 0.7 | 2.6 | 3.7 | 8.0 | 20.3 | 19.9 | 11.8 | 46.0 | 15.0 | | | 22 | | |
| 4-14 | B21t | 28.4 | 12.8 | 58.8 | 0.6 | 1.8 | 2.4 | 5.8 | 17.8 | 7.2 | 5.6 | 29.5 | 10.6 | | | 9 | | |
| 14-21 | B22t | 29.6 | 12.6 | 57.8 | 2.7 | 2.9 | 2.1 | 5.3 | 16.6 | 6.2 | 6.4 | 26.9 | 13.0 | | | 6 | | |
| 21-30 | C | 46.5 | 19.5 | 34.0 | 9.4 | 8.5 | 4.0 | 7.3 | 17.3 | 10.8 | 8.7 | 32.8 | 29.2 | | | 11 | | |
| 30-37+ | R | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | | 6E1b Carbonate as $CaCO_3$ Pct. | 3A1a Carbonate in <0.002 mm Pct. | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | Bulk density: g/cc | | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct | Water content: Pct | 4D1 Extensibility in./in. | | | pH: 8C1b Sat. Paste | pH: 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 1 | 3.63 | 0.186 | 20 | | | | | | | | | 12.3 | | | | | 6.5 | 6.9 |
| 1- 4 | 1.93 | 0.104 | 19 | | | | 1.34 | 1.54 | | | 24.9 | 15.9 | | 0.045 | | | 6.4 | 6.9 |
| 4-14 | 1.22 | 0.072 | 17 | | | | 1.31 | 1.76 | | | 34.5 | 28.0 | | 0.096 | | | 6.0 | 6.9 |
| 14-21 | 0.61 | 0.046 | 13 | | 8 | - | 1.22 | 1.74 | | | 39.1 | 27.7 | | 0.112 | | | 7.3 | 8.1 |
| 21-30 | 0.26 | | | | 39 | tr. | 1.36 | 1.80 | | | 29.4 | 16.4 | | 0.088 | | | 7.6 | 8.4 |
| 30-37+ | | Rock | | | | | 2.46 | 2.46 | | | 4.3 | | | - | | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 6H2a Ext. Acidity | Cation Exch. Capacity 5A2a NaOAc | | | Water extract from saturated paste: Ca | Mg | Na | K | | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0- 1 | 18.4 | 2.5 | 0.1 | 0.6 | 5.9 | 26.5 | | | | | | | | | | | | |
| 1- 4 | 22.7 | 2.8 | 0.2 | 0.7 | 5.1 | 30.1 | | | | | | | | | | | | |
| 4-14 | 48.3 | 4.7 | 0.1 | 0.6 | 5.9 | 47.4 | | | | | | | | | | | | |
| 14-21 | 35.6 | 4.8 | 0.2 | 0.8 | 1.1 | 48.1 | | | | | | | | | | | | |
| 21-30 | 36.7 | 3.2 | 0.2 | 0.4 | - | 28.7 | | | | | | | | | | | | |
| 30-37+ | | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | Water at Saturation Pct. | Exchangeable Na Pct | | Gypsum Pct. | 5C3 Base Sat. (sum) Pct. | Clay Mineralogy (<0.002 mm.): Montmorillonite 7A2 X-ray | Vermiculite 7A2 X-ray | Mica | Kaolin % DTA 7A3 |
|---|---|---|---|---|---|---|---|---|---|
| 0- 1 | | | | | 79 | t | - | x | 3 |
| 1- 4 | | | | | 84 | | | | |
| 4-14 | | | | | 90 | xxx | - | x | 13 |
| 14-21 | | | | | 97 | | | | |
| 21-30 | | | | | 100+ | xxx | - | t | 17 |
| 30-37+ | | Rock | | | | | | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## HOGG LOAM
S62Ariz-3-24

Location: Long Valley Area, Arizona. W 1/2, NW 1/4, Sec. 29, T14N, R10E, Coconino County, Arizona, photo DGJ-8-143, 19 miles E. and 43 miles S. of Flagstaff. Date of Sampling: June 7, 1962.
Collectors: Truman Anderson, Stanley Buol, R.E. Nelson, L. . Grant and Y.H. Havens.
Classification: Mollic Eutroboralf, fine, montmorillonitic.
Vegetation: Ponderosa pine, gambel oak, western wheat, juniper, ring muhly. Use: Grazed forest land. Climate: 20-22" precipitation, subhumid. Mean annual temperature 45° F. Parent Material: Dense gray limestone of the Kaibab formation. Elevation: 5000 feet. Relief: Gently sloping, 3-5 percent convex slope to northwest. Drainage: Well drained, slow permeability.
Remarks: Modal profile, 40-50 percent of surface covered with gray dolomitic limestone fragments. Depth to bedrock ranges from 15-36". Thickness of lower horizons is quite variable in sample pit. This site has fewer pine needles on surface than S62 Ariz-3-23.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>62297 | 0 to 1 inch, brown-dark brown (7.5YR 4/2) loam, very dark brown (10YR 2/2) when moist; weak to moderate medium platy structure breaking to moderate fine granular structure; slightly hard, friable, nonsticky and slightly plastic; plentiful fine roots; many fine interstitial pores; common fine gravel, cobbles and stones; slightly acid (pH 6.5); abrupt smooth boundary. |
| A12<br>RSL<br>62298 | 1 to 4 inches, brown-dark brown (7.5YR 4/2) loam, dark brown (7.5YR 3/2) moist; weak fine and medium subangular blocky and moderate fine granular structure; hard, friable, slightly sticky and slightly plastic; plentiful fine and few medium roots; many fine interstitial and few fine tubular pores; common fine gravel, cobbles and stones; slightly acid (pH 6.3); abrupt wavy boundary. |
| B21t<br>RSL<br>62299 | 4 to 14 inches, dark red (2.5YR 3/6) clay, dark red (2.5YR 3/6) moist; surfaces of ped faces are dark reddish brown (5YR 3/4); few small slickensides; moderate medium and coarse angular blocky structure; extremely hard, extremely firm, sticky and very plastic; plentiful fine and medium and few coarse roots; few fine interstitial and few fine tubular pores; few fine and medium gravel; medium acid (pH 6.0); clear irregular boundary. |
| B22t<br>RSL<br>62300 | 14 to 21 inches, reddish brown (5YR 4/4) clay, reddish brown (5YR 4/4) moist, with dark reddish brown (5YR 3/4) coatings and organic coatings on ped faces; moderate medium and coarse angular blocky structure; extremely hard, extremely firm, sticky and very plastic; common large slickensides; few to common spots of weathered lime occur in lower part of horizon; plentiful fine and few medium and coarse roots; few fine interstitial and few fine tubular pores; few fine and medium gravel and few stones; moderately alkaline (pH 8.0); slight effervescence in spots; abrupt irregular boundary. |
| C<br>RSL<br>62301 | 21 to 30 inches, reddish yellow (7.5YR 7/8) weathered limestone and reddish brown (5YR 4/4) gravelly clay, reddish yellow (5YR 7/8) weathered limestone and dark reddish brown (5YR 3/3) moist gravelly clay; limy material makes up 60-70 percent of mass; few imperfectly formed calcite crystals at contact of C1ca and R horizon; massive; very hard, friable, sticky and plastic; few fine and medium roots; many fine interstitial pores; common to many gravel, few cobbles and stones; moderately alkaline (pH 8.0); violent effervescence; abrupt irregular boundary. |
| R<br>RSL<br>62302 | 30 to 37 inches +, light brownish gray (10YR 6/2) dolomitic limestone, grayish brown (10YR 5/2) moist; massive; extremely hard, extremely firm; violent effervescence. |

CONSECUTIVE PEDON NUMBER C 68131 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CANELO TAXADJUNCT · SOIL NO. S68 ARIZ. 12-12 SAMPLE NO. 8 971-8 978 , E.PIMA-SANTA CRU AREA

SOIL FAMILY: AQUIC HAPLUSTALF LOAMY-SKELETAL,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE .2U | LT | CARBONATE 3A1A | 1A2A INT. COARSE FRAGMENTS .2-.02 | I PCT. OF WHOLE 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 8 971 | 0- 3 | A22 | 68.3 | 26.1 | 5.6 | 12.0 | 14.0 | 9.7 | 21.4 | 11.2 | 13.9 | 12.2 | | | | | 36.9 | 51A | 21 | 24 | 6 |
| 8 972 | 3- 15 | A21 | 59.8 | 32.4 | 7.8 | 9.3 | 11.3 | 8.8 | 20.1 | 10.3 | 14.7 | 17.7 | | | | | 35.9 | 51A | 31 | 15 | 5 |
| 8 973 | 15- 23 | A22G | 60.3 | 29.8 | 9.9 | 7.2 | 12.5 | 10.0 | 19.9 | 10.7 | 11.0 | 18.8 | | | | | 32.8 | 54A | 16 | 30 | 8 |
| 8 974 | 23- 38 | B1 G | 59.2 | 21.4 | 19.4 | 10.4 | 14.5 | 9.5 | 16.4 | 8.4 | 6.1 | 15.3 | | | | | 22.9 | 58A | 35 | 21 | 2 |
| 8 975 | 38- 58 | B2 TG | 46.3 | 14.4 | 39.3 | 8.2 | 9.2 | 6.7 | 14.2 | 8.0 | 5.9 | 8.5 | | | | | 22.1 | 67A | 35 | 31 | 1 |
| 8 976 | 58- 97 | B31TG | 60.2 | 10.4 | 29.4 | 10.6 | 14.4 | 10.2 | 17.7 | 7.3 | 5.7 | 4.7 | | | | | 22.6 | 57A | 29 | 28Z | N |
| 8 977 | 97-145 | B32 | 67.4 | 10.5 | 22.1 | 9.5 | 15.6 | 12.4 | 21.4 | 8.5 | 5.1 | 5.4 | | | | | 25.3 | 61A | 26 | 35Z | N |
| 8 978 | 145-183 | C | 60.0 | 13.6 | 26.4 | 7.6 | 11.5 | 10.1 | 20.9 | 9.9 | 6.7 | 6.9 | | | | | 28.5 | 68A | 45 | 23Z | N |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR-BON 6A1A | NITRO-GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6G2D | DI-CIT AL 6G7A | EXT PYROP FE 6G5C | EXT PYROP AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY 1/3 BAR 4A1F | DRY 4A1F | 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PERCENT | | | | PCT.NO.40 | | GRAMS PER CC | | | | -PERCENT- | | | -PERCENT- | |
| 8 971 | 0- 3 | 1.31 | 0.083 | | | 0.7 | 0.1 | | | NP | NP | 1.28 | | | 0.67 | | | 4.6 | | |
| 8 972 | 3- 15 | 0.55 | 0.038 | | | 0.8 | TR | | | | | | 1.28 | 1.28 | 0.66 | | 11.8 | 4.1 | | |
| 8 973 | 15- 23 | 0.41 | | | | 0.8 | 0.1 | | | NP | NP | | 1.29 | 1.29 | 0.64 | | 15.2 | 4.5 | | |
| 8 974 | 23- 38 | 0.29 | | | | 0.8 | 0.1 | | | | | 1.28 | | | 0.60 | | | 6.1 | | |
| 8 975 | 38- 58 | 0.55 | | | | 0.9 | 0.1 | | | 36 | 19 | | 1.27 | 1.37 | 0.52 | | 30.4 | 13.2 | 2.6 | 1.3 |
| 8 976 | 58- 97 | 0.23 | | | | 0.9 | 0.1 | | | | | | 1.24 | 1.29 | 0.62 | | 30.7 | 12.6 | 1.3 | 0.8 |
| 8 977 | 97-145 | 0.06 | | | | 0.9 | TR | | | 28 | 17 | 1.15 | | | 0.59 | | | 10.7 | | |
| 8 978 | 145-183 | | | | | 0.9 | 0.1 | | | 36 | 18 | | 1.15 | 1.18 | 0.52 | | 29.1 | 12.9 | 0.9 | 0.4 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | C E C NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 8 971 | 0- 3 | 4.7 | 1.2 | TR | 0.3 | 6.2 | | 0.1 | 6.2 | 8.2 | 100+ | 98 | 76 | | 5.5 | 4.7 |
| 8 972 | 3- 15 | 3.0 | 0.8 | 0.1 | 0.2 | 4.1 | 2.5 | 0.2 | 6.6 | 6.3 | 62 | 95 | 65 | | 5.5 | 4.7 |
| 8 973 | 15- 23 | 3.5 | 1.9 | 0.1 | 0.2 | 5.7 | | 0.2 | 5.7 | 7.4 | 100+ | 97 | 77 | | 5.4 | 4.6 |
| 8 974 | 23- 38 | 5.0 | 3.7 | 0.2 | 0.3 | 9.2 | | 0.3 | 9.2 | 10.8 | 100+ | 97 | 85 | | 5.6 | 4.7 |
| 8 975 | 38- 58 | 9.2 | 10.8 | 0.4 | 0.7 | 21.1 | | 0.5 | 21.1 | 21.6 | 100+ | 98 | 98 | | 5.2 | 4.5 |
| 8 976 | 58- 97 | 9.8 | 11.2 | 0.9 | 0.7 | 22.6 | | 0.2 | 22.6 | 21.8 | 100+ | 99 | 100+ | | 4.9 | 4.4 |
| 8 977 | 97-145 | 9.0 | 5.1 | 0.8 | 0.6 | 15.5 | 1.8 | 0.4 | 17.3 | 18.7 | 90 | 97 | 83 | | 5.5 | 4.9 |
| 8 978 | 145-183 | 11.1 | 21.0 | 1.0 | 0.6 | 33.7 | | | 33.7 | 21.5 | 100+ | | 100+ | | 6.2 | 5.6 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2F IV | DTA 7A3 | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PERCENT | | | | |
| 8 971 | 0- 3 | MI 2 | KK 2 | MT 1 | | | | | | |
| 8 972 | 3- 15 | | | | | | | | | |
| 8 973 | 15- 23 | MT 2 | MI 2 | KK 2 | | | | | | |
| 8 974 | 23- 38 | | | | | | | | | |
| 8 975 | 38- 58 | MT 3 | MI 3 | KK 3 | | | | | | |
| 8 976 | 58- 97 | | | | | | | | | |
| 8 977 | 97-145 | MT 4 | MI 3 | KK 2 | | | | | | |
| 8 978 | 145-183 | MT 4 | MI 3 | KK 2 | | | | | | |

| CODE | MINERAL |
|---|---|
| MI | MICA |
| KK | KAOLINIT |
| MT | MONTMORT |

| RELATIVE AMOUNT | |
|---|---|
| 1 | TRACE |
| 2 | SMALL |
| 3 | MODERATE |
| 4 | ABUNDANT |
| 5 | DOMINANT |
| 6 | INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

CANELO VERY GRAVELLY SANDY LOAM (taxadjunct) 1/
S68 Ariz-12-12-1 through 8

Location: Santa Cruz County, Arizona, 3.6 miles south of Canelo near top of ridge, ½ mile above tank on wash, approximately 458 feet east and 450 feet south of W¼ corner Section 27, T22S, R18E. Photo AMS 502, FS EEX 14-171. Date of Sampling: October 16, 1968.
Description by: Havens and Richardson. Collectors: Nettleton and Brasher.
Classification: Aquic Haplustalf, loamy-skeletal, mixed, mesic.
Vegetation: Oak, juniper, manzanita, plains lovegrass, canebeard grass, blue grama, New Mexico needlegrass, deergrass, sideoats grama, three-awn and wolftail. Climate: Mean annual temperature 56°F. Mean annual precipitation 18 to 19 inches. Parent Material: Old alluvium from dacite, quartzite and rhyolite tuffs. Topography: Rounded narrow topped ridge remnants of dissected old fan. 14 percent slope, Northwest aspect. Elevation: 5375 feet. Drainage: Somewhat poorly drained. Rapid runoff. Soil Moisture: Dry.
Remarks: This site was paired with S68 Ariz-12-10-1 through 6.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-3 cm) |
| A1 | 0 to 1 inch, grayish brown (10YR 5/2) very gravelly sandy loam, dark yellowish |
| RSL | brown (10YR 3/4) moist; weak thick platy structure; slightly hard, friable, |
| 68971 | nonsticky and nonplastic; many very fine, fine and medium roots; common fine interstitial pores; noneffervescent; medium acid (pH 6.0); clear smooth boundary. |
| A21 | 1 to 6 inches, pale brown (10YR 6/3) very gravelly fine sandy loam, dark brown |
| RSL | (7.5YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; |
| 68972 | many very fine, fine and medium roots; common very fine tubular pores; |
| (3-15 cm) | noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| A22 | 6 to 9 inches, light gray (10YR 7/2) gravelly loam, brown (7.5YR 5/4) moist; |
| RSL | massive; slightly hard, friable, nonsticky and slightly plastic; many very |
| 68973 | fine, fine and medium roots; many fine and medium tubular pores; noneffer- |
| (15-23 cm) | vescent; medium acid (pH 5.6); clear wavy boundary. |
| B1g | 9 to 15 inches, white (10YR 8/2) very gravelly sandy clay loam, brown (10YR |
| RSL | 5/3) moist, with few medium distinct pale yellow (5Y 8/4) mottles, pale yellow |
| 68974 | (5Y 7/4) moist; weak fine subangular blocky structure; hard, friable, |
| (23-38 cm) | slightly sticky and slightly plastic; many very fine, fine and medium roots; few fine tubular pores; noneffervescent; medium acid (pH 5.6); clear wavy boundary. |
| B2tg | 15 to 23 inches, mottled red (2.5YR 4/8), reddish gray (5YR 5/2) and pinkish |
| RSL | gray (5YR 6/2) very gravelly clay, red (2.5YR 4/8), reddish gray (5YR 5/2) |
| 68975 | and dark reddish gray (5YR 4/2) moist, mottles are many medium and large and |
| (38-58 cm) | distinct; moderate medium subangular and angular blocky structure; very hard, firm, sticky and plastic; few fine and medium roots; common fine tubular pores; common thin clay films on ped faces and in pores; noneffervescent; strongly acid (pH 5.5); clear wavy boundary. |
| B31tg | 23 to 38 inches, mottled yellowish red (5YR 4/6), (4/8), reddish gray (5YR 5/2) |
| RSL | and pinkish gray (5YR 6/2) very gravelly clay, yellowish red (5YR 4/6), (4/8), |
| 68976 | dark reddish gray (5YR 4/2) and reddish gray (5YR 5/2) moist; weak medium |
| (58-97 cm) | subangular blocky structure; hard, friable, sticky and plastic; few fine roots; common fine tubular pores; common thin clay films on ped faces and in pores; noneffervescent; strongly acid (pH 5.2); gradual wavy boundary. |
| B32 | 38 to 57 inches, mottled yellowish red (5YR 4/6), (4/8), reddish gray |
| RSL | (5YR 5/2) and pinkish gray (5YR 6/2) very gravelly sandy clay loam, yellowish |
| 68977 | red (5YR 4/6), dark reddish gray (5YR 4/2) and reddish gray (5YR 5/2) moist; |
| (97-145 cm) | massive; hard, friable, slightly sticky and plastic; common fine tubular pores; few thin clay films on ped faces and in pores; noneffervescent; strongly acid (pH 5.5). |
| C | 57 to 72 inches, mottled pinkish gray (5YR 6/2) and yellowish red (5YR 4/6) |
| RSL | very cobbly clay, reddish gray (5YR 5/2) and yellowish red (5YR 4/6) moist; |
| 68978 | massive; hard, friable, slightly sticky and plastic; noneffervescent; strongly |
| (145-183 cm) | acid (pH 5.5). |

1/ The Canelo series is in a clayey-skeletal, mixed, mesic family of Aquic Haplustalfs. This pedon has an A2 horizon that lacks mottles and has a chroma of 4 and has an argillic horizon that has less than 35 percent clay.

CONSECUTIVE PEDON NUMBER C 68130 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CANELO SOIL NO. S68 ARIZ. 12-10 SAMPLE NO. 8 964-8 970 E.PIMA-SANTA CRU AREA

SOIL FAMILY: AQUIC HAPLUSTALF CLAYEY-SKELETAL,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2- .02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL 1 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 6A1A | 6B1A | 6C1A | 6D1A | 6E1A | 6F1A | 6G1A | 6H1A | 6I1A | 6J1A | 6K1A | 6L1A | | 1A2A | | | |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 8 964 | 0- 13 | A1 | 60.5 | 32.0 | 7.5 | 21.5 | 13.8 | 7.5 | 11.1 | 6.6 | 15.5 | 16.5 | | | | 27.9 | 33A | 9 | 15 | 9 |
| 8 965 | 13- 18 | A21 | 56.4 | 35.6 | 8.0 | 14.9 | 14.0 | 8.3 | 11.9 | 7.3 | 16.9 | 18.7 | | | | 30.6 | 44A | 23 | 14 | 7 |
| 8 966 | 18- 36 | A22 | 53.1 | 35.1 | 11.8 | 15.9 | 13.1 | 7.0 | 10.6 | 6.5 | 14.1 | 21.0 | | | | 25.9 | 44A | 26 | 12 | 6 |
| 8 967 | 36- 58 | B21TG | 47.4 | 25.6 | 27.0 | 15.5 | 12.7 | 5.8 | 8.1 | 5.3 | 8.5 | 17.1 | | | | 18.0 | 64A | 39 | 2 | 23 |
| 8 968 | 58- 86 | B22TG | 13.1 | 9.1 | 77.8 | 3.3 | 3.7 | 1.9 | 2.9 | 1.3 | 2.4 | 6.7 | | | | 5.1 | 65A | 29 | 30 | 6 |
| 8 969 | 86-130 | B23T | 46.4 | 11.5 | 42.1 | 20.6 | 13.1 | 5.0 | 5.5 | 2.2 | 2.9 | 8.6 | | | | 7.7 | 64A | 38 | 18 | 8 |

| SAMPLE NO. | DEPTH CM. | ORG. CAR-BON 6A1A -PERCENT- | MATTER NITRO-GEN 6B1A -PERCENT- | CARBONATE AS CACO3 LT 2 6C1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LIMIT EST. LL 4F1 | PL 4F2 | BULK DENSITY 1/3 BAR 4A1F | DRY BAR 4A1F | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | -PERCENT- | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | PERCENT | | | -PERCENT- | |
| 8 964 | 0- 13 | 0.78 | 0.053 | TR | | 0.5 | TR | | | NP | NP | | 1.60 | 1.60 | 0.78 | | 10.3 | 4.3 | | |
| 8 965 | 13- 18 | 0.48 | 0.030 | TR | | 0.5 | TR | | | NP | NP | | 1.53 | 1.53 | 0.69 | | 9.7 | 4.2 | | |
| 8 966 | 18- 36 | 0.28 | | | | 0.5 | TR | | | NP | NP | | 1.25 | 1.25 | 0.74 | | 22.2 | 4.6 | | |
| 8 967 | 36- 58 | 0.22 | | | | 0.6 | 0.1 | | | 26 | 16 | | 1.45 | 1.45 | 0.50 | | 21.3 | 8.0 | | |
| 8 968 | 58- 86 | 0.30 | | | | 1.0 | 0.1 | | | 66 | 27 | | 1.22 | 1.49 | 0.54 | | 37.9 | 24.1 | 6.9 | 3.5 |
| 8 969 | 86-130 | | | | | 1.1 | 0.1 | | | 45 | 25 | 1.30 | | | 0.53 | | | 15.1 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | CEC NH4-OAC 5A6A | BASE SUM+ ACI-DITY | SATURATION SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 8 964 | 0- 13 | 2.5 | 0.7 | 0.1 | 0.4 | 3.7 | | | 3.7 | 4.6 | 100+ | | 80 | | 6.3 | 5.6 |
| 8 965 | 13- 18 | 1.9 | 0.5 | 0.1 | 0.4 | 2.9 | | | 2.9 | 3.8 | 100+ | | 76 | | 6.1 | 5.4 |
| 8 966 | 18- 36 | 2.0 | 0.5 | 0.1 | 0.4 | 3.0 | | | 3.0 | 3.8 | 100+ | | 79 | | 6.2 | 5.5 |
| 8 967 | 36- 58 | 6.3 | 1.6 | 0.1 | 0.6 | 8.6 | | | 8.6 | 8.3 | 100+ | | 100+ | | 5.8 | 5.3 |
| 8 968 | 58- 86 | 6.6 | 13.6 | 0.5 | 1.3 | 22.0 | | 3.0 | 22.0 | 23.5 | 100+ | 88 | 94 | | 4.4 | 4.0 |
| 8 969 | 86-130 | 3.9 | 5.8 | 0.6 | 0.9 | 11.2 | 6.7 | 2.3 | 17.9 | 14.9 | 63 | 83 | 75 | | 4.3 | 3.7 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 -PERCENT- | 7A3 | <0.0002 MM X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 964 | 0- 13 | MT 1 | MI 1 | KK 1 | | | | | | |
| 8 965 | 13- 18 | MI 2 | KK 2 | MT 1 | | | | | | |
| 8 966 | 18- 36 | MT 1 | MI 1 | KK 1 | | | | | | |
| 8 967 | 36- 58 | KK 3 | MI 2 | MT 1 | | | | | | |
| 8 968 | 58- 86 | KK 4 | MI 3 | MT 1 | | | | | | |
| 8 969 | 86-130 | MI 2 | KK 2 | MT 1 | | | | | | |

MINERAL CODE: MT MONTMORT 1 TRACE; MI MICA 2 SMALL; KK KAOLINIT 3 MODERATE; 4 ABUNDANT; 5 DOMINANT; 6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## CANELO GRAVELLY SANDY LOAM
S68 Ariz-12-10-1 through 6

Location: Santa Cruz County, Arizona, 12 miles south of Elgin and 0.8 mile by road, east-southeast of Canelo Pass cattle guard and 100 feet east of road. Approximately 2000 feet east of W¼ corner Section 30, T22S, R18E. Photo 20-93.
Date of Sampling: October 14, 1968.
Description by: Havens and Clemmons. Collectors: Nettleton and Brasher.
Classification: Aquic Haplustalf, clayey-skeletal, mixed, mesic.
Vegetation: Oak, juniper, manzanita and grasses--bluestem, plains lovegrass, muhly and three-awn. Climate: Mean annual temperature approximately 56°F. Mean annual precipitation 18-20 inches. Parent Material: Mixed old alluvium from dacite, andesite, rhyolite and tuffs. Topography: High alluvial fan. 3 percent slope. Southeast aspect. Elevation: 5225 feet. Drainage: Somewhat poorly drained. Soil Moisture: Slightly moist.
Remarks: This site was paired with S68 Ariz-12-12-1 through 8.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-13 cm) |
| A1 | 0 to 5 inches, brown (10YR 5/3) gravelly sandy loam, dark brown |
| RSL | (7.5YR 3/2) moist; moderate fine granular structure; slightly |
| 68964 | hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; common fine interstitial and tubular pores; noneffervescent; slightly acid (pH 6.2); abrupt smooth boundary. |
| A21 | 5 to 7 inches, very pale brown (10YR 7/3) very gravelly sandy |
| RSL | loam, brown (7.5YR 5/4) moist; massive; slightly hard, very |
| 68965 | friable, slightly sticky and slightly plastic; common very fine |
| (13-18 cm) | and fine roots; common fine interstitial and tubular pores; noneffervescent; medium acid (pH 6.0); abrupt smooth boundary. |
| A22 | 7 to 14 inches, light gray (10YR 7/2) very gravelly loam, light |
| RSL | brown (7.5YR 6/4) moist, with few fine distinct brownish yellow |
| 68966 | (10YR 6/8) mottles, yellowish brown (10YR 5/8) moist; weak |
| (18-36 cm) | medium subangular blocky structure near massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few fine tubular pores; noneffervescent; very strongly acid (pH 5.0); abrupt wavy boundary. |
| B21tg | 14 to 23 inches, mottled pinkish white (7.5YR 8/2), reddish |
| RSL | yellow (7.5YR 6/6) and yellowish red (5YR 5/8) very gravelly |
| 68967 | heavy clay loam, light brown (7.5YR 6/4), strong brown (7.5YR 5/6) |
| (36-58 cm) | and yellowish red (5YR 4/8) moist, mottles are many medium and large and distinct with few fine distinct light gray (10YR 7/1) mottles; moderate medium subangular blocky and angular blocky structure; hard, friable, sticky and plastic; common fine and few very fine roots; common very fine tubular pores; common thin clay films on ped faces and in pores; noneffervescent; strongly acid (pH 5.2); clear wavy boundary. |
| B22tg | 23 to 34 inches, white (10YR 8/2) very gravelly clay, light gray |
| RSL | (10YR 7/2) and very pale brown (10YR 7/4) moist, with many medium |
| 68968 | and large and distinct red (10R 4/6) mottles, red (10R 4/6) |
| (58-86 cm) | moist; moderate medium subangular and angular blocky structure; very hard, firm, sticky and plastic; few fine and very fine roots; few thin clay films on ped faces; noneffervescent; very strongly acid (pH 4.6); clear wavy boundary. |
| B23t | 34 to 51 inches, light red (2.5YR 6/6) and red (2.5YR 4/6) very |
| RSL | cobbly clay, red (2.5YR 4/6) moist, with common fine distinct |
| 68969 | pinkish gray (7.5YR 7/2) mottles, brown (7.5YR 5/4) moist; |
| (86-130 cm) | moderate medium and fine subangular blocky structure; very hard, friable, sticky and plastic; few fine tubular pores; common moderately thick clay films on ped faces and in pores; noneffervescent; very strongly acid (pH 4.6). |

Note: Coarse fragments over 3 inches - B21 13 percent
B22 29 percent

CONSECUTIVE PEDON NUMBER C 68138 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CASTO SOIL NO. S68 ARIZ. 2- 4 SAMPLE NO. 81003-81004 E.PIMA-SANTA CRU AREA

SOIL FAMILY: UDIC HAPLUSTALF,LOAMY-SKELETAL,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | INT. II .2- .02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 81003 | 86-122 | C 2CA | 47.5 | 28.5 | 24.0 | 3.1 | 4.0 | 3.8 | 19.0 | 17.6 | 11.0 | 17.5 | | | | 41.8 | 56A | 31 | 21 | 4 |
| 81004 | 122-137 | C 3CA | 48.7 | 29.8 | 21.5 | 8.0 | 8.0 | 4.9 | 15.2 | 12.6 | 10.5 | 19.3 | | | 1 | 32.8 | 73A | 43 | 10 | 20 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L I M I T LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT.NO.40 GRAMS PER CC | | | | | | PERCENT | | | PERCENT | |
| 81003 | 86-122 | | | 6 | | | | | | | | 1.26 | | | 0.61 | | | 17.7 | | |
| 81004 | 122-137 | | | 11 | | | | | | | | 1.26 | | | 0.44 | | | 15.6 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4B | MG 5B3A 6O4B | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA- CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81003 | 86-122 | 73.3 | 5.4 | 0.5 | 0.3 | 79.5 | | | 79.5 | 47.4 | 100+ | | 100+ | | 7.8 | 7.4 |
| 81004 | 122-137 | 70.6 | 4.9 | 0.5 | 0.3 | 76.3 | | | 76.3 | 41.3 | 100+ | | 100+ | | 7.9 | 7.6 |

C L A Y M I N E R A L O G Y

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | | | | | | | | | |
| 81003 | 86-122 | MT 5 | KK 2 | | | | | | | | MT MONTMORT | 1 TRACE |
| 81004 | 122-137 | | | | | | | | | | KK KAOLINIT | 2 SMALL |
| | | | | | | | | | | | | 3 MODERATE |
| | | | | | | | | | | | | 4 ABUNDANT |
| | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## CASTO GRAVELLY SANDY LOAM
S68 Ariz-2-4-1 through 8

Location: Cochise County, Arizona, 11 miles west of south from Fort Huachuca, 2¼ miles south-southeast of Parker Canyon Lodge, approximately 3800 feet southwest of intersection Forest Service Roads 48 and 61, 1700 feet west and 2350 feet south of NE corner Section 29, T23S, R19E. Photo AMS 662 (FS EEX 22-44). Date of Sampling: October 16, 1968.
Description by: Havens and Richardson. Collectors: Nettleton and Brasher.
Classification: Udic Haplustalf, loamy-skeletal, mixed, mesic.
Vegetation: Oak, juniper, grass. Grasses: tanglehead, canebeard grass, blue grama, sprucetop grama, wolftail, curly mesquite, sideoats grama, plains lovegrass, bluestem. Trees: Oak, juniper, guajillo. Climate: Mean annual temperature 56°F. Mean annual precipitation 18-19 inches. Parent Material: Old alluvium from dacite, andesite, quartzite, sandstone and siltstone. Topography: Strongly sloping sides of old terrace remnants. 15 percent slope. Northwest aspect. Elevation: 5600 feet. Drainage: Well drained. Rapid runoff. Soil Moisture: Dry.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-3 cm) |
| A1 | 0 to 1 inch, dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, nonsticky and slightly plastic; many fine and very fine roots; common fine interstitial pores; noneffervescent; slightly acid (pH 6.5); abrupt smooth boundary. |
| B21t (3-13 cm) | 1 to 5 inches, dark grayish brown (10YR 4/2) gravelly heavy clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium angular and subangular blocky structure; hard, friable, sticky and plastic; many fine and very fine roots; common fine interstitial pores; few thin clay films on ped faces and in pores; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B22t (13-28 cm) | 5 to 11 inches, reddish brown (5YR 4/4) gravelly clay, reddish brown (5YR 4/4) moist; moderate medium and coarse angular and subangular blocky structure; very hard, firm, sticky and plastic; common fine and medium roots; few fine tubular pores; common moderately thick clay films on ped faces and in pores; noneffervescent; medium acid (pH 6.0); clear wavy boundary. |
| B23t (28-46 cm) | 11 to 18 inches, reddish brown (5YR 4/4) very gravelly clay, reddish brown (5YR 4/4) moist, with pinkish gray (7.5YR 7/2) weathered rock, brown (7.5YR 5/2) moist; weak medium and coarse subangular blocky structure; very hard, firm, sticky and plastic; common fine and medium roots; few fine tubular pores; common moderately thick clay films on ped faces and in pores; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| B3t (46-61 cm) | 18 to 24 inches, pinkish gray (7.5YR 7/2) weathered rock and reddish brown (5YR 4/4) clay, very gravelly clay, brown (7.5YR 5/2) and reddish brown (5YR 4/4) moist; nearly massive breaking to weak medium subangular blocky structure; very hard, firm, sticky and plastic; few fine and medium roots; few fine tubular pores; common thin clay films on ped faces and in pores; noneffervescent; neutral (pH 6.6); clear wavy boundary. |
| C1 (61-86 cm) | 24-34 inches, pinkish gray (7.5YR 7/2) (80 percent weathered rock) and reddish brown (5YR 4/4) (clay 20 percent), very gravelly sandy clay loam, light brown (7.5YR 6/4) and reddish brown (5YR 4/4) moist; massive; very hard, friable, slightly sticky and plastic; few fine and medium roots; few fine tubular pores; noneffervescent; neutral (pH 6.6); clear wavy boundary. |
| C2ca RSL 681003 (86-122 cm) | 34 to 48 inches, pinkish white (7.5YR 8/2) very gravelly sandy clay loam, light brown (7.5YR 6/4) moist, with common medium distinct reddish brown (5YR 4/4) mottles (this horizon has pocket of mottled pinkish white (7.5YR 8/2) and reddish brown (5YR 5/4) clay loam material in lower part. This pocket is discontinuous; massive; hard, friable, slightly sticky and slightly plastic; few fine and medium roots; strongly effervescent; moderately alkaline (pH 8.2); clear irregular boundary. |
| C3ca RSL 681004 (122-137 cm) | 48 to 54 inches, pinkish white (7.5YR 8/2) very gravelly light sandy clay loam, brown (7.5YR 5/2) moist; massive; hard, friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline (pH 8.0). |

Note: Only 2 horizons sampled: S68 Ariz-2-4-7, S68 Ariz-2-4-8.

CONSECUTIVE PEDON NUMBER C 68139 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CASTO SOIL NO. S68 ARIZ. 2- 5 SAMPLE NO. 81005-81006 E.PIMA-SANTA CRU AREA

SOIL FAMILY: UDIC HAPLUSTALF,LOAMY-SKELETAL,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. CLAY 2- .2U | FINE CLAY LT .2U | CARBONATE 3A1A | INT. .2- .02 | COARSE FRAGMENTS- PCT. OF WHOLE 75- 20 | I 20-5 | II 5-2 | III |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 | | | | | | | | | | | | 1A2A | | | | | |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 81005 | 74-119 | B3TCA | 65.0 | 11.2 | 23.8 | 10.6 | 17.2 | 12.4 | 18.0 | 6.8 | 4.7 | 6.5 | | | | 20.2 | 76A | 54 | 15 | 7 |
| 81006 | 119-142 | C ICA | 69.4 | 10.2 | 20.4 | 12.2 | 20.4 | 14.0 | 16.8 | 6.0 | 4.0 | 6.2 | | | | 17.9 | 69A | 50 | 16 | 3 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A -PERCENT- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B -PERCENT- | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L L 4F1 | I M I T PL 4F2 | EST. 1/3 BAR 4A1F | DRY BAR 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C -PERCENT- | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 -PERCENT- | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | PCT.NO.40 | | GRAMS PER CC | | | | | | | | |
| 81005 | 74-119 | | | TR | | | | | | | | 1.26 | | 0.40 | | | 11.7 | | | |
| 81006 | 119-142 | | | TR | | | | | | | | 1.26 | | 0.48 | | | 11.1 | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4B | MG 5B3A 6D4B | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81005 | 74-119 | 19.5 | 9.1 | 1.9 | 0.3 | 30.8 | | | 30.8 | 24.6 | 100+ | | 100+ | | 8.2 | 7.4 |
| 81006 | 119-142 | 20.0 | 8.7 | 1.8 | 0.2 | 30.7 | | | 30.7 | 22.2 | 100+ | | 100+ | | 8.0 | 7.2 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2F IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2F II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81005 | 74-119 | MT 4 | MI 2 | KK 2 | | | | | | | | |
| 81006 | 119-142 | | | | | | | | | | | |

MT MONTMORT 1 TRACE
MI MICA 2 SMALL
KK KAOLINIT 3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## CASTO GRAVELLY LOAM
S68 Ariz-2-5-1 through 7

Location: Cochise County, Arizona, 8 miles west of south from Fort Huachuca and approximately 1500 feet north-northeast of Parker Canyon Lodge (0.6 mile by road), 100 feet east of Highway 83 at intersection of Highway 83 and old road. Approximately 1150 feet east of SW corner Section 8, T23S, R19E. Photo AMS-663, FS EEX 22-41. Date of Sampling: October 16, 1968.
Description by: Havens, Clemmons and Richardson. Collectors: Nettleton and Brasher.
Classification: Udic Haplustalf, loamy-skeletal, mixed, mesic.
Vegetation: Trees, shrubs and grass. Grass: Sideoats grama, wolftail, blue grama, cane-beard grass, curly mesquite, slender grama, Arizona cottontop, plains lovegrass. Trees: Oak, juniper. Shrubs: Manzanita. Climate: Mean annual temperature 56°F. Mean annual precipitation 18-20 inches. Parent Material: Old alluvium from dacite, quartzite, sandstone and possibly siltstone. Topography: Hilly, dissected old fans. 18 percent slope, south aspect. Elevation: 5600 feet. Drainage: Well drained. Medium runoff. Soil moisture: Dry.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-5 cm) |
| A1 | 0 to 2 inches, dark grayish brown (10YR 4/2) gravelly loam, dark brown (10YR 3/3) moist; weak thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; many fine, very fine and medium roots; common fine interstitial and tubular pores; noneffervescent; medium acid (pH 6.0); abrupt smooth boundary. |
| B1t (5-15 cm) | 2 to 6 inches, brown (7.5YR 5/4) gravelly light sandy clay loam, dark brown (7.5 YR 3/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; many fine, very fine and medium roots; common fine interstitial and tubular pores; few thin clay films on ped faces and in pores; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| B21t (15-33 cm) | 6 to 13 inches, yellowish red (5YR 5/6) and reddish brown (5YR 5/4) gravelly clay, yellowish red (5YR 5/6) and reddish brown (5YR 4/4) moist; moderate medium subangular and angular blocky structure; hard, firm, sticky and plastic; common fine and medium roots; few fine tubular pores; common moderately thick clay films on ped faces and in pores; 40 percent gravel; noneffervescent; slightly acid (pH 6.5); abrupt wavy boundary. |
| B22t (33-74 cm) | 13 to 29 inches, reddish brown (5YR 5/4) and (4/4) very gravelly clay, reddish brown (5YR 4/4) and dark reddish brown (5YR 3/4) moist, with many medium and fine and distinct pink (5YR 7/3) and pinkish gray (7.2) mottles, light reddish brown (5YR 6/3) moist, mottles are from parent rock; weak fine and medium subangular blocky structure; very hard, firm, sticky and plastic; few fine and medium roots; few fine tubular pores; common thin clay films on ped faces and in pores; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B3tca RSL 681005 (74-119 cm) | 29 to 47 inches, reddish brown (5YR 5/3 and 5/4) very cobbly heavy clay loam, reddish brown (5YR 4/3 and 4/4) moist; weak, medium and coarse subangular blocky structure; very hard, friable, sticky and plastic; few fine roots; few fine tubular pores; common thin clay films on ped faces; slightly effervescent in spots; moderately alkaline (pH 8.0); clear wavy boundary. |
| C1ca RSL 681006 (119-142 cm) | 47 to 56 inches, reddish brown (5YR 5/3 and 5/4) very gravelly sandy clay loam, reddish brown (5YR 4/3 and 4/4) moist; massive; hard, friable, sticky and plastic; few thin clay films on rock faces; slightly effervescent in spots; moderately alkaline (pH 8.0); abrupt wavy boundary. |
| C2 (142-157 cm) | 56 to 62 inches, yellowish red (5YR 4/6) and red (2.5YR 4/6) very gravelly clay loam, yellowish red (5YR 3/6) and red (2.5YR 4/6) moist; massive; hard, friable, sticky and plastic; noneffervescent; mildly alkaline (pH 7.5). |

Note: 2 horizons sampled: S68 Ariz-2-5-5
S68 Ariz-2-5-6

CONSECUTIVE PEDON NUMBER C 68151 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CASTO VARIANT SOIL NO. S68 ARIZ. 12-13 SAMPLE NO. 81090-81095 E.PIMA-SANTA CRU AREA

SOIL FAMILY: UDIC HAPLUSTALF LOAMY-SKELETAL,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 PCT. OF LT 75 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 81090 | 0- 10 | A1 | 67.8 | 25.8 | 6.4 | 8.8 | 14.0 | 12.8 | 21.2 | 11.0 | 13.5 | 12.3 | | | | 35.4 | 68A | 52 | 10 | 6 |
| 81091 | 10- 25 | A2 | 63.1 | 30.2 | 6.7 | 8.8 | 13.3 | 12.1 | 20.7 | 8.2 | 12.5 | 17.7 | | | | 31.2 | 60A | 40 | 15 | 5 |
| 81092 | 25- 38 | B1 T | 56.5 | 27.7 | 15.8 | 6.2 | 13.8 | 10.9 | 18.2 | 7.4 | 9.3 | 18.4 | | | | 25.9 | 64A | 26 | 32 | 6 |
| 81093 | 38- 53 | B21T | 44.7 | 15.1 | 40.2 | 8.0 | 14.5 | 7.9 | 9.6 | 4.7 | 5.5 | 9.6 | | | | 14.6 | 57A | 17 | 39 | 1 |
| 81094 | 53- 76 | B22T | 51.3 | 13.0 | 35.7 | 11.5 | 17.3 | 8.9 | 10.5 | 3.1 | 5.9 | 7.1 | | | | 14.0 | 50A | 16 | 33 | 1 |
| | | | | | | | | | | | | | | | | | | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY 1/3 BAR 4A1F | DRY 4A1F | COLE 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 81090 | 0- 10 | 1.41 | 0.080 | | | 0.8 | 0.1 | | | | | 1.13 | 1.15 | 0.53 | | 11.5 | 4.3 | | 0.6 | 0.3 |
| 81091 | 10- 25 | 0.59 | 0.033 | | | 0.7 | TR | | | | | 1.28 | 1.28 | 0.57 | | 13.0 | 3.0 | | | |
| 81092 | 25- 38 | 0.39 | | | | 1.0 | 0.1 | | | | | 1.39 | 1.42 | 0.51 | | 15.0 | 5.5 | | 0.7 | 0.4 |
| 81093 | 38- 53 | 0.59 | | | | 2.1 | 0.2 | | | | | 1.25 | 1.49 | 0.62 | | 30.0 | 14.7 | | 6.0 | 3.6 |
| 81094 | 53- 76 | 0.42 | | | | 1.7 | 0.2 | | | | | | | 0.65 | | | 13.5 | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81090 | 0- 10 | 4.6 | 1.1 | TR | 0.3 | 6.0 | | | 6.0 | 7.8 | 100+ | | 77 | | 6.1 | 5.4 |
| 81091 | 10- 25 | 2.5 | 0.8 | 0.1 | 0.2 | 3.6 | | 0.1 | 3.6 | 4.9 | 100+ | 97 | 73 | | 5.6 | 4.9 |
| 81092 | 25- 38 | 4.2 | 2.1 | 0.1 | 0.2 | 6.6 | | 0.7 | 6.6 | 8.0 | 100+ | 90 | 82 | | 4.9 | 4.2 |
| 81093 | 38- 53 | 8.1 | 7.6 | 0.2 | 0.5 | 16.4 | 7.2 | 1.3 | 23.6 | 19.2 | 69 | 93 | 85 | | 4.8 | 4.2 |
| 81094 | 53- 76 | 8.0 | 7.7 | 0.3 | 0.6 | 16.6 | 6.4 | 1.2 | 23.0 | 20.2 | 72 | 93 | 82 | | 4.8 | 4.3 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 81090 | 0- 10 | MI 3 | KK 3 | MT 2 | | | | | | | |
| 81091 | 10- 25 | MI 3 | KK 3 | | | | | | | | |
| 81092 | 25- 38 | | | | | | | | | | |
| 81093 | 38- 53 | | | | | | | | | | |
| 81094 | 53- 76 | MT 4 | MI 3 | KK 3 | | | | | | | |

MI MICA
KK KAOLINIT
MT MONTMORT

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## CASTO VERY GRAVELLY SANDY LOAM variant 1/
S68 Ariz-12-13-1 through 5

Location: Santa Cruz County, Arizona, approximately 5.5 miles south-southeast of Harshaw, and 1 mile north of Washington Camp in road cut on east side of road from Washington Camp to Mowry-Harshaw. Photo EEX 20-61. Date of Sampling: October 17, 1968.
Description by: Havens and Richardson. Collectors: Nettleton and Brasher.
Classification: Udic Haplustalf, loamy-skeletal, mixed, mesic.
Vegetation: Blue and sideoats grama, deergrass, plains lovegrass, manzanita, oak, juniper, three-awn, little bluestem, hairy grama. Climate: Approximate mean annual precipitation is 18 inches and mean annual temperature is 57°F. Parent Material: Old mixed alluvium including granite, quartzite, rhyolite, dacite and purple siltstone. Topography: High old dissected fan - 36 percent slope. Southwest aspect. Elevation: 5350 feet. Drainage: Moderately well-drained. Rapid runoff. Soil Moisture: Dry.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-10 cm) |
| A1 | 0 to 4 inches, brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) |
| RSL | moist; moderate fine and very fine granular structure; slightly hard, very |
| 681090 | friable, nonsticky and nonplastic; many fine and common medium roots; many fine interstitial pores; 40 percent gravel, 10 percent cobbles; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| A2 | 4 to 10 inches, pinkish gray (7.5YR 7/2) very gravelly sandy loam, brown |
| RSL | (7.5YR 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; |
| 681091 | many fine and common medium roots; many fine interstitial and common fine |
| (10-25 cm) | tubular pores; 50 percent gravel, 10 percent cobbles; noneffervescent; medium acid (pH 6.0); abrupt wavy boundary. |
| B1t | 10 to 15 inches, reddish brown (5YR 5/4) and pink (5YR 7/3) very gravelly |
| RSL | sandy clay loam, yellowish red (5YR 4/6) and reddish brown (5YR 5/4) moist; |
| 681092 | weak medium subangular blocky structure; slightly hard, friable, slightly |
| (25-38 cm) | sticky and slightly plastic; common fine and very fine and few medium roots; common fine and few medium tubular pores; few thin clay films on ped faces; 40 percent gravel, 5 percent cobbles; noneffervescent; very strongly acid (pH 5.0); clear irregular boundary. |
| B21t | 15 to 21 inches, yellowish red (5YR 5/6) and (5/8), and dark red (10R 3/6) |
| RSL | very gravelly clay, light red (2.5YR 6/6), red (2.5YR 5/6) and dark red (10R |
| 681093 | 3/6) moist, with some brownish yellow (10YR 6/6) and white (8/2) weathered gravel |
| (38-53 cm) | that appears to be mottles; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few medium and common fine and very fine roots; few fine interstitial pores; common moderately thick clay films on ped faces; 40 percent gravel, 5 percent cobbles; noneffervescent; very strongly acid (pH 5.0); clear smooth boundary. |
| B22t | 21 to 30 inches, mottled very pale brown (10YR 7/3, yellow (8/6) and red |
| RSL | (10R 4/6) very gravelly clay, brownish yellow (10YR 6/6), pale brown (10YR 6/3) |
| 681094 | and light yellowish brown (10YR 6/4), and red (10R 4/6) moist, mottles are many |
| (53-76 cm) | medium and large and distinct; moderate medium subangular blocky structure; hard, firm sticky and plastic; few medium roots; common very fine and fine pores; common moderately thick clay films on ped faces and in pores; noneffervescent; very strongly acid (pH 5.0); gradual wavy boundary. |
| B23t | 30 to 77 inches, mottled light reddish brown (5YR 6/4), reddish brown (5YR 5/4) |
| (not sampled) | and yellowish red (5/6) very gravelly clay, reddish brown (5YR 4/4) and yellowish |
| (76-196 cm) | red (5YR 4/6) moist; massive; hard, firm, very sticky and very plastic; few fine and very fine roots; few fine interstitial pores; common moderately thick clay films on ped faces and pressure faces; 5 percent stones, 40 percent gravel; noneffervescent; strongly acid (pH 5.5); clear wavy boundary. |
| B3 | 77 to 100 inches plus, light reddish brown (5YR 6/4) and reddish brown (5YR 5/4) |
| (not sampled) | very gravelly clay or sandy clay, yellowish red (5YR 4/6 and 4/8) moist; massive; |
| (196-254 cm) | hard, firm, sticky and plastic; few very fine roots; common interstitial pores; few thin and moderately thick clay films on ped faces; noneffervescent; medium acid (pH 6.0). |

Note: The first 5 horizons were sampled for characterization.

1/ The B2t horizon is a very gravelly clay while the Casto Bt is a gravelly clay loam or gravelly sandy clay loam.

CONSECUTIVE PEDON NUMBER C 68137 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CASTO TAXADJUNCT SOIL NO. S68 ARIZ. 2- 3 SAMPLE NO. 8 995-81002 E.PIMA-SANTA CRU AREA

SOIL FAMILY: UDIC HAPLUSTALF,FINE-LOAMY,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | INT. COARSE FRAGMENTS .2- .02 | PCT. OF WHOLE I | 75- II | 20-5 III | 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 8 995 | 0- 3 | A1 | 72.1 | 14.4 | 13.5 | 4.4 | 13.3 | 13.4 | 27.9 | 13.1 | 7.6 | 6.8 | | | | 36.6 | 72A | 49 | 15 | 8 |
| 8 996 | 3- 13 | B21T | 62.4 | 15.8 | 21.8 | 4.2 | 12.4 | 12.1 | 23.4 | 10.3 | 7.4 | 8.4 | | | | 30.6 | 20* | 13 | 3Z | N |
| 8 997 | 13- 28 | B22T | 51.5 | 14.8 | 33.7 | 6.2 | 13.6 | 9.5 | 14.6 | 7.6 | 5.8 | 9.0 | | | | 21.6 | 23* | 15 | 3 | 1 |
| 8 998 | 28- 41 | B23T | 56.0 | 15.2 | 28.8 | 8.0 | 16.0 | 9.8 | 14.6 | 7.6 | 5.6 | 9.6 | | | | 21.1 | 38* | 27 | 6 | 2 |
| 8 999 | 41- 56 | B3 T | 59.8 | 18.5 | 21.7 | 8.5 | 15.7 | 9.8 | 16.0 | 9.8 | 6.3 | 12.2 | | | | 25.4 | 36* | 26 | 5 | 1 |
| 81000 | 56- 71 | C 1 | 58.8 | 24.3 | 16.9 | 8.4 | 13.2 | 7.1 | 16.3 | 13.8 | 9.2 | 15.1 | | | | 33.4 | 70* | 35 | 26 | 7 |
| 81001 | 71-114 | C 2 | 61.0 | 25.3 | 13.7 | 12.5 | 11.2 | 6.4 | 17.0 | 13.9 | 10.5 | 14.8 | | | | 35.5 | 70A | 24 | 39 | 7 |
| 81002 | 114-152 | C 3 | 57.4 | 27.1 | 15.5 | 11.6 | 11.1 | 5.9 | 15.7 | 13.1 | 8.4 | 18.7 | | | | 31.7 | 66A | 54 | 8 | 4 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 | 2-20 | SESQUIOXIDES DI-CIT EXT FE 6C2B | AL 6G7A | PYROP EXT FE 6C5A | AL 6G5A | ATTERBERG L L 4F1 | P L 4F2 | I 1/3 BAR 4A1F | M T EST. 1/3 BAR 4A1F | DRY 4A1H | BULK DENSITY 3B2 | CM | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | -----PERCENT------- | | | | PCT. | NO.40 | GRAMS PER CC | | | | | ----PERCENT--- | | | -PERCENT- | |
| 8 995 | 0- 3 | 1.27 | 0.094 | | | 0.8 | 0.1 | | | NP | NP | 1.25 | | | 0.43 | | | | 8.5 | | |
| 8 996 | 3- 13 | 1.24 | 0.091 | | | 0.9 | 0.1 | | | 39 | 21 | | 1.34 | 1.58 | 0.89 | | 25.3 | 11.6 | 5.6 | 4.9 | |
| 8 997 | 13- 28 | 0.47 | 0.030 | | | 1.1 | 0.2 | | | | | | 1.30 | 1.57 | 0.87 | | 31.2 | 16.8 | 6.5 | 5.6 | |
| 8 998 | 28- 41 | 0.36 | | | | 0.9 | 0.2 | | | 42 | 23 | | 1.23 | 1.53 | 0.78 | | 33.4 | 15.7 | 7.5 | 5.7 | |
| 8 999 | 41- 56 | 0.20 | | | | 0.9 | 0.1 | | | | | | 1.21 | 1.37 | 0.80 | | 29.9 | 13.3 | 4.2 | 3.3 | |
| 81000 | 56- 71 | | | | | 0.7 | 0.1 | | | 41 | 24 | | 1.21 | 1.35 | 0.48 | | 32.8 | 13.0 | 3.7 | 1.7 | |
| 81001 | 71-114 | | | | 2 | 0.6 | TR | | | | | | 1.26 | 1.30 | 0.46 | | 28.4 | 12.1 | 1.0 | 0.5 | |
| 81002 | 114-152 | | | | 5 | 0.5 | TR | | | 42 | 33 | 1.26 | | | 0.50 | | | 14.7 | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4B | MG 5B3A 6O4B | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA- CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 8 995 | 0- 3 | 19.1 | 4.9 | 0.1 | 0.5 | 24.6 | | | 24.6 | 18.4 | 100+ | | 100+ | | 6.2 | 5.8 |
| 8 996 | 3- 13 | 19.6 | 4.2 | 0.2 | 0.5 | 24.5 | | | 24.5 | 26.5 | 100+ | | 92 | | 6.1 | 5.6 |
| 8 997 | 13- 28 | 41.6 | 10.5 | 0.4 | 0.5 | 53.0 | | 0.2 | 53.0 | 39.0 | 100+ | 100+ | 100+ | | 5.4 | 5.0 |
| 8 998 | 28- 41 | 39.2 | 9.6 | 0.5 | 0.4 | 49.7 | | 0.5 | 49.7 | 36.9 | 100+ | 99 | 100+ | | 5.4 | 4.9 |
| 8 999 | 41- 56 | 37.8 | 8.2 | 0.5 | 0.3 | 46.8 | | | 46.8 | 36.3 | 100+ | | 100+ | | 5.8 | 5.2 |
| 81000 | 56- 71 | 38.8 | 8.7 | 0.8 | 0.3 | 48.6 | | | 48.6 | 37.8 | 100+ | | 100+ | | 6.3 | 5.6 |
| 81001 | 71-114 | 53.3 | 4.1 | 0.9 | 0.3 | 58.6 | | | 58.6 | 36.1 | 100+ | | 100+ | | 7.8 | 7.3 |
| 81002 | 114-152 | 45.6 | 4.8 | 1.0 | 0.3 | 51.7 | | | 51.7 | 41.9 | 100+ | | 100+ | | 7.8 | 7.4 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM MINERAL X RAY 7A2E I | 7A2E II | 7A2E III | CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 995 | 0- 3 | MT 4 | MI 1 | KK 1 | | | | | | | MT MONTMORT | 1 TRACE |
| 8 996 | 3- 13 | MT 4 | MI 1 | KK 1 | | | | | | | MI MICA | 2 SMALL |
| 8 997 | 13- 28 | | | | | | | | | | KK KAOLINIT | 3 MODERATE |
| 8 998 | 28- 41 | MT 4 | | | | | | | | | | 4 ABUNDANT |
| 8 999 | 41- 56 | | | | | | | | | | | 5 DOMINANT |
| 81000 | 56- 71 | MT 5 | | | | | | | | | | 6 INDETER. |
| 81001 | 71-114 | | | | | | | | | | | |
| 81002 | 114-152 | MT 5 | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## CASTO VERY GRAVELLY SANDY CLAY LOAM (taxadjunct) 1/

S68 Ariz-2-3-1 through 8

Location: Cochise County, Arizona, 8.5 miles southwest of Fort Huachuca, 1.1 mile northnortheast of road from Parker Canyon on Highway 83 on top of ridge above curve in road. Approximately 500 feet south and 700 feet east of W¼ corner Section 8, T23S, R19E. Photo AMS 663 (FS 22-41). Date of Sampling: October 16, 1968.
Description by: Havens, Clemmons and Richardson. Collectors: Nettleton and Brasher.
Classification: Udic Haplustalf, fine-loamy, mixed, mesic.
Vegetation: Juniper, oak, manzanita and grasses. Grasses: Plains lovegrass, blue grama, tanglehead, three-awn, curly mesquite, sideoats grama, wolftail, Arizona cottontop, bluestem. Climate: Mean annual temperature 56°F. Mean annual precipitation 18-20 inches. Parent Material: Old alluvium from quartzite, sandstone, dacite and tuffs. Topography: Steep sided, dissected old alluvial fans - 20 percent slope, northwest aspect. Elevation: 5,600 feet. Drainage: Well drained. Medium runoff. Soil moisture: Dry.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-3 cm) |
| A1 | 0 to 1 inch, dark grayish brown (10YR 4/2) very gravelly light sandy clay loam, |
| RSL | very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; |
| 68995 | slightly hard, friable, slightly sticky and slightly plastic; many fine and medium roots; common fine interstitial and tubular pores; noneffervescent; mildly alkaline (pH 7.8); abrupt smooth boundary. |
| B21t | 1 to 5 inches, dark grayish brown (10YR 4/2) gravelly heavy clay loam, very dark |
| RSL | grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, |
| 68996 | friable, sticky and plastic; few fine tubular pores; many very fine, fine and |
| (3-13 cm) | medium roots; few thin clay films on ped faces and in pores; noneffervescent; mildly alkaline (pH 7.6); clear smooth boundary. |
| B22t | 5 to 11 inches, reddish brown (5YR 4/4) gravelly clay, reddish brown (5YR 4/4) |
| RSL | moist; moderate medium and coarse subangular and angular blocky structure; very |
| 68997 | hard, firm, sticky and plastic; common fine and medium roots; few fine tubular |
| (13-28 cm) | pores; common moderately thick clay films on ped faces and in pores; 40 percent gravel; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| B23t | 11 to 16 inches, reddish brown (5YR 4/3) very gravelly clay, reddish brown (5YR |
| RSL | 4/3) moist, with many medium and coarse distinct pinkish gray (7.5YR 7/2) mottles, |
| 68998 | brown (7.5YR 5/2) moist, mottles appear to be weathered rock; moderate medium and |
| (28-41 cm) | coarse subangular and angular blocky structure; very hard, firm, sticky and plastic; common fine and medium roots; few fine tubular pores; common moderately thick clay films on ped faces and in pores; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| B3t | 16 to 22 inches, pinkish gray (7.5YR 7/2) weathered rock and reddish brown (5YR |
| RSL | 4/4) clay, very gravelly clay, brown (7.5YR 5/2) and reddish brown (5YR 4/4) |
| 68999 | moist; nearly massive breaking to moderate fine and medium subangular blocky struc- |
| (41-56 cm) | ture; very hard, firm, sticky and plastic; few fine and medium roots; common moderately thick clay films on ped faces and in pores; noneffervescent; mildly alkaline (pH 7.4); clear wavy boundary. |
| C1 | 22 to 28 inches, pinkish gray (7.5YR 7/2) rock, and 20 percent reddish brown (5YR 4/4) |
| RSL | very gravelly clay, light brown (7.5YR 6/4) and reddish brown (5YR 4/4) moist; |
| 681000 | massive; very hard, firm, sticky and plastic; few fine roots; common moderately |
| (56-71 cm) | thick clay films on surface of clay, slightly effervescent in spots; mildly alkaline (pH 7.6); clear irregular boundary. |
| C2 (71- | 28 to 45 inches, pinkish white (7.5YR 8/2) very gravelly sandy loam, brown (7.5YR |
| RSL 114 cm) | 5/2) moist; massive; hard, friable, slightly sticky and slightly plastic; slightly |
| 681001 | effervescent; moderately alkaline (pH 8.0); diffuse wavy boundary. |
| C3 | 45 to 60 inches, pinkish white (7.5YR 8/2) very gravelly sandy loam, brown (7.5YR |
| RSL | 5/2) moist; massive; hard, friable, slightly sticky and slightly plastic; strongly |
| 681002 | effervescent; moderately alkaline (pH 8.2). |
| (114-152 cm) | |

1/ The Casto series is in a loamy-skeletal, mixed, mesic family of Udic Haplustalfs. This pedon has less than 35 percent coarse fragments by volume.

CONSECUTIVE PEDON NUMBER C 68145 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MARTINEZ SOIL NO. S68 ARIZ. 2- 1 SAMPLE NO. 81042-81051 E.PIMA-SANTA CRU AREA

SOIL FAMILY: UDIC HAPLUSTALF,VERY-FINE,KAOLINITIC,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 SAND | .05- .002 SILT | LT .002 CLAY | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A.02 | 1A2A INT. II .2- 0F WHOLE SOIL | COARSE FRAGMENTS- PCT. I 75- 20 PCT. | II 20-5 OF | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 81042 | 0- 18 | A1 | 44.2 | 35.6 | 20.2 | 8.5 | 6.2 | 5.0 | 14.2 | 10.3 | 20.9 | 14.7 | | | | 39.4 | 16A | 7 | 7 | 2 |
| 81043 | 18- 28 | B11T | 37.1 | 33.3 | 29.6 | 4.7 | 4.9 | 4.3 | 13.5 | 9.7 | 19.7 | 13.6 | | | | 37.5 | 25A | 19 | 2 | 4 |
| 81044 | 28- 38 | B12T | 34.3 | 27.9 | 37.8 | 9.7 | 4.2 | 2.9 | 9.6 | 7.9 | 14.4 | 13.5 | | | | 28.2 | 24A | 17 | 7Z | N |
| 81045 | 38- 58 | B21T | 9.6 | 10.7 | 79.7 | 1.3 | 1.2 | 1.0 | 3.3 | 2.8 | 4.8 | 5.9 | | | | 9.6 | 6A | -- | 5 | 1 |
| 81046 | 58- 74 | B22T | 10.7 | 8.5 | 80.8 | 1.6 | 1.4 | 1.2 | 3.4 | 3.1 | 3.4 | 5.1 | | | | 8.7 | 7A | -- | 7Z | N |
| 81047 | 74- 89 | B23T | 22.8 | 11.8 | 65.4 | 4.6 | 3.9 | 3.2 | 6.4 | 4.7 | 5.7 | 6.1 | | | | 14.3 | 10A | -- | 10Z | N |
| 81048 | 89-112 | B31T | 43.8 | 12.0 | 44.2 | 12.5 | 12.0 | 5.8 | 8.5 | 5.0 | 4.6 | 7.4 | | | | 14.2 | 22A | 9 | 13Z | N |
| 81049 | 112-132 | B32T | 51.3 | 9.4 | 39.3 | 18.7 | 14.2 | 6.6 | 7.8 | 4.0 | 3.6 | 5.8 | | | | 11.7 | 38A | 23 | 15Z | N |
| 81050 | 132-170 | B33T | 51.9 | 10.2 | 37.9 | 12.9 | 13.5 | 8.5 | 11.7 | 5.3 | 4.0 | 6.2 | | | | 15.3 | 50A | 40 | 10Z | N |
| 81051 1/ | 0- 38 | | 72.5 | 19.5 | 8.0 | 17.3 | 19.5 | 10.5 | 17.2 | 8.0 | 13.4 | 6.1 | | | | 30.0 | 7A | -- | 7Z | N |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A -PERCENT- | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A -PERCENT- | EXT AL 6G5A | ATTERBERG L I M I T LL 4F1 | EST. PL 4F2 | BULK DENSITY 1/3 BAR 4A1F | DRY BAR 4A1F | DRY 15 BAR 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 -PERCENT- | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PCT.NO.40 | | | | | | GRAMS PER CC | | | | -PERCENT- | | | -PERCENT- | |
| 81042 | 0- 18 | 1.36 | 0.115 | | | 2.3 | 0.1 | | | 26 | 18 | | 1.36 | 1.42 | 0.91 | | 18.4 | 8.1 | 1.4 | 1.3 |
| 81043 | 18- 28 | 1.05 | 0.101 | | | 2.2 | 0.2 | | | | | | 1.35 | 1.41 | 0.86 | | 20.3 | 9.7 | 1.5 | 1.2 |
| 81044 | 28- 38 | 0.85 | 0.080 | | | 2.4 | 0.3 | | | | | | 1.41 | 1.46 | 0.86 | | 22.4 | 12.8 | 1.2 | 1.0 |
| 81045 | 38- 58 | 0.74 | 0.068 | | | 2.5 | 0.3 | | | 60 | 34 | | 1.26 | 1.54 | 0.97 | | 37.9 | 26.1 | 6.9 | 6.7 |
| 81046 | 58- 74 | 0.55 | | TR | | 2.4 | 0.3 | | | | | | 1.26 | 1.58 | 0.96 | | 37.7 | 27.6 | 7.8 | 7.5 |
| 81047 | 74- 89 | 0.23 | | TR | | 1.9 | 0.2 | | | 61 | 28 | | 1.28 | 1.62 | 0.95 | | 36.6 | 23.3 | 8.2 | 7.7 |
| 81048 | 89-112 | 0.16 | | TR | | 1.1 | 0.1 | | | | | | 1.49 | 1.66 | 0.86 | | 25.5 | 16.1 | 3.7 | 3.1 |
| 81049 | 112-132 | | | 1 | | 0.9 | TR | | | | | | 1.24 | 1.38 | 0.78 | | 34.4 | 14.4 | 3.6 | 2.8 |
| 81050 | 132-170 | | | 2 | | 0.9 | 0.1 | | | 44 | 21 | | 1.18 | 1.32 | 0.69 | | 36.9 | 14.2 | 3.8 | 2.6 |
| 81051 | 0- 38 | 1.19 | 0.105 | | | | | | | | | 1.37 | | | 0.96 | | | 9.7 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA- CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81042 | 0- 18 | 5.9 | 2.0 | 0.1 | 0.7 | 8.7 | 4.2 | | 12.9 | 11.2 | 67 | | 78 | | 6.1 | 5.3 |
| 81043 | 18- 28 | 6.0 | 3.6 | 0.1 | 0.6 | 10.3 | 4.3 | | 14.6 | 12.5 | 71 | | 82 | | 6.2 | 5.2 |
| 81044 | 28- 38 | 7.7 | 3.4 | 0.2 | 0.6 | 11.9 | 4.3 | | 16.2 | 15.6 | 73 | | 76 | | 6.4 | 5.4 |
| 81045 | 38- 58 | 15.3 | 8.7 | 1.2 | 0.9 | 26.1 | | | 26.1 | 29.0 | 100+ | | 90 | | 6.8 | 6.0 |
| 81046 | 58- 74 | 17.4 | 10.0 | 1.9 | 0.9 | 30.2 | | | 30.2 | 31.2 | 100+ | | 97 | | 7.4 | 6.8 |
| 81047 | 74- 89 | 17.0 | 15.2 | 2.2 | 0.7 | 35.1 | | | 35.1 | 29.5 | 100+ | | 100+ | | 8.0 | 7.5 |
| 81048 | 89-112 | 19.5 | 10.8 | 2.2 | 0.6 | 33.1 | | | 33.1 | 25.0 | 100+ | | 100+ | | 8.2 | 7.4 |
| 81049 | 112-132 | 19.9 | 11.5 | 2.2 | 0.5 | 34.1 | | | 34.1 | 26.2 | 100+ | | 100+ | | 8.2 | 7.4 |
| 81050 | 132-170 | 20.7 | 10.3 | 2.0 | 0.5 | 33.5 | | | 33.5 | 22.9 | 100+ | | 100+ | | 8.0 | 7.4 |
| 81051 | 0- 38 | | | | | | | | | | | | | | | |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 -PERCENT- | L.T. 0.0002 MM X RAY I 7A3 | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 81042 | 0- 18 | | | | | | | | | | 1 TRACE |
| 81043 | 18- 28 | | | | | | | | | KK KAOLINIT | 2 SMALL |
| 81044 | 28- 38 | | | | | | | | | MT MONTMORT | 3 MODERATE |
| 81045 | 38- 58 | | | | | | | | | MI MICA | 4 ABUNDANT |
| 81046 | 58- 74 | | | | | | | | | | 5 DOMINANT |
| 81047 | 74- 89 | KK 4 | MT 3 | MI 3 | | | | | | | 6 INDETER. |
| 81048 | 89-112 | | | | | | | | | | |
| 81049 | 112-132 | | | | | | | | | | |
| 81050 | 132-170 | MT 4 | MI 4 | KK 2 | | | | | | | |
| 81051 | 0- 38 | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
1/= Composite from 10 pedons.

## MARTINEZ GRAVELLY LOAM
S68 Ariz-2-1-1 through 9

Location: Cochise County, Arizona, about 12 miles W of south from Fort Huachuca and approximately 3 miles south of Parker Canyon Lodge. 1.3 miles southwest of intersection of Forest Service roads 48 and 61, 150 feet east of road. Approximately 1000 feet east and 2000 feet south of NW corner Section 32, T23S, R19E. Photo 692. FS 22-46. Date of Sampling: October 15, 1968.
Description by: Clemmons and Havens. Collectors: Nettleton and Brasher.
Classification: Udic Haplustalf, very-fine, kaolinitic, mesic.
Vegetation: Grassland--plains lovegrass, canebeard grass, New Mexico needle grama, three-awn, blue grama. Climate: Mean annual temperature approximately 57°F. Mean annual precipitation 16-18 inches. Parent Material: Old alluvium from dacite, andesite, rhyolite, quartzite and shale (siltstone). Topography: Nearly level to gently sloping broad tops of old terrace remnants. 1 to 3 percent slope. Southwest aspect. Elevation: 5425 feet. Drainage: Well drained, but with slow to very slow permeability. Medium runoff. Soil Moisture: Slightly moist.
Remarks: This was paired with S68 Ariz-2-2-1 through 7.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-18 cm) |
| A1 | 0 to 7 inches, brown (10YR 5/3) gravelly heavy loam, dark brown (10YR 3/3) moist; weak medium |
| RSL | platy structure in upper part, moderate at 2-5"; slightly hard, friable, slightly sticky and |
| 681042 | slightly plastic; many fine and medium roots; common very fine, fine and medium tubular pores; |
| | noneffervescent; neutral (pH 6.8); clear wavy boundary. |
| B11t | 7 to 11 inches, dark brown (7.5YR 4/4) gravelly light clay loam, dark brown (7.5YR 3/4) moist; |
| RSL | weak fine and medium subangular blocky structure; slightly hard, friable, sticky and slightly |
| 681043 | plastic; common very fine and fine roots; common very fine, fine and medium tubular pores; few |
| (18-28 cm) | thin clay films on ped faces; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B12t | 11 to 15 inches, brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; moderate fine and |
| RSL | medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and |
| 681044 | fine roots; few fine and medium tubular pores; 10 percent gravel; common thin clay films on ped faces |
| (28-38 cm) | and in pores; noneffervescent; neutral (pH 7.0); abrupt wavy boundary. |
| B21t | 15 to 23 inches, brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; strong medium and coarse |
| RSL | prismatic structure; hard, firm, sticky and very plastic; common very fine and fine roots; |
| 681045 | common very fine tubular pores; many moderately thick clay films on ped faces and common pres- |
| (38-58 cm) | sure faces; few fine gravel; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| B22t | 23 to 29 inches, yellowish brown (10YR 5/6) clay, dark yellowish brown (10YR 4/4) moist; moder- |
| RSL | ate coarse angular and subangular blocky structure; very hard, firm, sticky and very plastic; |
| 681046 | few very fine roots; many moderately thick clay films on ped faces and many pressure faces; |
| (58-74 cm) | common medium slickensides; few fine gravel; noneffervescent; neutral (pH 7.0); clear wavy |
| | boundary. |
| B23t | 29 to 35 inches, yellowish brown (10YR 5/6) clay, dark yellowish brown (10YR 4/4) moist; mod- |
| RSL | erate medium and coarse angular and subangular blocky structure; very hard, firm, sticky and |
| 681047 | very plastic; few very fine roots; few fine tubular pores; common moderately thick clay films |
| (74-89 cm) | on ped faces; noneffervescent; few fine filaments of lime; mildly alkaline (pH 7.8); gradual |
| | irregular boundary. |
| B31t | 35 to 44 inches, reddish brown (2.5YR 5/4) gravelly or very gravelly clay, reddish brown (2.5 |
| RSL | YR 5/4) moist, with tongues of 10YR soil material from horizon above; moderate medium subangu- |
| 681048 | lar blocky structure; hard, friable, sticky and plastic; few very fine roots; few fine tubular |
| (89-112 cm) | pores; common thin clay films on ped faces; slightly effervescent in spots and under gravel; |
| | moderately alkaline (pH 8.0); gradual wavy boundary. |
| B32t | 44 to 52 inches, mottled reddish brown (2.5YR 5/4), reddish yellow (7.5YR 6/6), light yellow- |
| RSL | ish brown (10YR 6/4) and yellowish brown (10YR 5/6) very gravelly clay or very gravelly clay |
| 681049 | loam, reddish brown (2.5YR 5/4), strong brown (7.5YR 5/6), yellowish brown (10YR 5/4) and dark |
| (112-132 cm) | yellowish brown (10YR 4/6) moist; moderate medium subangular blocky structure; hard, friable, |
| | sticky and plastic; few fine tubular pores; common thin clay films on ped faces; slightly |
| | effervescent in spots and under gravel; moderately alkaline (pH 8.0); gradual wavy boundary. |
| B33t | 52 to 67 inches, mottled reddish brown (2.5YR 5/4), reddish yellow (7.5YR 6/6), light yellow- |
| RSL | ish brown (10YR 6/4) and yellowish brown (10YR 5/6) gravelly heavy clay loam, reddish brown |
| 681050 | (2.5YR 5/4), strong brown (7.5YR 5/6), yellowish brown (10YR 5/4) and dark yellowish brown |
| (132-170 cm) | (10YR 4/6) moist; massive; hard, friable, sticky and plastic; few fine tubular pores; few |
| | thin clay films on ped faces and in pores; slightly effervescent in spots and under gravel; |
| | moderately alkaline (pH 8.0). |
| | (0-38 cm) |
| Composite A | 0 to 15 inch horizon sampled from 10 pedons selected at 10-foot intervals along a 100-foot, |
| RSL | N.S. transect centered at the backhoe pit. |
| 681051 | (0-38 cm) |

CONSECUTIVE PEDON NUMBER C 68146 . C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MARTINEZ SOIL NO. S68 ARIZ. 2- 2 SAMPLE NO. 81052-81059 E.PIMA-SANTA CRU AREA

SOIL FAMILY: UDIC HAPLUSTALF,VERY-FINE,KAOLINITIC,MESIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II .2- OF WHOLE SOIL | COARSE FRAGMENTS I 75-20 PCT. | II 20-5 OF 20 PCT. | III 5-2 OF LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 81052 | 0- 3 | A11 | 57.5 | 28.6 | 13.9 | 18.4 | 10.7 | 6.1 | 13.7 | 8.6 | 18.4 | 10.2 | | | | 34.7 | 9A | -- | 9Z | N |
| 81053 | 3- 15 | A12 | 39.3 | 31.5 | 29.2 | 4.9 | 5.5 | 5.2 | 14.1 | 9.6 | 17.8 | 13.7 | | | | 35.7 | 12A | 10 | 2Z | N |
| 81054 | 15- 25 | B2 T | 26.5 | 19.7 | 53.8 | 3.8 | 4.4 | 3.7 | 8.8 | 5.8 | 10.3 | 9.4 | | | | 21.2 | 2A | -- | 2Z | N |
| 81055 | 25- 46 | B21T | 10.3 | 7.7 | 82.0 | 1.4 | 1.5 | 1.4 | 3.5 | 2.5 | 3.6 | 4.1 | | | | 8.0 | --A | -- | -- | -- |
| 81056 | 46- 66 | B22T | 16.3 | 8.7 | 75.0 | 2.2 | 2.9 | 2.7 | 5.4 | 3.1 | 5.5 | 3.2 | | | | 11.6 | 1A | -- | 1Z | N |
| 81057 | 66- 89 | B23T | 24.9 | 9.1 | 66.0 | 1.8 | 5.6 | 5.2 | 8.5 | 3.8 | 3.6 | 5.5 | | | | 11.7 | 6A | -- | 6Z | N |
| 81058 | 89-117 | B3 T | 49.6 | 11.6 | 38.8 | 12.8 | 16.1 | 7.8 | 9.5 | 3.4 | 4.8 | 6.8 | | | | 12.9 | 18A | 14 | 4Z | N |
| 81059 | 1/ 0- 38 | | | | | | | | | | | | | | | | 7A | -- | 2 | 5 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT.NO.40 | | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 81052 | 0- 3 | 1.18 | 0.096 | | | 2.3 | 0.2 | | | 22 | 18 | 1.35 | | | 0.95 | | | 6.5 | | |
| 81053 | 3- 15 | 1.05 | 0.097 | | | 2.3 | 0.2 | | | 27 | 15 | | 1.41 | 1.49 | 0.93 | | 19.7 | 9.0 | 1.9 | 1.7 |
| 81054 | 15- 25 | 1.05 | 0.098 | | | 2.1 | 0.3 | | | | | 1.35 | | | 0.99 | | | 16.6 | | |
| 81055 | 25- 46 | 0.79 | 0.081 | | | 2.8 | 0.4 | | | 58 | 31 | | 1.28 | 1.55 | 1.00 | | 35.4 | 25.3 | 6.6 | 6.6 |
| 81056 | 46- 66 | 0.39 | | | | 2.6 | 0.3 | | | | | | 1.33 | 1.61 | 0.99 | | 33.4 | 24.9 | 6.6 | 6.5 |
| 81057 | 66- 89 | 0.21 | | | | 2.3 | 0.3 | | | | | 1.35 | | | 0.97 | | | 23.3 | | |
| 81058 | 89-117 | | | | | 1.5 | 0.2 | | | 40 | 22 | | 1.40 | 1.55 | 0.89 | | 30.0 | 14.5 | 3.5 | 3.1 |
| 81059 | 0- 38 | 1.00 | 0.090 | | | | | | | | | 1.35 | | | 0.96 | | | 8.3 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACIDITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | CEC NH4-OAC 5A6A | BASE SATURATION SUM+ ACIDITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81052 | 0- 3 | 2.6 | 1.2 | TR | 0.6 | 4.4 | 7.5 | 0.5 | 11.9 | 9.8 | 37 | 90 | 45 | | 5.0 | 4.2 |
| 81053 | 3- 15 | 4.9 | 2.7 | 0.1 | 0.7 | 8.4 | 5.5 | 0.2 | 13.9 | 12.8 | 60 | 98 | 66 | | 5.5 | 4.7 |
| 81054 | 15- 25 | 10.6 | 5.4 | 0.4 | 0.7 | 17.1 | 5.5 | | 22.6 | 19.9 | 76 | | 86 | | 6.1 | 5.5 |
| 81055 | 25- 46 | 15.4 | 15.0 | 1.2 | 1.1 | 32.7 | | | 32.7 | 28.7 | 100+ | | 100+ | | 7.1 | 6.8 |
| 81056 | 46- 66 | 17.8 | 14.4 | 1.8 | 0.9 | 34.9 | | | 34.9 | 27.5 | 100+ | | 100+ | | 7.8 | 7.5 |
| 81057 | 66- 89 | 18.6 | 11.1 | 1.9 | 0.9 | 32.5 | | | 32.5 | 26.7 | 100+ | | 100+ | | 8.0 | 7.5 |
| 81058 | 89-117 | 15.2 | 8.8 | 1.7 | 0.5 | 26.2 | | | 26.2 | 21.3 | 100+ | | 100+ | | 8.1 | 7.2 |
| 81059 | 0- 38 | | | | | | | | | | | | | | | |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | L.T. 0.0002 MM X RAY 7A3 | 7A2E I | 7A2E II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|
| 81052 | 0- 3 | MI 3 | KK 3 | MT 1 | | | | | | |
| 81053 | 3- 15 | MI 3 | KK 3 | MT 1 | | | | | | |
| 81054 | 15- 25 | | | | | | | | | |
| 81055 | 25- 46 | KK 4 | MI 3 | MT 1 | | | | | | |
| 81056 | 46- 66 | | | | | | | | | |
| 81057 | 66- 89 | | | | | | | | | |
| 81058 | 89-117 | KK 4 | MI 3 | MT 1 | | | | | | |
| 81059 | 0- 38 | | | | | | | | | |

MINERAL CODE: MI MICA, KK KAOLINIT, MT MONTMORT

RELATIVE AMOUNT: 1 TRACE, 2 SMALL, 3 MODERATE, 4 ABUNDANT, 5 DOMINANT, 6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
1/= Composite from 10 pedons.

## MARTINEZ GRAVELLY LOAM
S68 Ariz-2-2-1 through 7

Location: Cochise County, Arizona, 13.5 miles southwest of Fort Huachuca and approximately 5 miles south-southeast of Parker Canyon Lodge. 1.3 miles SW of intersection of Forest Service roads 48 and 227 and 100 feet north of road 227. Approximately 1600 feet west and 350 feet south of NE corner Section 9, T24S, R19E. Photo AMS 692, F.S. EEX 20-169.
Date of Sampling: October 15, 1968.
Description by: Clemmons and Havens. Collectors: Nettleton and Brasher.
Classification: Udic Haplustalf, very-fine, kaolinitic, mesic.
Vegetation: Grassland - blue grama, wolftail, three-awn, plains lovegrass, New Mexico needlegrass, purple grama. Climate: Warm semiarid. Mean annual temperature approximately 57°F. Mean annual precipitation 16-18 inches. Parent Material: Old alluvium from dacite, sandstone, quartzite and possibly siltstone. Topography: Nearly level to gently sloping broad top of old terrace or fan remnant. Slope, 2 percent southwest aspect. Elevation: 5,300 feet. Drainage: Well drained, but with slow to very slow permeability. Medium runoff. Soil Moisture: Slightly moist.
Remarks: This site was paired with S68 Ariz-2-1-1 through 9.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-3 cm) |
| A11 RSL 681052 | 0 to 1 inch, brown (10YR 5/3) gravelly loam, dark yellowish brown (10YR 3/4) moist; weak thick platy breaking to moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; common fine interstitial and tubular pores; noneffervescent; neutral (pH 7.0); abrupt smooth boundary. |
| A12 RSL 681053 (3-15 cm) | 1 to 6 inches, brown (7.5YR 5/4) clay loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine and very fine roots; common fine tubular pores; noneffervescent; neutral (pH 7.2); clear smooth boundary. |
| B1t RSL 681054 (15-25 cm) | 6 to 10 inches, dark brown (7.5YR 4/4) clay, dark brown (7.5YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; many fine and very fine roots; few fine and medium tubular pores; common thin clay films on ped faces and in pores; noneffervescent; neutral (pH 7.2); clear smooth boundary. |
| B21t RSL 1055 (25-46 cm) | 10 to 18 inches, dark yellowish brown (10YR 4/4) clay, dark yellowish brown (10YR 3/4) moist; moderate medium and coarse prismatic breaking to strong angular and subangular blocky structure; hard, friable, sticky and very plastic; common fine and very fine roots; few fine tubular pores; many moderately thick clay films on ped faces and in pores; common medium slickensides in lower part; noneffervescent; mildly alkaline (pH 7.4) gradual smooth boundary. |
| B22t RSL 1056 (46-66 cm) | 18 to 26 inches, yellowish brown (10YR 5/6) clay, yellowish brown (10YR 5/6) moist; moderate medium and coarse subangular and angular blocky structure; very hard, firm, sticky and very plastic; few fine and very fine roots; few fine tubular pores; many moderately thick clay films on ped faces and in pores; many medium and large slickensides; noneffervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| B23t RSL 1057 (66-89 cm) | 26 to 35 inches, yellowish brown (10YR 5/6) clay, yellowish brown (10YR 5/6) moist, with few fine distinct yellowish red (5YR 4/6) mottles, yellowish red (5YR 4/6) moist; moderate medium and coarse subangular and angular blocky structure; very hard, firm, sticky and very plastic; few fine roots; few fine tubular pores; common moderately thick clay films on ped faces and in pores; common pressure faces; many medium and large slickensides; noneffervescent; moderately alkaline (pH 8.0); clear irregular boundary. |
| B3t RSL 1058 (89-117 cm) | 35 to 46 inches, mottled yellowish brown (10YR 5/6), red (2.5YR 4/8)and brownish yellow (10YR 6/6) gravelly clay, yellowish brown (10YR 5/6), red (2.5YR 4/8) and brownish yellow (10YR 6/6) moist; mottles are many medium and coarse and distinct; massive breaking to moderate medium subangular and angular blocky structure; very hard, friable, sticky and plastic; few fine roots; common thin clay films on ped faces and in pores; slightly effervescent in spots under gravel; moderately alkaline (pH 8.0). |

Note: Montezuma Pass is N86°E, Mt. Wrightson is N58°W and the peak on Huachuca Mountain is due north from this site.

| | (0-38 cm) |
|---|---|
| Composite A RSL 681059 | 0 to 15 inch samples from 10 pedons selected at 10-foot intervals along a 100-foot N-S transect centered at the backhoe pit. RSL 681051 is a composite of 10 samples of the 0-15" horizon selected from a N-S transect of 100'. This pedon is down slightly in drainage from well drained. |

CONSECUTIVE PEDON NUMBER C 69151 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CROT SOIL NO. S69 ARIZ. 2- 5 SAMPLE NO. 9 773-9 779 WILLCOX AREA

SOIL FAMILY: AQUIC NATRUSTALF,FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 | SANDS .05-.002 | SILTS .002-LT | CLAYS LT .002 | INT. COARSE II 2- .02 | FRAGMENTS PCT. OF WHOLE 75- 20 | I 20-5 | II 5-2 | III |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | SOIL | PCT. OF LT 75 | | |
| 9 773 | 0- 5 | A21 | 71.0 | 24.1 | 4.9 | | | 30.2 | FRA | -- | -- | TR |
| 9 774 | 5- 13 | A22 | 74.0 | 21.5 | 4.5 | | | 27.2 | --A | -- | -- | -- |
| 9 775 | 13- 28 | B21TCASA | 60.9 | 15.5 | 23.6 | | | 21.7 | --A | -- | -- | -- |
| 9 776 | 28- 43 | B22TCASAG | 66.0 | 13.4 | 20.6 | | | 21.7 | --A | -- | -- | -- |
| 9 777 | 43- 51 | B3SAG | 79.4 | 7.3 | 13.3 | | | 20.2 | --A | -- | -- | -- |
| 9 778 | 51- 84 | C1SAG | 77.3 | 4.9 | 17.8 | | | 20.1 | --A | -- | -- | -- |
| 9 779 | 84-107 | C2SAG | 85.5 | 5.9 | 8.6 | | | 23.6 | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG. CAR- BON 6A1A -PERCENT-- | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 LL PCT. | P I 4F2 PL NO.40 | BULK DENSITY EST 1/3 4A1F | 1/3 BAR 4A1F GRAMS PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C -----PERCENT--- | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 773 | 0- 5 | 0.41 | 0.035 | TR | | 0.1 | | | | 1.66 | 1.68 | 1.00 | | 10.7 | 3.1 | 0.4 | 0.4 | 7.7 | | 7.1 |
| 9 774 | 5- 13 | 0.23 | 0.021 | TR | | 0.1 | | | | 1.74 | 1.75 | 1.00 | | 7.9 | 2.7 | 0.2 | 0.2 | 7.9 | | 7.1 |
| 9 775 | 13- 28 | 0.22 | | 5 | | 0.1 | | | | 1.44 | 1.64 | 1.00 | | 24.8 | 12.4 | 4.4 | 4.4 | 9.3 | 10.2 | 9.1 |
| 9 776 | 28- 43 | | | 11 | | 0.1 | | | | 1.67 | 1.79 | 1.00 | | 14.5 | 8.6 | 2.3 | 2.3 | 9.6 | 10.3 | 9.2 |
| 9 777 | 43- 51 | | | 7 | | 0.1 | | | | 1.73 | 1.83 | 1.00 | | 10.9 | 7.2 | 1.9 | 1.9 | 9.6 | 10.3 | 9.2 |
| 9 778 | 51- 84 | | | 4 | | 0.1 | | | | 1.57 | 1.79 | 1.00 | | 20.3 | 10.1 | 4.5 | 4.5 | 9.7 | 10.3 | 9.7 |
| 9 779 | 84-107 | | | 4 | | 0.1 | | | | 1.67 | 1.86 | 1.00 | | 15.1 | 4.8 | 3.7 | 3.7 | 9.7 | 10.3 | 9.5 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6Q1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 9 773 | 0- 5 | | | 1.7 | 1.5 | 3.2 | | 6.8 | | | | | | | | | | | | |
| 9 774 | 5- 13 | | | 2.8 | 1.2 | 4.0 | | 6.3 | | | | | | | | | | | | |
| 9 775 | 13- 28 | | | 20.7 | 2.2 | 22.9 | | 17.5 | 2.69 | 0.3 | 0.1 | 27.7 | 0.2 | 3.6 | 15.4 | 4.8 | | | | 8.9 |
| 9 776 | 28- 43 | | | 15.9 | 1.2 | 17.1 | | 10.8 | 3.39 | 0.4 | 0.2 | 53.7 | 0.2 | 8.4 | 13.5 | 6.2 | 10.9 | | | 9.5 |
| 9 777 | 43- 51 | | | 15.1 | 0.8 | 15.9 | | 9.7 | 5.25 | 0.4 | 0.2 | 70.6 | 0.4 | 15.2 | 21.4 | 8.7 | | | | 9.7 |
| 9 778 | 51- 84 | | | 21.7 | 1.1 | 22.8 | | 14.4 | 5.36 | 0.4 | 0.2 | 81.3 | 0.2 | 20.6 | 19.8 | 9.0 | 28.0 | | | 9.9 |
| 9 779 | 84-107 | | | 10.8 | 0.4 | 11.2 | | 6.4 | 7.0 | 0.3 | 0.1 | 82.0 | 0.3 | 25.5 | 20.3 | 10.4 | | | | 10.0 |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- -L.T. .0002 MM- X RAY DTA 7A2E I | 7A2E II | 7A2E III | 7A2E IV | 7A3 PCT. | X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 773 | 0- 5 | | 1.7 | 25 | | | | MI 2 | | | | | | | | MI MICA |
| 9 774 | 5- 13 | | 2.8 | 44 | | | | MI 3 | | | | | | | | MT MONTMORT |
| 9 775 | 13- 28 | 46.0 | 19.4 | 100+ | .62 | | | MI 3 | MT 1 | KK 1 | | | | | | KK KAOLINIT |
| 9 776 | 28- 43 | 36.6 | 13.9 | 100+ | 98 | | | | | | | | | | | |
| 9 777 | 43- 51 | 39.0 | 12.3 | 100+ | 100+ | | | MI 1 | | | | | | | | |
| 9 778 | 51- 84 | 62.1 | 16.7 | 100+ | 100+ | | | | | | | | | | | |
| 9 779 | 84-107 | 34.5 | 8.0 | 100+ | 100+ | | | MT 4 | MI 4 | | | | | | | |

| MINERAL CODE | RELATIVE AMOUNT |
|---|---|
| MI MICA | 1 TRACE |
| MT MONTMORT | 2 SMALL |
| KK KAOLINIT | 3 MODERATE |
| | 4 ABUNDANT |
| | 5 DOMINANT |
| | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## CROT SANDY LOAM
S69Ariz-2-5

Location: Cochise County, Arizona. 400 feet south and 2,550 feet east of the northwest corner of Sec. 23, T. 14 S., R. 24 E. East of U. S. Highway 666, about 3 miles south and 2 miles west of Willcox. Date of sampling: October 14, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Aquic Natrustalf, fine-loamy, mixed, thermic.
Vegetation: Alkali sacaton, Rothrock grama, burroweed, a few yucca, and scattered cacti. Use: Livestock range. Climate: Precipitation about 11 inches. Mean annual air temperature 58°F., January 41°F., July 78°F. Parent Material: Alluvium from rhyolite, andesite, quartzite, granite and limestone. Topography: Nearly level alluvial flats bordering playas. Slope, 0.2 percent, southwest facing. Elevation: 4180 feet. Drainage: Somewhat poorly drained. Runoff is slow. Permeability is very slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This sample was paired with S69Ariz-2-23. This soil has fluctuating water tables from about 11 inches on down. Those horizons designated as sa horizons show almost a complete coating of salt crystals on the exposed surfaces and pit banks when given time and opportunity to dry out.

| HORIZON | DESCRIPTION |
|---|---|
| A21<br>RSL<br>69773 | 0 to 5 cm (0 to 2 inches), light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; moderate thick platy structure; slightly hard, very friable, nonsticky, nonplastic; many fine and medium and few coarse roots; common very fine and fine vesicular pores; very slightly effervescent; strongly alkaline (pH 8.6); abrupt smooth boundary. |
| A22<br>RSL<br>69774 | 5 to 13 cm (2 to 5 inches), light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; common fine and medium and few coarse roots; common medium and coarse tubular pores; very slightly effervescent; moderately alkaline (pH 8.4); abrupt smooth boundary. |
| B21tcasa<br>RSL<br>69775 | 13 to 28 cm (5 to 11 inches), brown (10YR 5/3) clay loam or sandy clay loam, dark brown (10YR 4/3) moist; moderate medium and coarse columnar breaking to moderate medium subangular structure; hard, friable, sticky, plastic; common fine and few coarse roots; common fine tubular pores; common thin clay films on ped faces and in pores; common fine and medium irregularly shaped soft white lime masses; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| B22tcasag<br>RSL<br>69776 | 28 to 43 cm (11 to 17 inches), light gray (2.5Y 7/2) and yellowish brown (10YR 5/4) sandy clay loam, grayish brown (2.5Y 5/2) and dark yellowish brown (10YR 4/4) moist; moderate medium prismatic breaking to subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few very fine, fine and coarse roots; many fine and very fine tubular pores; few thin clay films on ped faces and in pores; common fine and medium irregularly shaped soft white lime masses; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| B3sag<br>RSL<br>69777 | 43 to 51 cm (17 to 20 inches), light gray (2.5Y 7/2) light sandy loam, grayish brown (2.5Y 5/2) moist, with a few medium faint yellowish brown (10YR 6/4) mottles, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure, hard, friable, slightly sticky, nonplastic; few coarse roots; common very fine and fine tubular pores; few thin clay films in old root channels; strongly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| C1sag<br>RSL<br>69778 | 51 to 84 cm (20 to 33 inches), light gray (5Y 7/2) sandy clay loam, olive (5Y 5/3) moist; massive; hard, friable, slightly sticky, slightly plastic; few coarse roots; few fine tubular pores; few thin clay films in old root channels; about 5 percent by volume of 5 to 10 mm subangular rhyolite, andesite, quartzite and granitic gravel; strongly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| C2sag<br>RSL<br>69779<br>(only 84 to 107 cm sampled) | 84 to 152 cm (33 to 60 inches), light gray (5Y 7/2) pale yellow (5Y 7/3) and olive gray (5Y 5/2) stratified sand, loamy sand, sandy loam, very fine sandy loam, loam, and silt loam in 1/2 to 4 inch strata, olive gray (5Y 5/2), olive (5Y 5/3) and olive gray (5Y 4/2) moist; slightly hard to hard, friable to loose, nonsticky to slightly sticky, nonplastic to slightly plastic; few coarse roots; common very fine interstitial and tubular pores; strongly effervescent; very strongly alkaline (pH 9.6). |

CONSECUTIVE PEDON NUMBER C 69169 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CROT SOIL NO. S69 ARIZ. 2-23 SAMPLE NO. 9 868-9 874 WILLCOX AREA

SOIL FAMILY: AQUIC NATRUSTALF,FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | INT. II .2-.02 | COARSE FRAGMENTS I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1A2A | | | | | | | | | | | | | | | | |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | WHOLE SOIL | PCT. OF LT 75 | | |
| 9 868 | 0- 10 | A21SA | 37.4 | 44.3 | 18.3 | 0.6 | 1.6 | 3.2 | 16.9 | 15.1 | 18.1 | 26.2 | | | 43.8 | --A | -- | -- | -- |
| 9 869 | 10- 20 | A22SA | 37.2 | 38.6 | 24.2 | 0.4 | 1.6 | 3.6 | 19.2 | 12.4 | 15.4 | 23.2 | | 5 | 39.9 | --A | -- | -- | -- |
| 9 870 | 20- 41 | B21TCASA | 23.7 | 28.5 | 47.8 | 0.2 | 1.4 | 2.8 | 12.3 | 7.0 | 9.1 | 19.4 | | 18 | 23.4 | --A | -- | -- | -- |
| 9 871 | 41- 50 | B22TCASAG | 16.2 | 35.8 | 48.0 | 0.2 | 1.7 | 2.4 | 6.8 | 5.1 | 6.3 | 29.5 | | 15 | 15.2 | --A | -- | -- | -- |
| 9 872 | 50- 84 | B3TCASAG | 31.8 | 35.9 | 32.3 | 0.9 | 3.5 | 4.9 | 13.1 | 9.4 | 8.6 | 27.3 | | 8 | 25.1 | --A | -- | -- | -- |
| 9 873 | 84-110 | C 1G | | | | | | | | | | | | | | 13A | 1 | 9 | 3 |
| 9 874 | 110-145 | C 2G | | | | | | | | | | | | | | 3A | -- | 2 | 1 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A -PERCENT-- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L I M I T LL 4F1 PCT. | PL 4F2 NO.40 | BULK DENSITY EST 1/3 4A1F | 1/3 BAR 4A1F GRAMS PER CC | ORY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C ----PERCENT--- | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 -PERCENT-- | 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 868 | 0- 10 | 1.44 | 0.149 | 5 | | | 27 | 24 | | 1.49 | 1.53 | 1.00 | | 22.7 | 12.3 | 0.9 | 0.9 | 7.9 | 9.2 | 7.8 |
| 9 869 | 10- 20 | 1.05 | 0.115 | 16 | | | | | | 1.29 | 1.34 | 1.00 | | 24.0 | 13.1 | 1.3 | 1.3 | 8.0 | 9.2 | 7.7 |
| 9 870 | 20- 41 | 0.79 | 0.088 | 33 | | | 51 | 24 | | 1.28 | 1.64 | 1.00 | | 33.4 | 18.9 | 8.6 | 8.6 | 8.6 | 9.7 | 8.3 |
| 9 871 | 41- 50 | 0.38 | | 47 | | | | | | 1.21 | 1.54 | 1.00 | | 36.0 | 28.8 | 8.4 | 8.4 | 9.5 | 10.1 | 9.4 |
| 9 872 | 50- 84 | 0.21 | | 44 | | | | | | 1.16 | 1.48 | 1.00 | | 36.2 | 21.2 | 8.5 | 8.5 | 9.4 | 10.2 | 9.4 |
| 9 873 | 84-110 | 0.03 | | 1 | | | | | 1.30 | | | 0.94 | | | 6.0 | | | 9.1 | | 8.6 |
| 9 874 | 110-145 | | | 1 | | | | | | 1.51 | 1.74 | 0.98 | | 23.6 | 12.9 | 4.8 | 4.8 | 8.2 | | 8.1 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C NA+ OAC 5A2A -MEQ/100G | NH4+ OAC 5A6A | WATER EXTRACT FROM SATURATED PASTE EC 8A1A MMHO | CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | | | | MEQ/1000 ML | | | | | | | | | |
| 9 868 | 0- 10 | | | 18.5 | 6.7 | 25.2 | | | 30.9 | 4.27 | 9.2 | 4.0 | 37.5 | 3.6 | | 18.9 | 16.9 | 18.0 | | 7.6 |
| 9 869 | 10- 20 | | | 14.9 | 3.7 | 18.6 | | | 25.8 | 1.43 | 2.8 | 1.2 | 13.6 | 1.2 | 0.6 | 9.1 | 3.9 | | | 7.5 |
| 9 870 | 20- 41 | | | 16.9 | 3.2 | 20.1 | | | 20.1 | 2.37 | 0.5 | 0.5 | 26.8 | 0.5 | 0.7 | 8.0 | 4.2 | 14.6 | | 8.3 |
| 9 871 | 41- 50 | | | 21.8 | 3.6 | 25.4 | | | 19.2 | 2.98 | 0.3 | 0.2 | 36.5 | 0.6 | 6.7 | 13.0 | 3.9 | | | 9.5 |
| 9 872 | 50- 84 | | | 15.3 | 2.4 | 17.7 | | | 14.4 | 2.54 | 0.2 | 0.2 | 54.8 | 0.4 | 5.9 | 10.4 | 3.2 | 8.3 | | 9.5 |
| 9 873 | 84-110 | | | 6.8 | 0.9 | 7.7 | | | 7.0 | 2.12 | 0.2 | 0.1 | 27.7 | 0.4 | 1.2 | 7.7 | 3.0 | 10.4 | | |
| 9 874 | 110-145 | | | 6.5 | 0.9 | 7.4 | | | 17.8 | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 868 | 0- 10 | 41.9 | 16.9 | 55 | 15 | | | | | | | | | | | |
| 9 869 | 10- 20 | 45.6 | 14.3 | 55 | 10 | | | MI 2 | | | | | | | | MI MICA |
| 9 870 | 20- 41 | 84.6 | 14.6 | 73 | 38 | | | MI 2 | MT 1 | KK 1 | | | | | | MT MONTMORT |
| 9 871 | 41- 50 | 142.0 | 16.6 | 87 | 73 | | | | | | | | | | | KK KAOLINIT |
| 9 872 | 50- 84 | 109.8 | 9.3 | 64 | 100+ | | | MI 3 | MT 2 | KK 1 | | | | | | |
| 9 873 | 84-110 | 46.9 | 5.5 | 79 | 72 | | | | | | | | | | | |
| 9 874 | 110-145 | | 6.5 | 37 | | | | | | | | | | | | |

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## CROT LOAM
S69Ariz-2-23

Location: Cochise County, Arizona. 1,750 feet south and 500 feet west of the northeast corner of Sec. 15, T. 15 S., R. 25 E. Near Flanders Ranch, about 9 miles east and 1 mile north of Cochise. Date of sampling: October 22, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Aquic Natrustalf, fine-loamy, mixed, thermic.
Vegetation: Alkali sacaton, alkali lovegrass and scattered mesquite. Use: Livestock range. Climate: Precipitation about 11 inches. Mean annual air temperature 58°F., January 41°F., July 78°F. Parent Material: Alluvium, principally from andesite, granite, limestone and quartzite. Topography: Nearly level flat bordering playas. Slope, 0.3 percent, west facing. Elevation: 4160 feet. Drainage: Somewhat poorly drained. Runoff is slow. Permeability is very slow. Soil Moisture: Moist when sampled.
Remarks: Field determinations of pH thymol blue indicator in 1:5 dilution. This sample paired with S69Ariz-2-5. Those horizons designated as sa horizons show an almost complete coating of salt crystals on the exposed surfaces and pit banks after given time and opportunity to dry out. The soil has a fluctuating water table of from about 15 inches downward.

| HORIZON | DESCRIPTION |
|---|---|
| A21sa<br>RSL<br>69868 | 0 to 10 cm (0 to 4 inches), light gray (10YR 7/2) loam, dark brown (10YR 4/3) moist; weak thick platy structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; common fine vesicular pores; strongly effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. |
| A22sa<br>RSL<br>69869 | 10 to 20 cm (4 to 8 inches), light brownish gray (10YR 6/2) loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; many very fine and fine vesicular and few fine tubular pores; strongly effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. |
| B21tcasa<br>RSL<br>69870 | 20 to 41 cm (8 to 16 inches), brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic breaking to moderate medium subangular and angular blocky structure; very hard, friable, sticky, plastic; many fine and medium roots; common very fine and fine tubular pores; common thin clay films on faces of peds and in pores; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| B22tcasag<br>RSL<br>69871 | 41 to 50 cm (16 to 20 inches), light brownish gray (2.5 Y 6/2) clay loam, grayish brown (2.5 Y 5/2) moist; weak medium prismatic breaking to moderate medium subangular blocky structure; hard, friable, sticky, plastic; many fine and medium roots; common very fine and fine tubular pores; common thin clay films on faces of peds and in pores; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| B3tcasag<br>RSL<br>69872 | 50 to 84 cm (20 to 33 inches), light olive gray (5Y 6/2) and white (5Y 8/2) light clay loam, olive gray (5Y 5/2) and pale yellow (5Y 7/3) moist; massive parting to weak medium subangular blocky structure; hard, friable, slightly sticky, plastic; common fine and medium roots; many fine and medium tubular pores; few thin clay films on faces of peds; about 3 percent by volume of 2 to 10 mm subangular quartz gravel; about 25 percent by volume of irregularly shaped soft white lime masses; strongly to violently effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| C1g<br>RSL<br>69873 | 84 to 110 cm (33 to 43½ inches), pale olive (5Y 6/3) stratified loamy sand and sandy loam, olive (5Y 5/3) moist; massive; hard, very friable, nonsticky, nonplastic; few fine and medium roots; few fine tubular pores; about 10 to 12 percent by volume of 2 to 10 mm subangular quartz gravel; about 20 percent by volume of irregularly shaped soft pinkish white masses; slightly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| C2g<br>RSL<br>69874 | 110 to 145 cm (43½ to 57 inches), mottled light olive gray (5Y 6/2), olive yellow (2.5Y 6/6) and brown (7.5YR 5/4) stratified clay with thin strata of sandy loam, olive gray (5Y 5/2), light olive brown (2.5Y 5/6) and dark brown (7.5YR 4/4) moist; massive; very hard, firm, sticky, plastic; few fine and medium roots; slightly effervescent; very strongly alkaline (pH 9.6). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Udic Paleustalf, fine, montmorillonitic, mesic

SOIL Elledge fine sandy loam (taxadjunct) SOIL Nos. S56Ariz-9-29 LOCATION Navajo County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 56181 - 56185

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non carbonate clay | 1/ Coarse fragments 2A2: >2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct | Pct. of < 76 mm | |
| 0–6 | A1 | 82.0 | 10.7 | 7.3 | 1.2 | 1.7 | 4.6 | 63.6 | 10.9 | 5.8 | 4.9 | 66.0 | 71.1 | | | 9 | | |
| 6–13 | A2 | 80.3 | 10.3 | 9.4 | 1.1 | 0.7 | 2.5 | 64.7 | 11.3 | 4.8 | 5.5 | 71.6 | 69.0 | | | 38 | | |
| 13–19 | B2t | 56.9 | 4.0 | 39.1 | 0.6 | 0.5 | 1.0 | 45.7 | 9.1 | 0.6 | 3.4 | 52.2 | 47.8 | | | 1 | | |
| 19–28 | B3t | 58.6 | 4.6 | 36.8 | 2.0 | 1.4 | 1.3 | 45.4 | 8.5 | 1.2 | 3.4 | 51.6 | 50.1 | | | 9 | | |
| 28+ | R | | | | P A R E N T | | | R O C K | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C4b Free $Fe_2O_3$ | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density | 3B2 Cm | Water content: 4B2 1/10 bar | Water content: 4B2 1/3 bar | Water content: 4B2 15 bar | 4D1 Extensibility LEf | 4D1 Extensibility LE | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | | Pct. | Pct | Pct | Pct | Pct. | | | |
| 0–6 | 1.43 | 0.069 | 21 | 0.5 | | | | | | 14.8 | 8.9 | 3.5 | | | 7.0 | | 7.3 |
| 6–13 | 0.31 | 0.022 | 14 | 0.5 | | | | | | 11.1 | 7.5 | 3.0 | | | 6.7 | | 6.6 |
| 13–19 | 0.42 | 0.029 | 15 | 0.7 | | | | | | | | 17.8 | | | 5.9 | | 6.2 |
| 19–28 | 0.37 | 0.024 | 15 | 1.4 | | | | | | | | 14.3 | | | 5.8 | | 6.2 |
| 28+ | | | | | P A R E N T | | R O C K | | | | | | | | | | |

| Depth (In.) | Extractable bases: 6N2b Ca | Extractable bases: 6O2c Mg | Extractable bases: 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch Capacity: 5A2a NaOAc | Cation Exch Capacity: 5A6a $NH_4OAc$ | | Water extract from saturated paste 8A1: 6N1a 6O1a Ca+Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1b $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0–6 | 8.6 | 1.5 | | | | 1.5 | 12.2 | | | 3.5 | 0.6 | 0.4 | | | 3.1 | – | | 0.4 |
| 6–13 | 3.2 | 1.0 | | | | 0.7 | 5.6 | | | 2.8 | 0.6 | 0.1 | | | 1.8 | – | | 0.3 |
| 13–19 | 15.7 | 1.8 | | | | 2.4 | 27.8 | | | 1.6 | 0.7 | tr. | | | 0.7 | – | | 0.2 |
| 19–28 | 14.6 | 6.1 | | | | 3.6 | 26.8 | | | 2.0 | 0.8 | tr. | | | 0.7 | – | | 0.3 |
| 28+ | | | | | P A R E N T | | | R O C K | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation | Exch. bases: 5B3b Ca | Exch. bases: 5B1b 6Q2a K | Exch. bases: 5B1b 6P2a Na | 5D2 Exchangeable Na | SAR | 5C3 Base Sat. | Clay mineralogy (<0.002 mm) 3A1: Mont. | Verm. | Mica 7A2 X-ray | Kaolin. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | meq /100 g | | | Pct. | | Pct. | | | | | |
| 0–6 | 29.7 | | 0.3 | 0.1 | | | 88 | | | x | x | |
| 6–13 | 22.9 | | 0.1 | 0.1 | | | 86 | | | x | x | |
| 13–19 | 55.4 | | 0.5 | 0.3 | | | 88 | xx | | x | xx | |
| 19–28 | 52.3 | | 0.4 | 0.3 | | | 86 | xx | | x | xx | |
| 28+ | | | | P A R E N T | | | R O C K | | | | | |

1/ Percent of the whole soil

## ELLEDGE FINE SANDY LOAM (taxadjunct) 1/
56Ariz-9-29-1 through 4

Location: Navajo County, Arizona NE ¼, Sec. 19, T 10 N, R 22 E on property line between State Highway lot and Elledge Motel. In Showlow. Date of Sampling: May 17, 1956.
Collectors: M. S. James, W. G. Harper, Gerald Kester, R. E. Nelson, and George Wendt.
Vegetation: Blue grama, sand dropseed, juniper, ponderosa and annual weeds. Climate: 18.4 precipitation at Showlow. Mean annual temperature 50.4° F.; January average 35.2° F.; July average 69.8° F.; Parent Material: Thinly interbedded shales and soft sandstones, probably a member of the Dakota sandstone formation. Relief: Gently sloping to undulating upland; slopes 3 percent to the east. Elevation: 6,520 feet. Drainage: Moderately well to well drained. Slow to medium runoff. Slow permeability.
Remarks: Dry through the A2 horizon, and moist in the D horizon at time of sampling. Slight water erosion. Angular sandstone fragments ranging up to about 12 inches in diameter are common on the surface.
Classification: Udic Paleustalf, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>56181 | 0-6" -- Dark gray (10YR 4/1) dry, very dark brown (2/2) moist; fine sandy loam; moderate medium to coarse platy; soft when dry, very friable when moist, nonsticky and nonplastic when wet; many grass roots; moderately permeable; noncalcareous; pH 7.5; clear, wavy lower boundary. |
| A2<br>RSL No.<br>56182 | 6-13" -- Light brownish gray (10YR 6/2) dry, brown (4/3) moist; heavy loamy fine sand; slightly hard when dry, very friable when moist, nonsticky and nonplastic when wet; grass roots common; moderately rapid permeability; noncalcareous; pH 6.3; abrupt, wavy lower boundary. |
| B2t<br>RSL No.<br>56183 | 13-19" -- Very strongly mottled clay consisting of three colors listed in order of their prominence: brown (7.5YR 5/2), reddish yellow (5YR 6/6), and reddish brown (2.5YR 4/4) dry; reddish brown (7.5YR 4/4 and 5/6), reddish brown (5YR 4/3), dark red (2.5YR 6/3) moist; very weak medium prisms that break to strong coarse to medium angular blocky and subangular blocky; continuous clay films on all ped surfaces; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; few grass roots and common tree roots; slowly to very slowly permeable; noncalcareous; pH 6; gradual, wavy lower boundary. |
| B3t<br>RSL No.<br>56184 | 19-28" -- Similar in color to horizon above but more of the brown and reddish brown colors and less red colors; fine sandy clay; moderately defined coarse to medium angular and subangular blocky aggregates; extremely hard when dry, firm when moist, very plastic and very sticky when wet; few tree roots and few grass roots; slowly to very slowly permeable; noncalcareous; pH 6. |
| R<br>RSL No.<br>56185 | 28"+ -- Decomposing sandstone with tongues of fine sandy clay penetrating downward into this rock. |

1/ The Elledge series is in a fine, mixed, mesic family of Typic Hapludalfs. This pedon has an argillic horizon with an abrupt upper boundary and is dominated by montmorillonitic clay.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Udic Paleustalf, fine, montmorillonitic, mesic

SOIL Elledge fine sandy loam (taxadjunct) SOIL Nos. S56Ariz-9-30 LOCATION Navajo County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 56186- 56189

| Depth (In) | Horizon | 1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) | Total: Silt (0.05–0.002) | Total: Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non carbonate clay | 1/ Coarse fragments 2A2: > 2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0–1 | A1 | 75.1 | 16.5 | 8.4 | 1.4 | 2.4 | 4.2 | 41.9 | 25.2 | 8.7 | 7.8 | 68.7 | 49.9 | | | 5 | | |
| 1–3 | A2 | 68.5 | 21.9 | 9.6 | 0.7 | 1.6 | 2.6 | 35.9 | 27.7 | 10.8 | 11.1 | 71.1 | 40.8 | | | 15 | | |
| 3–21 | B2t | 28.3 | 17.9 | 53.8 | 0.3 | 0.7 | 0.8 | 8.6 | 17.9 | 9.8 | 8.1 | 35.3 | 10.4 | | | 0 | | |
| 21–26 | R | PARENT ROCK | | | | | | | | | | | | | | | | |

| Depth (In) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C1b Free $Fe_2O_3$ | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density | 3B2 Cm | Water content | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility LEf | 4D1 Extensibility LE | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | | Pct. | Pct | Pct. | Pct | Pct | | | |
| 0–1 | 3.10 | 0.144 | 22 | 0.8 | | | | | | | | 6.6 | | | 6.3 | | 6.5 |
| 1–3 | 1.13 | 0.049 | 23 | 1.0 | | | | | | | | 4.4 | | | 5.5 | | 5.8 |
| 3–21 | 0.74 | 0.045 | 16 | 2.5 | | | | | | | | 15.0 | | | 5.7 | | 6.1 |
| 21–26 | PARENT ROCK | | | | | | | | | | | | | | | | |

| Depth (In) | Extractable bases: 6N2b Ca | 602c Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch Capacity: 5A2a NaOAc | 5A6a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a 6O1a Ca + Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1b $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | mmho/cm |
| 0–1 | 9.7 | 1.7 | | | | 4.2 | 16.9 | | 2.9 | 0.3 | 0.4 | | 2.3 | - | | 0.3 |
| 1–3 | 5.0 | 1.2 | | | | 3.6 | 12.5 | | 3.5 | 0.4 | 0.3 | | 2.0 | - | | 0.3 |
| 3–21 | 26.1 | 6.1 | | | | 4.5 | 43.5 | | 2.2 | 0.5 | 0.1 | | 1.3 | - | | 0.3 |
| 21–26 | PARENT ROCK | | | | | | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation | Exch. bases: 5B3b Ca | 5B1b 6Q2a K | 5B1b 6P2a Na | 5D2 Exchangeable Na | SAR | 5C3 Base Sat. | Clay mineralogy (<0.002 mm) 3A1: Mont. | Verm. | Mica 7A2 X-ray | Kaolin. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | meq /100 g | | | Pct. | | Pct. | | | | |
| 0–1 | 50.6 | | 0.3 | 0.1 | | | 74 | x | | x | x |
| 1–3 | 30.4 | | 0.2 | 0.1 | | | 64 | | | x | x |
| 3–21 | 68.4 | | 0.8 | 0.2 | | | 88 | xx | | x | x |
| 21–26 | PARENT ROCK | | | | | | | | | | |

1/ Percent of the whole soil

## ELLEDGE FINE SANDY LOAM (taxadjunct) 1/
S56Ariz-9-30

Location: NE1/4, Sec. 32, T. 10 N., R. 22 E., Navajo County, Arizona, about 3 miles south of Showlow. Date of Sampling: May 17, 1956.
Collectors: M. S. James, W. G Harper, Gerald Kester, R. E. Nelson and George Wendt.
Vegetation: Blue grama, fescue, juniper, ponderosa, oak trees and junegrass. Climate: About 18 inches precipitation. Nearest weather station (Showlow, short term): Mean annual temperature: 50.4° F.; January average 35.2° F.; July average 69.8° F.; mean annual precipitation 18.40 inches.
Parent Material: Interbedded soft sandstones and shales, probably a member of the Dakota formation.
Relief: Gently sloping to undulating upland. Slopes 3 percent to the east. Elevation: 6,580 feet. Drainage: Moderately well to well drained. Slow runoff when soil is dry. Medium to high when wet. Slow permeability.
Remarks: A few angular sandstone fragments ranging up to about 8 inches in thickness are common on the surface.
Classification: Udic Paleustalf, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A0 | 1/4-0" -- Loose pine needles. |
| A1<br>RSL No.<br>56186 | 0-1" -- Grayish brown (10YR 4.5/2) dry, very dark brown (2.5/2) moist; fine sandy loam; weak fine platy; soft when dry, very friable when moist, nonsticky and nonplastic when wet; few grass roots; rapid permeability; noncalcareous; pH 6.3; abrupt, wavy lower boundary. |
| A2<br>RSL No.<br>56187 | 1-3" -- Pinkish gray (7.5YR 6/2) dry, dark brown (3/2) moist; fine sandy loam; weak coarse platy; slightly hard when dry, very friable when moist, nonsticky and nonplastic when wet; few grass and tree roots; moderate to moderately rapid permeability; noncalcareous; pH 5; abrupt, wavy lower boundary. |
| B2t<br>RSL No.<br>56188 | 3-21" -- Brown (2.5YR 4/4) dry, with reddish brown (5YR 4/4) mottlings, reddish brown (2.5YR 4/4 and 5YR 5/4) moist; clay; moderate medium to coarse prisms that break to strong medium to coarse angular blocky; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; tree roots common, few grass roots; very slowly permeable; noncalcareous; pH 6; abrupt, wavy lower boundary. The topmost 3 or 4 inches of this horizon has common organic staining, dark brown (10YR 3/2) dry, and very dark brown (2.5/2) moist. These occur on both horizontal and vertical ped surfaces and is in the thick continuous clay films. |
| R<br>RSL No.<br>56189 | 21-26" -- Decomposing sandstone; pH 6.3. |

1/ The Elledge series is in a fine, mixed, mesic family of Typic Hapludalfs. This pedon has an argillic horizon with an abrupt upper boundary and is dominated by montmorillonitic clay.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Durargid, fine, mixed, thermic

SOIL Frye sandy loam SOIL Nos. S64Ariz-2-18 LOCATION Cochise County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64583 - 64594

| Depth cm | Horizon | 1B1b Total Sand (2-0.05) | Total Silt (0.05-0.002) | Total Clay (< 0.002) | Sand: Very coarse (2-1) | Sand: Coarse (1-0.5) | Sand: Medium (0.5-0.25) | Sand: Fine (0.25-0.1) | Sand: Very fine (0.1-0.05) | Silt: 0.05-0.02 | Silt: Int. III (0.02-0.002) | 3A1 Int. II (0.2-0.02) | (2-0.1) | Non carbonate clay | | Coarse fragments 1A2a: > 2 Pct. | 2 - 19 Pct. of < 76 mm | 19 - 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0-5 | A11 | 75.7 | 18.7 | 5.6 | 3.9 | 15.0 | 14.4 | 27.4 | 15.0 | 11.9 | 6.8 | 41.6 | 60.7 | | | 1 | 1 | |
| 5-15 | A12 | 66.1 | 23.6 | 10.3 | 3.7 | 12.4 | 12.6 | 24.8 | 12.6 | 11.2 | 12.4 | 36.6 | 53.5 | | | 2 | 2 | |
| 15-23 | A3 | 58.3 | 28.7 | 13.0 | 5.1 | 11.7 | 11.0 | 19.5 | 11.0 | 14.5 | 14.2 | 35.4 | 47.3 | | | 3 | 3 | |
| 23-31 | B1 | 50.3 | 32.5 | 17.2 | 4.9 | 9.0 | 8.6 | 17.4 | 10.4 | 16.0 | 16.5 | 36.0 | 39.9 | | | 4 | 4 | |
| 31-43 | B21t | 27.1 | 22.5 | 50.4 | 1.7 | 4.7 | 4.4 | 9.2 | 7.1 | 10.7 | 11.8 | 22.8 | 20.0 | | | 2 | 2 | |
| 43-58 | B22t | 27.3 | 25.0 | 47.7 | 1.8 | 4.6 | 4.2 | 9.6 | 7.1 | 11.9 | 13.1 | 24.2 | 20.2 | | | 2 | 2 | |
| 58-66 | B23tsica | 36.2 | 37.9 | *25.9 | 1.8 | 5.3 | 5.1 | 13.0 | 11.0 | 18.2 | 19.7 | 37.2 | 25.2 | | | 10 | 10 | |
| 66-84 | C1sica | | | | | | | | | | | | | | | 10 | 10 | |
| 84-96 | C2sica | | | | | | | | | | | | | | | 10 | 10 | |
| 96-142 | C3sica | 37.2 | 48.3 | 14.5 | 3.8 | 4.3 | 3.1 | 9.6 | 16.4 | 28.2 | 20.1 | 51.0 | 20.8 | 13 | | | | |
| 142-203 | C4 | 48.2 | 36.9 | 14.9 | 0.2 | 1.6 | 5.3 | 21.6 | 19.5 | 23.9 | 13.0 | 57.2 | 28.7 | | | | | |
| 203-236 | C5 | 70.7 | 17.5 | 11.8 | 0.5 | 5.0 | 17.8 | 34.6 | 12.8 | 10.8 | 6.7 | 41.2 | 57.9 | | | | | |

| Depth cm | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | 3A1a Carbonate in <0.002 mm. Pct. | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | 6C2a Ext. Iron as Fe g/cc | Water content Pct. | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | 3B2 Cm | pH: 8C1a 1:1 $H_2O$ | pH: 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-5 | 0.35 | 0.032 | 11 | | | | | | 0.5 | | | 2.7 | | | | 6.3 | 6.6 |
| 5-15 | 0.29 | 0.030 | 10 | | | | 1.67 | 1.68 | 0.6 | | 8.4 | 3.8 | 0.002 | 0.002 | 0.99 | 6.0 | 6.5 |
| 15-23 | 0.26 | 0.031 | 8 | | | | 1.62 | 1.66 | 0.7 | | 9.6 | 4.4 | 0.008 | 0.008 | 0.98 | 6.6 | 6.8 |
| 23-31 | 0.26 | 0.031 | 8 | | | | 1.60 | 1.67 | 0.8 | | 11.7 | 5.5 | 0.016 | 0.016 | 0.98 | 7.1 | 7.2 |
| 31-43 | 0.20 | | | | | | 1.43 | 1.71 | 1.2 | | 25.7 | 15.4 | 0.060 | 0.059 | 0.99 | 7.4 | 7.9 |
| 43-58 | 0.28 | | | | | | 1.44 | 1.73 | 1.1 | | 27.4 | 15.7 | 0.062 | 0.061 | 0.99 | 7.9 | 8.5 |
| 58-66 | 0.36 | | | | 12 | | | | 0.8 | | | 17.4 | | | 0.94 | 7.9 | 8.6 |
| 66-84 1/ | 0.17 | | | | 17 | | | | 0.4 | | | 14.0 | | | 0.94 | 8.2 | 8.9 |
| 84-96 1/ | 0.14 | | | | 26 | | 1.55 | 1.56 | 0.4 | | 18.1 | 11.4 | 0.003 | 0.003 | 0.94 | 8.4 | 9.1 |
| 96-142 | 0.04 | | | | 16 | 1 | 1.52 | 1.58 | 0.6 | | 18.2 | 8.2 | 0.014 | 0.014 | 1.00 | 8.4 | 9.2 |
| 142-203 | 0.01 | | | | 1 | | 1.53 | 1.62 | 0.7 | | 18.5 | 7.7 | 0.018 | 0.018 | 1.00 | 8.3 | 9.1 |
| 203-236 | 0.01 | | | | tr. | | 1.66 | 1.72 | 0.6 | | 11.2 | 6.2 | 0.011 | 0.011 | 1.00 | 8.3 | 8.6 |

| Depth cm | Extractable bases: 6N2b Ca | 602c Mg | 6P2a Na | 6Q2a K | 5B1a Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 601a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0-5 | 2.2 | 1.1 | 0.2 | 0.8 | 4.3 | 1.8 | 4.2 | | | | | | | | | | | |
| 5-15 | 2.8 | 1.6 | 0.2 | 1.0 | 5.6 | 2.3 | 5.7 | | | | | | | | | | | |
| 15-23 | 4.0 | 2.2 | 0.2 | 0.8 | 7.2 | 1.2 | 6.9 | | | | | | | | | | | |
| 23-31 | 5.0 | 2.3 | 0.3 | 0.9 | 8.5 | | 8.5 | | | | | | | | | | | |
| 31-43 | 13.4 | 9.0 | 1.2 | 1.4 | 25.0 | | 24.0 | | | | | | | | | | | |
| 43-58 | 16.7 | 10.9 | 1.7 | 1.5 | 30.8 | | 24.9 | | 5.0 | 4.3 | 6.0 | 0.5 | | - | 2.0 | 8.2 | | 1.63 |
| 58-66 | 24.2 | 12.3 | 3.0 | 1.9 | 41.4 | | 26.0 | | 8.1 | 7.6 | 10.8 | 0.5 | | - | 2.1 | 19.0 | | 2.84 |
| 66-84 1/ | 24.3 | 9.6 | 2.8 | 1.7 | 38.4 | | 23.4 | | 9.8 | 9.0 | 16.2 | 0.3 | | - | 2.1 | 26.4 | | 3.70 |
| 84-96 1/ | 23.3 | 6.8 | 2.4 | 1.4 | 33.9 | | 16.1 | | 6.0 | 5.0 | 14.0 | 0.4 | | - | 2.2 | 16.7 | | 2.68 |
| 96-142 | 19.9 | 5.1 | 2.4 | 1.2 | 28.6 | | 13.8 | | 4.0 | 2.5 | 17.5 | 0.3 | | - | 1.9 | 9.9 | | 2.46 |
| 142-203 | 16.9 | 4.6 | 2.2 | 1.1 | 24.8 | | 14.6 | | 3.5 | 2.1 | 10.2 | 0.2 | | - | 2.1 | 9.2 | | 1.74 |
| 203-236 | 7.5 | 3.1 | 1.7 | 0.8 | 13.1 | | 11.8 | | 2.0 | 1.3 | 7.6 | 0.1 | | - | 2.0 | 6.0 | | 1.20 |

| Depth cm | 8A Water at Saturation Pct | 5D2 Exchangeable Na 1/ Pct. | 5B1b Exch. Na me./100 g. | SAR | Clay mineralogy (<0.002 mm.) X-ray: Montmorillonite | Vermiculite | Illite | Kaolinite |
|---|---|---|---|---|---|---|---|---|
| 0-5 | | 5 | 0.2 | | | | | |
| 5-15 | | 4 | 0.2 | | - | - | xx | tr. |
| 15-23 | | 3 | 0.2 | | | | | |
| 23-31 | | 4 | 0.3 | | | | | |
| 31-43 | | 5 | 1.2 | | | | | |
| 43-58 | 55.0 | 6 | 1.4 | 3 | xx | - | xx | tr. |
| 58-66 | 62.3 | 9 | 2.3 | 4 | xxx | - | xxx | x |
| 66-84 1/ | 47.4 | 10 | 2.0 | 5 | | | | |
| 84-96 1/ | 44.8 | 12 | 1.8 | 6 | | | | |
| 96-142 | 43.2 | 12 | 1.6 | 9 | xxx | - | xx | x |
| 142-203 | 42.3 | 12 | 1.8 | 6 | | | | |
| 203-236 | 39.2 | 12 | 1.4 | 6 | | | | |

1/ All determinations reported in this line or column were made on crushed samples of the whole soil. Results reported as percent or meq /100 g or g /cc are for the whole soil including the >2 mm fraction. If these data are compared to other data on this data sheet, the effect of the >2 mm fraction has to be taken into consideration.

* -Incompletely dispersed

x - detected
xx - moderate
xxx - abundant
xxxx - dominant

## FRYE SANDY LOAM
S64Ariz-2-18

Location: Cochise County, Arizona. 7 miles west and 9 miles north of Willcox, Arizona on the Ft. Grant Road, 670 feet north and 125 feet west of the SE corner Sec. 11, T. 12 S, R. 23 E. Date of Sampling: October 19, 1964.
Description by: James E. Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James E. Jay, R. K. Preece. and M. L. Richardson.
Classification: Typic Durargid, fine, mixed, thermic.
Vegetation: Sparse cover of blue grama, annual gramas and burroweed. Climate: Precipitation about 12 inches annual. Mean annual temperature 58° F. (Willcox). Average January temperature 41° F. Soil temperature at time of sampling: 18 inches - 65° F., 26 inches - 70° F., 72 inches - 64° F. Parent Material: Alluvium from granite, rhyolite, andesite with possibly some influence from volcanic ash. Topography: Nearly level valley plain with slightly concave slopes of 0.2 percent. Elevation: 4280 feet. Drainage: Well drained. Slow runoff. Slowly permeable. Soil Moisture: Slightly moist about 25 percent field capacity. Water table 100 to 150 feet. Remarks: Sandy loam is the dominant type. Frye soils are of limited extent but are an important cropland soil. Field determination of pH by Hellige-Truog indicator and thymol blue in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>64583 | 0-5 cm (0-2 inches), brown (7.5YR 5/4) light sandy loam, brown to dark brown (7.5YR 4/4) when moist; moderate medium platy structure; slightly hard when dry, very friable when moist, nonsticky and nonplastic when wet; many fine and very fine roots; many fine interstitial pores; noneffervescent with HCL; pH 6.5; abrupt smooth boundary. |
| A12<br>RSL No.<br>64584 | 5-15 cm (2-6 inches), brown (7.5YR 5/4) sandy loam, dark reddish brown (5YR 3/4) when moist; massive, breaking to weak very fine and fine subangular blocky structure; slightly hard when dry, slightly sticky and slightly plastic when wet; many very fine, fine, and medium roots; many fine interstitial pores; noneffervescent; pH 8.0; clear smooth boundary. |
| A3<br>RSL No.<br>64585 | 15-23 cm (6-9 inches), same colors, heavy sandy loam; massive, breaking to moderate very fine and fine subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and plastic when wet; common fine tubular pores; noneffervescent; pH 8.1; abrupt smooth boundary. |
| B1<br>RSL No.<br>64586 | 23-31 cm (9-12 inches), same colors; sandy clay loam; massive, breaking to moderate fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and plastic when wet; common very fine and fine roots; common fine and very fine tubular and interstitial pores; few thin patchy clay films; noneffervescent; pH 8.2; clear smooth boundary. |
| B21t<br>RSL No.<br>64587 | 31-43 cm (12-17 inches), reddish brown (5YR 4/4) dry and moist, same color crushed; clay; moderate medium and coarse prismatic breaking to moderate medium and coarse angular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; many compressed fine and very fine roots on ped faces; few fine tubular and common exped pores; continuous thin clay films on ped faces; noneffervescent; pH 8.2; clear smooth boundary. |
| B22t<br>RSL No.<br>64588 | 43-58 cm (17-23 inches), same as horizon above. Broken for lab purposes. |
| B23tsica<br>RSL No.<br>64589 | 58-66 cm (23-26 inches), reddish yellow (7.5YR 6/6 & 6/8) clay, yellowish red (5YR 4/6) when moist, and common fine distinct mottles of pinkish white (7.5YR 8/2), pink (7.5YR 6/4) when moist; massive, breaking to moderate fine and medium subangular blocky structure; hard when dry, firm when moist, sticky and very plastic when wet; common fine roots that are massed and in lower part; common fine and very fine tubular and interstitial pores; few thin clay bridges; weakly to strongly effervescent; pH 8.2; abrupt smooth boundary. |
| C1sicam<br>RSL No.<br>64590 | 66-84 cm (26-33 inches), pinkish gray (7.5YR 6/2) with surface coatings of reddish yellow (7.5YR 6/8) and lime veins and mottles pink (7.5YR 7/4) lime and silica cemented indurated pan, reddish brown (5YR 5/3), yellowish red (5YR 5/8) and light brown (7.5YR 6/4) when moist; massive; extremely hard dry, extremely firm when moist; no roots except in occasional fractures; very few fine tubular pores; rodent burrows*; silica (?) coatings on plate faces; strongly effervescent; pH 8.2; clear smooth boundary. |
| C2sicam<br>RSL No.<br>64591 | 84-96 cm (33-38 inches), pale brown (10YR 6/3) matrix with many veins and laminae of white (N8) indurated pan materials; brown to dark brown (10YR 4/3) and pink (7.5YR 7/4) when moist; massive or weak coarse platy structure; extremely hard when dry, extremely firm when moist; no roots; few fine tubular pores; rodent burrows*; violently effervescent; pH 8.2; clear wavy boundary. |
| C3sica<br>RSL No.<br>64592 | 96-142 cm (38-56 inches), very pale brown and pale brown (10YR 7/3 & 6/3) and white coatings in pores (N8) clay loam, brown to dark brown (7.5YR 4/4) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and plastic when wet; no roots; many fine and very fine and a few coarse tubular pores; rodent burrows*; violently effervescent; pH 8.2; clear smooth boundary. |
| C4<br>RSL No.<br>64593 | 142-203 cm (56-80 inches), mottled pale brown, brown and very pale brown (10YR 6/3, 5/4 & 8/4) sandy loam, brown (7.5YR 5/4) and brown to dark brown (10YR 4/3) when moist; massive; slightly hard when dry, very friable when moist, nonsticky and slightly plastic when wet; no roots; many fine and very fine and a few coarse tubular pores; strongly effervescent; pH 8.4; clear smooth boundary. |
| C5<br>RSL No.<br>64594 | 203-236 cm (80-93 inches), pale brown and brown (10YR 6/3 & 5/4) sandy loam; brown to dark brown (10YR 4/3) when moist; massive; slightly hard when dry, friable when moist, nonsticky and slightly plastic when wet; no roots; many fine and very fine and a few coarse tubular pores; noneffervescent; pH 8.2. |

*Rodents have burrowed through the pans and worked vertically and horizontally at intervals of about 5 to 20 feet. These burrows are backfilled with a mixture of materials from all horizons. Roots and water enter the softer lower horizons through these workings and make the material somewhat effective for root growth and water retention.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Durargid, fine, mixed, thermic

SOIL Frye sandy loam SOIL Nos. S64Ariz-2-19 LOCATION Cochise County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64595 - 64604

| Depth cm | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | Non carbonate clay | | 3A1 Coarse fragments 1A2a: > 2 | 2 – 19 | 19 –76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0-5 | A11 | 71.2 | 22.0 | 6.8 | 5.7 | 13.5 | 13.9 | 27.7 | 10.4 | 11.9 | 10.1 | 36.6 | 60.8 | | | 3 | 3 | |
| 5-10 | A12 | 63.2 | 27.9 | 8.9 | 5.7 | 12.0 | 12.4 | 23.9 | 9.2 | 12.7 | 15.2 | 34.2 | 54.0 | | | 5 | 5 | |
| 10-15 | B1 | 59.0 | 27.3 | 13.7 | 6.2 | 10.6 | 10.8 | 22.0 | 9.4 | 12.1 | 15.2 | 33.0 | 49.6 | | | 8 | 8 | |
| 15-33 | B21t | 27.1 | 17.7 | 55.2 | 1.7 | 4.8 | 4.9 | 10.8 | 4.9 | 8.3 | 9.4 | 19.1 | 22.2 | | | 1 | 1 | |
| 33-48 | B22tca | 32.5 | 23.2 | 44.3 | 1.8 | 5.2 | 5.2 | 12.5 | 7.8 | 10.9 | 12.3 | 25.2 | 24.7 | | | 5 | 5 | |
| 48-58 | B3tca | 38.9 | 32.5 | 28.6 | 4.2 | 6.7 | 5.1 | 12.6 | 10.3 | 14.7 | 17.8 | 31.8 | 28.6 | 27 | | 54 | 54 | |
| 58-76 | C1cam | | | | | | | | | | | | | | | | | |
| 76-94 | C2ca | | | | | | | | | | | | | | | | | |
| 94-125 | C3ca | 42.1 | 36.4 | 21.5 | 3.7 | 3.8 | 2.7 | 14.4 | 17.5 | 22.8 | 13.6 | 50.2 | 24.6 | | | 11 | 11 | |
| 125-163 | IIC4 | 84.4 | 9.6 | 6.0 | 38.9 | 22.6 | 7.3 | 11.1 | 5.5 | 6.1 | 3.5 | 16.1 | 78.9 | | | 51 | 51 | |

| Depth cm | 6A1a Organic carbon | 6B1a Nitrogen | C/N | | 6E1b Carbonate as $CaCO_3$ 1/ | 3A1a Carbonate in <0.002 mm | Bulk density | | | Water content: | | 4B2 15 bar | | | pH: 8C1a 1:1 $H_2O$ | 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct. | | | Pct. | Pct. | g/cc | g/cc | g/cc | Pct. | Pct. | Pct. | | | | |
| 0-5 | 0.33 | 0.030 | 11 | | | | | | | | | 2.9 | | | 6.3 | 6.7 |
| 5-10 | 0.26 | 0.026 | | | | | | | | | | 3.3 | | | 5.7 | 6.2 |
| 10-15 | 0.25 | 0.028 | | | | | | | | | | 4.3 | | | 6.3 | 6.7 |
| 15-33 | 0.44 | 0.059 | | | | | | | | | | 18.3 | | | 7.5 | 8.2 |
| 33-48 | 0.26 | 0.035 | | | 2 | | | | | | | 15.2 | | | 8.3 | 8.9 |
| 48-58 | 0.39 | | | | 18 | 2 | | | | | | 11.9 | | | 8.3 | 9.1 |
| 58-76 | 0.13 | | | | 15 | | | | | | | 9.2 | | | 8.6 | 9.2 |
| 76-94 | 0.03 | | | | 5 | | | | | | | 9.5 | | | 8.5 | 9.3 |
| 94-125 | 0.02 | | | | 6 | | | | | | | 10.1 | | | 8.5 | 9.3 |
| 125-163 | 0.01 | | | | tr. | | | | | | | 3.0 | | | 8.8 | 9.2 |

| Depth cm | Extractable bases 5B1a: 6N2b Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0-5 | 2.5 | 1.1 | 0.2 | 0.8 | 4.6 | 1.8 | 4.7 | 6.4 | | | | | | | | | | |
| 5-10 | 2.4 | 1.3 | 0.2 | 0.6 | 4.5 | 1.8 | 5.3 | 6.3 | | | | | | | | | | |
| 10-15 | 3.5 | 1.9 | 0.3 | 0.6 | 6.3 | 1.0 | 6.4 | 7.3 | | | | | | | | | | |
| 15-33 | 15.2 | 10.2 | 1.4 | 1.8 | 28.6 | | 27.1 | | 2.1 | 1.6 | 5.1 | 0.3 | | - | 1.5 | 3.6 | | 0.98 |
| 33-48 | 22.0 | 10.2 | 1.7 | 1.6 | 35.5 | | 23.5 | | 2.2 | 1.7 | 6.4 | 0.3 | | - | 2.6 | 3.1 | | 1.06 |
| 48-58 | 20.2 | 8.5 | 2.1 | 1.7 | 32.5 | | 18.9 | | 2.8 | 2.1 | 9.4 | 0.4 | | - | 2.9 | 5.0 | | 1.48 |
| 58-76 | 21.6 | 7.1 | 2.6 | 1.6 | 32.9 | | 18.8 | | 2.9 | 2.4 | 6.9 | 0.2 | | - | 2.9 | 8.9 | | 2.02 |
| 76-94 | 19.9 | 6.4 | 3.0 | 1.4 | 30.7 | | 17.0 | | 2.1 | 1.6 | 13.2 | 0.2 | | - | 2.8 | 9.3 | | 1.80 |
| 94-125 | 20.9 | 6.2 | 3.4 | 1.4 | 31.9 | | 17.0 | | 1.2 | 0.9 | 8.7 | 0.2 | | - | 2.9 | 5.6 | | 1.24 |
| 125-163 | 5.1 | 1.8 | 1.5 | 0.6 | 9.0 | | 5.5 | | 1.1 | 0.8 | 6.7 | 0.2 | | - | 2.9 | 3.9 | | 0.94 |

| Depth cm | 8A Water at Saturation Pct. | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na me / 100 g | Gypsum Pct. | | | |
|---|---|---|---|---|---|---|---|
| 0-5 | | 4 | 0.2 | | | | |
| 5-10 | | 4 | 0.2 | | | | |
| 10-15 | | 5 | 0.3 | | | | |
| 15-33 | 61.7 | 4 | 1.1 | | | | |
| 33-48 | 57.1 | 5 | 1.2 | | | | |
| 48-58 | 51.4 | 9 | 1.2 | | | | |
| 58-76 | 36.2 | 7 | 1.4 | | | | |
| 76-94 | 42.0 | 5 | 0.8 | | | | |
| 94-125 | 47.0 | 6 | 1.0 | | | | |
| 125-163 | 20.6 | 9 | 0.5 | | | | |

1/ All determinations reported in this line or column were made on crushed samples of the whole soil. Results reported as percent or meq /100 g or g /cc are for the whole soil including the >2 mm fraction. If these data are compared to other data on this data sheet, the effect of the >2 mm fraction has to be taken into consideration.

## FRYE SANDY LOAM
S64Ariz-2-19

Location: Cochise County, Arizona. 7-1/4 miles west and 10-1/3 miles north of Willcox, Arizona on Ft. Grant Road. 1850 feet north and 1050 feet west of the SE corner of Sec. 2, T. 12 S, R. 23 E. Date of Sampling: October 19, 1964. Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, M. L. Richardson, and R. K. Preece.

Classification: Typic Durargid, fine, mixed, thermic.

Vegetation: Rangeland - Grass cover - Annual grama, tall three-awn, Rothrock grama, sand dropseed. Poor condition. Climate: Precipitation about 12 inches annual. Mean annual temperature 58° F. (Willcox) Soil temperature at time of sampling: 24 inches 69° F., 48 inches 71° F., 72 inches 71° F. Parent Material: Alluvium from granite, rhyolite, andesite, basalt with possibly some volcanic ash. Topography: Valley plain. Nearly level with slightly concave slopes of 0.2 percent. Elevation: 4285 feet. Drainage: Well drained. Slow external runoff. Slowly permeable. Soil Moisture: Slightly moist. About 25 percent field capacity. Water table 100 to 150 feet. Remarks: Sandy is the dominant type. Frye soils are of limited extent but are an important cropland soil. Paired sample is S64Ariz-2-18. Field determinations of pH by Hellige-Truog indicator and thymol blue in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>64595 | 0-5 cm (0-2 inches), brown (7.5YR 3/4) light sandy loam, brown to dark brown (7.5YR 4/4) when moist; weak medium and coarse platy structure; slightly hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; many very fine roots; many fine interstitial pores; pH 6.5; abrupt smooth boundary. |
| A12<br>RSL No.<br>64596 | 5-10 cm (2-4 inches), brown (7.5YR 5/4), heavy sandy loam, dark reddish brown (5YR 3/4) when moist; massive, breaking to weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; many fine and very fine roots; few fine and very fine tubular pores and common interstitial pores; noneffervescent; pH 7.0; abrupt smooth boundary. |
| B1<br>RSL No.<br>64597 | 10-15 cm (4-6 inches), brown (7.5YR 5/4) heavy sandy loam or loam, dark reddish brown (5YR 3/4) when moist; massive, breaking to weak fine and medium subangular blocky structure; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; many fine and very fine roots; few fine discontinuous pores; noneffervescent; pH 8.0; abrupt smooth boundary. |
| Note: | A thin discontinuous A2 horizon occurred in parts of the pit but was not sampled. Colors were 7.5YR 6/2 dry and 5YR 4/4 moist. |
| B21t<br>RSL No.<br>64598 | 15-33 cm (6-13 inches), reddish brown (5YR 4/3) clay, same color moist and crushed; moderate medium prismatic breaking to strong medium and coarse angular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; many fine and very fine exped roots becoming common and flattened in lower part; many exped pores; thin continuous clay films on ped faces; noneffervescent; pH 8.0; gradual wavy boundary. |
| B22tca<br>RSL No.<br>64599 | 33-48 cm (13-19 inches), reddish brown (5YR 5/4) clay, reddish brown (5YR 4/4) when moist, with common fine faint light reddish brown (5YR 6/3) mottles; moderate medium and coarse prismatic structure, breaking to moderate medium and coarse angular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; common fine and very fine crushed exped roots; few fine and very fine tubular and common exped pores; common thin clay films on ped faces and in pores; slightly effervescent in matrix and strongly effervescent in mottles; pH 8.2; clear smooth boundary. |
| B3tca<br>RSL No.<br>64600 | 48-58 cm (19-23 inches), brown (7.5YR 5/2) clay, reddish brown (5YR 4/4) when moist, with common fine distinct mottles and veins of lime that are pinkish white (7.5YR 8/2) and pinkish gray (7.5YR 7/2) when moist; moderate medium and coarse angular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; common exped fine roots and matted roots in lower part of horizon; common fine tubular and exped pores; common thin patchy clay films of peds and as bridges; strongly and violently effervescent; pH 8.2; abrupt smooth boundary. |
| C1cam<br>RSL No.<br>64601 | 58-76 cm (23-30 inches), light brown (7.5YR 6/4), with indurated duripan, brown to dark brown (7.5YR 4/4) when moist, pinkish white (7.5YR 8/2) veins and coatings pinkish gray (7.5YR 6/2) when moist; strong medium and coarse platy; extremely hard when dry, extremely firm when moist; common fine and very fine roots between plates of top 2 inches, none below; very few fine tubular and exped pores; rodent burrows*; patchy silica (?) coatings on plate faces; violently effervescent; pH 8.2; clear smooth boundary. |
| C2ca<br>RSL No.<br>64602 | 76-94 cm (30-37 inches), brown (7.5YR 5/4) strongly cemented duripan, brown to dark brown (7.5YR 4/4) when moist; many medium distinct mottles and veins of lime that are pinkish white (7.5YR 8/2) dry and pinkish gray (7.5YR 6/2) when moist; massive, extremely hard when dry, extremely firm when moist; no roots; many fine and very fine tubular pores; rodent burrows*; a few clay or silica bridges in places; strongly and violently effervescent; pH 8.4; abrupt wavy boundary. |
| C3ca<br>RSL No.<br>64603 | 94-125 cm (37-49 inches), similar to above horizon but decreasing lime content with depth. |
| IIC4<br>RSL No.<br>64604 | 125-163 cm (49-64 inches), light brown (7.5YR 6/4) sand and fine gravel, brown (7.5YR 5/4) moist; single grain, loose when dry, very friable when moist, nonsticky and nonplastic when wet; no roots, many interstitial pores; black coatings on some gravel; is basalt gravel up to 1/2 inch diameter; noneffervescent; pH 8.2. |

*Rodents have burrowed through the pans and worked vertically and horizontally at intervals of about 5 to 20 feet. These burrows are backfilled with a mixture of materials from all horizons. Roots and water enter the softer lower horizons through these fractures, making the material somewhat effective for root growth and water retention.

CONSECUTIVE PEDON NUMBER C 71 19 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA TAXADJUNCT SOIL NO. S71 ARIZ. 7- 4 SAMPLE NO. 1 109-1 115 CENT. MARICOPA AREA

SOIL FAMILY: TYPIC HAPLARGID,COARSE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION <2 MM | SANDS 2-.05 | SILTS .05-.002 | CLAYS LT .002 | VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CO. CLAYS 2-.2U | FINE CLAYS LT .2U | CARBONATE 3A1A | INT. 1I .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | 1A2A PCT. OF LT 75 | | |
| 1 109 | 0- 5 | A11 | 60.2 | 32.0 | 7.8 | 16.6 | 10.0 | 5.4 | 11.6 | 16.6 | 18.9 | 13.1 | 5.9 | 1.9 | | 1 | 42.1 | 40A 18 | 11 | 11 |
| 1 110 | 5- 13 | A12 | 65.7 | 27.2 | 7.1 | 10.3 | 10.4 | 7.7 | 15.2 | 22.1 | 17.2 | 10.0 | | | | TR | 47.4 | 35A 7 | 16 | 12 |
| 1 111 | 13- 31 | B21TCA | 43.2 | 36.4 | 20.4 | 12.3 | 7.9 | 4.7 | 8.2 | 10.1 | 12.0 | 24.4 | 12.6 | 7.8 | | 2 | 26.5 | 32A 2 | 13 | 17 |
| 1 112 | 31- 58 | B22TCA | 38.4 | 43.5 | 18.1 | 10.5 | 8.7 | 5.0 | 7.4 | 6.8 | 9.0 | 34.5 | | | | 1 | 19.9 | 18A -- | 5 | 13 |
| 1 113 | 58- 84 | B31TCA | 42.7 | 38.7 | 18.6 | 16.9 | 9.3 | 4.4 | 6.5 | 5.6 | 9.3 | 29.4 | 11.2 | 7.4 | | | 18.5 | 41A 2 | 17 | 22 |
| 1 114 | 84-112 | B32TCA | 26.0 | 53.5 | 20.5 | 5.8 | 5.4 | 3.7 | 6.5 | 4.6 | 7.9 | 45.6 | | | | TR | 16.1 | 43A -- | 25 | 18 |
| 1 115 | 112-147 | 2C 1 | 29.1 | 55.1 | 15.8 | 0.1 | 0.3 | 0.7 | 7.3 | 20.7 | 17.5 | 37.6 | 8.8 | 7.0 | | 2 | 43.9 | 67A 49 | 17 | TR |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A PCT. | NITROGEN 6B1A PCT. | CARBONATE AS CACO3 LT 2 6E1B PCT. | 2-19 6E1B PCT. | EXT. IRON FE 6C2B PCT. | ATTERBERG LL 4F1 PCT. | PL 4F2 PCT. | BULK DENSITY EST 1/3 BAR 4A1F GRAMS | 1/3 BAR 4A1F PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C PCT. | 1/3 BAR 4B1C PCT. | 15 BAR 4B2 PCT. | EXTENSBLTY LEF 4D1 PCT. | LE 4D1 PCT. | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 109 | 0- 5 | 0.40 | 0.025 | 14 | | | | | 1.39 | | | 0.74 | | | 5.9 | | | 8.0 | 9.4 | 7.0 |
| 1 110 | 5- 13 | 0.30 | 0.020 | 9 | | | | | | 1.39 | 1.40 | 0.78 | 16.8 | 11.0 | 5.4 | 0.2 | 0.2 | 8.0 | | 7.1 |
| 1 111 | 13- 31 | 0.35 | | 24 | | | | | | 1.41 | 1.55 | 0.80 | 27.2 | 23.5 | 10.1 | 3.2 | 2.5 | 8.6 | 10.0 | 7.4 |
| 1 112 | 31- 58 | 0.15 | | 37 | | | | | | 1.37 | 1.54 | 0.90 | 32.7 | 28.2 | 10.9 | 4.0 | 3.5 | 8.7 | 10.0 | 7.5 |
| 1 113 | 58- 84 | | | 23 | | | | | | 1.38 | 1.49 | 0.74 | 32.0 | 28.7 | 14.1 | 2.6 | 1.9 | 8.4 | 9.9 | 7.6 |
| 1 114 | 84-112 | | | 48 | | | | | 1.38 | | | 0.72 | | | 13.4 | | | 8.5 | 9.7 | 7.1 |
| 1 115 | 112-147 | | | 30 | | | | | 1.38 | | | 0.49 | | | 13.6 | | | 8.5 | 9.7 | 7.4 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E MEQ/100G | MG 5B4A 6Q2D MEQ/100G | NA 5B4A 6P2A MEQ/100G | K 5B4A 6Q2A MEQ/100G | SUM | BASE SAT. PCT. | C E C NA-OAC 5A2A MEQ/100G | NH4-OAC 5A6A MEQ/100G | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE CA 6N1A MEQ/1000 ML | MG 6Q1A MEQ/1000 ML | NA 6P1A MEQ/1000 ML | K 6Q1A MEQ/1000 ML | CO3 6I1A MEQ/1000 ML | HCO3 6J1A MEQ/1000 ML | CL 6K1A MEQ/1000 ML | SO4 6L1B MEQ/1000 ML | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 109 | 0- 5 | 18.4 | 1.6 | 2.6 | 0.7 | 23.3 | 100+ | | 11.8 | 5.39 | 10.5 | 2.0 | 34.5 | 0.7 | | 2.9 | 41.7 | | | 7.6 |
| 1 110 | 5- 13 | 18.8 | 1.9 | 0.4 | 0.1 | 21.2 | 100+ | | 10.9 | | | | | | | | | | | |
| 1 111 | 13- 31 | 22.9 | 2.0 | 6.4 | 0.3 | 31.6 | 100+ | | 18.9 | 2.35 | 0.9 | 0.5 | 20.1 | 0.1 | | 6.2 | 13.6 | | | 7.9 |
| 1 112 | 31- 58 | 13.9 | 1.4 | 18.2 | 0.3 | 33.8 | 100+ | | 18.2 | 7.5 | 1.0 | 0.4 | 74.2 | 0.3 | | 4.1 | 57.0 | 4.7 | | 8.4 |
| 1 113 | 58- 84 | 15.3 | 2.0 | 26.9 | 0.4 | 44.6 | 100+ | | 21.7 | 10.6 | 1.6 | 1.0 | 102.0 | 0.1 | | 3.5 | 70.2 | 28.1 | | 8.5 |
| 1 114 | 84-112 | 15.9 | 2.0 | 20.5 | 0.5 | 38.9 | 100+ | | 17.8 | 14.7 | 7.9 | 2.5 | 142.0 | 0.1 | | 3.6 | 79.4 | 84.0 | | 8.2 |
| 1 115 | 112-147 | 15.8 | 2.5 | 18.3 | 0.6 | 37.2 | 100+ | | 14.6 | 12.1 | 7.1 | 2.7 | 112.0 | 0.3 | | 3.2 | 62.5 | 61.0 | | 8.4 |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A SAT. PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY <0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A2E | PCT. 7A3 | L.T. .0002 MM X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 109 | 0- 5 | 31.5 | 1.5 | 13 | 14 | | | MT 5 | MI 3 | KK 2 | | | MI 3 | MT 2 | | MT MONTMORT | 1 TRACE |
| 1 110 | 5- 13 | | 0.4 | 4 | | | | | | | | | | | | MI MICA | 2 SMALL |
| 1 111 | 13- 31 | 46.7 | 5.5 | 29 | 24 | | 4.8 | MT 5 | MI 2 | KK 1 | | | MT 5 | MI 2 | | KK KAOLINIT | 3 MODERATE |
| 1 112 | 31- 58 | 75.5 | 12.6 | 69 | 89 | | 9.4 | | | | | | | | | | 4 ABUNDANT |
| 1 113 | 58- 84 | 76.9 | 19.1 | 88 | 89 | | 9.6 | MT 5 | MI 2 | KK 1 | | | MT 5 | MI 3 | | | 5 DOMINANT |
| 1 114 | 84-112 | 68.4 | 10.8 | 61 | 62 | | 8.4 | | | | | | | | | | 6 INDETER. |
| 1 115 | 112-147 | 82.9 | 9.0 | 62 | 51 | | 5.1 | MT 4 | MI 3 | KK 1 | | | MT 5 | MI 3 | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## HARQUA GRAVELLY LOAM (taxadjunct) 1/
S71Ariz-7-4(1-7)

Location: Maricopa County, Arizona. 1130 feet east and 270 feet south of the NW corner of Section 20, T1S, R6W, about 18 miles west of Buckeye. Date of Sampling: April 13, 1971. Description by: W. D. Nettleton, J. Jay, G. Hartman, R. Schurig and F. Cook. Collectors: W. D. Nettleton, J. Jay, G. Hartman, R. Schurig and F. Cook.
Classification: Typic Haplargid, coarse-loamy, mixed, hyperthermic.
Vegetation: Saltbush and creosotebush; cholla cactus. Use: Parkland, wildlife habitat and rangeland. Climate: Arid, continental. Mean annual air temperature 70 to 74° F. Precipitation about 7 inches. Parent Material: Old alluvium from granite, rhyolite, quartzite and schist. Topography: Gently sloping dissected low fans on 1 to 2 percent slopes. Elevation: 1100 feet. Drainage: Well drained, slow permeability. Medium runoff. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>71109 | 0 to 5 cm (0 to 2 inches), light brown (7.5YR 6/4) gravelly loam, dark brown (7.5YR 4/4) moist; weak coarse platy structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine roots; common fine tubular and few fine interstitial pores; 30 to 40 percent fine, medium and coarse subangular gravel; strongly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. |
| A12<br>RSL<br>71110 | 5 to 13 cm (2 to 5 inches), light brown (7.5YR 6/4) very gravelly fine sandy loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine roots; common fine interstitial and many very fine vesicular pores; 75 percent fine, medium and coarse subangular gravel; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| B21tca<br>RSL<br>71111 | 13 to 31 cm (5 to 12 inches), yellowish red (5YR 4/6) gravelly clay loam, yellowish red (5YR 4/4) moist; weak medium subangular blocky structure; hard, friable, sticky, plastic; common fine and medium roots; common fine interstitial pores and many very fine vesicular pores; 20 percent fine and medium subangular gravel; strongly effervescent; many coarse pinkish white fine and medium irregularly shaped soft lime masses; strongly alkaline (pH 8.8); clear wavy boundary. |
| B22tca<br>RSL<br>71112 | 31 to 58 cm (12 to 23 inches), yellowish red (5YR 4/6) gravelly clay loam, yellowish red (5YR 4/4) moist; weak medium subangular blocky structure; hard, friable, sticky, plastic; common fine tubular and interstitial pores; 25 percent fine, medium and coarse subangular gravel; strongly effervescent; many medium and coarse pinkish white irregularly shaped soft lime masses; strongly alkaline (pH 9.6); clear wavy boundary. |
| B31tca<br>RSL<br>71113 | 58 to 84 cm (23 to 33 inches), yellowish red (5YR 5/6) gravelly clay loam, yellowish red (5YR 4/6) moist; massive, hard, friable, sticky, plastic, few fine roots; common fine interstitial pores; 45 percent fine, medium and coarse subangular gravels; strongly effervescent; common coarse pinkish white irregularly shaped soft lime masses; strongly alkaline (pH 8.8); gradual wavy boundary. |
| B32tca<br>RSL<br>71114 | 84 to 112 cm (33 to 44 inches), yellowish red (5YR 5/6) gravelly clay loam, yellowish red (5YR 4/6) moist; massive, hard, friable, sticky, plastic; few fine roots; common fine interstitial pores; 45 percent fine and medium subangular gravel; strongly effervescent; common fine and medium pinkish white irregularly shaped soft lime masses and seams of lime; strongly alkaline (pH 8.5); abrupt smooth boundary. |
| IIC<br>RSL<br>71115 | 112 to 147 cm (44 to 58 inches), yellowish red (5YR 5/6) silty clay, yellowish red (5YR 4/6) moist; massive; very hard, friable, sticky, plastic; common fine interstitial pores; common black manganese stains; 10 percent fine and medium gravels; strongly effervescent; common coarse white irregularly shaped soft lime masses and concretions; strongly alkaline (pH 8.4); abrupt smooth boundary. |

1/ The Harqua series is in a fine-loamy, mixed, hyperthermic family of Typic Haplargids. This pedon has slightly less than 18 percent silicate clay in its control section.

CONSECUTIVE PEDON NUMBER C 68147 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SONOITA SOIL NO. S68 ARIZ. 12- 3 SAMPLE NO. 81060-81068 E.PIMA-SANTA CRU AREA

SOIL FAMILY: TYPIC HAPLARGID COARSE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 PCT. OF LT 75 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 81060 | 0- 5 | A11 | 75.7 | 18.5 | 5.8 | 11.0 | 20.3 | 12.8 | 21.2 | 10.4 | 13.5 | 5.0 | | | | 34.6 | 9A | -- | 2 | 7 |
| 81061 | 5- 10 | A12 | 72.5 | 19.5 | 8.0 | 17.3 | 19.5 | 10.5 | 17.2 | 8.0 | 13.4 | 6.1 | | | | 30.0 | 16A | -- | 5 | 11 |
| 81062 | 10- 25 | B21 | 69.8 | 18.2 | 12.0 | 14.5 | 18.3 | 10.4 | 16.9 | 9.7 | 8.7 | 9.5 | | | | 27.4 | 5A | -- | 5Z | N |
| 81063 | 25- 43 | B22 | 67.1 | 22.6 | 10.3 | 12.2 | 17.4 | 9.9 | 16.9 | 10.7 | 15.0 | 7.6 | | | | 34.2 | 19A | 15 | 1 | 3 |
| 81064 | 43- 66 | B23TCAB | 66.1 | 22.7 | 11.2 | 12.4 | 16.7 | 10.3 | 16.7 | 10.0 | 14.3 | 8.4 | | | | 33.5 | 17A | -- | 17Z | N |
| 81065 | 66-102 | 2B24TCAB | 64.1 | 18.5 | 17.4 | 16.2 | 17.1 | 8.9 | 13.8 | 8.1 | 9.7 | 8.8 | | | | 25.2 | 4A | -- | 4Z | N |
| 81066 | 102-157 | 2B25TCAB | 57.3 | 27.1 | 15.6 | 15.2 | 18.0 | 8.1 | 10.0 | 6.0 | 14.5 | 12.6 | | | | 25.6 | 3A | -- | 1 | 2 |
| 81067 | 157-178 | 2B3CAB | 65.8 | 19.6 | 14.6 | 14.5 | 20.0 | 10.6 | 14.4 | 6.3 | 11.6 | 8.0 | | | | 25.3 | 24A | 19 | 5Z | N |
| 81068 1/ | 0- 38 | | 52.4 | 23.5 | 24.1 | 8.1 | 11.0 | 5.6 | 17.3 | 10.4 | 9.8 | 13.7 | | | | 31.0 | 21A | -- | 6 | 15 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT EXT FE 6C2B | AL 6G7A | PYROP EXT FE 6C5A | AL 6G5A | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT.NO.40 | | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 81060 | 0- 5 | 0.38 | 0.031 | | | 0.5 | 0.1 | | | NP | NP | | 1.59 | 1.59 | 0.94 | | 3.2 | 2.3 | | |
| 81061 | 5- 10 | 0.23 | 0.021 | | | 0.6 | 0.1 | | | | | | 1.65 | 1.65 | 0.89 | | 7.2 | 2.9 | | |
| 81062 | 10- 25 | 0.23 | | | | 0.6 | 0.1 | | | NP | NP | | 1.62 | 1.63 | 0.97 | | 5.6 | 3.6 | 0.2 | 0.2 |
| 81063 | 25- 43 | 0.24 | | | | 0.6 | 0.1 | | | | | | 1.55 | 1.57 | 0.88 | | 7.7 | 3.9 | 0.4 | 0.4 |
| 81064 | 43- 66 | | | TR | | 0.5 | TR | | | | | | 1.53 | 1.56 | 0.90 | | 7.6 | 4.1 | 0.6 | 0.6 |
| 81065 | 66-102 | | | 2 | | 0.7 | 0.1 | | | 24 | 16 | | 1.57 | 1.65 | 0.98 | | 14.1 | 6.6 | 1.7 | 1.6 |
| 81066 | 102-157 | | | 2 | | 0.6 | 0.1 | | | | | | 1.65 | 1.71 | 0.98 | | 12.6 | 6.3 | 1.2 | 1.2 |
| 81067 | 157-178 | | | 1 | | 0.6 | 0.1 | | | | | 1.65 | | | 0.83 | | | 6.5 | | |
| 81068 | 0- 38 | 0.32 | 0.034 | | | | | | | | | 1.60 | | | 0.87 | | | 3.5 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81060 | 0- 5 | 5.1 | 2.6 | 0.1 | 0.7 | 8.5 | 0.8 | | 9.3 | 11.5 | 91 | | 74 | | 5.7 | 4.9 |
| 81061 | 5- 10 | 2.5 | 0.8 | 0.1 | 0.4 | 3.8 | | | 3.8 | 4.1 | 100+ | | 93 | | 7.9 | 7.5 |
| 81062 | 10- 25 | 4.7 | 1.3 | 0.1 | 0.3 | 6.4 | | | 6.4 | 5.3 | 100+ | | 100+ | | 8.0 | 7.5 |
| 81063 | 25- 43 | 6.4 | 1.3 | 0.1 | 0.2 | 8.0 | | | 8.0 | 6.1 | 100+ | | 100+ | | 7.8 | 7.0 |
| 81064 | 43- 66 | 7.9 | 1.4 | 0.1 | 0.2 | 9.6 | | | 9.6 | 5.0 | 100+ | | 100+ | | 8.2 | 7.1 |
| 81065 | 66-102 | 18.8 | 4.7 | 0.3 | 0.5 | 24.3 | | | 24.3 | 9.3 | 100+ | | 100+ | | 8.2 | 7.4 |
| 81066 | 102-157 | 16.9 | 3.9 | 0.6 | 0.5 | 21.9 | | | 21.9 | 8.7 | 100+ | | 100+ | | 8.3 | 7.5 |
| 81067 | 157-178 | 13.5 | 3.4 | 0.9 | 0.5 | 18.3 | | | 18.3 | 9.9 | 100+ | | 100+ | | 8.4 | 7.5 |
| 81068 | 0- 38 | | | | | | | | | | | | | | | |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81060 | 0- 5 | MI 3 | KK 2 | MT 1 | | | | | | | MI MICA | 1 TRACE |
| 81061 | 5- 10 | | | | | | | | | | KK KAOLINIT | 2 SMALL |
| 81062 | 10- 25 | MI 3 | KK 3 | | | | | | | | MT MONTMORT | 3 MODERATE |
| 81063 | 25- 43 | | | | | | | | | | | 4 ABUNDANT |
| 81064 | 43- 66 | | | | | | | | | | | 5 DOMINANT |
| 81065 | 66-102 | MI 3 | KK 2 | | | | | | | | | 6 INDETER. |
| 81066 | 102-157 | | | | | | | | | | | |
| 81067 | 157-178 | | | | | | | | | | | |
| 81068 | 0- 38 | | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
1/= Composite from 20 pedons.

## SONOITA GRAVELLY SANDY LOAM
S68 Ariz-12-3-1 through 8

Location: Santa Cruz County, Arizona, 2 miles south and 1 mile west of Amado. 0.4 mile west of ranchhouse, 75 feet south of ranchtrail, 600 feet west of E¼ corner Section 23, T20S, R12E. Photo AMS-265. Date of Sampling: October 9, 1968.
Description by: Richardson and Clemmons. Collectors: Nettleton and Clemmons.
Classification: Typic Haplargid, coarse-loamy, mixed, thermic.
Vegetation: Desert shrub--grass: Shrubs: Mesquite, catclaw, burroweed and barrel cacti. Grasses: three-awn, Arizona cottontop, Rothrock grama, bush muhly, annual needle grama.
Climate: Mean annual temperature approximately 63.8°F. Mean annual precipitation 11-12 inches.
Parent Material: Old reworked alluvium--mainly granite, andesite tuff and rhyolite tuff. Topography: Gently sloping fan. 3 percent slope. East aspect. Elevation: 3250 feet. Drainage: Well drained. Medium runoff. Soil moisture: Dry.
Remarks: Pit location S.50°W on Sardina Peak. S.15°W on Tumacacori Peak.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-5 cm) |
| A11 RSL 681060 | 0 to 2 inches, brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 4/4) moist; weak medium platy breaking to weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; few medium and fine tubular and many fine interstitial pores; 20 percent fine gravel; noneffervescent; slightly acid (pH 6.5); abrupt smooth boundary. |
| A12 RSL 681061 (5-10 cm) | 2 to 4 inches, brown (7.5YR 5/4) gravelly sandy loam, reddish brown (5YR 4/4) moist; massive breaking to weak fine and medium granular structure; hard, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine interstitial and few very fine and fine tubular pores; 20 percent fine gravel; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| B21 RSL 681062 (10-25 cm) | 4 to 10 inches, reddish brown (5YR 5/4) gravelly sandy loam, dark reddish brown (5YR 3/4) moist; massive breaking to fine, medium and coarse subangular blocky structure; hard, friable, slightly sticky and nonplastic; common fine and very fine and few medium roots; common very fine and fine tubular pores; 20 percent fine gravel; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B22 RSL 681063 (25-43 cm) | 10 to 17 inches, reddish brown (5YR 5/4) gravelly sandy loam, dark reddish brown (5YR 3/4) moist; massive breaking to fine, medium and coarse subangular blocky structure; hard, friable, slightly sticky and nonplastic; common fine and very fine and few medium roots; common very fine and fine tubular pores; 20 percent fine gravel; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B23tca RSL 681064 (43-66 cm) | 17 to 26 inches, reddish brown (5YR 5/4) gravelly light sandy clay loam, yellowish red (5YR 4/6) moist, with common fine distinct white (8/0) lime filaments, pinkish gray (7/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine and few coarse roots; few fine and very fine and few medium tubular pores; common thin clay films on ped faces and in pores; 25 percent fine gravel; few cobbles; slightly effervescent in spots; moderately alkaline (pH 8.0); clear wavy boundary. |
| IIB24tcab RSL 681065 (66-102 cm) | 26 to 40 inches, reddish brown (5YR 5/4) and reddish brown (2.5YR 4/4) gravelly sandy clay loam, yellowish red (5YR 4/6) and reddish brown (2.5YR 4/4) moist, with few fine faint pinkish white (5YR 8/2) lime filaments, light reddish brown (5YR 6/3) moist; massive; very hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; 30 percent gravel; slightly effervescent in spots; moderately alkaline (pH 8.0); clear wavy boundary. |
| IIB25tcab RSL 681066 (102-157 cm) | 40 to 62 inches, light brown (7.5YR 6/4) gravelly sandy clay loam, reddish brown (5YR 4/4) moist, with common fine distinct pinkish white (7.5YR 8/2) lime filaments, light brown (7.5YR 6/4) moist; massive; very hard, friable, slightly sticky and plastic; few fine and medium roots; few fine and medium tubular pores; common thin clay films on ped faces and in pores; 30 percent fine gravel; strongly to violently effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| IIB3cab RSL 681067 (157-178 cm) | 62 to 70 inches plus, yellowish red (5YR 5/6) gravelly sandy loam, yellowish red (5YR 4/6) moist; massive; very hard, friable, slightly sticky and slightly plastic; few very fine and fine tubular pores; 40 percent gravel; slightly effervescent in spots; moderately alkaline (pH 8.0). |
| Composite A RSL 681068 | 0 to 15 inch samples were selected from 20 pedons at 10-foot intervals along two 100-foot transects that intersect at the backhoe pit. (0-38 cm) |

CONSECUTIVE PEDON NUMBER C 69162 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SONOITA SOIL NO. S69 ARIZ. 2-16 SAMPLE NO. 9 847-9 848 WILLCOX AREA

SOIL FAMILY: TYPIC HAPLARGID,COARSE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II .2- 3A1A.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75- 20 PCT. | II 20-5 OF LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 9 847 | 23- 43 | B21T | 72.4 | 15.1 | 12.5 | 9.3 | 16.5 | 14.1 | 23.2 | 9.3 | 8.7 | 6.4 | | | | 30.4 | 16A | -- | 3 | 13 |
| 9 848 | 43- 74 | B22T | 68.4 | 17.0 | 14.6 | 12.9 | 14.7 | 10.8 | 19.3 | 10.7 | 9.6 | 7.4 | | | | 31.3 | 19A | 2 | 7 | 10 |

| SAMPLE NO. | DEPTH CM. | ORG. MATTER CARBON 6A1A -PERCENT- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A -PERCENT- | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LL 4F1 PCT. | PL 4F2 | BULK DENSITY 1/3 EST. 4A1F 1.55 | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 -PERCENT- | EXTNSBLTY LEF 4D1 | LE 4D1 -PERCENT- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | NO.40 GRAMS PER CC | | | | | | | | |
| 9 847 | 23- 43 | | | | | | | | | | | 1.55 | | 0.90 | | | | 4.7 | | |
| 9 848 | 43- 74 | | | | | | | | | | | 1.55 | | 0.88 | | | | 7.4 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6G2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA- CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 847 | 23- 43 | | | 0.1 | 0.9 | 1.0 | | | 1.0 | 8.1 | | | | | 7.1 | 7.1 |
| 9 848 | 43- 74 | | | 0.2 | 0.5 | 0.7 | | | 0.7 | 9.5 | | | | | 7.2 | 7.1 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <2 MM LESS THAN 0.002 MM X RAY DTA 7A2E I | 7A2E II | 7A2F III | 7A2E IV | 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM MINERAL X RAY CODE 7A2E I | 7A2E II | 7A2E III | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 847 | 23- 43 | | | | | | | | | | 1 TRACE |
| 9 848 | 43- 74 | | | | | | | | | | 2 SMALL |
| | | | | | | | | | | | 3 MODERATE |
| | | | | | | | | | | | 4 ABUNDANT |
| | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## SONOITA SANDY LOAM
S69Ariz-2-16

Location: Cochise County, Arizona. 2,400 feet east and 1,300 feet north of southwest corner of Sec. 21, T. 15 S., R. 26 E. East of Kansas Settlement Road, about 9½ miles south and 8½ miles east of Willcox. Date of sampling: October 16, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Haplargid, coarse-loamy, mixed, thermic.
Vegetation: Rothrock grama, three-awn and spike dropseed. Use: Livestock range. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Alluvium from acid igneous rocks. Topography: Level to moderately sloping convex fans and valley slopes. Slope, 0.5 percent, southwest facing. Elevation: 4370 feet. Drainage: Well drained. Runoff is slow to medium. Permeability is moderately slow. Soil Moisture: Dry when sampled.
Remarks: Field determination of pH by Hellige-Truog indicator solution. Paired with sample S69Ariz-2-28. The B21t and B22t are the only horizons sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A1 | 0 to 5 cm (0 to 2 inches), brown (7.5YR 5/4) sandy loam, dark reddish brown (5YR 3/4) moist; weak thin platy structure; slightly hard, friable, nonsticky, nonplastic; many fine and medium roots; common very fine and fine tubular pores; noneffervescent; medium acid (pH 6.0); abrupt smooth boundary. |
| A3 | 5 to 23 cm (2 to 9 inches), brown (7.5YR 5/4) sandy loam dark reddish brown (5YR 3/4) moist; massive; slightly hard, friable, nonsticky, nonplastic; many fine and medium roots; many very fine and fine and few medium tubular pores; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| B21t RSL 69847 | 23 to 43 cm (9 to 17 inches), reddish brown (5YR 5/4) sandy loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly plastic; common fine and medium roots; many fine and medium tubular pores; common thin oriented clay bridges and films in pores; noneffervescent; mildly alkaline (pH 7.5); gradual smooth boundary. |
| B22t RSL 69848 | 43 to 74 cm (17 to 29 inches), reddish brown (5YR 5/4) fine gravelly sandy clay loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many very fine and fine tubular pores; common thin oriented clay bridges and films in pores; about 15 percent by volume of 2 to 5 mm angular granitic and quartz gravel; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary. |
| B23t | 74 to 91 cm (29 to 36 inches), reddish brown (5YR 5/4) fine and gravelly sandy clay loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; hard, friable slightly sticky, slightly plastic; few very fine roots; many very fine and fine tubular pores; common thin oriented clay bridges and films in pores; about 15 percent by volume of 2 to 5 mm angular granitic and quartz gravel; noneffervescent; moderately alkaline (pH 8.0); abrupt wavy boundary. |
| B31tca | 91 to 117 cm (36 to 46 inches), yellowish red (5YR 5/6) gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic, many very fine and fine and few coarse tubular pores; many thin clay films on ped faces; about 30 percent by volume of 1/8 to 3 inch rounded rhyolite, andesite, granite, and quartz gravel; few fine threads of lime; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| B32tca | 117 to 135 cm (46 to 53 inches), reddish yellow (5YR 6/6) finely gravelly sandy clay loam, yellowish red (5YR 5/6) moist; massive; hard, friable, slightly sticky, slightly plastic; common very fine tubular pores; common thin oriented clay bridges and films in pores; about 30 percent by volume of 1/8 to 3 inch rounded rhyolite, andesite, granite, and quartz gravel; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| C | 135 to 150 cm (53 to 59 inches), reddish yellow (5YR 6/6) very gravelly sand, yellowish red (5YR 6/6) moist; massive; hard, very friable, nonsticky, nonplastic; few medium and coarse tubular and few very fine interstitial pores; about 50 percent by volume of 2 to 5 mm angular rhyolite, andesite, granite, and quartz gravel; slightly effervescent; moderately alkaline (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 69174 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SONOITA SOIL NO. S69 ARIZ. 2-28 SAMPLE NO. 9 889-9 890 WILLCOX AREA

SOIL FAMILY: TYPIC HAPLARGID,COARSE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | INT. 1A2A .2-.02 | COARSE FRAGMENTS OF WHOLE 20 75-20 | 20-5 | 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL PCT. OF LT 75 | | |
| 9 889 | 15- 38 | B21T | 67.2 | 15.6 | 17.2 | 18.4 | 20.0 | 9.7 | 11.9 | 7.2 | 8.6 | 7.0 | | | | 21.9 | 23A -- | 13 | 10 |
| 9 890 | 38- 56 | B22T | 69.2 | 12.9 | 17.9 | 28.2 | 16.6 | 7.6 | 10.0 | 6.8 | 7.3 | 5.6 | | | | 19.2 | 23A -- | 7 | 16 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A2c -PERCENT- | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 2-20 6E1b 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | DRY BAR 4A1F | 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | -PERCENT- | | PERCENT | | | | PCT.NO.40 | | GRAMS PER CC | | | | -----PERCENT--- | | | -PERCENT- | |
| 9 889 | 15- 38 | 0.15 | | | | | | | | | 1.55 | | 0.85 | | | | 7.2 | | |
| 9 890 | 38- 56 | 0.14 | | | | | | | | | 1.55 | | 0.85 | | | | 8.8 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1F | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 889 | 15- 38 | | | 0.3 | 0.7 | 1.0 | | | 1.0 | 12.0 | | | | | 7.8 | 7.5 |
| 9 890 | 38- 56 | | | 0.4 | 0.7 | 1.1 | | | 1.1 | 12.7 | | | | | 7.8 | 7.3 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <2 MM DTA 7A3 -PERCENT- | L.T. 0.0002 MM MINERAL X RAY 7A2E I | 7A2E II | 7A2E III | CODE |
|---|---|---|---|---|---|---|
| 9 889 | 15- 38 | | | | | |
| 9 890 | 38- 56 | | | | | |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## SONOITA SANDY LOAM
S69Ariz-2-28

Location: Cochise County, Arizona. 400 feet south and 500 feet west of the northeast corner of Sec. 16, T. 15 S., R. 26 E. East of Kansas Settlement Road, about 13 miles east and 2 miles north of Cochise. Date of sampling: October 23, 1969.

Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.

Classification: Typic Haplargid, coarse-loamy, mixed, thermic.

Vegetation: Rothrock grama, three-awn, mesquite and yucca. Use: Livestock range. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Alluvium from granite, rhyolite, andesite and possibly limestone. Topography: Nearly level convex fans and valley slopes. Slope, 0.5 percent, west facing. Elevation: 4400 feet. Drainage: Well drained. Runoff is slow to medium. Permeability is moderately slow. Soil Moisture: Dry when sampled.

Remarks: Field determinations of pH Hellige-Truog indicator solution. Paired with sample S69Ariz-2-16. The B21t and B22t are the only horizons sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A11 | 0 to 5 cm (0 to 2 inches), brown (7.5YR 5/4) sandy loam, dark reddish brown (5YR 3/4) moist; weak thin platy structure; slightly hard, friable, nonsticky, nonplastic; many fine and medium roots; common fine and medium tubular pores; noneffervescent; medium acid (pH 6.0); abrupt smooth boundary. |
| A12 | 5 to 15 cm (2 to 6 inches), reddish brown (5YR 4/4) sandy loam, dark reddish brown (5YR 3/4) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many fine and medium roots; common fine and medium tubular pores; noneffervescent; medium acid (pH 6.0); clear smooth boundary. |
| B21t RSL 69889 | 15 to 38 cm (6 to 15 inches), reddish brown (5YR 4/4) gravelly sandy clay loam, dark reddish brown (5YR 3/4) moist; massive parting to weak fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common fine and medium roots; common fine and medium tubular pores; common thin clay films on faces of peds and in pores; contains about 15 percent by volume of 2 to 5 mm angular granite, rhyolite and andesite gravel; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B22t RSL 69890 | 38 to 56 cm (15 to 22 inches), reddish brown (5YR 5/4) gravelly sandy clay loam, reddish brown (5YR 4/4) moist; massive parting to weak fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine and medium roots; common fine and medium tubular pores; common thin clay films on faces of peds and in pores; contains about 20 percent by volume of 2 to 15 mm angular granite, rhyolite and andesite gravel; 15 to 20 percent fine and medium gravel; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B23t | 56 to 79 cm (22 to 31 inches), yellowish red (5YR 5/6) gravelly sandy clay loam, yellowish red (5YR 4/6) moist; massive; hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many very fine and fine tubular pores; common thin clay films in pores and bridges; about 20 percent by volume of 2 to 25 mm angular granite, rhyolite and andesite gravel; very slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| B31tca | 79 to 97 cm (31 to 38 inches), yellowish red (5YR 5/6) gravelly light sandy clay loam, yellowish red (5YR 4/6) moist; massive; hard, friable, slightly sticky, slightly plastic; many fine and very fine tubular pores; common thin clay films in pores and as bridges; has about 25 percent by volume of rounded granite, rhyolite and andesite gravel of 3 to 80 mm; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| Cca | 97 to 120 cm (38 to 47 inches), brown (7.5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; slightly effervescent; moderately alakaline (pH 8.0); clear wavy boundary. |
| B2tbca | 120 to 150 cm (47 to 59 inches), red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; massive; hard, friable, sticky, plastic; slightly effervescent; moderately alkaline (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 67 52 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA SOIL NO. S67 ARIZ. 7- 5 SAMPLE NO. 7 629-7 638 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC HAPLARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HOR2. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI --SILTS-- .05-.02 | FSI .02-.002 | CO. CLAYS 2-.2U | FINE LT .2U | CARBO NATE 3A1A.02 | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 7 629 | 0- 0 | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| 7 630 | 0- 3 | A2 | 37.7 | 47.7 | 14.6 | 4.3 | 4.6 | 2.6 | 7.0 | 19.2 | 23.7 | 24.0 | 13.7 | 0.9 | | 47.6 | 10 | TR | 10Z | N |
| 7 631 | 3- 8 | A+B | 39.8 | 41.5 | 18.7 | 3.9 | 4.8 | 2.6 | 7.2 | 21.3 | 21.3 | 20.2 | 16.8 | 1.9 | | 47.5 | 9 | TR | 9Z | N |
| 7 632 | 8- 23 | B21T | 37.4 | 37.8 | 24.8 | 9.0 | 6.2 | 2.9 | 4.9 | 14.4 | 14.1 | 23.7 | 20.1 | 4.7 | | 31.5 | 23 | TR | 23Z | N |
| 7 633 | 23- 30 | B22TSA | 47.3 | 20.7 | 32.0 | 14.1 | 9.8 | 4.3 | 5.4 | 13.7 | 12.4 | 8.3 | 20.3 | 11.7 | | 29.0 | 22 | TR | 22Z | N |
| 7 634 | 30- 51 | B3ITCA | 58.6 | 20.1 | 21.3 | 20.5 | 12.7 | 5.2 | 5.9 | 14.3 | 12.7 | 7.4 | | | | 29.9 | 28 | TR | 28Z | N |
| 7 635 | 51- 712B32TCA | | 59.3 | 25.9 | 14.8 | 20.1 | 11.9 | 5.2 | 6.6 | 15.5 | 16.8 | 9.1 | | | | 35.7 | 40 | TR | 40Z | N |
| 7 636 | 71- 843C 1CA | | 45.8 | 36.9 | 17.3 | 4.5 | 7.0 | 4.1 | 6.3 | 23.9 | 25.2 | 11.7 | | | | 52.8 | 7 | TR | 7Z | N |
| 7 637 | 84- 943C 2CA | | | | | | | | | | | | | | | | 1 | TR | 1Z | N |
| 7 638 | 94-1143C 3CA | | | | | | | | | | | | | | | | 36 | 13 | 23Z | N |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR-BON 6A1A | NITRO-GEN 6B1A | CARBONATE AS CACO3 LT 2 -PERCENT | 2-19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | I M I T P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 7 629 | 0- 0 | | | | | | | | | | | | | | | | | | | |
| 7 630 | 0- 3 | 0.06 | 0.018 | 6 | | 0.7 | | | | 1.53 | 1.55 | 0.94 | | 18.2 | 8.5 | 0.4 | 0.4 | | 9.7 | |
| 7 631 | 3- 8 | | 0.019 | 6 | | 0.7 | | | 1.52 | | | 0.95 | | | 10.8 | | | | 9.7 | |
| 7 632 | 8- 23 | | | 2 | | 0.8 | | | | 1.51 | 1.58 | 0.85 | | 17.6 | 10.9 | 1.5 | 1.3 | | 8.5 | |
| 7 633 | 23- 30 | | | 1 | | 0.7 | | | 1.51 | | | 0.86 | | | 9.9 | | | | 8.1 | |
| 7 634 | 30- 51 | | | 4 | | 0.5 | | | 1.50 | | | 0.82 | | | 7.0 | | | | 8.2 | |
| 7 635 | 51- 71 | | | 7 | | 0.4 | | | | 1.48 | 1.54 | 0.73 | | 15.1 | 5.3 | 1.3 | 1.0 | | 8.4 | |
| 7 636 | 71- 84 | | | 4 | | 0.5 | | | 1.48 | | | 0.96 | | | 6.0 | | | | 8.5 | |
| 7 637 | 84- 94 | | | 13 | | | | | 1.48 | | | 0.99 | | | 7.3 | | | | | |
| 7 638 | 94-114 | | | 8 | | | | | 1.48 | | | 0.86 | | | 6.4 | | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | 8A1 SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | --------MEQ/100G-------- | | | | | | -MEQ/100G | | | MEQ/1000 ML | | | | | | | | PPM | |
| 7 629 | 0- 0 | | | | | | | | | | | | | | | | | | | |
| 7 630 | 0- 3 | | | 3.4 | 1.8 | 5.2 | | | 20.4 | 2.88 | 5.0 | 1.2 | 19.8 | 0.4 | | 2.6 | 14.9 | | | 8.3 |
| 7 631 | 3- 8 | | | 4.9 | 2.2 | 7.1 | | | 23.4 | 4.55 | 5.1 | 1.0 | 34.4 | 0.4 | | 2.2 | 27.6 | | | 7.9 |
| 7 632 | 8- 23 | | | 8.6 | 1.6 | 10.2 | | | 21.9 | 30.6 | 100.0 | 22.0 | 155.2 | 1.8 | | 0.6 | 237.0 | | | 7.6 |
| 7 633 | 23- 30 | | | 10.6 | 1.0 | 11.6 | | | 18.6 | 54.1 | 274.0 | 79.2 | 246.0 | 2.8 | | 0.2 | 464.0 | | | 7.5 |
| 7 634 | 30- 51 | | | 7.4 | 0.5 | 7.9 | | | 10.8 | 41.6 | 192.8 | 59.2 | 172.0 | 1.1 | | | 318.0 | | | 7.4 |
| 7 635 | 51- 71 | | | 6.0 | 0.4 | 6.4 | | | 8.0 | 32.8 | 138.8 | 44.8 | 147.2 | 1.1 | | | 241.0 | | | 7.5 |
| 7 636 | 71- 84 | | | 7.3 | 0.4 | 7.7 | | | 10.1 | 33.4 | 116.8 | 44.8 | 151.2 | 3.4 | | 0.4 | 254.0 | | | 7.5 |
| 7 637 | 84- 94 | | | | | | | | | | | | | | | | | | | |
| 7 638 | 94-114 | | | | | | | | | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A SAT. PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | -GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 629 | 0- 0 | | | | | | | | | | | | | | | | 1 TRACE |
| 7 630 | 0- 3 | 26.9 | 2.9 | 14 | 11 | | | MI 2 | | | | | | | | MI MICA | 2 SMALL |
| 7 631 | 3- 8 | 32.4 | 3.8 | 16 | 20 | | | | | | | | MI 3 | KK 1 | | KK KAOLINIT | 3 MODERATE |
| 7 632 | 8- 23 | 40.9 | 2.3 | 10 | 20 | | | MI 3 | KK 2 | | | | MI 3 | | | MT MONTMORT | 4 ABUNDANT |
| 7 633 | 23- 30 | 41.9 | 0.3 | 2 | 19 | | | | | | | | MI 3 | | | | 5 DOMINANT |
| 7 634 | 30- 51 | 40.3 | 0.5 | 4 | 15 | | | | | | | | | | | | 6 INDETER. |
| 7 635 | 51- 71 | 37.1 | 0.5 | 7 | 15 | | | MI 4 | MT 3 | KK 3 | | | | | | | |
| 7 636 | 71- 84 | 39.6 | 1.3 | 13 | 17 | | | | | | | | | | | | |
| 7 637 | 84- 94 | | | | | | | | | | | | | | | | |
| 7 638 | 94-114 | | | | | | | | | | | | | | | | |

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## HARQUA GRAVELLY LOAM
S-67-Ariz-7-5

Location: Maricopa County, Arizona. 150 feet west and 1550 feet south of the NE corner of Section 13, T1S, R9W., 15 miles southwest of Tonopah. Date of Sampling: October 10, 1967. Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton, A. DeWall.

Classification: Typic Haplargid, fine-loamy, mixed, hyperthermic.

Vegetation: Sparse stand of creosotebush and saltbush. Use: Seasonal grazing. Climate: Mean annual precipitation 6 inches. Mean annual air temperature 70° F.; January 51° F.; July 92° F. Parent Material: Medium and moderately fine textured alluvium from rhyolitic tuffs, andesite, granite and schist. Topography: Nearly level lower end of alluvial fan. Slope less than 1 percent to the northeast. Elevation: 1280 feet. Drainage: Well drained. Infiltration slow, permeability medium, surface runoff rapid. Soil Moisture: Dry.

Remarks: Sample RSL 67629 was taken from varnished desert pavement 1-0 inches. Sampled from backhoe pit.

| HORIZON | DESCRIPTION |
|---|---|
| A2 RSL 67630 | 0 to 3 cm (0 to 1 inch), pinkish white (7.5YR 7/2) clay loam, strong brown (7.5YR 5/6) when moist; weak coarse platy structure; slightly hard, firm, sticky and plastic; common very fine and fine vesicular pores; 90 percent of the surface covered with varnished desert pavement; strongly effervescent; strongly alkaline (pH 9.4); abrupt smooth boundary. |
| A & B RSL 67631 | 3 to 8 cm (1 to 3 inches), 60 percent is a pinkish white (7.5YR 7/2) and 40 percent light reddish brown loam, strong brown (7.5YR 5/6) and brown (7.5YR 5/4) when moist; weak fine and medium subangular blocky structure; slightly hard, firm, slightly sticky and plastic; few fine tubular pores; about 5-10 percent fine gravel; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| B21t RSL 67632 | 8 to 23 cm (3 to 9 inches), reddish brown (5YR 5/4) gravelly clay loam, yellowish red (5YR 4/6) when moist; weak very fine subangular blocky to granular structure; hard, friable, sticky and plastic; many very fine interstitial pores; few thin clay films in pores; about 15 percent fine gravel; weakly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| B22tsa RSL 67633 | 23 to 30 cm (9 to 12 inches), light reddish brown gravelly clay loam, common fine pink soft lime masses and common fine pink salt crystals, reddish brown (5YR 4/4) when moist; weak fine subangular blocky structure; hard, friable, sticky and plastic; common fine tubular pores and many fine interstitial pores; common thin clay films in pores and bridging sand grains; about 20 percent fine gravel; slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| B31tca RSL 67634 | 30 to 51 cm (12 to 20 inches), light reddish brown (5YR 6/4) gravelly clay loam, reddish brown (5YR 4/4) when moist; massive; hard, friable, sticky and plastic; common fine and very fine discontinuous tubular pores; few thin clay films in pores and bridging sand grains; many medium pink soft lime masses, about 25 percent fine gravel; violently effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| IIB32tca RSL 67635 | 51 to 71 cm (20 to 28 inches), pink (7.5YR 7/4) gravelly clay loam, brown (7.5YR 5/4) when moist; massive; hard, friable, sticky and plastic; many fine and very fine tubular pores and common fine interstitial pores; very few thin clay films in pores; many medium pinkish white lime veins and common fine soft lime masses, about 35 percent fine gravel; strongly to violently effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| IIIC1ca RSL 67636 | 71 to 84 cm (28 to 33 inches), light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) when moist; massive; very hard, firm, slightly sticky and plastic; many very fine tubular pores; very few thin clay films in pores; common fine pinkish white soft lime masses, about 3 percent fine gravel; weakly to noneffervescent in soil matrix; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| IIIC2ca RSL 67637 | 84 to 94 cm (33 to 37 inches), light brown (7.5YR 6/4) clay loam with common medium distinct pinkish white (7.5 YR 8/2) soft lime masses, dark brown (7.5 YR 4/4) and pinkish white (7.5 YR 7/2) when moist; massive; very hard, firm, slightly sticky and plastic; many fine and very fine tubular and interstitial pores; very few clay films in pores; weakly to strongly effervescent on soil matrix; moderately alkaline, pH 8.0; abrupt smooth boundary. |
| IIIC3ca RSL 67638 | 94 to 114 cm (37 to 45 inches), light brown (7.5 YR 6/4) clay loam with common medium distinct pink (7.5 YR 8/4) lime mottles, brown (7.5 YR 5/4) and light brown (7.5 YR 6/4) when moist; massive; hard, friable, sticky and plastic; many fine and medium tubular pores; very few thin clay films in pores; weakly to strongly effervescent in soil matrix; moderately alkaline, pH 8.0. |

CONSECUTIVE PEDON NUMBER C 71 17 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA SOIL NO. S71 ARIZ. 7- 5 SAMPLE NO. 1 95-1 104 CENT. MARICOPA AREA

SOIL FAMILY: TYPIC HAPLARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE PCT. OF WHOLE SOIL | I 75-20 | FRAGMENTS II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 | | | | | | | | | | | | | | 1A2A | | | |
| | | | | | SANDS | | | | | | | SILTS | | | CLAYS | | | | | | | |
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 1 | 95 | 0- | 4 | A2 | 38.4 | 48.5 | 13.1 | 3.1 | 3.9 | 2.8 | 9.2 | 19.4 | 21.0 | 27.5 | 12.0 | 1.1 | | 46.1 | 29A | 7 | 18 | 4 |
| 1 | 96 | 4- | 7 | B1 T | 44.7 | 38.9 | 16.4 | 5.7 | 5.2 | 3.8 | 11.1 | 18.9 | 18.0 | 20.9 | | | TR | 44.1 | 13A | 3 | 5 | 5 |
| 1 | 97 | 7- | 13 | B21Tca | 38.5 | 44.0 | 17.5 | 6.4 | 5.3 | 3.1 | 7.8 | 15.9 | 17.6 | 26.4 | 14.0 | 3.5 | 3 | 38.4 | 22A | 1 | 7 | 13 |
| 1 | 98 | 13- | 27 | B22tcasa | 34.1 | 43.9 | 22.0 | 12.6 | 4.6 | 2.2 | 5.1 | 9.6 | 10.9 | 33.0 | | | 5 | 23.6 | 28A | -- | 11 | 17 |
| 1 | 99 | 27- | 55 | B23tcasa | 45.3 | 33.2 | 21.5 | 15.1 | 11.3 | 4.4 | 6.9 | 7.6 | 8.7 | 24.5 | | | 2 | 20.3 | 32A | 2 | 11 | 20 |
| 1 | 100 | 55- | 71 | B24tcasa | 52.6 | 25.4 | 22.0 | 20.6 | 11.3 | 4.7 | 8.4 | 7.6 | 8.5 | 16.9 | | | TR | 21.0 | 40A | 2 | 14 | 24 |
| 1 | 101 | 71- | 94 | B25tcasa | 60.1 | 18.9 | 21.0 | 27.7 | 17.2 | 4.9 | 5.3 | 5.0 | 6.5 | 12.4 | | | | 14.5 | 44A | 1 | 13 | 29 |
| 1 | 102 | 94- | 124 | B31tcasa | 53.0 | 28.6 | 18.4 | 17.6 | 14.3 | 5.5 | 6.5 | 9.1 | 11.0 | 17.6 | 10.2 | 8.2 | 1 | 23.9 | 40A | 8 | 13 | 19 |
| 1 | 103 | 124- | 157 | B32tcasa | 58.6 | 17.1 | 24.3 | 20.0 | 18.0 | 7.2 | 7.7 | 5.7 | 6.2 | 10.9 | | | | 16.0 | 50A | 5 | 24 | 22 |
| 1 | 104 | 157- | 163 | B33tcasa | 47.0 | 36.2 | 16.8 | 11.8 | 12.0 | 6.3 | 7.9 | 9.0 | 11.9 | 24.3 | | | | 25.1 | 25A | 7 | 7 | 10 |

| SAMPLE NO. | | DEPTH CM. | | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-19 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | -PERCENT- | | -PERCENT- | | PCT. | PCT.NO.40 | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 1 | 95 | 0- | 4 | 0.04 | 0.011 | 14 | | | | | 1.40 | 1.44 | 0.82 | 22.7 | 20.9 | 8.0 | 0.9 | 0.8 | 9.1 | 10.0 | 8.3 |
| 1 | 96 | 4- | 7 | 0.03 | 0.017 | 16 | | | | | 1.37 | | 0.93 | | | 9.3 | | | 8.5 | 9.7 | 8.2 |
| 1 | 97 | 7- | 13 | 0.08 | | 20 | | | | | | 1.34 | 1.40 | 0.87 | 23.6 | 21.1 | 8.1 | 1.5 | 1.3 | 7.8 | 8.6 | 7.9 |
| 1 | 98 | 13- | 27 | 0.14 | | 30 | | | | | 1.32 | | | 0.84 | | | 9.0 | | | 7.8 | 8.4 | 7.9 |
| 1 | 99 | 27- | 55 | | | 26 | | | | | | 1.30 | 1.42 | 0.81 | 28.2 | 25.1 | 11.0 | 3.0 | 2.4 | 7.8 | 8.5 | 7.8 |
| 1 | 100 | 55- | 71 | | | 14 | | | | | 1.32 | | | 0.75 | | | 14.0 | | | 7.8 | 8.5 | 7.8 |
| 1 | 101 | 71- | 94 | | | 4 | | | | | | 1.33 | 1.43 | 0.72 | 26.6 | 24.6 | 15.6 | 2.4 | 1.7 | 7.8 | 8.4 | 7.4 |
| 1 | 102 | 94- | 124 | | | 24 | | | | | 1.13 | | | 0.78 | | | 12.1 | | | 7.4 | 8.8 | 7.3 |
| 1 | 103 | 124- | 157 | | | 2 | | | | | | 1.13 | 1.23 | 0.70 | 33.3 | 30.6 | 18.3 | 2.9 | 2.0 | 7.7 | 8.7 | 7.2 |
| 1 | 104 | 157- | 163 | | | 25 | | | | | 1.13 | | | 0.88 | | | 12.5 | | | 7.9 | 8.9 | 7.3 |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | PPM | | |
| 1 | 95 | 0- | 4 | 18.7 | 2.1 | 7.9 | 1.8 | 30.5 | 100+ | | | 19.1 | 5.50 | 2.5 | 0.6 | 48.5 | 0.4 | | 4.0 | 37.8 | 3.3 | 8.0 |
| 1 | 96 | 4- | 7 | 21.5 | 2.3 | 12.3 | 1.7 | 37.8 | 100+ | | | 21.6 | 15.9 | 17.3 | 3.0 | 140.0 | 1.0 | | 2.5 | 132.0 | 2.2 | 7.6 |
| 1 | 97 | 7- | 13 | 25.3 | 2.8 | 16.0 | 0.7 | 44.8 | 100+ | | | 15.3 | 35.5 | 131.5 | 21.3 | 280.0 | 0.9 | | 4.7 | 342.0 | 11.2 | 7.4 |
| 1 | 98 | 13- | 27 | 41.2 | 3.7 | 18.4 | 0.5 | 63.8 | 100+ | | | 16.1 | 51.4 | 242.4 | 42.6 | 376.0 | 0.6 | | 5.2 | 482.0 | 18.7 | 7.3 |
| 1 | 99 | 27- | 55 | 38.4 | 4.9 | 21.4 | 0.4 | 65.1 | 100+ | | | 20.3 | 48.2 | 250.3 | 49.4 | 411.0 | 0.5 | | 5.2 | 534.0 | 23.0 | 7.4 |
| 1 | 100 | 55- | 71 | 35.9 | 5.8 | 30.5 | 0.6 | 72.8 | 100+ | | | 22.6 | 55.6 | 210.9 | 45.4 | 433.0 | 0.4 | | 5.2 | 522.0 | 68.0 | 7.4 |
| 1 | 101 | 71- | 94 | 29.2 | 5.7 | 31.9 | 0.6 | 67.4 | 100+ | | | 24.6 | 49.9 | 171.1 | 42.6 | 448.0 | 0.5 | | 5.7 | 510.0 | 37.3 | 7.5 |
| 1 | 102 | 94- | 124 | 26.0 | 4.6 | 28.0 | 0.5 | 59.1 | 100+ | | | 18.3 | 45.7 | 103.7 | 33.0 | 376.0 | 0.3 | | 3.3 | 407.0 | 34.3 | 7.6 |
| 1 | 103 | 124- | 157 | 32.5 | 5.8 | 37.5 | 0.6 | 76.4 | 100+ | | | 27.5 | 39.1 | 65.9 | 27.1 | 355.0 | 0.3 | | 4.7 | 335.0 | 55.0 | 7.7 |
| 1 | 104 | 157- | 163 | 39.1 | 4.9 | 29.9 | 0.6 | 74.5 | 100+ | | | 20.9 | 32.1 | 43.0 | 17.7 | 302.0 | 0.2 | | 4.7 | 259.0 | 60.0 | 7.9 |

| SAMPLE NO. | | DEPTH CM. | | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY <0.002 MM X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | DTA IV 7A2E | DTA 7A3 PCT. | <2.0 MM X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 95 | 0- | 4 | 28.3 | 6.5 | 34 | 39 | | 5.7 | MT 4 | MI 3 | KK 2 | | | MI 3 | MT 2 | | MT MONTMORT | 1 TRACE |
| 1 | 96 | 4- | 7 | 34.3 | 7.5 | 35 | 44 | | 6.4 | | | | | | | | | MI MICA | 2 SMALL |
| 1 | 97 | 7- | 13 | 42.2 | 4.2 | 27 | 32 | | | MI 4 | MT 3 | KK 1 | | | MI 5 | MT 1 | KK 1 | KK KAOLINIT | 3 MODERATE |
| 1 | 98 | 13- | 27 | 39.3 | 3.6 | 22 | 31 | 1.0 | | | | | | | | | | | 4 ABUNDANT |
| 1 | 99 | 27- | 55 | 44.9 | 3.0 | 15 | 34 | 0.7 | | | | | | | | | | | 5 DOMINANT |
| 1 | 100 | 55- | 71 | 51.6 | 8.2 | 36 | 38 | 0.1 | | | | | | | | | | | 6 INDETER. |
| 1 | 101 | 71- | 94 | 50.7 | 9.2 | 37 | 43 | 0.5 | | | | | | | | | | | |
| 1 | 102 | 94- | 124 | 47.7 | 10.1 | 55 | 45 | 0.3 | | MT 4 | MI 3 | KK 1 | | | MT 4 | MI 3 | | | |
| 1 | 103 | 124- | 157 | 63.2 | 15.1 | 55 | 52 | 0.7 | 2.3 | | | | | | | | | | |
| 1 | 104 | 157- | 163 | 51.6 | 14.3 | 69 | 55 | 1.4 | 4.9 | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## HARQUA VERY GRAVELLY LOAM
S71Ariz-7-5(1-10)

Location: Maricopa County, Arizona. 1250 feet east and 500 feet south of NW corner Sec. 20, T1S, R6W, about 18 miles west of Buckeye.
Date of Sampling: April 13, 1971.
Description by: W. D. Nettleton, J. E. Jay, G. W. Hartman, R. G. Schurig, F. Cook. Collectors: W. D. Nettleton, J. E. Jay, G. W. Hartman, R. G. Schurig, F. Cook.
Classification: Typic Haplargid, fine-loamy mixed, hyperthermic.
Vegetation: Surface nearly barren. Use: Desert range. Climate: Semiarid. 7 inches precipitation. Mean annual air temperature of 70°F. Parent Material: Old alluvium from granite, gneiss, schist, basalt and tuff. Topography: Gently sloping dissected low alluvial fans, 1 percent. slopes. Elevation: 1100 feet. Drainage: Well-drained. Permeability is moderately slow. Runoff is medium. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A2<br>RSL<br>71095 | 0 to 4 cm (0 to 1 inch), light yellowish brown (10YR 6/4) very gravelly loam, brown (7.5YR 5/4) moist; weak coarse platy structure; slightly hard, friable, slightly sticky and plastic; few fine roots; many fine and medium vesicular pores; 70 to 80 percent of surface covered with fine, medium and coarse rounded gravel, thin coat of desert varnish on gravel; strongly effervescent; moderately alkaline (pH 8.0TB); abrupt smooth boundary. |
| B1t<br>RSL<br>71096 | 4 to 7 cm (1 to 3 inches), light yellowish brown (10YR 6/4) loam, yellowish red (5YR 5/8) moist; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and plastic; few fine roots; few fine tubular and common fine interstitial pores; 5 percent fine rounded gravel; strongly effervescent; strongly alkaline (pH 8.6); clear smooth boundary. |
| B21tca<br>RSL<br>71097 | 7 to 13 cm (3 to 5 inches), light reddish brown (5YR 6/4) and yellowish red (5YR 5/6) gravelly clay loam, reddish brown (5YR 4/4) and yellowish red (5YR 4/6) moist; weak fine and medium subangular blocky structure; hard, friable, sticky and plastic few fine roots; few fine tubular and common fine interstitial pores; 15 percent fine and medium rounded gravel; violently effervescent; many fine and medium white irregularly shaped soft lime masses, conductivity 9 mmhos.; moderately alkaline (pH 8.0); clear smooth boundary. |
| B22tcasa<br>RSL<br>71098 | 13 to 27 cm (5 to 10 inches), light reddish brown (5YR 6/4) and yellowish red (5YR 5/6) gravelly clay loam, reddish brown (5YR 4/4) and yellowish red (5YR 4/6) moist; massive, hard, friable, sticky and plastic; few fine roots; few fine tubular and common fine interstitial pores; 30 percent fine and medium rounded gravel; violently effervescent; many fine and medium white irregularly shaped soft lime masses, conductivity 45+ mmhos.; moderately alkaline (pH 8.0); clear smooth boundary. |
| B23tcasa<br>RSL<br>71099 | 27 to 55 cm(10 to 22 inches), light reddish brown (5YR 6/4) and yellowish red (5YR 5/6) very gravelly clay loam, yellowish red (5YR 4/6 and 5YR 4/8) moist; massive, hard, friable, sticky and plastic; no roots; few fine tubular and common fine interstitial pores; 50 percent very fine and fine rounded gravel; violently effervescent; many fine and medium white irregularly shaped soft lime masses, conductivity 45+ mmhos.; moderately alkaline (pH 8.0); gradual smooth boundary. |
| B24tcasa<br>RSL<br>71100 | 55 to 71 cm (22 to 28 inches), reddish brown (5YR 5/4 and 5YR 4/4) gravelly clay loam yellowish red (5YR 4/6) moist; massive; hard, friable, sticky and plastic; few fine tubular and common fine interstitial pores; 40 percent fine and medium rounded gravel; violently effervescent; many fine and medium white irregularly shaped soft lime masses, conductivity 45+ mmhos.; moderately alkaline (pH 8.0); gradual smooth boundary. |
| B25tcasa<br>RSL<br>71101 | 71 to 94 cm (28 to 37 inches), light reddish brown (5YR 6/4) and reddish brown (5YR 4/4) gravelly clay loam, reddish brown (5YR 5/4 and 4/4) when moist; massive; hard, friable, sticky and plastic; few fine interstitial pores; 30 percent fine and medium rounded gravel; violently effervescent; many fine and medium white irregularly shaped soft lime masses, conductivity 45+ mmhos.; moderately alkaline (pH 8.0); clear wavy boundary. |
| B31tcasa<br>RSL<br>71102 | 94 to 124 cm (37 to 49 inches), light reddish brown (5YR 6/4) gravelly sandy clay loam, reddish brown (5YR 4/4) moist; massive; hard, friable, slightly sticky and plastic; common fine tubular and fine interstitial pores; 35 percent fine and medium rounded gravel; common medium and coarse gypsum crystals pendant from gravel; violently effervescent; many fine and medium white irregularly shaped soft lime masses; conductivity 45+ mmhos.; moderately alkaline (pH 8.0); clear wavy boundary. |
| B32tcasa<br>RSL<br>71103 | 124 to 157 cm (49 to 62 inches), yellowish red (5YR 5/6) gravelly sandy clay loam, reddish brown (5YR 4/4) moist; massive, extremely hard, firm, sticky and plastic; many fine interstitial pores; 30 percent fine and medium rounded gravel; violently effervescent; many large firm white irregularly shaped lime masses, conductivity 45+ mmhos.; moderately alkaline (pH 8.0); clear wavy boundary. |
| B33tcasa<br>RSL<br>71104 | 157 to 163 cm (62 to 64 inches), yellowish red (5YR 5/6) gravelly sandy clay loam, reddish brown (5YR 4/4) moist; massive; hard, friable, sticky and plastic; many fine interstitial pores; 35 percent fine and medium rounded gravel; violently effervescent; many fine and medium white irregularly shaped soft lime masses, conductivity 45+ mmhos.; moderately alkaline (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 71 18 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA SOIL NO. S71 ARIZ. 7- 7 SAMPLE NO. 1 105-1 108 CENT. MARICOPA AREA

SOIL FAMILY: TYPIC HAPLARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | INT. .2-.02 WHOLE 20 | COARSE FRAGMENTS I 75-20 PCT. OF SOIL | II 20-5 PCT. OF | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 1 105 | 0- 3 | A2 | 40.7 | 47.4 | 11.9 | 4.0 | 4.6 | 3.6 | 10.5 | 18.0 | 19.1 | 28.3 | | | 1 | 43.5 | 43A | 12 | 25 | 6 |
| 1 106 | 3- 9 | B1tca | 33.7 | 50.2 | 16.1 | 5.4 | 4.2 | 3.1 | 8.6 | 12.4 | 12.4 | 37.8 | | | 3 | 29.9 | 18A | 2 | 7 | 9 |
| 1 107 | 9- 21 | B21tcase | 28.2 | 51.4 | 20.4 | 7.5 | 7.1 | 3.2 | 4.6 | 5.8 | 9.0 | 42.4 | | | 5 | 17.2 | 27A | 1 | 10 | 16 |
| 1 108 | 21- 56 | B22tcase | 46.0 | 31.4 | 22.6 | 14.6 | 9.2 | 5.5 | 9.0 | 7.7 | 8.4 | 23.0 | | | 2 | 20.6 | 35A | 2 | 13 | 20 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L LL 4F1 | P L PL 4F2 | B M I T | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PCT. | PCT. | NO.40 | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 1 105 | 0- 3 | 0.09 | 0.016 | 19 | | | | | | 1.40 | | | 0.72 | | | 8.2 | | | 8.9 | | 7.2 |
| 1 106 | 3- 9 | 0.07 | 0.015 | 34 | | | | | | 1.37 | | | 0.90 | | | 9.9 | | | 8.5 | 9.8 | 7.4 |
| 1 107 | 9- 21 | | | 45 | | | | | | 1.34 | | | 0.84 | | | 9.3 | | | 8.1 | 9.7 | 7.3 |
| 1 108 | 21- 56 | | | 23 | | | | | | 1.32 | | | 0.79 | | | 12.5 | | | 7.9 | 8.8 | 7.3 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | 8A1 SO4 6L1B | B 6T1A | PH SAT. PAST. 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ---MEQ/100G--- | | | | | PCT. | -MEQ/100G | | MMHO | ----MEQ/1000 ML---- | | | | | | | | PPM | |
| 1 105 | 0- 3 | 22.4 | 1.9 | 2.4 | 1.0 | 27.7 | 100+ | | 17.9 | | | | | | | | | | | |
| 1 106 | 3- 9 | 19.6 | 1.5 | 17.0 | 1.2 | 39.3 | 100+ | | 18.6 | 9.0 | 6.4 | 0.9 | 77.8 | 0.4 | | 3.7 | 73.7 | 1.8 | | 7.7 |
| 1 107 | 9- 21 | 18.7 | 2.0 | 19.5 | 0.1 | 40.3 | 100+ | | 17.7 | 21.0 | 14.9 | 6.7 | 203.0 | 0.4 | | 2.7 | 190.0 | 4.4 | | 7.7 |
| 1 108 | 21- 56 | 27.9 | 4.0 | 28.4 | 0.4 | 60.7 | 100+ | | 21.8 | 40.9 | 77.0 | 25.7 | 383.0 | 0.3 | | 5.2 | 382.0 | 31.4 | | 7.6 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY 7A2E I | 7A2E II | 7A2E III | DTA 7A2E IV | 7A3 PCT. | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 105 | 0- 3 | | 2.4 | 13 | | | | | | | | | | | | |
| 1 106 | 3- 9 | 39.4 | 13.9 | 75 | 41 | | 5.9 | | | | | | | | | |
| 1 107 | 9- 21 | 43.7 | 10.6 | 60 | 62 | | 6.9 | | | | | | | | | |
| 1 108 | 21- 56 | 48.3 | 9.9 | 45 | 53 | 1.7 | 2.8 | | | | | | | | | |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## HARQUA VERY GRAVELLY LOAM
S71Ariz-7-7(1-7)

Location: Maricopa County, Arizona. 1135 feet east and 270 feet south of the NW corner of Sec. 20, T1S, R6W, about 18 miles west of Buckeye. Date of Sampling: April 13, 1971.
Description by: W. Nettleton, J. Jay, G. Hartman, R. Schurig, F. Cook. Collectors: W. Nettleton, J. Jay, G. Hartman, R. Schurig, F. Cook.
Classification: Typic Haplargid, fine-loamy, mixed, hyperthermic.
Vegetation: Nearly barren. Use: Desert rangeland. Climate: Semiarid. 7 inches precipitation. Mean annual air temperature is 70° F. Parent Material: Old alluvium from granite, andesite, schist, tuff, and basalt. Topography: Gently sloping dissected low fans. Slopes about 1 percent. Elevation: 1100 feet. Drainage: Well drained, permeability is moderately slow. Runoff is medium. Soil Moisture: Dry when sampled.
Remarks: Only first 4 horizons were sampled by the Laboratory.

| HORIZON | DESCRIPTION |
|---|---|
| A2<br>RSL<br>71105 | 0 to 3 cm (0 to 1 inch), pale brown (10YR 6/3) and light brownish gray (10YR 6/2) very gravelly loam, brown (10YR 4/3) moist; weak thin platy structure; slightly hard, very friable, slightly sticky and plastic; few fine roots, many fine medium and coarse vesicular pores; 70 percent subangular gravel, 80 percent of the surface is covered with a varnished desert pavement; strongly effervescent; moderately alkaline (pH 8.2 TB); abrupt smooth boundary. |
| B1tca<br>RSL<br>71106 | 3 to 9 cm (1 to 3½ inches),light reddish brown (5YR 6/4) gravelly loam, reddish brown (5YR 5/4) and yellowish red (5YR 4/6) when moist; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; many fine interstitial pores; 30 percent subangular gravel; violently effervescent; many fine and medium irregularly shaped pinkish white soft lime masses; moderately alkaline (pH 8.3); abrupt smooth boundary. |
| B21tcasa<br>RSL<br>71107 | 9 to 21 cm (3½ to 8 inches),reddish brown (5YR 5/3) and light reddish brown (5YR 6/3) gravelly clay loam, reddish brown (5YR 5/4 and 4/4) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; few fine roots; 30 percent fine subangular gravel; violently effervescent; many fine and medium pinkish white irregularly shaped soft lime masses and seams of lime; conductivity 40 mmhos.; moderately alkaline (pH 8.4); clear smooth boundary. |
| B22tcasa<br>RSL<br>71108 | 21 to 56 cm (8 to 22 inches), reddish brown (5YR 5/3) and light reddish brown (5YR 6/3) gravelly clay loam, reddish brown (5YR 5/4 and 4/4) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; many fine interstitial and few fine tubular pores; 35 percent angular gravel; violently effervescent; many fine and medium pinkish white irregularly shaped soft lime masses and seams of lime; conductivity 45+ mmhos.; moderately alkaline (pH 8.3); clear wavy boundary. |
| B31tcasa | 56 to 83 cm (22 to 33 inches), light reddish brown (5YR 6/3) and reddish brown (5YR 5/3 and 5YR 5/4) gravelly sandy clay loam, reddish brown (5YR 4/4) and yellowish red (5YR 5/6 and 4/6) when moist; weak medium subangular blocky structure; hard, very friable, slightly sticky, plastic; many fine interstitial pores; 15 percent fine subangular gravel; common fine gypsum crystals on top of gravel; violently effervescent; many fine and medium pinkish white irregularly shaped soft lime masses and seams of lime; conductivity 45+ mmhos.; moderately alkaline (pH 8.3); gradual wavy boundary. |
| B32tcasa | 83 to 132 cm (33 to 52 inches), reddish brown (5YR 5/3 and 5YR 5/4) sandy clay loam, light reddish brown (5YR 6/3) and reddish brown (5YR 5/3) when moist; massive; hard, very friable, slightly sticky, plastic; many fine interstitial pores; 45 percent subangular gravel; common fine gypsum crystals on top of gravel; violently effervescent; common fine and medium pinkish white irregularly shaped soft lime masses and seams of lime, 1 to 2 inch thick seam of lime and ash at bottom of this horizon; conductivity 45+ mmhos.; moderately alkaline (pH 8.3); abrupt smooth boundary. |
| IICca | 132 to 156 cm (52 to 61½ inches), pinkish gray (5YR 6/2) light reddish brown (5YR 6/3) and reddish brown (5YR 5/3) clay loam, light reddish brown (5YR 6/3) and reddish brown (5YR 5/3) when moist; moderate medium angular blocky structure; extremely hard, firm, slightly sticky, plastic; very few fine tubular pores; many black manganese stains on ped faces and in root channels; common fine gypsum crystals on top of gravel; slightly effervescent; common fine pinkish white irregularly shaped soft lime concretions; conductivity 45+ mmhos.; strongly alkaline (pH 8.8). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, hyperthermic
SOIL Mohall loam SOIL Nos. S59Ariz-7-1 LOCATION Maricopa County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 5919 - 5928

| Depth (in.) | Horizon | 1B1b Sand (2–0 05) | Silt (0.05–0 002) | Clay (< 0.002) | Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0 1–0 05) | Silt 0.05–0.02 | Int III (0.02–0.002) | Int. II (0.2–0.02) | (2–0 1) | 3A1a Carbonate clay | 3A1a Non carbonate clay | Coarse fragments 1A2a >2 ** Pct. | 2 – 19 Pct. of < 76 mm | 19 -76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | Silt | | | | | | | | |
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0-1 * | A | 48.7 | 36.2 | 15.1 | 6.5 | 12.3 | 7.9 | 10.3 | 11.7 | 24.8 | 11.4 | 42.3 | 37.0 | | | 6 | | |
| 1-3 | B1t | 41.3 | 30.2 | 28.5 | 4.7 | 11.6 | 7.4 | 8.7 | 8.9 | 18.6 | 11.6 | 32.1 | 32.4 | | | 4 | | |
| 3-8 | B21t | 38.8 | 28.1 | 33.1 | 5.2 | 12.0 | 6.0 | 7.3 | 8.3 | 17.6 | 10.5 | 30.0 | 30.5 | | | 2 | | |
| 8-14 | B22t | 40.8 | 27.0 | 32.2 | 6.4 | 14.0 | 6.0 | 6.6 | 7.8 | 17.1 | 9.9 | 28.3 | 33.0 | | | 1 | | |
| 14-21 | B23t | 38.2 | 28.2 | 33.6 | 5.8 | 11.7 | 5.6 | 6.5 | 8.6 | 18.2 | 10.0 | 30.2 | 29.6 | | | 1 | | |
| 21-32 | B24t | 33.7 | 33.5 | 32.8 | 5.2 | 9.1 | 4.2 | 5.6 | 9.6 | 21.4 | 12.2 | 34.0 | 24.1 | | | 3 | | |
| 32-41 | C1ca | 38.3 | 39.7 | 22.0 | 6.8 | 11.4 | 5.0 | 6.7 | 8.4 | 19.8 | 19.9 | 31.9 | 29.9 | | | 16 | | |
| 41-56 | C2ca | 54.1 | 29.2 | 16.7 | 20.7 | 14.5 | 5.9 | 7.3 | 5.7 | 12.5 | 16.7 | 22.2 | 48.4 | | | 16 | | |
| 56-70 | C3ca | 60.0 | 25.2 | 14.8 | 18.8 | 17.8 | 8.0 | 9.7 | 5.7 | 11.1 | 14.1 | 21.9 | 54.3 | | | 26 | | |
| 70-84+ | C4 | 81.1 | 10.7 | 8.2 | 28.9 | 34.8 | 7.8 | 6.6 | 3.0 | 5.7 | 5.0 | 12.0 | 78.1 | | | 25 | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | 6C2b Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct | Bulk density 4A1f 1/3 bar g/cc | 4A1h Oven dry g/cc | g/cc | Water content 4B1c 1/3 bar Pct. | 4B2 15 bar Pct | 4D1 Extensibility LEf Pct | 4D1 Extensibility LE Pct | pH 8C1b Saturated Paste | 8C1a $H_2O$ 1:1 | 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | 0.24 | 0.033 | 7 | | - | | | | | 6.6 | | | 6.9 | | 7.6 |
| 1-3 | 0.26 | 0.035 | 7 | | - | | | | | 9.6 | | | 6.9 | | 7.1 |
| 3-8 | 0.18 | 0.030 | | | - | | | | | 11.4 | | | 7.1 | | 7.4 |
| 8-14 | 0.18 | 0.026 | | | - | | | | | 11.4 | | | 7.5 | | 8.2 |
| 14-21 | 0.15 | 0.024 | | | 2 | | | | | 12.0 | | | 7.7 | | 8.6 |
| 21-32 | 0.09 | 0.021 | | | 5 | | | | | 12.7 | | | 7.9 | | 8.8 |
| 32-41 | 0.07 | | | | 21 | | | | | 8.8 | | | 8.1 | | 9.0 |
| 41-56 | 0.05 | | | | 29 | | | | | 6.8 | | | 8.2 | | 9.3 |
| 56-70 | 0.03 | | | | 21 | | | | | 6.0 | | | 8.3 | | 9.4 |
| 70-84+ | 0.00 | | | | 5 | | | | | 4.7 | | | 8.4 | | 9.5 |

| Depth (In.) | Extractable bases 6N2b Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 5B1a Sum of bases | 6H2a Ext. Acidity | Cation Exch Capacity 5A2a NaOAc | 5A6a $NH_4OAc$ | Water extract from saturated paste 8A1 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1b $SO_4$ | 8A1a Electrical conductivity mmho/cm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | |
| 0-1 | 9.0 | 10.0 | 0.1 | 1.3 | 20.3 | | 16.9 | | 1.9 | 1.1 | 0.3 | 0.5 | - | 2.0 | 0.3 | | 0.4 |
| 1-3 | 12.1 | 15.2 | 0.2 | 1.3 | 28.8 | | 21.8 | | 2.3 | 1.4 | 0.5 | 0.3 | - | 1.4 | 0.1 | | 0.5 |
| 3-8 | 13.6 | 17.5 | 0.3 | 1.0 | 32.4 | | 23.5 | | 3.2 | 1.7 | 1.2 | 0.4 | - | 0.6 | 1.7 | | 0.7 |
| 8-14 | 14.9 | 17.4 | 0.6 | 0.8 | 33.7 | | 21.6 | | 3.8 | 2.0 | 2.2 | 0.2 | - | 1.4 | 3.4 | | 0.9 |
| 14-21 | | | 0.8 | 0.7 | | | 24.4 | | 3.1 | 1.7 | 3.7 | 0.2 | - | 0.6 | 5.0 | | 0.9 |
| 21-32 | | | 1.2 | 0.6 | | | 23.5 | | 3.4 | 2.3 | 6.0 | 0.1 | - | 2.0 | 7.7 | | 1.3 |
| 32-41 | | | 1.1 | 0.3 | | | 12.0 | | 2.5 | 2.2 | 9.1 | - | - | 1.4 | 8.2 | | 1.5 |
| 41-56 | | | 1.2 | 0.1 | | | 8.5 | | 1.6 | 2.0 | 12.0 | - | - | 0.6 | 9.1 | | 1.8 |
| 56-70 | | | 1.4 | 0.2 | | | 7.6 | | 1.3 | 2.0 | 12.8 | - | - | 1.4 | 8.1 | | 1.8 |
| 70-84+ | | | 1.4 | 0.2 | | | 6.8 | | 1.2 | 1.2 | 12.3 | - | - | 0.6 | 8.6 | | 1.6 |

| Depth (In.) | 8A Water at Saturation Pct. | Exch. bases 5B3b Ca meq/100 g | 5B1b 6Q2a K meq/100 g | 5B1b 6P2a Na meq/100 g | 5D1 Exchangeable Na Pct. | 5C2 Base Sat. NaOAc Pct. | Gypsum Pct | Clay mineralogy (<0.002 mm) 3A1 Mont. 7A2 X-ray | Verm. 7A2 X-ray | Mica 7A2 X-ray | Kaolin. 7A2 X-ray |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | 22.7 | | 1.3 | 0.1 | 0.6 | 100+ | | | | | |
| 1-3 | 32.3 | | 1.3 | 0.1 | 0.5 | 100+ | | | | | |
| 3-8 | 37.6 | | 1.0 | 0.3 | 1.3 | 100+ | | | | | |
| 8-14 | 39.7 | | 0.8 | 0.5 | 2.3 | 100+ | | | | | |
| 14-21 | 42.7 | | 0.7 | 0.6 | 2.5 | | | | | | |
| 21-32 | 45.1 | | 0.6 | 0.9 | 3.8 | | | | | | |
| 32-41 | 41.8 | | 0.3 | 0.7 | 5.8 | | | | | | |
| 41-56 | 34.4 | | 0.1 | 0.8 | 9.4 | | | | | | |
| 56-70 | 30.9 | | 0.2 | 1.0 | 13.2 | | | | | | |
| 70-84+ | 25.4 | | 0.2 | 1.1 | 16.2 | | | | | | |

* Sample from this horizon taken 35 feet from pit.
** Percent of whole soil.

## MOHALL LOAM
S59Ariz-7-1

Location: Maricopa County, Arizona, Maricopa County Area - Northern Part. 2,376 feet south and 1,050 feet east of northwest corner of Sec. 10, T. 4 N., R. 3 W., G&SRB&M, on west side of field road, 6 miles south and 2 miles west of Wittman. Date of Sampling: January 15, 1959.
Description by: Milo James. Collectors: Reuben E. Nelson, James Jay, and Milo James.
Classification: Typic Haplargid, fine-loamy, mixed, hyperthermic.
Vegetation: Very sparse cover of creosotebush and a scattering of annual grasses. Climate: 9 inches precipitation. Mean annual air temperature is approximately 70°F. Parent Material: Gravelly alluvium from schist, granite, rhyolite and with some andesite. Topography: Intermediate and low end of fan. Smooth convex slope, less than 1 percent, to the southeast. Elevation: 1,625 feet approximately. Drainage: Internal drainage good, surface drainage moderate to rapid. Soil Moisture: Deep, probably below 200 feet. Remarks: Soil very dry at time of sampling. Slight wind erosion at the sampling site. A thin gravel pavement on surface shows traces of desert varnish. Samples from 5 foot pit. Auger samples below 5 feet.

| HORIZON | DESCRIPTION |
|---|---|
| A<br>RSL No.<br>5919 | 0-1 inch (0-3 cm), brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine platy with vesicles between plates; slightly hard when dry, very friable moist, slightly sticky and slightly plastic when wet; noncalcareous; pH 7.5; common fine roots; abrupt wavy boundary. |
| B1t<br>RSL No.<br>5920 | 1-3 inches (3-8 cm), between brown and dark brown (7.5YR 4/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate fine to medium subangular blocky with few thin patchy clay skins and a few fine and occasional large tubular pores in peds; slightly hard when dry, friable moist, slightly sticky and slightly plastic when wet; noncalcareous; pH 7.5; common fine roots following faces of peds; clear wavy boundary. |
| B21t<br>RSL No.<br>5921 | 3-8 inches (8-20 cm), between brown and dark brown (7.5YR 4/4) light sandy clay, dark reddish brown (5YR 3/4) moist; weak to moderate medium and coarse prismatic breaking to moderate medium and coarse subangular blocky; thin continuous clay skins on all faces; few fine and occasional large tubular pores in peds; hard when dry, friable when moist, sticky and plastic when wet; noncalcareous except for occasional mycelia; pH 7.5; common fine roots following faces of peds. |
| B22t<br>RSL No.<br>5922 | 8-14 inches (20-36 cm), same description as above; abrupt wavy lower boundary. |
| B23t<br>RSL No.<br>5923 | 14-21 inches (36-53 cm), between brown and dark brown (7.5YR 4/4) light sandy clay; moderate coarse to very coarse angular blocky with tendency to very coarse platy; thin continuous clay skins on faces; occasional medium and a few fine continuous pores in peds; slight evidence of slickensides; very hard when dry, friable when moist, sticky and plastic when wet; calcareous; pH 8.0; common fine roots on faces; wavy lower boundary. |
| B24t<br>RSL No.<br>5924 | 21-32 inches (53-81 cm), reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) moist; massive breaking to weak medium subangular blocky; thin continuous clay skins on faces and in pores; a few fine continuous pores in peds; common medium distinct pinkish gray (5YR 7/2) lime nodules; reddish yellow (5YR 6/6) moist; nodules are firm but can be crushed in fingers; peds hard when dry, friable moist, slightly sticky and plastic when wet; calcareous in matrix to strongly calcareous in mottles; pH 8.0; a few fine roots; gradual wavy boundary. |
| C1ca<br>RSL No.<br>5925 | 32-41 inches (81-104 cm), light brown (7.5YR 6/4) sandy loam, brown (7.5YR 5/4) moist; common medium to coarse pinkish gray (5YR 7/2) lime mottles and nodules; reddish yellow (5YR 6/6) when moist; massive; common fine and few medium continuous pores; no roots; hard when dry, friable moist, slightly sticky and plastic when wet; strongly calcareous; pH 8.0; clear wavy boundary. |
| C2ca<br>RSL No.<br>5926 | 41-56 inches (104-142 cm), pinkish gray (7.5YR 7/2) gravelly sandy loam; light brown (7.5YR 6/4) moist; massive with common fine and few medium continuous pores; strongly cemented when dry, firm when moist, slightly sticky and nonplastic when wet; strongly calcareous; pH 8.0. |
| C3ca<br>RSL No.<br>5927 | 56-70 inches (142-178 cm), same description as above; clear wavy boundary. |
| C4<br>RSL No.<br>5928 | 70-84 inches + (178-213 cm), pink (7.5YR 7/4) gravelly coarse loamy sand, light brown (7.5YR 6/4) moist; massive or stratified; loose when dry or moist, nonsticky and nonplastic when wet; strongly calcareous; pH 8.0. |

U S. DEPARTMENT OF AGRICULTUR
SOIL CONSERVATION SERVIC-

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, hyperthermic
SOIL Mohall loam SOIL Nos. S59Ariz-7-2 LOCATION Maricopa County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 5929 - 5937

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non carbonate clay | Coarse fragments 1A2: ≥ 2 Pct | Coarse fragments 1A2: 2 – 19 Pct. of < 76 mm | Coarse fragments 1A2: 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct of < 2 mm | | | | | | | | | | | | | | | | |
| 0-4 | A | 46.7 | 40.5 | 12.8 | 7.0 | 14.1 | 7.6 | 8.9 | 9.1 | 20.2 | 20.3 | 34.4 | 37.6 | | | 1 | | |
| 4-10 | B1t | 52.0 | 30.3 | 17.7 | 7.3 | 15.9 | 8.6 | 10.2 | 10.0 | 16.7 | 13.6 | 32.3 | 42.0 | | | 2 | | |
| 10-19 | B21t | 49.0 | 28.3 | 22.7 | 7.3 | 16.0 | 7.9 | 9.0 | 8.8 | 16.3 | 12.0 | 30.0 | 40.2 | | | 3 | | |
| 19-27 | B22t | 38.2 | 34.5 | 27.3 | 6.3 | 9.8 | 5.2 | 7.2 | 9.7 | 20.5 | 14.0 | 34.3 | 28.5 | | | 6 | | |
| 27-36 | B3tca | 39.3 | 41.0 | 19.7 | 6.5 | 10.7 | 5.5 | 7.2 | 9.4 | 19.2 | 21.8 | 32.6 | 29.9 | | | 8 | | |
| 36-58 | C1ca | 46.8 | 36.4 | 16.8 | 11.0 | 13.8 | 6.3 | 7.5 | 8.2 | 18.0 | 18.4 | 30.3 | 38.6 | | | 11 | | |
| 58-70 | C2ca | 59.7 | 26.1 | 14.2 | 18.7 | 19.4 | 7.7 | 8.4 | 5.5 | 10.0 | 16.1 | 19.7 | 54.2 | | | 41 | | |
| 70-80 | C3ca | 70.1 | 15.8 | 14.1 | 21.1 | 26.7 | 10.1 | 8.5 | 3.7 | 4.0 | 11.8 | 11.4 | 66.4 | | | 32 | | |
| 80-98 | C4 | 82.6 | 9.9 | 7.5 | 19.1 | 35.7 | 14.9 | 10.6 | 2.3 | 4.5 | 5.4 | 11.1 | 80.3 | | | 24 | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | 6C2b Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | Bulk density: g/cc | Water content: Pct. | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct. | 4D1 Extensibility LEf Pct | 4D1 Extensibility LE Pct. | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-4 | 0.31 | 0.040 | 8 | | - | | | | | | 7.1 | | | 7.3 | | 8.0 |
| 4-10 | 0.18 | 0.027 | | | - | | | | | | 7.3 | | | 7.3 | | 7.8 |
| 10-19 | 0.20 | 0.035 | | | - | | | | | | 9.5 | | | 7.7 | | 8.3 |
| 19-27 | 0.23 | 0.029 | | | 5 | | | | | | 11.4 | | | 7.8 | | 8.8 |
| 27-36 | 0.22 | 0.020 | | | 16 | | | | | | 9.2 | | | 7.9 | | 8.8 |
| 36-58 | 0.16 | | | | 15 | | | | | | 7.6 | | | 8.2 | | 9.0 |
| 58-70 | 0.08 | | | | 19 | | | | | | 6.7 | | | 8.4 | | 9.2 |
| 70-80 | 0.03 | | | | 11 | | | | | | 6.7 | | | 8.5 | | 9.3 |
| 80-98 | 0.01 | | | | 2 | | | | | | 5.5 | | | 8.7 | | 9.4 |

| Depth (In.) | Extractable bases 5B1a: 6N2b Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch Capacity: 5A2a NaOAc | 5A6a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1b $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0-4 | 11.7 | 9.3 | | | | | 17.4 | | 2.8 | 1.3 | 0.4 | 0.5 | - | 2.2 | 1.1 | | 0.5 |
| 4-10 | 11.0 | 8.6 | | | | | 13.3 | | 3.1 | 1.0 | 0.7 | - | - | 1.6 | 1.0 | | 0.5 |
| 10-19 | 14.9 | 9.9 | | | | | 16.0 | | 5.7 | 1.7 | 1.3 | - | - | 1.6 | 2.5 | | 0.9 |
| 19-27 | | | | | | | 18.9 | | 6.8 | 2.1 | 1.6 | - | - | 1.0 | 2.7 | | 1.1 |
| 27-36 | | | | | | | 14.3 | | 4.2 | 1.5 | 1.2 | - | - | 1.0 | 1.7 | | 0.8 |
| 36-58 | | | | | | | 11.5 | | 1.7 | 1.0 | 1.5 | - | - | 0.8 | 1.1 | | 0.4 |
| 58-70 | | | | | | | 8.7 | | 1.3 | 1.0 | 2.8 | - | - | 2.0 | 0.9 | | 0.5 |
| 70-80 | | | | | | | 7.0 | | 0.6 | 0.5 | 3.3 | - | - | 1.6 | 0.7 | | 0.4 |
| 80-98 | | | | | | | 6.9 | | 0.4 | 0.4 | 4.1 | - | + | 2.2 | 0.7 | | 0.5 |

| Depth (In.) | 8A Water at Saturation Pct. | Exch. bases 5B3b Ca | 5B1b 6Q2a K | 5B1b 6P2a Na | 5D1 Exchangeable Na Pct. | 5C2 Base Sat. NaOAc Pct. | Gypsum Pct | Clay mineralogy (<0.002 mm) 3A1: Mont. | Verm. | Mica 7A2 X-ray | Kaolin. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | meq /100 g | | | | | | X-ray | | | |
| 0-4 | 26.4 | | 1.3 | 0.1 | 0.6 | 100+ | | | | | |
| 4-10 | 27.8 | | 0.8 | 0.2 | 1.5 | 100+ | | | | | |
| 10-19 | 33.7 | | 0.6 | 0.3 | 1.9 | 100+ | | | | | |
| 19-27 | 40.3 | | 0.5 | 0.3 | 1.6 | | | | | | |
| 27-36 | 39.0 | | 0.3 | 0.2 | 1.4 | | | | | | |
| 36-58 | 38.4 | | 0.2 | 0.3 | 2.6 | | | | | | |
| 58-70 | 34.2 | | 0.1 | 0.3 | 3.4 | | | | | | |
| 70-80 | 34.7 | | 0.2 | 0.6 | 8.6 | | | | | | |
| 80-98 | 28.4 | | 0.2 | 0.8 | 11.6 | | | | | | |

## MOHALL LOAM
S59Ariz-7-2

Location: Maricopa County, Arizona, Maricopa County Area - Northern Part. 2,310 feet north, 1,980 feet east of the southwest corner, Sec. 13, T. 5 N., R. 4 W., G&SRB&M, about 300 feet east of Morristown-Airfield Road and about 6 miles south of Morristown. Date of Sampling: January 16, 1959.
Description by: Milo James. Collectors: Reuben E. Nelson, James Jay and Milo James.
Classification: Typic Haplargid, fine-loamy, mixed, hyperthermic.
Vegetation: Creosotebush and bursage aspect with scattered clumps of tobosa, palo verde, and annual grasses. Climate: 9 inches precipitation. Mean annual air temperature is about 70° F.
Parent Material: Gravelly alluvium from schist, granite and rhyolite with possibly some andesite.
Topography: Low end of large fan from the Hieroglyphic Mountains, smooth concave slope of less than 1 percent sloping southward. Elevation: 1,675 feet approximately. Drainage: Internal drainage good, surface drainage moderately rapid. Soil Moisture: Probably below 200 feet. Remarks: Thin algae crust on surface in all depressed areas, occasional gravel on surface and throughout profile. Soil was very dry when sampled. Samples from 5 foot pit. Auger samples below 5 feet.

| HORIZON | DESCRIPTION |
|---|---|
| A<br>RSL No.<br>5929 | 0-4 inches (0-10 cm), brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine to coarse platy breaking to weak coarse granules; soft when dry, friable moist, sticky and plastic when wet; noncalcareous; pH 7.0; abrupt wavy lower boundary. |
| B1t<br>RSL No.<br>5930 | 4-10 inches (10-25 cm), brown (7.5YR 5/4) gravelly sandy clay loam, reddish brown (5YR 4/4) moist; weak very coarse angular blocky or massive; thin patchy clay skins on faces of peds; common fine and few medium tubular pores; hard when dry, friable moist, slightly sticky and plastic when wet; noncalcareous; pH 7.0; clear wavy boundary. |
| B21t<br>RSL No.<br>5931 | 10-19 inches (25-48 cm), between brown and dark brown (7.5YR 4/4) sandy clay, dark reddish brown (5YR 3/4) moist; weak to moderate medium prismatic breaking to moderate medium to coarse angular blocky; thin continuous clay skins on ped faces; no visible pores in peds; very hard when dry, friable moist, sticky and plastic when wet; noncalcareous; pH 8.0; abrupt wavy boundary. |
| B22t<br>RSL No.<br>5932 | 19-27 inches (48-69 cm), between brown and dark brown (7.5YR 4/4) light sandy clay, dark reddish brown (5YR 3/4) moist; weak medium prismatic breaking to weak medium to coarse angular blocky; thin continuous clay skins on peds; numerous fine common and medium tubular pores; hard when dry, friable moist, sticky and plastic when wet; calcareous; numerous fine mycelia of lime and occasional fine firm concretions; pH 8.0; clear wavy lower boundary. |
| B3tca<br>RSL No.<br>5933 | 27-36 inches (69-91 cm), light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 5/4) moist; common medium to coarse distinct pinkish gray (7.5YR 7/2) mottles and soft concretions of lime, pinkish gray (7.5YR 6/2) moist; massive with few thin patchy clay skins and few clay bridges; common fine and medium continuous tubular pores; slightly hard to hard when dry, friable moist, sticky and plastic when wet; calcareous in matrix, very strongly calcareous in concretions; pH 8.0; gradual wavy boundary. |
| C1ca<br>RSL No.<br>5934 | 36-58 inches (91-147 cm), pinkish gray (7.5YR 6/2) heavy loam, brown (7.5YR 5/4) moist; common medium to coarse distinct pinkish gray (7.5YR 7/2) mottles and soft concretions of lime, pinkish gray (7.5YR 6/2) moist; very few thin patchy clay skins; common fine and medium continuous tubular pores; massive; slightly hard when dry, friable when moist, sticky and plastic when wet; strongly calcareous; pH 8.0; gradual wavy boundary. |
| C2ca<br>RSL No.<br>5935 | 58-70 inches (147-178 cm), pinkish white (7.5YR 8/2) strongly cemented gravelly loamy sand, pinkish gray (7.5YR 6/2) when moist; massive; very hard to extremely hard when dry, firm when moist, nonsticky and nonplastic when wet; strongly calcareous; pH 8.0; gradual wavy boundary. |
| C3ca<br>RSL No.<br>5936 | 70-80 inches (178-203 cm), pinkish white (7.5YR 8/2) heavy loamy sand, pink (7.5YR 7/4) when moist; massive; hard when dry, friable when moist, slightly sticky and nonplastic when wet; strongly calcareous; pH 8.0; gradual wavy boundary. |
| C4<br>RSL No.<br>5937 | 80-98 inches (203-249 cm), pink (7.5YR 7/4) light loamy coarse sand, light brown (7.5YR 6/4) when moist; stratified; slightly hard when dry, loose when moist, nonsticky and nonplastic when wet; calcareous; pH 8.0. |

**SOIL SURVEY LABORATORY** Riverside, California

**SOIL TYPE** Mohall loam **LOCATION** Maricopa County, Arizona

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, hyperthermic

SOIL NOS. S59Ariz-7-3 **LAB. NOS.** 5938 - 5945

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 3A1 0.2-0.02 | 0.02-0.002 | 2A2 > 2 1/ | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 4 | A1 | 17.4 | 19.9 | 5.8 | 6.8 | 8.9 | 30.6 | 10.6 | 32.5 | 10.7 | 5 | cosl |
| 4-10 | B1 | 12.8 | 18.0 | 6.4 | 7.8 | 10.1 | 31.1 | 13.8 | 35.1 | 10.3 | 8 | cosl |
| 10-19 | B21 | 11.7 | 17.9 | 6.6 | 7.4 | 8.3 | 26.5 | 21.6 | 29.8 | 8.9 | 9 | scl |
| 19-27 | B22 | 9.6 | 15.7 | 5.7 | 5.7 | 7.7 | 27.7 | 27.9 | 28.8 | 9.7 | 10 | l-scl-cl |
| 27-37 | B3ca | 12.3 | 15.1 | 5.4 | 5.8 | 6.7 | 33.2 | 21.5 | 29.9 | 13.1 | 9 | l |
| 37-54 | C1can | 19.1 | 18.1 | 6.5 | 5.9 | 4.1 | 29.7 | 16.6 | 20.8 | 15.9 | 26 | cosl |
| 54-76 | C2can | 15.8 | 20.8 | 9.5 | 8.3 | 4.3 | 26.4 | 14.9 | 21.9 | 12.7 | 21 | cosl |
| 76-98+ | C3 | 24.6 | 33.7 | 15.1 | 8.9 | 2.0 | 10.0 | 5.7 | 11.4 | 4.0 | 20 | lcos |

| DEPTH INCHES | pH 8C1b SATURATED PASTE 1:1 | pH 8C1a 1:5 | pH 8C1a 1:10 | ORGANIC MATTER 6A1a ORGANIC CARBON % | ORGANIC MATTER 6B1a NITROGEN % | C/N | 6H1a $CO_3$ meq./l. | 8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C. | 6E1b $CaCO_3$ equivalent % | 6J1a $HCO_3$ meq/l | MOISTURE TENSIONS 1/10 ATMOS. % | MOISTURE TENSIONS 1/3 ATMOS. % | 4B2 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 4 | 7.2 | | 7.8 | 0.16 | 0.025 | | - | 0.3 | - | 1.0 | | | 5.6 |
| 4-10 | 7.5 | | 7.4 | 0.12 | 0.021 | | - | 0.4 | - | 1.6 | | | 6.0 |
| 10-19 | 7.6 | | 8.2 | 0.14 | 0.022 | | - | 0.6 | - | 0.6 | | | 9.1 |
| 19-27 | 8.1 | | 8.9 | 0.16 | 0.023 | | - | 0.9 | 2 | 0.6 | | | 12.0 |
| 27-37 | 8.1 | | 8.9 | 0.16 | 0.020 | | - | 0.9 | 10 | 0.4 | | | 10.3 |
| 37-54 | 8.6 | | 9.2 | 0.05 | | | - | 0.9 | 22 | 2.4 | | | 8.1 |
| 54-76 | 8.8 | | 9.6 | 0.02 | | | - | 1.2 | 15 | 1.8 | | | 8.0 |
| 76-98+ | 9.0 | | 9.7 | 0.01 | | | - | 1.2 | 6 | 2.6 | | | 4.0 |

| DEPTH INCHES | 5A2a CATION EXCHANGE CAPACITY (4 Na) | EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b | 5B1a Mg 6O2c | 6H2a H | Exch. 5B1b Na 6P2a | Exch. 5B1b K 6Q2a | 5D1 EXCH. Na % | SATURATION EXTRACT SOLUBLE 6P1a Na | 6Q1a K | 6N1a Ca | 6O1a Mg | 6K1a | CA MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | | | | | |
| 0- 4 | 8.5 | 7.7 | 8.0 | | 0.1 | 0.9 | 1.2 | 0.4 | 0.4 | 1.8 | 0.8 | 0.5 | 28.6 |
| 4-10 | 14.7 | 9.6 | 8.7 | | 0.3 | 0.6 | 2.0 | 0.6 | 0.2 | 2.1 | 0.9 | 0.5 | 23.3 |
| 10-19 | 20.7 | 13.9 | 10.8 | | 0.5 | 0.4 | 2.4 | 1.8 | 0.4 | 2.7 | 0.9 | 2.2 | 32.6 |
| 19-27 | 23.3 | | | | 0.6 | 0.4 | 2.6 | 3.1 | 0.4 | 3.7 | 1.3 | 4.5 | 41.2 |
| 27-37 | 17.1 | | | | 0.7 | 0.3 | 4.1 | 3.7 | 0.4 | 3.0 | 1.1 | 5.0 | 44.2 |
| 37-54 | 6.3 | | | | 0.8 | 0.2 | 12.7 | 13.5 | 0.1 | 1.0 | 0.6 | 5.7 | 40.3 |
| 54-76 | 6.1 | | | | 1.2 | 0.2 | 19.7 | 18.9 | 0.1 | 0.5 | 0.6 | 5.1 | 37.7 |
| 76-98+ | 4.0 | | | | 1.2 | 0.2 | 30.0 | 20.0 | 0.1 | 0.4 | 0.5 | 3.4 | 30.8 |

1/ Percent of the whole soil

## MOHALL LOAM
S59Ariz-7-3

Location: Maricopa County, Arizona, Maricopa County Area - Northern Part. 1,650 feet and 300 feet south of the northwest corner of Sec. 1, T. 5 N., R. 4 W., G&SRB&M, 100 feet east of road about 3 miles south of Morristown. Date of Sampling: January 16, 1959.
Description by: Milo James. Collectors: Reuben E. Nelson, James Jay, and Milo James.
Classification: Typic Haplargid, fine-loamy, mixed, hyperthermic.
Vegetation: Bursage aspect with scattering of galleta, creosote, palo verde, cane cholla, and annual weeds and grasses. Climate: Precipitation about 9 inches annual. Mean annual air temperature is about 70° F.
Parent Material: Granite, schist and rhyolite alluvium from Heiroglyphic Mountains.
Topography: Smooth, convex slope of less than 1 percent near the low end of a large fan. Surface drainage is to the south. Elevation: About 1,690 feet. Drainage: Internal drainage is good. Surface drainage is slow to moderate. Soil Moisture: Ground water is deep, probably more than 200 feet. Remarks: Occasional gravel encountered throughout profile. Soil was very dry when sampled. Sampled from 5 foot pit. Auger samples below 5 feet.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>5938 | 0-4 inches (0-10 cm), reddish yellow (7.5YR 6/6) loam, between brown and dark brown (7.5YR 4/4) when moist; a thin veneer, about 1/8 inch, of coarse sand on surface; weak medium to coarse platy breaking to weak fine granular; soft to slightly hard when dry, very friable when moist, sticky and plastic when wet; common fine to medium roots; many fine interstitial pores; noncalcareous; pH 7.2; abrupt wavy boundary. |
| B1<br>RSL No.<br>5939 | 4-10 inches (10-25 cm), strong brown (7.5YR 5/6) light sandy clay loam, between brown and dark brown (7.5YR 4/4) moist; massive, breaking to weak medium subangular blocky; a few thin patchy clay skins on peds, common fine and medium continuous tubular pores in peds; common fine roots following faces; slightly hard to hard when dry, very friable moist, sticky and plastic when wet; noncalcareous; pH 7.5; clear wavy boundary. |
| B21<br>RSL No.<br>5940 | 10-19 inches (25-48 cm), brown (7.5YR 5/4) sandy clay, reddish brown (5YR 4/4) moist; moderate medium and coarse prismatic breaking to moderate medium and coarse angular blocky; thin continuous clay skins; few fine pores; common fine roots following ped faces; very hard when dry, friable when moist, very sticky and very plastic when wet; noncalcareous; pH 7.5; clear wavy boundary. |
| B22<br>RSL No.<br>5941 | 19-27 inches (48-69 cm), brown (7.5YR 5/4) sandy clay, reddish brown (5YR 4/4) moist; moderate medium and coarse subangular blocky; thin continuous clay skins; no visible pores in peds; common fine roots following faces; very hard when dry, friable when moist, very sticky and very plastic when wet; calcareous in matrix, strongly calcareous in numerous fine mycelia of lime, an occasional soft concretion of lime; pH 8.0; clear wavy boundary. |
| B3ca<br>RSL No.<br>5942 | 27-37 inches (69-94 cm), strong brown (7.5YR 5/6) sandy clay loam, between brown and dark brown (7.5YR 4/4) moist; common medium and distinct pinkish white (7.5YR 8/2) mottles and soft or, occasionally, hard concretions of lime, pink (7.5YR 7/4) moist; massive breaking to weak fine and medium subangular blocky; thin patchy clay skins on ped faces; common fine and medium continuous pores in peds; slightly hard when dry, very friable when moist, sticky and plastic when wet; strongly to very strongly calcareous; pH 8.0; clear wavy boundary. |
| C1cam<br>RSL No.<br>5943 | 37-54 inches (94-137 cm), pinkish white (7.5YR 8/2) strongly cemented heavy loam, pinkish gray (7.5YR 7/2) moist, with earthy uncemented reddish yellow (7.5YR 8/6) inclusions, pinkish gray (7.5YR 6/2) moist; massive; a few fine continuous pores; very hard or extremely hard when dry, firm when moist, nonsticky and nonplastic when wet; strongly calcareous; pH 8.0. |
| C2cam<br>RSL No.<br>5944 | 54-76 inches (137-193 cm), same description as above except pink (7.5YR 7/4) when moist; gradual wavy boundary. |
| C3<br>RSL No.<br>5945 | 76-98 inches + (193-249 cm), pinkish gray (7.5YR 7/2) loamy coarse sand, light brown (7.5YR 6/4) when moist; massive; soft when dry, loose when moist, slightly sticky and nonplastic when wet; strongly calcareous with an occasional hard carbonate concretion; pH 8.0. |

CONSECUTIVE PEDON NUMBER C 67 56 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MOHALL SOIL NO. S67 ARIZ. 11- 1 SAMPLE NO. 7 658-7 668 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC HAPLARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS- I 75-20 WHOLE SOIL PCT. | II 20-5 OF PCT. | III 5-2 OF LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 7 658 | 0- 3 | A11 | 58.2 | 28.0 | 13.8 | 2.3 | 6.6 | 8.1 | 25.1 | 16.1 | 14.9 | 13.1 | 9.1 | 4.7 | | 45.6 | TR | TR | -- | -- |
| 7 659 | 3- 13 | A12 | 60.4 | 23.0 | 16.6 | 3.3 | 8.7 | 9.0 | 23.7 | 15.7 | 13.2 | 9.8 | 11.1 | 5.5 | | 41.9 | 1 | TR | 1Z | N |
| 7 660 | 13- 23 | B1 T | 57.5 | 21.8 | 20.7 | 2.5 | 7.2 | 8.7 | 23.2 | 15.9 | 13.1 | 8.7 | 12.2 | 8.5 | | 42.6 | 1 | TR | 1Z | N |
| 7 661 | 23- 46 | B21T | 45.9 | 24.5 | 29.6 | 1.6 | 4.0 | 5.3 | 18.4 | 16.6 | 15.0 | 9.5 | 14.1 | 15.5 | | 42.8 | 1 | TR | 1Z | N |
| 7 662 | 46- 66 | B22Tca | 39.4 | 31.3 | 29.3 | 1.4 | 3.2 | 4.2 | 14.7 | 15.9 | 18.7 | 12.6 | 16.4 | 12.9 | | 44.0 | 3 | TR | 3Z | N |
| 7 663 | 66- 84 | B23Tca | 32.4 | 31.3 | 36.3 | 1.5 | 3.2 | 3.8 | 11.6 | 12.3 | 15.2 | 16.1 | 23.9 | 12.4 | | 34.5 | 2 | TR | 2Z | N |
| 7 664 | 84-109 | B24Tca | 31.2 | 39.4 | 29.4 | 1.4 | 2.4 | 2.9 | 10.7 | 13.8 | 15.5 | 23.9 | | | | 36.0 | 4 | TR | 4Z | N |
| 7 665 | 109-130 | B31Tca | 33.9 | 40.1 | 26.0 | 1.2 | 2.4 | 3.4 | 12.3 | 14.6 | 16.0 | 24.1 | | | | 38.6 | 2 | TR | 2Z | N |
| 7 666 | 130-160 | B32Tca | 33.4 | 43.5 | 23.1 | 1.1 | 2.3 | 3.3 | 12.1 | 14.6 | 16.9 | 26.6 | | | | 39.4 | 1 | TR | 1Z | N |
| 7 667 | 160-180 | B33Tca | 27.4 | 48.9 | 23.7 | 0.5 | 1.2 | 2.1 | 9.6 | 14.0 | 17.4 | 31.5 | | | | 37.8 | 1 | TR | 1Z | N |
| 7 668 | 180-229 | C | 31.5 | 49.2 | 19.3 | 0.2 | 0.8 | 2.4 | 13.0 | 15.1 | 20.5 | 28.7 | | | | 44.2 | TR | TR | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | I M I T PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 7 658 | 0- 3 | 0.98 | 0.095 | TR | | 0.7 | | | 1.49 | 1.51 | 1.00 | | 14.7 | 6.3 | 0.4 | 0.4 | | 7.8 | | |
| 7 659 | 3- 13 | 0.26 | 0.038 | TR | | 0.7 | | | 1.63 | 1.65 | 1.00 | | 12.1 | 5.6 | 0.4 | 0.4 | | 7.5 | | |
| 7 660 | 13- 23 | | | TR | | 0.7 | | | 1.50 | 1.60 | 1.00 | | 16.3 | 6.9 | 2.2 | 2.2 | | 7.5 | | |
| 7 661 | 23- 46 | | | TR | | 0.7 | | | 1.47 | 1.65 | 0.99 | | 20.4 | 10.2 | 3.9 | 3.9 | | 8.4 | | |
| 7 662 | 46- 66 | | | 3 | | 0.7 | | | 1.39 | 1.56 | 0.98 | | 22.5 | 11.7 | 3.9 | 3.9 | | 8.9 | | |
| 7 663 | 66- 84 | | | 8 | | 0.7 | | | 1.41 | 1.61 | 0.99 | | 24.6 | 14.4 | 4.5 | 4.5 | | 9.1 | | |
| 7 664 | 84-109 | | | 15 | | 0.6 | | | 1.34 | 1.55 | 0.98 | | 24.0 | 13.5 | 5.0 | 4.9 | | 9.2 | | |
| 7 665 | 109-130 | | | 16 | | 0.6 | | | 1.45 | 1.66 | 0.99 | | 22.9 | 13.7 | 4.6 | 4.6 | | 9.4 | | |
| 7 666 | 130-160 | | | 18 | | 0.3 | | | 1.60 | 1.76 | 0.99 | | 21.6 | 10.0 | 3.2 | 3.2 | | 9.5 | | |
| 7 667 | 160-180 | | | 12 | | 0.6 | | | 1.42 | 1.57 | 0.99 | | 22.3 | 10.5 | 3.4 | 3.4 | | 9.4 | | |
| 7 668 | 180-229 | | | 9 | | 0.7 | | | 1.37 | 1.49 | 1.00 | | 24.1 | 8.3 | 2.8 | 2.8 | | 9.1 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | FC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1D | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 7 658 | 0- 3 | | | 0.1 | 2.0 | 2.1 | | | 13.7 | | | | | | | | | | | 6.9 |
| 7 659 | 3- 13 | | | 0.1 | 1.4 | 1.5 | | | 12.9 | | | | | | | | | | | 6.6 |
| 7 660 | 13- 23 | | | 0.1 | 1.6 | 1.7 | | | 16.9 | | | | | | | | | | | 6.9 |
| 7 661 | 23- 46 | | | 0.1 | 1.8 | 1.9 | | | 18.7 | | | | | | | | | | | 7.5 |
| 7 662 | 46- 66 | | | 0.2 | 1.3 | 1.5 | | | 17.8 | | | | | | | | | | | 7.9 |
| 7 663 | 66- 84 | | | 0.4 | 1.2 | 1.6 | | | 22.5 | | | | | | | | | | | 8.0 |
| 7 664 | 84-109 | | | 0.5 | 0.6 | 1.1 | | | 19.1 | | | | | | | | | | | 8.1 |
| 7 665 | 109-130 | | | 1.8 | 0.3 | 2.1 | | | 17.1 | | | | | | | | | | | 8.1 |
| 7 666 | 130-160 | | | 2.8 | 0.3 | 3.1 | | | 15.5 | 0.96 | 1.1 | 0.6 | 6.7 | 0.6 | | 2.3 | 2.0 | | | 8.3 |
| 7 667 | 160-180 | | | 4.0 | 0.2 | 4.2 | | | 16.9 | 2.70 | 3.3 | 2.4 | 17.8 | 0.2 | | 1.6 | 8.5 | | | 8.1 |
| 7 668 | 180-229 | | | 6.3 | 0.3 | 6.6 | | | 19.6 | 6.8 | 19.4 | 14.2 | 39.2 | 0.2 | | 1.0 | 18.4 | | | 7.9 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A2F | PCT. 7A3 | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 658 | 0- 3 | | 0.1 | 1 | | | | MT 3 | MI 3 | | | | MI 3 | | | MT MONTMORT | 1 TRACE |
| 7 659 | 3- 13 | | 0.1 | 1 | | | | MI 3 | MT 2 | KK 1 | | | MI 3 | MT 1 | | MI MICA | 2 SMALL |
| 7 660 | 13- 23 | | 0.1 | 1 | | | | MT 3 | MI 3 | KK 2 | | | | | | KK KAOLINIT | 3 MODERATE |
| 7 661 | 23- 46 | | 0.1 | 1 | | | | MT 4 | MI 4 | KK 2 | | | MT 3 | MI 3 | | | 4 ABUNDANT |
| 7 662 | 46- 66 | | 0.2 | 1 | | | | | | | | | MT 3 | MI 3 | | | 5 DOMINANT |
| 7 663 | 66- 84 | | 0.4 | 2 | | | | MT 4 | MI 2 | KK 2 | | | MT 4 | MI 3 | | | 6 INDETER. |
| 7 664 | 84-109 | | 0.5 | 3 | | | | | | | | | | | | | |
| 7 665 | 109-130 | | 1.8 | 11 | | | | | | | | | | | | | |
| 7 666 | 130-160 | 58.2 | 2.4 | 16 | 7 | | | | | | | | | | | | |
| 7 667 | 160-180 | 63.8 | 2.9 | 15 | 11 | | | | | | | | | | | | |
| 7 668 | 180-229 | 53.3 | 4.2 | 21 | 10 | | | MT 5 | MI 2 | KK 2 | | | | | | | |

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## MOHALL LOAM
S67Ariz-11-1

Location: Pinal County, Arizona. 150 feet north and 250 feet east of the center of Sec. 11, T. 3 S., R. 8 E., 13 miles north of Coolidge. Date of Sampling: October 13, 1967.
Description by: E. Adams, J. Jay. Collectors: K. Flach, D. Nettleton, D. Hendricks.
Classification: Typic Haplargid, fine-loamy, mixed, hyperthermic.
Vegetation: Desert shrub - dominantly creosote with some brittlebush and cacti. Use: Seasonal range.
Climate: Mean annual precipitation 9 inches (Florence). Mean annual temperature 70° F.; January 51° F., July 90° F. Parent Material: Alluvial valley fill material from acid and basic igneous and sedimentary rocks. Topography: Nearly level valley plain with slopes of less than 0.5 percent to the southwest.
Elevation: 1300 feet. Drainage: Well drained with a moderately slowly permeable subsoil. Medium runoff.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>67658 | 0-3 cm (0-1 inch), light brown (7.5YR 6/4) loam, brown (7.5YR 4/4) when moist; weak medium platy structure; slightly hard, friable, slightly sticky and plastic; many fine and medium roots; few fine vesicular pores; noneffervescent (pH 8.0 thymol blue); abrupt smooth boundary. |
| A12<br>RSL No.<br>67659 | 3-13 cm (1-5 inches), light brown (7.5YR 6/4) sandy loam, brown (7.5YR 4/4) when moist; weak coarse platy breaking to weak fine subangular blocky structure; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; many fine and medium roots; common fine tubular and and interstitial pores; noneffervescent (pH 8.0); abrupt smooth boundary. |
| B1t<br>RSL No.<br>67660 | 13-23 cm (5-9 inches), brown (7.5YR 5/4) light sandy clay loam, dark reddish gray (5YR 4/2) when moist; weak medium prismatic breaking to weak medium subangular blocky structure; hard when dry, friable when moist, slightly sticky and plastic when wet; common fine and medium roots; few fine tubular and common fine interstitial pores; few thin clay films in pores; noneffervescent (pH 8.0); clear smooth boundary. |
| B21t<br>RSL No.<br>67661 | 23-46 cm (9-18 inches ), brown (7.5YR 5/4), clay loam, dark brown (7.5YR 4/4) when moist; weak medium prismatic breaking to moderate medium subangular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; few fine and very fine roots; common fine tubular and few fine interstitial pores; few thin clay films in pores; noneffervescent (pH 8.0); clear smooth boundary. |
| B22tca<br>RSL No.<br>67662 | 46-66 cm (18-26 inches), reddish yellow (7.5YR 6/6) clay loam; dark brown (7.5YR 4/4) when moist; weak medium prismatic breaking to strong medium subangular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; few fine and very fine roots; few fine tubular and common fine interstitial pores; few thin clay films in pores and on ped faces; few fine soft masses of pinkish white and irregular filaments of carbonates; strongly effervescent (pH 8.0); gradual smooth boundary. |
| B23tca<br>RSL No.<br>67663 | 66-84 cm (26-33 inches), yellowish red (5YR 5/6) clay loam; reddish brown (5YR 4/4) when moist; weak medium prismatic breaking to strong medium prismatic breaking to strong medium subangular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; few fine and very fine roots; common fine tubular and interstitial pores; few thin clay films in pores and on ped faces; common medium pinkish white irregular soft masses of carbonates, slightly to strongly effervescent (pH 8.0); gradual smooth boundary. |
| B24tca<br>RSL No.<br>67664 | 84-109 cm (33-43 inches), light brown (7.5YR 6/4) clay loam, reddish brown (5YR 4/4) when moist; massive; hard when dry, firm when moist, slightly sticky and plastic when wet; few fine tubular and common fine interstitial pores; few thin clay films in pores; common medium pinkish white irregular soft masses of carbonates, strongly effervescent (pH 8.0); gradual smooth boundary. |
| B31tca<br>RSL No.<br>67665 | 109-130 cm (43-51 inches), light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) when moist; massive; hard when dry, firm when moist, slightly sticky and plastic when wet; few fine tubular pores; few thin clay films in pores; common medium pinkish white irregular soft masses of carbonates, strongly effervescent (pH 8.0); gradual smooth boundary. |
| B32tca<br>RSL No.<br>67666 | 130-160 cm (51-63 inches), light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) when moist; massive; hard when dry, firm when moist, sticky and plastic when wet; few fine and medium tubular pores; few thin clay films in pores; common medium pinkish white irregular soft masses of carbonates; strongly effervescent (pH 8.0); gradual smooth boundary. |
| B33tca<br>RSL No.<br>67667 | 160-180 cm (63-71 inches), light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) when moist; massive; hard when dry, firm when moist, sticky and plastic when wet; few fine tubular pores; few thin clay films in pores; few fine pinkish white irregular filaments and soft masses of carbonates, strongly effervescent (pH 8.0); gradual smooth boundary. |
| C<br>RSL No.<br>67668 | 180-229 cm (71-90 inches), very pale brown (10YR 7/3) loam, brown (7.5YR 4/4) and very pale brown (10YR 7/4) when moist; massive; hard when dry, firm when moist, sticky and plastic when wet; many fine tubular pores; few thin clay films in pores; few fine white filaments and soft masses of carbonates; strongly to violently effervescent (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 67 57 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MOHALL SOIL NO. S67 ARIZ. 11- 2 SAMPLE NO. 7 669-7 680 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC HAPLARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. COARSE II .2- DF | FRAGMENTS PCT. I 75- WHOLE | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 7 669 | 0- 5 | A11 | 18.2 | 55.8 | 26.0 | 1.0 | 2.5 | 2.9 | 6.7 | 5.1 | 13.3 | 42.5 | | | | 21.8 | TR | TR | -- | -- |
| 7 670 | 5- 10 | A12 | 54.2 | 28.7 | 17.1 | 2.9 | 6.3 | 8.9 | 22.0 | 14.1 | 14.0 | 14.7 | | | | 40.1 | 2 | TR | 2Z | N |
| 7 671 | 10- 20 | A3 | 57.1 | 18.9 | 24.0 | 3.7 | 6.7 | 9.6 | 23.8 | 13.3 | 9.6 | 9.3 | | | | 35.9 | 6 | TR | 6Z | N |
| 7 672 | 20- 28 | B1 T | 58.5 | 15.8 | 25.7 | 6.1 | 8.2 | 9.5 | 22.7 | 12.0 | 9.4 | 6.4 | | | | 33.4 | 8 | TR | 8Z | N |
| 7 673 | 28- 51 | B21T | 41.9 | 14.1 | 44.0 | 2.8 | 6.5 | 7.0 | 16.3 | 9.3 | 9.3 | 4.8 | | | | 27.0 | 4 | TR | 4Z | N |
| 7 674 | 51- 66 | B22T | 40.8 | 17.8 | 41.4 | 3.3 | 5.3 | 6.0 | 14.7 | 11.5 | 10.7 | 7.1 | | | | 30.0 | 11 | TR | 11Z | N |
| 7 675 | 66- 79 | B31T | 45.7 | 22.1 | 32.2 | 4.7 | 5.6 | 6.0 | 16.5 | 12.9 | 13.1 | 9.0 | | | | 35.0 | 14 | 2 | 12Z | N |
| 7 676 | 79-109 | B32TCA | 48.1 | 29.5 | 22.4 | 3.6 | 5.4 | 6.8 | 18.8 | 13.5 | 14.4 | 15.1 | | | 1 | 37.9 | 15 | TR | 15Z | N |
| 7 677 | 109-135 | C 1CA | 48.2 | 30.4 | 21.4 | 3.2 | 5.4 | 6.9 | 19.3 | 13.4 | 16.5 | 13.9 | | | 1 | 40.7 | 11 | TR | 11Z | N |
| 7 678 | 135-147 | 2A1 BCA | | | | | | | | | | | | | | | 23 | TR | 23Z | N |
| 7 679 | 147-193 | 2B2TBCA | 43.7 | 21.8 | 34.5 | 3.4 | 6.4 | 6.7 | 16.5 | 10.7 | 10.8 | 11.0 | | | | 30.2 | 4 | TR | 4Z | N |
| 7 680 | 193-208 | 2C2 CA | | | | | | | | | | | | | | | 5 | TR | 5Z | N |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A -PERCENT-- | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B -PERCENT- | EXT. IRON FE 6C2B PCT. | ATTERBERG L I M I T LL 4F1 | PL 4F2 PCT.NO.40 | BULK DENSITY EST 1/3 4A1F | 1/3 BAR 4A1F GRAMS PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C -PERCENT--- | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 669 | 0- 5 | 0.86 | 0.074 | TR | | 1.0 | | | | 1.36 | 1.47 | 1.00 | | 30.4 | 11.9 | 2.6 | 2.6 | | 8.6 | |
| 7 670 | 5- 10 | 0.31 | 0.044 | TR | | 0.7 | | | | 1.53 | 1.62 | 0.99 | | 19.5 | 6.3 | 1.9 | 1.9 | | 8.3 | |
| 7 671 | 10- 20 | | | TR | | 0.8 | | | | 1.71 | 1.82 | 0.96 | | 14.7 | 6.7 | 2.1 | 2.0 | | 8.4 | |
| 7 672 | 20- 28 | | | TR | | 0.7 | | | | 1.52 | 1.62 | 0.95 | | 14.2 | 6.9 | 2.1 | 2.0 | | 8.4 | |
| 7 673 | 28- 51 | | | TR | | 0.8 | | | | 1.50 | 1.71 | 0.98 | | 23.5 | 15.5 | 4.5 | 4.4 | | 8.8 | |
| 7 674 | 51- 66 | | | 4 | | 0.7 | | | 1.50 | | | 0.93 | | | 13.8 | | | | 9.0 | |
| 7 675 | 66- 79 | | | 5 | | 0.6 | | | 1.40 | | | 0.93 | | | 11.5 | | | | 9.2 | |
| 7 676 | 79-109 | | | 13 | | 0.4 | | | | 1.31 | 1.48 | 0.92 | | 21.3 | 9.2 | 4.2 | 3.8 | | 9.5 | |
| 7 677 | 109-135 | | | 12 | | 0.4 | | | 1.31 | | | 0.94 | | | 8.7 | | | | 9.6 | |
| 7 678 | 135-147 | | | | | | | | 1.34 | | | 0.87 | | | 8.7 | | | | | |
| 7 679 | 147-193 | | | | | 0.5 | | | | 1.36 | 1.58 | 0.98 | | 27.5 | 13.0 | 5.1 | 5.0 | | | |
| 7 680 | 193-208 | | | | | | | | 1.36 | | | 0.97 | | | 9.1 | | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C NA- OAC 5A2A -MEQ/100G | NH4- OAC 5A6A | WATER EXTRACT FROM SATURATED PASTE EC 8A1A MMHO | CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | | |
| 7 669 | 0- 5 | | | 0.1 | 1.6 | 1.7 | | | 27.6 | 1.26 | 10.3 | 2.1 | 0.6 | 0.9 | | 9.7 | 0.3 | | | 7.9 |
| 7 670 | 5- 10 | | | 0.1 | 1.0 | 1.1 | | | 15.2 | 1.55 | 11.9 | 2.6 | 1.0 | 0.5 | | 3.7 | 0.6 | | | 7.4 |
| 7 671 | 10- 20 | | | 0.1 | 1.2 | 1.3 | | | 16.3 | | | | | | | | | | | 7.6 |
| 7 672 | 20- 28 | | | 0.1 | 1.2 | 1.3 | | | 17.5 | 0.91 | 6.2 | 2.1 | 1.0 | 0.5 | | 1.2 | 0.4 | | | 7.6 |
| 7 673 | 28- 51 | | | 0.5 | 1.1 | 1.6 | | | 24.0 | | | | | | | | | | | 7.7 |
| 7 674 | 51- 66 | | | 0.7 | 0.8 | 1.5 | | | 19.0 | | | | | | | | | | | 7.9 |
| 7 675 | 66- 79 | | | 0.8 | 0.5 | 1.3 | | | 15.4 | | | | | | | | | | | 8.0 |
| 7 676 | 79-109 | | | 1.2 | 0.4 | 1.6 | | | 10.2 | 0.55 | 0.6 | 0.3 | 4.4 | 0.1 | | 2.6 | 0.7 | | | 8.3 |
| 7 677 | 109-135 | | | 1.5 | 0.2 | 1.7 | | | 9.7 | | | | | | | | | | | 8.5 |
| 7 678 | 135-147 | | | | | | | | | | | | | | | | | | | |
| 7 679 | 147-193 | | | 3.7 | 0.6 | 4.3 | | | 17.3 | | | | | | | | | | | |
| 7 680 | 193-208 | | | | | | | | | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM- AMT. REQ. 6F1B PCT. | 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY DTA 7A2E I | 7A2E II | 7A2E III | 7A2E IV | 7A3 PCT. | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 669 | 0- 5 | 55.9 | TR | TR | TR | | | MT 3 | MI 3 | KK 2 | | | | | |
| 7 670 | 5- 10 | 29.8 | TR | TR | TR | | | | | | | | | | |
| 7 671 | 10- 20 | | 0.1 | 1 | | | | MT 3 | MI 3 | KK 2 | | | | | |
| 7 672 | 20- 28 | 33.4 | TR | TR | TR | | | | | | | | | | |
| 7 673 | 28- 51 | | 0.5 | 2 | | | | MI 4 | MT 3 | KK 2 | | | | | |
| 7 674 | 51- 66 | | 0.7 | 4 | | | | | | | | | | | |
| 7 675 | 66- 79 | | 0.8 | 5 | | | | | | | | | | | |
| 7 676 | 79-109 | 63.8 | 0.9 | 9 | 7 | | | | | | | | | | |
| 7 677 | 109-135 | | 1.5 | 15 | | | | | | | | | | | |
| 7 678 | 135-147 | | | | | | | | | | | | | | |
| 7 679 | 147-193 | | 3.7 | 21 | | | | MI 4 | MT 3 | KK 2 | | | | | |
| 7 680 | 193-208 | | | | | | | | | | | | | | |

MINERAL CODE / RELATIVE AMOUNT

MT MONTMORT 1 TRACE
MI MICA 2 SMALL
KK KAOLINIT 3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

MT MONTMORT MTKK

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## MOHALL LOAM

S67Ariz-11-2

Location: Pinal County, Arizona. 450 feet east and 200 feet north of the southwest corner of Section 19, T3S, R9E, 16 miles north of Coolidge. Date of Sampling: October 14, 1967.
Description by: E. Adams, J. Jay. Collectors: K. Flach, D. Nettleton.
Classification: Typic Haplargid, fine-loamy, mixed, hyperthermic.
Vegetation: Desert shrub--creosote bush, cholla cacti, and brittlebush. Use: Desert rangeland. Climate: Mean annual precipitation 9 inches (Florence). Mean annual air temperature 70° F., January 51° F., July 90° F. Parent Material: Valley fill material derived from acidic and basic igneous and metamorphosed sedimentary rocks. Topography: Nearly level valley plain with slopes of 0.5 percent. Elevation: 1400 feet. Drainage: Well drained with moderately slow permeability. Runoff is medium. Soil Moisture: Dry when sampled.
Remarks: Profile is probably finer textured than modal Mohave (est. 37-39 percent clay). Structure is about 1 grade stronger than Mohave. Soil temperature at 20 inches 84° F.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>67669 | 0 to 5 cm (0 to 2 inches), light brown (7.5YR 6/4) loam, brown (7.5YR 4/4) when moist; weak medium platy breaking to moderate medium and fine subangular blocky structure; hard, friable, sticky and plastic; many *fine and very fine roots; common fine vesicular pores; non-* to slightly effervescent ((pH 8.0 thymol blue); abrupt smooth boundary. |
| A12<br>RSL<br>67670 | 5 to 10 cm ( 2 to 4 inches), light brown (7.5YR 6/4) loam, brown (7.5YR 4/4) when moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and plastic; many fine and very fine roots; few fine tubular and many fine intersitital pores; noneffervescent (pH 8.0); abrupt smooth boundary. |
| A3<br>RSL<br>67671 | 10 to 20 cm (4 to 8 inches), light brown (7.5YR 6/4) loam, brown (7.5YR 4/4) when moist; massive; slightly hard, friable, slightly sticky and plastic; common fine and very fine roots; few fine tubular and common fine interstitial pores; about 5 percent gravel; noneffervescent (pH 8.0); abrupt wavy boundary. |
| B1t<br>RSL<br>67672 | 20 to 28 cm (8 to 11 inches), yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) when moist; weak coarse prismatic structure; hard, friable, sticky and plastic; common fine and very fine roots; very few fine tubular and few fine interstitial pores; few thin clay films in pores; about 5-10 percent quartzite gravel; noneffervescent (pH 8.0); clear smooth boundary. |
| B21t<br>RSL<br>67673 | 28 to 51 cm (11 to 20 inches), reddish brown (5YR 5/3) clay loam, reddish brown (5YR 4/4) when moist; strong medium prismatic breaking to strong medium angular blocky structure; very hard, friable, sticky and plastic; common fine and very fine roots; few fine tubular and common fine interstitial pores; common moderately thick clay films on ped faces and in pores; about 5 percent gravel; noneffervescent (pH 8.0); clear smooth boundary. |
| B22t<br>RSL<br>67674 | 51 to 66 cm (20 to 26 inches), reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) when moist; strong medium prismatic breaking to strong medium angular blocky structure; very hard, friable, sticky and plastic; common fine and very fine roots; common fine tubular and interstitial pores; common moderately thick clay films on ped faces and in pores; about 10 percent medium gravel; noneffervescent (pH 8.0); clear smooth boundary. |
| B31t<br>RSL<br>67675 | 66 to 79 cm (26 to 31 inches), reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) when moist; weak medium prismatic breaking to moderate medium angular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; common fine tubular and interstitial pores; about 10 percent gravel; strongly effervescent (pH 8.0); clear smooth boundary. |
| B32tca<br>RSL<br>67676 | 79 to 109 cm (31 to 43 inches), reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) when moist; weak medium prismatic breaking to moderate medium angular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; common fine tubular and interstitial pores; common moderately thick clay films on ped faces and in pores; common medium pinkish white irregular soft masses of carbonate; about 10-15 percent quartzite gravel, strongly effervescent, violently effervescent on mottles (pH 8.0); gradual smooth boundary. |
| C1ca<br>RSL<br>67677 | 109 to 135 cm (43 to 53 inches), light reddish brown (5YR 6/3) and reddish brown (5YR 5/3) clay loam (30 percent), reddish brown (5YR 4/4) when moist; massive; hard, firm, sticky and plastic; common fine and very fine roots; common fine tubular and interstitial pores; few thin clay films in pores; common medium pinkish white irregular soft masses of carbonates; about 10 percent gravel; strongly effervescent, violently effervescent on mottles (pH 8.0); gradual smooth boundary. |
| IIA1bca<br>RSL<br>67678 | 135 to 147 cm (53 to 58 inches), light reddish brown (5YR 6/3) gravelly loam, yellowish red (5YR 4/6) when moist; massive; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few *fine tubular and many fine interstitial pores; few thin clay films in pores; common medium distinct pinkish* white (5YR 8/2) irregular soft masses of carbonates, pinkish gray (5YR 7/2) when moist; about 15-20 percent quartzite gravel; strongly effervescent, violently effervescent on mottles (pH 8.0); clear smooth boundary. |
| IIB2tbca<br>RSL<br>67679 | 147 to 193 cm (58 to 76 inches), pink (5YR 7/3) clay loam, reddish brown (5YR 4/4) when moist; weak medium prismatic breaking to weak medium angular blocky structure; very hard, friable, sticky and plastic; few fine and very fine roots; very few fine tubular and few fine interstitial pores; few moderately thick clay films on ped faces in pores; many large pinkish white irregular soft masses of carbonates, less than 5 percent gravel; noneffervescent in matrix, violently effervescent on mottles (pH 8.0); gradual smooth boundary. |
| IIC2ca<br>RSL<br>67680 | 193 to 208 cm (76 to 82 inches), light reddish brown (5YR 6/3) and reddish yellow (5YR 6/6) clay loam (30 percent), reddish yellow (5YR 7/6) when moist; massive; very hard, friable, sticky and plastic; few fine vesicular and fine tubular pores; very few thin clay film in pores; common large pinkish white irregular soft masses of carbonate, about 5 percent gravel; strongly effervescent, violently effervescent on mottles (pH 8.0). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, mesic

SOIL Balon gravelly clay loam (taxadjunct) SOIL Nos. S65Ariz-13-6 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65193 - 65199

| Depth (In) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (<0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: (0.05–0.02) | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments: >2 | 2–19 | 19–76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | Pct | Pct. of <76mm | |
| 0-3 | A1 | 57.1 | 22.3 | 20.6 | 6.4 | 12.4 | 10.8 | 18.5 | 9.0 | 10.5 | 11.8 | 28.3 | 48.1 | 0 | 21 | 42 | 11** | 31** |
| 3-7 | B1t | 42.6 | 24.2 | 33.2 | 5.2 | 10.5 | 7.8 | 12.2 | 6.9 | 9.8 | 14.4 | 22.6 | 35.7 | 0 | 33 | 12 | 8 | 4 |
| 7-15 | B21t | 43.3 | 27.7 | 29.0 | 5.9 | 11.8 | 7.6 | 11.1 | 6.9 | 10.5 | 17.2 | 23.0 | 36.4 | 0 | 29 | 26 | 17 | 9 |
| 15-23 | B22t | 52.4 | 29.0 | 18.6 | 8.6 | 14.4 | 8.8 | 12.4 | 8.2 | 11.0 | 18.0 | 25.7 | 44.2 | 0 | 19 | 31 | 21** | 10** |
| 23-36 | B3t | 56.9 | 27.7 | 15.4 | 10.9 | 17.0 | 9.5 | 12.2 | 7.3 | 9.1 | 18.6 | 22.6 | 49.6 | 0 | 15 | 34 | 20** | 14** |
| 36-54 | C1 | 52.4 | 33.1 | 14.5 | 12.5 | 14.7 | 7.3 | 10.6 | 7.3 | 10.3 | 22.8 | 23.2 | 45.1 | 0 | 15 | 55 | 29** | 26** |
| 54-73+ | C2 | 59.0 | 24.8 | 16.2 | 16.8 | 18.6 | 8.4 | 9.9 | 5.3 | 7.4 | 17.4 | 17.8 | 53.7 | 0 | 16 | 48 | 26** | 22** |

| Depth (In) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density | 3B2 | Water content | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | pH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | Cm | Pct. | Pct. | Pct. | in./in. | in./in. | | | |
| 0-3 | 0.64 | 0.057 | 11 | 1.6 | - | | | | | | | 8.6 | | | 6.5 | | |
| 3-7 | 0.53 | 0.050 | 11 | 1.4 | - | 1.34 | 1.54 | | 0.94 | | 22.8 | 15.5 | 0.049 | 0.045 | 6.7 | | |
| 7-15 | 0.38 | | | 1.3 | - | 1.35 | 1.61 | | 0.85 | | 26.7 | 16.2 | 0.061 | 0.051 | 6.7 | | |
| 15-23 | 0.16 | | | 1.3 | - | 1.49 | 1.65 | | 0.80 | | 22.4 | 12.7 | 0.034 | 0.027 | 6.7 | | |
| 23-36 | 0.09 | | | 1.2 | - | 1.49 | 1.62 | | 0.78 | | 22.7 | 11.6 | 0.028 | 0.021 | 6.7 | | |
| 36-54 | 0.09 | | | 1.2 | - | | | | | | | 12.4 | | | 6.7 | | |
| 54-73+ | 0.04 | | | 1.0 | - | | | | | | | 11.6 | | | 6.9 | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Atterberg limits: Plastic limit | Liquid limit | Plastic index | Base saturation: 5C1 $NH_4OAc$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | Pct. of <0.4 mm | | | Pct | Pct |
| 0-3 | 12.9 | 5.8 | 0.1 | 0.4 | 19.2 | | 20.6 | | | | | | 93 | |
| 3-7 | 23.3 | 9.2 | 0.2 | 0.3 | 33.0 | | 35.4 | | | | | | 93 | |
| 7-15 | 25.4 | 9.6 | 0.3 | 0.3 | 35.6 | | 37.7 | | | | | | 94 | |
| 15-23 | 22.2 | 9.0 | 0.3 | 0.2 | 31.7 | | 33.2 | | | | | | 95 | |
| 23-36 | 21.7 | 8.6 | 0.3 | 0.2 | 30.8 | | 32.0 | | | | | | 96 | |
| 36-54 | 23.4 | 9.4 | 0.5 | 0.3 | 33.6 | | 34.9 | | | 20 | 42 | 22 | 96 | |
| 54-73+ | 23.4 | 9.6 | 0.5 | 0.3 | 33.8 | | 34.3 | | | | | | 98 | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| 0-3 | XXXX | - | - | t | |
| 3-7 | XXXX | - | - | t | |
| 7-15 | XXXX | - | - | t | |
| 15-23 | XXXX | - | - | - | |
| 23-36 | XXXX | - | - | - | |
| 36-54 | XXXX | - | - | - | |
| 54-73+ | XXXX | - | - | - | |

* Values from characterization sample (5Kg)(except as noted).

** 2-19 mm. from characterization sample, 19-76 mm from field weight (>50Kg).

## BALON GRAVELLY CLAY LOAM (taxadjunct) 1/
S65Ariz-13-6

Location: Western Yavapai County, Arizona. About 2/10 mile northeast of Poland Junction substation on south exposure of ridge. 4/10 mile west and 3/10 mile south of northeast corner of Sec. 5, T12N, R1E. EGE 1959, Photo #27-95. Date of Sampling: May 5, 1965.
Collectors: Flach, Nettleton, Jay, Meurisse, Freeman
Vegetation: Brushgrass. Oakbrush, squawbush, blue grama, black grama. Brush is dominant on north slopes and grass is dominant on south slopes. Climate: Mean annual precipitation 12-14". Mean annual temperature 57°F. Soil temperature at time of sampling 66°F. at 20". Parent Material: Alluvium from schist, phyllite and granite. Relief: Gently sloping, dissected old alluvial fans on a 8 percent convex slope. About midslope on a fan with a south exposure. Elevation: 4800 feet. Drainage: Medium run-off, moderately slow to slowly permeable and well drained.
Remarks: This soil is formed in old alluvium from schist, phyllite and granite under a chaparral or grass vegetation. It is on gently sloping to moderately steep dissected old alluvial fans. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-7.
Classification: Typic Haplargid, fine-loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| | Gravel pavement on 75 percent of surface, 10 percent cobbles on surface. |
| A1<br>RSL No.<br>65193 | 0 to 3 inches, dark grayish brown (10YR 4/2) gravelly clay loam, very dark grayish brown (10YR 3/2) when moist; moderate medium granular structure; slightly hard, friable, nonsticky and slightly plastic; few fine roots; many fine interstitial pores; A1 has 30-40 percent gravels by volume; noneffervescent; medium acid (pH 6.0); abrupt smooth boundary. |
| B1t<br>RSL No.<br>65194 | 3 to 7 inches, dark grayish brown (10YR 4/2) heavy clay loam, dark brown (7.5YR 3/2) when moist; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and plastic; plentiful fine and medium roots; common fine tubular and many fine interstitial pores; few thin clay films on ped faces and in pores; 10 percent fine and medium weathered pebbles which are easily broken in hands; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B21t *<br>RSL No.<br>65195 | 7 to 15 inches, brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) when moist; moderate medium subangular and angular blocky structure; very hard, friable, sticky and plastic; abundant fine, medium and coarse roots; common fine tubular and many fine interstitial pores; common thin clay films on ped faces and in pores; 10 percent fine and medium weathered pebbles that are easily broken in hands; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B22t<br>RSL No.<br>65196 | 15 to 23 inches, brownish yellow (10YR 6/6), yellowish brown (10YR 5/4) and white (10YR 8/1) gravelly heavy clay loam or clay; dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/6) and white (10YR 8/2) when moist; weak medium subangular and angular blocky structure; very hard, friable, sticky and plastic; plentiful fine, medium and coarse roots; common fine tubular and many fine interstitial pores; few thin clay films on ped faces and in pores; 20 to 30 percent weathered pebbles which are easily broken in hands; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary. |
| B3t<br>RSL No.<br>65197 | 23 to 36 inches, light yellowish brown (10YR 6/4), pale brown (10YR 6/3) and white (10YR 8/2) gravelly clay loam, yellowish brown (10YR 5/4), brownish yellow (10YR 6/6) and white (10YR 8/2) when moist; massive structure; very hard, friable, sticky and plastic; plentiful fine, medium and coarse roots; few fine and medium tubular and many fine interstitial pores; few thin oriented clay as bridges; 30 to 40 percent weathered pebbles which are easy to break in hand; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| C1<br>RSL No.<br>65198 | 36 to 54 inches, light yellowish brown (10YR 6/4), brownish yellow (10YR 6/6) and dark yellowish brown (10YR 4/4) gravelly sandy clay loam or gravelly clay loam, dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/6), brownish yellow (10YR 6/6), and dark brown (10YR 3/3) when moist; massive; hard, friable, slightly sticky and plastic; plentiful fine and medium roots; few fine tubular and many fine interstitial pores; very few thin oriented clay bridges; 30-40 percent slightly weathered pebbles which are hard to break in hand; noneffervescent; neutral (pH 7.2); gradual wavy boundary. |
| C2 *<br>RSL No.<br>65199 | 54 to 73 inches plus, very pale brown (10YR 8/4) gravelly loamy sand, yellowish brown (10YR 5/4) when moist; massive structure; hard, friable, nonsticky and nonplastic; few fine and medium roots; many fine interstitial pores; 45 percent hard gravels; noneffervescent; neutral (pH 7.2). |

* Sampled for BPR

1/ The Balon series is in a fine-loamy, mixed, mesic family of Ustollic Haplargids. This pedon lacks sufficient organic carbon to meet ustollic requirements.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, mesic

SOIL Balon gravelly clay loam (taxadjunct) SOIL Nos. S65Ariz-13-7 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65200 - 65206

| Depth (In) | Horizon | 1B1b Total Sand (2–0 05) | Total Silt (0.05–0.002) | Total Clay (< 0 002) | Sand (Pct. of < 2 mm) Very coarse (2–1) | Sand Coarse (1–0 5) | Sand Medium (0.5–0.25) | Sand Fine (0.25–0.1) | Sand Very fine (0.1–0.05) | Silt 0.05–0.02 | Silt Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0 1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | ★ Coarse fragments 1A2a > 2 Pct | 2 – 19 (Pct. of < 76mm) | 19–76 (Pct. of < 76mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | A1 | 60.1 | 20.7 | 19.2 | 12.0 | 14.6 | 11.0 | 15.3 | 7.2 | 8.3 | 12.4 | 22.9 | 52.9 | 0 | 19 | 53 | 20 | 33 |
| 2-7 | B1t | 38.1 | 25.1 | 36.8 | 6.0 | 10.2 | 6.4 | 9.5 | 6.0 | 8.9 | 16.2 | 19.9 | 32.1 | 0 | 37 | 16 | 15 | 1 |
| 7-17 | B21t | 53.6 | 22.5 | 23.9 | 13.0 | 18.5 | 8.4 | 8.9 | 4.8 | 7.9 | 14.6 | 16.9 | 48.8 | 0 | 24 | 53 | 33 | 20 |
| 17-25 | B22t | 58.9 | 19.3 | 21.8 | 20.7 | 19.1 | 6.9 | 7.4 | 4.8 | 6.0 | 13.3 | 14.5 | 54.1 | 0 | 22 | 50 | 43 | 7 |
| 25-40 | B3t | 57.4 | 23.1 | 19.5 | 13.8 | 17.0 | 8.8 | 10.2 | 7.6 | 8.4 | 14.7 | 21.1 | 49.8 | 0 | 20 | 44 | 31 | 13 |
| 40-53 | C1 | 55.6 | 25.2 | 19.2 | 12.2 | 16.9 | 8.6 | 9.8 | 8.1 | 9.1 | 16.1 | 22.2 | 47.5 | 0 | 19 | 37 | 35 | 2 |
| 53-80+ | C2 | 59.0 | 21.8 | 19.2 | 17.9 | 17.5 | 7.3 | 8.9 | 7.4 | 8.8 | 13.0 | 20.8 | 51.6 | 0 | 19 | 35 | 30 | 5 |

| Depth (In) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct | Bulk density 4A1f 1/3 bar g/cc | Bulk density 4A1h Oven dry g/cc | g/cc | Water content Pct. | Water content 4B1c 1/3 bar Pct. | Water content 4B2 15 bar Pct | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | 1.64 | 0.130 | 13 | | - | | | | | | 9.4 | | | 6.5 | | |
| 2-7 | 0.63 | 0.063 | 10 | | - | | | | | | 17.1 | | | 6.9 | | |
| 7-17 | 0.21 | | | | - | | | | | | 13.8 | | | 6.7 | | |
| 17-25 | 0.12 | | | | - | | | | | | 13.2 | | | 6.7 | | |
| 25-40 | 0.05 | | | | - | | | | | | 12.0 | | | 6.8 | | |
| 40-53 | 0.03 | | | | tr | | | | | | 12.2 | | | 7.9 | | |
| 53-80+ | 0.03 | | | | 1 | | | | | | 10.7 | | | 8.1 | | |

| Depth (In.) | Extractable bases 5B1a 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation 5C1 $NH_4OAc$ Pct | 5C3 Sum Pct. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | |
| 0-2 | 10.8 | 6.0 | 0.2 | 1.0 | 18.0 | 3.2 | 19.4 | 21.2 | | 93 | 85 |
| 2-7 | 19.6 | 10.4 | 0.2 | 1.0 | 31.2 | 3.7 | 35.9 | 34.9 | | 87 | 89 |
| 7-17 | 20.4 | 10.9 | 0.4 | 0.4 | 32.1 | 3.6 | 34.0 | 35.7 | | 94 | 90 |
| 17-25 | 17.1 | 9.4 | 0.4 | 0.3 | 27.2 | 2.8 | 32.0 | 30.0 | | 85 | 91 |
| 25-40 | 18.5 | 10.4 | 0.5 | 0.3 | 29.7 | 1.7 | 30.8 | 31.4 | | 96 | 95 |
| 40-53 | 19.5 | 10.0 | 0.7 | 0.3 | 30.5 | | 29.1 | | | 100+ | |
| 53-80+ | 20.1 | 9.7 | 0.8 | 0.3 | 30.9 | | 28.5 | | | 100+ | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |

* All values from characterization sample.

## BALON GRAVELLY CLAY LOAM (taxadjunct) 1/
S65Ariz-13-7

Location: Western Yavapai County, Arizona. 1 mile south of Dewey, Arizona on State Highway #69 to cemetery and 1 mile northwest of cemetery on ridge near mine pits. 5/10 mile south and 4/10 mile west of northeast corner of Sec. 10, T13N, R1E. Photo #267, AMS Project 134, Lot FA.
Date of Sampling: May 5, 1965.
Collectors: Flach, Alexander, Nettleton, Jay, Freeman, Meurisse
Vegetation: Grass-brush. Sideoats grama, blue grama, three-awn, oakbrush, squawbush. Climate: Mean annual precipitation 13-14". Mean annual temperature 55°F. Soil temperature at time of sampling 63°F. at 20 inches and 64°F. at 60 inches. Parent Material: Alluvium from schist, phyllite and granite. Relief: Strongly sloping, dissected old alluvial fans on a 10 percent, convex slope. About 50 feet from the crest of the ridge top on a south exposure. Elevation: 4800 feet. Drainage: Medium runoff, moderately slow to slowly permeable and well drained.
Remarks: This soil is in old alluvium from schist, phyllite and granite under a chaparral or grass vegetation. It is on gently sloping to moderately steep dissected old alluvial fans. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-6.
Classification: Typic Haplargid, fine-loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65200 | 0 to 2 inches, brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) when moist; moderate to strong very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; plentiful fine roots; many fine interstitial pores; 30 percent gravel; with surface 30 percent covered by gravel and 10 percent by cobble; noneffervescent; slightly acid (pH 6.5); abrupt smooth boundary. |
| B1t<br>RSL No.<br>65201 | 2 to 7 inches, brown (7.5YR 5/4) gravelly clay, dark brown (7.5YR 3/4) when moist; moderate fine, medium and coarse subangular blocky structure; very hard, firm, sticky and plastic; abundant fine and medium roots; many fine interstitial and few fine tubular pores; few thin clay film on ped faces and in pores; 30 percent gravel; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B21t*<br>RSL No.<br>65202 | 7 to 17 inches, strong brown (7.5YR 5/6) gravelly sandy clay, brown (7.5YR 4/4) when moist; moderate medium and coarse subangular blocky structure; very hard, friable, sticky and plastic; abundant fine and medium roots; common fine interstitial and fine tubular pores; common fine clay film on ped faces and in bridges; 20 percent gravel; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B22t<br>RSL No.<br>65203 | 17 to 25 inches, strong brown (7.5YR 5/6) gravelly sandy clay loam, brown (7.5YR 4/4) when moist; weak fine and medium angular blocky structure; hard, friable, slightly sticky and plastic; plentiful very fine and fine roots; common thin clay film on ped faces and in bridges; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B3t<br>RSL No.<br>65204 | 25 to 40 inches, pink (7.5YR 7/4) gravelly sandy loam, strong brown (7.5YR 5/6) when moist; massive or rock controlled structure; hard, friable, slightly sticky and slightly plastic; plentiful fine, medium and large roots; many fine interstitial pores; very few, thin, oriented clay bridges; 45 percent gravel; noneffervescent; neutral (pH 7.0); gradual smooth boundary. |
| C1<br>RSL No.<br>65205 | 40 to 53 inches, reddish yellow (7.5YR 7/6) gravelly sandy loam, strong brown (7.5YR 5/6) when moist; massive or rock controlled structure; hard, friable, slightly sticky and slightly plastic; few large roots; many fine interstitial and few fine tubular pores; very few oriented clay as bridges; 45 percent gravel; noneffervescent; mildly alkaline (pH 7.5); gradual smooth boundary. |
| C2*<br>RSL No.<br>65206 | 53 to 80 inches plus, light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) when moist; massive rock controlled structure; hard, firm, slightly sticky and slightly plastic; many fine interstitial and fine tubular pores; 45 percent gravel; noneffervescent to very slightly effervescent; moderately alkaline (pH 8.0). |

* Sampled for BPR.

1/ The Balon series is in a fine-loamy, mixed, mesic family of Ustollic Haplargids. This pedon lacks sufficient organic carbon to meet ustollic requirements.

**SOIL SURVEY LABORATORY** Riverside, California

**SOIL TYPE** Clovis sandy clay loam (taxadjunct) **LOCATION** Navajo County, Arizona

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, mesic

SOIL NOS. 56-Ariz-9-25 **LAB. NOS.** 56150-56157

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 | | | | | | | | | 2A2 | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | > 2 1/ | |
| 0- 1 | A11 | 3.7 | 7.6 | 9.2 | 35.0 | 16.7 | 17.4 | 10.4 | 50.2 | 7.0 | 17 | lfsl |
| 1- 3 | A12 | 6.3 | 9.6 | 9.0 | 29.4 | 15.0 | 21.1 | 9.6 | 45.2 | 10.5 | 16 | fsl |
| 3- 6 | A13 | 4.5 | 7.1 | 8.1 | 29.8 | 13.7 | 23.1 | 13.7 | 44.3 | 12.3 | 15 | fsl |
| 6-10 | B21t | 3.3 | 6.6 | 8.4 | 29.3 | 12.0 | 13.6 | 26.8 | 38.0 | 6.7 | 13 | scl |
| 10-23 | B22t | 4.6 | 8.2 | 9.0 | 25.2 | 12.7 | 11.7 | 28.6 | 36.7 | 3.6 | 21 | scl |
| 23-31 | B31ca | 4.3 | 8.3 | 10.4 | 25.3 | 12.3 | 14.7 | 24.7 | 35.8 | 6.4 | 14 | scl |
| 31-54 | B32ca | 1.9 | 7.0 | 12.6 | 25.9 | 8.8 | 20.2 | 23.6 | 32.2 | 11.1 | 9 | scl |
| 54-62 | C1 | 10.3 | 19.0 | 15.5 | 22.6 | 6.9 | 11.9 | 13.8 | 25.0 | 5.7 | 35 | cosl |

| pH | | | ORGANIC MATTER | | | 6H1a $CO_3$ | 8A1a Elec. Conduc. | 6E1b | 6F1a | MOISTURE TENSIONS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8C1b SATURATED PASTE 1:1 | 8C1a 1:5 | 8C1a 1:10 | 6A1a ORGANIC CARBON % | 6B1a NITROGEN % | C/N | meq./l. | EC×10³ MILLIMHOS PER CM @25°C. | $CaCO_3$ equivalent % | GYPSUM me./100g. SOIL | 4B1a 1/10 ATMOS. % | 4B1a 1/3 ATMOS. % | 4B2 15 ATMOS. % |
| 7.7 | | 7.9 | 0.56 | 0.050 | 11.2 | | 0.8 | | | 15.9 | 9.9 | 4.0 |
| 7.8 | | 7.9 | 0.39 | 0.045 | 8.7 | | 0.5 | | | 14.1 | 10.3 | 3.6 |
| 7.8 | | 8.2 | 0.34 | 0.039 | 8.7 | | 0.6 | | | 16.1 | 12.5 | 4.7 |
| 7.6 | | 7.7 | 0.44 | 0.053 | 8.3 | | 0.5 | | | | | 9.0 |
| 7.4 | | 7.7 | 0.42 | 0.054 | 7.8 | | 1.3 | | | | | 11.3 |
| 7.7 | | 8.2 | 0.30 | 0.032 | 9.4 | | 2.0 | | | | | 9.6 |
| 8.3 | | 9.0 | 0.14 | | | 0.4 | 0.5 | 16 | | | | 7.8 |
| 8.1 | | 8.9 | 0.04 | | | 0.4 | 0.6 | 5 | | | | 5.4 |

| 5A2a | EXTRACTABLE CATIONS 5B | | | | | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE 8A1 | | | | | 8A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CATION EXCHANGE CAPACITY | 5B1a Ca 6N2b | 5B1a Mg 6O2c | 6H2a H | Exch. 5B1b Na 6P2a | Exch. 5B1b K 6Q2a | | 6P1a Na | 6Q1a K | 6N1a 6O1a Ca+Mg | 6J1a $HCO_3$ | 6K1a Cl | MOISTURE AT SATURATION % |
| ← Na → | milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | | | | | |
| 10.3 | 7.8 | 1.3 | 0.7 | 0.1 | 0.7 | 93 | 0.4 | 0.8 | 8.1 | 6.7 | .3 | 22.5 |
| 9.7 | 6.7 | 1.2 | 0.5 | 0.1 | 0.7 | 95 | 0.6 | 0.7 | 4.5 | 3.9 | 0 | 18.9 |
| 11.9 | 7.5 | 1.5 | 0.6 | 0.2 | 0.7 | 94 | 0.8 | 0.7 | 5.2 | 3.9 | .9 | 18.3 |
| 20.9 | 11.1 | 3.7 | 1.3 | 0.2 | 0.9 | 92 | 0.7 | 0.3 | 4.3 | 3.0 | 1.0 | 33.8 |
| 21.8 | 10.8 | 6.0 | 1.4 | 0.3 | 1.1 | 93 | 3.6 | 0.9 | 10.4 | 1.2 | 7.8 | 38.6 |
| 20.3 | | 4.9 | – | 0.8 | 1.0 | | 12.3 | 1.4 | 18.1 | 1.7 | 8.0 | 36.9 |
| 14.3 | | 6.4 | – | 0.9 | 0.5 | | 3.8 | 0.2 | 1.3 | 2.2 | .3 | 37.5 |
| 10.1 | | 4.4 | – | 0.4 | 0.3 | | 3.4 | 0.2 | 2.0 | 2.8 | .2 | 26.0 |

1/ Percent of the whole soil

## CLOVIS SANDY CLAY LOAM * (taxadjunct) 1/
56Ariz-9-25-1 through 8

Location: Navajo County, Arizona. North of County road about 100 feet and west of the northwest corner of Taylor Cemetery in the SW¼, NE¼ NW¼ of Sec. 2, T. 12 N., R. 21 E. Date of Sampling: May 14, 1956.
Collectors: M. S. James, W. G. Harper, Gerald Kester, R. E. Nelson and George Wendt.
Vegetation: Blue grama, ring muhlenbergia, sand dropseed and snakeweed. Climate: Estimated annual precipitation about 12 inches. Nearest weather station (Snowflake): Mean annual temperature 51.6° F.; January average 31.6° F.; July average 72.3° F.; mean annual precipitation 12.25 inches. Parent Material: Alluvium from mixed rocks probably part from tertiary alluvial deposits and part from the Millet*, a tentative soil series. Relief: Very slightly undulating valley plain or terrace that has been somewhat dissected. Slope between 1½ and 2 percent to the northeast. Elevation: 5,640 feet. Drainage: Well drained. Moderate runoff. Moderately slow permeability.
Classification: Typic Haplargid, fine-loamy, mixed, mesic.
Remarks: Very slight wind and water erosion. Profile slightly moist. A few fine rounded pebbles ranging up to 1 inch in diameter have been concentrated on the surface, and occasional pebbles occur throughout the entire profile.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>56150 | 0-1" -- Reddish brown (5YR 5/3) dry, (3.5/3) moist, sandy loam mulch; moderate very fine granular; soft when dry, loose when moist, slightly sticky when wet; very few or no plant roots; moderately rapid permeability; noncalcareous; pH 7.5 or 7.7; abrupt, smooth lower boundary. |
| A12<br>RSL No.<br>56151 | 1-3" -- Similar in color and texture to the surface horizon; moderate medium to fine platy; slightly hard when dry, very friable when moist; slightly sticky when wet; plant roots common; moderately rapid permeability; noncalcareous; pH 7.6; abrupt, wavy lower boundary. |
| A13<br>RSL No.<br>56152 | 3-6" -- Similar in color to the surface horizon; very weak, very coarse platy; slightly hard when dry, very friable when moist, slightly sticky when wet; plant roots common; moderately permeable; noncalcareous; pH 7.6; clear, smooth lower boundary. |
| B21t<br>RSL No.<br>56153 | 6-10" -- Reddish brown (5YR 4/3) dry, (3.5/3) moist; sandy clay loam with common clay films on all ped faces; weak coarse prisms that break to moderate coarse to medium subangular blocky; very hard when dry, firm when moist, sticky and plastic when wet; plant roots common; moderately slow permeability; calcareous; pH 8; abrupt, wavy lower boundary. |
| B22t<br>RSL No.<br>56154 | 10-23" -- Reddish brown (2.5YR 4/4) dry, (3.5/4) moist, fine-textured sandy clay loam with many clay films on vertical ped faces and common clay films on horizontal ped faces; strong medium prisms that break to moderate to coarse to medium subangular blocky; very hard when dry, firm when moist, sticky and plastic when wet; common plant roots; moderately slow permeability; noncalcareous; pH 8; clear, smooth lower boundary. |
| B31ca<br>RSL No.<br>56155 | 23-31" -- Reddish brown (5YR 5/3) dry, (4/3) moist, with a few fine faint white lime mottlings; heavy sandy clay loam; moderate medium prisms that break to moderate coarse and medium subangular blocky; common clay films on vertical and horizontal ped faces; hard when dry, friable when moist, sticky and plastic when wet; few plant roots; moderately slow permeability; slightly calcareous; pH 8.3 clear, wavy lower boundary. |
| B32ca<br>RSL No.<br>56156 | 31-54" -- Light brown (7.5YR 6/3) dry, brown (5/3) moist, sandy clay loam with many medium, distinct, white lime mottlings and nodules which are (2.5YR 8/2) dry; moderate medium subangular blocky; very hard when dry, friable when moist, sticky when wet; few plant roots; moderate permeability; very strongly calcareous; pH 8.4; clear, wavy lower boundary. |
| C1<br>RSL No.<br>56157 | 54-62" -- Reddish brown (5YR 4/3) moist, loam; massive; slightly hard when dry, very friable when moist, nonsticky when wet; moderately rapid permeability; moderately to strongly calcareous; pH 8.4; abrupt, wavy lower boundary. |
| R | 62+ -- Decomposing Moenkopi shale. |

*Similar profiles have been correlated in adjacent Central Apache County Area as Clovis Sandy Clay Loam, 1968.

1/ The Clovis series is in a fine-loamy, mixed, mesic family of Ustollic Haplargids. This pedon has too little organic matter in the surface 15 inches.

**SOIL SURVEY LABORATORY** Riverside, California

**SOIL TYPE** Clovis sandy loam (taxadjunct) **LOCATION** Navajo County, Arizona

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, mesic

SOIL NOS. 56-Ariz-9-26 **LAB. NOS.** 56158-56165

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 | | | | | | | | | 2A2 | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | > 2 1/ | |
| 0- 1 | A1 | 2.5 | 5.8 | 11.5 | 43.1 | 17.6 | 9.8 | 9.7 | 49.7 | 4.9 | 3 | lfs |
| 1- 3 | A12 | 4.2 | 5.9 | 12.5 | 44.1 | 15.1 | 10.1 | 8.1 | 48.7 | 4.0 | 7 | lfs |
| 3- 5 | A13 | 1.6 | 4.6 | 9.1 | 41.3 | 19.2 | 14.4 | 9.8 | 55.3 | 6.0 | 5 | fsl |
| 5- 9 | B1t | 1.4 | 4.8 | 9.0 | 34.8 | 18.3 | 15.7 | 16.0 | 50.5 | 6.4 | 3 | fsl |
| 9-18 | B2t | 1.7 | 5.3 | 11.2 | 30.1 | 11.5 | 13.1 | 27.1 | 36.6 | 5.5 | 4 | scl |
| 18-28 | B3ca | 3.1 | 4.1 | 7.7 | 22.3 | 11.2 | 26.7 | 24.9 | 34.5 | 16.2 | 6 | scl |
| 28-53 | C1ca | 3.6 | 4.5 | 9.5 | 30.9 | 14.0 | 24.1 | 13.4 | 43.7 | 12.2 | 4 | fsl |
| 53-68 | IIC2 | 5.1 | 20.5 | 26.4 | 26.4 | 6.0 | 8.1 | 7.5 | 22.8 | 3.6 | 24 | fs |

| pH 8C1b SATURATED PASTE 1:1 | pH 8C1a 1:5 | pH 8C1a 1:10 | ORGANIC MATTER 6A1a ORGANIC CARBON % | ORGANIC MATTER 6B1a NITROGEN % | ORGANIC MATTER C/N | 6I1a $CO_3$ meq./l. | 6I1a Elec. Condc. EC×10³ MILLIMHOS PER CM @25°C. | 6E1b $CaCO_3$ equivalent % | 6F1a GYPSUM me./100g. SOIL | MOISTURE TENSIONS 4B1a 1/10 ATMOS. % | MOISTURE TENSIONS 4B1a 1/3 ATMOS. % | MOISTURE TENSIONS 4B2 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.8 | | 8.1 | 0.62 | 0.074 | 8.4 | - | 1.1 | Tr. | - | 11.8 | 7.5 | 3.6 |
| 8.0 | | 8.1 | 0.40 | 0.037 | 10.8 | - | 0.4 | Tr. | - | 11.0 | 6.7 | 2.9 |
| 8.1 | | 8.0 | 0.26 | 0.032 | 8.1 | 0.6 | 0.4 | Tr. | - | 12.8 | 8.1 | 3.1 |
| 8.0 | | 8.0 | 0.32 | 0.039 | 8.2 | 0.2 | 0.4 | Tr. | - | | | 5.2 |
| 7.8 | | 8.2 | 0.36 | 0.050 | 7.2 | 0.3 | 0.4 | Tr. | - | | | 8.8 |
| 8.1 | | 8.7 | 0.27 | 0.033 | 8.2 | 0.2 | 0.4 | 34 | - | | | 7.2 |
| 8.3 | | 9.0 | 0.09 | | | - | 0.5 | 22 | - | | | 4.5 |
| 8.2 | | 8.8 | 0.13 | | | 0.3 | 0.9 | 1 | - | | | 3.0 |

| 5A2a CATION EXCHANGE CAPACITY (Na) | EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b | 5B1a Mg 6O2c | 6H2a H | Exch. 5B1b Na 6P2a | Exch. 5B1b K 6Q2a | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE 8A1 6P1a Na | 6Q1a K | 6N1a 6O1a Ca+Mg | 6J1a $HCO_3$ | 6K1a Cl | 8A MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | | | | | |
| 8.3 | | | | 0.1 | 1.0 | | 0.9 | 5.4 | 9.3 | 9.4 | 0.5 | 24.9 |
| 7.5 | | | | 0.1 | 0.6 | | 0.3 | 0.8 | 3.5 | 3.3 | 0.1 | 21.6 |
| 8.3 | | | | 0.1 | 0.6 | | 0.4 | 0.6 | 3.5 | 2.9 | - | 21.4 |
| 12.6 | | | | 0.1 | 0.7 | | 0.4 | 0.4 | 4.0 | 3.3 | - | 26.4 |
| 18.0 | | | | 0.1 | 0.9 | | 0.4 | 0.3 | 3.8 | 2.4 | 0.1 | 33.4 |
| 10.5 | | | | 0.1 | 0.4 | | 0.6 | 0.2 | 3.1 | 2.0 | - | 30.3 |
| 6.7 | | | | 0.1 | 0.2 | | 1.4 | 0.2 | 3.6 | 2.1 | 0.3 | 27.0 |
| 6.7 | | | | 0.3 | 0.1 | | 4.1 | Tr. | 3.9 | 2.0 | 3.7 | 21.4 |

1/ Percent of the whole soil

## CLOVIS SANDY LOAM (taxadjunct)* 1/
56Ariz-9-26-1 through 8

Location: Navajo County, Arizona in the east part of the town of Taylor, center of NW ¼, Sec. 1, T 12 N, R 21 E. Date of Sampling: May 16, 1956.
Collectors: J. D. Freeman, M. S. James and R. E. Nelson.
Vegetation: Blue grama, ring muhlenbergia, sand dropseed and snakeweed. Climate: About 13 inches precipitation, part in summer, part in winter. Parent Material: Alluvium from many sources of rocks. Relief: Valley plain or terrace; smooth slope, 0 to 1 percent to the north. Elevation: 5,600 feet. Drainage: Well drained, moderately rapid runoff. Moderately rapid permeability.
Remarks: Slight wind erosion. Profile moist to 30 inches. Dry below.
Classification: Typic Haplargid, fine-loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>56158 | 0-1" -- Reddish brown (5YR 5/3) dry, (4/3) moist, sandy loam; moderate very fine granular; soft when dry, loose when moist; slightly sticky when wet; many plant roots; moderately rapid permeability; slightly calcareous; pH 8.2; abrupt, smooth lower boundary. |
| A12<br>RSL No.<br>56159 | 1-3" -- Reddish brown (5YR 5/3) dry, (3.5/3) moist, sandy loam; moderate very fine granular; slightly hard when dry, very friable when moist, slightly sticky when wet; many plant roots; moderately rapid permeability; noncalcareous; pH 7.8; abrupt, wavy lower boundary. |
| A13<br>RSL No.<br>56160 | 3-5" -- Similar in color to the horizon above; sandy loam; massive or very weak very coarse platy; slightly hard when dry, very friable when moist, slightly sticky when wet; plant roots common; moderately rapid permeability; clear, smooth lower boundary. |
| B1t<br>RSL No.<br>56161 | 5-9" -- Reddish brown (5YR 4/3) dry, (3.5/3) moist; sandy loam; weak coarse prisms that break to weak medium subangular blocky; thin clay films on all ped surfaces; hard when dry, friable when moist, plastic and sticky when wet; plant roots common; moderately rapid permeability; noncalcareous; pH 7.8; clear, wavy lower boundary. |
| B2t<br>RSL No.<br>56162 | 9-18" -- Reddish brown (5YR 4/3) dry, (3/3) moist; sandy clay loam; weak very coarse prisms that break to weak medium subangular blocky; thin clay films on all ped faces; very hard when dry, firm when moist; sticky and plastic when wet; plant roots common; moderately rapid permeability; noncalcareous; pH 7.8; clear, wavy lower boundary. |
| B3ca<br>RSL No.<br>56163 | 18-28" -- Light reddish brown (5YR 6/3) dry, reddish brown (5/3) moist; heavy-textured loam; weak fine to medium angular blocky; thin patchy clay films; hard when dry, friable when moist; slightly sticky when wet; few plant roots; moderately rapid permeability; calcareous; pH 8.6; gradual, wavy lower boundary. |
| C1ca<br>RSL No.<br>56164 | 28-53" -- Reddish brown (5YR 4/3) dry, (4/4) moist; sandy loam with pink (5YR 7/3) calcium carbonate coatings on ped surfaces and in cracks and seams; moderate coarse platy; hard when dry, friable when moist, slightly sticky when wet; few plant roots; moderately rapid permeability; strongly calcareous; pH 8.4; gradual, wavy lower boundary. |
| IIC2<br>RSL No.<br>56165 | 53-68" -- Reddish brown (5YR 5/3) dry, (4/3) moist, with slight mottling of yellow; fine sandy loam and sandy strata with occasional pebbles; weak fine granular or single grain structure; soft when dry, loose when moist, slightly sticky when wet; few plant roots; rapid permeability; slightly calcareous; pH 8.2. |

*Similar profiles have been correlated as Clovis Sandy Loam in adjacent Central Apache County Area, 1968.

1/ The Clovis series is in a fine-loamy, mixed, mesic family of Ustollic Haplargids. This pedon has too little organic matter in the surface 15 inches.

U. S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, mesic

SOIL *Gaddes gravelly sandy loam (taxadjunct) SOIL Nos. S65Ariz-13-16 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65231 - 65237

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | (2–0.1) | | 3A1a Non-carbonate clay | * Coarse fragments 1A2a: > 2 | 2 - 19 | 19 - 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct of < 2 mm | | | | | | | | | | | | | | Pct | Pct of < 76mm | |
| 0-2 | A1 | 66.7 | 24.8 | 8.5 | 10.4 | 11.8 | 9.5 | 21.1 | 13.9 | 15.1 | 9.7 | 40.8 | 52.8 | | 8 | 31 | 31 | 0 |
| 2-5 | B21t | 50.4 | 22.9 | 26.7 | 10.9 | 9.7 | 7.1 | 14.4 | 8.3 | 13.2 | 9.7 | 29.5 | 42.1 | | 27 | 21 | 21 | 0 |
| 5-11 | B22t | 45.2 | 23.0 | 31.8 | 13.2 | 9.6 | 5.3 | 10.8 | 6.3 | 13.0 | 10.0 | 24.8 | 38.9 | | 32 | 23 | 23 | 0 |
| 11-24 | B23t | 43.4 | 21.8 | 34.8 | 15.3 | 9.6 | 4.5 | 8.9 | 5.1 | 11.8 | 10.0 | 21.6 | 38.3 | | 35 | 50 | 50 | 0 |
| 24-36 | B3t-C1 | 63.8 | 19.1 | 17.1 | 26.3 | 15.6 | 6.7 | 10.9 | 4.3 | 10.6 | 8.5 | 19.9 | 59.5 | | 17 | 47 | 47 | 0 |
| 36-51+ | C2 | 80.7 | 13.6 | 5.7 | 25.3 | 19.0 | 10.8 | 18.5 | 7.1 | 7.1 | 6.5 | 22.9 | 73.6 | | 6 | 23 | 23 | 0 |
| 0-2 | Composite A | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | | Water content: | Water content: 4B1c 1/3 bar | Water content: 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct | | Pct. | Pct | g/cc | g/cc | g/cc | Pct | Pct | Pct. | in./in. | in./in. | | | |
| 0-2 | 0.87 | 0.064 | 14 | | - | | | | | | 4.8 | | | 6.8 | | |
| 2-5 | 0.57 | 0.054 | 11 | | - | | | | | | 10.6 | | | 6.9 | | |
| 5-11 | 0.35 | 0.035 | 10 | | - | | | | | | 13.0 | | | 6.7 | | |
| 11-24 | 0.30 | | | | - | | | | | | 16.8 | | | 6.8 | | |
| 24-36 | 0.09 | | | | - | | | | | | 9.4 | | | 7.2 | | |
| 36-51+ | 0.04 | | | | - | | | | | | 3.6 | | | 7.6 | | |
| 0-2 | 1.16 | 0.072 | 16 | | - | | | | | | 6.5 | | | 7.0 | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | | 6G1d KCl Ext. $Al^{+++}$ | | Atterberg limits: Plastic limit | Liquid limit | Plastic index | | Base saturation 5C1 $NH_4OAc$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | | Pct. of <0.4 mm | | | | Pct | Pct |
| 0-2 | 5.8 | 2.9 | 0.1 | 1.0 | 9.8 | | 9.9 | | | | | | | | | 100+ | |
| 2-5 | 16.0 | 6.7 | 0.3 | 0.5 | 23.5 | | 24.4 | | | | | | | | | 96 | |
| 5-11 | 18.7 | 7.1 | 0.4 | 0.4 | 26.6 | | 28.3 | | | | | | | | | 94 | |
| 11-24 | 34.6 | 13.2 | 1.6 | 0.4 | 49.8 | | 51.4 | | | | | | | | | 97 | |
| 24-36 | 19.2 | 6.4 | 1.7 | 0.4 | 27.7 | | 29.6 | | | | | 19 | 33 | 14 | | 94 | |
| 36-51+ | 7.5 | 2.1 | 0.1 | 0.1 | 9.8 | | 11.7 | | | | | | | | | 84 | |
| 0-2 | 10.4 | 3.8 | 0.1 | 0.1 | 14.4 | | 15.6 | | | | | | | | | 92 | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |

* Soil contains partly weathered gravel and sand, part of which can be crushed depending on the force applied. Gravel and sand, therefore, were determined by shaking overnight in a hexametaphosphate solution. Silt and clay, all chemical determinations, and 15 bar water retention were determined on crushed samples of the whole soil. All data are re-calculated to percent or meq /100 g of the <2 mm fraction.

## GADDES GRAVELLY SANDY LOAM (taxadjunct) 1/
S65Ariz-13-16

Location: Western Yavapai County, Arizona. About 5 miles southeast of Wagoner on the Crown King Road and 100 feet south of the road. 1/2 mile south and 1/8 mile east of northwest corner Sec. 5, T9N, R2W. Photo #1170. AMS Project 134, Lot FA. Date of Sampling: May 11, 1965.
Collectors: Nettleton, Wendt.
Vegetation: Brush. Oakbrush, deerbrush, squawbush, shrubby buckwheat, squirreltail, and snakeweed.
Climate: Mean annual precipitation 12". Mean annual temperature 57°F. Soil temperature at time of sampling 64°F. at 20". Parent Material: Weathered granite and closely related materials.
Relief: Nearly level or undulating pediment surface on a 3 percent convex slope with a southwest aspect.
Elevation: 4200 feet. Drainage: Medium runoff, moderate to moderately slowly permeable and well drained.
Remarks: This soil is formed on deeply weathered granite (grus) under a chaparral vegetation. It is on nearly level plains to moderately steep hills. The dark surface is too thin for a mollic horizon but has more than 1 percent O.M. Hellige-Truog field kit was used to determine pH. Paired sample is S65Ariz-13-8.
Classification: Typic Haplargid, fine-loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65231 | 0 to 2 inches, brown (7.5YR 5/4) gravelly sandy loam, dark reddish brown (5YR 3/4) when moist; moderate medium platy breaking to strong very fine granular structure; slightly hard, friable, slightly sticky and plastic; plentiful very fine roots; many interstitial pores; 30 percent fine gravels and surface is 40 percent covered with fine gravel and cobble; noneffervescent; slightly acid (pH 6.5); abrupt smooth boundary. |
| B21t*<br>RSL No.<br>65232 | 2 to 5 inches, reddish brown (5YR 4/4) gravelly light clay, dark reddish brown (5YR 3/4) when moist; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky and very plastic; abundant fine and very fine roots; common very fine and fine tubular and many interstitial pores; few thin clay films on ped faces; 25 percent fine gravel; noneffervescent; neutral to mildly alkaline (pH 7.0 to 7.5); clear, smooth boundary. |
| B22t*<br>RSL No.<br>65233 | 5 to 11 inches, reddish brown (5YR 4/4) gravelly clay, yellowish red (5YR 4/6) when moist; weak to moderate fine and medium subangular blocky structure; very hard, firm, slightly sticky and plastic; plentiful fine and very fine roots; common fine tubular pores; common thin clay films on ped faces; 25 percent fine gravel; noneffervescent; neutral (pH 7.0); clear, wavy boundary. |
| B23t<br>RSL No.<br>65234 | 11 to 24 inches, reddish brown (5YR 4/4) and yellowish red (5YR 4/8) gravelly clay, yellowish red (5YR 4/6) and reddish yellow (7.5YR 6/8) when moist; massive; hard, firm, slightly sticky and plastic; few fine and very fine roots; common interstitial pores; common moderately thick clay films in pores and as oriented clay bridges; 30 percent fine gravel; noneffervescent; slightly acid (pH 6.5); clear, wavy boundary. |
| B3t-C1*<br>RSL No.<br>65235 | 24 to 36 inches, reddish brown (5YR 4/4) and strong brown (7.5YR 5/6) very gravelly weathered granite (grus), yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) with fine very dark gray (7.5YR 3/1) flecks when moist; massive; hard, firm, nonsticky and nonplastic; common interstitial pores; 5 percent, 3 to 10 inch fragments of less weathered material; noneffervescent; slightly acid (pH 6.5); gradual wavy boundary. (Discarded 3-10" less weathered fragments - 5 percent of sample from BPR sample.) |
| C2<br>RSL No.<br>65236 | 36 to 51 inches, reddish brown (5YR 4/4) and strong brown (7.5YR 5/6) very gravelly weathered granite (grus); yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) with fine very dark gray (7.5YR 3/1) flecks when moist; massive; hard, firm, nonsticky and nonplastic; common interstitial pores; noneffervescent; slightly acid (pH 6.5). Hard to auger with bucket auger when dry. |

*Sampled for BPR.

RSL No.
65237 Composite A - supplemental sample.

1/ The Gaddes series is in a fine-loamy, mixed, mesic family of Ustollic Haplargids. This pedon has a lower organic carbon content than is typical of the series.

CONSECUTIVE PEDON NUMBER C 68140 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CONTINENTAL TAXADJUNCT SOIL NO. S68 ARIZ. 12- 1 SAMPLE NO. 81007-81016 E.PIMA-SANTA CRU AREA

SOIL FAMILY: TYPIC HAPLARGID FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2~.2U | FINE LT .2U | CARBONATE 3A1A.02 | INT. II .2-.02 WHOLE 20 | COARSE FRAGMENTS I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | SOIL PCT. OF LT 75 | | | |
| 81007 | 0- 3 | A1 | 77.7 | 15.5 | 6.8 | 11.3 | 23.9 | 14.0 | 20.5 | 8.0 | 11.3 | 4.2 | 4.1 | 2.7 | | 29.1 | 5A -- | 2 | 3 |
| 81008 | 3- 8 | B1 | 68.5 | 19.6 | 11.9 | 10.9 | 18.8 | 11.1 | 17.9 | 9.8 | 13.6 | 6.0 | 7.9 | 4.0 | | 32.6 | 2A -- | 1 | 1 |
| 81009 | 8- 30 | B21T | 58.1 | 15.8 | 26.1 | 19.1 | 15.5 | 6.9 | 10.6 | 6.0 | 9.5 | 6.3 | 12.3 | 13.8 | | 20.9 | 16A 10 | 5 | 1 |
| 81010 | 30- 53 | B22T | 48.3 | 14.7 | 37.0 | 21.3 | 10.8 | 4.3 | 6.8 | 5.1 | 8.5 | 6.2 | 16.6 | 20.4 | | 17.3 | 35A 24 | 9 | 2 |
| 81011 | 53- 76 | B23TCA | 35.6 | 12.9 | 51.5 | 12.8 | 9.9 | 3.7 | 5.5 | 3.7 | 7.1 | 5.8 | 26.9 | 24.6 | | 13.8 | 27A 20 | 3 | 4 |
| 81012 | 76- 99 | B24TCA | 46.5 | 14.7 | 38.8 | 15.1 | 13.9 | 5.1 | 7.7 | 4.7 | 9.1 | 5.6 | | | | 18.0 | 76* 52 | 19 | 2 |
| 81013 | 99-132 | B3 CA | 53.5 | 11.4 | 35.1 | 19.1 | 17.1 | 6.9 | 7.2 | 3.2 | 5.8 | 5.6 | | | | 12.4 | 86* 44 | 33 | 5 |
| 81014 | 132-193 | C 1CA | 71.5 | 13.4 | 15.1 | 27.5 | 22.8 | 8.7 | 8.7 | 3.8 | 6.2 | 7.2 | | | 3 | 14.2 | 72* 43 | 17 | 2 |
| 81015 | 193-218 | C 2CA | 63.8 | 18.2 | 18.0 | 17.6 | 17.3 | 9.5 | 13.1 | 6.3 | 8.7 | 9.5 | | | 2 | 21.7 | 75* 28 | 29 | 7 |
| 81016 | 0- 38 | | 68.8 | 24.0 | 7.2 | 21.9 | 19.0 | 9.4 | 12.4 | 6.1 | 10.6 | 13.4 | | | | 23.1 | 28A -- | 21 | 7 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L L 4F1 | I M I T PL 4F2 | EST. 1/3 BAR 4A1F | BULK DENSITY 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT.NO.40 | | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 81007 | 0- 3 | 0.47 | 0.043 | | | | | | | | | 1.50 | | 0.97 | | | | 3.2 | | |
| 81008 | 3- 8 | 0.33 | 0.036 | | | | | | | NP | NP | | 1.56 | 1.62 | 0.99 | | 11.0 | 4.2 | 1.3 | 1.3 |
| 81009 | 8- 30 | 0.38 | | | | | | | | | | 1.30 | | | 0.92 | | | 8.3 | | |
| 81010 | 30- 53 | 0.45 | | TR | | | | | | 39 | 22 | | 1.27 | 1.32 | 0.79 | | 20.0 | 11.9 | 1.3 | 1.0 |
| 81011 | 53- 76 | 0.48 | | 2 | | | | | | | | 1.40 | | | 0.83 | | | 17.8 | | |
| 81012 | 76- 99 | 0.28 | | 2 | | | | | | | | 1.40 | | | 0.37 | | | 15.5 | | |
| 81013 | 99-132 | 0.30 | | 3 | | | | | | | | 1.40 | | | 0.24 | | | 14.5 | | |
| 81014 | 132-193 | | | 20 | | | | | | | | | 1.39 | 1.47 | 0.43 | | 17.7 | 7.9 | 1.9 | 0.8 |
| 81015 | 193-218 | | | 14 | | | | | | 34 | 21 | | 1.48 | 1.56 | 0.37 | | 19.2 | 9.1 | 1.8 | 0.6 |
| 81016 | 0- 38 | 0.36 | | | | | | | | | | 1.35 | | | 0.84 | | | 6.8 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI-DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81007 | 0- 3 | 5.1 | 0.9 | TR | 0.6 | 6.6 | | | 6.6 | 6.0 | 100+ | | 100+ | | 6.9 | 6.4 |
| 81008 | 3- 8 | 9.1 | 2.1 | 0.1 | 0.5 | 11.8 | | | 11.8 | 7.9 | 100+ | | 100+ | | 7.3 | 6.5 |
| 81009 | 8- 30 | 14.6 | 3.3 | 0.1 | 0.5 | 18.5 | | | 18.5 | 16.8 | 100+ | | 100+ | | 7.5 | 6.9 |
| 81010 | 30- 53 | 19.7 | 5.3 | 0.2 | 0.6 | 25.8 | | | 25.8 | 21.6 | 100+ | | 100+ | | 7.7 | 7.1 |
| 81011 | 53- 76 | 36.7 | 9.4 | 0.4 | 1.0 | 47.5 | | | 47.5 | 29.0 | 100+ | | 100+ | | 7.9 | 7.5 |
| 81012 | 76- 99 | 39.8 | 11.1 | 0.8 | 1.4 | 53.1 | | | 53.1 | 28.9 | 100+ | | 100+ | | 8.0 | 7.6 |
| 81013 | 99-132 | 40.1 | 10.7 | 0.7 | 1.0 | 52.5 | | | 52.5 | 21.9 | 100+ | | 100+ | | 7.9 | 7.6 |
| 81014 | 132-193 | 27.9 | 4.4 | 1.0 | 0.6 | 33.9 | | | 33.9 | 9.9 | 100+ | | 100+ | | 8.5 | 7.7 |
| 81015 | 193-218 | 30.4 | 5.7 | 1.7 | 0.7 | 38.5 | | | 38.5 | 13.9 | 100+ | | 100+ | | 8.4 | 7.7 |
| 81016 | 0- 38 | | | | | | | | | | | | | | | |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM MINERAL X RAY 7A2E I | 7A2E II | 7A2E III | CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 81007 | 0- 3 | | | | | | | MT 3 | MI 3 | KK 1 | |
| 81008 | 3- 8 | MI 3 | KK 2 | MT 1 | | | | MT 3 | MI 3 | KK 1 | MT MONTMORT |
| 81009 | 8- 30 | | | | | | | MT 4 | MI 3 | KK 1 | MI MICA |
| 81010 | 30- 53 | MI 3 | KK 2 | MT 1 | | | | MT 4 | MI 3 | KK 1 | KK KAOLINIT |
| 81011 | 53- 76 | | | | | | | MT 4 | MI 3 | KK 2 | |
| 81012 | 76- 99 | | | | | | | | | | |
| 81013 | 99-132 | | | | | | | | | | |
| 81014 | 132-193 | | | | | | | | | | |
| 81015 | 193-218 | | | | | | | | | | |
| 81016 | 0- 38 | | | | | | | | | | |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.

CONTINENTAL SANDY LOAM (taxadjunct) 1/
S68 Ariz-12-1-1 through 9

Location: Santa Cruz County Area, Arizona. 1.2 miles west-southwest of Amado School. 100 feet south of intersection of two ranch trails. Approximately 2900 feet north, 2700 feet west of southeast corner Section 11, T20S, R12E. Photo AMS-581. Date of Sampling: October 9, 1968.
Description by: Richardson and Havens. Collectors: Nettleton and Brasher.
Classification: Typic Haplargid, fine-loamy, mixed, thermic.
Vegetation: Desert shrub--grass: mesquite, burroweed, three-awn, Rothrock grama, fluffgrass, plains bristlegrass. Climate: Mean annual temperature approximately 63.8°F. Mean annual precipitation 10-12 inches. Parent Material: Old alluvium from granite, andesite and rhyolite tuffs. Topography: Gently sloping fan. 2 percent slope, east aspect. Elevation: 3,200 feet. Drainage: Well drained. Moderate runoff. Soil Moisture: Dry.
Remarks: This site is paired with S68 Ariz-12-2-1 through 8.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-3 cm) |
| A1 | 0 to 1 inch, brown (7.5YR 5/4) sandy loam, reddish brown (5YR 4/3) moist; thin platy |
| RSL | breaking to weak fine granular structure; soft, very friable, nonsticky and nonplastic; |
| 681007 | common fine roots; many fine interstitial pores; 10 percent coarse fragments; noneffer- |
| | vescent; neutral, (pH 7.0); abrupt smooth boundary. |
| B1 | 1 to 3 inches, reddish brown (5YR 5/4) heavy sandy loam, dark reddish brown (5YR 3/4) |
| RSL | moist; weak medium subangular blocky structure; slightly hard, friable, slightly |
| 681008 | sticky and slightly plastic; many fine and very fine roots; few fine tubular pores; 10 per- |
| (3-8 cm) | cent gravel;noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary. |
| B21t | 3 to 12 inches, reddish brown (2.5YR 4/4) gravelly clay loam or sandy clay loam, dark |
| RSL | reddish brown (2.5YR 3/4) moist; weak medium and fine subangular blocky structure; |
| 681009 | hard, friable, sticky and plastic; common fine and very fine roots; common fine and |
| (8-30 cm) | very fine tubular and common fine exped pores; few thin clay films in pores and on |
| | ped faces; 20 percent fine and medium gravel; noneffervescent; moderately alkaline |
| | (pH 8.0); clear wavy boundary. |
| B22t | 12 to 21 inches, reddish brown (2.5YR 4/4) gravelly clay, dark red (2.5YR 3/6) moist; |
| RSL | moderate fine and medium subangular blocky structure; hard, friable, sticky and |
| 681010 | plastic; common fine and very fine roots; common fine and very fine tubular and common |
| (30-53 cm) | fine exped pores; common thin clay films on ped faces and in pores; 35 percent fine and |
| | medium gravel; slightly effervescent; moderately alkaline (pH 8.2); clear wavy |
| | boundary. |
| B23tca | 21 to 30 inches, reddish brown (2.5YR 4/4) and red (2.5YR 4/6) heavy gravelly clay |
| RSL | loam with white (5YR 8/1) and pink (5YR 7/3) mottles, reddish brown (5YR 4/4) and |
| 681011 | yellowish red (5YR 4/6) moist; mottles are light reddish brown (5YR 6/4) moist; |
| (53-76 | massive breaking to weak medium subangular blocky structure; hard, friable, sticky and |
| cm) | plastic; common fine and very fine roots; common fine and few medium tubular pores; |
| | few thin clay films on ped faces and in pores; 40 percent gravel; strongly effervescent in |
| | mottles; moderately alkaline (pH 8.2); clear wavy boundary. |
| B24tca | 30 to 39 inches, reddish brown (2.5YR 4/4) and red (2.5YR 4/6) gravelly heavy clay |
| RSL | loam, with common medium distinct white (5YR 8/1) and pink (5YR 7/3) mottles and lime |
| 681012 | segregations, reddish brown (2.5YR 4/4) and red (2.5YR 4/6) moist, with light reddish |
| (76-99 cm) | brown (5YR 6/4) mottles, moist; massive breaking to weak medium subangular blocky |
| | structure; hard, friable, sticky and plastic; common fine and very fine roots; common |
| | fine and few medium tubular pores; few thin clay films on ped faces and in pores; 40 percent |
| | gravel; strongly effervescent in mottles; moderately alkaline (pH 8.2); clear wavy |
| | boundary. |
| B3ca | 39 to 52 inches, mottled reddish yellow (5YR 6/6) and pink (5YR 8/3) gravelly heavy |
| RSL | clay loam, yellowish red (5YR 4/6), pink (5YR 8/3) and light reddish brown (5YR 6/4) |
| 681013 | moist. Lime mottles are many medium and coarse and distinct;massive; hard, friable, |
| (99- | sticky and plastic; few fine roots; common fine and few medium tubular pores; few thin |
| 132 cm) | clay films on ped faces and in pores; 45 percent fine, medium and coarse gravel; strongly |
| | effervescent in matrix, violently effervescent in mottles; moderately alkaline |
| | (pH 8.2); clear wavy boundary. |
| C1ca | 52 to 78 inches, pink (5YR 7/3) and light reddish brown (5YR 6/3) very gravelly sandy |
| RSL | loam, light reddish brown (5YR 6/4) and reddish brown (5YR 5/4) moist; massive; very |
| 681014 | hard, friable, slightly sticky and nonplastic; few fine roots; common fine and very |
| (132 - | fine and few medium tubular pores; 55 percent gravel; violently effervescent; moderately |
| 193 cm) | alkaline, (pH 8.2); clear wavy boundary. |
| C2ca | 78 to 86 inches, pink (7.5YR 7/4) very gravelly sandy loam, brown (7.5YR 5/4) moist; |
| RSL | massive; hard, friable, nonsticky and nonplastic; strongly effervescent; moderately |
| 681015 | alkaline (pH 8.2). |
| (193-218 cm) | |
| Composite A | 0-15 inch samples of 10 pedons selected at 10-foot intervals along a NS, 100-foot |
| RSL | transect near backhoe pit. |
| 681016 | (0-38 cm) |

1/ The Continental series is in a fine, mixed, thermic family of Typic Haplargids. This pedon has less than 35 percent clay in its control section.

CONSECUTIVE PEDON NUMBER C 68141 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CONTINENTAL TAXADJUNCT SOIL NO. S68 ARIZ. 12- 2 SAMPLE NO. 81017-81025 E.PIMA-SANTA CRU ARE

SOIL FAMILY: TYPIC HAPLARGID FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATOR

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 81017 | 0- 8 | A11 | 74.6 | 17.5 | 7.9 | 23.9 | 18.3 | 9.7 | 14.5 | 8.2 | 11.7 | 5.8 | | | | 27.6 | 29A | -- | 17 | 12 |
| 81018 | 8- 15 | A12 | 68.2 | 19.5 | 12.3 | 17.1 | 18.5 | 10.6 | 14.3 | 7.7 | 11.9 | 7.6 | | | | 27.1 | 42A | 16 | 15 | 11 |
| 81019 | 15- 25 | B1 | 66.3 | 12.2 | 21.5 | 36.1 | 15.6 | 5.4 | 5.9 | 3.3 | 6.9 | 5.3 | | | | 13.2 | 40A | 13 | 17 | 10 |
| 81020 | 25- 48 | B21T | 46.9 | 8.8 | 44.3 | 18.4 | 15.3 | 5.3 | 5.5 | 2.4 | 4.9 | 3.9 | | | | 9.7 | 6A | 3 | 2 | 1 |
| 81021 | 48- 79 | B22T | 68.0 | 5.3 | 26.7 | 34.2 | 22.2 | 6.4 | 4.0 | 1.2 | 3.4 | 1.9 | | | | 6.1 | 22A | -- | 10 | 12 |
| 81022 | 79- 97 | 2B31CA | 62.6 | 13.1 | 24.3 | 28.8 | 19.7 | 6.2 | 5.9 | 2.0 | 5.3 | 7.8 | | | 2 | 10.0 | 73A | 37 | 14 | 22 |
| 81023 | 97-132 | 2B32CA | 64.1 | 11.6 | 24.3 | 33.4 | 17.6 | 5.9 | 5.1 | 2.1 | 4.6 | 7.0 | | | 2 | 9.1 | 58A | -- | 28 | 30 |
| 81024 | 132-183 | 2B33CA | 68.6 | 12.8 | 18.6 | 26.5 | 20.7 | 8.3 | 9.5 | 3.6 | 6.7 | 6.1 | | | | 14.7 | 19A | 5 | 3 | 11 |
| 81025 | 0- 38 | | 67.5 | 15.7 | 16.8 | 18.7 | 13.6 | 11.0 | 17.4 | 6.8 | 7.0 | 8.7 | | | TR | 22.3 | 36A | -- | 26 | 10 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 81017 | 0- 8 | 0.39 | 0.035 | | | 0.9 | TR | | | NP | NP | | 1.49 | 1.51 | 0.82 | | 4.5 | 3.6 | 0.4 | 0.4 |
| 81018 | 8- 15 | 0.43 | 0.041 | | | 0.8 | TR | | | | | | 1.39 | 1.41 | 0.72 | | 14.2 | 4.7 | 0.5 | 0.3 |
| 81019 | 15- 25 | 0.39 | | | | 1.1 | 0.1 | | | 29 | 17 | | 1.35 | 1.39 | 0.75 | | 14.3 | 7.6 | 1.0 | 0.7 |
| 81020 | 25- 48 | 0.57 | | | | 1.3 | 0.2 | | | 47 | 26 | | 1.33 | 1.51 | 0.97 | | 29.3 | 16.5 | 4.3 | 4.2 |
| 81021 | 48- 79 | 0.16 | | TR | | 0.8 | TR | | | | | | 1.41 | 1.47 | 0.87 | | 21.6 | 9.1 | 1.4 | 1.2 |
| 81022 | 79- 97 | 0.14 | | 12 | | 0.4 | 0.1 | | | | | | 1.16 | 1.24 | 0.46 | | 31.8 | 9.9 | 2.2 | 1.0 |
| 81023 | 97-132 | | | 13 | | 0.4 | TR | | | | | 1.20 | | | 0.62 | | | 11.6 | | |
| 81024 | 132-183 | | | 4 | | 0.5 | TR | | | | | | 1.31 | 1.37 | 0.89 | | 22.3 | 8.1 | 1.5 | 1.3 |
| 81025 | 0- 38 | 0.47 | | | | | | | | | | 1.40 | | | 0.77 | | | 6.8 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACIDITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | CEC NH4-OAC 5A6A | BASE SATURATION SUM+ ACIDITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81017 | 0- 8 | 4.8 | 0.9 | TR | 0.4 | 6.1 | | | 6.1 | 6.0 | 100+ | | 100+ | | 6.8 | 6.3 |
| 81018 | 8- 15 | 4.4 | 1.6 | TR | 0.4 | 6.4 | | | 6.4 | 7.2 | 100+ | | 90 | | 6.6 | 5.9 |
| 81019 | 15- 25 | 6.6 | 2.5 | 0.1 | 0.6 | 9.8 | | | 9.8 | 11.4 | 100+ | | 86 | | 6.8 | 6.1 |
| 81020 | 25- 48 | 14.6 | 6.2 | 0.2 | 1.0 | 22.0 | | | 22.0 | 23.3 | 100+ | | 94 | | 7.0 | 6.4 |
| 81021 | 48- 79 | 22.0 | 7.1 | 0.3 | 0.8 | 30.2 | | | 30.2 | 20.0 | 100+ | | 100+ | | 8.0 | 7.0 |
| 81022 | 79- 97 | 26.7 | 5.8 | 0.4 | 0.6 | 33.5 | | | 33.5 | 14.2 | 100+ | | 100+ | | 8.3 | 7.6 |
| 81023 | 97-132 | 27.6 | 6.1 | 0.6 | 0.6 | 34.9 | | | 34.9 | 13.8 | 100+ | | 100+ | | 8.4 | 7.7 |
| 81024 | 132-183 | 27.7 | 6.6 | 0.7 | 0.6 | 35.6 | | | 35.6 | 16.2 | 100+ | | 100+ | | 8.5 | 7.7 |
| 81025 | 0- 38 | | | | | | | | | | | | | | | |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|
| 81017 | 0- 8 | MT 2 | MI 2 | KK 2 | | | | | | |
| 81018 | 8- 15 | | | | | | | | | |
| 81019 | 15- 25 | MI 2 | KK 2 | MT 1 | | | | | | |
| 81020 | 25- 48 | | | | | | | | | |
| 81021 | 48- 79 | MT 2 | MI 2 | KK 2 | | | | | | |
| 81022 | 79- 97 | | | | | | | | | |
| 81023 | 97-132 | | | | | | | | | |
| 81024 | 132-183 | | | | | | | | | |
| 81025 | 0- 38 | | | | | | | | | |

MINERAL CODE
MT MONTMORT
MI MICA
KK KAOLINIT

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## CONTINENTAL GRAVELLY SANDY LOAM (taxadjunct) 1/

S68 Ariz-12-2-1 through 8

Location: Santa Cruz County, Arizona. 2.3 miles west-southwest of Amado School. 0.9 mile south-southeast of a windmill and 270 feet west of ranch road. Section 14, T20S, R12E. Photo AMS-590. Date of Sampling: October 9, 1968.
Description by: Richardson and Clemmons. Collectors: Nettleton and Brasher.
Classification: Typic Haplargid, fine-loamy, mixed, thermic.
Vegetation: Desert shrub--grass: mesquite, burroweed, catclaw; three-awn, Rothrock grama, purple grama and fluffgrass. Climate: Mean annual temperature approximately 63.8°F. Mean annual precipitation 11-12 inches. Parent Material: Old alluvium from granite, andesite, rhyolite and tuffs.
Topography: Gently sloping old fan. 2 to 3 percent slope. East-southeast aspect. Elevation: 3300 feet. Drainage: Well drained. Medium runoff. Soil Moisture: Dry.
Remarks: This site is paired with S68 Ariz-12-1-1 through 8.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-8 cm) |
| A11 RSL 681017 | 0 to 3 inches, reddish brown (5YR 5/4) gravelly sandy loam, dark reddish brown (5YR 3/4) moist; weak fine and medium platy structure; slightly hard, very friable, non-sticky and nonplastic; common fine and very fine roots; many fine interstitial pores; **30 percent fine gravel; noneffervescent; mildly alkaline (pH 7.5); abrupt smooth boundary.** |
| A12 RSL 681018 (8-15 cm) | 3 to 6 inches, reddish brown (5YR 4/4) gravelly sandy loam, dark reddish brown (5YR 3/4) moist; weak fine and medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; common fine and very fine roots; few fine, very fine **and medium tubular pores; 25 percent fine gravel; noneffervescent; slightly acid (pH 6.5); clear smooth boundary.** |
| B1 RSL 681019 (15-25 cm) | 6 to 10 inches, reddish brown (5YR 4/4) gravelly sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and medium tubular pores; few thin clay films in pores and gravel coating; **30 percent fine gravel; noneffervescent; neutral (pH 7.0); clear wavy boundary.** |
| B21t RSL 681020 (25-48 cm) | 10 to 19 inches, reddish brown (2.5YR 4/4) gravelly clay, dark red (2.5YR 3/6) moist; weak medium and coarse prismatic breaking to moderate medium and coarse subangular blocky structure; very hard, friable, sticky and plastic; common fine and very fine and few medium roots; common fine exped pores; common pressure faces; **20 percent fine gravel; noneffervescent; mildly alkaline (pH 7.8); clear wavy boundary.** |
| B22t RSL 681021 (48-79 cm) | 19 to 31 inches, red (2.5YR 4/6) gravelly clay or very gravelly clay, red (2.5YR 4/6) moist; weak medium subangular blocky structure; very hard, friable, sticky and very plastic; few fine and very fine roots; few fine and very fine tubular pores; common **thin clay films in pores; 50-60 percent fine and medium gravel; noneffervescent; moderately alkaline (pH 8.0); abrupt wavy boundary.** |
| IIB31ca RSL 681022 (79-97 cm) | 31 to 38 inches, reddish brown (2.5YR 5/4) very gravelly clay, reddish brown (2.5YR 4/4) moist, with pinkish gray (5YR 7/2) lime coatings, light reddish brown (5YR 6/4) moist; massive, hard, friable, sticky and plastic; few fine and very fine roots; common **fine and few medium tubular pores; few thin clay films in pores; 55 percent gravel;5 percent cobbles; violently effervescent; moderately alkaline (pH 8.0); clear wavy boundary.** |
| IIB32ca RSL 681023 (97-132 cm) | 38 to 52 inches, pink (5YR 7/3) very gravelly sandy clay loam, reddish brown (5YR 5/4) moist, with common medium distinct reddish brown (5YR 5/4) lime mottles, reddish brown (5YR 4/4) moist; massive; hard, friable, sticky and slightly plastic; few very fine roots; few fine and very fine tubular and common fine interstitial pores; **few thin clay films in pores; 50 percent fine gravel; violently effervescent; moderately alkaline (pH 8.0); clear wavy boundary.** |
| IIB33ca RSL 681024 (132-183 cm) | 52 to 72 inches plus, light reddish brown (5YR 6/3) gravelly sandy clay loam, reddish brown (5YR 5/4) moist, with common fine faint white (5YR N8/) lime filaments, pink (5YR 7/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular and common fine interstitial pores; **few thin clay films in pores; 20 percent gravel; strongly effervescent in spots; mildly alkaline (pH 7.5).** |
| | (0-38 cm) |
| Composite A 681025 | 0 to 15 inch horizon sampled from 20 pedons selected at 10-foot intervals from two 100-foot transects that intersect near the backhoe pit. |

Readings from pit sample: S.63°E on Mt Josephine
S.21°W on Mt Sardina
S.55°W on Toros Spur

1/ The Continental series is in a fine, mixed, thermic family of Typic Haplargids. This pedon has less than 35 percent clay in its control section.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, thermic

SOIL Karro loam variant SOIL Nos. S64Ariz-2-22 LOCATION Cochise County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64619 - 64623

| Depth in. | Horizon | 1B1b Total: Sand (2-0.05) | Silt (0.05-0.002) | Clay (< 0.002) | Size class and particle diameter (mm) Sand: Very coarse (2-1) | Coarse (1-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | Silt: 0.05-0.02 | Int. III (0.02-0.002) | Int. II (0.2-0.02) | 3A1 (2-0.1) | Non carbonate clay | | Coarse fragments: > 2 Pct | 1A2a 2 - 19 | 19 - 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | Pct. of < 76 mm | |
| 0-9 | Ap1 | 40.2 | 38.9 | 20.9 | 1.2 | 4.6 | 6.7 | 16.8 | 10.9 | 14.9 | 24.0 | 34.9 | 29.3 | 19 | | 1 | 1 | |
| 9-14 | Ap2 | 36.4 | 39.6 | 24.0 | 0.8 | 3.9 | 5.9 | 15.4 | 10.4 | 14.9 | 24.7 | 33.8 | 26.0 | 21 | | 1 | 1 | |
| 14-19 | B2tca | 23.6 | 32.3 | 44.1 | 0.6 | 2.4 | 3.8 | 9.6 | 7.2 | 11.5 | 20.8 | 23.9 | 16.4 | 35 | | | tr. | |
| 19-25 | B3tca | 34.7 | 28.9 | 36.4 | 4.5 | 7.0 | 5.2 | 10.7 | 7.3 | 9.1 | 19.8 | 22.3 | 27.4 | 29 | | | tr. | |
| 25-33+ | C1ca | 39.6 | 26.2 | 34.2 | 8.7 | 8.8 | 5.8 | 10.4 | 5.9 | 8.7 | 17.5 | 20.0 | 33.7 | 27 | | | tr. | |

| Depth in. | Horizon | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | 3A1a Carbonate in <0.002 mm Pct. | Bulk density: 4A1f 1/3 bar g/cc | 4A1h Oven dry g/cc | g/cc | Water content: Pct. | 4B1c 1/3 bar Pct. | 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | 3B2 Cm | pH: 8C1a 1:1 $H_2O$ | 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-9 | Ap1 | 0.85 | 0.081 | 10 | 9 | 2 | | | | | | 13.5 | | | | 8.1 | 8.7 |
| 9-14 | Ap2 | 0.70 | 0.081 | 9 | 9 | 3 | | | | | | 14.2 | | | | 7.9 | 8.6 |
| 14-19 | B2tca | 0.56 | 0.063 | 9 | 19 | 9 | 1.23 | 1.45 | | | 33.8 | 21.4 | 0.057 | 0.057 | 1.00 | 8.0 | 8.7 |
| 19-25 | B3tca | 0.35 | 0.048 | 7 | 25 | 7 | | | | | | 23.3 | | | | 8.2 | 8.9 |
| 25-33+ | C1ca | 0.23 | | | 39 | 7 | | | | | | 23.6 | | | | 8.2 | 8.9 |

| Depth in. | Horizon | Extractable bases 6N2b Ca | 6O2c Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0-9 | Ap1 | 24.6 | 5.0 | 1.1 | 1.9 | 32.6 | | 17.3 | | 6.5 | 2.3 | 4.4 | 0.7 | | - | 2.6 | 3.7 | | 1.32 |
| 9-14 | Ap2 | 23.0 | 5.3 | 1.2 | 1.9 | 31.4 | | 16.6 | | 10.8 | 3.8 | 6.8 | 0.8 | | - | 2.1 | 6.9 | | 2.16 |
| 14-19 | B2tca | 22.6 | 11.2 | 1.4 | 2.3 | 37.5 | | 17.9 | | 6.2 | 5.8 | 5.4 | 1.0 | | - | 2.2 | 6.4 | | 1.91 |
| 19-25 | B3tca | 22.0 | 17.2 | 1.5 | 2.6 | 43.3 | | 22.9 | | 3.8 | 6.0 | 5.5 | 1.2 | | - | 3.1 | 4.8 | | 1.62 |
| 25-33+ | C1ca | 17.4 | 15.1 | 1.4 | 2.3 | 36.2 | | 19.2 | | 2.5 | 5.4 | 5.1 | 1.1 | | - | 2.9 | 3.3 | | 1.38 |

| Depth in. | Horizon | 8A Water at Saturation Pct. | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na me / 100 g | Gypsum Pct. |
|---|---|---|---|---|---|
| 0-9 | Ap1 | 49.4 | 5 | 0.9 | |
| 9-14 | Ap2 | 53.0 | 5 | 0.8 | |
| 14-19 | B2tca | 70.6 | 4 | 1.0 | |
| 19-25 | B3tca | 71.3 | 5 | 1.1 | |
| 25-33+ | C1ca | 72.6 | 5 | 1.0 | |

1/ Percent of the whole soil including >2 mm.

## KARRO LOAM, ARGILLIC VARIANT 1/
S64Ariz-2-22

Location: Cochise County, Arizona. 10 miles south and 4 miles east of Willcox via the Kansas Settlement Road. 250 feet south and 250 feet west of the northeast corner of Sec. 26, T. 15 S, R. 25 E. Date of Sampling: October 21, 1964.
Description: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, R. K. Preece, and M. L. Richardson.
Classification: Typic Haplargid, fine-loamy, mixed, thermic.
Vegetation: Fallow cropland. Climate: Precipitation about 11 inches annual. Mean annual temperature is 58° F. at Willcox. Mean January temperature 41° F., mean July temperature 77° F. Soil temperature at time of sampling was: 20 inches 72° F., 48 inches 68° F., 84 inches 65° F. Parent Material: Mixed alluvium from rhyolite, ignimbrite, andesite, limestone and quartzite. Topography: Nearly level valley plain near Willcox playa. Slopes are smooth and very slightly convex with gradient of
Elevation: 4205 feet. Drainage: Well drained. Moderately permeable. Slow surface runoff. Soil Moisture: Moist - about 50 percent field capacity. Water table at 100 to 150 feet. Remarks: The argillic variant is intermixed with the normal type. Paired sample S64Ariz-2-21. Field determinations of pH by thymol blue in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| Ap1<br>RSL No.<br>64619 | 0-9 inches (0-23 cm), pinkish gray (7.5YR 6/2) loam, brown to dark brown (7.5YR 4/2) when moist; moderate fine and very fine granular structure; slightly hard when dry, very friable when moist, slightly sticky and plastic when wet; many fine and medium roots; many fine interstitial pores; violently effervescent; pH 8.6; clear smooth boundary. |
| Ap2<br>RSL No.<br>64620 | 9-14 inches (23-36 cm), same color as Ap1; loam; massive, breaking to moderate fine and very fine granular structure; slightly hard when dry, very friable when moist, slightly sticky and plastic when wet; many fine and medium roots; many fine interstitial and a few fine tubular pores; violently effervescent; pH 8.6; clear smooth boundary. |
| B2tca<br>RSL No.<br>64621 | 14-19 inches (36-48 cm), pinkish gray (7.5YR 6/2) with common medium faint mottles of pinkish gray (7.5YR 7/2) light clay, brown (7.5YR 5/4) and pinkish gray (7.5YR 6/2) when moist; moderate fine and medium prismatic breaking to moderate medium and coarse subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; common fine and medium roots; common fine and medium tubular and fine interstitial pores; continuous thin clay films on ped faces; violently effervescent; pH 8.6; clear wavy boundary. |
| B3tca<br>RSL No.<br>64622 | 19-25 inches (48-63 cm), pinkish gray and light brown (7.5YR 6/2 & 6/4) with many fine to medium faint mottles of pinkish white (7.5YR 8/2) gravelly (concretions) heavy clay loam, brown (7.5YR 5/2 & 5/4) and light brown (7.5YR 6/2) when moist; massive, breaking to moderate fine and medium subangular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; few fine tubular pores; common thin clay films on ped faces, in pores, and as bridges; violently effervescent; approximately 20 percent fine and medium lime-silica(?) concretions that are extremely hard and very firm; pH 8.6; gradual wavy boundary. |
| C1ca<br>RSL No.<br>64623 | 25-33 inches (63-84 cm), pink (7.5YR 7/4 & 8/4) clay loam, light brown (7.5YR 6/4) and pink (7.5YR 7/4) when moist; massive, breaking to moderate fine angular and subangular blocky structure; very hard when dry, firm when moist, slightly sticky and plastic when wet; no roots; few fine tubular pores; common fine and medium concretions that are extremely hard and extremely firm; violently effervescent; pH 8.6; gradual smooth boundary. |

1/ The Karro series is in a coarse-loamy, carbonatic, thermic family of Ustollic Calciorthids. This pedon has an argillic horizon with more than 18 percent clay and less than 40 percent carbonate.

CONSECUTIVE PEDON NUMBER C 69202 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MOHAVE SOIL NO. S69 ARIZ. 10- 1 SAMPLE NO. 91071-91078 WALNUT G.-TUCSON AREA

SOIL FAMILY: TYPIC HAPLARGID,FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A.02 | INT. WHOLE 20 | COARSE FRAGMENTS I 75- | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 91071 | 0- 8 | A1 | 48.4 | 26.9 | 24.7 | 3.3 | 6.6 | 8.1 | 17.7 | 12.7 | 8.3 | 18.6 | | | 30.5 | --A | -- | -- | -- |
| 91072 | 8- 15 | B1 T | 69.9 | 14.7 | 15.4 | 5.9 | 8.9 | 12.1 | 28.5 | 14.5 | 7.3 | 7.4 | | | 37.4 | --A | -- | -- | -- |
| 91073 | 15- 28 | B21T | 51.3 | 16.4 | 32.3 | 6.5 | 8.6 | 8.1 | 17.4 | 10.7 | 8.2 | 8.2 | | | 28.1 | --A | -- | -- | -- |
| 91074 | 28- 46 | B22T | 40.2 | 22.1 | 37.7 | 7.2 | 7.1 | 4.5 | 11.6 | 9.8 | 8.3 | 13.8 | | | 24.8 | --A | -- | -- | -- |
| 91075 | 46- 61 | B23TCA | 36.7 | 33.6 | 29.7 | 10.9 | 6.1 | 3.7 | 8.1 | 7.9 | 11.5 | 22.1 | | | 1 24.2 | --A | -- | -- | -- |
| 91076 | 61- 81 | B24TCA | 50.3 | 19.8 | 29.9 | 8.5 | 13.9 | 8.0 | 12.4 | 7.5 | 7.1 | 12.7 | | | 2 21.1 | --A | -- | -- | -- |
| 91077 | 81-102 | B3 CA | 44.2 | 23.3 | 32.5 | 4.8 | 10.1 | 7.2 | 14.1 | 8.0 | 7.7 | 15.6 | | | 4 23.2 | --A | -- | -- | -- |
| 91078 | 102-1402C | CA | 51.1 | 18.9 | 30.0 | 8.3 | 15.5 | 7.9 | 11.8 | 7.6 | 7.2 | 11.7 | | | 17 21.3 | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-19 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | ORY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 91071 | 0- 8 | 0.84 | 0.095 | 1 | | 0.7 | | | 1.45 | | | 1.00 | | | 9.5 | | | 7.7 | | 7.3 |
| 91072 | 8- 15 | 0.18 | 0.026 | TR | | 0.5 | | | 1.50 | | | 1.00 | | | 5.1 | | | 7.3 | | 7.3 |
| 91073 | 15- 28 | 0.22 | | 1 | | 0.7 | | | 1.50 | | | 1.00 | | | 10.5 | | | 7.6 | | 7.3 |
| 91074 | 28- 46 | | | 6 | | 0.7 | | | 1.50 | | | 1.00 | | | 13.1 | | | 7.7 | | 7.6 |
| 91075 | 46- 61 | | | 8 | | 0.6 | | | 1.40 | | | 1.00 | | | 12.1 | | | 7.8 | | 7.8 |
| 91076 | 61- 81 | | | 10 | | 0.4 | | | 1.40 | | | 1.00 | | | 10.9 | | | 8.0 | | 7.9 |
| 91077 | 81-102 | | | 15 | | 0.3 | | | 1.45 | | | 1.00 | | | 13.6 | | | 8.3 | | 8.1 |
| 91078 | 102-140 | | | 46 | | 0.1 | | | 1.45 | | | 1.00 | | | 13.5 | | | 8.5 | 9.8 | 8.3 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | CEC NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | --------MEQ/100G-------- | | | | | PCT. | -MEQ/100G | | MMHO | ----------MEQ/1000 ML---------- | | | | | | | | PPM | |
| 91071 | 0- 8 | | | 0.4 | 0.7 | 1.1 | | | 19.8 | | | | | | | | | | | |
| 91072 | 8- 15 | | | 0.5 | 1.2 | 1.7 | | | 9.7 | | | | | | | | | | | |
| 91073 | 15- 28 | | | 0.4 | 1.8 | 2.2 | | | 18.1 | | | | | | | | | | | |
| 91074 | 28- 46 | | | 0.4 | 1.9 | 2.3 | | | 20.6 | | | | | | | | | | | |
| 91075 | 46- 61 | | | 1.1 | 1.5 | 2.6 | | | 18.6 | | | | | | | | | | | |
| 91076 | 61- 81 | | | 1.9 | 1.3 | 3.2 | | | 15.4 | | | | | | | | | | | |
| 91077 | 81-102 | | | 3.6 | 1.1 | 4.7 | | | 18.8 | | | | | | | | | | | |
| 91078 | 102-140 | | | 5.6 | 0.5 | 6.1 | | | 11.0 | 1.48 | 0.5 | 0.4 | 15.9 | 4.3 | | 5.7 | 1.2 | 8.3 | | 8.6 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY 7A2C I | 7A2E II | 7A2E III | DTA 7A2E IV | 7A3 PCT. | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91071 | 0- 8 | | 0.4 | 2 | | | | | | | | | | | | | 1 TRACE |
| 91072 | 8- 15 | | 0.5 | 5 | | | | MI 3 | MT 1 | KK 1 | | | | | | MI MICA | 2 SMALL |
| 91073 | 15- 28 | | 0.4 | 2 | | | | MI 3 | MT 1 | | | | | | | MT MONTMORT | 3 MODERATE |
| 91074 | 28- 46 | | 0.4 | 2 | | | | | | | | | | | | KK KAOLINIT | 4 ABUNDANT |
| 91075 | 46- 61 | | 1.1 | 6 | | | | MI 3 | | | | | | | | | 5 DOMINANT |
| 91076 | 61- 81 | | 1.9 | 12 | | | | | | | | | | | | | 6 INDETER. |
| 91077 | 81-102 | | 3.6 | 19 | | | | | | | | | | | | | |
| 91078 | 102-140 | 71.6 | 4.5 | 41 | 24 | | | MT 4 | MI 2 | KK 1 | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## MOHAVE FINE SANDY LOAM
S69Ariz-10-1

Location: Pima County, Arizona. Approximately 2,350 feet east of NW corner of Section 3, T. 15 S., R. 11 E. in road cut south side of road. About 16 miles west and 3 miles north of junction of I-10 and Ajo Road in Tucson. Date of sampling: September 18, 1969.
Description by: Y. H. Havens and D. M. Hendricks. Collectors: Y. H. Havens and D. M. Hendricks.
Classification: Typic Haplargid, fine-loamy, mixed, thermic.
Vegetation: Desert shrub -- grass: mesquite, burroweed and annual grasses. Climate: Mean annual temperature is approximately 68° F. Mean annual precipitation 10-11 inches. Parent material: Old mixed alluvium from mixed sources. Topography: Nearly level. Slope less than 1 percent. Elevation: 2,330 feet. Drainage: Well drained. Medium runoff. Soil moisture: Dry to 20 inches, moist below.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>691071 | 0-8 cm (0-3 inches), brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 4/4) moist; weak thick platy structure; slightly hard, friable, nonsticky, slightly plastic; common fine and very fine roots; few fine and very fine tubular pores; noneffervescent to slightly effervescent; mildly alkaline (pH 7.6); clear wavy boundary. |
| B1t<br>RSL No.<br>691072 | 8-15 cm (3-6 inches), reddish brown (5YR 5/4) heavy sandy loam, reddish brown (5YR 4/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common fine and very fine and few coarse roots; common very fine and fine vesicular and tubular pores; few fine gravel; noneffervescent to slightly effervescent in spots; moderately alkaline (pH 7.9); abrupt wavy boundary. |
| B21t<br>RSL No.<br>691073 | 15-28 cm (6-11 inches), reddish brown (5YR 4/4) light clay loam, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky, plastic; common fine and medium roots; common fine tubular pores; common thin clay films on ped faces and in pores; few fine distinct pink (7.5YR 7/4) lime filaments, light brown (6/4) moist; slightly effervescent; moderately alkaline (pH 7.9); clear wavy boundary. |
| B22t<br>RSL No.<br>691074 | 28-46 cm (11-18 inches), reddish brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky, plastic; common fine and medium roots; common fine tubular and interstitial pores; common thin clay films on ped faces and in pores; common fine distinct pink (7.5YR 7/4) lime filaments and mottles, light brown (6/4) moist; slightly to strongly effervescent; moderately alkaline (pH 8.1); clear wavy boundary. |
| B23tca<br>RSL No.<br>691075 | 46-61 cm (18-24 inches), reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky, plastic; few fine, medium and coarse roots; common fine tubular and interstitial pores; common thin clay films on ped faces; common to many fine to large distinct pink (7.5YR 7/4) lime filaments and soft segregations, light brown (7.5YR 6/4) moist; strongly effervescent; moderately alkaline (pH 8.1); gradual wavy boundary. |
| B24tca<br>RSL No.<br>691076 | 61-81 cm (24-32 inches), brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; weak fine and medium subangular blocky structure; hard, friable, slightly sticky, plastic; few fine, medium and coarse roots; common very fine and fine tubular pores; few thin clay films on ped faces; many medium and large distinct pink (7.5YR 7/4) lime filaments and soft lime segregations, light brown (7.5YR 6/4) moist; common very fine manganese concretions; strongly effervescent; moderately alkaline (pH 8.1); clear wavy boundary. |
| B3ca<br>RSL No.<br>691077 | 81-102 cm (32-40 inches), mottled brown (7.5YR 5/4) and pink (7.5YR 7/4) sandy clay loam, dark brown (7.5YR 4/4) and light brown (6/4) moist, mottles are many medium and large and distinct; weak medium and coarse subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine and very fine roots; few fine tubular pores; few thin clay films on ped faces; few fine manganese concretions and coatings; few fine gravel; violently effervescent; strongly alkaline (pH 8.5); clear wavy boundary. |
| IICca<br>RSL No.<br>691078 | 102-140 cm (40-55 inches), white (N 8/ ) clay loam, light gray (10YR 7/2) moist; massive; very hard, friable, sticky, slightly plastic; common fine and very fine roots; few fine tubular pores; common root holes and tubular pores filled with 7.5YR soil material; violently effervescent; very strongly alkaline (pH 9.1). |

CONSECUTIVE PEDON NUMBER C 67 62 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES VECONT SOIL NO. S67 ARIZ. 7-16 SAMPLE NO. 7 708-7 713 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC HAPLARGID,FINE,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. 2-.2U | CLAYS FINE LT .2U | CLAYS CARBONATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20 | II 20-5 PCT. OF LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 7 708 | 0- 25 | AP1 | 19.7 | 32.6 | 47.7 | 1.0 | 1.7 | 1.7 | 7.7 | 7.6 | 10.6 | 22.0 | | | | 23.4 | 1 | TR | 1Z | N |
| 7 709 | 25- 41 | AP2 | 19.5 | 32.7 | 47.8 | 1.3 | 2.1 | 1.7 | 7.3 | 7.1 | 10.6 | 22.1 | | | | 22.6 | 1 | TR | 1Z | N |
| 7 710 | 41- 58 | B21TCA | 19.0 | 33.5 | 47.5 | 1.0 | 1.9 | 1.6 | 6.8 | 7.7 | 10.2 | 23.3 | | | | 22.5 | TR | TR | -- | -- |
| 7 711 | 58- 79 | B22TCA | 19.4 | 32.1 | 48.5 | 1.1 | 2.1 | 1.8 | 7.0 | 7.4 | 9.5 | 22.6 | | | | 21.6 | TR | TR | -- | -- |
| 7 712 | 79-117 | B3TCA | 22.0 | 30.9 | 47.1 | 1.1 | 2.5 | 2.2 | 8.6 | 7.6 | 10.5 | 20.4 | | | | 23.8 | TR | TR | -- | -- |
| 7 713 | 117-165 | C 1 | 23.3 | 29.3 | 47.4 | 1.1 | 2.4 | 2.1 | 9.1 | 8.6 | 11.9 | 17.4 | | | | 26.4 | TR | TR | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-19 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 7 708 | 0- 25 | 0.91 | 0.074 | 1 | | 1.1 | | | | 1.21 | 1.49 | 1.00 | | 25.1 | 15.9 | 7.2 | 7.1 | | 8.6 | |
| 7 709 | 25- 41 | 0.52 | 0.062 | 1 | | | | | | 1.41 | 1.75 | 0.99 | | 27.1 | 16.8 | 7.5 | 7.4 | | 8.7 | |
| 7 710 | 41- 58 | 0.16 | | 2 | | 1.1 | | | | 1.46 | 1.77 | 1.00 | | 26.2 | 16.7 | 6.6 | 6.6 | | 8.9 | |
| 7 711 | 58- 79 | 0.15 | | 2 | | | | | | 1.49 | 1.79 | 1.00 | | 26.1 | 17.1 | 6.3 | 6.3 | | 9.0 | |
| 7 712 | 79-117 | 0.10 | | 3 | | | | | | 1.44 | 1.75 | 1.00 | | 27.5 | 17.9 | 6.7 | 6.7 | | 9.2 | |
| 7 713 | 117-165 | 0.04 | | 5 | | 0.9 | | | | 1.39 | 1.68 | 1.00 | | 28.7 | 17.8 | 6.5 | 6.5 | | 9.5 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | 8A1 SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | | |
| 7 708 | 0- 25 | | | 1.7 | 3.1 | 4.8 | | | 28.9 | 2.14 | 7.6 | 2.7 | 8.2 | 1.4 | | 3.8 | 9.2 | | | 7.6 |
| 7 709 | 25- 41 | | | 1.5 | 2.4 | 3.9 | | | 28.8 | | | | | | | | | | | 7.6 |
| 7 710 | 41- 58 | | | 2.4 | 2.1 | 4.5 | | | 28.1 | | | | | | | | | | | 7.7 |
| 7 711 | 58- 79 | | | 3.0 | 1.6 | 4.6 | | | 29.6 | | | | | | | | | | | 7.7 |
| 7 712 | 79-117 | | | 3.8 | 1.3 | 5.1 | | | 27.0 | | | | | | | | | | | 7.8 |
| 7 713 | 117-165 | | | 6.1 | 1.2 | 7.3 | | | 24.9 | | | | | | | | | | | 8.2 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT 8A SAT. PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | GYPSUM REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | DTA IV 7A2E | L.T. .0002 MM X RAY I 7A3 | X RAY II 7A2E | X RAY III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 708 | 0- 25 | 59.3 | 1.2 | 4 | 4 | | | MI | 4 | MT 3 | KK 2 | | | |
| 7 709 | 25- 41 | | 1.5 | 5 | | | | | | | | | | |
| 7 710 | 41- 58 | | 2.4 | 9 | | | | MI | 4 | MT 3 | KK 2 | | | |
| 7 711 | 58- 79 | | 3.0 | 10 | | | | | | | | | | |
| 7 712 | 79-117 | | 3.8 | 14 | | | | | | | | | | |
| 7 713 | 117-165 | | 6.1 | 24 | | | | MI | 4 | MT 3 | KK 2 | | | |

| MINERAL CODE | RELATIVE AMOUNT |
|---|---|
| MI MICA | 1 TRACE |
| MT MONTMORT | 2 SMALL |
| KK KAOLINIT | 3 MODERATE |
| | 4 ABUNDANT |
| | 5 DOMINANT |
| | 6 INDETER. |

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## VECONT CLAY LOAM
S67Ariz-7-16

Location: Maricopa County, Arizona. 1200 feet south and 180 feet east of the west 1/4 corner of Sec. 14, T. 1 S., R. 6 E. Date of Sampling: October 14, 1967.
Description by: E. Adams and J. Jay. Collectors: K. Flach, D. Nettleton, E. Adams, and J. Jay.
Classification: Typic Haplargid, fine, mixed, hyperthermic. 1/
Vegetation: Cotton. Use: Cropland. Climate: Mean annual precipitation is about 8 inches. Mean annual air temperature is about 80° F. Temperature at 20 inches approximately 80° F. Parent Material: Mixed - acid and basic igneous and metamorphosed sedimentaries. Topography: Flood plains and low fans. Elevation: 1250 feet. Drainage: Well drained. Permeability is slow to very slow. Soil Moisture: Moist when sampled. Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This profile has slightly stronger structure than the modal profile.

| HORIZON | DESCRIPTION |
|---|---|
| Ap1<br>RSL No.<br>67708 | 0-25 cm (0-10 inches), reddish brown (5YR 5/3) clay loam, dark reddish brown (5YR 3/4) moist; strong fine granular and moderate medium subangular blocky structure; hard when dry, very firm when moist, very sticky and very plastic when wet; common fine and very fine roots; many fine interstitial pores; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| Ap2<br>RSL No.<br>67709 | 25-41 cm (10-16 inches), reddish brown (5YR 5/3), clay, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; hard when dry, friable when moist, very sticky and very plastic when wet; many fine and very fine roots; many fine interstitial pores; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| B21tca<br>RSL No.<br>67710 | 41-58 cm (16-23 inches), reddish brown (5YR 5/3) clay, dark reddish brown (5YR 3/4) moist, with pink (5YR 7/4) carbonate segregations; moderate medium and coarse prismatic breaking to moderate medium angular blocky structure; hard when dry, friable when moist, very sticky and very plastic when wet; few fine roots; few fine tubular and interstitial pores; very few moderately thick clay films in pores; slightly effervescent; moderately alkaline (pH 8.0). |
| B22tca<br>RSL No.<br>67711 | 58-79 cm (23-31 inches), reddish brown (5YR 5/3) clay, dark reddish brown (5YR 3/3) moist with light reddish brown (5YR 6/4) carbonate segregations; weak medium and coarse prismatic structure breaking to moderate medium and coarse angular blocky structure; hard when dry, friable when moist, very sticky and very plastic when wet; few fine roots; few fine interstitial and tubular pores; few moderately thick clay films in pores; slightly effervescent; moderately alkaline (pH 8.0); clear irregular boundary. |
| B3tca<br>RSL No.<br>67712 | 79-117 cm (31-46 inches), reddish brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist, with light reddish brown (5YR 6/4) carbonate segregations; weak fine angular blocky structure; hard when dry, friable when moist, very sticky and very plastic when wet; very few very fine roots; few and very few tubular and interstitial pores; few moderately thick clay films in pores; slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C1<br>RSL No.<br>67713 | 117-165 cm (46-65 inches), reddish brown (5YR 5/4) clay, dark reddish brown (5YR 3/4) moist; weak fine angular blocky structure; hard when dry, friable when moist, very sticky and very plastic when wet; very few very very fine roots; few fine and very fine tubular and interstitial pores; few moderately thick clay films in pores; slightly effervescent; moderately alkaline (pH 8.0). |

1/ The pedon lacks a clay increase presumably because the surface has been removed by landleveling.

CONSECUTIVE PEDON NUMBER C 67 63 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES VECONT SOIL NO. S67 ARIZ. 7-17 SAMPLE NO. 7 714-7 720 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC HAPLARGID,FINE,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 SAND | .05- .002 SILT | LT .002 CLAY | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | SILTS VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | INT. II .2- .02 | COARSE FRAGMENTS I 75- WHOLE SOIL | II 20-5 PCT. | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 7 714 | 0- 28 | AP | 36.4 | 22.5 | 41.1 | 1.2 | 4.0 | 5.3 | 16.2 | 9.7 | 10.0 | 12.5 | | | | 28.8 | TR | TR | -- | -- |
| 7 715 | 28- 53 | B21T | 34.0 | 23.6 | 42.4 | 1.3 | 3.9 | 5.1 | 15.1 | 8.6 | 11.4 | 12.2 | | | | 28.8 | TR | TR | -- | -- |
| 7 716 | 53- 74 | B22T | 33.7 | 24.2 | 42.1 | 1.7 | 4.5 | 5.0 | 13.7 | 8.8 | 11.6 | 12.6 | | | | 27.9 | TR | TR | -- | -- |
| 7 717 | 74-104 | B31TCA | 30.1 | 26.0 | 43.9 | 0.8 | 3.1 | 4.2 | 13.2 | 8.8 | 11.6 | 14.4 | | | | 28.3 | TR | TR | -- | -- |
| 7 718 | 104-130 | B32TCA | | | | | | | | | | | | | | | TR | TR | --Z | -- |
| 7 719 | 130-150 | B33TCA | | | | | | | | | | | | | | | 2 | TR | 2Z | N |
| 7 720 | 150-178 | B34TCA | | | | | | | | | | | | | | | TR | TR | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG. CARBON 6A1A | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L LL 4F1 | T M PL 4F2 | I | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 7 714 | 0- 28 | 0.54 | 0.065 | 1 | | 0.9 | | | | 1.47 | 1.76 | 1.00 | | 24.1 | 13.7 | 6.2 | 6.2 | | 8.7 | | |
| 7 715 | 28- 53 | 0.17 | | 2 | | | | | | 1.58 | 1.90 | 1.00 | | 23.3 | 14.7 | 6.3 | 6.3 | | 9.0 | | |
| 7 716 | 53- 74 | | | 3 | | | | | 1.55 | | | 1.00 | | | 15.1 | | | | 9.3 | | |
| 7 717 | 74-104 | | | 6 | | 0.8 | | | | 1.51 | 1.82 | 1.00 | | 25.2 | 16.1 | 6.4 | 6.4 | | 9.3 | | |
| 7 718 | 104-130 | | | | | | | | 1.50 | | | | | | 17.1 | | | | | | |
| 7 719 | 130-150 | | | | | | | | 1.50 | | | | | | 12.5 | | | | | | |
| 7 720 | 150-178 | | | | | | | | | 1.60 | 1.79 | 1.00 | | 20.5 | | 3.8 | 3.8 | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 6N4C | MG 6O4C | NA 6P2A | K 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 7 714 | 0- 28 | | | 1.2 | 1.8 | 3.0 | | | 22.6 | 1.35 | 4.3 | 1.8 | 8.2 | 1.4 | | 4.6 | 4.8 | | | 7.7 |
| 7 715 | 28- 53 | | | 2.8 | 1.6 | 4.4 | | | 23.0 | | | | | | | | | | | 7.8 |
| 7 716 | 53- 74 | | | 4.1 | 1.2 | 5.3 | | | 23.2 | | | | | | | | | | | 7.9 |
| 7 717 | 74-104 | | | 3.6 | 0.7 | 4.3 | | | 22.9 | | | | | | | | | | | 8.0 |
| 7 718 | 104-130 | | | | | | | | | | | | | | | | | | | |
| 7 719 | 130-150 | | | | | | | | | | | | | | | | | | | |
| 7 720 | 150-178 | | | | | | | | | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A SAT. PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A2E | -L.T. .0002 MM- DTA 7A3 PCT. | X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 714 | 0- 28 | 52.5 | 0.8 | 3 | 5 | | | MI 4 | MT 3 | KK 2 | | | | | | MI MICA |
| 7 715 | 28- 53 | | 2.8 | 12 | | | | | | | | | | | | MT MONTMORT |
| 7 716 | 53- 74 | | 4.1 | 18 | | | | | | | | | | | | KK KAOLINIT |
| 7 717 | 74-104 | | 3.6 | 16 | | | | MI 4 | MT 3 | KK 3 | | | | | | |
| 7 718 | 104-130 | | | | | | | | | | | | | | | |
| 7 719 | 130-150 | | | | | | | | | | | | | | | |
| 7 720 | 150-178 | | | | | | | | | | | | | | | |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
N=NOT DETERMINED.

## VECONT CLAY LOAM
S67Ariz-7-17

Location: Maricopa County, Arizona. 110 feet east and 50 feet south of center of Sec. 17, T. 1 S., R. 6 E. Date of Sampling: October 14, 1967.
Description by: E. Adams and J. Jay. Collectors: K. Flach, D. Nettleton, E. Adams, and J. Jay.
Classification: Typic Haplargid, fine, mixed, hyperthermic. 1/
Vegetation: Alfalfa. Use: Cropland. Climate: Mean annual precipitation is about 8 inches. Mean annual air temperature is about 80° F. Temperature at 20 inches approximately 80° F. Parent Material: Mixed - acid and basic igneous and metamorphosed sedimentaries. Topography: Flood plains and low fans. Elevation: 1237 feet. Drainage: Well drained. Permeability is slow to very slow. Soil Moisture: Moist when sampled. Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. The carbonate segregations in this profile are at a greater depth than in the modal.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL No.<br>67714 | 0-28 cm (0-11 inches), reddish brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; moderate medium granular structure; hard when dry, friable when moist, sticky and plastic when wet; many fine and medium roots; many very fine and fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| B21t<br>RSL No.<br>67715 | 28-53 cm (11-21 inches), reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; weak coarse prismatic structure breaking to moderate medium angular blocky structure; hard when dry, firm when moist, very sticky and very plastic when wet; common fine and medium roots; very few fine tubular and few fine interstitial pores; very few thin clay films line tubular or interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| B22t<br>RSL No.<br>67716 | 53-74 cm (21-29 inches), reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; weak coarse prismatic structure breaking to weak medium angular blocky structure; hard when dry, friable when moist, very sticky and very plastic when wet; common fine and medium roots; very few fine tubular and few fine interstitial pores; very few thin clay films line tubular or interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| B31tca<br>RSL No.<br>67717 | 74-104 cm (29-41 inches), reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; massive; hard when dry, friable when moist, very sticky and very plastic when wet; common fine and medium roots; very few fine tubular pores and common fine interstitial pores; very few thin clay films line tubular or interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| B32tca<br>RSL No.<br>67718 | 104-130 cm (41-51 inches), reddish brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist with light reddish brown (5YR 6/4) carbonate segregations; weak coarse prismatic structure breaking to moderate medium angular blocky structure; hard when dry, friable when moist; very sticky and very plastic when wet; common fine and medium roots; very few fine tubular and few fine interstitial pores; few thin clay films line tubular or interstitial pores; strongly to violently effervescent; moderately alkaline (pH 8.2); gradual smooth boundary. |
| B33tca<br>RSL No.<br>67719 | 130-150 cm (51-59 inches), reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; weak coarse prismatic structure breaking to moderate medium angular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; common fine and medium roots; few fine tubular pores; and common fine interstitial pores; common moderately thick clay films on ped faces and in tubular and interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| B34tca<br>RSL No.<br>67720 | 150-178 cm (59-70 inches), reddish brown (5YR 5/4 and 4/4) clay loam, dry and moist; weak coarse prismatic structure breaking to moderate medium angular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; few fine roots; few fine tubular and interstitial pores; common moderately thick clay films on ped faces and in tubular and interstitial pores; strongly effervescent; moderately alkaline (pH 8.0). |

1/ The pedon lacks a clay increase presumably because the surface has been removed by landleveling.

CONSECUTIVE PEDON NUMBER C 69155 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES FORREST TAXADJUNCT SOIL NO. S69 ARIZ. 2- 9 SAMPLE NO. 9 808-9 813 WILLCOX AREA

SOIL FAMILY: TYPIC HAPLARGID,FINE,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. .2U | CLAYS FINE LT .2U | CARBONATE 3A1A.02 | INT. COARSE FRAGMENTS I 75-20 PCT. OF WHOLE 20 SOIL | II 20-5 PCT. OF | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | |
| 9 808 | 0- 10 | A1 | 48.7 | 34.5 | 16.8 | 7.5 | 12.8 | 8.5 | 13.0 | 6.9 | 15.2 | 19.3 | | | 29.1 | --A | -- | -- | -- |
| 9 809 | 10- 33 | B21T | 42.4 | 23.3 | 34.3 | 10.5 | 11.3 | 5.8 | 9.1 | 5.7 | 9.6 | 13.7 | | | 20.2 | --A | -- | -- | -- |
| 9 810 | 33- 79 | B22T | 30.4 | 18.5 | 51.1 | 5.2 | 7.1 | 4.3 | 7.9 | 5.9 | 8.6 | 9.9 | | | 18.9 | --A | -- | -- | -- |
| 9 811 | 79-100 | C 1CA | 41.1 | 24.5 | 34.4 | 8.8 | 10.2 | 5.8 | 10.0 | 6.3 | 9.3 | 15.2 | | 2 | 21.3 | --A | -- | -- | -- |
| 9 812 | 100-180 | C 2CA | 52.1 | 32.6 | 15.3 | 17.4 | 12.5 | 6.4 | 9.9 | 5.9 | 9.0 | 23.6 | | 5 | 20.1 | --A | -- | -- | -- |
| 9 813 | 0- 38 | A1 | | | | | | | | | | | | | | 3A | -- | 2 | 1 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | P I 4A1F | BULK DENSITY 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT.NO.40 | | | GRAMS PER CC | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 9 808 | 0- 10 | 0.59 | 0.058 | | | | 21 | 14 | | 1.64 | 1.71 | 1.00 | | 12.8 | 6.0 | 1.4 | 1.4 | 6.3 | | 5.7 |
| 9 809 | 10- 33 | 0.54 | 0.057 | | | | | | 1.60 | | | 1.00 | | | 11.3 | | | 6.9 | | 6.7 |
| 9 810 | 33- 79 | 0.44 | | 1 | | | 57 | 24 | | 1.55 | 1.81 | 1.00 | | 21.7 | 16.9 | 5.3 | 5.3 | 7.4 | | 7.3 |
| 9 811 | 79-100 | 0.27 | | 18 | | | | | 1.75 | | | 1.00 | | | 10.9 | | | 7.6 | 8.5 | 7.7 |
| 9 812 | 100-180 | | | 38 | | | 28 | 15 | | 1.82 | 1.88 | 1.00 | | 10.0 | 6.2 | 1.1 | 1.1 | 7.7 | 9.2 | 7.7 |
| 9 813 | 0- 38 | | | TR | | | | | 1.60 | | | 0.98 | | | 8.0 | | | 7.4 | | 7.1 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA-OAC 5A2A | NH4-OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -------MEQ/100G-------- | | | | | PCT. | -MEQ/100G | | | ----------MEQ/1000 ML---------- | | | | | | | | | |
| 9 808 | 0- 10 | | | 0.4 | 1.2 | 1.6 | | | 11.2 | | | | | | | | | | | |
| 9 809 | 10- 33 | | | 0.4 | 1.4 | 1.8 | | | 18.4 | | | | | | | | | | | |
| 9 810 | 33- 79 | | | 0.9 | 1.9 | 2.8 | | | 26.3 | | | | | | | | | | | |
| 9 811 | 79-100 | | | 1.1 | 1.1 | 2.2 | | | 14.9 | 1.92 | 5.8 | 3.4 | 9.1 | 0.6 | | 2.8 | 12.0 | 3.9 | | 7.6 |
| 9 812 | 100-180 | | | 1.3 | 0.4 | 1.7 | | | 7.6 | 1.79 | 2.7 | 2.3 | 11.5 | 0.3 | | 2.4 | 10.3 | 3.2 | | 8.0 |
| 9 813 | 0- 38 | | | 0.1 | 1.1 | 1.2 | | | 14.7 | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A SAT. PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY DTA 7A2E I | 7A2E II | 7A2E III | 7A2E IV | 7A3 PCT. | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 808 | 0- 10 | | 0.4 | 4 | | | | MI 3 | KK 2 | | | | | | | MI MICA |
| 9 809 | 10- 33 | | 0.4 | 2 | | | | MI 4 | KK 2 | | | | | | | KK KAOLINIT |
| 9 810 | 33- 79 | | 0.9 | 3 | | | | | | | | | | | | |
| 9 811 | 79-100 | 42.7 | 0.7 | 5 | 4 | | | MI 4 | MT 1 | KK 1 | | | | | | MT MONTMORT |
| 9 812 | 100-180 | 37.8 | 0.9 | 11 | 7 | | | | | | | | | | | |
| 9 813 | 0- 38 | | 0.1 | 1 | | | | | | | | | | | | |

| RELATIVE AMOUNT | |
|---|---|
| 1 | TRACE |
| 2 | SMALL |
| 3 | MODERATE |
| 4 | ABUNDANT |
| 5 | DOMINANT |
| 6 | INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

FORREST LOAM (taxadjunct) 1/
S69Ariz-2-9

Location: Cochise County, Arizona. 2,200 feet north and 2,150 feet east of the southwest corner of Sec. 6, T. 16 S., R. 24 E. East of Southern Pacific Railroad tracks about 3 miles south and 1 mile west of Cochise. Date of sampling: October 15, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Haplargid, fine, mixed, thermic.
Vegetation: Tobosa, scattered mesquite, yucca and Russian thistle. Use: Livestock range. Climate: Precipitation is about 12 to 13 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Alluvium, principally from rhyolite, andesite, granite, quartzite and limestone. Topography: Slightly convex to smooth, nearly level to gently sloping valley plains and old fans. Slope, 0.5 percent, northeast facing. Elevation: 4300 feet. Drainage: Well drained. Runoff is medium to slow. Permeability is slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator solution. Paired with sample S69Ariz-2-8. A composite sample of 0 to 15 inches (0 to 38 cm) was taken for organic carbon determination - four sites sampled approximately 20 feet N, E, S and W of pit and composite sample obtained (RSL 69813).

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>69808 | 0 to 10 cm (0 to 4 inches), brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; moderate coarse platy structure; slightly hard, friable, sticky, slightly plastic; many fine and medium roots; few medium and coarse tubular pores; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| B21t<br>RSL<br>69809 | 10 to 33 cm (4 to 13 inches), reddish brown (5YR 4/4) light clay, dark reddish brown (5YR 3/4) moist; moderate medium and coarse subangular and angular blocky structure; very hard, friable, sticky, plastic; many very fine and fine roots; few fine and coarse tubular pores; common pressure faces; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B22t<br>RSL<br>69810 | 33 to 79 cm (13 to 31 inches), dark reddish brown (2.5YR 3/4) clay, dark reddish brown (2.5YR 3/4) moist; strong medium prismatic structure; very hard, friable, sticky, very plastic; common very fine and fine roots; many pressure faces; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary. |
| C1ca<br>RSL<br>69811 | 79 to 100 cm (31-39½ inches), reddish yellow (5YR 6/6) gravelly clay loam, yellowish red (5YR 5/6) moist; massive parting to weak medium subangular blocky structure; very hard, friable, sticky, plastic; few very fine and fine roots; common medium and coarse tubular pores; few thin clay films in pores; about 15 percent by volume of 1/2 to 2 inch rounded rhyolite, andesite and quartzite gravel; about 30 percent by volume of medium and large white irregularly shaped soft masses and concretions of lime; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| C2ca<br>RSL<br>69812 | 100 to 180 cm (39½ - 71 inches), pink (7.5YR 7/4) loam, yellowish red (5YR 5/6) moist; massive; hard, friable, slightly sticky, slightly plastic; few fine and medium tubular pores; 3 to 5 percent by volume of 1/2 to 2 inch rounded rhyolite, andesite and quartzite gravel; about 20 percent by volume of medium and large pinkish white irregularly shaped soft lime masses and concretions; violently effervescent; moderately alkaline (pH 8.2). |
| RSL<br>69813 | See Remarks. |

1/ The Forrest series is in a fine, mixed, thermic family of Ustollic Haplargids. This pedon has less organic matter in the surface 38 cm.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haplargid, fine, montmorillonitic, mesic

SOIL Arp gravelly clay loam (taxadjunct) SOIL Nos. S65Ariz-13-5 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65188 - 65192

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand (Pct. of < 2 mm) Very coarse (2–1) | Sand Coarse (1–0.5) | Sand Medium (0.5–0.25) | Sand Fine (0.25–0.1) | Sand Very fine (0.1–0.05) | Silt 0.05–0.02 | Silt Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments 1A2a > 2 (Pct.) | 2 – 19 (Pct. of < 76mm) | 19 – 76 (Pct. of < 76mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | A1 | 22.0 | 41.2 | 36.8 | 2.6 | 3.6 | 2.8 | 6.1 | 6.9 | 19.8 | 21.4 | 30.3 | 15.1 | 0 | 37 | 28 | 19 | 9 |
| 2-5 | B1t | 17.2 | 42.4 | 40.4 | 1.9 | 3.3 | 2.2 | 4.3 | 5.5 | 19.5 | 22.9 | 27.5 | 11.7 | 0 | 40 | 4 | 4 | 0 |
| 5-11 | B21t | 22.4 | 44.0 | 33.6 | 3.6 | 5.1 | 2.8 | 5.2 | 5.7 | 20.7 | 23.3 | 29.2 | 16.7 | 0 | 34 | 5 | 5 | 0 |
| 11-18 | B22t | 32.8 | 40.0 | 27.2 | 6.0 | 8.5 | 4.3 | 6.9 | 7.1 | 18.5 | 21.5 | 29.2 | 25.7 | 0 | 27 | ** | ** | ** |
| 18-34 | C | 35.6 | 48.3 | 16.1 | 4.7 | 10.4 | 5.2 | 8.0 | 7.3 | 20.3 | 28.0 | 31.8 | 28.3 | 0 | 16 | ** | ** | ** |
| 34-49 | R | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon (Pct.) | 6B1a Nitrogen (Pct.) | C/N | 6C2a Ext. Iron as Fe (Pct.) | 6E1b Carbonate as $CaCO_3$ (Pct.) | Bulk density 4A1f 1/3 bar (g/cc) | Bulk density 4A1h Oven dry (g/cc) | Bulk density (g/cc) | Water content (Pct.) | Water content 4B1c 1/3 bar (Pct.) | Water content 4B2 15 bar (Pct) | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | 0.60 | 0.058 | 10 | | - | | | | | | 13.1 | | | 6.6 | | |
| 2-5 | 0.49 | 0.061 | 8 | | - | | | | | | 15.5 | | | 6.7 | | |
| 5-11 | 0.35 | 0.052 | 7 | | - | | | | | | 15.3 | | | 6.7 | | |
| 11-18 | 0.25 | | | | - | | | | | | 12.8 | | | 6.8 | | |
| 18-34 | 0.14 | | | | - | | | | | | 11.0 | | | 7.0 | | |

| Depth (In.) | Extractable bases 5B1a 6N2a Ca (meq/100 g) | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | Cation Exch. Capacity 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Atterberg limits Plastic limit (Pct. of <0.4 mm) | Atterberg limits Liquid limit | Atterberg limits Plastic index | Base saturation 5C1 $NH_4OAc$ (Pct) | Base saturation (Pct.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | 20.7 | 9.8 | 0.2 | 0.4 | 31.1 | | 33.5 | | | | | | 93 | |
| 2-5 | 25.1 | 8.8 | 0.2 | 0.3 | 34.4 | | 38.3 | | | | | | 90 | |
| 5-11 | 23.6 | 7.8 | 0.2 | 0.2 | 31.8 | | 33.6 | | | | | | 95 | |
| 11-18 | 21.2 | 7.4 | 0.2 | 0.2 | 29.0 | | 30.6 | | | 23 | 38 | 15 | 95 | |
| 18-34 | 23.6 | 8.0 | 0.3 | 0.1 | 32.0 | | 34.0 | | | | | | 94 | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A Mont. (X-ray) | Verm. | Mica | Kaolin |
|---|---|---|---|---|

* All values from characterization sample.
** >2 mm not determined. Characterization sample ground whole.

## ARP GRAVELLY CLAY LOAM (taxadjunct) 1/
S65Ariz-13-5

Location: Western Yavapai County Area, Arizona. 3 miles northwest of Mayer, Arizona on State Highway #69 and 1 mile west on road to Binghampton, mine, 6/10 mile west & 3/10 mile south of the northeast corner of Sec. 8, T12N, R1E. EGE 1959, Photo #27-96. Date of Sampling: May 5, 1965.
Collectors: Flach, Nettleton, Jay, Meurisse, Freeman.
Vegetation: Brush. Oakbrush, squawbush, manzanita, mountain mahogany. Climate: Mean annual precipitation 12-14". Mean annual temperature 57°F. Soil temperature at time of sampling 64°F. at 17". Parent Material: Yavapai schist and phyllite. Relief: Gently rolling hills on a 6 percent convex slope about 50 feet from crest of ridge on a southwest exposure. Elevation: 4750 feet. Drainage: Medium runoff, moderately slow to slowly permeable and well drained.
Remarks: This soil is found on schist and phyllite under a chaparral or grass vegetation. It is on nearly level bench-like areas and moderately steep to steep hills. About 40 percent of the surface is covered with quartzite, schist and phyllite gravel. A few cobbles, stones, and rock outcrops may be present. The schist and phyllite bedrock is vertically oriented. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-4.
Classification: Typic Haplargid, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65188 | 0 to 2 inches, dark brown (7.5YR 4/4) gravelly clay loam, dark reddish brown (5YR 3/4) when moist; moderate fine granular structure; slightly hard, friable, sticky and plastic; few fine roots; many fine interstitial pores; 40 percent gravel; noneffervescent; slightly acid (pH 6.5); abrupt smooth boundary. |
| B1t<br>RSL No.<br>65189 | 2 to 5 inches, reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) when moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; plentiful fine, medium and coarse roots; common fine tubular and many fine interstitial pores; few thin, oriented clay bridges; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B21t*<br>RSL No.<br>65190 | 5 to 11 inches, reddish brown (5YR 5/4) clay, dark reddish brown (5YR 3/4) when moist; moderate fine and medium subangular and angular blocky structure; hard, friable, sticky and plastic; plentiful fine, medium and coarse roots; few fine tubular and common fine interstitial pores; common thin clay films on ped faces; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B22t<br>RSL No.<br>65191 | 11 to 18 inches, strong brown (7.5YR 5/6) clay, dark brown (7.5YR 4/4) when moist; moderate, medium, subangular blocky structure; hard, friable, sticky and plastic; few fine roots; few fine tubular and common fine interstitial pores; common thin clay films on ped faces; noneffervescent; neutral (pH 7.0); clear irregular boundary. This horizon tongues into C horizon. |
| C*<br>RSL No.<br>65192 | 18 to 34 inches, light yellowish (2.5Y 6/4) weathered schist, olive (5Y 5/3) when moist; massive; hard, firm, few fine roots; few fine interstitial pores; common thin clay coatings on rock faces; noneffervescent; medium acid (pH 6.0); clear smooth boundary. |
| R<br>No sample. | 34 to 49 inches plus, pale yellow (2.5Y 7/4) extremely hard schist, with few fine, distinct dark gray (10YR 3/1) mineral grains; light olive brown (2.5Y 5/4) when moist; massive; few fine roots in seams; noneffervescent; medium acid (pH 6.0). |

*Note - Sampled for BPR. B21t and B22t combined in BPR sample.

1/ The Arp series is in a fine, montmorillonitic, mesic family of Ustollic Haplargids. This pedon has less than 0.6 percent organic carbon in the surface 15 inches.

CONSECUTIVE PEDON NUMBER C 69205 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES LEHMANS TAXADJUNCT SOIL NO. S69 ARIZ. 10- 4 SAMPLE NO. 91093-91095 WALNUT G.-TUCSON AREA

SOIL FAMILY: LITHIC HAPLARGID,CLAYEY-SKELETAL,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | INT. II .2- .02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 91093 | 0- 4 | A1 | 67.3 | 21.4 | 11.3 | 19.4 | 14.7 | 7.1 | 14.5 | 11.6 | 14.0 | 7.4 | | | | 33.9 | 40A | 6 | 7 | 27 |
| 91094 | 4- 13 | B2 T | 41.0 | 14.0 | 45.0 | 20.5 | 7.4 | 3.3 | 5.4 | 4.4 | 6.2 | 7.8 | | | | 13.7 | 51A | 9 | 11 | 31 |
| 91095 | 13- 76 | R | | | | | | | | | | | | | | | 33A | -- | 20 | 13 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L I M I T LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT.NO.40 GRAMS PER CC | | | | | | PERCENT | | | PERCENT | |
| 91093 | 0- 4 | 0.54 | 0.048 | | | 1.0 | 0.1 | | | | | | 1.23 | 1.29 | 0.77 | | 16.7 | 6.8 | 1.6 | 1.2 |
| 91094 | 4- 13 | 0.85 | 0.075 | | | 1.2 | 0.1 | | | | | | 1.01 | 1.18 | 0.72 | | 36.1 | 13.9 | 5.3 | 3.7 |
| 91095 | 13- 76 | 0.09 | | | | 1.0 | 0.1 | | | | | 1.40 | | | 0.79 | | | 6.0 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA- CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 91093 | 0- 4 | | | 0.2 | 0.9 | 1.1 | | | 1.1 | 9.5 | | | | | 6.9 | 6.9 |
| 91094 | 4- 13 | | | 0.2 | 1.2 | 1.4 | | | 1.4 | 20.6 | | | | | 6.4 | 6.1 |
| 91095 | 13- 76 | | | | | | | | | | | | | | 7.1 | 7.1 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PERCENT | | | | | | |
| 91093 | 0- 4 | MT 2 | MI 2 | KK 1 | | | | | | | MT MONTMORT | 1 TRACE |
| 91094 | 4- 13 | MI 3 | KK 2 | | | | | | | | MI MICA | 2 SMALL |
| 91095 | 13- 76 | | | | | | | | | | KK KAOLINIT | 3 MODERATE |
| | | | | | | | | | | | | 4 ABUNDANT |
| | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## LEHMANS VERY GRAVELLY LOAM (taxadjunct) 1/
S69Ariz-10-4

Location: Pima County, Arizona. 1,500 feet west and 150 feet south of northeast corner of Sec. 32, T. 14 S., R. 13 E., about 4 miles west of junction of Ajo Road and I-10 in Tucson.
Date of sampling: October 2, 1969.
Description by: Y. H. Havens and D. M. Hendricks. Collectors: Y. H. Havens and D. M. Hendricks.
Classification: Lithic Haplargid, clayey-skeletal, mixed, thermic.
Vegetation: Paloverde (Cercidium macrum), jojoba (goatnut) (coffeeberry) (Simmondsia californica), range ratany (Krameria parvifolia), false mesquite (Calliandra eriophylla), triangle leafed bursage (Ambrosia deltoidea), cacti, ocotillo (Fouquieria splendens), whitethorn, slender grama (Bouteloua filiformis), and annual grasses. Climate: Mean annual temperature approximately 67-69° F. Mean annual precipitation approximately 10-11 inches. Parent material: Rhyolite.
Topography: Strongly sloping to steep hills or mountains. Elevation: 2,600 feet.
Drainage: Well drained. Soil moisture: Dry.
Remarks: 60 percent gravel and cobbles and few stones on surface with small areas of rock outcrop.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>691093 | 0-4 cm (0-1½ inches), brown (7.5YR 5/4) very gravelly loam, dark brown (7.5YR 4/2) moist; weak thick platy structure in upper part, weak fine subangular blocky structure in lower part; soft, very friable, slightly sticky, slightly plastic; common fine, medium and coarse roots; common fine interstitial and few very fine tubular pores; approximately 60 to 70 percent coarse fragments; noneffervescent; neutral (pH 7.1); abrupt wavy boundary. |
| B2t<br>RSL No.<br>691094 | 4-13 cm (1½ -5 inches), reddish brown (5YR 4/4) and yellowish red (5YR 4/6) very gravelly light clay, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular and angular blocky structure; hard, friable, sticky, plastic; many fine, medium and coarse roots; few fine interstitial and tubular pores; common moderately thick clay films on ped faces and in pores; 50 to 60 percent gravel and cobbles; noneffervescent; slightly acid (pH 6.2); abrupt irregular boundary. |
| R<br>RSL No.<br>691095 | 13-76 cm (5-30 inches), light gray (5YR 7/1) and white (10YR 8/2) fractured rhyolite bedrock with reddish brown (5YR 4/4) soil material from B2t horizon in fractures and cracks, pinkish gray (5YR 6/2) and light gray (10YR 7/2) moist; massive; extremely hard; many fine, medium and coarse roots in fractures and cracks; common moderately thick clay films on rock faces; noneffervescent. |

1/ The Lehmans series is in a clayey, montmorillonitic, thermic family of Lithic Haplargids. This pedon has more than 35 percent coarse fragments.

CONSECUTIVE PEDON NUMBER C 71 3 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES GACHADO TAXADJUNCT SOIL NO. S71 ARIZ. 10- 2 SAMPLE NO. 1 13-1 17 ORGAN PIPE MON AREA

SOIL FAMILY: LITHIC HAPLARGID,LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. .2U | CLAYS FINE .2U | CARBO NATE 3A1A | INT. COARSE FRAGMENTS 1A2A II .2-.02 | PCT. OF WHOLE 20 SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 1 | 13 | 0- | 5 | A | 53.6 | 31.4 | 15.0 | 8.3 | 6.8 | 4.5 | 10.8 | 23.2 | 21.5 | 9.9 | 13.4 | 1.6 | | 51.9 | 29A | 5 | 15 | 9 |
| 1 | 14 | 5- | 11 | B21T | 45.3 | 26.4 | 28.3 | 6.5 | 7.5 | 4.4 | 9.3 | 17.6 | 15.9 | 10.5 | 24.7 | 3.6 | | 39.4 | 19A | 4 | 6 | 8 |
| 1 | 15 | 11- | 21 | B22T | 36.0 | 26.2 | 37.8 | 4.9 | 5.0 | 3.5 | 7.4 | 15.2 | 13.3 | 12.9 | 33.6 | 4.2 | | 33.0 | 13A | -- | 5 | 8 |
| 1 | 16 | 21- | 33 | B3TCA | 44.7 | 21.6 | 33.7 | 13.0 | 9.4 | 5.4 | 7.8 | 9.1 | 11.7 | 9.9 | | | | 25.0 | 56* G | 2 | 20 | 15 |
| 1 | 17 | 33- | 43 | R | | | | | | | | | | | | | | | | | | |

| SAMPLE NO. | | DEPTH CM. | | ORG.MATTER CAR-BON 6A1A | NITRO-GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6G2B | EXT AL 6G7A | PYROP FE 6G5C | EXT AL 6G5A | ATTERBERG L L 4F1 | P L 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | DRY BAR 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PERCENT | | PERCENT | | PERCENT | | | | PCT. | | GRAMS PER CC | | | PERCENT | | | PERCENT | |
| 1 | 13 | 0- | 5 | 0.21 | 0.029 | TR | | 1.1 | 0.1 | | | | | 1.30 | | 0.83 | | | 7.3 | | |
| 1 | 14 | 5- | 11 | 0.15 | 0.026 | TR | | 1.1 | 0.1 | | | | | | 1.41 | 1.51 | 0.89 | 25.1 | 19.8 | 11.1 | 2.3 | 2.0 |
| 1 | 15 | 11- | 21 | 0.22 | | TR | | 1.0 | 0.1 | | | | | | 1.19 | 1.37 | 0.94 | 34.5 | 28.9 | 14.3 | 4.8 | 4.5 |
| 1 | 16 | 21- | 33 | 0.24 | | 2 | | 0.9 | 0.1 | | | | | | 1.26 | 1.39 | 0.62 | 30.3 | 29.0 | 13.9 | 3.3 | 2.0 |
| 1 | 17 | 33- | 43 | | | 8 | | 0.5 | TR | | | | | 2.65 | | | 1.00 | | | 2.4 | | |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MEQ/100G | | | | | | | | | PERCENT | | | | | | |
| 1 | 13 | 0- | 5 | 10.5 | 4.5 | 0.2 | 1.3 | 16.5 | | | 16.5 | 17.7 | 100+ | | 93 | | 7.6 | 7.1 |
| 1 | 14 | 5- | 11 | 23.0 | 6.8 | 0.2 | 1.3 | 31.3 | | | 31.3 | 26.6 | 100+ | | 100+ | | 7.9 | 7.2 |
| 1 | 15 | 11- | 21 | 27.9 | 6.8 | 0.3 | 1.2 | 36.2 | | | 36.2 | 34.7 | 100+ | | 100+ | | 7.5 | 7.4 |
| 1 | 16 | 21- | 33 | 31.5 | 5.8 | 0.4 | 0.9 | 38.6 | | | 38.6 | 27.8 | 100+ | | 100+ | | 8.3 | 7.7 |
| 1 | 17 | 33- | 43 | 13.7 | 0.9 | 0.2 | 0.2 | 15.0 | | | 15.0 | 3.6 | 100+ | | 100+ | | 8.9 | 7.9 |

| SAMPLE NO | | DEPTH CM. | | CLAY MINERALOGY <2 MM LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | | RELATIVE AMOUNT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PERCENT | | | | | | | | | | | | |
| 1 | 13 | 0- | 5 | MT 4 | MI 3 | KK 2 | | | | MI 3 | MM 2 | | MT | MONTMORT | 1 | TRACE |
| 1 | 14 | 5- | 11 | MT 3 | MI 3 | KK 1 | | | | MI 3 | MM 2 | | MI | MICA | 2 | SMALL |
| 1 | 15 | 11- | 21 | | | | | | | MT 3 | MI 3 | | KK | KAOLINIT | 3 | MODERATE |
| 1 | 16 | 21- | 33 | MT 3 | MI 3 | KK 1 | | | | | | | | | 4 | ABUNDANT |
| 1 | 17 | 33- | 43 | | | | | | | | | | MM | MT/MICA | 5 | DOMINANT |
| | | | | | | | | | | | | | | | 6 | INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## GACHADO VERY GRAVELLY LOAM (taxadjunct) 1/

S71Ariz-10-2(1-5)

Location: Pima County, Arizona. Approximately 5/16 mile east of the SW corner of Section 32 (projected), T16S, R5W, Salt River base line and meridian, about 6 miles north of Lukeville just east of Highway 85. Date of Sampling: April 5, 1971.

Description by: Y. H. Havens. Collectors: K. W. Flach, D. Hendricks, K. Vogt and E. Chamberlin.

Classification: Lithic Haplargid, loamy, mixed, hyperthermic.

Vegetation: Desert shrubs, creosotebush, saguaro, triangular bursage, ocotillo, cholla and paloverde. Use: Parkland, wildlife habitat and rangeland. Climate: Precipitation 9 to 10 inches. Mean annual air temperature 70° to 71° F. Parent Material: Pyroclastic-latitic and andesitic tuffs including welded tuffs. Topography: Convex moderately sloping valley slopes. Slope 6 percent south facing. Elevation: 1850 feet. Drainage: Well drained. Runoff is moderate. Permeability is moderately slow. Soil Moisture: Dry at time of sampling.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>71013 | 0 to 5 cm (0 to 2 inches), brown (7.5YR 5/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; common fine vesicular pores; 70 to 90 percent gravel by volume, 50 to 90 percent of surface is covered with gravel; noneffervescent; moderately alkaline (pH 8.0 Thymol blue); abrupt wavy boundary. |
| B21t<br>RSL<br>71014 | 5 to 11 cm (2 to 4½ inches), yellowish red (5YR 5/6) gravelly sandy clay loam, yellowish red (5YR 4/6) moist; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky, plastic; few very fine and fine roots; few very fine tubular and common interstitial pores; 20 percent gravel; noneffervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| B22t<br>RSL<br>71015 | 11 to 21 cm (4½ to 8 inches), yellowish red (5YR 4/6) heavy clay loam, yellowish red (5YR 4/6) moist; moderate medium prismatic structure parting to moderate medium subangular blocky structure; hard, friable, sticky, plastic or very plastic; few very fine and fine roots; few very fine tubular pores; 10 percent gravel by volume; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| B3tca<br>RSL<br>71016 | 21 to 33 cm (8 to 13 inches), yellowish red (5YR 5/6) very gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak medium and coarse subangular blocky structure; hard, friable, slightly sticky, plastic; few very fine roots; common fine interstitial and few fine tubular pores; 40 percent gravel and 20 percent cobbles; strongly effervescent; moderately alkaline (pH 8.3); abrupt irregular boundary. |
| R<br>RSL<br>71017 | 33 to 43 cm (13 to 17 inches), dark gray (5YR 4/1) bedrock, very dark gray (7.5YR 3/0) moist, with thin pinkish white lime coatings on upper surface; extremely hard; rock has hardness greater than 3. |

1/ The Gachado series is in a loamy-skeletal, mixed, hyperthermic family of Lithic Haplargids. This pedon has a control section with less than 35 percent coarse fragments by volume.

CONSECUTIVE PEDON NUMBER C 69167 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CHIRICAHUA TAXADJUNCT SOIL NO. S69 ARIZ. 2-21 SAMPLE NO. 9 861-9 864 WILLCOX AREA

SOIL FAMILY: LITHIC USTOLLIC HAPLARGID,CLYEY-SKLTL,MXD,THRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SANDS SILTS CLAYS | | | | | | | | | | | | | 1A2A INT. | COARSE FRAGMENTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CO. 2-.2U | FINE LT .2U | CARBO NATE 3A1A | II .2-.02 | PCT. OF WHOLE 20 | I 75-20 | II 20-5 | III 5-2 |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 9 861 | 0- 10 | A1 | 49.1 | 23.3 | 27.6 | 3.9 | 5.7 | 5.3 | 20.2 | 14.0 | 12.3 | 11.0 | | | | 39.2 | 76* | 52 | 12 | 2 |
| 9 862 | 10- 28 | B21T | 33.3 | 21.5 | 45.2 | 5.5 | 5.8 | 3.7 | 10.0 | 8.3 | 9.7 | 11.8 | 44.9 | 0.3 | | 24.3 | 72* | 43 | 17 | 1 |
| 9 863 | 28- 38 | B22T | 27.1 | 17.0 | 55.9 | 9.3 | 4.8 | 2.3 | 5.9 | 4.8 | 7.4 | 9.6 | | | | 15.8 | 72* | 39 | 19 | 2 |
| 9 864 | 38- 46 | B23TCA | 27.9 | 18.5 | 53.6 | 13.0 | 4.1 | 2.0 | 4.8 | 4.0 | 7.6 | 10.9 | | | | 14.5 | 73A | 38 | 31 | 4 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR-BON 6A1A -PERCENT- | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L I M I T LL 4F1 | PL 4F2 | EST. 1/3 BAR 4A1F | BULK DENSITY 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 9 861 | 0- 10 | 1.02 | 0.103 | | | | | | | 29 | 18 | | 1.33 | 1.47 | 0.39 | | 15.8 | 9.7 | 3.4 | 1.3 |
| 9 862 | 10- 28 | 1.24 | 0.113 | | | | | | | 42 | 22 | | 1.33 | 1.56 | 0.43 | | 24.0 | 14.6 | 5.5 | 2.2 |
| 9 863 | 28- 38 | 1.01 | 0.109 | TR | | | | | | | | | 1.24 | 1.58 | 0.45 | | 33.2 | 19.1 | 8.4 | 3.5 |
| 9 864 | 38- 46 | 1.08 | 0.122 | 6 | | | | | | | | 1.24 | | | 0.44 | | | 19.3 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI-DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 861 | 0- 10 | | | 0.1 | 1.4 | 1.5 | | | 1.5 | 17.5 | | | | | 7.0 | 6.8 |
| 9 862 | 10- 28 | | | 0.1 | 1.8 | 1.9 | | | 1.9 | 23.8 | | | | | 6.6 | 6.3 |
| 9 863 | 28- 38 | | | 0.1 | 1.7 | 1.8 | | | 1.8 | 28.3 | | | | | 7.2 | 7.1 |
| 9 864 | 38- 46 | | | 0.2 | 1.8 | 2.0 | | | 2.0 | 28.0 | | | | | 7.6 | 7.4 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 861 | 0- 10 | MI 5 | MT 2 | KK 2 | | | | | | |
| 9 862 | 10- 28 | MI 5 | MT 2 | KK 2 | | | | | | |
| 9 863 | 28- 38 | | | | | | | | | |
| 9 864 | 38- 46 | MI 5 | KK 2 | | | | | | | |

MI MICA
MT MONTMORT
KK KAOLINIT

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.
A=STANDARD PREPARATION.

## CHIRICAHUA VERY COBBLY CLAY LOAM (taxadjunct) 1/
S69Ariz-2-21

Location: Cochise County, Arizona. 100 feet south and 750 feet east of the northwest corner of Sec. 3, T. 17 S., R. 25 E. North of U. S. Highway 666 about 1½ miles east of Pearce. Date of sampling: October 20, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Lithic Ustollic Haplargid, clayey-skeletal, mixed, thermic.
Vegetation: Tanglehead, tobosa, scattered yucca and few small mesquite. Use: Livestock range. Climate: Precipitation is about 12 to 13 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Dacite, rhyolite and andesite. Topography: Moderately steep to steep convex hills. Slope, 30 percent, south facing. Elevation: 4400 feet. Drainage: Well drained. Surface runoff is medium to rapid. Permeability is slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator solution. This sample paired with S69Ariz-2-20.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>69861 | 0 to 10 cm (0 to 4 inches), brown (7.5YR 5/4) very cobbly clay loam, very dark brown (5YR 3/4) moist; weak fine granular structure; slightly hard, friable, sticky, plastic; many fine and medium roots; few very fine tubular pores; 80 percent of the surface has cover of subangular dacite, rhyolite and andesite gravel, cobbles and stones. The cover is comprised of 20 percent of 1/4 to 3 inch gravel, 50 percent of 4 to 8 inch cobbles, and 10 percent of 12 to 14 inch stones; in the horizon are 30 percent by volume of 4 to 6 inch subangular cobbles and 20 percent by volume of 1/4 to 3 inch subangular gravel; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary. |
| B21t<br>RSL<br>69862 | 10 to 28 cm (4 to 11 inches), reddish brown (5YR 4/3) cobbly clay, dark reddish brown (5YR 3/3) moist; moderate medium angular and subangular blocky structure; very hard, friable, sticky, plastic; common fine and medium roots; few coarse roots; few very fine tubular pores; few thin clay films on ped faces; about 30 percent by volume of 4 to 6 inch subangular dacite, rhyolite and andesite cobbles and 20 percent of 1/4 to 3 inch gravel; noneffervescent; medium acid (pH 6.0); clear wavy boundary. |
| B22t<br>RSL<br>69863 | 28 to 38 cm (11 to 15 inches), dark reddish brown (2.5YR 3/4) cobbly clay, dark reddish brown (2.5YR 3/4) moist; moderate fine and medium angular blocky structure; hard, friable, sticky, very plastic; few fine and medium roots; few very fine tubular pores; common thin clay films on ped faces; about 30 percent by volume of 4 to 6 inch subangular dacite, rhyolite and andesite cobbles and 20 percent of 1/4 to 3 inch gravel; noneffervescent; mildly alkaline (pH 7.7); clear wavy boundary. |
| B23tca<br>RSL<br>69864 | 38 to 46 cm (15 to 18 inches), dark reddish brown (2.5YR 3/4) gravelly clay, dark red (2.5YR 3/6) moist; moderate fine angular blocky structure; hard, friable, sticky, plastic; few fine and medium roots; few very fine tubular pores; common thin clay films on ped faces; about 30 percent by volume of 1/4 to 1-1/2 inch subangular dacite, rhyolite and andesite gravel and 10 percent of 4 to 6 inch cobbles; thin white lime coatings on gravel; strongly effervescent; moderately alkaline (pH 8.0); abrupt wavy boundary. |
| R | 46 to 53 cm (18 to 21 inches), light gray (10YR 7/1) and weak red (10R 5/4) extremely hard fractured dacite bedrock with discontinuous thin white lime coatings in the fractures and rock surfaces, and a thin discontinuous grayish brown and weak red on bedrock surfaces; few fine roots in fractures. |

1/ The Chiricahua series is in a clayey, mixed, thermic, shallow family of Ustollic Haplargids. This pedon has more than 35 percent coarse fragments by volume, the soil is less than 20 inches deep, and it lacks an argillic horizon.

CONSECUTIVE PEDON NUMBER C 69166 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MOANO TAXADJUNCT SOIL NO. S69 ARIZ. 2-20 SAMPLE NO. 9 858-9 860 WILLCOX AREA

SOIL FAMILY: LITHIC USTOLLIC HAPLARGID,CLYY-SKLT,MONT.,THRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SANDS SILTS CLAYS | | | | | | | | | | | | | 1A2A INT. | COARSE FRAGMENTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | II .2- .02 | PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 | III 5-2 |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 9 858 | 0- 8 | A1 | 23.7 | 41.7 | 34.6 | 7.1 | 5.2 | 2.6 | 4.7 | 4.1 | 15.9 | 25.8 | | | | 22.7 | 71* | 53 | 13 | 3 |
| 9 859 | 8- 20 | B21T | 24.0 | 37.7 | 38.3 | 6.8 | 4.5 | 2.3 | 5.2 | 5.2 | 15.6 | 22.1 | | | | 23.8 | 78* | 47 | 28 | 1 |
| 9 860 | 20- 43 | B22T | 21.1 | 36.2 | 42.7 | 9.6 | 3.9 | 1.5 | 2.9 | 3.2 | 11.4 | 24.8 | | | | 16.2 | 65* | 37 | 23 | 3 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR-BON 6A1A | NITRO-GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LIQUID LL 4F1 | PLASTIC PL 4F2 | BULK DENSITY 1/3 BAR EST. 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | -PERCENT- | |
| 9 858 | 0- 8 | 1.86 | 0.143 | | | 2.6 | 0.1 | | | 47 | 30 | 1.25 | | 0.46 | | | | 16.4 | | |
| 9 859 | 8- 20 | 1.59 | 0.149 | | | 2.7 | 0.1 | | | 50 | 28 | | 1.28 | 1.66 | 0.37 | | 30.0 | 16.8 | 9.1 | 3.0 |
| 9 860 | 20- 43 | 1.53 | 0.151 | TR | | 2.5 | 0.1 | | | | | 1.28 | | | 0.52 | | | 21.7 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | C E C NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 858 | 0- 8 | | | 0.1 | 0.9 | 1.0 | | | 1.0 | 36.1 | | | | | 7.2 | 7.0 |
| 9 859 | 8- 20 | | | 0.1 | 0.8 | 0.9 | | | 0.9 | 36.7 | | | | | 6.7 | 6.6 |
| 9 860 | 20- 43 | | | 0.2 | 0.5 | 0.7 | | | 0.7 | 44.2 | | | | | 6.8 | 6.7 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 858 | 0- 8 | MT 4 | MI 3 | KK 2 | | | | | | | MT MONTMORT | 1 TRACE |
| 9 859 | 8- 20 | | | | | | | | | | MI MICA | 2 SMALL |
| 9 860 | 20- 43 | | | | | | | | | | KK KAOLINIT | 3 MODERATE |
| | | | | | | | | | | | | 4 ABUNDANT |
| | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.

## MOANO GRAVELLY CLAY LOAM (taxadjunct) 1/
S69Ariz-2-20

Location: Cochise County, Arizona. 800 feet east of northwest corner of Sec. 33, T. 17 S., R. 24 E. 5½ miles west and 1½ north of Pearce.
Date of sampling: October 20, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Lithic Ustollic Haplargid, clayey-skeletal, montmorillonitic, thermic.
Vegetation: Sideoats grama, blue grama, tobosa, fluffgrass and scattered yucca, and mesquite. Use: Rangeland. Climate: Precipitation about 12 to 13 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Schist. Topography: Strongly sloping convex hills. Slope, 10 percent, east facing. Elevation: 4720 feet. Drainage: Well drained. Surface runoff is medium to rapid. Permeability is slow. Soil Moisture: Dry when sampled.
Remarks: Field determination of pH by Hellige-Truog indicator solution. This sample paired with S69Ariz-2-21.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>69858 | 0 to 8 cm (0 to 3 inches), dark brown (7.5YR 4/2) gravelly clay loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky, plastic; many very fine roots; about 70 percent surface cover of 1/8 to 1 inch subangular schist gravel; 40 to 50 percent by volume of 1/8 to 1-1/2 inch subangular schist gravel; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B21t<br>RSL<br>69859 | 8 to 20 cm (3 to 8 inches), dark reddish brown (5YR 3/4) gravelly clay, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky structure; hard, friable, sticky, plastic; many very fine and fine roots; few very fine tubular pores; few thin clay films on ped faces; about 50 percent by volume of 1/8 to 1-1/2 inch subangular schist gravel; noneffervescent; neutral (pH 7.3); clear smooth boundary. |
| B22t<br>RSL<br>69860 | 20 to 43 cm (8 to 17 inches), reddish brown (5YR 4/4) gravelly heavy clay, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky structure; hard, friable, sticky, plastic; common very fine and fine roots; few thin clay films on ped faces; about 50 percent by volume of 1/8 to 1-1/2 inch subangular schist gravel; noneffervescent; mildly alkaline (pH 7.8); abrupt irregular boundary. |
| R | 43 to 125 cm (17 to 49 inches), gray fractured extremely hard tilted schist bedrock with thin tongues of soil material in fractures, gray when moist. Interior of rock is noneffervescent. Rock faces and soil material in fractures are slightly to strongly effervescent. |

1/ The Moano series is in a loamy-skeletal, mixed, mesic family of Lithic Haplustolls. This pedon lacks a mollic epipedon and has an argillic horizon with more than 35 percent clay.

CONSECUTIVE PEDON NUMBER C 69171 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MOAND TAXADJUNCT SOIL NO. S69 ARIZ. 2-25 SAMPLE NO. 9 881-9 883 WILLCOX AREA

SOIL FAMILY: LITHIC USTOLLIC HAPLARGID,LOAMY-SKLTL,MXD,THRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II .2-.02 WHOLE | COARSE FRAGMENTS PCT. OF WHOLE 20 I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 9 881 | 0- 3 | A1 | 68.5 | 19.1 | 12.4 | 6.5 | 15.5 | 15.4 | 19.8 | 11.3 | 10.5 | 8.6 | | | | 31.9 | 48A | 8 | 30 | 10 |
| 9 882 | 3- 13 | B2 | 54.6 | 22.1 | 23.3 | 4.3 | 9.9 | 11.0 | 18.9 | 10.5 | 8.3 | 13.8 | | | | 29.0 | 50* | 16 | 18 | 8 |
| 9 883 | 13- 33 | C 1 | | | | | | | | | | | | | | | 94A | 78 | 14 | 2 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A -PERCENT- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A -PERCENT- | EXT AL 6G5A | ATTERBERG LL 4F1 PCT. | LIMIT PL 4F2 NO.40 | T EST. 1/3 BAR 4A1F GRAMS | BULK DENSITY 1/3 BAR 4A1F PER | DRY 4A1H CC | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 -PERCENT- | EXTNSBLTY LEF 4D1 | LE 4D1 -PERCENT- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 881 | 0- 3 | 0.69 | 0.062 | | | 1.7 | 0.1 | | | NP | NP | 1.25 | | 0.70 | | | | 5.4 | | |
| 9 882 | 3- 13 | 1.05 | 0.083 | | | 2.1 | 0.1 | | | 31 | 21 | | 1.49 | 1.64 | 0.64 | | 18.2 | 9.2 | 3.2 | 2.0 |
| 9 883 | 13- 33 | 1.44 | 0.167 | | | 3.2 | 0.1 | | | | | 1.50 | | | 0.08 | | | 16.7 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 881 | 0- 3 | | | 0.1 | 0.4 | 0.5 | | | 0.5 | 13.8 | | | | | 6.3 | 5.7 |
| 9 882 | 3- 13 | | | 0.1 | 0.3 | 0.4 | | | 0.4 | 26.5 | | | | | 6.9 | 6.5 |
| 9 883 | 13- 33 | | | 0.3 | 0.4 | 0.7 | | | 0.7 | 39.1 | | | | | 7.0 | 6.7 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <.002 MM FRACTION X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM FRACTION X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 881 | 0- 3 | MT 4 | MI 3 | KK 1 | | | | | | |
| 9 882 | 3- 13 | MT 4 | MI 2 | KK 2 | | | | | | |
| 9 883 | 13- 33 | | | | | | | | | |

MINERAL CODE: MT MONTMORT, MI MICA, KK KAOLINIT

RELATIVE AMOUNT: 1 TRACE, 2 SMALL, 3 MODERATE, 4 ABUNDANT, 5 DOMINANT, 6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.

# MOANO GRAVELLY HEAVY LOAM (taxadjunct) 1/

S69Ariz-2-25

Location: Cochise County, Arizona. 2,400 feet east and 400 feet north of the southwest corner of Sec. 21, T. 14 S., R. 27 E. North of State Highway 186, about 14 miles east and 3 miles south of Willcox. Date of Sampling: October 22, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Lithic Ustollic Haplargid, loamy-skeletal, mixed, thermic.
Vegetation: Cane beardgrass, sideoats gramma, juniper, agave and a few mesquite. Use: Livestock range. Climate: Precipitation about 13 to 14 inches. Mean annual air temperature 57°F., January 41°F., July 74°F. Parent Material: Pinal schist. Topography: Moderately steep convex hills. Slope, 22 percent, northwest facing. Elevation: 5300 feet. Drainage: Well drained. Surface runoff is medium. Permeability is moderate: Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator solution. This sample was not paired. The Schist bedrock has a hardness of less than 3 on Mho's scale and does not qualify as a lithic contact. This soil is quite similar to the Moano series.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>69881 | 0 to 3 cm (0 to 1 inch), dark brown (7.5YR 4/4) gravelly heavy loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many fine and medium roots; 50 to 60 percent of 1/8 to 1-1/2 inch subangular schist gravel; noneffervescent; neutral (pH 7.0); abrupt smooth boundary. |
| B2<br>RSL<br>69882 | 3 to 13 cm (1 to 5 inches), reddish brown (5YR 4/4) gravelly light clay loam, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard to hard, friable, sticky, plastic; many fine and medium roots; 30 to 40 percent by volume of 2 to 20 mm subangular schist gravel; noneffervescent; neutral (pH 7.0); clear irregular boundary. |
| C1<br>RSL<br>69883 | 13 to 33 cm (5 to 13 inches), reddish brown (5YR 4/4) very gravelly clay loam, dark reddish brown (5YR 3/4) moist; rock controlled structure; hard, friable, sticky, plastic; many very fine and fine roots; 80 to 90 percent fractured schist bedrock; noneffervescent; neutral (pH 7.0); clear irregular boundary. |
| C2 | 33 to 61 cm (13 to 24 inches), pale olive (5Y 6/3) fractured schist bedrock with reddish brown (5YR 4/4) clay loam soil material in fractures and seams; common fine roots in soil material; noneffervescent. |

1/ The Moano is in a loamy-skeletal, mixed, mesic family of Lithic Haplustolls. This pedon has an argillic horizon, has a chroma of 4 within 3 cm of the surface, and is thermic.

CONSECUTIVE PEDON NUMBER C 68132 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CARALAMPI SOIL NO. S68 ARIZ. 12- 4 SAMPLE NO. 8 979-8 986 E.PIMA-SANTA CRU AREA

SOIL FAMILY: USTOLLIC HAPLARGID LOAMY-SKELETAL,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1818,3A1 TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. .2- OF WHOLE SOIL | COARSE FRAGMENTS I 75-20 PCT. | II 20-5 OF LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 8 979 | 0- 5 | A1 | 72.9 | 10.9 | 16.2 | 21.6 | 23.7 | 12.2 | 11.7 | 3.7 | 5.8 | 5.1 | | | | 14.7 | 59* | 40 | 17Z | N |
| 8 980 | 5- 13 | B1 T | 60.7 | 9.8 | 29.5 | 21.8 | 15.3 | 9.1 | 10.9 | 3.6 | 5.4 | 4.4 | | | | 14.1 | 79A | 59 | 12 | 8 |
| 8 981 | 13- 23 | B21T | 54.7 | 10.6 | 34.7 | 18.9 | 15.0 | 8.0 | 9.2 | 3.6 | 4.7 | 5.9 | | | | 12.8 | 64A | 28 | 19 | 17 |
| 8 982 | 23- 33 | B22T | 64.4 | 12.2 | 23.4 | 23.2 | 18.4 | 9.1 | 9.9 | 3.8 | 5.4 | 6.8 | | | | 13.9 | 48* | 11 | 20 | 15 |
| 8 983 | 33- 58 | B23T | 63.7 | 18.0 | 18.3 | 15.0 | 16.2 | 10.5 | 14.8 | 7.2 | 7.8 | 10.2 | | | | 22.0 | 53A | 13 | 22 | 18 |
| 8 984 | 58- 79 | B31T | 68.0 | 18.6 | 13.4 | 17.5 | 18.5 | 10.5 | 14.4 | 7.1 | 7.3 | 11.3 | | | | 21.4 | 49A | 7 | 19 | 23 |
| 8 985 | 79-107 | B32T | 70.9 | 17.2 | 11.9 | 24.4 | 20.3 | 9.6 | 11.5 | 5.1 | 6.4 | 10.8 | | | | 17.0 | 43A | 10 | 20 | 13 |
| 8 986 | 107-142 | C | 73.5 | 17.0 | 9.5 | 26.1 | 19.2 | 10.6 | 12.8 | 4.8 | 7.1 | 9.9 | | | | 17.7 | 39A | 3 | 14 | 22 |

| SAMPLE NO. | DEPTH CM. | ORG. CAR- BON 6A1A | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L I M I T LL 4F1 | PL 4F2 | EST. 1/3 BAR 4A1F | BULK DENSITY 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT. | | NO.40 GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 8 979 | 0- 5 | 1.93 | 0.146 | | | 2.0 | | | | 39 | 24 | | 1.17 | 1.25 | 0.61 | | 14.0 | 9.1 | 2.2 | 1.3 |
| 8 980 | 5- 13 | 1.67 | 0.127 | | | 1.8 | | | | | | | 1.09 | 1.12 | 0.39 | | 17.0 | 15.2 | 0.9 | 0.3 |
| 8 981 | 13- 23 | 1.14 | 0.083 | | | 1.9 | 0.6 | | | 55 | 33 | | 1.22 | 1.31 | 0.54 | | 22.3 | 15.5 | 2.4 | 1.3 |
| 8 982 | 23- 33 | 0.67 | 0.052 | | | 1.5 | 0.6 | | | | | 1.30 | | | 0.69 | | | 12.9 | | |
| 8 983 | 33- 58 | 0.48 | | | | 1.3 | 0.2 | | | | | | 1.45 | 1.54 | 0.61 | | 19.6 | 12.5 | 2.0 | 1.2 |
| 8 984 | 58- 79 | 0.18 | | | | 1.0 | 0.2 | | | NP | NP | | 1.48 | 1.59 | 0.65 | | 23.4 | 10.0 | 2.4 | 1.5 |
| 8 985 | 79-107 | | | | | 0.8 | 0.1 | | | | | | 1.43 | 1.49 | 0.70 | | 19.8 | 8.7 | 1.4 | 1.0 |
| 8 986 | 107-142 | | | | | 0.7 | TR | | | NP | NP | | 1.54 | 1.63 | 0.72 | | 16.7 | 8.7 | 1.9 | 1.4 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8G1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 8 979 | 0- 5 | 7.5 | 4.7 | 0.1 | 0.9 | 13.2 | 4.2 | | 17.4 | 16.2 | 76 | | 81 | | 5.9 | 5.4 |
| 8 980 | 5- 13 | 17.3 | 9.1 | 0.1 | 0.7 | 27.2 | | | 27.2 | 24.0 | 100+ | | 100+ | | 6.1 | 5.6 |
| 8 981 | 13- 23 | 13.1 | 11.3 | 0.1 | 0.6 | 25.1 | | | 25.1 | 26.2 | 100+ | | 96 | | 5.9 | 5.5 |
| 8 982 | 23- 33 | 12.9 | 13.0 | 0.2 | 0.4 | 26.5 | | | 26.5 | 25.2 | 100+ | | 100+ | | 5.9 | 5.3 |
| 8 983 | 33- 58 | 13.8 | 10.5 | 0.2 | 0.3 | 24.8 | | | 24.8 | 25.6 | 100+ | | 97 | | 5.8 | 5.5 |
| 8 984 | 58- 79 | 13.9 | 11.6 | 0.5 | 0.3 | 26.3 | | | 26.3 | 24.3 | 100+ | | 100+ | | 6.4 | 5.8 |
| 8 985 | 79-107 | 12.7 | 10.7 | 0.4 | 0.2 | 24.0 | | | 24.0 | 21.3 | 100+ | | 100+ | | 6.4 | 5.8 |
| 8 986 | 107-142 | 15.4 | 9.6 | 0.8 | 0.3 | 26.1 | | | 26.1 | 26.1 | 100+ | | 100+ | | 6.8 | 5.9 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PERCENT | | | | | | |
| 8 979 | 0- 5 | MT 3 | MI 2 | KK 2 | | | | | | | MT MONTMORT | 1 TRACE |
| 8 980 | 5- 13 | | | | | | | | | | MI MICA | 2 SMALL |
| 8 981 | 13- 23 | | | | | | | | | | KK KAOLINIT | 3 MODERATE |
| 8 982 | 23- 33 | MT 3 | MI 2 | KK 2 | | | | | | | | 4 ABUNDANT |
| 8 983 | 33- 58 | | | | | | | | | | | 5 DOMINANT |
| 8 984 | 58- 79 | MT 5 | MI 1 | | | | | | | | | 6 INDETER. |
| 8 985 | 79-107 | | | | | | | | | | | |
| 8 986 | 107-142 | MT 5 | | | | | | | | | | |

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
A=STANDARD PREPARATION.

## CARALAMPI GRAVELLY SANDY LOAM
S68 Ariz-12-4-1 through 8

Location: Santa Cruz County, Arizona, 2½ miles north-northwest of Nogales. Approximately 2800 feet north and 1600 feet west of SE corner Section 36, T23S, R13E in road cut. Photo AMS-702. Date of Sampling: October 10, 1968.
Description by: Richardson and Havens. Collectors: Brasher and Nettleton.
Classification: Ustollic Haplargid, loamy-skeletal, mixed, thermic.
Vegetation: Grasses: curly mesquite, sideoats grama, sprucetop grama, slender grama, cane-beard grass, three-awn, hairy grama, blue grama and plains lovegrass. Brush: (sparse cover) mesquite, guajillo, range ratany and lycium. Climate: Mean annual temperature (Nogales 62.3°F.). Mean annual precipitation 14-15.5 inches. Parent Material: Old alluvium from granite, andesite, rhyolite and related tuffs. Topography: Deeply dissected old terraces or fans, 25 percent slope. Northeast aspect. Elevation: 3680 feet. Drainage: Well drained. Medium runoff. Soil Moisture: Slightly moist.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-5 cm) |
| A1 | 0 to 2 inches, dark brown (7.5YR 4/4) gravelly sandy loam, dark reddish brown |
| RSL | (5YR 3/4) moist; weak fine granular structure; slightly hard, friable, nonsticky |
| 68979 | and nonplastic; common very fine and fine roots; common very fine interstitial pores; noneffervescent; neutral (pH 7.0); abrupt smooth boundary. |
| B1t | 2 to 5 inches, dark brown (7.5YR 4/2) very gravelly sandy clay loam, dark brown |
| RSL | (7.5YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, |
| 68980 | slightly sticky and plastic; common very fine and fine roots; many very fine |
| (5-13 cm) | interstitial pores; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| B21t | 5 to 9 inches, dark reddish brown (5YR 3/4) very gravelly clay loam, dark red- |
| RSL | dish brown (5YR 3/4) moist; weak fine and medium subangular blocky structure; |
| 68981 | slightly hard, friable, sticky and plastic; many very fine and fine roots; common |
| (13-23 cm) | very fine interstitial and tubular pores; few thin clay films on ped faces; non-effervescent; slightly acid (pH 6.5); abrupt wavy boundary. |
| B22t | 9 to 13 inches, yellowish red (5YR 4/6) very gravelly heavy clay loam, dark red |
| RSL | (2.5YR 3/6) moist; moderate medium subangular blocky structure; hard, friable, |
| 68982 | sticky and plastic; many very fine and fine roots; common very fine interstitial |
| (23-33 cm) | and tubular pores; common thin clay films on ped faces and in pores; nonefferves-cent; slightly acid (pH 6.5); clear wavy boundary. |
| B23t | 13 to 23 inches, yellowish red (5YR 4/6) and reddish yellow (5YR 6/6) gravelly |
| RSL | sandy clay loam, yellowish red (5YR 4/6) moist; weak fine and medium subangular |
| 68983 | blocky structure; hard, friable, slightly sticky and slightly plastic; common very |
| (33-58 cm) | fine and fine roots; few very fine tubular pores; common thin clay films on ped faces; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| B31t | 23 to 31 inches, reddish brown (5YR 5/4) very gravelly sandy clay loam, reddish |
| RSL | brown (5YR 4/4) moist, with common fine faint pink (5YR 7/3) and light reddish |
| 68984 | brown (5YR 6/3) mottles, light reddish brown (5YR 6/4) moist; massive breaking to |
| (58-79 cm) | weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine tubular pores; few thin clay films on ped faces and in pores; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| B32t | 31 to 42 inches, light reddish brown (5YR 6/4) very gravelly light sandy clay |
| RSL | loam or sandy loam, reddish brown (5YR 4/4) moist; massive breaking to weak |
| 68985 | medium subangular blocky structure; hard, friable, nonsticky and slightly plastic; |
| (79-107 cm) | few very fine roots; few thin clay films on ped faces and in pores; nonefferves-cent; slightly acid (pH 6.5); clear wavy boundary. |
| C | 42 to 56 inches, light brown (7.5YR 6/4) gravelly sandy loam, dark brown (7.5YR |
| RSL | 4/4) moist; massive; hard, friable, nonsticky and nonplastic; noneffervescent; |
| 68986 | slightly acid (pH 6.5). |
| (107-142 cm) | |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Haplargid, coarse-loamy, mixed, mesic

SOIL Palma loamy sand SOIL Nos. S65Ariz-1-10 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65704 - 65712

| Depth (In) | Horizon | 1B1b Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments 1A2a: ≥ 2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0- 3 | A1 | 92.5 | 3.3 | 4.2 | 2.1 | 19.1 | 22.2 | 44.1 | 5.0 | 1.9 | 1.4 | 25.7 | 87.5 | 0 | 4 | - | - | - |
| 3- 5 | B1 | 90.2 | 2.5 | 7.3 | 1.8 | 17.5 | 20.8 | 44.8 | 5.3 | 1.5 | 1.0 | 27.5 | 84.9 | 0 | 7 | - | - | - |
| 5-12 | B2t | 84.4 | 3.2 | 12.4 | 0.7 | 12.4 | 18.1 | 46.9 | 6.3 | 1.9 | 1.3 | 31.4 | 78.1 | 0 | 12 | - | - | - |
| 12-21 | B3 | 87.0 | 3.5 | 9.5 | 0.1 | 2.7 | 10.6 | 65.9 | 7.7 | 2.2 | 1.3 | 45.7 | 79.3 | 0 | 10 | - | - | - |
| 21-41 | Cca | 88.1 | 3.2 | 8.7 | 0.1 | 0.5 | 5.4 | 70.4 | 11.7 | 1.3 | 1.9 | 57.0 | 76.4 | 0 | 9 | - | - | - |
| 41-54 | IIBb21ca | 81.1 | 6.7 | 12.2 | 2.0 | 10.3 | 18.0 | 42.4 | 8.4 | 2.9 | 3.8 | 31.6 | 72.7 | 0 | 12 | - | - | - |
| 54-62 | IIBb22 | 83.5 | 5.8 | 10.7 | 1.8 | 17.2 | 24.3 | 35.5 | 4.7 | 2.6 | 3.2 | 23.1 | 78.8 | 0 | 11 | 1 | 1 | - |
| 62-73 | IIBb23ca | 79.6 | 5.3 | 15.1 | 1.1 | 13.1 | 27.1 | 34.5 | 3.8 | 1.8 | 3.5 | 19.1 | 75.8 | 0 | 15 | - | - | - |
| 73-79+ | IIIC2 | 93.4 | 2.1 | 4.5 | 0.7 | 15.4 | 41.6 | 32.6 | 3.1 | 1.2 | 0.9 | 15.9 | 90.3 | - | - | - | - | - |

| Depth (In) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | 4A1h Oven dry | | 3B2 | Water content: 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1b Saturated Paste | 8C1a $H_2O$ 1:1 | 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | Cm | Pct. | Pct. | Pct. | in./in. | in./in. | | | |
| 0- 3 | 0.23 | 0.013 | 18 | | - | | | | | | 2.3 | | | | 8.0 | |
| 3- 5 | 0.34 | 0.017 | 20 | | - | 1.70 | 1.73 | | 1.00 | | 4.5 | 3.4 | 0.007 | 0.007 | | 7.5 | |
| 5-12 | 0.27 | | | | - | 1.63 | 1.71 | | 1.00 | | 8.5 | 5.3 | 0.016 | 0.016 | | 6.9 | |
| 12-21 | 0.21 | | | | tr. | 1.54 | 1.60 | | 1.00 | | 7.1 | 4.5 | 0.014 | 0.014 | | 7.9 | |
| 21-41 | 0.12 | | | | 3 | 1.56 | 1.60 | | 1.00 | | 6.9 | 4.0 | 0.008 | 0.008 | | 8.3 | |
| 41-54 | 0.16 | | | | 5 | 1.70 | 1.74 | | 1.00 | | 8.1 | 5.5 | 0.008 | 0.008 | | 8.4 | |
| 54-62 | 0.10 | | | | 3 | 1.70 | 1.76 | | 0.99 | | 7.4 | 4.4 | 0.013 | 0.013 | 7.9 | 8.5 | |
| 62-73 | 0.19 | | | | 4 | 1.66 | 1.81 | | 1.00 | | 9.5 | 5.3 | 0.029 | 0.029 | 7.9 | 8.5 | |
| 73-79+ | 0.06 | | | | tr. | | | | | | | 1.9 | | | 8.4 | 8.6 | |

| Depth (In) | Extractable bases: 6N2a Ca | 6O2a Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A2a NaOAc | 5A1a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0- 3 | 6.2 | 0.3 | 0.2 | 0.2 | 6.9 | | | 4.9 | | | | | | | | | |
| 3- 5 | 6.1 | 1.2 | 0.2 | 0.2 | 7.7 | | | 7.4 | | | | | | | | | |
| 5-12 | 8.9 | 1.8 | 0.3 | 0.2 | 11.2 | | | 11.3 | | | | | | | | | |
| 12-21 | 13.7 | 1.5 | 0.2 | 0.2 | 15.6 | | | 8.2 | | | | | | | | | |
| 21-41 | 17.6 | 1.9 | 0.3 | 0.2 | 20.0 | | | 7.8 | | | | | | | | | |
| 41-54 | 17.4 | 2.6 | 0.4 | 0.2 | 20.6 | | | 11.3 | | | | | | | | | |
| 54-62 | 17.9 | 2.1 | 0.5 | 0.2 | 20.7 | | | 8.3 | 1.5 | 0.6 | 2.1 | 0.1 | - | 2.3 | 0.2 | | 0.42 |
| 62-73 | 21.5 | 2.9 | 0.6 | 0.2 | 25.2 | | | 10.7 | 1.2 | 0.5 | 2.4 | tr. | - | 2.6 | 0.2 | | 0.42 |
| 73-79+ | 6.7 | 0.9 | 0.5 | 0.1 | 8.2 | | | 4.2 | 0.9 | 0.3 | 2.3 | 0.1 | - | 1.9 | 0.1 | | 0.32 |

| Depth (In.) | 8A Water at Saturation | 5D2 Exchangeable Na | 5B1b Exch. Na meq / 100g | Gypsum | 5C1 Base Sat. $NH_4OAc$ | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin. | % Kaolinite DTA |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | X-ray | | | | |
| 0- 3 | | 4 | | | 100+ | xxxx | | tr. | x | |
| 3- 5 | | 3 | | | 100+ | | | | | |
| 5-12 | | 3 | | | 99 | xxxx | | - | x | 3 |
| 12-21 | | 2 | | | 100+ | | | | | |
| 21-41 | | 4 | | | 100+ | | | | | |
| 41-54 | | 4 | | | 100+ | | | | | |
| 54-62 | 25.7 | 5 | 0.4 | | 100+ | xxxx | | | xx | 5 |
| 62-73 | 29.4 | 5 | 0.5 | | 100+ | | | | | |
| 73-79 | 25.7 | 10 | 0.4 | | 100+ | xxxx | | | xx | |

1/ From characterization sample (5 kg) except as noted.

Micromorphology

65704 Sandy skeletal fabric, thin clay skins on most grains.

65706 Sandy skeletal fabric, clay skins on grains, common clay bridges between grains.

- = looked
- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## PALMA LOAMY SAND
S65Ariz-1-10

Location: Apache County, Arizona. A pit located 1300 feet south and 30 feet west of the center of Section 4, T. 15 N., R. 29 E. Photo No. 6213. Approximately 16 miles north of St. Johns. Date of Sampling: September 22, 1965.
Collectors: M.L. Miller, K.N. Larson, J.E. Jay, R.E. Nelson, and B. Brasher.
Vegetation: Never cultivated. Grass-juniper aspect. 20 percent basal density. Blue grama, sand dropseed, Indian ricegrass, galleta, one-seeded juniper, rabbitbrush, snakeweed (Gutierrezia sarothrae). Climate: 13 inches ppt. 50°F. approximate M.A.T. Parent Material: Loamy alluvium of Tertiary age from mixed rocks. Relief: Undulating plain, convex-complex 5 percent slope facing northwest at pit site. Near crest of low ridge. Elevation: 5850 feet. Drainage: Runoff is slow to medium. This soil is well drained. Groundwater is deep. Permeability is moderate.
Remarks: Determination of pH was made with a Hellige-Truog field kit. This soil has a weak argillic horizon. Measure of free carbonate obtained by observing reaction to dilute HCl.
Classification: Ustollic Haplargid, coarse-loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65704 | 0 to 3 inches, brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) when moist; weak medium and coarse platy structure; soft to slightly hard, very friable, nonsticky and nonplastic; few fine and medium roots; few fine and medium tubular pores; noneffervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| B1<br>RSL No.<br>65705 | 3 to 5 inches, reddish brown (5YR 4/4) light sandy loam, reddish brown (5YR 4/4) when moist; weak medium and coarse subangular blocky structure; hard, friable, nonsticky and nonplastic; plentiful fine and medium roots; many fine interstitial and common fine tubular pores; noneffervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| B2t<br>RSL No.<br>65706 | 5 to 12 inches, reddish brown (5YR 4/4) sandy loam, dark reddish brown (5YR 3/4) when moist; weak coarse prismatic breaking to weak medium and coarse subangular blocky structure; hard, friable, nonsticky and slightly plastic; plentiful fine and medium roots; common fine interstitial and common fine and medium tubular pores; common thin oriented clay bridges holding mineral grains together and in pores; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B3<br>RSL No.<br>65707 | 12 to 21 inches, brown (7.5YR 5/4) light fine sandy loam, dark brown (7.5YR 4/4) when moist; massive; hard, friable, nonsticky and nonplastic; few fine, medium and coarse roots; few fine and medium tubular pores; noneffervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| Cca<br>RSL No.<br>65708 | 21 to 41 inches, light brown (7.5YR 6/4) fine sandy loam, dark brown (7.5YR 4/4) when moist, massive; slightly hard, friable, nonsticky and nonplastic; few fine, medium and coarse roots; many fine interstitial and few fine and medium tubular pores; strongly effervescent with common fine and medium distinct white (N 8/) lime filaments and veins; moderately alkaline (pH 8.0); clear smooth boundary. |
| IIBb21ca<br>RSL No.<br>65709 | 41 to 54 inches, reddish brown (5YR 5/4) light sandy clay loam, reddish brown (5YR 4/4) when moist, massive; hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular and common fine interstitial pores; strongly to violently effervescent with many fine and medium distinct white (N 8/) lime filaments and few soft lime concretions; moderately alkaline (pH 8.0); clear smooth boundary. |
| IIBb22<br>RSL No.<br>65710 | 54 to 62 inches, reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) when moist; massive; hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular and common fine interstitial pores; strongly to violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| IIBb23ca<br>RSL No.<br>65711 | 62 to 73 inches, reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) when moist, massive; hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular and common fine interstitial pores; strongly to violently effervescent with common large distinct pinkish white (5YR 8/2) lime mottles and soft masses, pink (5YR 8/4) when moist; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| IIIC2<br>RSL No.<br>65712 | 73 to 79 inches +, light brown (7.5YR 6/4) loamy sand, brown (7.5YR 5/4) when moist; massive; slightly hard, friable, nonsticky and nonplastic; many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Haplargid, fine-loamy, mixed, mesic
SOIL Clovis loamy sand SOIL Nos. S65Ariz-1-8 LOCATION Apache County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65679 - 65686

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | 3A1 (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments 1A2a: ≥ 2 (Pct) | 2 – 19 (Pct. of < 76 mm) | 19 – 76 (Pct. of < 76 mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0- 3 | A1 | 88.5 | 7.0 | 4.5 | 1.4 | 15.5 | 24.6 | 36.1 | 10.9 | 4.2 | 2.8 | 33.4 | 77.6 | 0 | 5 | - | - | - |
| 3- 8 | B1 | 79.8 | 8.6 | 11.6 | 1.3 | 11.4 | 20.4 | 34.5 | 12.2 | 6.5 | 2.1 | 37.0 | 67.6 | 0 | 12 | - | - | - |
| 8-16 | B21t | 66.1 | 6.7 | 27.2 | 1.0 | 8.8 | 18.5 | 30.3 | 7.5 | 3.1 | 3.6 | 25.5 | 58.6 | 0 | 27 | - | - | - |
| 16-24 | B22tca | 59.0 | 13.9 | 27.1 | 1.2 | 10.2 | 17.2 | 25.3 | 5.1 | 3.9 | 10.0 | 20.4 | 53.9 | 4 | 23 | - | - | - |
| 24-30 | B3ca | 48.2 | 22.9 | 28.9 | 1.3 | 8.5 | 12.4 | 21.5 | 4.5 | 6.8 | 16.1 | 21.8 | 43.7 | 9 | 20 | - | - | - |
| 30-58 | IIC1 | 88.7 | 4.4 | 6.9 | 2.2 | 18.9 | 30.0 | 32.2 | 5.4 | 1.9 | 2.5 | 20.7 | 83.3 | 0 | 7 | - | - | - |
| 58-64 | IIIC2ca | 74.1 | 10.5 | 15.4 | 1.2 | 19.0 | 28.9 | 21.4 | 3.6 | 2.8 | 7.7 | 14.2 | 70.5 | 1 | 14 | - | - | - |
| 64-76+ | IVC3 | 84.4 | 6.3 | 9.3 | 2.3 | 21.1 | 29.4 | 26.5 | 5.1 | 2.8 | 3.5 | 18.6 | 79.3 | 0 | 9 | 4 | 4 | - |

| Depth (In.) | 6A1a Organic carbon (Pct.) | 6B1a Nitrogen (Pct.) | C/N | 6C2a Ext. Iron as Fe (Pct.) | 6E1b Carbonate as $CaCO_3$ (Pct.) | Bulk density: 4A1f 1/3 bar (g/cc) | Bulk density: 4A1h Oven dry (g/cc) | (g/cc) | 3B2 Cm | Water content (Pct.) | 4B1c 1/3 bar (Pct.) | 4B2 15 bar (Pct.) | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 3 | 0.41 | 0.028 | 15 | | - | 1.75 | 1.77 | | 1.00 | | 5.0 | 2.5 | 0.004 | 0.004 | | 7.5 | |
| 3- 8 | 0.32 | 0.031 | 10 | | - | 1.68 | 1.76 | | 1.00 | | 10.0 | 4.4 | 0.017 | 0.017 | | 7.5 | |
| 8-16 | 0.52 | | | | - | 1.54 | 1.68 | | 1.00 | | 16.4 | 11.2 | 0.030 | 0.030 | | 7.4 | |
| 16-24 | 0.37 | | | | 10 | 1.50 | 1.62 | | 1.00 | | 16.4 | 10.3 | 0.027 | 0.027 | | 8.4 | |
| 24-30 | 0.41 | | | | 23 | 1.33 | 1.41 | | 1.00 | | 23.6 | 10.7 | 0.020 | 0.020 | 7.8 | 8.5 | |
| 30-58 | 0.10 | | | | 3 | 1.79 | 1.85 | | 1.00 | | 5.8 | 2.9 | 0.010 | 0.010 | 7.5 | 8.2 | |
| 58-64 | 0.13 | | | | 7 | 1.62 | 1.71 | | 1.00 | | 12.3 | 6.2 | 0.018 | 0.018 | 7.5 | 7.9 | |
| 64-76+ | 0.10 | | | | 3 | | | | | | | | | | 7.6 | 8.0 | |

| Depth (In.) | Extractable bases 6N2a Ca | 6O2a Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A2a NaOAc | 5A1a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0- 3 | 4.5 | 0.6 | 0.2 | 0.3 | 5.6 | | | 4.9 | | | | | | | | | |
| 3- 8 | 6.2 | 2.0 | 0.3 | 0.2 | 8.7 | | | 8.6 | | | | | | | | | |
| 8-16 | 13.2 | 5.4 | 0.6 | 0.5 | 19.7 | | | 20.6 | | | | | | | | | |
| 16-24 | 23.3 | 5.6 | 0.8 | 0.4 | 30.1 | | | 17.5 | | | | | | | | | |
| 24-30 | 20.9 | 5.2 | 1.1 | 0.3 | 27.5 | | | 14.7 | 1.6 | 1.0 | 4.8 | 0.1 | | - | 3.0 | 0.8 | | 0.71 |
| 30-58 | 13.2 | 1.9 | 0.7 | 0.1 | 15.9 | | | 5.2 | 18.4 | 9.4 | 13.8 | 0.3 | | - | 2.3 | 5.3 | 33.4 | 3.22 |
| 58-64 | 19.4 | 3.0 | 1.6 | 0.3 | 24.3 | | | 10.6 | 31.0 | 12.2 | 24.0 | 0.3 | | - | 1.3 | 18.9 | 48.7 | 5.16 |
| 64-76+ | 14.2 | 1.9 | 1.9 | 0.2 | 18.2 | | | 7.8 | 22.4 | 7.7 | 20.4 | 0.4 | | - | 1.4 | 17.2 | 32.3 | 4.39 |

| Depth (In.) | 8A Water at Saturation (Pct.) | 5D2 Exchangeable Na (Pct.) | 5B1b Exch. Na meq / 100g | 6F1a Gypsum (Pct.) | 5C1 Base Sat. $NH_4OAc$ (Pct.) | Clay mineralogy (<0.002 mm.) 7A: Mont. (X-ray) | Verm. (X-ray) | Mica (X-ray) | Kaolin. (X-ray) | % Kaolinite DTA |
|---|---|---|---|---|---|---|---|---|---|---|
| 0- 3 | | 4 | | | 100+ | xxx | | x | t. | |
| 3- 8 | | 3 | | | 100+ | | | | | |
| 8-16 | | 3 | | - | 96 | xxxx | | | xx | 5 |
| 16-24 | | 5 | | - | 100+ | xxxx | | | xx | |
| 24-30 | 43.5 | 7 | 1.0 | - | 100+ | | | | | |
| 30-58 | 20.7 | 12 | 0.6 | - | 100+ | | | | | |
| 58-64 | 33.0 | 8 | 0.9 | tr. | 100+ | | | | | |
| 64-76+ | 26.3 | 18 | 1.4 | - | 100+ | xxxx | | | x | 7 |

1/ From characterization sample (5 kg) except as noted.

Micromorphology

65679 Sandy skeletal fabric, thin clay skins on most grains.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## CLOVIS LOAMY SAND
S65Ariz-1-8

Location: Apache County, Arizona. A pit located 1320 feet south and 53 feet east of the center of Sec. 4, T. 15 N., R. 29 E., Photo No. 6213, approximately 16 miles north of Saint Johns. Date of Sampling: September 22, 1965.
Collectors: M.L. Miller, K.N. Larson, J.E. Jay, R.E. Nelson, B. Brasher.
Vegetation: Never cultivated. Grass with basal density of 25 percent. Blue grama, galleta, spike dropseed, rabbitbrush, snakeweed (Gutierrzia sarothrae), few scattered one-seeded juniper trees. Climate: 13 inches ppt. 50° F. approximate M.A.T. Parent Material: Loamy alluvium from mixed rocks, sands and gravels of Tertiary age. Relief: Undulating plain, concave-complex 1 percent slope facing northwest at pit site. Elevation: 5845 feet. Drainage: Runoff is slow. This soil is well drained. Groundwater is deep. Permeability is moderately slow.
Remarks: Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate obtained by observing reaction to dilute HCl. This soil has an argillic horizon.
Classification: Ustollic Haplargid, fine-loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL. No.<br>65679 | 0 to 3 inches, brown (10YR 5/3) loamy sand or sandy loam, dark brown (10YR 3/3) when moist; moderate medium and coarse platy structure; slightly hard, very friable, nonsticky and nonplastic; abundant fine and medium roots; many fine interstitial and tubular pores; noneffervescent; mildly alkaline (pH 7.5); clear smooth boundary. |
| B1<br>RSL No.<br>65680 | 3 to 8 inches, reddish brown (5YR 5/4) sandy clay loam, dark reddish brown (5YR 4/3) when moist; moderate medium and coarse subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; abundant fine and medium roots; common fine tubular and interstitial pores; noneffervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| B21t<br>RSL No.<br>65681 | 8 to 16 inches, reddish brown (5YR 5/4) sandy clay loam or clay loam, dark reddish brown (5YR 3/4) when moist; weak medium and coarse prismatic breaking to moderate medium and coarse angular and subangular blocky structure; very hard, friable, slightly sticky and plastic; plentiful fine and medium roots; common fine interstitial and tubular pores; common thin clay films on ped faces and in tubular and interstitial pores; noneffervescent; neutral (pH 7.0); gradual smooth boundary. |
| B22tca<br>RSL No.<br>65682 | 16 to 24 inches, reddish brown (5YR 5/4) sandy clay loam or clay loam, dark reddish brown (5YR 3/4) when moist, with few to common medium distinct pink (7.5YR 7/4) mottles, brown (7.5YR 5/4) when moist; weak medium and coarse prismatic breaking to moderate medium and coarse subangular and angular blocky structure; very hard, friable, slightly sticky and plastic; plentiful fine roots; common fine tubular and interstitial pores; common thin clay films on ped faces and in tubular and interstitial pores; strongly to violently effervescent; moderately alkaline (pH 8.2); gradual smooth boundary. |
| B3ca<br>RSL No.<br>65683 | 24 to 30 inches, pink (7.5YR 8/4) light clay loam, light brown (7.5YR 6/4) when moist; massive; hard, friable, slightly sticky and plastic; plentiful fine roots; common fine interstitial and tubular pores; violently effervescent, estimated 20 to 25 percent $CaCO_3$; moderately alkaline (pH 8.2); clear wavy boundary. |
| IIC1<br>RSL No.<br>65684 | 30 to 58 inches, brown (10YR 5/3) loamy sand, dark yellowish brown (10YR 4/4) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; common fine interstitial and few fine tubular pores; strongly effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. |
| IIIC2ca<br>RSL No.<br>65685 | 58 to 64 inches, light brown (7.5YR 6/4) heavy sandy loam, dark brown (7.5YR 4/4) when moist; massive; hard, friable, slightly sticky and plastic; plentiful fine and medium roots; common fine interstitial and few fine tubular pores; violently effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. |
| IVC3<br>RSL No.<br>65686 | 64 to 76 inches +, brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and medium roots; common fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.2). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVIC

SOIL FAMILY: Ustollic Haplargid, fine-loamy, mixed, mesic

SOIL Gaddes gravelly sandy loam* SOIL Nos. S65Ariz-13-8 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65225 - 65230

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand (Pct. of < 2 mm): Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | (2–0.1) | | 3A1a Non-carbonate clay | * Coarse fragments 1A2a: > 2 (Pct.) | 2 – 19 (Pct. of < 76mm) | 19 – 76 (Pct. of < 76mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-3 | A1 | 66.3 | 23.2 | 10.5 | 18.3 | 18.0 | 9.6 | 13.8 | 6.6 | 11.9 | 11.3 | 25.5 | 59.7 | | 10 | 16 | 16 | 0 |
| 3-11 | B21t | 63.7 | 20.5 | 15.8 | 26.2 | 17.1 | 6.8 | 9.2 | 4.4 | 10.8 | 9.7 | 19.9 | 59.3 | | 18 | 22 | 22 | 0 |
| 11-24 | B31t-C1 | 57.7 | 24.2 | 18.1 | 16.4 | 15.1 | 8.2 | 11.9 | 6.1 | 11.4 | 12.8 | 23.7 | 51.6 | | 16 | 41 | 41 | 0 |
| 24-36 | B32t-C2 | 52.5 | 22.8 | 24.7 | 26.9 | 12.5 | 4.2 | 5.9 | 3.0 | 10.7 | 12.1 | 16.8 | 49.5 | | 25 | 47 | 47 | 0 |
| 36-45 | B33t-C3 | 64.4 | 18.8 | 16.8 | 30.2 | 16.2 | 5.8 | 8.2 | 4.0 | 10.4 | 8.4 | 18.7 | 60.4 | | 17 | 44 | 44 | 0 |
| 45-54+ | C4 | 67.6 | 17.8 | 14.6 | 32.9 | 17.4 | 5.7 | 7.6 | 4.0 | 10.4 | 7.4 | 18.1 | 63.6 | | 15 | 45 | 45 | 0 |

| Depth (In.) | 6A1a Organic carbon (Pct.) | 6B1a Nitrogen (Pct.) | C/N | 6C2a Ext. Iron as Fe (Pct.) | 6E1b Carbonate as $CaCO_3$ (Pct) | | Bulk density: 4A1f 1/3 bar (g/cc) | 4A1h Oven dry (g/cc) | | 3B2 Cm | Water content (Pct) | 4B1c 1/3 bar (Pct.) | 4B2 15 bar (Pct.) | 4D1 Extensibility COLEF (in./in.) | 4D1 Extensibility COLE (in./in.) | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 1.42 | 0.094 | 15 | 0.8 | - | | | | | | | | 5.6 | | | 6.9 | | |
| 3-11 | 0.54 | 0.029 | 18 | 1.2 | - | | 1.53 | 1.58 | | 0.86 | | 14.5 | 7.7 | 0.010 | 0.009 | 6.4 | | |
| 11-24 | 0.22 | | | 0.8 | - | | 1.74 | 1.81 | | 0.69 | | 13.5 | 8.3 | 0.012 | 0.008 | 7.8 | | |
| 24-36 | 0.21 | | | 1.1 | - | | 1.56 | 1.67 | | 0.66 | | 20.0 | 14.5 | 0.021 | 0.014 | 7.6 | | |
| 36-45 | 0.14 | | | 0.9 | - | | 1.54 | 1.60 | | 0.69 | | 16.8 | 9.6 | 0.014 | 0.009 | 7.5 | | |
| 45-54+ | 0.16 | | | 0.7 | - | | 1.77 | 1.81 | | 0.65 | | 12.6 | 8.0 | 0.006 | 0.004 | 7.6 | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | | 6G1d KCl Ext. $Al^{+++}$ | | Atterberg limits: Plastic limit | Liquid limit | Plastic index | | | Base saturation: 5C1 $NH_4OAc$ (Pct.) | (Pct) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | | Pct. of <0.4 mm | | | | | | |
| 0-3 | 11.9 | 1.9 | 0.2 | 0.4 | 12.9 | | 14.4 | | | | | | | | | | 100+ | |
| 3-11 | 12.7 | 3.3 | 0.1 | 0.3 | 16.4 | | 18.3 | | | | | | | | | | 90 | |
| 11-24 | 17.0 | 5.1 | 0.3 | 0.3 | 22.7 | | 23.2 | | | | | | | | | | 98 | |
| 24-36 | 29.4 | 10.8 | 0.4 | 0.4 | 41.0 | | 41.3 | | | | | | | | | | 99 | |
| 36-45 | 22.0 | 8.2 | 0.4 | 0.2 | 30.8 | | 31.4 | | | | | | | | | | 98 | |
| 45-54+ | 16.9 | 5.8 | 0.4 | 0.2 | 23.3 | | 24.7 | | | | | 18 | 32 | 14 | | | 94 | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| 0-3 | xxx | - | xx | xx | |
| 3-11 | xxx | - | xx | xx | |
| 11-24 | xxxx | - | - | xx | |
| 24-36 | | | | | |
| 36-45 | xxxx | - | - | xx | |
| 45-54+ | xx | xxx | - | x | |

* Soil contains partly weathered gravel and sand, part of which can be crushed depending on the force applied. Gravel and sand, therefore, were determined by shaking overnight in a hexametaphosphate solution. Silt and clay, all chemical determinations, and 15 bar water retention were determined on crushed samples of the whole soil. All data are re-calculated to percent or meq /100 g of the <2 mm fraction.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## GADDES GRAVELLY SANDY LOAM
S65Ariz-13-8

Location: Western Yavapai County, Arizona. About 4 miles east of Dewey, Arizona on the Cherry Road, then 1/10 mile south of road. 150 feet northeast of 1/4 corner of Sec. 6, T13N, R2E. Photo #202. AMS Project 134, Lot FA. Date of Sampling: May 6, 1965.
Collectors: Flach, Alexander, Nettleton, Jay, Meurisse, Wendt.
Vegetation: Brush. Oakbrush, mountain mahogany, squawbush, snakeweed. Climate: Mean annual precipitation 12 to 14". Mean annual temperature 55°F. Soil temperature at time of sampling, 52°F. at 20" and 51° at 60". Parent Material: Weathered granite (grus) and closely related materials. Relief: Nearly level or undulating pediment surface on a 3 percent convex slope with a south aspect. Elevation: 4920 feet. Drainage: Medium runoff, moderate to moderately slowly permeable and well drained.
Remarks: Nonmodal. The dark surface is too thin for a mollic horizon but has more than 1 percent O.M. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-16.
Classification: Ustollic Haplargid, fine-loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65225 | 0 to 3 inches, brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) when moist; weak medium platy breaking to moderate fine granular structure; slightly hard, very friable, nonsticky and slightly plastic; plentiful fine and medium roots; many fine interstitial pores; 40-50 percent fine gravel; 80 percent of surface covered by fine gravel and a few cobbles; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| B21t<br>RSL No.<br>65226 | 3 to 11 inches, reddish brown (5YR 5/4) gravelly light clay, reddish brown (5YR 4/4) when moist; weak to moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and plastic; plentiful fine, medium and coarse roots; few fine tubular and many fine interstitial pores; common thin clay film on ped faces and in pores; 25-30 percent fine gravels; noneffervescent; moderately alkaline (pH 8.0); clear, wavy boundary. |
| B31t-C1*<br>RSL No.<br>65227 | 11 to 24 inches, reddish brown (5YR 5/4) very gravelly weathered granite (grus), yellowish red (5YR 5/6) when moist, with dark gray (5YR 3/1) flecks; massive; hard, friable, nonsticky and slightly plastic; few medium and coarse roots; few fine tubular and many fine interstitial pores; few thin clay films on ped faces and oriented clay as bridges; 75 percent fine and medium gravel; noneffervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| B32t-C2*<br>RSL NO.<br>65228 | 24 to 36 inches, reddish brown (5YR 5/4) very gravelly weathered granite (grus) yellowish red (5YR 4/6) when moist, with very fine dark gray (5YR 3/1) flecks; massive; very hard, friable, nonsticky and slightly plastic; few fine, medium and coarse roots; few fine and medium tubular and many fine interstitial pores; many thin clay coatings on sand grains; 75 percent fine and medium gravel; noneffervescent; moderately alkaline (pH 8.0); clear, smooth boundary. |
| B33t-C3<br>RSL No.<br>65229 | 36 to 45 inches, reddish brown (5YR 5/4) very gravelly weathered granite (grus) yellowish red (5YR 4/6) when moist with very fine dark gray (5YR 3/1) flecks; massive; very hard, friable, nonsticky and slightly plastic; few fine medium and coarse roots; few fine and medium tubular and many fine interstitial pores; many thin clay coatings on sand grains; 75 percent fine and medium gravel; noneffervescent; neutral (pH 7.3); clear, smooth boundary. |
| C4*<br>RSL No.<br>65230 | 45 to 54 inches plus, reddish brown (5YR 5/4) weathered granite (grus), yellowish red (5YR 4/6) when moist with very fine dark gray (5YR 3/1) flecks; massive; very hard, friable; few fine, medium and coarse roots; many fine interstitial pores; many thin clay coatings on sand grains; noneffervescent; neutral (pH 7.0). |

* Sampled for BPR. B32t-C2 and B33t-C3 horizons were combined in sample for BPR.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Haplargid, fine-loamy, mixed, mesic

SOIL Showlow gravelly loam (taxadjunct) SOIL Nos. S65Ariz-13-12 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65269 - 65275

| Depth (In.) | Horizon | 1B1b Total Sand (2-0 05) | Total Silt (0.05-0 002) | Total Clay (< 0 002) | Sand Very coarse (2-1) | Sand Coarse (1-0.5) | Sand Medium (0.5-0.25) | Sand Fine (0.25-0.1) | Sand Very fine (0.1-0.05) | Silt 0.05-0.02 | Silt Int III (0.02-0 002) | Int. II (0.2-0.02) | (2-0 1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments LA2a >= 2 | 2 - 19 | 19 - 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0-2 | A1 | 59.2 | 22.6 | 18.2 | 7.9 | 12.4 | 9.5 | 18.9 | 10.5 | 13.6 | 9.0 | 34.2 | 49.7 | 0 | 18 | 39 | 16 | 23 |
| 2-6 | B1t | 48.8 | 20.5 | 30.7 | 5.1 | 9.1 | 9.0 | 16.8 | 8.8 | 12.1 | 8.4 | 30.0 | 40.0 | 0 | 31 | **39 | **8 | t*31 |
| 6-15 | B21t | 49.4 | 13.9 | 36.7 | 10.0 | 8.9 | 6.4 | 15.0 | 9.1 | 6.4 | 7.5 | 24.0 | 40.3 | 0 | 37 | 40 | 24 | 16 |
| 15-23 | B22t | 60.7 | 13.4 | 25.9 | 15.3 | 12.3 | 7.6 | 16.2 | 9.3 | 6.0 | 7.4 | 24.5 | 51.4 | 0 | 26 | 29 | 29 | 0 |
| 23-41 | B3t | 63.1 | 16.0 | 20.9 | 13.5 | 13.2 | 8.4 | 17.8 | 10.2 | 6.1 | 9.9 | 26.4 | 52.9 | 0 | 21 | 37 | 25 | 12 |
| 41-63 | C1 | 64.3 | 16.8 | 18.9 | 14.7 | 14.3 | 8.5 | 16.8 | 10.0 | 5.9 | 10.9 | 25.5 | 54.3 | 0 | 19 | 38 | 35 | 3 |
| 63-74+ | C2ca | 67.2 | 15.3 | 17.5 | 13.1 | 13.5 | 8.5 | 19.6 | 12.5 | 6.3 | 9.0 | 30.0 | 54.7 | 0 | 18 | 47 | 38 | 9 |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density 4A1f 1/3 bar | Bulk density 4A1h Oven dry | | 3B2 | Water content | Water content 4B1c 1/3 bar | Water content 4B2 15 bar | 4D1 Extensibility COLE | 4D1 Extensibility COLE | pH 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | Cm | Pct. | Pct. | Pct. | in./in. | in./in. | | | |
| 0-2 | 1.65 | 0.112 | 15 | 0.9 | - | 1.52 | 1.56 | | 0.73 | | 12.8 | 8.1 | 0.008 | 0.006 | 6.9 | | |
| 2-6 | 1.08 | 0.087 | 12 | 1.2 | - | 1.45 | 1.61 | | 0.74 | | 18.9 | 12.7 | 0.036 | 0.026 | 6.7 | | |
| 6-15 | 0.42 | 0.039 | 11 | 1.2 | - | 1.41 | 1.61 | | 0.74 | | 24.4 | 16.2 | 0.047 | 0.034 | 6.4 | | |
| 15-23 | 0.18 | | | 1.0 | - | 1.53 | 1.73 | | 0.81 | | 23.5 | 12.8 | 0.041 | 0.033 | 6.8 | | |
| 23-41 | 0.06 | | | 0.8 | - | 1.52 | 1.68 | | 0.75 | | 22.5 | 11.9 | 0.033 | 0.024 | 7.5 | | |
| 41-63 | 0.03 | | | 0.7 | 1 | 1.55 | 1.69 | | 0.74 | | 18.8 | 11.5 | 0.029 | 0.021 | 8.2 | | |
| 63-74+ | 0.03 | | | 0.7 | tr | 1.61 | 1.68 | | 0.65 | | 14.9 | 10.2 | 0.014 | 0.009 | 8.1 | | |

| Depth (In.) | Extractable bases 5B1a 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | 5A3a Sum | CEC clay | 6G1d KCl Ext. $Al^{+++}$ | Base saturation 5C1 $NH_4OAc$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | Pct. | Pct |
| 0-2 | 10.2 | 3.6 | 0.1 | 0.5 | 14.4 | | 15.9 | | 87 | | 91 | |
| 2-6 | 15.4 | 6.7 | 0.2 | 0.6 | 22.9 | | 25.5 | | 83 | | 90 | |
| 6-15 | 20.2 | 9.6 | 0.3 | 0.4 | 30.5 | | 33.8 | | 65 | | 90 | |
| 15-23 | 16.8 | 8.7 | 0.6 | 0.3 | 26.4 | | 28.6 | | 110 | | 92 | |
| 23-41 | 14.8 | 8.1 | 1.2 | 0.3 | 24.4 | | 25.8 | | 123 | | 94 | |
| 41-63 | 21.2 | 7.7 | 2.4 | 0.2 | 31.5 | | 23.9 | | 126 | | 100+ | |
| 63-74+ | 16.2 | 6.5 | 2.4 | 0.4 | 25.5 | | 20.5 | | 156 | | 100+ | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |
| 0-2 | xxx | | xx | x |
| 2-6 | | | | |
| 6-15 | xxxx | | t | x |
| 15-23 | | | | |
| 23-41 | | | | |
| 41-63 | xxxx | | x | - |
| 63-74+ | | | | |

* Values from characterization sample (5Kg)(except as noted).
** 2-19 mm from characterization sample, 19-76 mm from field weight (>50 Kg).

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## SHOWLOW GRAVELLY LOAM (taxadjunct) 1/
S65Ariz-13-12

Location: Western Yavapai County Area, Arizona. About 1½ miles south of the junction of the Rancho Moana and Williamson Valley roads on the county road between Skull Valley and Williamson Valley, then 300 feet west. NE¼ Sec. 14, T15N, R4W. Photo EGE 22-156. Date of Sampling: May 7, 1965.
Collectors: Flach, Nettleton, Jay, Meurisse, Winkelaar, Wiesner, Wendt
Vegetation: Brush - grass. Oakbrush, algerita, squawbush, tree oak, blue grama and sideoats grama. Climate: Mean annual precipitation 14-16". Mean annual temperature 55°F. Soil temperature at the time of sampling was 62°F. at 20" and 57°F. at 60". Parent Material: Mixed alluvium from granite, quartz, and some basalt. Relief: Midslope on a strongly sloping alluvial fan, on a 16 percent convex, east facing slope. Elevation: 4825 feet. Drainage: Medium runoff, moderately slowly permeable and well drained.
Remarks: This soil is formed in old alluvium, dominantly from granite and schist with some basalt, under a chaparral-type vegetation. It occurs on gently to steeply sloping alluvial fans at elevations of 4000 to 6000 feet. Hellige-Truog field kit was used to determine pH. Paired samples are S65 Ariz-13-9 and S65 Ariz-13-18.
Classification: Ustollic Haplargid, fine-loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65269 | 0 to 2 inches, dark grayish brown (10YR 4/2) gravelly loam, dark brown (7.5YR 3/2) when moist; moderate fine granular structure; slightly hard, friable, slightly sticky and plastic; abundant fine and medium roots; many interstitial pores; 40 percent gravels with a few cobbles on surface; noneffervescent; neutral (pH 7.0); clear, smooth boundary. |
| B1t<br>RSL No.<br>65270 | 2 to 6 inches, brown (7.5YR 4/2) heavy clay loam, dark brown (7.5YR 3/2) when moist; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and very plastic; plentiful fine roots; few fine tubular and many fine interstitial pores; few thin clay films on ped faces and in pores; common fine gravels (5 percent); noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B21t*<br>RSL No.<br>65271 | 6 to 15 inches, brown (7.5YR 4/4) clay, yellowish red (5YR 4/6) when moist; moderate, medium, subangular blocky structure; hard, firm, sticky and very plastic; few fine and medium roots; few fine tubular and many interstitial pores; common thin clay films on ped faces and in pores; common fine gravels(5-10 percent); noneffervescent; neutral (pH 7.0); gradual smooth boundary. |
| B22t<br>RSL No.<br>65272 | 15 to 23 inches, brown (7.5YR 4/4) finely gravelly clay, yellowish red (5YR 5/6) when moist; massive; very hard, firm, sticky and plastic; few fine and medium roots; few fine tubular and many fine interstitial pores; common moderately thick clay films on ped faces and in pores; 20 percent fine gravel; noneffervescent; neutral (pH 7.0); gradual smooth boundary. |
| B3t<br>RSL No.<br>65273 | 23 to 41 inches, pink (7.5YR 7/4) sandy clay loam, yellowish red (5YR 5/6) when moist; massive; very hard, firm, sticky and slightly plastic; few fine and medium roots; few fine tubular and many fine interstitial pores; few moderately thick clay film on ped faces and in pores; noneffervescent; mildly alkaline (pH 7.8); clear smooth boundary. |
| C1*<br>RSL No.<br>65274 | 41 to 63 inches, light brown (7.5YR 6/4) heavy sandy loam; yellowish red (5YR 5/6) when moist; massive; very hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few fine tubular and many fine interstitial pores; noneffervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C2ca<br>RSL No.<br>65275 | 63 to 74 inches plus, light brown (7.5YR 6/4) heavy sandy loam, yellowish red (5YR 5/6) when moist; massive; hard, firm, slightly sticky and slightly plastic; many interstitial and very few fine tubular pores; few oriented clay as bridges; noneffervescent to strongly effervescent; moderately alkaline (pH 8.0). |

* Sampled for BPR. B21t and B22t combined for BPR sample.
C1 and C2ca combined for BPR sample.

1/ The Showlow series is in a fine, montmorillonitic, mesic family of Ustollic Haplargids. This pedon has less than 35 percent clay.

CONSECUTIVE PEDON NUMBER C 68134 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CARALAMPI TAXADJUNCT SOIL NO. S68 ARIZ. 12- 6 SAMPLE NO. 8 989-8 990 E.PIMA-SANTA CRU AREA

SOIL FAMILY: USTOLLIC HAPLARGID FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION | | | SANDS | | | | SILTS | | CLAYS | | | 1A2A INT. | COARSE FRAGMENTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | II .2-.02 | PCT. OF WHOLE SOIL | I 75-20 PCT. | II 20-5 OF LT 75 | III 5-2 |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 8 989 | 0- 38 | A | 59.8 | 18.5 | 21.7 | 8.5 | 15.7 | 9.8 | 16.0 | 9.8 | 6.3 | 12.2 | | | | 25.4 | 45* | 13 | 9 | 21 |
| 8 990 | 5- 56 | B T | 54.8 | 14.1 | 31.1 | 16.5 | 14.3 | 9.2 | 11.2 | 3.6 | 6.8 | 7.3 | | | | 15.4 | 35A | 8 | 12 | 15 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT. | | NO.40 GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 8 989 | 0- 38 | 1.47 | 0.116 | | | | | | | | | 1.13 | | | 0.74 | | | 13.0 | | |
| 8 990 | 5- 56 | | | | | | | | | | | 1.35 | | | 0.77 | | | 13.0 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 8 989 | 0- 38 | | | | | | | | | | | | | | | |
| 8 990 | 5- 56 | 12.3 | 11.7 | 0.1 | 0.6 | 24.7 | | | 24.7 | 22.2 | 100+ | | 100+ | | 6.2 | 5.7 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY DTA 7A2E I | 7A2E II | 7A2E III | 7A2E IV | 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 989 | 0- 38 | | | | | | | | | | | 1 TRACE |
| 8 990 | 5- 56 | MT 4 | MI 3 | KK 2 | | | | | | | MT MONTMORT | 2 SMALL |
| | | | | | | | | | | | MI MICA | 3 MODERATE |
| | | | | | | | | | | | KK KAOLINIT | 4 ABUNDANT |
| | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.
A=STANDARD PREPARATION.

Santa Cruz County Area

CARALAMPI VERY GRAVELLY LOAM (taxadjunct) 1/
S68 Ariz-12-6-1 through 6

Location: Santa Cruz County, Arizona, 10 miles northeast of Nogales and 1.3 mile northwest of Highway 82 on Lake Patagonia road in road cut. Approximately 500 feet north and 600 feet west of southeast corner, Sec. 31, T22S, R15E. Photo AMS-670. Date of Sampling: October 11, 1968.
Description by: Richardson and Havens. Collectors: Nettleton and Brasher.
Classification: Ustollic Haplargid, fine-loamy, mixed, thermic.
Vegetation: Grassland-minor brush. Brush: Few guajillo, mimosa, ocotillo and cacti. Grass: Purple grama, sideoats grama, curly mesquite, wolftail and three-awn. Climate: Mean annual temperature 62°F. Mean annual precipitation 14-15 inches. Parent Material: Mixed old alluvium from andesite, dacite and related tuffs plus some granite rocks. Topography: Moderately steep dissected old fan. 25 percent slope, north aspect. Elevation: 4200 feet. Drainage: Well drained. Soil Moisture: Moist.
Remarks: Composite samples only.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-5 cm) |
| A1 | 0 to 2 inches, dark brown (10YR 4/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine interstitial pores; noneffervescent; medium acid (pH 6.0); abrupt wavy boundary. |
| B1t (5-15 cm) | 2 to 6 inches, reddish brown (5YR 4/4) very gravelly clay loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; many fine and very fine roots; common fine interstitial pores; common thin clay films on ped faces; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| B21t (15-25 cm) | 6 to 10 inches, reddish brown (2.5YR 4/4) very gravelly clay loam, dark reddish brown (2.5YR 3/4) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; common fine and medium roots; common fine interstitial pores; common thin clay films on ped faces; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| B22t (25-56 cm) | 10 to 22 inches, reddish brown (2.5YR 4/4) heavy clay loam, dark red (2.5YR 3/6) moist; weak medium and coarse subangular blocky structure; hard, friable, sticky and plastic; common fine roots; common fine interstitial pores; common thin clay films on ped faces and in pores; 35 percent gravel; noneffervescent; neutral (pH 7.0); abrupt smooth boundary. |
| B3 (56-99 cm) | 22 to 39 inches, light reddish brown (5YR 6/4) and yellowish red (5YR 4/6) very gravelly sandy clay loam, yellowish red (5YR 5/6) and (4/6) moist; massive; hard, friable, slightly sticky and plastic; few fine and medium roots; common fine interstitial pores; noneffervescent; neutral (pH 7.0); abrupt wavy boundary. |
| C (99-137 cm) | 39 to 54 inches, mottled reddish yellow (5YR 7/6), yellowish red (5YR 5/6) and (4/6) very gravelly sandy loam, yellowish red (5YR 5/6) and (4/6) moist; massive; very hard, friable, slightly sticky and slightly plastic; few very fine roots; slightly effervescent under rock; moderately alkaline (pH 8.0). |

Composite A
RSL 68989 — 0 to 15 inches, sample collected from road cut. (0-38 cm)

Composite B (5-56 cm)
RSL 68990 — 2 to 22 inches, sample of the upper 20 inches of the argillic horizon from the road cut.

1/ The Caralampi series is in a loamy-skeletal, mixed, thermic family of Ustollic Haplargids. This pedon has less than 35 percent coarse fragments by volume in its control section.

CONSECUTIVE PEDON NUMBER C 68135 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CARALAMPI TAXADJUNCT SOIL NO. S68 ARIZ. 12- 7 SAMPLE NO. 8 991-8 992 E.PIMA-SANTA CRU AREA

SOIL FAMILY: USTOLLIC HAPLARGID FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SANDS SILTS CLAYS | | | | | | | | | | | | | 1A2A INT. | COARSE FRAGMENTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | .2- .02 | PCT. OF WHOLE SOIL | I 75+ 20 | II 20-5 | III 5-2 |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 8 991 | 0- 38 | A | 61.0 | 25.3 | 13.7 | 12.5 | 11.2 | 6.4 | 17.0 | 13.9 | 10.5 | 14.8 | | | | 35.5 | 40* | 7 | 14 | 16 |
| 8 992 | 10- 61 | B T | 58.4 | 12.9 | 28.7 | 15.6 | 15.3 | 10.7 | 13.1 | 3.7 | 5.2 | 7.7 | | | | 14.8 | 41* | 22 | 10 | 7 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT EXT FE 6C2B | AL 6G7A | PYROP EXT FE 6C5A | AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT.NO.40 | | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 8 991 | 0- 38 | 1.36 | 0.107 | | | | | | | | | 1.13 | | 0.78 | | | | 15.3 | | |
| 8 992 | 10- 61 | | | | | | | | | | | 1.35 | | 0.74 | | | | 14.1 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA- CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 8 991 | 0- 38 | | | | | | | | | | | | | | | |
| 8 992 | 10- 61 | 10.8 | 7.8 | 0.1 | 0.5 | 19.2 | | | 19.2 | 19.2 | 100+ | | 100+ | | 6.4 | 5.9 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2F II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2F III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 991 | 0- 38 | | | | | | | | | | | 1 TRACE |
| 8 992 | 10- 61 | MT 4 MI 2 KK 1 | | | | | | | | | MT MONTMORT | 2 SMALL |
| | | | | | | | | | | | MI MICA | 3 MODERATE |
| | | | | | | | | | | | KK KAOLINIT | 4 ABUNDANT |
| | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.

CARALAMPI GRAVELLY LOAM (taxadjunct) 1/
S68 Ariz-12-7-1 through 5

Location: Santa Cruz County, Arizona, about 10 miles northeast of Nogales on road to Lake Patagonia. 1.6 miles northwest of Highway 82 and 800 feet east of cattle guard at bottom of hill. About 500 feet north, 1100 feet west of SE corner Section 31, T22S, R15E. Photo AMS-670. Date of Sampling: October 11, 1968.
Description by: Richardson and Havens. Collectors: Nettleton and Brasher.
Classification: Ustollic Haplargid, fine-loamy, mixed, thermic.
Vegetation: Grass - scattered brush. Grass: Curly mesquite, sideoats grama, three-awn, tanglehead, Indian wheat, wolftail. Brush: Guajillo, mimosa, few mesquite.
Climate: Mean annual temperature 62°F. Mean annual precipitation 14-15 inches.
Parent Material: Old alluvium from andesite, dacite, granite and tuff. Topography: Dissected old fan. 25 percent slope. North aspect. Elevation: 4100 feet. Drainage: Well drained. Medium runoff. Soil Moisture: Moist.
Remarks: Composite samples only. No effervescence in profile could be found to 12 feet.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-10 cm) |
| A1 | 0 to 4 inches, dark brown (7.5YR 4/2) gravelly loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine interstitial pores; 40 percent coarse fragments; noneffervescent; slightly acid (pH 6.5); abrupt wavy boundary. |
| B1t (10-28 cm) | 4 to 11 inches, reddish brown (5YR 4/4) gravelly sandy clay loam or gravelly clay loam, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky breaking to moderate fine granular structure; slightly hard, friable, sticky and plastic; many very fine and fine roots; common fine and very fine tubular and common fine interstitial pores; few thin clay films on ped faces and in pores; 35 percent coarse fragments; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| B2t (28-56 cm) | 11 to 22 inches, reddish brown (5YR 4/4) gravelly sandy clay loam, dark reddish brown (5YR 3/4) moist; weak fine and medium subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; common fine and very fine tubular pores; few thin clay films on ped faces and in pores; 45-50 coarse fragments; noneffervescent; neutral (pH 7.0); abrupt wavy boundary. |
| B3t (56-94 cm) | 22 to 37 inches, light reddish brown (5YR 6/3 and 6/4) very gravelly sandy clay loam, reddish brown (5YR 4/3 and 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; common thin clay films in pores and pressure faces adjacent to gravel; 50-60 percent coarse fragments; noneffervescent; neutral to mildly alkaline (pH 7.0 to 7.5); abrupt wavy boundary. |
| C (94-183 cm) | 37 to 72 inches plus, brown (7.5YR 5/4) and strong brown (7.5YR 5/6) stratified gravelly to very gravelly sandy loam and sandy clay loam, dark brown (7.5YR 4/4) and yellowish red (5YR 4/6) moist; massive; hard, friable, nonsticky and slightly plastic in places; few fine and very fine roots; 40-60 percent coarse fragments; noneffervescent; mildly alkaline (pH 7.5). |
| Composite A RSL 68991 | 0 to 15 inches, sample collected from a road cut. (0-38 cm) |
| Composite B RSL 68992 | 4 to 24 inches, sample of upper 20 inches of the Argillic horizon collected from the road cut. (10-61 cm) |

1/ The Caralampi series is in a loamy-skeletal, mixed, thermic family of Ustollic Haplargids. This pedon has less than 35 percent coarse fragments by volume in its control section.

CONSECUTIVE PEDON NUMBER C 68136 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CARALAMPI TAXADJUNCT SOIL NO. S68 ARIZ. 12- 8 SAMPLE NO. 8 993-8 994 E.PIMA-SANTA CRU AREA

SOIL FAMILY: USTOLLIC HAPLARGID FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| | | | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 | | | | | | | | | | | | 1A2A | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TOTAL FRACTION | | | SANDS | | | | SILTS | | | CLAYS | | | INT. | COARSE FRAGMENTS | |
| SAMPLE NO. | DEPTH CM. | HORZ. | SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | II PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 PCT. OF | III 5-2 LT 75 |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | |
| 8 993 | 0- 38 | A | 47.5 | 28.5 | 24.0 | 3.1 | 4.0 | 3.8 | 19.0 | 17.6 | 11.0 | 17.5 | | | | 41.8 | 37* | 18 | 7 | 8 |
| 8 994 | 3- 53 | B T | 58.0 | 19.6 | 22.4 | 19.4 | 15.9 | 7.3 | 10.3 | 5.1 | 7.3 | 12.3 | | | | 17.2 | 30* | 9 | 8 | 9 |

| | | ORG.MATTER | | CARBONATE | SESQUIOXIDES | | | | ATTERBERG | | | BULK DENSITY | | CM | WATER CONTENT | | | EXTNSBLTY | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NO. | DEPTH CM. | CAR- BON 6A1A | NITRO GEN 6B1A | AS CACO3 LT 2 6E1B | 2-20 6E1B | DI-CIT EXT FE 6C2B | AL 6G7A | PYROP EXT FE 6C5A | AL 6G5A | LL 4F1 | PL 4F2 | I 4A1F | M I T 4A1F | EST. 1/3 BAR 4A1H | DRY 3B2 | 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | LEF 4D1 | LE 4D1 |
| | | -PERCENT- | | -PERCENT- | | ------PERCENT------- | | | | PCT. NO.40 | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT- | |
| 8 993 | 0- 38 | 0.86 | 0.070 | | | | | | | | | 1.13 | | 0.80 | | | | 16.2 | | |
| 8 994 | 3- 53 | | | | | | | | | | | 1.35 | | 0.82 | | | | 14.9 | | |

| | | --EXTRACTABLE BASES---- | | | | | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | --C E C-- SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | -----PH------ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NO. | DEPTH CM. | CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | | | | | | | | NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA- CL2 8C1E |
| | | MEQ/100G | | | | | | | | | ----PERCENT---- | | | | | |
| 8 993 | 0- 38 | | | | | | | | | | | | | | | |
| 8 994 | 3- 53 | 24.8 | 15.6 | 0.1 | 0.4 | 40.9 | | | 40.9 | 38.8 | 100+ | | 100+ | | 6.6 | 6.2 |

| | | CLAY MINERALOGY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
| 8 993 | 0- 38 | | | | | | | | | | | 1 TRACE |
| 8 994 | 3- 53 | MT 4 | MI 3 | KK 2 | | | | | | | MT MONTMORT | 2 SMALL |
| | | | | | | | | | | | MI MICA | 3 MODERATE |
| | | | | | | | | | | | KK KAOLINIT | 4 ABUNDANT |
| | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.

Santa Cruz County Area

## CARALAMPI GRAVELLY LIGHT SANDY CLAY LOAM (taxadjunct) 1/
S68 Ariz-12-8-1 through 4

Location: Santa Cruz County, Arizona, approximately 3 miles north of Patagonia in NW¼ NE¼ Section 25, T21S, R15E. Date of Sampling: October 11, 1968.
Description by: Havens and Richardson Collectors: Nettleton and Brasher.
Classification: Ustollic Haplargid, fine-loamy, mixed, thermic.

Vegetation: Mostly grass - minor brush. Grass: Curly mesquite, sideoats grama, purple grama, slender grama, canebeard grass, tanglehead, three-awn. Brush: Few mesquite, guajillo, few agave. Climate: Mean annual temperature 62°F. Mean annual precipitation 16 inches. Parent Material: Old alluvium from granite, andesite and rhyolite - high in tuff and volcanic ash. Topography: Old alluvial fan. 25 percent slope. South aspect. Elevation: 4500 feet. Drainage: Well drained. Soil Moisture: Moist.
Remarks: Composite samples only.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-3 cm) |
| A1 | 0 to 1 inch, brown (7.5YR 5/2) gravelly light sandy clay loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine interstitial pores; neutral (pH 7.0) abrupt smooth boundary. |
| B21t (3-28 cm) | 1 to 11 inches, reddish brown (5YR 5/4) gravelly sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine and fine roots; common very fine interstitial and few fine tubular pores; common thin clay films on ped faces; 30 percent gravel; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| B22t (28-58 cm) | 11 to 23 inches, reddish brown (5YR 5/4) gravelly sandy clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; many very fine and medium roots; few very fine and fine tubular pores; few thin clay films on ped faces and in pores; 40 percent gravel; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| C1 (58-114 cm) | 23 to 45 inches, light brown (7.5YR 6/4) very gravelly sandy clay loam, brown (7.5YR 5/4) moist; massive; very hard, firm, sticky and plastic; common very fine tubular pores; 45 percent coarse fragments; noneffervescent; mildly alkaline (pH 7.5). |
| Composite A RSL 68993 | 0 to 15 inches, sample collected from road cut. (0-38 cm) |
| Composite B 68994 | 1 to 21 inches, sample upper 20 inches of the argillic horizon from the road cut. (3-53 cm) |

1/ The Caralampi series is in a loamy-skeletal, mixed, thermic family of Ustollic Haplargids. This pedon has less than 35 percent coarse fragments by volume in its control section.

CONSECUTIVE PEDON NUMBER C 69154 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES FORREST TAXADJUNCT SOIL NO. S69 ARIZ. 2- 8 SAMPLE NO. 9 798-9 807 WILLCOX AREA

SOIL FAMILY: USTOLLIC HAPLARGID,FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE 20 | I 75-SOIL | II 20-5 PCT. OF | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 9 798 | 0- 5 | A11 | 53.3 | 34.2 | 12.5 | 7.8 | 13.2 | 8.0 | 13.6 | 10.7 | 15.1 | 19.1 | | | | 33.5 | 39A | -- | 37 | 2 |
| 9 799 | 5- 10 | A12 | 49.7 | 32.0 | 18.3 | 8.2 | 17.0 | 7.2 | 10.1 | 7.2 | 13.8 | 18.2 | | | | 27.0 | 5A | — | 1 | 4 |
| 9 800 | 10- 28 | B1 T | 38.9 | 26.0 | 35.1 | 8.0 | 11.0 | 4.9 | 8.6 | 6.4 | 10.0 | 16.0 | | | | 21.3 | 4A | — | 1 | 3 |
| 9 801 | 28- 41 | B21T | 36.3 | 28.1 | 35.6 | 6.9 | 8.3 | 4.6 | 9.4 | 7.1 | 12.5 | 15.6 | | | | 25.2 | 6A | -- | 1 | 5 |
| 9 802 | 41- 51 | B22T | 49.1 | 23.8 | 27.1 | 15.3 | 13.0 | 5.7 | 8.8 | 6.3 | 10.6 | 13.2 | | | | 22.0 | 6A | — | 1 | 5 |
| 9 803 | 51- 74 | B23T | 37.1 | 22.7 | 40.2 | 10.0 | 9.2 | 4.1 | 7.6 | 6.2 | 10.6 | 12.1 | | | | 21.2 | 7A | -- | TR | 7 |
| 9 804 | 74- 89 | C 1CA | 28.3 | 44.8 | 26.9 | 5.4 | 7.4 | 3.3 | 6.2 | 6.0 | 12.0 | 32.8 | | | 7 | 21.6 | 5A | -- | TR | 5 |
| 9 805 | 89-125 | C 2CA | 32.6 | 46.5 | 20.9 | 5.9 | 5.8 | 3.6 | 8.6 | 8.7 | 16.3 | 30.2 | | | 7 | 30.3 | 2A | — | TR | 2 |
| 9 806 | 125-150 | C 3CA | 45.0 | 39.0 | 16.0 | 8.7 | 7.6 | 5.1 | 11.7 | 11.9 | 20.7 | 18.3 | | | | 39.6 | 23A | 11 | 10 | 2 |
| 9 807 | 0- 38 | A1 | 21.1 | 50.2 | 28.7 | 1.0 | 2.6 | 2.3 | 8.7 | 6.5 | 16.2 | 34.0 | | | 10 | 28.4 | 3A | -- | -- | 3 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1H | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 9 798 | 0- 5 | 0.78 | 0.073 | TR | | 0.6 | 21 | 17 | | 1.45 | 1.52 | 0.74 | | 13.7 | 6.1 | 1.6 | 1.2 | 6.4 | | 6.2 |
| 9 799 | 5- 10 | 0.51 | 0.047 | | | 0.7 | | | | 1.55 | 1.64 | 0.97 | | 14.9 | 7.0 | 1.9 | 1.8 | 6.3 | | 6.0 |
| 9 800 | 10- 28 | 0.58 | 0.062 | | | 1.0 | | | | 1.42 | 1.65 | 0.98 | | 23.1 | 12.6 | 5.1 | 5.0 | 6.6 | | 6.4 |
| 9 801 | 28- 41 | 0.58 | 0.053 | | | 0.9 | 45 | 21 | | 1.59 | 1.81 | 0.96 | | 20.0 | 12.6 | 4.4 | 4.3 | 7.2 | | 7.0 |
| 9 802 | 41- 51 | 0.39 | | | | 0.9 | | | | 1.60 | 1.78 | 0.96 | | 17.6 | 10.2 | 3.6 | 3.5 | 7.3 | | 7.1 |
| 9 803 | 51- 74 | 0.33 | | 2 | | 1.1 | 52 | 22 | | 1.44 | 1.71 | 0.96 | | 27.8 | 14.2 | 5.9 | 5.6 | 7.7 | | 7.6 |
| 9 804 | 74- 89 | | | 33 | | 0.4 | 33 | 17 | | 1.49 | 1.62 | 0.97 | | 18.2 | 9.4 | 2.8 | 2.7 | 7.7 | | 7.8 |
| 9 805 | 89-125 | | | 30 | | 0.4 | | | | 1.65 | 1.76 | 0.98 | | 16.7 | 7.2 | 2.2 | 2.1 | 7.8 | | 7.8 |
| 9 806 | 125-150 | | | 18 | | 0.4 | | | | 1.67 | 1.78 | 0.84 | | 14.4 | 6.4 | 2.1 | 1.8 | 7.9 | 9.0 | 7.9 |
| 9 807 | 0- 38 | | | | | 0.8 | | | 1.50 | | | 0.99 | | | 11.2 | | | 6.8 | | 6.8 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6NZE | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | | |
| 9 798 | 0- 5 | | | 0.3 | 1.7 | 2.0 | | | 11.7 | | | | | | | | | | | |
| 9 799 | 5- 10 | | | 0.3 | 1.3 | 1.6 | | | 13.4 | | | | | | | | | | | |
| 9 800 | 10- 28 | | | 0.2 | 1.5 | 1.7 | | | 22.9 | | | | | | | | | | | |
| 9 801 | 28- 41 | | | 0.5 | 1.2 | 1.7 | | | 22.8 | | | | | | | | | | | |
| 9 802 | 41- 51 | | | 0.5 | 0.9 | 1.4 | | | 17.7 | | | | | | | | | | | |
| 9 803 | 51- 74 | | | 0.9 | 1.2 | 2.1 | | | 22.3 | | | | | | | | | | | |
| 9 804 | 74- 89 | | | 1.1 | 0.5 | 1.6 | | | 13.9 | | | | | | | | | | | |
| 9 805 | 89-125 | | | 1.2 | 0.4 | 1.6 | | | 10.9 | | | | | | | | | | | |
| 9 806 | 125-150 | | | 1.3 | 0.3 | 1.6 | | | 9.6 | 1.08 | 1.5 | 1.3 | 10.0 | 0.1 | | 2.3 | 5.2 | | | 8.0 |
| 9 807 | 0- 38 | | | 0.4 | 1.5 | 1.9 | | | 19.6 | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A SAT. PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | -GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 798 | 0- 5 | | 0.3 | 3 | | | | MI 3 | MT 2 | KK 2 | | | | |
| 9 799 | 5- 10 | | 0.3 | 2 | | | | MI 4 | MT 2 | KK 2 | | | | |
| 9 800 | 10- 28 | | 0.2 | 1 | | | | | | | | | | |
| 9 801 | 28- 41 | | 0.5 | 2 | | | | MI 4 | KK 3 | MT 2 | | | | |
| 9 802 | 41- 51 | | 0.5 | 3 | | | | | | | | | | |
| 9 803 | 51- 74 | | 0.9 | 4 | | | | MI 4 | KK 3 | | | | | |
| 9 804 | 74- 89 | | 1.1 | 8 | | | | MT 4 | MI 2 | KK 2 | | | | |
| 9 805 | 89-125 | | 1.2 | 11 | | | | | | | | | | |
| 9 806 | 125-150 | 34.7 | 1.0 | 10 | 8 | | | | | | | | | |
| 9 807 | 0- 38 | | 0.4 | 2 | | | | | | | | | | |

MINERAL CODE: MI MICA, MT MONTMORT, KK KAOLINIT

RELATIVE AMOUNT: 1 TRACE, 2 SMALL, 3 MODERATE, 4 ABUNDANT, 5 DOMINANT, 6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

FORREST LOAM (taxadjunct) 1/
S69Ariz-2-8

Location: Cochise County, Arizona. 1,200 feet north and 1,200 feet west of the southeast corner of Sec. 13, T. 17 S., R. 24 E. West of U. S. Highway 666, about 3½ miles north and 3/4 mile west of Pearce. Date of sampling: October 15, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Ustollic Haplargid, fine-loamy, mixed, thermic.
Vegetation: Blue grama, tobosa, three-awn, burroweed and scattered yucca. Use: Livestock range. Now in subdivision area for homesites. Climate: Precipitation is about 12 to 13 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Alluvium, principally from rhyolite, andesite, granite, quartzite and limestone. Topography: Slightly convex to smooth, nearly level to gently sloping valley plains and old fans. Slope, 0.5 percent, northeast facing. Elevation: 4320 feet. Drainage: Well drained. Runoff is medium to slow. Permeability is slow.
Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator solution. Paired with sample S69Ariz-2-9. A composite sample of 0 to 15 inch layer (0 to 38 cm) was taken for organic carbon determination - four sites sampled approximately 20 feet N, E, S, and W of pit and composite sample obtained (RSL 69807).

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>69798 | 0 to 5 cm (0 to 2 inches), brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; weak thin platy structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine and fine vesicular pores; 2 to 3 percent by volume of 1/2 to 1 inch rounded rhyolite and quartzite gravel; noneffervescent; slightly acid (pH 6.5); abrupt smooth boundary. |
| A12<br>RSL<br>69799 | 5 to 10 cm (2 to 4 inches), brown (7.5YR 5/4) heavy loam, dark brown (7.5YR 4/4) or dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, sticky, plastic; common very fine and fine roots; few fine tubular pores; about 3 percent by volume of 1/2 to 1 inch rounded rhyolite and quartzite gravel; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| B1t<br>RSL<br>69800 | 10 to 28 cm (4 to 11 inches), reddish brown (5YR 4/3) clay loam or light clay, dark reddish brown (5YR 3/4) moist; moderate medium and coarse subangular blocky structure; very hard, friable, sticky, plastic; common very fine and fine roots; few very fine tubular pores; common small pressure faces; noneffervescent; neutral (pH 7.0); gradual smooth boundary. |
| B21t<br>RSL<br>69801 | 28 to 41 cm (11 to 16 inches), reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; moderate medium and coarse subangular and angular blocky structure; very hard, friable, sticky, plastic; common very fine and fine roots; few very fine tubular pores; common small pressure faces; noneffervescent; mildly alkaline (pH 7.5); clear smooth boundary. |
| B22t<br>RSL<br>69802 | 41 to 51 cm (16 to 20 inches), reddish brown (5yr 4/4) clay, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; very hard, friable, sticky, plastic; common very fine and fine roots; few very fine tubular pores; common small pressure faces; about 3 percent by volume of 1/2 to 2 inch rounded rhyolite and quartzite gravel; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary. |
| B23t<br>RSL<br>69803 | 51 to 74 cm (20 to 29 inches), red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; strong medium prismatic structure; very hard, firm, sticky, plastic; common very fine and fine roots; many large pressure faces; about 3 percent by volume of 1/2 to 2 inch rounded rhyolite and quartzite gravel; strongly effervescent; moderately alkaline (pH 8.0); abrupt wavy boundary. |
| C1ca<br>RSL<br>69804 | 74 to 89 cm (29 to 35 inches), reddish yellow (5YR 6/6) heavy clay loam, yellowish red (5YR 5/6) moist; massive; hard, friable, sticky, plastic; common very fine and fine roots; common fine tubular pores; about 30 percent by volume of medium and large pinkish white irregularly shaped soft lime masses and concretions; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| C2ca<br>RSL<br>69805 | 89 to 125 cm (35 to 49 inches), light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, plastic; few very fine and fine roots; few fine tubular pores; about 20 percent by volume of medium and large white irregularly shaped soft lime masses and concretions; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| C3ca<br>RSL<br>69806 | 125 to 150 cm (49 to 59 inches), light brown (7.5YR 6/4) loam, strong brown (7.5YR 5/6) moist; massive; hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; few fine tubular pores; about 3 percent by volume of 1/2 to 1 1/2 inch rounded andesite, rhyolite and quartzite gravel; 8 to 10 percent by volume of medium and large white irregularly shaped soft masses and concretions of lime; violently effervescent; moderately alkaline (pH 8.2). |
| RSL<br>69807 | See Remarks. |

1/ The Forrest series is in a fine, mixed, thermic family of Ustollic Haplargids. This pedon has a control section with less than 35 percent clay.

CONSECUTIVE PEDON NUMBER C 68129 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES BERNARDINO TAXADJUNCT SOIL NO. S68 ARIZ. 12-14 SAMPLE NO. 8 959-8 963 E.PIMA-SANTA CRU AREA

SOIL FAMILY: USTOLLIC HAPLARGID, FINE-LOAMY, MIXED, THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 SAND | 2- .05 SILT | LT .002 CLAY | SANDS VCS 2-1 | SANDS CS 1-.5 | SANDS MS .5-.25 | SANDS FS .25-.10 | SANDS VFS .1-.05 | SILTS CSI .05-.02 | SILTS FSI .02-.002 | CLAYS CO. 2-.2U | CLAYS FINE LT .2U | CLAYS CARBONATE 3A1A | INT. II 1A2A .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 PCT. OF LT 75 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 8 959 | 0- 8 | A1 | 46.3 | 25.8 | 27.9 | 1.5 | 3.1 | 7.6 | 20.4 | 13.7 | 13.6 | 12.2 | | | | 38.9 | --A | -- | -- | -- |
| 8 960 | 8- 20 | A3 | 56.1 | 18.9 | 25.0 | 3.5 | 4.7 | 11.4 | 25.3 | 11.2 | 10.4 | 8.5 | | | | 34.8 | --A | -- | -- | -- |
| 8 961 | 20- 30 | B2 T | 50.5 | 17.9 | 31.6 | 4.2 | 5.4 | 11.5 | 21.5 | 7.9 | 8.5 | 9.4 | | | | 27.1 | --A | -- | -- | -- |
| 8 962 | 30- 43 | B3 TCA | 40.8 | 30.4 | 28.8 | 5.0 | 5.7 | 8.1 | 14.7 | 7.3 | 10.6 | 19.8 | | | 5 | 25.6 | --A | -- | -- | -- |
| 8 963 | 43-107 | C CA | 40.3 | 43.8 | 15.9 | 2.7 | 7.7 | 7.2 | 14.3 | 8.4 | 19.4 | 24.4 | | | 3 | 35.1 | 39A | -- | 30 | 9 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | CARBONATE AS CACO3 2-20 6E1B | SESQUIOXIDES DI-CIT EXT FE 6C2B | SESQUIOXIDES PYROP EXT AL 6G7A | SESQUIOXIDES DI-CIT EXT FE 6C5A | SESQUIOXIDES PYROP EXT AL 6G5A | ATTERBERG LIMIT LL 4F1 | ATTERBERG LIMIT PL 4F2 | BULK DENSITY 1/3 BAR 4A1F | BULK DENSITY DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | WATER CONTENT 1/3 BAR 4B1C | WATER CONTENT 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | EXTNSBLTY LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT.NO.40 | | GRAMS PER CC | | | PERCENT | | | PERCENT | | |
| 8 959 | 0- 8 | 2.57 | 0.201 | 5 | | 1.1 | 0.2 | | | 42 | 28 | 0.87 | 1.03 | 1.00 | | 24.7 | 13.1 | 5.8 | 5.8 |
| 8 960 | 8- 20 | 1.52 | 0.127 | 1 | | 1.2 | 0.1 | | | 31 | 20 | 1.32 | 1.41 | 1.00 | | 19.4 | 10.2 | 2.2 | 2.2 |
| 8 961 | 20- 30 | 1.23 | 0.120 | 6 | | 1.1 | 0.2 | | | 37 | 22 | 1.33 | 1.46 | 1.00 | | 22.7 | 12.2 | 3.2 | 3.2 |
| 8 962 | 30- 43 | 0.87 | 0.086 | 31 | | 0.6 | 0.2 | | | 39 | 22 | 1.02 | 1.15 | 1.00 | | 38.7 | 11.4 | 4.1 | 4.1 |
| 8 963 | 43-107 | 0.24 | | 59 | | 0.4 | TR | | | 33 | 26 | 1.15 | 1.19 | 0.78 | | 30.3 | 8.3 | 1.1 | 0.9 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | CEC NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | BASE SATURATION SUM+ AL | BASE SATURATION NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | PH H2O 1/1 8C1A | PH CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 8 959 | 0- 8 | 43.9 | 2.1 | 0.1 | 1.7 | 47.8 | | | 47.8 | 25.9 | 100+ | | 100+ | | 7.8 | 7.4 |
| 8 960 | 8- 20 | 31.3 | 1.4 | 0.1 | 0.8 | 33.6 | | | 33.6 | 21.2 | 100+ | | 100+ | | 7.9 | 7.5 |
| 8 961 | 20- 30 | 40.5 | 2.0 | 0.1 | 0.6 | 43.2 | | | 43.2 | 24.4 | 100+ | | 100+ | | 7.8 | 7.5 |
| 8 962 | 30- 43 | 41.8 | 3.0 | 0.1 | 0.6 | 45.5 | | | 45.5 | 22.6 | 100+ | | 100+ | | 8.0 | 7.6 |
| 8 963 | 43-107 | 39.5 | 3.8 | 1.0 | 0.5 | 44.8 | | | 44.8 | 20.3 | 100+ | | 100+ | | 8.3 | 7.7 |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | DTA IV 7A2E | DTA 7A3 -PERCENT- | L.T. 0.0002 MM X RAY I 7A3 | X RAY II 7A2E | X RAY III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 959 | 0- 8 | MT 3 | MI 2 | KK 1 | | | | | | MT MONTMORT | 1 TRACE |
| 8 960 | 8- 20 | MT 4 | MI 3 | KK 2 | | | | | | MI MICA | 2 SMALL |
| 8 961 | 20- 30 | MT 4 | MI 2 | KK 2 | | | | | | KK KAOLINIT | 3 MODERATE |
| 8 962 | 30- 43 | MT 5 | MI 1 | KK 1 | | | | | | | 4 ABUNDANT |
| 8 963 | 43-107 | MT 4 | MI 3 | KK 2 | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## BERNARDINO CLAY LOAM (taxadjunct) 1/
S68 Ariz-12-14-1 through 5

Location: Santa Cruz County, Arizona, 3-1/2 miles west of Elgin on north side of road opposite a windmill, approximately the S¼ corner Section 26, T20S, R17E. Photo AMS-255. Date of Sampling: Oct.17, 1968. Description by: Havens. Collectors: Nettleton and Brasher. Classification: Ustollic Haplargid, fine-loamy, mixed, thermic. Vegetation: Blue grama, black grama, purple grama, wolftail, three-awn and curly mesquite. Climate: Mean annual temperature 61°F. Mean annual precipitation 15 inches. Parent Material: Mixed old alluvium from andesite, rhyolite and related tuff. Topography: Rolling plains, 4 to 5 percent slope. Southeast aspect. Elevation: 4975 feet. Drainage: Well drained. Medium runoff. Soil Moisture: Dry.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-8 cm) |
| A1<br>RSL<br>68959 | 0 to 3 inches, reddish brown (5YR 5/4) light clay loam, dark reddish brown (5YR 3/4) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and plastic; many fine and medium roots; common fine interstitial and tubular pores; noneffervescent; abrupt smooth boundary. |
| A3<br>RSL<br>68960<br>(8-20 cm) | 3 to 8 inches, reddish brown (5YR 4/4) heavy clay loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many fine and medium roots; common fine and medium tubular pores; few thin clay films on ped faces and in pores; noneffervescent; clear smooth boundary. |
| B2t<br>RSL<br>68961<br>(20-30 cm) | 8 to 12 inches, reddish brown (5YR 4/4) clay, dark red (2.5YR 3/6) moist; moderate medium prismatic structure; very hard, friable, sticky and plastic; many fine and medium roots; common fine and medium tubular pores; common moderately thick clay films on ped faces and in pores; noneffervescent; clear smooth boundary. |
| B3tca<br>RSL<br>68962<br>(30-43 cm) | 12 to 17 inches, reddish brown (5YR 5/3) and (5/4) clay loam or clay, reddish brown (5YR 4/4) and pink (5YR 7/3) moist, with many medium and large distinct pinkish white (5YR 8/2) lime segregations; weak medium and coarse subangular blocky structure; hard, friable, sticky and plastic; common fine roots; few coarse tubular pores; few thin clay films on ped faces and in pores; strongly to violently effervescent; clear wavy boundary. |
| Cca<br>RSL<br>68963<br>(43-107 cm) | 17 to 42 inches, mottled pinkish white (7.5YR 8/2) and pinkish gray (6/2) and brown (7.5YR 5/4) heavy loam or clay loam, pinkish white (7.5YR 8/2), light brown (6/3) and dark brown (4/4) moist; massive; slightly hard, very friable, slightly sticky and plastic; few fine roots; violently effervescent. |

1/ The Bernardino series is in a fine, mixed, thermic family of Ustollic Haplargids. This pedon has an argillic horizon with less than 35 percent clay.

CONSECUTIVE PEDON NUMBER C 69208 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES BERNARDINO SOIL NO. S69 ARIZ. 2- 2 SAMPLE NO. 91108-91114 WALNUT G.-TUCSON AREA

SOIL FAMILY: USTOLLIC HAPLARGID,FINE,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 SAND | .05- .002 SILT | LT .002 CLAY | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS OF WHOLE SOIL 75-20 PCT. | 20-5 PCT. OF | 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 91108 | 0- 5 | A1 | 66.9 | 15.5 | 17.6 | 10.1 | 13.1 | 10.9 | 23.5 | 9.3 | 9.0 | 6.5 | | | | 31.7 | 68A | 17 | 32 | 19 |
| 91109 | 5- 15 | B21T | 51.7 | 11.5 | 36.8 | 9.6 | 10.7 | 9.6 | 16.5 | 5.3 | 4.7 | 6.8 | | | | 18.1 | 11A | -- | 2 | 9 |
| 91110 | 15- 23 | B22T | 45.4 | 12.9 | 41.7 | 14.8 | 9.3 | 6.1 | 10.6 | 4.6 | 4.6 | 8.3 | | | | 14.4 | 34A | -- | 15 | 19 |
| 91111 | 23- 33 | B23T | 53.1 | 14.7 | 32.2 | 20.8 | 12.2 | 6.0 | 9.5 | 4.6 | 4.8 | 9.9 | | | | 14.4 | 54A | -- | 28 | 26 |
| 91112 | 33- 43 | B3 T | 52.6 | 16.3 | 31.1 | 12.0 | 12.9 | 7.1 | 13.7 | 6.9 | 6.0 | 10.3 | | | | 20.6 | 41A | -- | 23 | 18 |
| 91113 | 51- 79 | C 2CA | 77.8 | 10.8 | 11.4 | 22.1 | 21.6 | 10.9 | 17.3 | 5.9 | 4.2 | 6.6 | | | | 19.5 | 32A | -- | 8 | 24 |
| 91114 | 79-127 | C 3CA | 74.2 | 14.1 | 11.7 | 29.0 | 16.2 | 8.4 | 13.9 | 6.7 | 5.5 | 8.6 | | | 2 | 19.9 | 61A | 3 | 45 | 13 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 91108 | 0- 5 | 1.63 | 0.121 | | | 0.9 | TR | | | | | 1.25 | | 0.50 | | | | 9.3 | | |
| 91109 | 5- 15 | 1.50 | 0.134 | | | 1.1 | 0.1 | | | | | | 1.18 | 1.45 | 0.95 | | 30.0 | 15.3 | 7.1 | 6.7 |
| 91110 | 15- 23 | 1.14 | 0.097 | | | 1.0 | 0.1 | | | | | | 1.12 | 1.43 | 0.82 | | 33.5 | 18.3 | 8.5 | 6.8 |
| 91111 | 23- 33 | 0.88 | 0.074 | | | 0.7 | 0.1 | | | | | | 1.14 | 1.38 | 0.67 | | 32.8 | 15.9 | 6.6 | 4.2 |
| 91112 | 33- 43 | 0.60 | 0.063 | | | 0.6 | 0.1 | | | | | | 1.34 | 1.63 | 0.75 | | 26.8 | 15.9 | 6.7 | 4.9 |
| 91113 | 51- 79 | | | 9 | | 0.3 | TR | | | | | | 1.40 | 1.41 | 0.80 | | 21.9 | 6.6 | 0.2 | 0.2 |
| 91114 | 79-127 | | | 13 | | 0.2 | TR | | | | | 1.40 | | | 0.55 | | | 6.6 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 91108 | 0- 5 | | | 0.4 | 1.1 | 1.5 | | | 1.5 | 19.2 | | | | | 7.2 | 7.0 |
| 91109 | 5- 15 | | | 0.4 | 1.1 | 1.5 | | | 1.5 | 29.9 | | | | | 7.0 | 7.0 |
| 91110 | 15- 23 | | | 0.6 | 1.0 | 1.6 | | | 1.6 | 36.5 | | | | | 6.9 | 6.4 |
| 91111 | 23- 33 | | | 0.5 | 1.0 | 1.5 | | | 1.5 | 35.0 | | | | | 7.1 | 6.7 |
| 91112 | 33- 43 | | | 0.5 | 1.0 | 1.5 | | | 1.5 | 32.9 | | | | | 7.1 | 6.9 |
| 91113 | 51- 79 | | | 0.5 | 0.5 | 1.0 | | | 1.0 | 17.1 | | | | | 7.6 | 7.5 |
| 91114 | 79-127 | | | 0.7 | 0.5 | 1.2 | | | 1.2 | 18.2 | | | | | 7.6 | 7.7 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91108 | 0- 5 | MT 3 | | | | | | | | | MT MONTMORT | 1 TRACE |
| 91109 | 5- 15 | MT 3 | | | | | | | | | | 2 SMALL |
| 91110 | 15- 23 | | | | | | | | | | | 3 MODERATE |
| 91111 | 23- 33 | MT 5 | | | | | | | | | | 4 ABUNDANT |
| 91112 | 33- 43 | MT 5 | | | | | | | | | | 5 DOMINANT |
| 91113 | 51- 79 | | | | | | | | | | | 6 INDETER. |
| 91114 | 79-127 | | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## BERNARDINO GRAVELLY LOAM
S69Ariz-2-2

Location: Cochise County, Arizona. 2,300 feet east and 800 feet south of northwest corner of Sec. 36, T. 19 S., R. 23 E., south side of road. About 3 miles NE of Tombstone on Gleeson Road. Date of sampling: September 25, 1969.
Description by: Y. H. Havens and D. M. Hendricks. Collectors: Y. H. Havens and D. M. Hendricks.
Classification: Ustollic Haplargid, fine, mixed, thermic.
Vegetation: Curly mesquite, hairy, blue, sideoats and black grama, yucca, snakeweed, tree mesquite, and rhus. Climate: Mean annual temperature approximately 63° F. Mean annual precipitation approximately 14 inches. Parent material: Mixed alluvium from andesite, rhyolite, tuff, limestone, basalt and some quartzite. Topography: Strongly sloping old fan. Elevation: Approximately 4,930 feet. Drainage: Well drained. Soil moisture: Dry.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>691108 | 0-5 cm (0-2 inches), brown (7.5YR 5/2) gravelly loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, slightly plastic; common very fine and fine roots; common fine interstitial pores; noneffervescent; neutral (pH 7.3); clear smooth boundary. |
| B21t<br>RSL No.<br>691109 | 5-15 cm (2-6 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; moderate fine and medium subangular blocky structure; hard to very hard, friable, sticky, plastic; common very fine and fine roots; few very fine tubular and interstitial pores; few thin clay films on ped faces and in pores; 5 percent gravel; noneffervescent; neutral (pH 7.3); clear wavy boundary. |
| B22t<br>RSL No.<br>691110 | 15-23 cm (6-9 inches), dark reddish brown (5YR 3/4) clay, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular and angular blocky structure; very hard, friable, sticky, plastic; common fine and medium roots; few very fine tubular and interstitial pores; common thin clay films on ped faces and in pores; 8 to 10 percent gravel; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| B23t<br>RSL No.<br>691111 | 23-33 cm (9-13 inches), reddish brown (5YR 5/3) gravelly light clay, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; very hard, friable, sticky, plastic; common very fine and fine roots; few very fine tubular pores; common thin clay films on ped faces and in pores; 20 percent gravel; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| B3t<br>RSL No.<br>691112 | 33-43 cm (13-17 inches), reddish brown (5YR 5/3) light clay, dark reddish brown (5YR 3/4) moist; weak medium and coarse prismatic breaking to moderate medium and coarse angular and subangular blocky structure; very hard, firm, sticky, plastic; common very fine roots; few very fine tubular pores; common thin clay films on ped faces and in pores; 5 percent gravel; noneffervescent; mildly alkaline (pH 7.8); clear wavy boundary. |
| C1<br>(not sampled) | 43-51 cm (17-20 inches), pinkish gray (7.5YR 6/2) gravelly heavy sandy loam, brown (7.5YR 5/4) moist; massive; hard, very friable, slightly sticky, slightly plastic; few fine and medium roots; common very fine interstitial pores; 15 to 20 percent gravel; slightly effervescent in spots; moderately alkaline (pH 8.1); this layer is discontinuous. |
| C2ca<br>RSL No.<br>691113 | 51-79 cm (20-31 inches), stratified white (7.5YR N 8/ ) gravelly light sandy clay loam, and pinkish gray (7.5YR 6/2) sandy loam, pinkish white (7.5YR 8/2) and brown (7.5YR 5/4) moist; strata are 1 to 3 inches thick; massive; hard, friable, slightly sticky, slightly plastic; few fine roots; common very fine interstitial pores; 15 percent gravel; violently effervescent, strongly effervescent in brown strata; moderately alkaline (pH 8.1); abrupt wavy boundary. |
| C3ca<br>RSL No.<br>691114 | 79-127 cm (31-50 inches), stratified white (7.5YR N 8/ ) gravelly light sandy clay loam, and pinkish gray (7.5YR 6/2) light sandy loam, pinkish white (7.5YR 8/2) and brown (7.5YR 5/4) moist; strata are 2 to 5 inches thick; massive; hard, very friable, nonsticky, slightly plastic; few fine roots; many fine and medium vesicular pores; 30 percent gravel; violently effervescent, strongly effervescent in brown strata; moderately alkaline (pH 8.4). |

CONSECUTIVE PEDON NUMBER C 68149 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES WHITE HOUSE SOIL NO. S68 ARIZ. 12- 9 SAMPLE NO. 81070-81079 E.PIMA-SANTA CRU AREA

SOIL FAMILY: USTOLLIC HAPLARGID,FINE,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 SAND | .05- .002 SILT | LT .002 CLAY | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | SILTS CO. 2- .2U | CLAYS FINE LT .2U | CLAYS CARBONATE 3A1A | 1A2A INT. II .2- .02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 81070 | 0- 8 | A1 | 46.0 | 37.9 | 16.1 | 5.9 | 7.4 | 6.2 | 15.5 | 11.0 | 21.0 | 16.9 | 8.7 | 7.4 | | 41.6 | 16A | -- | 12 | 4 |
| 81071 | 8- 23 | B1 T | 33.7 | 35.2 | 31.1 | 3.7 | 4.6 | 4.1 | 12.3 | 9.0 | 19.4 | 15.8 | 11.9 | 19.2 | | 36.4 | 3A | -- | 3Z | N |
| 81072 | 23- 41 | B21T | 15.4 | 15.5 | 69.1 | 3.3 | 3.0 | 1.7 | 4.4 | 3.0 | 7.3 | 8.2 | 17.9 | 51.2 | | 13.1 | --A | -- | -- | -- |
| 81073 | 41- 56 | B22T | 16.2 | 15.9 | 67.9 | 3.8 | 2.7 | 1.9 | 4.7 | 3.1 | 6.4 | 9.5 | | | | 12.4 | --A | -- | -- | -- |
| 81074 | 56- 66 | B23TCA | 22.1 | 19.8 | 58.1 | 4.6 | 5.2 | 2.9 | 5.6 | 3.8 | 6.7 | 13.1 | | | | 13.8 | --A | -- | -- | -- |
| 81075 | 66- 99 | B31TCA | 40.4 | 25.1 | 34.5 | 8.0 | 10.2 | 5.1 | 10.1 | 7.0 | 8.4 | 16.7 | 19.3 | 15.2 | | 20.9 | --A | -- | -- | -- |
| 81076 | 99-124 | B32TCA | 44.3 | 26.6 | 29.1 | 9.1 | 12.5 | 5.6 | 9.6 | 7.5 | 9.5 | 17.1 | | | | 22.4 | --A | -- | -- | -- |
| 81077 | 124-157 | B33CA | 54.2 | 18.1 | 27.7 | 8.4 | 18.3 | 6.1 | 12.7 | 8.7 | 3.0 | 15.1 | | | | 19.4 | 39A | 14 | 24 | 1 |
| 81078 | 157-198 | 2C CA | 52.4 | 23.5 | 24.1 | 8.1 | 11.0 | 5.6 | 17.3 | 10.4 | 9.8 | 13.7 | | | | 31.0 | 25A | 23 | 2Z | N |
| 81079 | 1/ 0- 38 | | | | | | | | | | | | | | | | 8A | -- | 7 | 1 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-19 6E1B | EXT. IRON FE 6C2B | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 8C1A | H2O 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 81070 | 0- 8 | 1.10 | 0.099 | | | 1.9 | 22 | 18 | | 1.38 | 1.42 | 0.91 | | 15.8 | 7.0 | 1.0 | 0.9 | 5.3 | | 4.4 |
| 81071 | 8- 23 | 1.07 | 0.100 | | | 2.2 | 30 | 17 | | 1.42 | 1.51 | 0.98 | | 18.2 | 10.6 | 2.1 | 2.0 | 5.8 | | 5.0 |
| 81072 | 23- 41 | 0.98 | 0.092 | | | 2.4 | | | | 1.24 | 1.58 | 1.00 | | 36.9 | 23.5 | 8.4 | 8.4 | 6.9 | | 6.5 |
| 81073 | 41- 56 | 0.52 | | 1 | | 2.4 | 60 | 30 | | 1.23 | 1.59 | 1.00 | | 38.7 | 24.4 | 8.9 | 8.9 | 7.8 | | 7.4 |
| 81074 | 56- 66 | 0.44 | | 9 | | 2.1 | | | | 1.27 | 1.61 | 1.00 | | 37.1 | 21.6 | 8.2 | 8.2 | 8.0 | | 7.3 |
| 81075 | 66- 99 | 0.17 | | 10 | | 2.8 | | | | 1.33 | 1.51 | 1.00 | | 31.1 | 18.8 | 4.3 | 4.3 | 8.1 | | 7.6 |
| 81076 | 99-124 | | | 1 | | 3.1 | 49 | 30 | | 1.29 | 1.45 | 1.00 | | 32.4 | 20.5 | 4.0 | 4.0 | 8.0 | | 7.5 |
| 81077 | 124-157 | | | 1 | | 2.3 | | | | 1.31 | 1.45 | 0.76 | | 31.8 | 19.1 | 3.4 | 2.6 | 7.9 | | 7.3 |
| 81078 | 157-198 | | | 1 | | 2.3 | 42 | 26 | | 1.26 | 1.36 | 0.86 | | 31.8 | 17.5 | 2.6 | 2.2 | 7.8 | | 7.3 |
| 81079 | 0- 38 | 1.10 | 0.100 | | | | | | 1.30 | | | 0.96 | | | 10.3 | | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6G2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 81070 | 0- 8 | 4.6 | 2.1 | 0.1 | 0.9 | 7.7 | 66 | | 11.6 | | | | | | | | | | | |
| 81071 | 8- 23 | 10.3 | 3.7 | 0.1 | 1.0 | 15.1 | 91 | | 16.6 | | | | | | | | | | | |
| 81072 | 23- 41 | 20.2 | 9.0 | 0.7 | 1.5 | 31.4 | 93 | | 33.6 | | | | | | | | | | | |
| 81073 | 41- 56 | 30.8 | 13.0 | 1.2 | 1.5 | 46.5 | 100+ | | 35.9 | | | | | | | | | | | |
| 81074 | 56- 66 | 40.5 | 16.2 | 1.2 | 1.3 | 59.2 | 100+ | | 35.5 | | | | | | | | | | | |
| 81075 | 66- 99 | 47.5 | 17.0 | 2.3 | 1.1 | 67.9 | 100+ | | 50.7 | | | | | | | | | | | |
| 81076 | 99-124 | 42.4 | 15.3 | 2.3 | 0.9 | 60.9 | 100+ | | 45.6 | | | | | | | | | | | |
| 81077 | 124-157 | 36.0 | 14.0 | 2.2 | 0.9 | 53.1 | 100+ | | 42.5 | 1.45 | 3.8 | 1.9 | 7.1 | 0.3 | TR | 1.7 | 6.6 | 0.6 | | |
| 81078 | 157-198 | 34.7 | 11.5 | 2.1 | 0.8 | 49.1 | 100+ | | 42.9 | 1.90 | 6.5 | 1.6 | 8.1 | 0.3 | TR | 1.5 | 13.1 | | | |
| 81079 | 0- 38 | | | | | | | | | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A3 | DTA PCT. | MINERALOGY L.T. .0002 MM X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | | RELATIVE AMOUNT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81070 | 0- 8 | | 0.1 | 1 | | | | MI 3 | KK 2 | | | | | | | MI | MICA | 1 | TRACE |
| 81071 | 8- 23 | | 0.1 | 1 | | | | MI 3 | KK 2 | MT 1 | | | KK 3 | MI 2 | MT 1 | KK | KAOLINIT | 2 | SMALL |
| 81072 | 23- 41 | | 0.7 | 2 | | | | | | | | | MI 3 | KK 2 | MT 1 | MT | MONTMORT | 3 | MODERATE |
| 81073 | 41- 56 | | 1.2 | 3 | | | | MT 3 | MI 3 | KK 2 | | | | | | | | 4 | ABUNDANT |
| 81074 | 56- 66 | | 1.2 | 3 | | | | | | | | | | | | | | 5 | DOMINANT |
| 81075 | 66- 99 | | 2.3 | 5 | | | | | | | | | MT 5 | MI 2 | KK 2 | | | 6 | INDETER. |
| 81076 | 99-124 | | 2.3 | 5 | | | | MT 4 | MI 3 | KK 2 | | | | | | | | | |
| 81077 | 124-157 | 35.0 | 1.8 | 4 | 4 | TR | | | | | | | | | | | | | |
| 81078 | 157-198 | 51.2 | 1.7 | 4 | 4 | | | MT 4 | MI 2 | KK 2 | | | | | | | | | |
| 81079 | 0- 38 | | | | | | | | | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
1/= Composite from 10 pedons.

## WHITE HOUSE GRAVELLY LOAM
S68 Ariz-12-9-1 through 9

Location: Santa Cruz County, Arizona, 3 miles south and 4.5 miles east of Sonoita and 1.3 miles east-southeast of Highway 83 and 0.1 mile south of El Paso Natural Gas Pipe line in the San Ignacio Del Babocomari Grant, Compass bearing--Mt. Wrightson is S87°W from this pit. Also Empire Mountain is N20°E of pit. Photo AMS-256. Date of Sampling: October 14, 1968.
Description by: Havens and Clemmons. Collectors: Nettleton and Brasher.
Classification: Ustollic Haplargid, fine, mixed, thermic.
Vegetation: Grass aspect - blue grama, wolftail, plains bristlegrass, three-awn, sprucetop grama, curly mesquite. Climate: Mean annual temperature 62°F. Mean annual precipitation 16 inches. Parent Material: Old alluvium from andesite, dacite, rhyolite and related tuffs. Topography: Nearly level to gently sloping plain, 1 to 2 percent slope, northeast aspect. Elevation: 4975 feet. Drainage: Well drained. Soil Moisture: Dry.
Remarks: This soil was paired with S68 Ariz-12-11-1 through 9.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-8 cm) |
| A1<br>RSL<br>681070 | 0 to 3 inches, brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/2) moist; weak thick platy breaking to moderate fine granular structure; slightly hard, friable, nonsticky and slightly plastic; many very fine and fine roots; common fine interstitial pores; noneffervescent; slightly acid (pH 6.2); abrupt smooth boundary. |
| B1t<br>RSL<br>681071<br>(8-23 cm) | 3 to 9 inches, reddish brown (5YR 5/4) clay loam, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; few fine and very fine tubular pores; few thin clay films on ped faces; few fine gravel; noneffervescent; neutral (pH 6.8); clear smooth boundary. |
| B21t<br>RSL<br>681072<br>(23-41 cm) | 9 to 16 inches, reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; moderate medium and coarse prismatic structure; hard, firm, sticky and plastic; common fine and very fine roots; few very fine interstitial pores; many moderately thick clay films on ped faces; few fine gravel; noneffervescent; neutral (pH 7.0); gradual smooth boundary. |
| B22t<br>RSL<br>681073<br>(41-56 cm) | 16 to 22 inches, reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; weak medium prismatic breaking to moderate subangular and angular blocky structure; hard, firm, sticky and plastic; common fine roots; many moderately thick clay films on ped faces; 2 to 5 percent gravel; small slickensides in lower part; noneffervescent; mildly alkaline (pH 7.4); clear wavy boundary. |
| B23tca<br>RSL<br>681074<br>(56-66 cm) | 22 to 26 inches, dark red (2.5YR 3/6) clay, dark red (2.5YR 3/6) moist; moderate medium and coarse subangular and angular blocky structure; hard, firm, sticky and plastic; common fine roots; few fine tubular pores; many moderately thick clay films and common pressure faces; common medium slickensides; 5 percent gravel; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary |
| B31tca<br>RSL<br>681075<br>(66-99 cm) | 26 to 39 inches, mottled red (2.5YR 4/6) and pink (5YR 7/4) clay loam, dark red (2.5YR 3/6) and light reddish brown (5YR 6/4) moist, mottles are many medium and large and distinct; massive breaking to weak medium subangular blocky structure; hard, friable, sticky and plastic; few fine roots; common thin clay films on ped faces; 5-10 percent gravel; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| B32tca<br>RSL<br>681076<br>(99-124 cm) | 39 to 49 inches, mottled yellowish red (5YR 5/6) and pink (5YR 7/4) gravelly sandy clay loam, yellowish red (5YR 4/6) and light reddish brown (5YR 6/4) moist; mottles are many medium and large and distinct; massive; hard, very friable, slightly sticky and plastic; few very fine interstitial pores; few thin clay films on ped faces; slightly to violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| B33ca<br>RSL<br>681077<br>(124-157 cm) | 49 to 62 inches, mottled yellowish red (5YR 5/8) and pink (5YR 7/3) gravelly sandy clay loam, yellowish red (5YR 4/8) and light reddish brown (5YR 6/3) moist, mottles are many medium and large and distinct; massive; hard, friable, sticky and plastic; few very fine interstitial pores; slightly to strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| IICca<br>RSL<br>681078<br>(157-198 cm) | 62 to 78 inches, mottled red (2.5YR 5/8) and pinkish white (5YR 8/2) very gravelly light sandy clay loam, red (2.5YR 4/8) and pinkish gray (5YR 7/2) moist, mottles are many medium and large and distinct; massive; hard, friable; sticky and plastic; slightly to strongly effervescent; moderately alkaline (pH 8.0). |
| Composite A<br>RSL<br>681079<br>(0-38 cm) | 0 to 15 inch horizon sampled from 10 pedons selected at 10-foot intervals along a 100-foot, N-S transect centered at the backhoe pit.<br><br>Note: Discontinuous stone line in pit to left of area described. |

CONSECUTIVE PEDON NUMBER C 68150 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES WHITE HOUSE SOIL NO. S68 ARIZ. 12-11 SAMPLE NO. 81080-81089 E.PIMA-SANTA CRU AREA

SOIL FAMILY: USTOLLIC HAPLARGID,FINE,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION <2 mm SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS I 75-20 WHOLE SOIL | II 20-5 PCT. OF | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. | | |
| 81080 | 0- 3 | A11 | 53.0 | 26.0 | 21.0 | 3.2 | 7.4 | 9.1 | 23.4 | 9.9 | 14.5 | 11.5 | | | | 37.3 | 9A | -- | 7 | 2 |
| 81081 | 3- 13 | A12 | 47.9 | 23.8 | 28.3 | 3.8 | 6.4 | 7.6 | 20.0 | 10.1 | 12.3 | 11.5 | | | | 33.3 | 2A | -- | 2Z | N |
| 81082 | 13- 20 | B1 T | 40.1 | 21.4 | 38.5 | 5.7 | 5.3 | 5.8 | 15.3 | 8.0 | 10.9 | 10.5 | | | | 27.2 | --A | -- | -- | -- |
| 81083 | 20- 43 | B21T | 26.4 | 16.9 | 56.7 | 1.2 | 3.3 | 4.3 | 10.7 | 6.9 | 8.1 | 8.8 | | | | 21.3 | --A | -- | -- | -- |
| 81084 | 43- 66 | B22T | 27.6 | 19.2 | 53.2 | 2.5 | 3.7 | 4.0 | 10.5 | 6.9 | 8.4 | 10.8 | | | | 21.5 | --A | -- | -- | -- |
| 81085 | 66- 94 | B23TCA | 40.1 | 26.3 | 33.6 | 9.7 | 7.4 | 5.0 | 10.8 | 7.2 | 7.6 | 18.7 | | | 1 | 21.1 | 31A | 31 | -- | -- |
| 81086 | 94-112 | B31TCA | 41.4 | 28.0 | 30.6 | 8.3 | 9.3 | 5.8 | 10.3 | 7.7 | 6.4 | 21.6 | | | 1 | 20.0 | 39A | 24 | 15Z | N |
| 81087 | 112-140 | B32TCA | | | | | | | | | | | | | | | 53A | 35 | 18Z | N |
| 81088 | 140-190 | B33TCA | | | | | | | | | | | | | | | 60A | 39 | 21Z | N |
| 81089 | 0- 38 | | | | | | | | | | | | | | | | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP EXT FE 6C5A | AL 6G5A | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | DRY 4A1F | 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT. NO.40 | | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 81080 | 0- 3 | 1.75 | 0.140 | | | 1.0 | 0.1 | | | | | 1.30 | | 0.96 | | | | 8.6 | | |
| 81081 | 3- 13 | 1.30 | 0.110 | | | 1.2 | 0.1 | | | 29 | 17 | | 1.35 | 1.44 | 0.99 | | 18.0 | 10.0 | 2.2 | 2.1 |
| 81082 | 13- 20 | 1.14 | 0.102 | | | 1.5 | 0.1 | | | | | | 1.28 | 1.58 | 1.00 | | 32.8 | 13.7 | 7.3 | 7.3 |
| 81083 | 20- 43 | 1.14 | | TR | | 1.7 | 0.2 | | | | | | 1.29 | 1.58 | 1.00 | | 34.8 | 20.2 | 7.0 | 7.0 |
| 81084 | 43- 66 | 0.61 | | 2 | | 1.5 | 0.1 | | | 45 | 27 | | 1.35 | 1.67 | 1.00 | | 33.0 | 19.9 | 7.3 | 7.3 |
| 81085 | 66- 94 | 0.32 | | 19 | | 0.8 | 0.1 | | | | | | 1.40 | 1.65 | 0.81 | | 28.8 | 13.9 | 5.6 | 4.5 |
| 81086 | 94-112 | 0.20 | | 26 | | 0.6 | TR | | | | | 1.45 | | | 0.74 | | | 12.6 | | |
| 81087 | 112-140 | | | 2 | | 0.8 | 0.1 | | | 35 | 21 | | 1.45 | 1.53 | 0.61 | | 13.0 | 9.6 | 1.8 | 1.1 |
| 81088 | 140-190 | | | 1 | | 0.6 | TR | | | | | 1.45 | | | 0.55 | | | 8.8 | | |
| 81089 | 0- 38 | 1.16 | 0.099 | | | | | | | | | 1.30 | | | 1.00 | | | 11.3 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI-DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81080 | 0- 3 | 6.8 | 3.5 | 0.1 | 0.9 | 11.3 | 5.6 | | 16.9 | 15.2 | 67 | | 74 | | 5.9 | 5.3 |
| 81081 | 3- 13 | 10.4 | 4.6 | 0.1 | 0.8 | 15.9 | 4.7 | | 20.6 | 18.2 | 77 | | 87 | | 6.0 | 5.5 |
| 81082 | 13- 20 | 15.3 | 4.5 | 0.1 | 0.8 | 20.7 | | | 20.7 | 22.6 | 100+ | | 92 | | 6.3 | 5.8 |
| 81083 | 20- 43 | 21.2 | 10.2 | 0.2 | 1.3 | 32.9 | | | 32.9 | 32.3 | 100+ | | 100+ | | 6.7 | 6.2 |
| 81084 | 43- 66 | 34.8 | 7.5 | 0.5 | 1.4 | 44.2 | | | 44.2 | 31.6 | 100+ | | 100+ | | 7.6 | 7.4 |
| 81085 | 66- 94 | 37.2 | 7.9 | 0.6 | 1.0 | 46.7 | | | 46.7 | 24.2 | 100+ | | 100+ | | 7.9 | 7.6 |
| 81086 | 94-112 | 35.4 | 6.5 | 0.8 | 0.7 | 43.4 | | | 43.4 | 22.8 | 100+ | | 100+ | | 8.1 | 7.6 |
| 81087 | 112-140 | 21.3 | 3.7 | 0.7 | 0.7 | 26.4 | | | 26.4 | 20.5 | 100+ | | 100+ | | 8.1 | 7.4 |
| 81088 | 140-190 | 19.5 | 2.8 | 0.5 | 0.6 | 23.4 | | | 23.4 | 17.2 | 100+ | | 100+ | | 8.2 | 7.5 |
| 81089 | 0- 38 | | | | | | | | | | | | | | | |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM MINERAL X RAY CODE 7A2E I | 7A2F II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|
| 81080 | 0- 3 | | | | | | | | | |
| 81081 | 3- 13 | MT 4 | MI 3 | KK 2 | | | | | | |
| 81082 | 13- 20 | | | | | | | | | |
| 81083 | 20- 43 | | | | | | | | | |
| 81084 | 43- 66 | MI 4 | MT 3 | KK 2 | | | | | | |
| 81085 | 66- 94 | | | | | | | | | |
| 81086 | 94-112 | | | | | | | | | |
| 81087 | 112-140 | MT 4 | MI 3 | KK 2 | | | | | | |
| 81088 | 140-190 | | | | | | | | | |
| 81089 | 0- 38 | | | | | | | | | |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

MT MONTMORT
MI MICA
KK KAOLINIT

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## WHITE HOUSE LOAM
S68 Ariz-12-11-1 through 9

Location: Santa Cruz County, Arizona, approximately 5 miles east of Lochiel, Arizona and 300 feet south of Forest Service Road #4. Approximately 2400 feet east and 1200 feet south of NW corner Section 20, T24S, R18E. Photo 14-130 EEX (AMS 694). Date of Sampling: October 15, 1968
Description by: Clemmons and Havens. Collectors: Nettleton and Brasher.
Classification: Ustollic Haplargid, fine, mixed, thermic.
Vegetation: Grassland: blue grama, curly mesquite, sideoats grama, three-awn. Invading Shrub: Senecio.
Climate: Mean annual precipitation 16 to 18 inches. Mean annual temperature approximately 61°F.
Parent Material: Old alluvium from andesite, dacite, rhyolite and related tuffs. Topography: Nearly level to gently sloping plains. Slope 1 to 2 percent. Southwest aspect. Elevation: 4850 feet.
Drainage: Well drained. Medium runoff. Soil Moisture: Moist.
Remarks: This site was paired with S68 Ariz-12-9-1 through 9. From pit Mt. Wrightson is N36°W, peak on Huachuca N30°E, second peak on Huachuca N67°E.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-3 cm) |
| A11<br>RSL<br>681080 | 0 to 1 inch, brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; weak fine and medium granular structure; soft, friable, slightly sticky and slightly plastic; common fine and medium roots; noneffervescent; mildly alkaline (pH 7.4); abrupt smooth boundary. |
| A12<br>RSL<br>681081<br>(3-13 cm) | 1 to 5 inches, reddish brown (5YR 4/4) light clay loam, dark reddish brown (5YR 3/4) moist; massive breaking to weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine and very fine roots; common fine tubular pores; few thin clay films in pores; noneffervescent; mildly alkaline (pH 7.6); clear smooth boundary. |
| B1t<br>RSL<br>681082<br>(13-20 cm) | 5 to 8 inches, dark reddish brown (5YR 3/4) heavy clay loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; common fine tubular pores; common thin clay films on ped faces and in pores; noneffervescent; mildly alkaline (pH 7.6); clear wavy boundary. |
| B21t<br>RSL<br>681083<br>(20-43 cm) | 8 to 17 inches, dark reddish brown (2.5YR 3/4) clay, dark reddish brown (2.5YR 3/4) moist; moderate medium and coarse prismatic structure; very hard, firm, sticky and very plastic; common fine and very fine roots; few fine tubular pores; common moderately thick clay films on ped faces and in pores; noneffervescent; mildly alkaline (pH 7.6); gradual wavy boundary. |
| B22t<br>RSL<br>681084<br>(43-66 cm) | 17 to 26 inches, reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; weak medium and coarse prismatic breaking to strong medium subangular and angular blocky structure; very hard, firm, sticky and very plastic; common fine and few very fine roots; few fine tubular pores; common moderately thick clay films on ped faces and in pores; common medium slickensides; noneffervescent, slightly effervescent in spots in lower part; Mildly alkaline (pH 7.8); clear wavy boundary. |
| B23tca<br>RSL<br>681085<br>(66-94 cm) | 26 to 37 inches, reddish brown (5YR 5/4) gravelly clay, reddish brown (5YR 4/4) moist; with many medium and large and distinct pink (5YR 7/3) lime mottles, light reddish brown (5YR 6/3) moist; moderate fine and medium subangular blocky structure; very hard, friable, sticky and very plastic; common very fine and fine roots; few fine tubular pores; common thin clay films on ped faces and in pores; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| B31tca<br>RSL<br>681086<br>(94-112 cm) | 37 to 44 inches, mottled reddish brown (5YR 5/4) and pink (5YR 7/3) very gravelly clay, reddish brown (5YR 4/4) and light reddish brown (5YR 6/3) moist, mottles are many medium and large and distinct; nearly massive breaking to moderate fine and medium subangular blocky structure; hard, friable, sticky and very plastic; few very fine roots; common fine tubular pores; common thin clay films on ped faces and in pores; violently effervescent; moderately alkaline (pH 8.2); gradual wavy boundary. |
| B32tca<br>RSL<br>681087<br>(112-140 cm) | 44 to 55 inches, mottled reddish brown (5YR 5/3) and white (10YR 8/1) very gravelly clay loam or very gravelly sandy clay loam, reddish brown (5YR 4/4) and pinkish gray (5YR 7/2) moist, mottles are many medium and large and distinct, white (8/1) mottles are lime segregations; nearly massive breaking to moderate fine and medium subangular blocky structure; hard, friable sticky and plastic; few fine roots; common fine tubular pores; few thin clay films on ped faces and in pores; violently effervescent; moderately alkaline (pH 8.2); gradual smooth boundary. |
| B33tca<br>RSL<br>681088<br>(140-190 cm) | 55 to 75 inches, mottled reddish brown (5YR 5/3) and white (10YR 8/1) very gravelly sandy clay loam, reddish brown (5YR 4/4) and pinkish gray (5YR 7/2) moist, mottles are many medium and large and distinct, white (8/1) mottles are lime segregations; nearly massive breaking to moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few fine tubular pores; few thin clay films on ped faces and in pores; violently effervescent; moderately alkaline (pH 8.2). |
| | (0-38 cm) |
| Composite A<br>RSL<br>681089 | 0 to 15 inch sample collected from 10 pedons selected at 10-foot intervals from a N-S, 100-foot transect near the sample pit. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Haplargid, fine, montmorillonitic, mesic
SOIL Arp gravelly clay loam SOIL Nos. S65Ariz-13-4 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65183 - 65187

| Depth (In) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand (2–1) | Sand (1–0.5) | Sand (0.5–0.25) | Sand (0.25–0.1) | Sand (0.1–0.05) | Silt (0.05–0.02) | Silt Int III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | 3A1 (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments 1A2a >2 | 2–19 | 19–76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0-2 | A1 | 35.8 | 37.3 | 26.9 | 6.6 | 6.5 | 4.6 | 9.8 | 8.3 | 19.3 | 18.0 | 33.4 | 27.5 | 0 | 27 | 42 | 35 | 7 |
| 2-4 | B1t | 23.0 | 33.5 | 43.5 | 3.1 | 4.1 | 3.5 | 6.6 | 5.7 | 13.4 | 20.1 | 22.8 | 17.3 | 0 | 44 | 29 | 12 | 17 |
| 4-11 | B21t | 15.2 | 31.4 | 53.4 | 2.1 | 2.7 | 2.0 | 4.5 | 3.9 | 10.2 | 21.2 | 16.7 | 11.3 | 0 | 53 | 19 | 15 | 4 |
| 11-16 | B22t | 11.2 | 34.5 | 54.3 | 1.8 | 2.1 | 1.4 | 3.0 | 2.9 | 9.5 | 25.0 | 14.0 | 8.3 | 0 | 54 | 12 | 12 | 0 |
| 16-30 | C | 24.1 | 50.1 | 25.8 | 7.1 | 5.7 | 2.5 | 4.4 | 4.4 | 11.7 | 38.4 | 13.5 | 19.7 | 0 | 26 | 37 | 35 | 2 |
| 30-47 | R | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density 4A1f 1/3 bar | Bulk density 4A1h Oven dry | 3B2 | Water content 4B1c 1/3 bar | Water content 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH 8C1a $H_2O$ 1:1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct. | | Pct. | Pct | g/cc | g/cc | Cm | Pct. | Pct | in./in. | in./in. | |
| 0-2 | 0.82 | 0.063 | 13 | 3.1 | - | | | | | 11.3 | | | 6.7 |
| 2-4 | 1.02 | 0.086 | 12 | 3.1 | - | 1.30 | 1.60 | 0.83 | 28.4 | 18.7 | 0.071 | 0.058 | 6.7 |
| 4-11 | 0.81 | 0.066 | 12 | 3.7 | - | 1.25 | 1.79 | 0.90 | 37.8 | 27.0 | 0.127 | 0.111 | 6.9 |
| 11-16 | 0.91 | 0.071 | 13 | 4.3 | - | 1.21 | 1.64 | 0.94 | 40.1 | 29.2 | 0.106 | 0.098 | 7.0 |
| 16-30 | 0.20 | | | 5.0 | - | 1.36 | 1.73 | 0.77 | 34.3 | 22.1 | 0.085 | 0.062 | 7.3 |

| Depth (In.) | Extractable bases 5B1a 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Atterberg limits Plastic limit | Liquid limit | Plastic index | Base saturation 5C1 $NH_4OAc$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | Pct. of <0.4 mm | | | Pct. |
| 0-2 | 17.4 | 9.0 | 0.2 | 0.5 | 27.1 | | 29.5 | | | | | | 92 |
| 2-4 | 26.5 | 11.8 | 0.2 | 0.5 | 39.0 | | 43.2 | | | | | | 90 |
| 4-11 | 35.4 | 14.2 | 0.4 | 0.3 | 50.3 | | 54.3 | | | | | | 93 |
| 11-16 | 38.0 | 15.6 | 0.4 | 0.2 | 54.2 | | 56.3 | | | | | | 96 |
| 16-30 | 33.8 | 13.2 | 0.6 | 0.3 | 47.9 | | 49.5 | | | 26 | 70 | 44 | 97 |

| Depth (In) | Clay mineralogy (<0.002 mm) 7A Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |
| 0-2 | xxxx | - | - | x |
| 2-4 | xxxx | - | - | x |
| 4-11 | xxxx | - | - | x |
| 11-16 | xxxx | - | - | x |
| 16-30 | xxxx | - | - | x |

* All values from characterization sample.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## ARP GRAVELLY CLAY LOAM
S65Ariz-13-4

Location: Western Yavapai County Area, Arizona. About 2/10 mile east of Poland Junction substation. 3/10 mile south and 1/10 mile east of northwest corner Sec. 4, T12N, R1E. Photo #326. AMS Project 134, Lot FA. Date of Sampling: May 5, 1965.
Collectors: Flach, Nettleton, Jay, Wendt, Freeman
Vegetation: Brushgrass. Oakbrush, squawbush, manzanita, sideoats grama, three-awns, and annuals. Climate: Mean annual precipitation 14". Mean annual temperature 57°F. Soil temperature at time of sampling 66°F. at 16". Parent Material: Yavapai schist and phyllite. Relief: Moderately sloping hill or ridge on a 5 percent convex southwest slope about 50 feet from crest of ridge. Elevation: 4,850 feet. Drainage: Medium runoff, moderately slowly permeable and well drained.
Remarks: This soil is found on schist and phyllite under a chaparral or grass vegetation. It is on nearly level bench-like areas and moderately steep or steep hills. The schist or phyllite bedrock is vertically oriented. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-5.
Classification: Ustollic Haplargid, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65183 | 0 to 2 inches, dark reddish gray (5YR 4/2) gravelly clay loam, dark reddish brown (5YR 3/2) when moist; strong very fine granular structure; loose, friable, sticky and plastic; few very fine roots; many interstitial pores; 35 percent schist, quartzite and phyllite gravel, and a few cobbles; noneffervescent; mildly alkaline (pH 7.5); abrupt smooth boundary. |
| B1t<br>RSL<br>65184 | 2 to 4 inches, dark reddish brown (5YR 3/2) dry and moist, heavy clay loam; strong fine and medium subangular blocky structure; very hard, firm, sticky and very plastic; abundant very fine and fine roots; common very fine and fine interstitial and tubular pores; noneffervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| B21t*<br>RSL No.<br>65185 | 4 to 11 inches, dark red (2.5YR 2/4) clay, dark reddish brown (2.5YR 3/4) when moist; weak medium prismatic breaking to moderate medium subangular blocky structure; very hard, friable, very sticky and very plastic; plentiful very fine and fine roots; few very fine and fine interstitial and few fine tubular pores; pressure faces common; noneffervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| B22t<br>RSL No.<br>65186 | 11 to 16 inches, dark reddish brown (2.5YR 3/4) dry and moist clay; moderate medium angular blocky structure; very hard, friable, very sticky and very plastic; plentiful very fine roots; few very fine and fine interstitial and few fine tubular pores; common pressure faces with thin clay films; noneffervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| C*<br>RSL No.<br>65187 | 16 to 30 inches, yellowish red (5YR 5/6) weathered phyllite, reddish brown (5YR 4/4) and very dark gray (5YR 3/1) when moist; massive; very hard, very firm; few fine, medium and coarse roots; few fine interstitial pores; common thin to thick clay films in cracks; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary. |
| R<br>No sample | 30 to 47 inches plus, strong brown (7.5YR 5/6) and black (5YR 2/1) phyllite; massive; extremely hard; few fine roots in seams; few fine interstitial pores; common thin to thick discontinuous clay films along fragment faces; noneffervescent; mildly alkaline (pH 7.5). |

*Note - Sampled for BPR. B21t and B22t combined in BPR sample.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Haplargid, fine, montmorillonitic, mesic

SOIL Showlow loam SOIL Nos. S56Ariz-9-27 LOCATION Navajo County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 56166 - 56172

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Noncarbonate clay | 1/ Coarse fragments 2A2: ≥ 2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct | Pct. of < 76 mm | |
| 0–1 | A11 | 46.0 | 42.3 | 11.7 | 4.4 | 8.6 | 7.4 | 13.1 | 12.5 | 26.5 | 15.8 | 46.8 | 33.5 | | | 24 | | |
| 1–3 | A12 | 37.7 | 44.3 | 18.0 | 3.9 | 7.7 | 6.4 | 10.6 | 9.1 | 22.7 | 21.6 | 38.0 | 28.6 | | | 18 | | |
| 3–12 | B1t | 32.2 | 39.3 | 28.5 | 2.4 | 6.3 | 5.5 | 9.3 | 8.7 | 20.6 | 18.7 | 34.8 | 23.5 | | | 11 | | |
| 12–24 | B21t | 25.4 | 28.6 | 46.0 | 3.0 | 5.1 | 4.4 | 7.2 | 5.7 | 13.7 | 14.9 | 23.6 | 19.7 | | | 3 | | |
| 24–31 | B22tca | 22.3 | 19.5 | 58.2 | 1.5 | 3.7 | 4.4 | 8.6 | 4.1 | 9.2 | 10.3 | 18.1 | 18.2 | | | 1 | | |
| 31–44 | C1ca | 65.9 | 6.4 | 27.7 | 12.6 | 23.1 | 15.1 | 12.9 | 2.2 | 2.3 | 4.1 | 10.4 | 63.7 | | | 48 2/ | | |
| 44–52 | C2ca | 76.2 | 3.3 | 20.5 | 13.8 | 26.6 | 19.8 | 14.6 | 1.4 | 3.5 | 2.1 | 8.1 | 74.8 | | | 53 2/ | | |

| Depth (In.) | 6A1a Organic carbon (Pct.) | 6B1a Nitrogen (Pct.) | C/N | 6C1b Free $Fe_2O_3$ (Pct.) | 6E1b Carbonate as $CaCO_3$ (Pct) | Bulk density: 4A1f 1/3 bar (g/cc) | Bulk density: 4A1h Oven dry (g/cc) | (g/cc) | 3B2 Cm | Water content (Pct) | 4B1c 1/3 bar (Pct.) | 4B2 15 bar (Pct) | 4D1 Extensibility LEf (Pct) | 4D1 Extensibility LE (Pct.) | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–1 | 1.52 | 0.102 | 15 | 1.3 | | | | | | | | 5.7 | | | 6.8 | | 7.0 |
| 1–3 | 1.70 | 0.121 | 14 | 1.5 | | | | | | | | 8.0 | | | 6.9 | | 6.9 |
| 3–12 | 0.82 | 0.061 | 13 | 1.7 | | | | | | | | 11.0 | | | 6.9 | | 6.9 |
| 12–24 | 0.61 | 0.051 | 12 | 2.2 | | | | | | | | 19.1 | | | 7.1 | | 7.1 |
| 24–31 | 0.43 | 0.031 | 14 | 2.0 | tr. | | | | | | | 27.4 | | | 7.5 | | 7.7 |
| 31–44 | 0.18 | | | 1.5 | 1 | | | | | | | 13.7 | | | 7.6 | | 8.1 |
| 44–52 | 0.04 | | | 1.4 | tr. | | | | | | | 9.7 | | | 7.7 | | 8.1 |

| Depth (In.) | Extractable bases 5B1a: 6N2b Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A2a NaOAc | 5A6a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a 6O1a Ca + Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1b $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | mmho/cm |
| 0–1 | 11.3 | 12.8 | | | | 3.1 | 17.2 | | 4.9 | 0.4 | 0.3 | | 3.6 | – | | 0.5 |
| 1–3 | 14.5 | 16.5 | | | | 2.6 | 21.2 | | 5.4 | 0.3 | 0.2 | | 4.1 | – | | 0.5 |
| 3–12 | 16.2 | 19.1 | | | | 5.0 | 40.1 | | 5.2 | 0.4 | 0.2 | | 4.6 | – | | 0.5 |
| 12–24 | 25.3 | 31.6 | | | | 5.6 | 46.3 | | 2.8 | 0.9 | 0.1 | | 2.6 | – | | 0.4 |
| 24–31 | 31.4 | 51.4 | | | | | 59.2 | | 2.9 | 1.2 | 0.1 | | 1.9 | – | | 0.4 |
| 31–44 | 28.2 | 34.1 | | | | | 25.9 | | 2.9 | 1.6 | 0.1 | | 2.6 | – | | 0.4 |
| 44–52 | 16.1 | 19.6 | | | | | 29.3 | | 3.0 | 2.2 | 0.1 | | 2.4 | – | | 0.5 |

| Depth (In.) | 8A Water at Saturation (Pct.) | Exch. bases: 5B3b Ca (meq/100 g) | 5B1b 6P2a K (meq/100 g) | 5B1b 6Q2a Na (meq/100 g) | 5D2 Exchangeable Na (Pct) | SAR | 5C3 Base Sat. (Pct) | Clay mineralogy (<0.002 mm) 3A1: Mont. (7A2 X-ray) | Verm. (7A2 X-ray) | Mica (7A2 X-ray) | Kaolin. (7A2 X-ray) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–1 | 25.8 | | 0.5 | 0.1 | | | 88 | | | x | x |
| 1–3 | 32.0 | | 0.5 | 0.1 | | | 92 | | | x | |
| 3–12 | 39.0 | | 0.5 | 0.2 | | | 88 | | | xx | xx |
| 12–24 | 57.8 | | 0.8 | 0.3 | | | 91 | xx | | | x |
| 24–31 | 87.1 | | 0.9 | 0.5 | | | 100+ | xx | | | |
| 31–44 | 40.6 | | 0.5 | 0.4 | | | 100+ | xx | | | |
| 44–52 | 34.2 | | 0.3 | 0.4 | | | 100+ | | | | |

1/ Percent of the whole soil except as noted

2/ Percent of the <1-inch fractio

SHOWLOW LOAM
56Ariz-9-27-1 through 7

Location: Navajo County, Arizona 2.1 miles east of Aripine post office near the E ¼ corner of Sec. 12, T 11 N, R 18 E, about 50 feet north of State Hwy. #160. Date of Sampling: May 15, 1956. Collectors: M. S. James, W. G. Harper, Gerald Kester, R. E. Nelson, George Wendt. Vegetation: Blue grama, juniper, pinon, oak, ponderosa. Climate: Estimated annual precipitation about 18 inches. Nearest weather station (Pinedale): Mean annual temperature 48.9° F.; January average 29.4° F.; July average 69.4° F.; mean annual precipitation 18.84 inches. Parent Material: Tertiary or Quaternary stratified alluvium. Relief: Eroded old nearly level to gently rolling valley plain. Slope of 0-2 percent. Elevation: 6,400 feet. Drainage: Profile well drained; medium to rapid runoff; very slow permeability.

Remarks: Profile slightly moist when sampled. Very slight wind and water erosion. Occasional rounded pebbles ranging up to about 2 inches in diameter are in the upper horizons. 27 to 30 percent gravel and a few rounded cobbles are below a depth of 31 inches. Cobbles range up to about 5 inches in diameter. They consist principally of quartzite, granodiorite, sandstone and rhyolite. When samples were collected from the 31 to 44-inch and 44 to 52-inch horizons, a large part of the gravel larger than 1 inch in diameter was discarded. This was estimated to be about 16 percent of sample.

Classification: Ustollic Haplargid, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>56166 | 0-1" -- Brown (7.5YR 5/2) dry, black (2.5/2) moist; loam; very weak vesicular and weak coarse platy; slightly hard when dry, very friable when moist, slightly sticky when wet; many grass and tree roots; moderately permeable; noncalcareous; pH 7; abrupt, smooth lower boundary. |
| A12<br>RSL No.<br>56167 | 1-3" -- Dark grayish brown (10YR 4/2) dry, black (2/2) moist; heavy loam; moderate fine platy; slightly hard when dry, very friable when moist, slightly sticky when wet; many grass and tree roots; moderately permeable; noncalcareous; pH 7; abrupt, smooth lower boundary. |
| B1t<br>RSL No.<br>56168 | 3-12" -- Reddish brown (2.5YR 4/3) dry, (5YR 4/3) moist; heavy clay loam; moderate medium to fine subangular blocky aggregates with thin patchy clay films; hard when dry, friable when moist, very plastic and sticky when wet; many grass and tree roots; moderately slow permeability; noncalcareous; pH 7; gradual, smooth lower boundary. |
| B21t<br>RSL No.<br>56169 | 12-24" -- Reddish brown (3.5YR 4/3) dry, dark reddish brown (3/3) moist; clay; moderate coarse prisms that break to moderate very coarse and coarse angular blocky; thick continuous clay films on vertical and horizontal faces; extremely hard when dry, extremely firm when moist, very plastic and very sticky when wet; many tree roots but practically no grass roots; very slowly permeable; noncalcareous; pH 8; clear, smooth lower boundary. |
| B22tca<br>RSL No.<br>56170 | 24-31" -- Reddish brown (2.5YR 4/4) dry, (3.5/4) moist; clay with very few fine to medium prominent white lime flecks in the lower part; strong coarse to medium angular blocky; extremely hard when dry, extremely firm when moist, very plastic and sticky when wet; many slickensides at a 45° angle; few tree roots; very slowly permeable; mildly calcareous where a few flecks of lime occur in the lower portion of this horizon; pH 8; clear, wavy lower boundary. |
| C1ca<br>RSL No.<br>56171 | 31-44" -- Reddish brown (5YR 5/4) dry, (4/4) moist; gravelly clay loam with common medium, faint, light reddish brown (5YR 4/6) mottlings; massive and compact; extremely hard when dry, firm when moist, slightly sticky when wet; very few plant roots; slowly permeable strongly to very strongly calcareous; pH 8; clear, wavy lower boundary. |
| C2ca<br>RSL No.<br>56172 | 44-52" -- Reddish brown (5YR 4/4) dry, (3.5/4) moist; gravelly sandy clay loam; massive and compact; extremely hard when dry, firm when moist, slightly sticky when wet; no plant roots; moderately slow permeability; slightly calcareous; pH 7.8. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Haplargid, fine, montmorillonitic, mesic

SOIL Showlow gravelly loam SOIL Nos. S65Ariz-13-9 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65256 - 65268

| Depth (In.) | Horizon | 1B1b Total Sand (2-0 05) | Total Silt (0.05-0.002) | Total Clay (< 0.002) | Sand (Very coarse (2-1)) | Sand (Coarse (1-0.5)) | Sand (Medium (0.5-0 25)) | Sand (Fine (0 25-0.1)) | Sand (Very fine (0 1-0.05)) | Silt (0.05-0.02) | Silt (Int. III (0 02-0.002)) | Int. II (0.2-0 02) | (2-0 1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments 1A2a > 2 | 2 - 19 | 19 - 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0-2 | A1 | 53.0 | 30.4 | 16.6 | 8.9 | 11.7 | 8.3 | 13.6 | 10.5 | 18.4 | 12.0 | 35.8 | 42.5 | 0 | 17 | 34 | 22 | 12 |
| 2-5 | B1t | 42.2 | 29.8 | 28.0 | 6.1 | 8.7 | 6.6 | 11.8 | 9.0 | 17.1 | 12.7 | 32.6 | 33.2 | 0 | 28 | 26 | 13 | 13 |
| 5-14 | B21t | 32.9 | 18.0 | 49.1 | 8.2 | 8.8 | 4.6 | 6.8 | 4.5 | 9.0 | 9.0 | 16.9 | 26.4 | 0 | 49 | 21 | 15 | 6 |
| 14-22 | IIB22t | 46.5 | 12.3 | 41.2 | 16.6 | 13.7 | 5.2 | 7.3 | 3.7 | 5.5 | 6.8 | 12.9 | 42.8 | 0 | 41 | 67** | 29** | 30** |
| 22-29 | IIIB3tca | 55.8 | 14.7 | 29.5 | 18.0 | 15.6 | 7.2 | 10.6 | 4.4 | 6.3 | 8.4 | 15.8 | 51.4 | 1 | 29 | 59** | 40** | 16** |
| 29-35 | IIIC1ca | 67.9 | 13.8 | 18.3 | 17.0 | 22.6 | 12.1 | 12.0 | 4.2 | 6.7 | 7.1 | 15.9 | 63.7 | 0 | 18 | 35** | 20** | 12** |
| 35-42 | IIIC2ca | 69.7 | 11.7 | 18.6 | 14.6 | 21.6 | 12.0 | 15.7 | 5.8 | 5.7 | 6.0 | 18.7 | 63.9 | 0 | 19 | 24 | 24 | 0 |
| 42-48 | IVC3ca | | | | | | | | | | | | | | | 44 | 44 | 0 |
| 48-52 | VC4 | | | | | | | | | | | | | | | 43 | 36 | 7 |
| 52-56 | VIC5ca | | | | | | | | | | | | | | | 26 | 26 | 0 |
| 56-63 | VIIC6 | | | | | | | | | | | | | | | 35 | 35 | 0 |
| 63-71 | VIIIC7ca | | | | | | | | | | | | | | | 23 | 23 | 0 |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Carbonate as $CaCO_3$ crushed whole soil | Bulk density 4A1f 1/3 bar | Bulk density 4A1h Oven dry | Bulk density | 3B2 | Water content | Water content 4B1c 1/3 bar | Water content 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct | | Pct. | Pct. | | g/cc | g/cc | g/cc | Cm | Pct. | Pct. | Pct. | in./in. | in./in. | | | |
| 0-2 | 1.18 | 0.092 | 13 | 1.6 | - | | | | | | | | 6.6 | | | 6.4 | | |
| 2-5 | 0.78 | 0.074 | 11 | 1.8 | - | | 1.53 | 1.61 | | 0.83 | | 16.9 | 9.9 | 0.018 | 0.015 | 6.6 | | |
| 5-14 | 0.68 | 0.071 | 10 | 2.2 | - | | 1.27 | 1.51 | | 0.89 | | 33.2 | 17.8 | 0.061 | 0.053 | 7.4 | | |
| 14-22 | 0.50 | 0.056 | 9 | 2.0 | tr | | 1.52 | 1.68 | | 0.46 | | 25.1 | 15.8 | 0.033 | 0.015 | 7.7 | | |
| 22-29 | 0.20 | | | 1.5 | 8 | 5 | 1.50 | 1.57 | | 0.55 | | 21.5 | 12.3 | 0.015 | 0.008 | 8.3 | | |
| 29-35 | 0.07 | | | 1.4 | 3 | 3 | 1.57 | 1.61 | | 0.76 | | 16.1 | 8.4 | 0.008 | 0.006 | 8.3 | | |
| 35-42 | 0.03 | | | 1.3 | 2 | 2 | | | | | | | 8.3 | | | 8.2 | | |
| 42-48 | - | | | 1.4 | 5 | 8 | | | | | | | 9.3 | | | 8.2 | | |
| 48-52 | 0.02 | | | 1.3 | 1 | | | | | | | | 5.0 | | | 8.4 | | |
| 52-56 | 0.02 | | | 1.3 | 4 | 6 | | | | | | | 7.1 | | | 8.4 | | |
| 56-63 | 0.10 | | | 1.4 | 1 | | | | | | | | 5.9 | | | 8.5 | | |
| 63-71 | 0.02 | | | 1.3 | 2 | 5 | | | | | | | 6.2 | | | 8.6 | | |

| Depth (In.) | Extractable bases 5B1a 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | Cation Exch. Capacity 5A3a Sum | CEC clay | 6G1d KCl Ext. $Al^{+++}$ | Base saturation 5C1 $NH_4OAc$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | Pct | Pct |
| 0-2 | 14.9 | 5.6 | 0.1 | 0.9 | 21.5 | | 12.8 | | 77 | | 100+ | |
| 2-5 | 11.8 | 4.0 | 0.2 | 0.5 | 16.5 | | 18.9 | | 68 | | 87 | |
| 5-14 | 21.5 | 8.9 | 0.2 | 0.8 | 31.4 | | 34.0 | | 69 | | 92 | |
| 14-22 | 21.7 | 9.0 | 0.4 | 0.8 | 31.9 | | 32.3 | | 78 | | 99 | |
| 22-29 | 24.4 | 7.0 | 0.4 | 0.6 | 32.4 | | 22.4 | | 76 | | 100+ | |
| 29-35 | 23.0 | 5.7 | 0.5 | 0.4 | 29.6 | | 16.7 | | 91 | | 100+ | |
| 35-42 | 19.2 | 5.4 | 0.6 | 0.4 | 25.6 | | 16.6 | | 89 | | 100+ | |
| 42-48 | 23.4 | 6.6 | 0.8 | 0.4 | 31.2 | | 19.4 | | | | 100+ | |
| 48-52 | 14.2 | 3.8 | 0.5 | 0.2 | 18.7 | | 11.0 | | | | 100+ | |
| 52-56 | 19.4 | 4.8 | 0.7 | 0.3 | 25.2 | | 14.7 | | | | 100+ | |
| 56-63 | 15.8 | 4.3 | 0.7 | 0.3 | 21.1 | | 13.1 | | | | 100+ | |
| 63-71 | 18.2 | 4.3 | 0.8 | 0.3 | 23.6 | | 13.3 | | | | 100+ | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| 0-2 | xx | | xxx | x | |
| 2-5 | | | | | |
| 5-14 | xxx | | xx | x | |
| 14-22 | xxx | | xx | x | |
| 22-29 | | | | | |
| 29-35 | | | | | |
| 35-42 | xxx | | xx | t | |
| 42-48 | | | | | |
| 48-52 | | | | | |
| 52-56 | | | | | |
| 56-63 | | | | | |
| 63-71 | | | | | |

* Values from characterization sample (5Kg)(except as noted).

** 2-19 mm from characterization sample, 19-76 mm from field weight; >2 mm includes volume estimate of >76 mm fraction.

| Remarks: | Depth | Horizon | CEC meq /100g | Sum of bases | Carbonate as $CaCO_3$ Pct. |
|---|---|---|---|---|---|
| | 71-76" | IXC8ca | 10.0 | 16.0 | 1 |

\- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## SHOWLOW GRAVELLY LOAM

S65Ariz-13-9

Location: Western Yavapai County, Arizona. 3/4 mile east of Dewey, Arizona to Henderson Ranch headquarters, then 1½ mile northeast of headquarters. 4/10 mile north and 1/10 mile west of southeast corner of Sec. 35, T14N, R1E. Photo #203, AMS Project 134, Lot FA. Date of Sampling: May 11, 1965.
Collectors: Flach, Alexander, Nettleton, Jay, Meurisse, Wendt.
Vegetation: Grass. Three-awns, sideoats grama, black grama, ring muhly, sand dropseed and annuals. Climate: Mean annual precipitation 12". Mean annual temperature 55°F. Soil temperature at time of sampling 59°F. at 20" and 56°F. at 60". Parent Material: Alluvium from granite, schist, phyllite. Relief: Nearly level, convex, on the crest of alluvial fan on 2 percent slope with a southwest aspect. Elevation: 4,800 feet. Drainage: Medium runoff, moderately slowly permeable and well drained.
Remarks: This soil is formed in old alluvium from granite, schist, and phyllite under a grass cover. It is on nearly level to moderately steep dissected alluvial fans. Hellige-Truog field kit was used to determine pH. Paired samples are S65 Ariz-13-12 and S65 Ariz-13-18.
Classification: Ustollic Haplargid, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65256 | 0 to 2 inches, reddish brown (5YR 5/4) gravelly loam, dark reddish brown (5YR 3/4) when moist; weak fine and medium platy structure; hard, friable, slightly sticky and plastic; plentiful fine and medium roots; many fine and medium vesicular pores; 20-30 percent fine gravels with thin surface gravel pavement; noneffervescent; medium acid (pH 6.0); abrupt, smooth boundary. |
| B1t<br>RSL No.<br>65257 | 2 to 5 inches, reddish brown (5YR 4/4) sandy clay loam, dark reddish brown (5YR 3/4) when moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; abundant fine and medium roots; common fine and medium tubular and many interstitial pores; few thin clay films on ped faces; noneffervescent; neutral (pH 7.0); clear, smooth boundary. |
| B21t*<br>RSL No.<br>65258 | 5 to 14 inches, reddish brown (5YR 4/4) gravelly clay, dark reddish brown (5YR 3/4) when moist; moderate medium to coarse prismatic; breaking to moderate medium to coarse subangular and angular blocky structure; very hard, friable, slightly sticky, very plastic; plentiful fine and medium roots; few fine tubular and common fine interstitial pores; continuous thin and moderately thick clay films on ped faces and in pores; 20-30 percent gravel; noneffervescent; mildly alkaline (pH 7.5); clear smooth boundary. |
| IIB22t<br>RSL No.<br>65259 | 14 to 22 inches, yellowish red (5YR 4/6) dry and moist; gravelly clay; massive, rock controlled structure; very hard, friable, sticky and very plastic; few fine and medium roots; few fine tubular and common fine interstitial pores; many thin and moderately thick clay films on rock faces and in pores; 30-40 percent gravel; noneffervescent; neutral (pH 7.0); clear, smooth boundary. |
| IIIB3tca<br>RSL No.<br>65260 | 22 to 29 inches, yellowish red (5YR 5/6) gravelly sandy clay loam, yellowish red (5YR 4/6) when moist; massive; very hard, friable; slightly sticky and very plastic; very few fine roots; few fine tubular and many fine interstitial pores; common thin clay film in pores, as bridges and on gravels and sand grains; 30-40 percent gravel; strongly effervescent; moderately alkaline (pH 8.0); clear, wavy boundary. |
| IIIC1ca*<br>RSL No.<br>65261 | 29 to 35 inches, reddish yellow (5YR 6/6) gravelly light sandy clay loam, yellowish red (5YR 5/6) when moist; massive; hard, friable, slightly sticky and plastic; few fine roots; many fine interstitial and few fine tubular pores; few thin clay films in pores and as bridges; 30-40 percent gravels; strongly to violently effervescent; moderately alkaline (pH 8.0); clear, smooth boundary. |
| IIIC2ca<br>RSL No.<br>65262 | 35 to 42 inches, yellowish red (5YR 5/6) gravelly sandy loam, yellowish red (5YR 4/6) when moist; massive; hard, friable, slightly sticky and slightly plastic; no roots; many fine interstitial and few fine tubular pores; few thin clay films in pores and as bridges; 40-45 percent gravels; strongly to violently effervescent; moderately alkaline (pH 8.0); abrupt, smooth boundary. |
| IVC3ca<br>RSL No.<br>65263 | 42 to 48 inches, reddish yellow (5YR 6/6) very fine sandy loam, yellowish red (5YR 4/6) when moist; massive; very hard, friable, slightly sticky and plastic; few fine tubular and many fine interstitial pores; very few thin clay film in pores and as bridges; strongly to violently effervescent, fine and very fine ($CaCO_3$) filaments; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| VC4<br>RSL No.<br>65264 | 48 to 52 inches, yellowish red (5YR 5/6) very gravelly loamy sand, yellowish red (5YR 4/6) when moist with common fine and very fine ($CaCO_3$) filaments (5YR 7/4) dry and (5YR 5/4) moist; massive; loose dry and moist, nonsticky and nonplastic; many fine interstitial pores; 60-70 percent gravels; noneffervescent to slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| VIC5ca<br>RSL No.<br>65265 | 52 to 56 inches, reddish yellow (5YR 7/6) gravelly sandy loam, yellowish red (5YR 5/6) when moist; massive; hard, very friable, nonsticky and nonplastic; common fine and medium tubular and many fine interstitial pores; very few thin clay films as bridges; 30 percent gravel; strongly to violently effervescent; moderately alkaline (pH 8.0); abrupt, smooth boundary. |
| VIIC6<br>RSL No.<br>65266 | 56 to 63 inches, light reddish brown (5YR 6/4) very gravelly light sandy loam, yellowish red (5YR 4/6) when moist, common medium mottles of $CaCO_3$ (5YR 7/4) dry and (5YR 5/4) moist; massive; loose dry and moist; nonsticky and nonplastic; many fine interstitial pores; 60-70 percent gravel; noneffervescent to slightly effervescent; moderately alkaline (pH 8.0); abrupt, smooth boundary. |
| VIIIC7ca<br>RSL No.<br>65267 | 63 to 71 inches, reddish yellow (5YR 6/6) clay loam, yellowish red (5YR 4/6) when moist with common medium $CaCO_3$ filaments (5YR 7/4) dry and (5YR 5/4) moist; massive; firm, nonsticky and slightly plastic; common fine tubular and many fine interstitial pores; strongly to violently effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| IXC8ca<br>RSL No.<br>65268 | 71 to 76 inches, reddish brown (5YR 5/4) very gravelly loamy sand, reddish brown (5YR 4/4) when moist; massive; loose dry and moist; nonsticky and nonplastic; many fine interstitial pores; 70 percent gravel; noneffervescent to weakly effervescent; moderately alkaline (pH 8.0); abrupt, smooth boundary. |

*Sampled for BPR. B21t and IIB22t horizons were combined in sample for BPR.
C1 through C8 horizons combined in sample for BPR.

CONSECUTIVE PEDON NUMBER C 68133 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CARALAMPI TAXADJUNCT SOIL NO. S68 ARIZ. 12- 5 SAMPLE NO. 8 987-8 988 E.PIMA-SANTA CRU AREA

SOIL FAMILY: USTOLLIC HAPLARGID FINE,MONTMORILLONITIC,THERM RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | SANDS CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II PCT. OF WHOLE SOIL | COARSE FRAGMENTS I 75- 20 PCT. OF LT 75 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 8 987 | 0- 38 | A | 51.5 | 14.8 | 33.7 | 6.2 | 13.6 | 9.5 | 14.6 | 7.6 | 5.8 | 9.0 | | | | 21.6 | 61* | 30 | 18 | 11 |
| 8 988 | 13- 63 | B T | 60.2 | 3.5 | 36.3 | 29.8 | 20.0 | 6.5 | 3.3 | 0.6 | 2.1 | 1.4 | | | | 3.9 | 44* | 5 | 20 | 17 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A -PERCENT- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B -PERCENT- | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L L 4F1 PCT.NO.40 | P L 4F2 | I 4A1F | M 1/3 BAR 4A1F | I T EST. 1/3 BAR 4A1H | BULK DENSITY DRY 3B2 GRAMS PER CC | CM | WATER CONTENT 1/10 BAR 4B1C -PERCENT- | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 -PERCENT- | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 987 | 0- 38 | 0.98 | 0.087 | | | | | | | | | | | 1.13 | 0.60 | | | | 13.4 | | |
| 8 988 | 13- 63 | | | | | | | | | | | | | 1.35 | 0.71 | | | | 15.4 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA- CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 8 987 | 0- 38 | | | | | | | | | | | | | | | |
| 8 988 | 13- 63 | 11.4 | 10.5 | 0.7 | 1.3 | 23.9 | | | 23.9 | 24.9 | 100+ | | 96 | | 6.5 | 6.1 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM MINERAL X RAY 7A2E I | 7A2E II | 7A2E III | CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 987 | 0- 38 | | | | | | | | | | | 1 TRACE |
| 8 988 | 13- 63 | MT 5 | KK 1 | | | | | | | | MT MONTMORT<br>KK KAOLINIT | 2 SMALL<br>3 MODERATE<br>4 ABUNDANT<br>5 DOMINANT<br>6 INDETER. |

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.

## CARALAMPI VERY GRAVELLY SANDY LOAM (taxadjunct) 1/

S68 Ariz-12-5-1 through 7

Location: Santa Cruz County, Arizona, 6 miles NW of Nogales, .45 miles south-southeast of Ruby Road on west side of old Ruby Road in road cut. Approximately 1900 feet south and 200 feet east of the NW corner Section 14, T23S, R13E. Photo AMS-673. Date of Sampling: October 17, 1968.
Description by: Richardson and Clemmons. Collectors: Nettleton and Brasher.
Classification: Ustollic Haplargid, fine, montmorillonitic, thermic.
Vegetation: Grass-shrub. Shrubs: Mesquite, guajillo and mimosa. Grasses: Sideoats, purple grama, canebeard grass, sprucetop grass. Climate: Mean annual temperature 62.3°F. Mean annual precipitation 14-16 inches. Parent Material: Old alluvium from granite, andesite, rhyolite and related tuffs. Topography: Dissected old alluvial fans. 12 percent slope, east aspect. Elevation: 3,975 feet.
Drainage: Well drained. Medium runoff. Soil moisture: Dry.
Remarks: Composite sample taken to determine coarse fragment content.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-5 cm) |
| A1 | 0 to 2 inches, brown (7.5YR 5/4) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; weak medium platy structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine and few medium roots; many fine interstitial pores; 50 percent gravel, 5 percent cobble; noneffervescent; neutral (pH 6.8); abrupt smooth boundary. |
| A3 or B1 (2-13 cm) | 2 to 5 inches, dark brown (7.5YR 4/2) very gravelly sandy clay loam, dark brown (7.5YR 3/2) moist; weak fine and medium subangular blocky structure; hard, friable, slightly sticky and plastic; many fine and very fine roots; common fine interstitial and tubular pores; 50 percent gravel; noneffervescent; neutral (pH 7.0); abrupt wavy boundary. |
| B21t (13-30 cm) | 5 to 12 inches, yellowish red (5YR 5/6) gravelly heavy clay loam, yellowish red (5YR 4/6) moist; weak fine and medium subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine and few medium roots; few fine and very fine tubular pores; few thin clay films on ped faces and in pores; 40 percent gravel; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| B22t (30-43 cm) | 12 to 17 inches, reddish brown (5YR 5/3) very gravelly heavy clay loam, reddish brown (5YR 4/3) moist; weak medium subangular blocky structure; very hard, friable, sticky and plastic; common fine and very fine and few medium roots; few fine and very fine tubular pores; common thin clay films on ped faces and in pores; 55 percent gravel; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| B31t (43-69 cm) | 17 to 27 inches, reddish brown (5YR 5/4) very gravelly heavy clay loam, dark reddish brown (5YR 3/4) moist; massive; very hard, friable, sticky and plastic; few fine and very fine and few medium roots; few fine and very fine tubular pores; common thin clay films on ped faces and in pores; 55 percent gravel; noneffervescent; neutral (pH 7.2); clear wavy boundary. |
| B32t (69-94 cm) | 27 to 37 inches, yellowish red (5YR 5/6) very gravelly sandy clay loam, yellowish red (5YR 5/6) moist; massive; very hard, friable, sticky and plastic; few fine, very fine and medium roots; few fine and very fine tubular pores; few thin clay films on ped faces; 60 percent gravel; noneffervescent; mildly alkaline (pH 7.4); abrupt wavy boundary. |
| B33t (94-130 cm) | 37 to 51 inches, yellowish red (5YR 5/6) very gravelly heavy clay loam, yellowish red (5YR 4/6) moist; massive; very hard, friable, sticky and plastic; few very fine and medium roots; common fine and very fine tubular pores; few thin clay films in pores and on ped faces; 65 percent gravel; noneffervescent; mildly alkaline (pH 7.8). |
| Composite A | (0-38 cm) |
| 68987 | 0 to 15 inches sample collected from the road cut. |
| Composite B | 5 to 25 inches sample of upper 20 inches of the argillic horizon from |
| 68988 | the road cut. |
| | (13-63 cm) |

1/ The Caralampi series is in a loamy-skeletal, mixed, thermic family of Ustollic Haplargids. This pedon has less than 35 percent coarse fragments by volume and more than 35 percent clay by weight in its control section.

CONSECUTIVE PEDON NUMBER C 69152 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES STEWART TAXADJUNCT SOIL NO. S69 ARIZ. 2- 6 SAMPLE NO. 9 780-9 788 WILLCOX AREA

SOIL FAMILY: TYPIC NADURARGID,LOAMY,MIXED,THERMIC,SHALLOW RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 9 780 | 0- 5 | A21 | 63.6 | 31.9 | 4.5 | 2.1 | 6.5 | 7.3 | 27.4 | 20.3 | 16.8 | 15.1 | | | | 55.1 | --A | -- | -- |
| 9 781 | 5- 15 | A22SA | 50.1 | 36.6 | 13.3 | 1.6 | 4.8 | 5.5 | 21.7 | 16.5 | 15.5 | 21.1 | | | | 46.2 | --A | -- | -- |
| 9 782 | 15- 23 | B2 SA | 56.3 | 25.6 | 18.1 | 1.6 | 8.9 | 9.0 | 22.0 | 14.8 | 11.9 | 13.7 | | | | 40.1 | --A | -- | -- |
| 9 783 | 23- 46 | C1SASIM | 64.2 | 30.6 | 5.2 | 1.6 | 5.9 | 9.3 | 28.1 | 19.3 | 17.0 | 13.6 | | | | 51.8 | --A | -- | -- |
| 9 784 | 46- 56 | C2SASIM | 55.1 | 34.0 | 10.9 | 1.3 | 4.1 | 7.6 | 30.1 | 12.0 | 17.7 | 16.3 | | | | 45.3 | --A | -- | -- |
| 9 785 | 56- 84 | C3SAG | 56.2 | 31.0 | 12.8 | 1.5 | 3.5 | 4.8 | 28.7 | 17.7 | 18.3 | 12.7 | | | | 54.1 | --A | -- | -- |
| 9 786 | 84- 94 | C4SAG | 91.2 | 7.2 | 1.6 | 3.4 | 11.1 | 21.4 | 43.7 | 11.6 | 5.0 | 2.2 | | | | 38.4 | --A | -- | -- |
| 9 787 | 94-107 | C5SAG | 48.7 | 36.7 | 14.6 | 7.2 | 6.7 | 5.8 | 15.0 | 14.0 | 23.6 | 13.1 | | | | 46.5 | --A | -- | -- |
| 9 788 | 28- 38 | C1SASIM | | | | | | | | | | | | | | | --G | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-19 6E1B | EXT. IRON FE 6C2B | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSIBLTY LEF | LE | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 9 780 | 0- 5 | 0.52 | 0.039 | TR | | 0.2 | NP | NP | | 1.56 | 1.58 | 1.00 | | 8.9 | 3.0 | 0.4 | 0.4 | 7.4 | | 7.3 |
| 9 781 | 5- 15 | 0.27 | 0.031 | 6 | | 0.2 | | | | 1.62 | 1.66 | 1.00 | | 12.5 | 5.7 | 0.8 | 0.8 | 9.6 | 10.3 | 9.4 |
| 9 782 | 15- 23 | 0.23 | | 4 | | 0.2 | NP | NP | | 1.52 | 1.56 | 1.00 | | 19.4 | 15.3 | 0.9 | 0.9 | 10.1 | 10.4 | 10.0 |
| 9 783 | 23- 46 | | | 1 | | 0.3 | | | | 1.60 | 1.63 | 1.00 | | 21.7 | 9.1 | 0.6 | 0.6 | 9.9 | 10.1 | 9.7 |
| 9 784 | 46- 56 | | | TR | | 0.3 | | | | 1.52 | 1.63 | 1.00 | | 22.1 | 9.4 | 2.4 | 2.4 | 9.8 | 10.3 | 9.6 |
| 9 785 | 56- 84 | | | 1 | | 0.2 | | | | 1.52 | 1.70 | 1.00 | | 22.6 | 9.0 | 3.8 | 3.8 | 9.8 | 10.2 | 9.6 |
| 9 786 | 84- 94 | | | TR | | 0.1 | | | | 1.60 | 1.73 | 1.00 | | 15.0 | 1.5 | 2.6 | 2.6 | 9.4 | 10.0 | 8.7 |
| 9 787 | 94-107 | | | 3 | | 0.1 | | | 1.60 | | | 1.00 | | | 9.5 | | | 9.7 | 10.4 | 9.7 |
| 9 788 | 28- 38 | | | | | | | | | 1.62 | 1.65 | 1.00 | | 20.9 | | 0.6 | 0.6 | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6Q1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | 8A1 SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | ----------MEQ/1000 ML---------- | | | | | | | | PPM | |
| 9 780 | 0- 5 | | | 1.9 | 1.7 | 3.6 | | | 8.4 | | | | | | | | | | | |
| 9 781 | 5- 15 | | | 22.4 | 1.6 | 24.0 | | | 17.2 | 12.1 | 0.7 | 0.2 | 154.0 | 0.5 | 4.5 | 28.0 | 17.7 | 110.8 | | 8.9 |
| 9 782 | 15- 23 | | | 54.1 | 1.9 | 56.0 | | | 34.5 | 15.9 | 0.4 | 0.1 | 218.0 | 0.3 | 31.5 | 26.3 | 21.1 | 140.4 | | 9.7 |
| 9 783 | 23- 46 | | | 32.0 | 0.9 | 32.9 | | | 25.1 | 5.25 | 0.7 | 0.2 | 74.3 | 0.2 | 13.4 | 12.3 | 5.6 | 28.7 | | 9.9 |
| 9 784 | 46- 56 | | | 27.4 | 0.8 | 28.2 | | | 21.9 | 4.77 | 1.3 | 0.6 | 58.8 | 0.1 | 11.1 | 12.7 | 8.3 | 25.3 | | 9.7 |
| 9 785 | 56- 84 | | | 22.4 | 0.7 | 23.1 | | | 19.0 | 5.47 | 5.5 | 0.2 | 69.4 | 0.1 | 13.4 | 12.5 | 8.3 | 32.4 | | 9.7 |
| 9 786 | 84- 94 | | | 4.9 | 0.1 | 5.0 | | | 4.0 | 2.44 | 0.6 | 0.2 | 39.5 | 0.2 | 8.2 | 6.7 | 3.9 | 10.1 | | 9.4 |
| 9 787 | 94-107 | | | 20.6 | 0.4 | 21.0 | | | 16.1 | 6.3 | 0.3 | 0.1 | 82.0 | 0.1 | 13.8 | 13.1 | 8.7 | 37.4 | | 9.6 |
| 9 788 | 28- 38 | | | | | | | | | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT 8A PCT. | NA SAT. 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 780 | 0- 5 | | 1.9 | 23 | | | | MI 3 | | | | | | | |
| 9 781 | 5- 15 | 27.0 | 18.2 | 100+ | 100+ | | | MI 4 | KK 1 | | | | | | |
| 9 782 | 15- 23 | 45.0 | 44.3 | 100+ | 100+ | | | MI 3 | | | | | | | |
| 9 783 | 23- 46 | 39.3 | 29.1 | 100+ | 100+ | | | MT 3 | MM 3 | MI 3 | KK 1 | | | | |
| 9 784 | 46- 56 | 38.5 | 25.1 | 100+ | 60 | | | | | | | | | | |
| 9 785 | 56- 84 | 37.2 | 19.8 | 100+ | 41 | | | | | | | | | | |
| 9 786 | 84- 94 | 27.0 | 3.8 | 96 | 62 | | | MI 3 | MT 1 | KK 1 | | | | | |
| 9 787 | 94-107 | 41.4 | 17.2 | 100+ | 100+ | | | | | | | | | | |
| 9 788 | 28- 38 | | | | | | | | | | | | | | |

| MINERAL CODE | RELATIVE AMOUNT |
|---|---|
| MI MICA | 1 TRACE |
| KK KAOLINIT | 2 SMALL |
| MT MONTMORT | 3 MODERATE |
| MM MT/MICA | 4 ABUNDANT |
| | 5 DOMINANT |
| | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## STEWART FINE SANDY LOAM (taxadjunct) 1/
S69Ariz-2-6

Location: Cochise County, Arizona. 2,500 feet east and 850 feet north of the southwest corner of Sec. 11, T. 14 S., R. 24 E. East of U. S. Highway 666, about 2½ miles southwest of Willcox.
Date of sampling: October 15, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Nadurargid, loamy, mixed, thermic, shallow.
Vegetation: Alkali sacaton, alkali lovegrass, and spike dropseed. Use: Livestock range. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 58°F., January 41°F., July 78°F. Parent Material: Alluvium, principally from rhyolite, andesite, quartzite and granite. Topography: Level and nearly level flats and low terraces bordering playas. Slope, 0.2 percent, southwest facing. Elevation: 4200 feet. Drainage: Somewhat poorly drained. Runoff is slow. Permeability is very slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by hymol lue indicator in 1:5 dilution. This sample was not paired. The horizons designated as sa show an almost complete coating of salt crystals on exposed surfaces and pit banks when given time and opportunity to dry out.

| HORIZON | DESCRIPTION |
|---|---|
| A21<br>RSL<br>69780 | 0 to 5 cm (0 to 2 inches), light gray (10YR 7/2) fine sandy loam, grayish brown (10YR 5/2) moist; moderate thin platy structure; slightly hard, very friable, nonsticky, nonplastic; many fine and medium roots; many fine and medium vesicular and few fine tubular pores; slightly effervescent; very strongly alkaline (pH 9.4); abrupt smooth boundary. |
| A22sa<br>RSL<br>69781 | 5 to 15 cm (2 to 6 inches), light gray (10YR 7/2) fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; many fine and medium roots; common fine tubular pores; slightly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| B2sa<br>RSL<br>69782 | 15 to 23 cm (6 to 9 inches), brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; weak fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many fine and medium roots; few fine tubular pores; few thin clay films in pores; some very dark gray stains on ped faces; slightly effervescent; very strongly alkaline (pH 9.6); abrupt smooth boundary. |
| C1sasim<br>RSL<br>69783* | 23 to 46 cm (9 to 18 inches), light yellowish brown (10YR 6/4) lime-silica cemented hardpan, dark yellowish brown (10YR 4/4) moist; massive; extremely hard, very firm; common very fine and fine roots; many fine and very fine vesicular and tubular pores; many dark gray stains on part of the surface, underside and on joint faces of the pan, brownish yellow coating in old root channels; few fine filaments of lime; slightly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| C2sasim<br>RSL<br>69784 | 46 to 56 cm (18 to 22 inches), light gray (10YR 7/2) lime-silica cemented hardpan, grayish brown (10YR 4/2) moist; massive; very hard, very firm; many fine and very vesicular and tubular pores; slightly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| C3sag<br>RSL<br>69785 | 56 to 84 cm (22 to 33 inches), light gray (10YR 7/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable, slightly sticky, slightly plastic; common fine and very fine vesicular and tubular and few coarse tubular pores; few thin clay films in old root channels; slightly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| C4sag<br>RSL<br>69786 | 84 to 94 cm (33 to 37 inches), light gray (10YR 7/1 and 7/2 and 2.5YR 7/2) very fine sand and loamy sand in 1 to 6 inch strata; grayish brown (10YR 5/2) and (2.5Y 5/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; many very fine interstitial pores; very slightly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| C5sag<br>RSL<br>69787 | 94 to 107 cm (37 to 42 inches), pale yellow (5Y 7/3) and light gray (2.5Y 7/2) loam, sandy loam and loamy sand in 1 to 6 inch strata; olive (5Y 4/3) and dark grayish (2.5Y 4/2) moist, the coarser textures normally have the lighter and yellower colors; massive; hard, firm to friable, nonsticky, non-to slightly plastic; few fine tubular pores; slightly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| C6sag | 107 to 130 cm (42 to 51 inches), pale yellow (5Y 7/3) sand, olive (5Y 5/3) moist; single grain; loose, nonsticky, nonplastic; common fine interstitial pores; about 5 to 8 percent by volume 2 to 5 mm subangular quartz gravel; slightly effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| C7sag | 130 to 152 cm (51 to 60 inches), pale yellow (5Y 7/3) stratified loamy sand and sandy loam, olive (5Y 5/3) moist; massive; hard, friable, slightly sticky, slightly plastic; contains about 2 to 3 percent by volume of 2 to 5 mm subangular quartz gravel; 8 to 10 percent by volume of large irregularly shaped white soft lime masses; slightly to violently effervescent; very strongly alkaline (pH 9.6). |
| *C1sasim<br>RSL<br>69788 | 28 to 38 cm (11 to 15 inches), special sample. |

1/ The Stewart series is in a loamy, mixed, thermic family of Typic Durorthids. This pedon has a natric horizon.

CONSECUTIVE PEDON NUMBER C 69153 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES DUNCAN TAXADJUNCT SOIL NO. S69 ARIZ. 2- 7 SAMPLE NO. 9 789-9 797 WILLCOX AREA

SOIL FAMILY: TYPIC NADURARGID,VERY-FINE,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | SILTS VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2- .02 | COARSE FRAGMENTS OF WHOLE SOIL | I 75- 20 PCT. | II 20-5 OF LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 9 789 | 0- 5 | A21 | 53.0 | 38.6 | 8.4 | 1.7 | 5.2 | 6.4 | 21.8 | 17.9 | 22.8 | 15.8 | | 17.7 | | 54.5 | --A | -- | -- | -- |
| 9 790 | 5- 13 | A22 | 45.7 | 44.6 | 9.7 | 1.6 | 4.5 | 5.0 | 19.4 | 15.2 | 22.5 | 22.1 | 8.9 | 0.8 | | 50.3 | --A | -- | -- | -- |
| 9 791 | 13- 28 | B21T | 23.1 | 36.3 | 40.6 | 1.2 | 2.7 | 2.7 | 8.9 | 7.6 | 13.3 | 23.0 | 39.9 | 0.7 | 5 | 26.3 | --A | -- | -- | -- |
| 9 792 | 28- 48 | B22TSA | 24.2 | 39.0 | 36.8 | 2.6 | 3.6 | 2.6 | 7.3 | 8.1 | 12.2 | 26.8 | 31.8 | 5.0 | 3 | 24.9 | --A | -- | -- | -- |
| 9 793 | 48- 79 | B23TSA | 21.1 | 30.3 | 48.6 | 0.4 | 1.6 | 2.0 | 7.5 | 9.6 | 12.8 | 17.5 | 45.4 | 3.2 | 10 | 27.3 | --A | -- | -- | -- |
| 9 794 | 79- 89 | B3CASA | 15.6 | 33.0 | 51.4 | 2.2 | 2.8 | 1.8 | 3.9 | 4.9 | 8.0 | 25.0 | 51.1 | 0.3 | 16 | 15.3 | --A | -- | -- | -- |
| 9 795 | 89-100 | CCASIM | 70.7 | 16.4 | 12.9 | 18.6 | 20.5 | 10.7 | 14.4 | 6.5 | 6.4 | 10.0 | | | 4 | 20.2 | --G | -- | -- | -- |
| 9 796 | 100-115 | B21TCAB | 27.0 | 31.2 | 41.8 | 4.8 | 6.5 | 4.0 | 6.8 | 4.9 | 6.6 | 24.6 | | | 1 | 15.4 | --A | -- | -- | -- |
| 9 797 | 115-150 | B22TB | 31.2 | 27.9 | 40.9 | 1.2 | 3.7 | 4.3 | 12.5 | 9.5 | 9.6 | 18.3 | | | | 27.0 | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L I M I T LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 9 789 | 0- 5 | 0.64 | 0.066 | TR | | 0.3 | NP | NP | | 1.62 | 1.64 | 1.00 | | 11.9 | 4.9 | 0.4 | 0.4 | 7.9 | | 7.8 |
| 9 790 | 5- 13 | 0.37 | 0.041 | TR | | 0.3 | | | | 1.68 | 1.72 | 1.00 | | 12.5 | 4.6 | 0.8 | 0.8 | 8.4 | | 7.6 |
| 9 791 | 13- 28 | 0.56 | 0.063 | 12 | | 0.2 | 62 | 27 | | 1.35 | 1.59 | 1.00 | | 27.5 | 25.0 | 5.6 | 5.6 | 8.8 | 10.1 | 8.9 |
| 9 792 | 28- 48 | 0.32 | | 17 | | 0.1 | | | | 1.13 | 1.36 | 1.00 | | 35.4 | 26.2 | 6.4 | 6.4 | 9.4 | 10.3 | 9.4 |
| 9 793 | 48- 79 | 0.29 | | 19 | | 0.2 | 64 | 23 | | 1.23 | 1.70 | 1.00 | | 37.1 | 30.9 | 11.4 | 11.4 | 9.8 | 10.4 | 9.9 |
| 9 794 | 79- 89 | | | 44 | | 0.1 | | | 1.25 | | | 1.00 | | | 36.2 | | | 9.7 | 10.4 | 9.7 |
| 9 795 | 89-100 | | | 80 | | 0.1 | | | | 2.19 | 2.20 | 1.00 | | 5.8 | 7.3 | 0.2 | 0.2 | 9.4 | 10.2 | 8.6 |
| 9 796 | 100-115 | | | 28 | | 0.4 | 72 | 28 | 1.15 | | | 1.00 | | | 26.1 | | | 8.8 | 10.0 | 8.8 |
| 9 797 | 115-150 | | | 1 | | 0.7 | | | | 1.12 | 1.52 | 1.00 | | 37.0 | 34.7 | 10.7 | 10.7 | 8.5 | | 8.5 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | WATER EXTRACT FROM SATURATED PASTE EC 8A1A | CA 6N1B | MG 6Q1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 9 789 | 0- 5 | | | 1.7 | 1.8 | 3.5 | | | 10.6 | | | | | | | | | | | |
| 9 790 | 5- 13 | | | 3.2 | 1.5 | 4.7 | | | 10.3 | | | | | | | | | | | |
| 9 791 | 13- 28 | | | 41.5 | 1.7 | 43.2 | | | 32.9 | 2.33 | 0.4 | 0.2 | 40.5 | 0.1 | 1.0 | 14.4 | 5.9 | 3.9 | | 8.4 |
| 9 792 | 28- 48 | | | 50.6 | 1.8 | 52.4 | | | 35.0 | 4.66 | 0.3 | 0.1 | 58.2 | 0.1 | 7.5 | 13.6 | 15.7 | 16.1 | | 9.0 |
| 9 793 | 48- 79 | | | 53.9 | 1.7 | 55.6 | | | 37.1 | 7.9 | 0.5 | 0.6 | 104.0 | 0.1 | 34.2 | 23.4 | 13.4 | 30.5 | | 9.9 |
| 9 794 | 79- 89 | | | 49.5 | 1.3 | 50.8 | | | 32.2 | 5.36 | 0.5 | 0.3 | 65.8 | 0.1 | 19.6 | 16.2 | 8.0 | 18.1 | | 9.9 |
| 9 795 | 89-100 | | | 10.8 | 0.6 | 11.4 | | | 11.4 | 2.06 | 0.2 | 0.1 | 23.7 | 0.1 | 2.9 | 15.1 | 2.0 | | | 9.0 |
| 9 796 | 100-115 | | | 24.2 | 1.1 | 25.3 | | | 30.6 | 1.49 | 0.2 | 0.1 | 16.9 | 0.1 | 2.4 | 10.3 | 2.2 | | | 8.7 |
| 9 797 | 115-150 | | | 22.5 | 0.9 | 23.4 | | | 34.1 | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT 8A SAT. PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA PCT. 7A3 | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 789 | 0- 5 | | 1.7 | 16 | | | | MI 3 | MT 1 | KK 1 | | | | | | MI MICA | 1 TRACE |
| 9 790 | 5- 13 | | 3.2 | 31 | | | | MI 2 | | | | | | | | MT MONTMORT | 2 SMALL |
| 9 791 | 13- 28 | 94.1 | 37.7 | 100+ | 74 | | | MI 2 | MT 1 | | | | | | | KK KAOLINIT | 3 MODERATE |
| 9 792 | 28- 48 | 80.3 | 45.9 | 100+ | 100+ | | | MT 3 | MI 2 | | | | | | | | 4 ABUNDANT |
| 9 793 | 48- 79 | 117.1 | 41.7 | 100+ | 100+ | | | MI 3 | MT 2 | KK 1 | | | MT 5 | | | | 5 DOMINANT |
| 9 794 | 79- 89 | 149.6 | 39.7 | 100+ | 100+ | | | MT 3 | MI 3 | | | | | | | | 6 INDETER. |
| 9 795 | 89-100 | 32.8 | 10.0 | 88 | 61 | | | MT 3 | MI 3 | KK 1 | | | | | | | |
| 9 796 | 100-115 | 86.7 | 22.7 | 74 | 44 | | | MI 3 | MT 2 | KK 1 | | | | | | | |
| 9 797 | 115-150 | | 22.5 | 66 | | | | MI 3 | MT 1 | KK 1 | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

DUNCAN LOAM (taxadjunct) 1/
S69Ariz-2-7

Location: Cochise County, Arizona. 100 feet north and 2200 feet east of the SW corner, Section 23, T13S, R24E. About 2 miles west and 2 miles north of Willcox. Date of Sampling: October 15, 1969. Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan. Classification: Typic Nadurargid, very-fine, mixed, thermic. Vegetation: Alkali sacaton and scattered mesquite. Use: Livestock forage. Climate: Precipitation is about 11 to 12 inches. Mean annual air temperature 58°F., January 41°F., July 77°F. Parent Material: Alluvium, principally from andesite, rhyolite, granite, and limestone. Topography: Nearly level old alluvial flats bordering playas. Slopes slightly convex, 0.2 percent, southwest facing. Elevation: 4192 feet. Drainage: Well drained. Runoff is slow. Permeability is very slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This sample was not paired. Exposed surfaces in the 5 upper horizons develop a coating of salt crystals upon drying.

| HORIZON | DESCRIPTION |
|---|---|
| A21<br>RSL<br>69789 | 0 to 5 cm (0 to 2 inches), light gray (10YR 7/2) loam, dark grayish brown (10YR 4/2) moist; weak thick platy structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; common fine, medium and coarse vesicular and tubular pores; slightly effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. |
| A22<br>RSL<br>69790 | 5 to 13 cm (2 to 5 inches), light gray (10YR 7/2) loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; many fine and medium roots; common very fine, fine and medium vesicular and few tubular pores; slightly effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary. |
| B21t<br>RSL<br>69791 | 13 to 28 cm (5 to 11 inches), brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; moderate medium prismatic breaking to strong medium and coarse angular and subangular blocky structure; hard, friable, sticky, plastic; many fine and medium and few coarse roots; common moderately thick clay films on ped faces; a few fine white (10YR 8/2) irregularly shaped soft masses of $CaCO_3$, light brownish gray moist; slightly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| B22tsa<br>RSL<br>69792 | 28 to 48 cm (11 to 19 inches), light brown (7.5YR 6/4) clay loam or clay, dark brown (7.5YR 4/4) moist; light brownish gray (10YR 6/2) moist; moderate medium prismatic breaking to moderate fine and medium subangular and angular blocky structure; hard, friable, sticky, plastic; many fine and medium and few coarse roots; few fine tubular pores; common thin clay films on ped faces; a few fine white (10YR 8/2) irregularly shaped soft masses of $CaCO_3$, light brownish gray moist; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| B23tsa<br>RSL<br>69793 | 48 to 79 cm (19 to 31 inches), pinkish gray (7.5YR 7/2) clay, brown (7.5YR 5/4) moist; light brownish gray (10YR 6/2) moist; moderate fine subangular blocky structure; very hard, friable, sticky, very plastic; common fine and medium and few coarse roots; few very fine tubular pores; common thin clay films on ped faces; a few fine white (10YR 8/2) irregularly shaped soft masses of $CaCO_3$, light brownish gray moist; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| B3casa<br>RSL<br>69794 | 79 to 89 cm (31 to 35 inches), pinkish gray (7.5YR 7/2) clay, brown (7.5YR 5/4) moist; moderate fine and medium subangular blocky structure; very hard, friable, sticky, plastic; few medium roots; common very fine tubular pores; few thin clay films on ped faces; many medium and large white (10YR 8/2) irregularly shaped soft masses of $CaCO_3$, pale brown when moist; violently effervescent; very strongly alkaline (pH 9.6); abrupt smooth boundary. |
| Ccasim<br>RSL<br>69795 | 89 to 100 cm (35 to 39½ inches), very pale brown (10YR 7/3) and light yellowish brown (10YR 6/4) silica-lime cemented pan (duripan), yellowish brown (10YR 5/4) and brown (7.5YR 5/4) moist; massive; extremely hard; few fine and coarse roots in fractures; few very fine vesicular pores; violently effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. |
| B21tcab<br>RSL<br>69796 | 100 to 115 cm (39½ to 45½ inches), mottled reddish brown (5YR 5/4) and pinkish white (7.5YR 8/2) gravelly clay loam, reddish brown (5YR 4/4) and light brown (7.5YR 6/4) moist; moderate medium subangular blocky structure; very hard, friable, sticky, plastic; few fine tubular pores; common thin clay films on ped faces; approximately 10 to 12 percent by volume of rounded silica-lime cemented nodules (durinodes) 1/4 to 1-1/2 inches in diameter, many medium and large irregularly shaped soft masses of $CaCO_3$; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary. |
| B22tb<br>RSL<br>69797 | 115 to 150 cm (45½ to 59 inches), reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky, plastic; common very fine and fine tubular pores; common thin clay films on ped faces and in pores; few fine salt crystals and few fine irregularly shaped soft masses of $CaCO_3$; slightly effervescent; moderately alkaline (pH 8.4). |

1/ The Duncan series is in a fine, mixed, thermic family of Typic Nadurargids. This pedon calculates to have more than 35 percent clay.

CONSECUTIVE PEDON NUMBER C 71 4 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA TAXADJUNCT SOIL NO. S71 ARIZ. 10- 4 SAMPLE NO. 1 18-1 25 ORGAN PIPE MON AREA

SOIL FAMILY: TYPIC NATRARGID,CLAYEY-SKELETAL,ILLTC,HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS-- CSI .05- .02 | FSI .02- .002 | CLAYS---- CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | INT. COARSE FRAGMENTS- II .2- .02 WHOLE 20 | PCT. OF | I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | SOIL | PCT. OF | LT 75 | | |
| 1 | 18 | 0- | 4 | A2 | 45.0 | 40.2 | 14.8 | 4.8 | 4.6 | 3.5 | 12.5 | 19.6 | 16.3 | 23.9 | 12.9 | 1.9 | | 44.5 | 30A | 14 | 12 | 4 |
| 1 | 19 | 4- | 8 | A3 | 49.8 | 28.6 | 21.6 | 8.5 | 7.6 | 4.2 | 11.1 | 18.4 | 12.2 | 16.4 | 18.2 | 3.4 | | 38.2 | 30A | 9 | 15 | 7 |
| 1 | 20 | 8- | 15 | B21TSA | 37.9 | 21.5 | 40.6 | 7.9 | 5.4 | 2.6 | 7.4 | 14.6 | 10.0 | 11.5 | 31.8 | 8.8 | | 29.7 | 44A | 20 | 17 | 8 |
| 1 | 21 | 15- | 28 | B22TSA | 33.4 | 18.2 | 48.4 | 9.8 | 5.7 | 2.2 | 5.0 | 10.7 | 9.4 | 8.8 | 30.5 | 17.9 | | 23.4 | 60A | 27 | 24 | 9 |
| 1 | 22 | 28- | 43 | B3TCASA | 53.4 | 21.0 | 25.6 | 23.4 | 10.5 | 3.9 | 5.7 | 9.9 | 9.6 | 11.4 | 14.0 | 11.6 | 2 | 22.8 | 73A | 34 | 28 | 11 |
| 1 | 23 | 43- | 55 | C 1CA | 65.8 | 18.0 | 16.2 | 31.3 | 16.2 | 5.0 | 5.5 | 7.8 | 8.3 | 9.7 | | | 1 | 18.9 | 66A | 32 | 16 | 18 |
| 1 | 24 | 55- | 74 | C 2CA | 70.1 | 15.4 | 14.5 | 34.5 | 15.2 | 6.1 | 7.4 | 6.9 | 6.2 | 9.2 | | | TR | 17.1 | 66A | 20 | 26 | 20 |
| 1 | 25 | 74- | 107 | C 3CA | | | | | | | | | | | | | | | 62A | 8 | 26 | 28 |

| SAMPLE NO. | | DEPTH CM. | | ORG. CAR- BON 6A1A -PERCENT-- | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2 19-2 6E1B -PERCENT- | EXT. IRON FE 6C2B PCT. | ATTERBERG L I M I T LL 4F1 PCT. | PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F GRAMS | DRY 4A1H PER CC | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C ----PERCENT--- | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | -----PH------- H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 18 | 0- | 4 | 0.13 | 0.017 | 2 | | 0.6 | | | | 1.46 | 1.50 | 0.81 | 19.8 | 17.2 | 7.6 | 0.9 | 0.7 | 8.0 | 8.8 | 8.0 |
| 1 | 19 | 4- | 8 | 0.13 | 0.021 | 4 | | 0.6 | | | 1.46 | | | 0.81 | | | 8.1 | | | 7.8 | 8.2 | 7.8 |
| 1 | 20 | 8- | 15 | 0.18 | | 1 | | 0.7 | | | | 1.31 | 1.40 | 0.72 | 24.0 | 18.9 | 11.8 | 2.2 | 1.6 | 7.7 | 8.0 | 7.8 |
| 1 | 21 | 15- | 28 | 0.24 | | 2 | | 0.7 | | | 1.31 | | | 0.57 | | | 16.7 | | | 7.7 | 7.9 | 7.7 |
| 1 | 22 | 28- | 43 | 0.05 | | 16 | | 0.3 | | | | 0.75 | 0.80 | 0.57 | 73.1 | 68.3 | 11.4 | 2.2 | 1.2 | 7.6 | 8.2 | 7.7 |
| 1 | 23 | 43- | 55 | 0.07 | | 15 | | 0.3 | | | | 0.89 | 0.93 | 0.61 | 41.3 | 37.7 | 9.2 | 1.5 | 0.9 | 7.8 | 8.3 | 7.6 |
| 1 | 24 | 55- | 74 | 0.12 | | 8 | | 0.3 | | | | 1.14 | 1.18 | 0.55 | 30.0 | 25.2 | 7.8 | 1.2 | 0.6 | 7.8 | 8.4 | 7.7 |
| 1 | 25 | 74- | 107 | | | 5 | | | | | 1.14 | | | 0.59 | | | 6.8 | | | 8.0 | 8.4 | 7.8 |

| SAMPLE NO. | | DEPTH CM. | | ----EXTRACTABLE BASES--- CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | --C E C-- NA- OAC 5A2A -MEQ/100G | NH4- OAC 5A6A | ------WATER EXTRACT FROM SATURATED PASTE 8A1 ----- EC 8A1A MMHO | CA 6N1A | MG 6O1A | NA 6P1A -----MEQ/1000 | K 6Q1A | CO3 6I1A ML | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 18 | 0- | 4 | 12.6 | 3.7 | 15.3 | 1.7 | 33.3 | 100+ | | | 16.8 | 39.5 | 100.5 | 28.1 | 318.0 | 2.7 | | 3.8 | 437.0 | 9.7 | 1.1 | 7.5 |
| 1 | 19 | 4- | 8 | 19.8 | 7.5 | 29.1 | 2.4 | 58.8 | 100+ | | | 15.1 | 74.3 | 301.7 | 111.9 | 515.0 | 2.0 | | 6.2 | 908.0 | 17.6 | 1.7 | 7.3 |
| 1 | 20 | 8- | 15 | 31.7 | 12.4 | 33.7 | 2.5 | 80.3 | 100+ | | | 19.2 | 63.3 | 338.7 | 144.9 | 485.0 | 1.3 | | 4.3 | 863.0 | 25.0 | 2.9 | 7.4 |
| 1 | 21 | 15- | 28 | 61.4 | 17.2 | 38.4 | 1.1 | 118.1 | 100+ | | | 18.5 | 71.3 | 352.2 | 162.0 | 433.0 | 1.0 | | 6.6 | 842.0 | 36.0 | 2.2 | 7.4 |
| 1 | 22 | 28- | 43 | 39.9 | 12.0 | 30.9 | 0.5 | 83.3 | 100+ | | | 9.4 | 46.4 | 201.4 | 86.4 | 298.0 | 0.6 | | 4.3 | 522.0 | 34.0 | 1.4 | 7.4 |
| 1 | 23 | 43- | 55 | 28.6 | 5.8 | 21.3 | 0.3 | 56.0 | 100+ | | | 7.2 | 36.1 | 134.9 | 57.1 | 220.0 | 0.5 | | 4.3 | 372.0 | 26.7 | 2.6 | 7.5 |
| 1 | 24 | 55- | 74 | 22.3 | 3.8 | 18.2 | 0.2 | 44.5 | 100+ | | | 5.8 | 31.0 | 100.9 | 39.4 | 196.0 | 0.5 | | 3.3 | 303.0 | 27.7 | 3.3 | 7.4 |
| 1 | 25 | 74- | 107 | 17.1 | 2.6 | 9.9 | 0.2 | 29.8 | 100+ | | | 6.5 | 28.4 | 82.8 | 34.2 | 218.0 | 0.4 | | 6.2 | 286.0 | 23.1 | 4.7 | 7.6 |

| SAMPLE NO. | | DEPTH CM. | | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | 502 NA PCT. | 5E | SAR | -GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | --LESS THAN 0.002 MM--- -L.T. .0002 MM- ------X RAY--------- DTA 7A2E I | 7A2E II | 7A2E III | 7A2E IV | 7A3 PCT. | -----X RAY----- 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | CLAY MINERALOGY | | | | | | | | | | | | | | | | |
| 1 | 18 | 0- | 4 | 32.2 | 5.1 | 30 | 40 | | | | MI 3 | KK 1 | | | | MI 3 | | | MI MICA | 1 TRACE |
| 1 | 19 | 4- | 8 | 32.9 | 12.2 | 81 | 36 | | | | | | | | | MI 4 | | | KK KAOLINIT | 2 SMALL |
| 1 | 20 | 8- | 15 | 46.0 | 11.4 | 59 | 31 | 2.7 | | | MI 4 | KK 2 | | | | MI 5 | | | | 3 MODERATE |
| 1 | 21 | 15- | 28 | 67.4 | 9.2 | 50 | 27 | 2.9 | | | | | | | | MI 4 | | | | 4 ABUNDANT |
| 1 | 22 | 28- | 43 | 66.0 | 11.2 | 100+ | 25 | 0.4 | | | | | | | | MI 3 | | | | 5 DOMINANT |
| 1 | 23 | 43- | 55 | 59.9 | 6.1 | 100+ | 22 | 0.8 | | | MI 5 | KK 1 | | | | | | | | 6 INDETER. |
| 1 | 24 | 55- | 74 | 56.1 | 7.2 | 100+ | 23 | 0.5 | | | | | | | | | | | | |
| 1 | 25 | 74- | 107 | 42.9 | 0.6 | 9 | 29 | 0.5 | | | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

# HARQUA VERY GRAVELLY LOAM (taxadjunct) 1/

S71 Ariz-10-4-(1-8*)

Location: Pima County, Arizona. North of salt well. Go west on Puerto Blanco Road past International boundary and stake #22, 3/4 mile north and 1/10 mile west of boundary marker #170., Organ Pipe Cactus National Monument. Date of Sampling: April 6, 1971.
Description by: Y.H.Havens, E.Chamberlin. Collectors: K. Flach, E. Chamberlin, K. Vogt.
Classification: Typic Natrargid, clayey-skeletal, illitic, hyperthermic.
Vegetation: Scattered creosotebush and turkshead. Use: Desert rangeland. Climate: Mean annual precipitation 7 to 9 inches. Mean annual air temperature 69° F. Parent Material: Mixed alluvium from schist, rhyolite, diorite, welded tuff and gneiss. Topography: Nearly level, less than 1 percent slope. Elevation: 1250 feet. Drainage: Well drained, slow permeability. Soil Moisture: Dry.
Remarks: 80 percent of surface covered with varnished gravel--desert pavement.

| HORIZON | DESCRIPTION |
|---|---|
| A2 RSL 7118 | 0 to 4 cm (0 to 1½ inches), light brown (7.5YR 6/4) very gravelly loam, dark brown (7.5YR 4/4) moist; weak thick platy structure; slightly hard, very friable, nonsticky, slightly plastic; many fine and very fine vesicular pores; 50 percent gravel by volume; slightly effervescent; strongly alkaline (pH 8.6 thymol blue); abrupt wavy boundary. |
| A3 RSL 7119 | 4 to 8 cm (1½ to 3 inches), reddish brown (5YR 5/4) gravelly loam, yellowish red (5YR 4/6) moist; structureless; soft, very friable, slightly sticky, slightly plastic; common very fine interstitial pores; 40 percent gravel by volume; strongly effervescent; strongly alkaline (pH 8.5); clear wavy boundary. |
| B21tsa RSL 7120 | 8 to 15 cm (3 to 6 inches), yellowish red (5YR 5/6) gravelly light clay loam, yellowish red (5YR 4/6) moist, weak medium prismatic parting to weak fine subangular blocky structure; hard, friable, slightly sticky, plastic; few fine roots; few fine tubular and interstitial pores; few thin clay films on faces of peds and in pores; 35 percent gravel by volume; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary. |
| B22tsa RSL 7121 | 15 to 28 cm (6 to 11 inches), yellowish red (5YR 5/6) gravelly clay loam, yellowish red (5YR 4/6) moist; weak medium prismatic parting to weak fine subangular blocky structure; hard, friable, sticky, plastic; few fine roots; few fine tubular and interstitial pores; common thin clay films on faces of peds and in pores; 35 percent gravel; strongly effervescent; few fine pinkish white (7.5YR 8/2) lime filaments; moderately alkaline (pH 8.3); gradual wavy boundary. |
| B3tcasa RSL 7122 | 28 to 43 cm (11 to 17 inches), pinkish white (5YR 8/2) and yellowish red (5YR 5/6) gravelly loam, pink (5YR 7/3) and reddish brown (5YR 5/4) moist; weak medium subangular blocky structure; hard, friable, sticky, plastic; common fine interstitial and few fine tubular pores; few thin clay films on faces of peds; 50 percent gravel; violently effervescent; many pinkish white (7.5YR 8/2) slightly hard lime masses and coatings on gravel; moderately alkaline (pH 8.3); clear wavy boundary. |
| C1ca RSL 7123 | 43 to 55 cm (17 to 22 inches), pinkish white (7.5YR 8/2) and light brown (7.5YR 6/4) very gravelly sandy loam, light brown (7.5YR 6/4) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, slightly plastic; many very fine and fine interstitial pores; 60 percent gravel; violently effervescent; many pinkish white (7.5YR 8/2) slightly hard lime masses and gravel is completely coated with lime; moderately alkaline (pH 8.3); clear wavy boundary. |
| C2ca RSL 7124 | 55 to 74 cm (22 to 29 inches), pinkish white (7.5YR 8/2) and light brown (7.5YR 6/4) very gravelly loam, light brown (7.5YR 6/4) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, plastic; common very fine and fine interstitial pores; 70 percent gravel; violently effervescent; many pinkish white (7.5YR 8/2) slightly hard lime masses, and gravel is completely coated with lime; moderately alkaline (pH 8.3); clear wavy boundary. |
| C3ca RSL 7125 | 74 to 107 cm (29 to 42 inches), light brown (7.5YR 6/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; hard, very friable, slightly sticky, slightly plastic; many fine interstitial pores; 65 percent gravel; violently effervescent; moderately alkaline (pH 8.3). |

1/ The Harqua series is in a fine-loamy, mixed, hyperthermic family of Typic Haplargids. This pedon has a natric horizon with over 35 percent clay.

CONSECUTIVE PEDON NUMBER C 71 16 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CASA GRANDE TAXADJUNCT SOIL NO. S71 ARIZ. 7- 3 SAMPLE NO. 1 94-1 94 CENT. MARICOPA AREA

SOIL FAMILY: TYPIC NATRARGID,COARSE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CO. 2-.2U | FINE LT .2U | CARBO NATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL 75-20 | I 20-5 | II 5-2 | III PCT. OF LT 75 A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 1 | 94 | 20- 67 | B2tca | 69.5 | 15.4 | 15.1 | 2.1 | 15.9 | 22.6 | 20.2 | 8.7 | 8.8 | 6.6 | | | 25.1 | | | | |

| SAMPLE NO. | DEPTH CM. | ORG. CAR- BON 6A1A -PERCENT-- | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 | I M I T PL 4F2 PCT.NO.40 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F GRAMS PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 ----PERCENT--- | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 94 | 20- 67 | | | 7 | | | | 1.52 | | | 1.00 | | | 7.2 | | | 9.0 | 10.0 | 8.6 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES--- CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C-- NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | | |
| 1 | 94 | 20- 67 | 12.4 | 1.4 | 9.8 | 0.3 | 23.9 | 100+ | | 6.6 | 9.0 | 1.0 | 0.7 | 88.9 | 0.2 | | 2.9 | 55.1 | 26.6 | | 8.7 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | -GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | C L A Y M I N E R A L O G Y --LESS THAN 0.002 MM--- -L.T. .0002 MM- X RAY DTA 7A2E I | 7A2E II | 7A2E III | 7A2E IV | 7A3 PCT. | X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 94 | 20- 67 | 74.8 | 3.1 | 48 | 96 | | 5.6 | | | | | | | | |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## CASA GRANDE SANDY LOAM (taxadjunct) 1/
S71Ariz-7-3(1)

Location: Maricopa County, Arizona. The site is located 600 feet west and 40 feet north of the SE corner of the NW 1/4 of Sec. 2, T1S, R6W, about 15 miles west of Buckeye. Date of Sampling: April 12, 1971.
Description by: W. Nettleton, J. Jay, G. Hartman, R. Schurig, F. Cook. Collectors: W. Nettleton, J. Jay, G. Hartman, R. Schurig, F. Cook.
Classification: Typic Natrargid, coarse-loamy, mixed, hyperthermic.
Vegetation: Four-wing saltbush, cholla cactus, mesquite. Use: Desert range. Climate: Semi-arid. 7 inches precipitation. Mean annual air temperature 70° F. Parent Material: Alluvium from granite, rhyolite, andesite and quartzite. Topography: Nearly level valley plain. Slopes less than one percent. Elevation: 1100 feet. Drainage: Well drained, slow to very slow permeability. Slow runoff.
Remarks: Sample site is 140 feet W NW from S71Ariz-7-1(1-13). 20-67 cm was sampled for ESP. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A11 | 0 to 6 cm (0 to 2-1/2 inches), light yellowish brown (10YR 6/4) sandy loam, dark brown (10YR 4/3) moist; weak thin platy structure; slightly hard, very friable, nonsticky, slightly plastic; common very fine roots; common fine tubular pores; weakly effervescent; moderately alkaline (pH 8.3 TB); clear smooth boundary. |
| A12 | 6 to 20 cm (2-1/2 to 8 inches), light yellowish brown (10YR 6/4) sandy loam, dark brown (10YR 4/3) when moist; massive, slightly hard, very friable, nonsticky, slightly plastic; common fine roots; common fine tubular pores; nonefferves-cent; moderately alkaline (pH 8.3); abrupt smooth boundary. |
| B2tca RSL 71094 (20-67 cm) | 20 to 39 cm (8 to 15-1/2 inches), yellowish red (5YR 5/6) heavy sandy loam, dark brown (7.5YR 4/4) moist; massive; hard, very friable, slightly sticky, slightly plastic; few fine roots; many fine interstitial pores; weakly to strongly effervescent; a 1 1/2 inch stratum of fine, medium and coarse gravel at the bottom of horizon; common fine white irregularly shaped soft lime masses and lime filaments; strongly alkaline (pH 9.0); abrupt smooth boundary. |
| IIB2tca RSL No. 71094 | 39 to 67 cm (15-1/2 to 26-1/2 inches)reddish brown (5YR 5/4) and yellowish red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) and reddish brown (5YR 4/4) moist; strong fine prismatic; very hard, firm, sticky and plastic; few fine roots; common fine interstitial and few fine tubular pores; slightly effervescent; many fine and medium white irregularly shaped soft lime masses; very strongly alkaline (pH 9.4). |

1/ The Casa Grande series is in a fine-loamy, mixed, hyperthermic family of Typic Natrargids. This pedon has a control section with less than 18 percent clay.

CONSECUTIVE PEDON NUMBER C 71 13 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CASA GRANDE SOIL NO. S71 ARIZ. 7- 1 SAMPLE NO. 1 73-1 85 CENT. MARICOPA AREA

SOIL FAMILY: TYPIC NATRARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | SILTS CO. 2- .2U | FINE LT .2U | CLAYS CARBONATE 3A1A.02 | INT. II .2- | 1A2A COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 PCT. OF LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | | |
| 1 | 73 | 0- | 5 | A11 | 65.6 | 29.8 | 4.6 | 2.2 | 11.4 | 15.3 | 18.2 | 18.5 | 20.1 | 9.7 | | | 46.4 | | A | | | | |
| 1 | 74 | 5- | 13 | A12 | 72.9 | 21.7 | 5.4 | 2.1 | 14.9 | 19.7 | 21.3 | 14.9 | 15.4 | 6.3 | | | 39.0 | | A | | | | |
| 1 | 75 | 13- | 20 | B21T | 61.2 | 21.0 | 17.8 | 1.8 | 11.7 | 15.7 | 18.4 | 13.6 | 11.6 | 9.4 | | | 32.7 | | A | | | | |
| 1 | 76 | 20- | 38 | B22TCA | 55.8 | 24.3 | 19.9 | 3.3 | 12.4 | 14.1 | 14.8 | 11.2 | 9.6 | 14.7 | | 1 | 27.1 | 8A | -- | 4 | 3 | | |
| 1 | 77 | 38- | 54 | B23TCA | 47.0 | 34.6 | 18.4 | 2.3 | 12.3 | 13.5 | 12.8 | 6.1 | 5.6 | 29.0 | | 3 | 17.2 | 17A | -- | 12 | 5 | | |
| 1 | 78 | 54- | 74 | B24TCA | 46.5 | 31.7 | 21.8 | 4.9 | 12.6 | 10.2 | 11.0 | 7.8 | 8.7 | 23.0 | | 1 | 21.7 | 2A | -- | -- | 2 | | |
| 1 | 79 | 74- | 97 | B25TCA | 38.9 | 43.0 | 18.1 | 0.5 | 4.2 | 4.6 | 11.1 | 18.5 | 22.2 | 20.8 | | | 48.0 | | A | | | | |
| 1 | 80 | 97- | 122 | C 1 | 62.1 | 23.2 | 14.7 | 0.5 | 2.8 | 5.1 | 31.9 | 21.8 | 11.8 | 11.4 | | | 55.5 | | A | | | | |
| 1 | 81 | 122- | 129 | 2C 2 | 45.3 | 35.0 | 19.7 | -- | 0.5 | 1.2 | 15.6 | 28.0 | 18.2 | 16.8 | | | 58.3 | | A | | | | |
| 1 | 82 | 129- | 142 | 3C 3 | 66.4 | 19.8 | 13.8 | 0.1 | 0.7 | 2.3 | 36.5 | 26.8 | 10.2 | 9.6 | | -- | 63.3 | | A | | | | |
| 1 | 83 | 142- | 147 | 3C 4 | | | | | | | | | | | | | | | TRA | -- | -- | TR | |
| 1 | 84 | 147- | 165 | 4C 5 | | | | | | | | | | | | | | | A | | | | |
| 1 | 85 | 165- | 190 | 5C 6 | | | | | | | | | | | | | | | G | | | | |

| SAMPLE NO. | | DEPTH CM. | | ORG.MATTER CARBON 6A1A PCT. | NITRO GEN 6B1A PCT. | CARBONATE AS CACO3 LT 2 6E1B PCT. | 19-2 6E1B PCT. | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 PCT. | I M I T PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F GRAMS | 1/3 BAR 4A1F PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C PCT. | 1/3 BAR 4B1C PCT. | 15 BAR 4B2 PCT. | EXTENSBLTY LEF 4D1 PCT. | LE 4D1 PCT. | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 73 | 0- | 5 | 0.29 | 0.037 | TR | | | | | 1.66 | | 1.00 | | | | 3.1 | | | 8.4 | | 7.6 |
| 1 | 74 | 5- | 13 | 0.06 | 0.012 | TR | | | | | | 1.66 | 1.67 | 1.00 | 10.1 | 5.5 | 2.3 | 0.2 | 0.2 | 8.8 | 9.2 | 7.6 |
| 1 | 75 | 13- | 20 | | | 2 | | | | | | 1.60 | 1.69 | 1.00 | 17.6 | 14.7 | 6.2 | 1.8 | 1.8 | 9.2 | 9.9 | 8.5 |
| 1 | 76 | 20- | 38 | | | 13 | | | | | | 1.52 | 1.61 | 0.95 | 19.7 | 17.2 | 7.2 | 1.9 | 1.8 | 9.0 | 9.9 | 8.6 |
| 1 | 77 | 38- | 54 | | | 28 | | | | | | 1.60 | 1.69 | 0.89 | 18.0 | 15.5 | 7.9 | 1.8 | 1.6 | 9.0 | 9.8 | 8.5 |
| 1 | 78 | 54- | 74 | | | 15 | | | | | | 1.43 | 1.72 | 0.99 | 30.2 | 25.2 | 11.8 | 6.3 | 6.3 | 8.8 | 9.8 | 8.6 |
| 1 | 79 | 74- | 97 | | | 4 | | | | | | 1.31 | 1.56 | 1.00 | 38.1 | 31.1 | 11.7 | 6.0 | 6.0 | 8.5 | 9.5 | 8.3 |
| 1 | 80 | 97- | 122 | | | 1 | | | | | | 1.34 | 1.56 | 1.00 | 34.1 | 26.0 | 9.8 | 5.2 | 5.2 | 8.9 | 9.8 | 8.6 |
| 1 | 81 | 122- | 129 | | | 1 | | | | | 1.34 | | 1.00 | | | | 16.4 | | | 8.5 | 9.5 | 8.5 |
| 1 | 82 | 129- | 142 | | | 1 | | | | | 1.34 | | 1.00 | | | | 11.1 | | | 8.6 | 9.7 | 8.5 |
| 1 | 83 | 142- | 147 | | | 1 | | | | | 1.34 | | 1.00 | | | | 20.8 | | | 8.5 | | 8.4 |
| 1 | 84 | 147- | 165 | | | TR | | | | | 1.34 | | 1.00 | | | | 14.2 | | | 8.4 | | 8.3 |
| 1 | 85 | 165- | 190 | | | 51 | | | | | 1.34 | | 1.00 | | | | 16.3 | | | 8.5 | | 8.7 |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES CA 5B4A 6N2E MEQ/100G | MG 5B4A 6Q2D MEQ/100G | NA 5B4A 6P2A MEQ/100G | K 5B4A 6Q2A MEQ/100G | SUM MEQ/100G | BASE SAT. PCT. | C E C NA+ OAC 5A2A MEQ/100G | NH4- OAC 5A6A MEQ/100G | WATER EXTRACT EC 8A1A MMHO | CA 6N1A MEQ/1000 ML | MG 6O1A MEQ/1000 ML | NA 6P1A MEQ/1000 ML | K 6Q1A MEQ/1000 ML | CO3 6I1A MEQ/1000 ML | HCO3 6J1A MEQ/1000 ML | CL 6K1A MEQ/1000 ML | SO4 6L1B MEQ/1000 ML | B 6T1A PPM | SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 73 | 0- | 5 | 7.7 | 1.9 | 0.3 | 0.8 | 10.7 | 100+ | 7.2 | | | | | | | | | | | | 8.1 |
| 1 | 74 | 5- | 13 | 4.8 | 1.5 | 1.4 | 0.6 | 8.3 | 100+ | 5.6 | 2.46 | 1.6 | 1.3 | 17.6 | 0.2 | | 1.0 | 18.6 | | | | 8.3 |
| 1 | 75 | 13- | 20 | 8.9 | 1.5 | 8.2 | 0.8 | 19.4 | 100+ | 9.9 | 6.8 | 1.0 | 0.5 | 65.9 | 0.2 | | 4.4 | 55.6 | | | | 8.3 |
| 1 | 76 | 20- | 38 | 14.0 | 1.4 | 13.0 | 0.5 | 28.9 | 100+ | 9.6 | 14.4 | 2.2 | 1.5 | 143.0 | 0.2 | | 4.6 | 107.0 | 31.2 | | | 8.2 |
| 1 | 77 | 38- | 54 | 13.9 | 1.6 | 14.9 | 0.2 | 30.6 | 100+ | 10.2 | 12.7 | 2.9 | 2.7 | 131.0 | 0.1 | | 3.2 | 92.3 | 32.6 | | | 8.5 |
| 1 | 78 | 54- | 74 | 14.6 | 2.0 | 21.6 | 0.3 | 38.5 | 100+ | 14.9 | 10.4 | 1.6 | 0.8 | 103.0 | 0.1 | | 2.3 | 68.4 | 29.0 | | | 8.6 |
| 1 | 79 | 74- | 97 | 28.3 | 2.2 | 29.4 | 0.4 | 60.3 | 100+ | 21.4 | 16.9 | 19.9 | 3.2 | 168.0 | TR | | 3.2 | 85.8 | 110.4 | | | 8.1 |
| 1 | 80 | 97- | 122 | 11.9 | 2.0 | 25.5 | 0.3 | 39.7 | 100+ | 19.0 | 9.7 | 2.3 | 1.1 | 96.6 | 0.5 | | 1.4 | 56.8 | 36.2 | | | 8.5 |
| 1 | 81 | 122- | 129 | 17.8 | 2.9 | 38.9 | 0.5 | 60.1 | 100+ | 31.4 | 14.2 | 11.5 | 2.2 | 145.0 | 0.1 | | 2.7 | 74.4 | 88.8 | | | 8.2 |
| 1 | 82 | 129- | 142 | 9.5 | 2.1 | 27.2 | 0.4 | 39.2 | 100+ | 21.5 | 12.3 | 4.1 | 1.4 | 118.0 | 0.1 | | 3.6 | 72.9 | 54.6 | | | 8.3 |
| 1 | 83 | 142- | 147 | | | | | | | | | | | | | | | | | | | |

| SAMPLE NO. | | DEPTH CM. | | WATER AT 1/3 BAR SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY DTA I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | L.T. .0002 MM X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 73 | 0- | 5 | | 0.3 | 4 | | | | MI 3 | MT 1 | | | | | | | MI MICA | 1 TRACE |
| 1 | 74 | 5- | 13 | 22.0 | 1.0 | 18 | 15 | | 0.8 | MT 3 | MI 3 | KK 1 | | | | | | MT MONTMORT | 2 SMALL |
| 1 | 75 | 13- | 20 | 36.4 | 5.8 | 59 | 76 | | 5.2 | MT 4 | MI 3 | KK 1 | | | | | | | 3 MODERATE |
| 1 | 76 | 20- | 38 | 41.4 | 7.1 | 74 | 100+ | | 5.9 | | | | | | | | | KK KAOLINIT | 4 ABUNDANT |
| 1 | 77 | 38- | 54 | 65.9 | 6.3 | 61 | 78 | | 5.3 | | | | | | | | | | 5 DOMINANT |
| 1 | 78 | 54- | 74 | 106.4 | 10.6 | 71 | 94 | | 9.2 | MT 5 | MI 3 | | | | | | | | 6 INDETER. |
| 1 | 79 | 74- | 97 | 84.0 | 15.3 | 71 | 49 | 0.7 | 10.1 | | | | | | | | | | |
| 1 | 80 | 97- | 122 | 107.5 | 15.1 | 80 | 74 | | 9.8 | MT 5 | MI 1 | | | | | | | | |
| 1 | 81 | 122- | 129 | 121.7 | 21.3 | 68 | 55 | | 14.1 | | | | | | | | | | |
| 1 | 82 | 129- | 142 | 85.0 | 17.2 | 80 | 71 | | 10.9 | MT 5 | MI 1 | | | | | | | | |
| 1 | 83 | 142- | 147 | | | | | | | | | | | | | | | | |
| 1 | 84 | 147- | 165 | | | | | | | | | | | | | | | | |
| 1 | 85 | 165- | 190 | | | | | | | | | | | | | | | | |

MT MONTMORT MI KK
VR VERMICLT

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

# CASA GRANDE SANDY LOAM
S71Ariz-7-1(1-13)

Location: Maricopa County, Arizona. 500 feet west of the NE corner of the SE¼ of the NW¼ of Section 2, T1S, R6W, about 15 miles west of Buckeye. Date of Sampling: April 12, 1971.
Description by: W. D. Nettleton, J. Jay, G. Hartman, R. Schurig, F. Cook. Collectors: W. D. Nettleton, J. Jay, G. Hartman, R. Schurig, F. Cook.
Classification: Typic Natrargid, fine-loamy, mixed, hyperthermic.
Vegetation: Four-wing saltbush, cholla cactus, mesquite trees. Use: Desert rangeland. Climate: 7 inches precipitation. Mean annual air temperature 70° F. Parent Material: Old alluvium from granite, quartzite, rhyolite, andesite, tuff, schist and limestone. Topography: Nearly level valley floors. Elevation: 1100 feet. Drainage: Well drained. Slow to very slow permeability. Slow runoff. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>71073 | 0 to 5 cm (0 to 2 inches), light yellowish brown (10YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; weak coarse platy structure; soft, very friable, nonsticky and slightly plastic; many fine roots; many fine and medium tubular pores; slightly effervescent; moderately alkaline (pH 8.2 TB); abrupt smooth boundary. |
| A12<br>RSL<br>71074 | 5 to 13 cm (2 to 5 inches), light yellowish brown (10YR 6/4) sandy loam, dark brown (7.5YR 4/4) when moist; massive; soft, very friable, slightly sticky and slightly plastic; many fine roots; many fine and medium tubular pores; slightly effervescent; moderately alkaline (pH 8.3); abrupt smooth boundary. |
| B21t<br>RSL<br>71075 | 13 to 20 cm (5 to 8 inches), yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) when moist; weak coarse columnar structure; hard, friable, sticky and plastic; common fine roots; many fine, medium and coarse tubular and interstitial pores; strongly effervescent; common coarse pinkish white irregularly shaped soft lime masses that are violently effervescent; bleached sand grains on tops of columns; strongly alkaline (pH 8.8); clear smooth boundary. |
| B22tca<br>RSL<br>71076 | 20 to 38 cm (8 to 15 inches), reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) when moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; common fine roots; common fine interstitial and tubular pores; 5 percent fine subangular gravel; strongly effervescent; common coarse pinkish white soft lime masses that are violently effervescent; very strongly alkaline (pH 9.2); gradual smooth boundary. |
| B23tca<br>RSL<br>71077 | 38 to 54 cm (15 to 21 inches), light reddish brown (5YR 6/4) clay loam, reddish brown (5YR 4/4) when moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few fine roots; common fine interstitial and few fine tubular pores; 5 percent fine subangular gravel; violently effervescent; many coarse pinkish white irregularly shaped soft lime masses; strongly alkaline (pH 9.2); gradual smooth boundary. |
| B24tca<br>RSL<br>71078 | 54 to 74 cm (21 to 29 inches), light reddish brown (5YR 6/3) clay loam, reddish brown (5YR 4/4) when moist; weak fine and medium subangular blocky structure; hard, friable, sticky and plastic; no roots; common fine and medium tubular and interstitial pores; violently effervescent; many coarse pinkish white irregularly shaped soft lime masses; moderately alkaline (pH 9.0); gradual smooth boundary. |
| B25tca<br>RSL<br>71079 | 74 to 97 cm (29 to 38 inches), light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; hard, friable, sticky and plastic; few fine tubular and many fine interstitial pores; common mica flakes; common fine black manganese stains; strongly effervescent; common fine pinkish white seams of lime that are violently effervescent; strongly alkaline (pH 8.6); gradual wavy boundary. |
| C1<br>RSL<br>71080 | 97 to 122 cm (38 to 48 inches), light reddish brown (5YR 6/3) silty clay loam, reddish brown (5YR 4/4) when moist; massive; hard, friable, sticky, plastic; few fine tubular and many fine interstitial pores; noneffervescent; common fine pinkish white (7.5YR 8/2) seams of lime that are violently effervescent; moderately alkaline (pH 8.7); clear smooth boundary. |
| IIC2<br>RSL<br>71081 | 122 to 129 cm (48 to 51 inches), light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) when moist; weak fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine interstitial pores; common mica flakes; noneffervescent; common pinkish white seams of lime that are violently effervescent; strongly alkaline (pH 8.6) abrupt smooth boundary. |
| IIIC3<br>RSL<br>71082 | 129 to 142 cm (51 to 54 inches), light brown (7.5YR 6/4) silty clay, yellowish brown (7.5YR 5/4) when moist; massive; hard, friable, sticky and plastic; few fine tubular and many fine interstitial pores; strongly effervescent; strongly alkaline (pH 8.6); clear smooth boundary. |
| IIIC4<br>RSL<br>71083 | 142 to 147 cm (54 to 59 inches), pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) when moist; massive; hard, friable, slightly sticky, slightly plastic; few fine interstitial pores; common mica flakes; noneffervescent; moderately alkaline (pH 8.4); clear smooth boundary. |
| IVC5<br>RSL<br>71084 | 147 to 165 cm (59 to 61 inches), white (10YR 8/1) sandy clay loam; light gray (10YR 7/2) moist; massive; extremely hard, firm, sticky and plastic; few fine interstitial and tubular pores; strongly to violently effervescent; moderately alkaline (pH 8.3); abrupt wavy boundary. |
| VC6<br>RSL<br>71085 | 165 to 190 cm (61 to 72 inches), light reddish brown (5YR 6/3) sandy clay, reddish brown (5YR 4/3) when moist; massive; extremely hard, firm, sticky, plastic; few fine black manganese stains; strongly effervescent; strongly alkaline (pH 8.7). |

CONSECUTIVE PEDON NUMBER C 71 14 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CASA GRANDE SOIL NO. S71 ARIZ. 7- 2 SAMPLE NO. 1 86-1 86 CENT. MARICOPA AREA

SOIL FAMILY: TYPIC NATRARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 SAND | 2- .05- .002 SILT | LT .002 CLAY | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II .2- .02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 1 | 86 14- 70 | B2tca | 57.0 | 21.1 | 21.9 | 2.0 | 12.8 | 14.4 | 16.5 | 11.3 | 10.2 | 10.9 | | | 1 | 29.2 | 1A -- | -- | 1 |

| SAMPLE NO. | DEPTH CM. | ORG. CAR- BON 6A1A | MATTER NITRO GEN 681A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L I M I T EST LL 4F1 | PL 4F2 | BULK DENSITY 1/3 BAR 4A1F | ORY 4A1H | CM 3B2 | WATER CONTENT EXTENSBLTY 1/10 BAR 481C | 1/3 BAR 481C | 15 BAR 482 | LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 1 | 86 14- 70 | | | 10 | | | | | 1.52 | | 0.99 | | | 8.2 | | | 8.9 | 9.7 | 8.5 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 584A 6N2E | MG 584A 602D | NA 584A 6P2A | K 584A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | 8A1 SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 1 | 86 14- 70 | 14.4 | 2.0 | 11.5 | 0.8 | 28.7 | 100+ | | 10.3 | 11.5 | 2.5 | 1.2 | 109.0 | 0.4 | | 3.6 | 85.6 | 12.5 | | 8.1 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 PCT. | L.T. .0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 86 14- 70 | 45.9 | 6.5 | 63 | 80 | | 5.8 | | | | | | | | | |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

# CASA GRANDE FINE SANDY LOAM
S-71Ariz-7-2(1)

Location: Maricopa County, Arizona. 400 feet west and 30 feet south of the NE corner of the SE¼ of the NW¼, Section 2, T1S, R6W, about 15 miles west of Buckeye. Date of Sampling: April 12, 1971.
Described by: J. E. Jay, W. D. Nettleton, G. Hartman, R. Schurig, F. Cook.
Collectors: J. Jay, W. D. Nettleton, G. Hartman, R. Schurig, F. Cook.
Classification: Typic Natrargid, fine-loamy, mixed, hyperthermic.
Vegetation: Saltbush, cholla cactus. Use: Range. Climate: Semiarid. 7 inches precipitation. Mean annual air temperature is 70° F. Parent Material: Old alluvium from granite, schist, rhyolite, andesite, quartzite, basalt. Topography: Nearly level valley plain. Elevation: 1100 feet. Less than 1 percent slope. Drainage: Well drained, moderately slow permeability. Slow runoff. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A11 | 0 to 3 cm (0 to 1 inch), light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist, weak thin platy structure; slightly hard, very friable, nonsticky and slightly plastic; common fine roots; many fine, medium and coarse vesicular pores; 1/8 inch black algae crust on the surface; noneffervescent to slightly effervescent; moderately alkaline (pH 8.2 TB); abrupt smooth boundary. |
| A12 | 3 to 14 cm (1 to 5½ inches), light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; common fine roots; few fine tubular pores; slightly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. |
| B21tca* RSL No. 71086 (14 to 70 cm) | 14 to 25 cm (5½ to 10 inches), light reddish brown (5YR 6/4) and reddish brown (5YR 5/4) clay loam, yellowish red (5YR 4/6) and reddish brown (5YR 4/4) moist; moderate, medium and coarse columnar structure; hard, friable, slightly sticky and plastic; common fine roots; common fine tubular pores; strongly effervescent, many fine and medium white irregular shaped violently effervescent soft lime masses; very strongly alkaline (pH 9.2); clear smooth boundary. |
| B22tca * RSL No. 71086 | 25 to 58 cm (10 to 23 inches), reddish brown (5YR 5/4) and yellowish red (5YR 5/6) heavy sandy clay loam; yellowish red (5YR 4/6) and reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; few fine roots; common fine tubular pores; slightly effervescent on ped interiors, strongly effervescent on ped surfaces and violently effervescent in lime masses; many white irregularly shaped soft lime masses; very strongly alkaline (pH 9.0); gradual smooth boundary. |
| B23tca* RSL No. 71086 | 58 to 70 cm (23 to 27½ inches), reddish brown (5YR 5/4) heavy sandy clay loam, reddish brown (5YR 4/4) moist; massive; very hard, friable, sticky and plastic; common fine tubular pores; strongly effervescent; many fine and medium white violently effervescent irregular soft lime masses; very strongly alkaline (pH 9.0). |

*This is a channel sample of B21tca, B22tca, and B23tca.

CONSECUTIVE PEDON NUMBER C 71 15 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CASA GRANDE SOIL NO. S71 ARIZ. 7- 9 SAMPLE NO. 1 87-1 93 CENT. MARICOPA AREA

SOIL FAMILY: TYPIC NATRARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | SILTS-- CO. 2- .2U | CLAYS---- FINE LT .2U | CARBO NATE 3A1A | INT. II .2- .02 | COARSE FRAGMENTS- I OF WHOLE 20 75- | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 1 | 87 | 0- | 7 | A1 | 69.4 | 26.0 | 4.6 | 5.6 | 10.7 | 10.5 | 20.5 | 22.1 | 17.2 | 8.8 | 3.4 | 1.2 | | 50.3 | 1A | -- | -- | 1 |
| 1 | 88 | 7- | 16 | B21TCA | 49.6 | 35.3 | 15.1 | 4.0 | 7.1 | 7.1 | 14.4 | 17.0 | 15.6 | 19.7 | 13.5 | 1.6 | | 39.9 | 2A | -- | -- | 2 |
| 1 | 89 | 16- | 36 | B22TCA | 48.5 | 29.8 | 21.7 | 3.3 | 7.1 | 8.0 | 14.4 | 15.7 | 13.5 | 16.3 | | | TR | 36.0 | 2A | -- | -- | 2 |
| 1 | 90 | 36- | 65 | B31TCA | 49.1 | 27.2 | 23.7 | 3.1 | 9.8 | 10.1 | 13.0 | 13.1 | 15.1 | 12.1 | 15.9 | 7.8 | 1 | 34.0 | 2A | -- | -- | 2 |
| 1 | 91 | 65- | 92 | B32TCA | 46.4 | 36.3 | 17.3 | 1.1 | 5.4 | 7.7 | 13.9 | 18.3 | 20.4 | 15.9 | | | 1 | 45.1 | A | | | |
| 1 | 92 | 92- | 130 | C 1CA | 47.0 | 38.1 | 14.9 | 1.9 | 6.0 | 7.6 | 13.2 | 18.3 | 21.7 | 16.4 | | | 4 | 46.1 | 3A | -- | -- | 3 |
| 1 | 93 | 130- | 165 | C 2 | 67.8 | 24.1 | 8.1 | 0.7 | 4.8 | 12.4 | 33.0 | 16.9 | 18.0 | 6.1 | 4.6 | 3.5 | | 50.4 | 1A | -- | -- | 1 |

| SAMPLE NO. | | DEPTH CM. | | ORG. CAR- BON 6A1A -PERCENT- | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 PCT. | T M PL 4F2 | I T NO.40 4A1F | BULK DENSITY EST 1/3 BAR GRAMS | 1/3 BAR 4A1F | DRY 4A1H PER CC | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 ----PERCENT--- | EXTENSBLTY LEF 4D1 -PERCENT- | LE 4D1 | -----PH------- H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 87 | 0- | 7 | 0.17 | 0.022 | TR | | | | | | 1.69 | 1.70 | 0.99 | 14.6 | 8.8 | 3.1 | 0.2 | 0.2 | 8.8 | | 7.8 |
| 1 | 88 | 7- | 16 | 0.11 | 0.019 | 6 | | | | | | 1.55 | 1.63 | 0.99 | 20.2 | 17.7 | 7.3 | 1.7 | 1.7 | 9.4 | 10.0 | 8.5 |
| 1 | 89 | 16- | 36 | 0.12 | | 8 | | | | | | 1.63 | 1.76 | 0.99 | 19.0 | 15.9 | 9.0 | 2.6 | 2.5 | 9.2 | 10.2 | 8.9 |
| 1 | 90 | 36- | 65 | | | 7 | | | | | | 1.44 | 1.62 | 0.99 | 23.3 | 19.2 | 8.8 | 4.0 | 4.0 | 8.5 | 9.5 | 8.5 |
| 1 | 91 | 65- | 92 | | | 10 | | | | | 1.44 | | | 1.00 | | | 7.6 | | | 9.1 | 9.9 | 8.6 |
| 1 | 92 | 92- | 130 | | | 17 | | | | | | 1.59 | 1.69 | 0.98 | 21.5 | 16.2 | 6.5 | 2.1 | 2.0 | 9.1 | 10.1 | 8.7 |
| 1 | 93 | 130- | 165 | | | 5 | | | | | | 1.69 | 1.77 | 0.99 | 12.2 | 8.6 | 3.9 | 1.6 | 1.5 | 9.5 | 10.1 | 8.6 |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES--- CA 5B4A 6N2E | MG 5B4A 6G2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C-- NA- OAC 5A2A -MEQ/100G | NH4- OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A -MEQ/1000 ML | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 87 | 0- | 7 | 9.7 | 1.9 | 0.6 | 1.0 | 13.2 | 100+ | | 7.2 | | | | | | | | | | | |
| 1 | 88 | 7- | 16 | 16.9 | 2.7 | 9.3 | 1.6 | 30.5 | 100+ | | 18.3 | 2.25 | 0.4 | 0.3 | 19.3 | 0.2 | | 6.8 | 12.9 | | | 8.3 |
| 1 | 89 | 16- | 36 | 13.9 | 1.9 | 16.5 | 0.8 | 33.1 | 100+ | | 18.0 | 6.2 | 0.6 | 0.5 | 57.8 | 0.2 | | 6.7 | 35.0 | | | 8.4 |
| 1 | 90 | 36- | 65 | 18.8 | 1.7 | 17.0 | 0.5 | 38.6 | 100+ | | 14.0 | 16.9 | 17.7 | 2.8 | 198.0 | 0.1 | | 3.4 | 63.0 | 158.5 | | 8.1 |
| 1 | 91 | 65- | 92 | 13.8 | 1.3 | 15.6 | 0.4 | 31.1 | 100+ | | 10.6 | 16.9 | 7.1 | 1.7 | 183.0 | 0.1 | | 4.0 | 64.5 | 128.5 | | 8.3 |
| 1 | 92 | 92- | 130 | 12.2 | 1.4 | 12.9 | 0.3 | 26.8 | 100+ | | 8.4 | 13.8 | 1.2 | 1.0 | 148.0 | 0.1 | | 5.1 | 55.1 | 90.0 | | 8.7 |
| 1 | 93 | 130- | 165 | 11.7 | 1.2 | 8.7 | 0.2 | 21.8 | 100+ | | 6.6 | 9.8 | 0.8 | 0.6 | 101.0 | 0.2 | | 4.5 | 38.2 | 52.6 | | 8.8 |

| SAMPLE NO. | | DEPTH CM. | | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | -GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A2E | PCT. 7A3 | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 87 | 0- | 7 | | 0.6 | 8 | | | | MI | 3 | MT | 2 | KK 1 | MI | 3 | MM 1 | MI MICA | 1 TRACE |
| 1 | 88 | 7- | 16 | 29.7 | 8.7 | 48 | 33 | | 5.4 | MI | 4 | MT | 3 | KK 2 | MI | 3 | MT 2 KK 1 | MT MONTMORT | 2 SMALL |
| 1 | 89 | 16- | 36 | 46.5 | 13.8 | 77 | 78 | | 10.4 | | | | | | | | | KK KAOLINIT | 3 MODERATE |
| 1 | 90 | 36- | 65 | 46.6 | 8.4 | 60 | 62 | 0.4 | 8.4 | MI | 4 | MT | 3 | KK 2 | MI | 4 | MT 1 KK 1 | | 4 ABUNDANT |
| 1 | 91 | 65- | 92 | 42.5 | 7.8 | 74 | 87 | | 7.3 | | | | | | | | | MM MT/MICA | 5 DOMINANT |
| 1 | 92 | 92- | 130 | 43.6 | 6.4 | 77 | 100+ | | 6.1 | | | | | | | | | | 6 INDETER. |
| 1 | 93 | 130- | 165 | 36.9 | 5.0 | 75 | 100+ | | 5.4 | MT | 5 | MI | 3 | KK 2 | MI | 4 | MT 1 KK 1 | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

# CASA GRANDE FINE SANDY LOAM
S71Ariz-7-9(1-7)

Location: Maricopa County, Arizona. 1130 feet east and 980 feet south of NW corner Sec. 18, T1N, R8W, about 31 miles west of Buckeye. Date of Sampling: April 14, 1971.
Description by: J. Jay, W. Nettleton, G. Hartman, R. Schurig, F. Cook.
Collectors: J. Jay, W. Nettleton, G. Hartman, R. Schurig, F. Cook.
Classification: Typic Natrargid, fine-loamy, mixed, hyperthermic.
Vegetation: Saltbush and creosotebush. Use: Range. Climate: Semi-arid. Mean annual air temperature 70° F. 7 inches precipitation. Parent Material: Old alluvium from granite, rhyolite, andesite, quartzite, limestone, and basalt. Topography: Nearly level valley plain. Slopes less than 1 percent. Elevation: 1170 feet. Drainage: Moderate drainage. Moderately slow permeability. Slow runoff. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>71087 | 0 to 7 cm (0 to 2¾ inches), brown (10YR 5/3) fine sandy loam, yellowish brown (10YR 5/4) moist; weak coarse platy structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; common fine vesicular and tubular pores; noneffervescent to slightly effervescent; moderately alkaline (pH 8.2 TB); abrupt smooth boundary. |
| B21tca<br>RSL<br>71088 | 7 to 16 cm (2¾ to 6⅓ inches), reddish brown (5YR 5/3) clay loam, reddish brown (5YR 4/4) moist; moderate medium and coarse prismatic structure; hard, friable, slightly sticky and plastic; common very fine and fine roots; many fine tubular pores; common fine and medium white irregularly shaped soft lime masses; violently effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. |
| B22tca<br>RSL<br>71089 | 16 to 36 cm (6⅓ to 14 inches), reddish brown (5YR 5/3) clay loam, reddish brown (5YR 4/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky structure; hard, friable, sticky and plastic; few fine and medium roots; common fine tubular pores; many fine and medium white irregularly shaped soft lime masses; violently effervescent; very strongly alkaline (pH 9.6); clear smooth boundary. |
| B31tca<br>RSL<br>71090 | 36 to 65 cm (14 to 25½ inches), reddish brown (5YR 5/3) clay loam, reddish brown (5YR 4/4) moist; massive; slightly hard, very friable, sticky and plastic; very few fine roots; few very fine tubular and common very fine interstitial pores; common fine and medium white irregularly shaped soft lime masses; violently effervescent; very strongly alkaline (pH 9.2); clear smooth boundary. |
| B32tca<br>RSL<br>71091 | 65 to 92 cm (25½ to 36⅓ inches), pinkish gray (7.5YR 6/2) light clay loam, brown (7.5YR 4/4) moist; massive; hard, friable, sticky and plastic; common fine tubular and few medium tubular pores; common fine and medium white irregularly shaped soft lime masses; violently effervescent; very strongly alkaline (pH 9.2); gradual smooth boundary. |
| C1ca<br>RSL<br>71092 | 92 to 130 cm (36½ to 51 inches), pinkish gray (7.5YR 6/2) fine sandy loam, brown (7.5YR 5/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; common fine tubular pores; many fine and medium white filaments, mottles and soft lime masses; violently effervescent; very strongly alkaline (pH 9.2); gradual smooth boundary. |
| C2<br>RSL<br>71093 | 130 to 165 cm (51 to 65 inches), pale brown (10 YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; hard, very friable, slightly sticky and slightly plastic; common fine tubular pores; few faint white lime filaments; strongly effervescent; very strongly alkaline (pH 9.6). |

CONSECUTIVE PEDON NUMBER C 71 20 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA TAXADJUNCT SOIL NO. S71 ARIZ. 7- 6 SAMPLE NO. 1 116-1 125 CENT. MARICOPA AREA

SOIL FAMILY: TYPIC NATRAGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION <2 MM | SANDS 2-.05 | SANDS .05-.002 | SILTS .002-LT | CLAYS LT | VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | CLAYS FINE LT .2U | CLAYS CARBONATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20 | COARSE FRAGMENTS II 20-5 | COARSE FRAGMENTS III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 1 116 | 0- 5 | A11 | 57.6 | 35.7 | 6.7 | | | 10.1 | 7.2 | 4.2 | 10.9 | 25.2 | 25.3 | 10.4 | | | | 57.4 | 24A | 2 | 11 | 10 |
| 1 117 | 5- 15 | A12 | 59.4 | 32.0 | 8.6 | | | 6.2 | 7.9 | 6.1 | 13.5 | 25.7 | 23.3 | 8.7 | | | | 57.2 | 17A | 2 | 7 | 8 |
| 1 118 | 15- 19 | B21TCA | 56.1 | 28.4 | 15.5 | | | 16.3 | 9.3 | 5.3 | 9.9 | 15.3 | 16.2 | 12.2 | | | TR | 37.2 | 43A | 6 | 20 | 17 |
| 1 119 | 19- 36 | B22TCA | 32.2 | 43.7 | 24.1 | | | 8.0 | 6.8 | 4.0 | 6.0 | 7.4 | 11.4 | 32.3 | | | 5 | 22.1 | 31A | -- | 11 | 20 |
| 1 120 | 36- 56 | B23TCA | 38.5 | 39.7 | 21.8 | | | 7.2 | 8.3 | 6.4 | 8.4 | 8.2 | 11.4 | 28.3 | | | 1 | 23.9 | 33A | 2 | 15 | 17 |
| 1 121 | 56- 76 | B31TCA | 58.2 | 22.7 | 19.1 | | | 28.4 | 12.4 | 5.7 | 6.6 | 5.1 | 7.3 | 15.4 | | | 1 | 15.3 | 38A | 2 | 14 | 22 |
| 1 122 | 76- 88 | B32TCA | 39.1 | 44.2 | 16.7 | | | 14.2 | 8.2 | 3.6 | 6.5 | 6.6 | 10.2 | 34.0 | | | TR | 20.1 | 31A | 2 | 11 | 17 |
| 1 123 | 88-111 | B33TCA | 60.8 | 21.9 | 17.3 | | | 31.1 | 11.2 | 5.0 | 6.5 | 7.0 | 9.2 | 12.7 | | | | 19.6 | 44A | 1 | 17 | 27 |
| 1 124 | 111-127 | 2C 1CA | 20.4 | 66.3 | 13.3 | | | 1.2 | 1.1 | 0.7 | 3.3 | 14.1 | 16.9 | 49.4 | | | 1 | 33.4 | 6A | -- | 3 | 3 |
| 1 125 | 127-178 | 2C 2CA | 38.0 | 48.0 | 14.0 | | | 0.3 | 0.5 | 1.1 | 9.0 | 27.1 | 26.4 | 21.6 | | | TR | 60.3 | G | | | |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A -PERCENT-- | NITROGEN 6B1A -PERCENT- | CARBONATE AS CACO3 LT 2 6E1B | CARBONATE AS CACO3 2-19 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG LIMIT LL 4F1 PCT. | ATTERBERG LIMIT PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F GRAMS | BULK DENSITY 1/3 BAR 4A1F PER CC | BULK DENSITY DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C ----PERCENT--- | WATER CONTENT 1/3 BAR 4B1C ----PERCENT--- | WATER CONTENT 15 BAR 4B2 ----PERCENT--- | EXTENSBLTY LEF 4D1 -PERCENT-- | EXTENSBLTY LE 4D1 -PERCENT-- | PH H2O 1/1 8C1A | PH H2O 1/10 8C1A | PH CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 116 | 0- 5 | 0.09 | 0.021 | 4 | | | | | 1.50 | | 0.85 | | | | 5.0 | | | 8.1 | | 7.0 |
| 1 117 | 5- 15 | 0.12 | 0.018 | 4 | | | | | | 1.50 | 1.53 | 0.90 | 22.7 | 13.1 | 5.5 | 0.7 | 0.6 | 9.0 | | 7.2 |
| 1 118 | 15- 19 | 0.36 | | 9 | | | | | 1.49 | | 0.70 | | | | 7.5 | | | 8.8 | 9.9 | 7.2 |
| 1 119 | 19- 36 | 0.30 | | 38 | | | | | | 1.48 | 1.60 | 0.80 | 22.4 | 19.0 | 11.6 | 2.6 | 2.1 | 8.7 | 9.9 | 7.4 |
| 1 120 | 36- 56 | 0.12 | | 29 | | | | | 1.48 | | | 0.78 | | | 12.0 | | | 7.7 | 9.3 | 7.3 |
| 1 121 | 56- 76 | 0.05 | | 15 | | | | | | 1.17 | 1.31 | 0.78 | 37.0 | 32.1 | 14.0 | 3.8 | 3.0 | 8.3 | 9.3 | 7.6 |
| 1 122 | 76- 88 | 0.04 | | 31 | | | | | 1.17 | | | 0.84 | | | 11.5 | | | 8.3 | 9.8 | 7.8 |
| 1 123 | 88-111 | | | 8 | | | | | 1.17 | | | 0.74 | | | 14.3 | | | 8.1 | 9.5 | 8.0 |
| 1 124 | 111-127 | | | 44 | | | | | 1.55 | | | 0.97 | | | 11.2 | | | 8.4 | 9.8 | 7.9 |
| 1 125 | 127-178 | | | 9 | | | | | | 1.55 | 1.74 | 1.00 | 25.2 | 20.8 | 12.8 | 3.9 | 3.9 | 8.4 | 9.7 | 7.9 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E -MEQ/100G | EXTRACTABLE BASES MG 5B4A 6Q2D -MEQ/100G | EXTRACTABLE BASES NA 5B4A 6P2A -MEQ/100G | EXTRACTABLE BASES K 5B4A 6Q2A -MEQ/100G | SUM | BASE SAT. PCT. | C E C NA- DAC 5A2A -MEQ/100G | C E C NH4- OAC 5A6A | WATER EXTRACT EC 8A1A MMHO | WATER EXTRACT CA 6N1A | WATER EXTRACT MG 6Q1A | WATER EXTRACT NA 6P1A | WATER EXTRACT K 6Q1A | WATER EXTRACT FROM SATURATED PASTE CO3 6I1A | WATER EXTRACT FROM SATURATED PASTE HCO3 6J1A | WATER EXTRACT FROM SATURATED PASTE CL 6K1A | WATER EXTRACT FROM SATURATED PASTE SO4 6L1B | 8A1 B PPM 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | | | MMHO | MEQ/1000 ML | | | | | | | | | |
| 1 116 | 0- 5 | 17.8 | 1.7 | 0.4 | 1.0 | 20.9 | 100+ | | 11.0 | | | | | | | | | | | |
| 1 117 | 5- 15 | 17.4 | 1.7 | 1.9 | 0.7 | 21.7 | 100+ | | 11.9 | | | | | | | | | | | |
| 1 118 | 15- 19 | 13.6 | 1.7 | 6.3 | 0.4 | 22.0 | 100+ | | 14.4 | 3.88 | 0.4 | 0.5 | 32.3 | 0.2 | | 4.6 | 27.4 | | | 8.1 |
| 1 119 | 19- 36 | 15.6 | 2.3 | 13.4 | 0.3 | 31.6 | 100+ | | 16.5 | 9.2 | 4.7 | 1.5 | 86.8 | 0.1 | | 3.4 | 46.4 | 38.5 | | 8.1 |
| 1 120 | 36- 56 | 25.3 | 2.9 | 17.6 | 0.3 | 46.1 | 100+ | | 16.7 | 14.8 | 22.8 | 6.1 | 140.0 | 0.1 | | 4.0 | 48.6 | 112.0 | | 8.2 |
| 1 121 | 56- 76 | 46.3 | 3.6 | 22.2 | 0.4 | 72.5 | 100+ | | 22.1 | 18.1 | 21.7 | 8.2 | 177.0 | 0.1 | | 3.8 | 55.6 | 150.0 | | 8.2 |
| 1 122 | 76- 88 | 19.4 | 3.2 | 19.6 | 0.4 | 42.6 | 100+ | | 17.6 | 14.4 | 11.4 | 5.4 | 143.0 | 0.2 | | 4.2 | 45.1 | 117.2 | | 8.3 |
| 1 123 | 88-111 | 20.7 | 3.7 | 22.3 | 0.5 | 47.2 | 100+ | | 21.8 | 16.3 | 15.4 | 6.2 | 161.0 | 0.2 | | 4.2 | 49.6 | 134.8 | | 8.2 |
| 1 124 | 111-127 | 13.6 | 2.9 | 14.4 | 0.4 | 31.3 | 100+ | | 12.1 | 9.4 | 2.8 | 1.5 | 88.3 | 0.1 | | 3.2 | 32.7 | 57.0 | | 8.6 |
| 1 125 | 127-178 | 14.8 | 3.4 | 18.3 | 0.5 | 37.0 | 100+ | | 17.1 | 13.0 | 6.9 | 3.7 | 126.0 | 0.1 | | 3.4 | 45.6 | 96.8 | | 8.4 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | GYPSUM REQ. 6P3A MEQ. | CLAY MINERALOGY <0.002 MM I 7A2E | CLAY MINERALOGY <0.002 MM II 7A2E | CLAY MINERALOGY <0.002 MM III 7A2E | CLAY MINERALOGY <0.002 MM IV 7A2E | DTA 7A3 PCT. | CLAY MINERALOGY -L.T. .0002 MM- I 7A2E | CLAY MINERALOGY -L.T. .0002 MM- II 7A2E | CLAY MINERALOGY -L.T. .0002 MM- III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 116 | 0- 5 | | 0.4 | 4 | | | | MM 3 | KK 1 | | | | | | |
| 1 117 | 5- 15 | | 1.9 | 16 | | | | MM 3 | | | | | | | |
| 1 118 | 15- 19 | 37.0 | 5.1 | 35 | 48 | | 2.0 | | | | | | | | |
| 1 119 | 19- 36 | 59.2 | 8.3 | 50 | 49 | | 3.8 | MT 3 | MI 2 | | | | | | |
| 1 120 | 36- 56 | 65.7 | 8.4 | 50 | 37 | 2.9 | 3.8 | | | | | | | | |
| 1 121 | 56- 76 | 59.7 | 11.6 | 53 | 46 | 2.9 | 6.0 | MT 3 | | | | | | | |
| 1 122 | 76- 88 | 59.9 | 11.0 | 63 | 49 | | 6.1 | | | | | | | | |
| 1 123 | 88-111 | 60.8 | 12.5 | 57 | 49 | 0.6 | 9.0 | MT 5 | MI 3 | KK 1 | | | | | |
| 1 124 | 111-127 | 79.1 | 7.4 | 61 | 60 | | 5.6 | | | | | | | | |
| 1 125 | 127-178 | 66.6 | 9.9 | 58 | 55 | | 7.0 | MT 4 | MM 4 | KK 1 | | | | | |

| MINERAL CODE | RELATIVE AMOUNT |
|---|---|
| MM MT/MICA | 1 TRACE |
| KK KAOLINIT | 2 SMALL |
| | 3 MODERATE |
| MT MONTMORT | 4 ABUNDANT |
| MI MICA | 5 DOMINANT |
| | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## HARQUA GRAVELLY FINE SANDY LOAM (taxadjunct) 1/

S71Ariz-7-6(1-10)

Location: Maricopa County, Arizona. 1650 feet north and 400 feet west of the SE corner of Sec. 18, T1S, R6W, about 20 miles west of Buckeye. Date of Sampling: April 13, 1971.
Description by: W. D. Nettleton, J. E. Jay, G. Hartman, R. G. Schurig, F. Cook. Collectors: J.E.Jay, W. D. Nettleton, G. Hartman, R. Schurig, F. Cook.
Classification: Typic Natrargid, fine-loamy, mixed, hyperthermic.
Vegetation: Creosotebush, four-wing saltbush, mesquite, cholla cactus. Use: Rangeland. Climate: Semiarid. 7 inches precipitation. Mean annual air temperature 70° F. Parent Material: Old alluvium from granite, rhyolite, schist, andesite and tuff. Topography: Gently sloping dissected low fans. Slopes 1 to 2 percent. Elevation: 1100 feet. Drainage: Well drained. Permeability is slow. Runoff medium. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A11 RSL 71116 | 0 to 5 cm (0 to 2 inches), light yellowish brown (10YR 6/4) gravelly fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak coarse platy structure; slightly hard, very friable, nonsticky, slightly plastic; few very fine and fine roots; few fine tubular and interstitial pores; 25 percent fine and medium subangular gravel; strongly effervescent; moderately alkaline (pH 8.2 TB); abrupt smooth boundary. |
| A12 RSL 71117 | 5 to 15 cm (2 to 6 inches), light yellowish brown (10YR 6/4) gravelly fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive, slightly hard, very friable, nonsticky, slightly plastic; common very fine and fine and few medium fine roots; common fine interstitial and few fine tubular pores; 35 percent subangular gravel; strongly effervescent; moderately alkaline (pH 8.3); abrupt wavy boundary. |
| B21tca RSL 71118 | 15 to 19 cm (6 to 7½ inches), yellowish red (5YR 5/6 and 5YR 4/6) gravelly clay loam, yellowish red (5YR 5/6 and 5YR 4/6) moist; weak medium prismatic parting to moderate medium subangular blocky structure; hard, friable, slightly sticky, plastic; few fine medium and very fine roots; common fine interstitial and few fine tubular pores; 35 percent subangular gravel; strongly to violently effervescent; common fine and medium pinkish white (7.5YR 8/2) and pink (7.5YR 8/4) irregularly shaped soft lime masses; strongly alkaline (pH 8.6); clear smooth boundary. |
| B22tca RSL 71119 | 19 to 36 cm (7½ to 14 inches), light brown (7.5YR 6/4) and light reddish brown (5YR 6/4) gravelly clay loam, brown (7.5YR 5/4 and 4/4) when moist; weak medium prismatic parting to weak medium subangular blocky structure; hard, friable, slightly sticky, plastic; few very fine, fine and medium roots; common fine interstitial and few fine tubular pores; 25 percent subangular gravel; violently effervescent; many fine and medium pinkish white and pink irregularly shaped soft lime masses; strongly alkaline (pH 8.7) clear smooth boundary. |
| B23tca RSL 71120 | 36 to 56 cm (14 to 22 inches), light brown (7.5YR 6/4) and yellowish red (5YR 5/6) gravelly clay loam, reddish brown (5YR 4/4) and yellowish red (5YR 4/6) moist; weak fine subangular blocky structure; hard, friable, slightly sticky, plastic, very few fine roots; common fine interstitial and few fine tubular pores; common small clusters of gypsum crystals; 40 percent subangular gravel; violently effervescent; many fine and medium pinkish white and pink irregularly shaped soft lime masses; strongly alkaline (pH 9.0); gradual smooth boundary. |
| B31tca RSL 71121 | 56 to 76 cm (22 to 30 inches), yellowish red (5YR 4/6 and 4/8) gravelly sandy clay loam, yellowish red (5YR 4/6 and 4/8) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine interstitial and few fine tubular pores; common small clusters of gypsum crystals; 30 percent subangular gravel; violently effervescent; common fine and medium pinkish white and pink irregularly shaped soft lime masses; strongly alkaline (pH 8.6) clear wavy boundary. |
| B32tca RSL 71122 | 76 to 88 cm (30 to 35 inches), light brown (7.5YR 6/4) very gravelly clay loam, reddish brown (5YR 4/4) moist; massive; hard, very friable, slightly sticky, slightly plastic; common fine interstitial pores; 50 percent subangular gravel; violently effervescent; many coarse and medium seams of lime and strata of volcanic ash; strongly alkaline (pH 8.5); clear wavy boundary. |
| B33tca RSL 71123 | 88 to 111cm (35 to 44 inches), yellowish red (5YR 5/6) gravelly sandy clay loam, reddish brown (5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine interstitial pores; 40 percent subangular gravel; violently effervescent; common fine and medium pinkish white irregularly shaped soft lime masses and concretions; strongly alkaline (pH 8.7); clear wavy boundary. |
| IIC1ca RSL 71124 | 111 to 127 cm (44 to 50 inches), light brown (7.5YR 6/4) gravelly clay loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine interstitial pores; 30 percent subangular gravel; violently effervescent; many fine and medium pinkish white seams of lime and strata of volcanic ash; strongly alkaline (pH 8.9); abrupt wavy boundary. |
| IIC2ca RSL 71125 | 127 to 178 cm (50 to 70 inches), light brown (7.5YR 6/4) clay loam, brown (7.5YR 4/4) moist; moderate medium angular blocky structure; extremely hard, very firm, slightly sticky, plastic; few fine tubular pores; common fine black manganese stains on ped faces; common fine yellow (5YR 8/6) masses on ped faces; slightly effervescent; violently effervescent on few fine pinkish white irregularly shaped extremely hard lime concretions; strongly alkaline (pH 9.0). |

1/ The Harqua series is in a fine-loamy, mixed, hyperthermic family of Typic Haplargids. This pedon has a natric horizon.

CONSECUTIVE PEDON NUMBER C 71 6 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA TAXADJUNCT SOIL NO. S71 ARIZ. 10- 6 SAMPLE NO. 1 33-1 40 ORGAN PIPE MON AREA

SOIL FAMILY: TYPIC NATRARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL FRACTION 2- .05 SAND | .05- .002 SILT | LT .002 CLAY | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. 2- .2U | CLAYS FINE LT .2U | CARBO NATE 3A1A | 1A2A INT. COARSE FRAGMENTS II .2- .02 | PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 1 | 33 | 0- | 5 | A2 | 48.7 | 39.3 | 12.0 | 8.2 | 6.8 | 4.9 | 11.8 | 17.0 | 16.2 | 23.1 | 11.0 | 1.0 | | 40.6 | 24A | 4 | 14 | 6 |
| 1 | 34 | 5- | 12 | A3 | 54.6 | 34.6 | 10.8 | 13.9 | 7.3 | 4.6 | 11.3 | 17.5 | 15.5 | 19.1 | 8.9 | 1.9 | | 40.1 | 44A | 21 | 13 | 9 |
| 1 | 35 | 12- | 33 | B21tcasa | 39.1 | 30.4 | 30.5 | 11.2 | 5.0 | 3.5 | 8.0 | 11.4 | 9.0 | 21.4 | 22.8 | 7.7 | 2 | 25.3 | 51* | 8V | 27 | 15 |
| 1 | 36 | 33- | 53 | B22tcasa | 41.3 | 28.6 | 30.1 | 13.1 | 7.6 | 4.5 | 6.9 | 9.2 | 7.4 | 21.2 | 18.6 | 11.5 | 3 | 20.4 | 50A | 14 | 23 | 13 |
| 1 | 37 | 53- | 74 | B23tcasa | 50.2 | 26.3 | 23.5 | 11.8 | 9.8 | 7.2 | 10.3 | 11.1 | 6.9 | 19.4 | | | 1 | 22.8 | 42A | 1 | 25 | 16 |
| 1 | 38 | 74- | 97 | 2C1casa | 33.6 | 50.9 | 15.5 | 1.4 | 1.9 | 1.8 | 5.1 | 23.4 | 15.8 | 35.1 | 8.3 | 7.2 | 1 | 42.3 | 8A | 2 | 3 | 4 |
| 1 | 39 | 97- | 112 | 2C2casa | 45.9 | 42.8 | 11.3 | 0.2 | 0.6 | 0.9 | 7.8 | 36.4 | 13.9 | 28.9 | | | TR | 56.3 | 1A | -- | -- | 1 |
| 1 | 40 | 112- | 132 | 2C3casa | 65.4 | 24.1 | 10.5 | 1.0 | 1.3 | 1.6 | 15.8 | 45.7 | 15.7 | 8.4 | | | | 73.0 | 2A | -- | -- | 2 |

| SAMPLE NO. | | DEPTH CM. | | ORG.MATTER CAR- BON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | -PERCENT-- | | -PERCENT- | | PCT. | PCT.NO.40 | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 1 | 33 | 0- | 5 | 0.05 | 0.013 | 3 | | 0.8 | | | | 1.56 | 1.58 | 0.84 | 19.1 | 16.6 | 7.3 | 0.4 | 0.4 | 9.0 | 9.8 | 8.3 |
| 1 | 34 | 5- | 12 | 0.07 | 0.013 | 2 | | 0.7 | | | 1.56 | | | 0.69 | | | 8.4 | | | 8.5 | 9.4 | 8.4 |
| 1 | 35 | 12- | 33 | 0.17 | | 12 | | 0.5 | | | 1.17 | | | 0.68 | | | 13.8 | | | 8.2 | 8.6 | 8.2 |
| 1 | 36 | 33- | 53 | 0.14 | | 20 | | 0.6 | | | 1.17 | | | 0.69 | | | 14.6 | | | 8.3 | 8.7 | 8.3 |
| 1 | 37 | 53- | 74 | 0.09 | | 19 | | 0.4 | | | | 1.17 | 1.28 | 0.75 | 25.4 | 23.1 | 10.9 | 3.0 | 2.3 | 8.5 | 8.8 | 8.4 |
| 1 | 38 | 74- | 97 | | | 32 | | 0.3 | | | | 1.43 | 1.55 | 0.95 | 28.8 | 23.4 | 9.6 | 2.7 | 2.6 | 8.6 | 9.4 | 8.5 |
| 1 | 39 | 97- | 112 | | | 26 | | | | | 1.35 | | | 1.00 | | | 8.1 | | | 8.7 | 9.6 | 8.4 |
| 1 | 40 | 112- | 132 | | | 2 | | | | | | 1.28 | 1.44 | 0.99 | 34.2 | 23.7 | 7.4 | 4.0 | 4.0 | 8.8 | 9.5 | 8.5 |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | -MEQ/100G-------- | | | | PCT. | -MEQ/100G | | MMHO | ---------- | | MEQ/1000 | | ML | ---------- | | | PPM | |
| 1 | 33 | 0- | 5 | 20.0 | 2.5 | 6.9 | 1.6 | 31.0 | 100+ | | 18.2 | 3.90 | 1.3 | 0.9 | 34.2 | 0.2 | | 5.3 | 24.7 | | 1.1 | 8.2 |
| 1 | 34 | 5- | 12 | 12.2 | 1.2 | 20.6 | 1.1 | 35.1 | 100+ | | 17.0 | 32.0 | 23.6 | 2.9 | 330.0 | 0.6 | | 4.3 | 295.0 | 28.0 | 7.2 | 7.9 |
| 1 | 35 | 12- | 33 | 38.4 | 2.3 | 43.9 | 0.6 | 85.2 | 100+ | | 18.8 | 56.8 | 43.8 | 11.5 | 515.0 | 0.4 | | 5.7 | 513.0 | 92.5 | 12.5 | 7.9 |
| 1 | 36 | 33- | 53 | 57.4 | 2.2 | 45.0 | 0.4 | 105.0 | 100+ | | 17.6 | 45.0 | 34.2 | 7.2 | 538.0 | 0.2 | | 2.4 | 407.0 | 106.5 | 10.0 | 8.1 |
| 1 | 37 | 53- | 74 | 42.9 | 1.5 | 30.6 | 0.3 | 75.3 | 100+ | | 14.7 | 33.7 | 14.7 | 4.6 | 369.0 | 0.2 | | 2.9 | 238.0 | 129.0 | 11.0 | 8.3 |
| 1 | 38 | 74- | 97 | 19.1 | 1.6 | 24.1 | 0.2 | 45.0 | 100+ | | 11.7 | 23.5 | 15.5 | 4.0 | 228.0 | 0.2 | | 2.1 | 149.0 | 96.5 | 13.7 | 8.4 |
| 1 | 39 | 97- | 112 | 13.1 | 1.4 | 18.9 | 0.2 | 33.6 | 100+ | | 9.8 | 19.6 | 10.4 | 2.4 | 198.0 | 0.2 | | 2.3 | 118.0 | 106.0 | 10.2 | 8.3 |
| 1 | 40 | 112- | 132 | 9.5 | 1.4 | 18.0 | 0.3 | 29.2 | 100+ | | 11.7 | 16.6 | 4.0 | 1.3 | 163.0 | 0.2 | | 3.2 | 101.0 | 64.8 | 9.3 | 8.5 |

| SAMPLE NO. | | DEPTH CM. | | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33 | 0- | 5 | 28.1 | 5.9 | 33 | 33 | | 4.8 | MI 3 | | | | | MI 2 | | | MI MICA | 1 TRACE |
| 1 | 34 | 5- | 12 | 33.7 | 9.5 | 56 | 91 | 0.1 | 8.3 | | | | | | MI 4 | | | | 2 SMALL |
| 1 | 35 | 12- | 33 | 50.9 | 17.7 | 94 | 98 | 2.9 | 4.2 | MI 5 | KK 1 | | | | MI 5 | | | KK KAOLINIT | 3 MODERATE |
| 1 | 36 | 33- | 53 | 59.9 | 12.8 | 72 | 100+ | 5.5 | 4.9 | | | | | | MI 4 | MT 2 | | MT MONTMORT | 4 ABUNDANT |
| 1 | 37 | 53- | 74 | 56.7 | 9.7 | 66 | 100+ | | 4.4 | | | | | | | | | | 5 DOMINANT |
| 1 | 38 | 74- | 97 | 66.4 | 9.0 | 77 | 73 | | 4.8 | MT 4 | MI 3 | KK 1 | | | MT 4 | MI 3 | | | 6 INDETER. |
| 1 | 39 | 97- | 112 | 58.5 | 7.3 | 75 | 78 | | 2.8 | | | | | | | | | | |
| 1 | 40 | 112- | 132 | 58.3 | 8.5 | 73 | 100+ | | 6.4 | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.
V=NOT WEIGHED. VALUE CALCULATED FROM A VOLUME ESTIMATE.

## HARQUA VERY GRAVELLY SANDY LOAM (taxadjunct) 1/

S71 Ariz-10-6-(1-8*)

Location: Pima County, Arizona. 1/4 mile north and 1/8 mile west of the southeast corner of Section 13, T18S, R5W, Organ Pipe Cactus National Monument. Date of Sampling: April 7, 1971.
Description by: Y. H. Havens, E. Chamberlin. Collectors: K. Flach, E. Chamberlin, K. Vogt.
Classification: Typic Natrargid, fine-loamy, mixed, hyperthermic.
Vegetation: Saltbush, creosotebush, bursage and mesquite. Use: Desert rangeland. Climate: Mean annual precipitation 8 to 10 inches. Mean annual air temperature 69° F. Parent Material: Mixed--dominantly basalt with influence from rhyolite and andesite. Topography: Gently sloping--convex, with 1½ to 2 percent slope. Elevation: 1600 feet. Drainage: Well drained with moderately slow to slow permeability. Soil Moisture: Dry.
Remarks: 70 percent of surface covered with gravel.

| HORIZON | DESCRIPTION |
|---|---|
| A2<br>RSL<br>7133 | 0 to 5 cm (0 to 2 inches), light brown (7.5YR 6/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; moderate medium and coarse platy structure; slightly hard, very friable, nonsticky, slightly plastic; many very fine and fine vesicular pores; 50 percent gravel by volume; slightly effervescent; strongly alkaline (pH 8.5 thymol blue); abrupt wavy boundary. |
| A3sa<br>RSL<br>7134 | 5 to 12 cm (2 to 5 inches), strong brown (7.5YR 5/6) gravelly loam, yellowish red (5YR 4/6) moist; massive; soft, very friable, slightly sticky, slightly plastic; few very fine roots; common very fine interstitial pores; 40 percent gravel; slightly effervescent; strongly alkaline (pH 8.5); clear wavy boundary. |
| B21tcasa<br>RSL<br>7135 | 12 to 33 cm (5 to 13 inches), yellowish red (5YR 4/6) gravelly light clay loam, yellowish red (5YR 4/6) moist; weak medium prismatic parting to weak fine and medium subangular blocky structure; hard, friable, slightly sticky, plastic; few very fine roots; common very fine interstitial and few very fine tubular pores; 40 percent gravel; strongly effervescent; many fine and medium pinkish white (7.5YR 8/2) slightly hard lime masses--some gravel coated with lime on underside; strongly alkaline (pH 8.6); gradual wavy boundary. |
| B22tcasa<br>RSL<br>7136 | 33 to 53 cm (13 to 21 inches), yellowish red (5YR 5/6) gravelly light clay loam, yellowish red (5YR 4/6) moist; weak fine and medium subangular blocky structure; hard, friable, sticky, plastic; few very fine roots; common very fine interstitial and few very fine tubular pores; few thin clay films on faces of peds and in pores; 40 percent gravel; violently effervescent; many fine and medium pinkish white (7.5YR 8/2) slightly hard lime masses--some gravel coated with lime on underside; strongly alkaline (pH 8.7); gradual wavy boundary. |
| B23tcasa<br>RSL<br>7137 | 53 to 74 cm (21 to 29 inches), reddish brown (5YR 5/4) gravelly sandy loam, reddish brown (5YR 4/4) moist; weak fine and medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common very fine interstitial and few very fine tubular pores; few thin clay films on faces of peds and in pores; 40 percent gravel; violently effervescent; many fine and medium pinkish white (7.5YR 8/2) slightly hard lime masses and gravel are completely lime coated; strongly alkaline (pH 8.6); clear wavy boundary. |
| IIC1casa<br>RSL<br>7138 | 74 to 97 cm (29 to 38 inches), pinkish white (7.5YR 8/2) and light brown (7.5YR 6/4) gravelly loam, light brown (7.5YR 6/4) and brown (7.5YR 5/4) moist; massive; hard, very friable, slightly sticky, plastic; few very fine interstitial pores; 20 percent gravel; violently effervescent; moderately alkaline (pH 8.4); abrupt wavy boundary. |
| IIC2casa<br>RSL<br>7139 | 97 to 112 cm (38 to 44 inches), pinkish white (7.5YR 8/2) and light brown (7.5YR 6/4) loam, light brown (7.5YR 6/4) moist; massive; hard, friable, slightly sticky, plastic; few very fine tubular pores; violently effervescent; few coarse pinkish white (7.5YR 8/2) slightly hard lime masses; very strongly alkaline (pH 9.2); clear irregular boundary. |
| IIC3casa<br>RSL<br>7140 | 112 to 132 cm (44 to 52 inches), light brown (7.5YR 6/4) stratified very fine sandy loam and sandy loam, brown (7.5YR 5/4) moist; massive; hard, very friable; slightly sticky, slightly plastic; few very fine tubular pores; common very fine mica flakes; slightly effervescent; few coarse pinkish white (7.5YR 8/2) slightly hard lime masses; strongly alkaline (pH 8.5). |

1/ The Harqua series is in a fine-loamy, mixed, hyperthermic family of Typic Haplargids. This pedon has a natric horizon.

CONSECUTIVE PEDON NUMBER C 71 7 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA TAXADJUNCT SOIL NO. S71 ARIZ. 10- 7 SAMPLE NO. 1 41-1 47 ORGAN PIPE MON AREA

SOIL FAMILY: TYPIC NATRARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2- .02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 1 | 41 | 0- | 7 | A2 | 55.2 | 35.1 | 9.7 | 9.0 | 7.3 | 5.6 | 11.6 | 21.7 | 18.9 | 16.2 | 7.6 | 2.1 | | 47.5 | 46A | 5 | 34 | 7 |
| 1 | 42 | 7- | 15 | B1ca | 34.8 | 41.8 | 23.4 | 3.7 | 4.6 | 3.7 | 8.2 | 14.6 | 16.3 | 25.5 | | | | 36.0 | 26A | 9V | 10 | 6 |
| 1 | 43 | 15- | 30 | B21tcasa | 31.1 | 28.1 | 40.8 | 7.4 | 4.5 | 2.9 | 5.7 | 10.6 | 9.9 | 18.2 | 29.0 | 11.8 | 1 | 23.8 | 42A | 10V | 20 | 13 |
| 1 | 44 | 30- | 46 | B22tcasa | 36.6 | | | 11.9 | 6.4 | 3.6 | 5.3 | 9.4 | | | | | | | 45A | 9V | 21 | 14 |
| 1 | 45 | 46- | 69 | B3tcasa | 39.1 | 30.0 | 30.9 | 10.7 | 8.1 | 4.5 | 6.0 | 9.8 | 10.1 | 19.9 | 19.4 | 11.5 | 6 | 23.3 | 44A | 8V | 21 | 15 |
| 1 | 46 | 69- | 84 | 2C1casa | 32.0 | 41.8 | 26.2 | 2.0 | 2.6 | 1.9 | 4.2 | 21.3 | 21.3 | 20.5 | | | 2 | 45.3 | A | | | |
| 1 | 47 | 84- | 104 | 2C2casa | 35.1 | 40.9 | 24.0 | 0.4 | 1.0 | 0.7 | 3.9 | 29.1 | 24.9 | 16.0 | 13.9 | 10.1 | 1 | 56.8 | TRA | -- | -- | TR |

| SAMPLE NO. | | DEPTH CM. | | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | 1 M 1 T | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 1 | 41 | 0- | 7 | 0.16 | 0.021 | 1 | | 0.7 | | | | 1.22 | | | 0.72 | | | 5.8 | | | 8.5 | 9.1 | 7.8 |
| 1 | 42 | 7- | 15 | 0.14 | 0.024 | 3 | | 0.8 | | | | | 1.22 | 1.32 | 0.86 | 32.9 | 26.0 | 11.9 | 2.7 | 2.3 | 8.4 | 9.5 | 8.0 |
| 1 | 43 | 15- | 30 | 0.24 | | 10 | | 0.7 | | | | | 1.02 | 1.16 | 0.78 | 44.1 | 38.7 | 17.3 | 4.4 | 3.3 | 8.4 | 9.6 | 8.3 |
| 1 | 44 | 30- | 46 | 0.11 | | 13 | | 0.5 | | | | | 1.05 | 1.19 | 0.76 | 40.2 | 34.8 | 18.2 | 4.3 | 3.1 | 8.1 | 8.6 | 8.1 |
| 1 | 45 | 46- | 69 | | | 26 | | 0.4 | | | | | 1.20 | 1.38 | 0.74 | 35.0 | 30.8 | 12.9 | 4.8 | 3.4 | 8.5 | 9.2 | 8.4 |
| 1 | 46 | 69- | 84 | | | 19 | | 0.4 | | | | 1.34 | | | 1.00 | | | 12.8 | | | 8.6 | 9.3 | 8.6 |
| 1 | 47 | 84- | 104 | | | 10 | | 0.4 | | | | | 1.34 | 1.53 | 1.00 | 32.2 | 25.7 | 12.7 | 4.5 | 4.5 | 8.5 | 9.4 | 8.5 |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6G2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MEQ/100G | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 1 | 41 | 0- | 7 | 12.4 | 2.2 | 1.0 | 1.0 | 16.6 | 100+ | | 11.2 | 1.47 | 6.0 | 2.3 | 10.8 | 0.4 | | 1.6 | 8.3 | 7.8 | 0.4 | 8.0 |
| 1 | 42 | 7- | 15 | 18.6 | 2.7 | 5.3 | 1.4 | 28.0 | 100+ | | 21.2 | 4.69 | 5.2 | 1.2 | 36.7 | 0.3 | | 4.8 | 34.0 | 5.4 | 1.4 | 7.8 |
| 1 | 43 | 15- | 30 | 19.7 | 2.3 | 17.8 | 0.9 | 40.7 | 100+ | | 24.2 | 9.8 | 4.3 | 1.6 | 88.9 | 0.2 | | 5.4 | 57.3 | 29.3 | 6.5 | 7.9 |
| 1 | 44 | 30- | 46 | 91.2 | 2.4 | 23.5 | 0.5 | 117.6 | 100+ | | 18.7 | 21.2 | 26.0 | 4.0 | 216.0 | 0.2 | | 5.9 | 112.0 | 94.0 | 14.0 | 7.9 |
| 1 | 45 | 46- | 69 | 36.2 | 2.0 | 26.6 | 0.4 | 65.2 | 100+ | | 17.1 | 23.5 | 25.3 | 4.7 | 259.0 | 0.2 | | 2.7 | 140.0 | 123.0 | 15.5 | 8.2 |
| 1 | 46 | 69- | 84 | 28.7 | 2.7 | 29.5 | 0.5 | 61.4 | 100+ | | 18.5 | 19.1 | 15.4 | 3.2 | 202.0 | 0.1 | | 4.0 | 88.3 | 133.6 | 19.0 | 8.5 |
| 1 | 47 | 84- | 104 | 33.2 | 2.5 | 30.8 | 0.6 | 67.1 | 100+ | | 19.9 | 19.3 | 21.0 | 3.3 | 204.0 | 0.1 | | 3.4 | 79.9 | 150.8 | 15.5 | 8.4 |

| SAMPLE NO. | | DEPTH CM. | | WATER EXCHANGBLE AT SAT. 8A | NA 5B4B | NA 5O2 | SAR 5E | GYPSUM AMT. 6F1B | REQ. 6P3A | CLAY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 | MINERALOGY L.T. .0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCT. | MEQ. | PCT. | | PCT. | MEQ. | | | | | PCT. | | | | | |
| 1 | 41 | 0- | 7 | 27.8 | 0.7 | 6 | 5 | | | MI 3 | KK 1 | | | | MI 3 | | | MI MICA | 1 TRACE |
| 1 | 42 | 7- | 15 | 47.9 | 3.5 | 17 | 21 | | 2.8 | | | | | | | | | KK KAOLINIT | 2 SMALL |
| 1 | 43 | 15- | 30 | 76.5 | 11.0 | 45 | 52 | | 9.4 | MI 4 | KK 1 | | | | MI 4 | MT 3 | | | 3 MODERATE |
| 1 | 44 | 30- | 46 | 68.8 | 8.6 | 46 | 56 | 15.9 | 6.6 | | | | | | | | | MT MONTMORT | 4 ABUNDANT |
| 1 | 45 | 46- | 69 | 64.2 | 10.0 | 58 | 67 | 1.9 | 6.1 | | | | | | MI 4 | MT 3 | | | 5 DOMINANT |
| 1 | 46 | 69- | 84 | 83.8 | 12.6 | 68 | 66 | 0.2 | 10.3 | MT 5 | MI 2 | KK 1 | | | | | | | 6 INDETER. |
| 1 | 47 | 84- | 104 | 90.2 | 12.4 | 62 | 59 | 1.8 | 10.6 | | | | | | MT 5 | MI 3 | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
V=NOT WEIGHED. VALUE CALCULATED FROM A VOLUME ESTIMATE.

## HARQUA VERY GRAVELLY LOAM (taxadjunct) 1/

S71 Ariz 10-7-(1-7*)

Location: Pima County, Arizona. Northwest of Blankenship well, north on highest ridge, 1/4 mile south and 200 feet west of northeast corner Section 14, T18S, R5W, Organ Pipe Cactus National Monument. Date of Sampling: April 7, 1971.
Description by: Y. H. Havens, E. Chamberlin. Collectors: K. Flach, E. Chamberlin, K. Vogt.
Classification: Typic Natrargid, fine-loamy, mixed, hyperthermic.
Vegetation: Saltbush, creosotebush and mesquite. Use: Desert rangeland. Climate: Mean annual precipitation 7 to 9 inches. Mean annual air temperature 69° F. Parent Material: Mixed--dominantly basalt, rhyolite and andesite. Topography: Gently sloping-convex with 2 to 3 percent slope. Elevation: 1450 feet. Drainage: Well drained with moderately slow to slow permeability. Soil Moisture: Dry to IICca—moist IICca.
Remarks: 80 percent of surface covered with gravel and cobble--dominantly basalt and rhyolite.

| HORIZON | DESCRIPTION |
|---|---|
| A2<br>RSL<br>7141 | 0 to 7 cm (0 to 3 inches), light brown (7.5YR 6/4) very gravelly loam, dark brown (7.5YR 4/4) moist; weak medium and coarse platy structure; slightly hard, very friable, nonsticky, slightly plastic; few very fine roots; many very fine tubular and vesicular pores; 50 percent gravel by volume; slightly effervescent; strongly alkaline (pH 8.6 thymol blue); abrupt wavy boundary. |
| B1sa<br>RSL<br>7142 | 7 to 15 cm (3 to 6 inches), yellowish red (5YR 5/6) loam, yellowish red (5YR 4/8) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine interstitial pores; few fine gravel; slightly effervescent; few fine pinkish white (7.5YR 8/2) soft lime masses and salt crystals; strongly alkaline (pH 8.5); clear wavy boundary. |
| B21tcasa<br>RSL<br>7143 | 15 to 30 cm (6 to 12 inches), yellowish red (5YR 5/6) gravelly clay loam, yellowish red (5YR 4/6) moist; weak medium prismatic parting to moderate fine and medium subangular blocky structure; hard, friable, sticky, plastic; few very fine roots; few fine and medium tubular pores; few thin clay films on faces of peds and in pores; 35 percent gravel and cobble; strongly effervescent; common fine pinkish white (7.5YR 8/2) slightly hard lime masses, pink (7.5YR 7/4) moist; strongly alkaline (pH 8.7); abrupt wavy boundary. |
| B22tcasa<br>RSL<br>7144 | 30 to 46 cm (12 to 18 inches), reddish brown (5YR 5/4) gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak medium prismatic parting to moderate fine and medium subangular blocky structure; hard, friable, sticky, plastic; few very fine roots; few fine tubular pores; few thin clay films on faces of peds and in pores; 35 percent gravel; violently effervescent; many fine pinkish white (7.5YR 8/2) slightly hard lime masses and lime coatings on gravel, pink (7.5YR 7/4) moist; common medium and coarse salt crystals; strongly alkaline (pH 8.7); clear wavy boundary. |
| B3tcasa<br>RSL<br>7145 | 46 to 69 cm (18 to 27 inches), light brown (7.5YR 6/4) gravelly clay loam, brown (7.5YR 5/4) moist; weak fine and medium subangular blocky structure; hard, friable sticky, plastic; few very fine roots; few fine tubular pores; few thin clay films on faces of peds and in pores; 25 percent gravel; violently effervescent; many fine pinkish white (7.5YR 8/2) slightly hard lime masses and lime coatings on gravel, pink (7.5YR 7/4) moist; common medium and coarse salt crystals; very strongly alkaline (pH 9.0); clear wavy boundary. |
| IIC1casa<br>RSL<br>7146 | 69 to 84 cm (27 to 33 inches), light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; massive; hard, friable, sticky, plastic; few fine tubular pores; few fine gravel; violently effervescent; common fine and medium pinkish white (7.5YR 8/2) slightly hard lime masses, pink (7.5YR 7/4) moist; very strongly alkaline (pH 9.0); clear wavy boundary. |
| IIC2casa<br>RSL<br>7147 | 84 to 104 cm (33 to 41 inches), light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, plastic; few fine tubular pores; few fine gravel; very strongly alkaline (pH 9.0). |

1/ The Harqua series is in a fine-loamy, mixed, hyperthermic family of Typic Haplargids. This pedon has a natric horizon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Natrargid, fine-loamy, mixed, thermic
SOIL Gothard clay loam SOIL Nos. S64Ariz-2-20 LOCATION Cochise County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64605 - 64611

| Depth (in.) | Horizon | 1B1b Total: Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | Non carbonate clay | | Coarse fragments 1A2a: > 2 Pct | 2 – 19 Pct of < 2 mm | 19 – 76 Pct of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0-2 | A21 | 68.7 | 23.0 | 8.3 | 0.3 | 3.5 | 7.3 | 34.7 | 22.9 | 13.6 | 9.4 | 58.5 | 45.8 | 8 | | | tr. | |
| 2-5 | A22 | 56.0 | 34.4 | 9.6 | 0.6 | 3.2 | 5.2 | 25.7 | 21.3 | 17.0 | 17.4 | 55.1 | 34.7 | 10 | | | tr. | |
| 5-11 | B2t | 41.4 | 29.3 | 29.3 | 0.5 | 2.6 | 4.0 | 19.3 | 15.0 | 12.8 | 16.5 | 40.2 | 26.4 | 28 | | | tr. | |
| 11-24 | Cca | 39.2 | 36.5 | 24.3 | 1.2 | 2.3 | 3.2 | 16.3 | 16.2 | 13.0 | 23.5 | 40.3 | 23.0 | 19 | | 1 | 1 | |
| 24-42 | IIB2tcab | 41.6 | 30.1 | 28.3 | 0.7 | 2.8 | 5.4 | 18.0 | 14.7 | 10.9 | 19.2 | 37.1 | 26.9 | 16 | | 5 | 5 | |
| 42-51 | IIC1cab | 69.8 | 14.0 | 16.2 | 9.6 | 18.1 | 16.1 | 19.1 | 6.9 | 6.3 | 7.7 | 22.2 | 62.9 | 16 | | 12 | 12 | |
| 51-80+ | IIIC2casib | 75.7 | 14.1 | 10.2 | 1.9 | 6.3 | 17.4 | 39.4 | 10.7 | 8.2 | 5.9 | 40.4 | 65.0 | 10 | | 7 | 7 | |

| Depth (in.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | 3A1a Carbonate in <0.002 mm. Pct. | Bulk density: 4A1f 1/3 bar g/cc | 4A1h Oven-dry g/cc | g/cc | 6C2a Ext. Iron as Fe Pct. | Water content: Pct. | 4B1c 1/3 bar Pct. | 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | 3B2 Cm | pH: 8C1a $H_2O$ 1:1 | 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | 0.40 | 0.042 | 10 | 3 | 3 | | 1.57 | 1.57 | | 0.28 | | 11.5 | 4.3 | 0.001 | 0.001 | 1.00 | 8.7 | 9.2 |
| 2-5 | 0.29 | 0.032 | 9 | tr. | tr. | | 1.66 | 1.68 | | 0.35 | | 13.1 | 4.9 | 0.005 | 0.005 | 1.00 | 9.2 | 9.7 |
| 5-11 | 0.38 | 0.041 | 9 | 6 | 6 | 1 | 1.27 | 1.56 | | 0.40 | | 32.9 | 15.1 | 0.072 | 0.072 | 1.00 | 9.0 | 9.9 |
| 11-24 | 0.13 | | | 15 | 15 | 5 | 1.58 | 1.72 | | 0.22 | | 19.0 | 11.0 | 0.030 | 0.030 | 0.99 | 9.9 | 10.2 |
| 24-42 | 0.07 | | | 24 | 25 | 12 | 1.71 | 1.93 | | 0.14 | | 18.9 | 9.5 | 0.041 | 0.040 | 0.97 | 10.0 | 10.2 |
| 42-51 | 0.03 | | | 2 | 2 | | 1.51 | 1.74 | | 0.23 | | 23.8 | 10.0 | 0.048 | 0.044 | 0.93 | 9.9 | 10.2 |
| 51-80+ | 0.01 | | | 1 | 1 | | 1.40 | 1.60 | | 0.34 | | 26.3 | 7.2 | 0.044 | 0.042 | 0.96 | 9.7 | 10.0 |

| Depth (in.) | Extractable bases 5B1a: 6N2b Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1a $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0-2 | 16.8 | 1.6 | 2.0 | 1.0 | 21.4 | | 8.2 | | 2.7 | 0.6 | 11.5 | 0.4 | | - | 3.9 | 3.4 | | 1.60 |
| 2-5 | 13.0 | 1.3 | 4.1 | 0.8 | 19.2 | | 9.5 | | 0.5 | 0.3 | 11.2 | 0.2 | | - | 5.0 | 3.0 | | 1.25 |
| 5-11 | 16.3 | 2.0 | 17.2 | 0.9 | 36.4 | | 20.8 | | 1.1 | 0.3 | 41.3 | 0.1 | | - | 8.5 | 8.3 | 25.5 | 4.35 |
| 11-24 | 11.2 | 0.5 | 27.9 | 0.9 | 40.5 | | 20.3 | | 1.0 | 0.3 | 159 | 0.3 | | 10.0 | 12.4 | 10.9 | 138 | 13.2 |
| 24-42 | 10.8 | 0.6 | 21.7 | 0.6 | 33.7 | | 13.0 | | 0.5 | 0.3 | 198 | 0.5 | | 15.6 | 12.2 | 11.9 | 161 | 16.7 |
| 42-51 | 8.4 | 0.8 | 19.8 | 0.5 | 29.5 | | 14.7 | | 0.5 | 0.5 | 110 | 0.2 | | 5.4 | 13.9 | 7.3 | 85.2 | 10.0 |
| 51-80+ | 3.6 | 0.4 | 12.4 | 0.2 | 16.6 | | 11.3 | | 0.3 | 0.2 | 50.5 | 0.1 | | 1.1 | 8.5 | 4.9 | 35.7 | 5.16 |

| Depth (in.) | 8A Water at Saturation Pct | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na me / 100 g | SAR | Clay mineralogy (<0.002 mm.) X-ray 7A: Montmorillonite | Vermiculite | Illite | Kaolinite | Atterberg limits (Pct. of <0.4 mm): Plastic limit | Liquid limit | Plastic index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | 29.9 | 21 | 1.7 | 9 | x | - | x | - | | | |
| 2-5 | 27.7 | 40 | 3.8 | 18 | | | | | | | |
| 5-11 | 59.8 | 72 | 14.7 | 49 | xxxx | - | xx | tr. | 15 | 48 | 33 |
| 11-24 | 47.0 | 100 | 20.4 | 197 | xxxx | - | x | tr. | 16 | 39 | 23 |
| 24-42 | 41.4 | 104 | 13.5 | 312 | xxx | - | xx | tr. | 14 | 32 | 18 |
| 42-51 | 63.1 | 86 | 12.9 | 155 | | | | | | | |
| 51-80+ | 57.6 | 84 | 9.5 | 98 | | | | | 24 | 34 | 10 |

1/ In percent of the whole soil including >2 mm.

## GOTHARD CLAY LOAM, SALINE-ALKALI
S64Ariz-2-20

Location: Cochise County, Arizona. 16-1/2 miles south and 2-3/4 miles east of Willcox, Arizona reached by Kansas Settlement Road. 1/4 mile west and 100 feet north of east 1/4 corner of Sec. 27, T. 16 S., R. 25 E. Date of Sampling: October 20, 1964.
Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, M. L. Richardson, and R. K. Preece.
Classification: Typic Natrargid, fine-loamy, mixed, thermic.
Vegetation: Grassland. Mainly alkali sacaton with minor amounts of tobosa grass, mesquite bushes and annual grasses. Climate: Precipitation 12 inches annual. Mean annual temperature 58° F. (Willcox) Mean January temperature 41° F., mean July temperature 77° F. Soil temperature at time of sampling: 24 inches 70° F., 84 inches 70° F. Parent Material: Mixed alluvium from rhyolite, rhyolite-tuff, and andesite. Topography: Nearly level plains adjacent to the Willcox Playa. Slopes are 0.2 percent or less and very slightly concave. Elevation: 4210 feet. Drainage: Moderately well drained. Surface runoff very slow. Very slowly permeable. Soil Moisture: Slightly moist - 25 to 50 percent field capacity. Ground water 50 to 100 feet. Remarks: Paired with sample S64Ariz-2-21. Field determination of pH by thymol blue in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| A21<br>RSL No.<br>64605 | 0-2 inches (0-5 cm ), light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) when moist; weak medium and fine platy structure; slightly hard when dry, very friable when moist, nonsticky and nonplastic when wet; common fine and medium roots; common fine discontinuous and a few fine and medium continuous tubular pores; slightly effervescent with HCl; pH 8.6; abrupt smooth boundary. |
| A22<br>RSL No.<br>64606 | 2-5 inches (5-13 cm), light gray to gray (10YR 6/1) fine sandy loam, dark grayish brown (10YR 4/2) when moist; massive; hard when dry, friable when moist, nonsticky and nonplastic when wet; common fine and medium roots; many fine discontinuous and a few fine continuous tubular pores; strongly effervescent - lime disseminated; pH 8.6; abrupt smooth boundary. |
| B2t<br>RAL No.<br>64607 | 5-11 inches (13-28 cm), grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) when moist; moderate fine and medium prismatic breaking to moderate fine and medium angular and subangular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; common fine and medium roots; many exped interstitial and common thin clay films on ped faces and in pores; slightly effervescent; pH 9.0; clear smooth boundary. |
| Cca<br>RSL No.<br>64608 | 11-24 inches (28-61 cm), pale brown (10YR 6/3) with many fine faint mottles of light gray (10YR 7/2) clay loam, brown to dark brown (10YR 4/3) and light brownish gray (10YR 6/2) when moist; massive, breaking to strong fine subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; many fine and medium roots in upper 6 inches and only common in lower 7 inches; many fine exped and common fine and medium tubular pores; few thin clay films on ped faces; strongly and violently effervescent; pH 9.6; abrupt wavy boundary. |
| IIB2tcab<br>RSL No.<br>64609 | 24-42 inches (61-107 cm), pink (7.5YR 7/4) matrix; common medium faint ped coatings of reddish yellow (7.5YR 6/1) and many medium to large soft mottles of white (N8), clay, brown, (7.5YR 5/4), reddish yellow (7.5YR 6/6) and pinkish white (7.5YR 7/2) when moist; weak coarse prismatic breaking to moderate medium angular and subangular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; common exped fine roots; many fine exped and common fine and very fine tubular pores; thin continuous clay films on ped faces and lining pores; slightly effervescent in matrix and violently effervescent in mottles; pH 9.6; abrupt wavy boundary. |
| IIClcab<br>RSL No.<br>64610 | 42-51 inches (107-130 cm), light gray (2.5Y 7/2). Matrix with common medium faint mottles of light brownish gray (10YR 6/2) and a few fine distinct black mottles, heavy clay loam or sandy clay, light brownish gray (2.5Y 5/2), grayish brown (10YR 5/2) and black when moist; massive, breaking to coarse angular blocky structure; extremely hard when dry, firm when moist, sticky and plastic when wet; no roots; common fine and very fine tubular pores; few thin clay films on ped faces and in pores; slight effervescence in matrix and violent in lime mottles; pH 9.4; abrupt wavy boundary. |
| IIIC2casib<br>RSL No.<br>64611 | 51-80 inches + (130-203 cm), similar colors to IICca plus a few fine and medium distinct coatings or splotches of light olive brown (2.5Y 5/6) stratified loamy sandy to light sandy loam with thin lenses of sandy clay; massive, weakly cemented by alkali(?) or silica; very hard and brittle when dry, friable when moist, nonsticky and nonplastic when wet; roots; common fine and a few medium tubular pores; slight effervescent in posts; pH 9.0. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Natrargid, fine-loamy, mixed, thermic

SOIL Gothard clay loam SOIL Nos. S64Ariz-2-21 LOCATION Cochise County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64612 - 64618

| Depth (In.) | Horizon | 1B1b Total Sand (2-0 05) | Silt (0 05-0 002) | Clay (< 0.002) | Sand: Very coarse (2-1) | Coarse (1-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | Silt: 0 05-0.02 | Int. III (0.02-0.002) | Int II (0.2-0.02) | (2-0.1) | Non carbonate clay | | Coarse fragments 1A2a: >2 | 2 - 19 | 19 - 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0-2 | A2 | 47.6 | 38.1 | 14.3 | 1.1 | 3.6 | 5.9 | 21.9 | 15.1 | 14.0 | 24.1 | 43.1 | 32.5 | 14 | | 1 | 1 | |
| 2-7 | B2t | 34.4 | 20.9 | 44.7 | 0.8 | 2.7 | 4.9 | 15.4 | 10.6 | 8.1 | 12.8 | 28.3 | 23.8 | 37 | | 1 | 1 | |
| 7-20 | Cca | 52.8 | 21.0 | 26.2 | 1.2 | 3.5 | 7.2 | 23.8 | 17.1 | 10.4 | 10.6 | 42.5 | 35.7 | 19 | | 6 | 6 | |
| 20-40 | IIB2tcab | 48.0 | 25.2 | 26.8 | 1.9 | 5.8 | 7.6 | 18.8 | 13.9 | 9.7 | 15.5 | 34.9 | 34.1 | 19 | | 8 | 8 | |
| 40-51 | IIC1ca | 46.7 | 32.1 | 21.2 | 2.4 | 7.1 | 8.9 | 16.0 | 12.3 | 14.9 | 17.2 | 35.5 | 34.4 | 21 | | 8 | 8 | |
| 51-58 | IIIC2 | 70.5 | 16.7 | 12.8 | 8.7 | 20.7 | 15.4 | 16.8 | 8.9 | 8.5 | 8.2 | 25.6 | 61.6 | 13 | | 30 | 30 | |
| 58-69 | IVC3 | 64.0 | 22.1 | 13.9 | 7.7 | 15.0 | 11.0 | 19.3 | 11.0 | 11.5 | 10.6 | 32.8 | 53.0 | 14 | | 7 | 7 | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | 3A1a Carbonate in <0.002 mm. Pct. | Atterberg limits: Plastic limit | Liquid limit | Plastic index (Pct. of <0.4 mm) | Water content: Pct. | Pct | 4B2 15 bar Pct. | pH: 8C1a 1:1 $H_2O$ | 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | 0.35 | 0.042 | 8 | 4 | 4 | | | | | | | 6.2 | 9.2 | 9.7 |
| 2-7 | 0.36 | 0.044 | 8 | 15 | 15 | 8 | 17 | 46 | 29 | | | 17.6 | 8.9 | 9.9 |
| 7-20 | 0.19 | | | 14 | 15 | 7 | 12 | 36 | 24 | | | 11.8 | 9.3 | 10.0 |
| 20-40 | 0.06 | | | 23 | 25 | 8 | 12 | 28 | 16 | | | 12.4 | 9.3 | 10.0 |
| 40-51 | 0.03 | | | tr. | tr. | | | | | | | 16.1 | 9.1 | 10.0 |
| 51-58 | 0.02 | | | 3 | 4 | | 21 | 38 | 17 | | | 7.6 | 9.2 | 9.8 |
| 58-69 | 0.02 | | | tr. | tr. | | | | | | | 9.1 | 9.0 | 9.6 |

| Depth (In.) | Extractable bases 5B1a: 6N2b Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1a $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0-2 | 18.7 | 1.4 | 5.6 | 0.4 | 26.1 | | 13.5 | | 1.5 | 0.5 | 21.6 | 0.2 | - | 5.8 | 6.0 | | 2.50 |
| 2-7 | 14.5 | 2.4 | 26.3 | 1.3 | 44.5 | | 25.9 | | 1.7 | 0.5 | 101 | 0.2 | - | 6.0 | 10.8 | 95.7 | 10.0 |
| 7-20 | 13.3 | 1.1 | 18.4 | 0.6 | 33.4 | | 14.6 | | 1.0 | 0.5 | 205 | 0.5 | - | 8.5 | 7.5 | 205 | 17.2 |
| 20-40 | 14.1 | 1.3 | 23.1 | 0.6 | 34.3 | | 12.8 | | 0.8 | 0.5 | 104 | 0.2 | - | 5.8 | 5.8 | 101 | 10.2 |
| 40-51 | 7.8 | 1.0 | 14.6 | 0.6 | 24.0 | | 16.1 | | 0.4 | 0.2 | 32.6 | 0.1 | - | 5.6 | 3.8 | 23.9 | 3.48 |
| 51-58 | 6.6 | 0.6 | 8.9 | 0.3 | 16.4 | | 10.4 | | 0.3 | 0.1 | 27.1 | 0.1 | - | 5.6 | 4.6 | | 2.98 |
| 58-69 | 3.3 | 0.6 | 9.1 | 0.3 | 13.8 | | 11.5 | | 0.4 | 0.3 | 15.3 | 0.1 | - | 5.6 | 2.8 | | 1.74 |

| Depth (In.) | 8A Water at Saturation Pct | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na me / 100 g | Gypsum Pct | SAR |
|---|---|---|---|---|---|
| 0-2 | 27.6 | 37 | 5.0 | | 22 |
| 2-7 | 63.6 | 77 | 19.9 | | 105 |
| 7-20 | 54.5 | 49 | 7.2 | | 236 |
| 20-40 | 72.1 | 122 | 15.6 | | 107 |
| 40-51 | 89.1 | 73 | 11.7 | | 59 |
| 51-58 | 57.0 | 71 | 7.4 | | 60 |
| 58-69 | 65.6 | 67 | 7.7 | | 26 |

1/ In percent of whole soil including >2 mm.

## GOTHARD CLAY LOAM, SALINE-ALKALI
S64Ariz-2-21

Location: Cochise County, Arizona. 16 miles south and 1-1/4 miles east of Willcox, Arizona via Kansas Settlement road. 1050 feet east and 350 feet north of the S 1/4 corner Sec. 21, T. 16 S., R. 25 E. Date of Sampling: October 20, 1964.
Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, M. L. Richardson, R. K. Preece.
Classification: Typic Natrargid, fine-loamy, mixed, thermic.
Vegetation: Grassland - principally alkali sacaton, few shadscale and annual grasses. Climate: Precipitation 12 inches annual. Mean annual temperature (Willcox) 58° F. Mean January temperature 41° F., mean July temperature 77° F. Soil temperature at time of sampling: 2 inches 69° F., 4 inches 71° F., 6 inches 71° F. Parent Material: Mixed alluvium mainly from rhyolite, ignimbrite, and andesite. Topography: Nearly level plain adjacent to Willcox Playa. Slopes are very slightly concave and about 0.2 percent. Elevation: 4190 feet. Drainage: Moderate internal. Slow external. Very slowly permeable. Soil Moisture: Slightly moist - 25 to 50 percent field capacity. Water table 50-100 feet. Remarks: Paired sample S64Ariz-2-20. Field determinations of pH by thymol blue in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| A2<br>RSL No.<br>64612 | 0-2 inches (0-5 cm), grayish brown and light gray (10YR 6/2 & 7/1) fine sandy loam, brown (10YR 5/3) when moist; moderate medium and coarse platy structure; slightly hard when dry, very friable when moist, nonsticky and nonplastic when wet; common fine and medium roots; common discontinuous fine tubular pores; strongly effervescent with HCl; pH 8.6; abrupt smooth boundary. |
| B2t<br>RSL No.<br>64613 | 2-7 inches (5-18 cm), light brown (7.5YR 6/4) clay, brown (7.5YR 5/4) when moist; moderate fine and medium prismatic breaking to moderate fine and medium angular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; many fine, medium and coarse roots; many fine exped and a few fine and very fine tubular pores; few thin clay skins on peds and in pores; strongly effervescent-lime disseminated and a few fine faint mottles; pH 9.4; gradual smooth boundary. |
| Cca(sa?)<br>RSL No.<br>64614 | 7-20 inches (18-51 cm), light gray (10YR 7/1) and many fine faint mottles of white (10YR 8/1) light clay, light grayish brown (10YR 6/2) and light gray (10YR 7/2) when moist; massive, breaking to moderate medium angular and subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; common fine and medium roots; few fine and very fine tubular and common fine interstitial exped pores; few thin clay bridges; strongly effervescent; pH 9.4; gradual wavy boundary. |
| IIB2tcab<br>RSL No.<br>64615 | 20-40 inches (51-102 cm), matrix pinkish gray (7.5YR 6/2); brown (7.5YR 5/4) patchy clay films and many medium to large distinct mottles of white (N8), clay, brown (7.5YR 5/2), brown to dark brown (7.5YR 4/4), and light gray (10YR 7/2) when moist; massive, breaking to moderate medium angular and subangular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; few fine exped roots; many fine and very fine and a few medium tubular pores; common thin clay films on ped faces and lining pores; strongly effervescent in matrix and violently effervescent in mottles; pH 9.4; gradual wavy boundary. |
| IIC1ca<br>RSL NO.<br>64616 | 40-51 inches (102-130 cm), pinkish gray (7.5YR 6/2) matrix with patchy coatings of light brown (7.5YR 6/4( and a few fine faint mottles of pale olive (5Y 6/3) clay loam, brown (7.5YR 4/4) and olive (5Y 5/3) when moist; massive and weakly cemented; extremely hard when dry, firm when moist, sticky and plastic when wet; few fine roots; many fine and very fine tubular pores; slightly and strongly effervescent pH 9.4; gradual smooth boundary. |
| IIIC2<br>RSL No.<br>64617 | 51-58 inches (130-147 cm), light gray (10YR 7/1) with common fine to medium mottles of light yellowish brown (10YR 6/4) and a few fine mottles of white (8/N), light sandy loam or loamy sand, gray (10YR 6/1), yellowish brown (10YR 5/4) and light gray (10YR 7/2) when moist; massive and weakly cemented by silica (?); extremely hard and brittle when dry; firm when moist, nonsticky and slightly plastic when wet; no roots; common fine tubular pores; slight and strong effervescence; pH 9.4; clear smooth boundary. |
| IVC3<br>RSL No.<br>64618 | 58-69 inches (147-175 cm), matrix color is light gray (5Y 7/1) with varicolored mottles of yellowish red (5YR 5/6), dark reddish brown (5YR 3/2), olive brown (2.5YR 4/4), and light brown (7.5YR 6/4), loamy sand stratified with thin sandy clay loam lenses, gray (5Y 6/1) with mottles brown (7.5YR 4/4 & 5/4) light reddish brown (5YR 6/4) and olive (5Y 3/4) when moist; massive and weakly cemented by silica(?); extremely hard when dry, firm when moist, nonsticky and slightly plastic when wet; no roots; common fine tubular and a very few very coarse tubular pores; slight effervescence in spots; pH 9.0; abrupt wavy boundary. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Natrargid, fine, mixed, thermic
SOIL Gothard finely gravelly loam (taxadjunct) SOIL Nos. S64Ariz-2-29 LOCATION Cochise County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64662 - 64671

| Depth (In.) | Horizon | 1B1b Total: Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | 3A1 Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments: >2 Pct. | 4A2a 2 – 19 Pct. of < 76 mm | 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0–2 | A11 | 64.4 | 26.6 | 9.0 | 8.0 | 12.5 | 10.8 | 19.9 | 13.2 | 17.2 | 9.4 | 41.7 | 51.2 | | | 18 | 17 | 1 |
| 2–5 | A12 | 58.7 | 31.1 | 10.2 | 9.3 | 12.5 | 9.3 | 16.8 | 10.8 | 16.0 | 15.1 | 36.2 | 47.9 | | | 27 | 25 | 2 |
| 5–9 | B2t | 51.1 | 32.5 | 16.4 | 9.5 | 11.0 | 7.2 | 13.2 | 10.2 | 17.5 | 15.0 | 35.1 | 40.9 | | | 29 | 29 | tr. |
| 9–11 | A2 | 49.6 | 35.1 | 15.3 | 14.3 | 9.7 | 5.8 | 10.8 | 9.0 | 17.3 | 17.8 | 32.2 | 40.6 | | | 54 | 51 | 3 |
| 11–19 | B21t | 25.2 | 18.2 | 56.6 | 3.8 | 5.5 | 3.8 | 7.0 | 5.1 | 9.0 | 9.2 | 17.9 | 20.1 | | | 14 | 14 | tr. |
| 19–25 | B22tca | 35.1 | 17.3 | 47.6 | 5.9 | 8.0 | 5.4 | 9.6 | 6.2 | 8.7 | 8.6 | 20.0 | 28.9 | | | 13 | 13 | tr. |
| 25–29 | B3ca | 48.7 | 22.4 | 28.9 | 6.8 | 9.8 | 7.0 | 15.1 | 10.0 | 12.4 | 10.0 | 30.5 | 38.7 | | | 22 | 22 | tr. |
| 29–39 | C1ca | 51.4 | 28.4 | 20.2 | 7.5 | 10.5 | 7.6 | 15.6 | 10.2 | 12.5 | 15.9 | 30.9 | 41.2 | | | 27 | 27 | tr. |
| 39–57 | C2ca | 62.5 | 23.2 | 14.3 | 7.7 | 10.7 | 9.1 | 21.2 | 13.8 | 13.6 | 9.6 | 39.2 | 48.7 | | | 29 | 26 | 3 |
| 57–72+ | IIC3 | 82.1 | 10.9 | 7.0 | 19.1 | 26.5 | 15.8 | 15.1 | 5.6 | 5.1 | 5.8 | 17.3 | 76.5 | | | 40 | 24 | 16 |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | 6E1b Carbonate as $CaCO_3$ 2/ Pct. | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | 3A1a Carbonate in <0.002 mm. Pct. | Atterberg limits: Plastic limit | Liquid limit | Plastic index (Pct. of <0.4 mm) | 6C2a Ext. Iron as Fe Pct. | Water content: Pct. | Pct. | 4B2 15 bar Pct | | | pH: 8C1a 1:1 $H_2O$ | 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–2 | 0.32 | 0.033 | 10 | | | | | | | 0.6 | | | 4.1 | | | 5.7 | 6.3 |
| 2–5 | 0.29 | 0.033 | 9 | | | | | | | 0.7 | | | 4.5 | | | 5.9 | 6.4 |
| 5–9 | 0.30 | 0.036 | 8 | | | | | | | 0.8 | | | 6.2 | | | 7.4 | 7.6 |
| 9–11 | 0.27 | 0.032 | 8 | | | | | | | 0.7 | | | 5.4 | | | 7.4 | 7.6 |
| 11–19 | 0.32 | 0.040 | 8 | | | | 21 | 70 | 51 | 1.0 | | | 20.0 | | | 7.7 | 8.5 |
| 19–25 | 0.20 | | | 2 | 2 | | | | | 0.7 | | | 18.2 | | | 7.9 | 8.8 |
| 25–29 | 0.19 | | | 1 | 1 | | | | | 0.6 | | | 12.4 | | | 7.9 | 8.8 |
| 29–39 | 0.06 | | | 16 | 12 | 2 | | | | 0.4 | | | 10.0 | | | 8.0 | 9.0 |
| 39–57 | 0.04 | | | 15 | 11 | | 18 | 28 | 10 | 0.4 | | | 7.1 | | | 8.3 | 9.2 |
| 57–72+ | 0.03 | | | 7 | 4 | | | | | 0.3 | | | 4.8 | | | 8.4 | 9.2 |

| Depth (In.) | Extractable bases 5B1a: 6N2b Ca | 602c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 601a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0–2 | 2.4 | 1.3 | 1.2 | 0.8 | 5.7 | 1.9 | 5.6 | | | | 0.8 | | | | | | | 0.41 |
| 2–5 | 3.4 | 1.4 | 1.0 | 0.8 | 6.6 | 1.9 | 6.2 | | | | 0.8 | | | | | | | 0.40 |
| 5–9 | 6.0 | 2.5 | 1.0 | 1.0 | 10.5 | | 9.2 | | | | 1.5 | | | | | | | 0.63 |
| 9–11 | 5.1 | 2.0 | 1.4 | 0.8 | 9.3 | | 7.8 | | 3.6 | 1.9 | 4.5 | 0.5 | | - | 2.1 | 2.5 | | 1.10 |
| 11–19 | 20.6 | 9.8 | 3.8 | 1.7 | 35.9 | | 34.4 | | 4.8 | 2.6 | 9.9 | 0.5 | | - | 1.8 | 8.0 | | 1.81 |
| 19–25 | 29.1 | 9.6 | 4.5 | 1.9 | 45.1 | | 29.1 | | 6.6 | 3.6 | 13.2 | 0.5 | | - | 1.6 | 12.0 | | 2.52 |
| 25–29 | 20.8 | 7.0 | 4.8 | 1.6 | 34.2 | | 23.2 | | 8.2 | 4.8 | 18.2 | 0.5 | | - | 2.3 | 17.2 | | 3.18 |
| 29–39 | 23.1 | 5.4 | 4.8 | 1.3 | 34.6 | | 19.8 | | 7.6 | 4.2 | 20.2 | 0.4 | | - | 1.8 | 19.3 | | 3.30 |
| 39–57 | 20.0 | 3.8 | 4.2 | 1.1 | 29.1 | | 14.5 | | 5.6 | 2.9 | 18.2 | 0.4 | | - | 1.9 | 15.8 | | 2.87 |
| 57–72+ | 18.5 | 2.3 | 3.7 | 0.8 | 25.3 | | 10.4 | | 6.9 | 3.2 | 17.4 | 0.2 | | - | 1.6 | 16.4 | | 2.80 |

| Depth (In.) | 8A Water at Saturation Pct. | 5D2 Exchangeable Na 3/ Pct. | 5B1b Exch. Na me / 100 g | Clay mineralogy (<0.002 mm.): Montmorillonite (X-ray 7A) | Vermiculite (X-ray 7A) | Illite (X-ray 7A) | Kaolinite (X-ray 7A) |
|---|---|---|---|---|---|---|---|
| 0–2 | 25.2 | 21 | 1.2 | | | | |
| 2–5 | 26.6 | 16 | 1.0 | xx | - | xx | xx |
| 5–9 | 31.4 | 11 | 1.0 | xx | - | xx | |
| 9–11 | 28.3 | 17 | 1.3 | | | | |
| 11–19 | 67.4 | 9 | 3.1 | | | | |
| 19–25 | 64.9 | 13 | 3.7 | xxx | - | xxx | tr. |
| 25–29 | 45.4 | 17 | 4.0 | | | | |
| 29–39 | 42.2 | 20 | 4.0 | | | | |
| 39–57 | 36.8 | 24 | 3.5 | xxxx | - | xx | tr. |
| 57–72+ | 27.2 | 31 | 3.2 | | | | |

1/ In percent of whole soil including >2 mm.

2/ In percent of <2 mm. fraction ; calculated assuming no carbonates in >2 mm. fraction.

x - detected
xx - moderate
xxx - abundant
xxxx - dominant

## GOTHARD FINELY GRAVELLY LOAM (taxadjunct) 1/

S64Ariz-2-29

Location: Cochise County, Arizona. 8-1/2 miles north and 1 mile west of Willcox, Arizona and 400 feet east of the ranch road, 800 feet south and 50 feet west of the northeast corner of Sec. 24, T. 12 S., R. 24 E. Date of Sampling: October 23, 1964.

Description: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, M. L. Richardson, and R. K. Preece.

Classification: Typic Natrargid, fine, mixed, thermic.

Vegetation: Grassland: poor to fair cover of Rothrock grama, black grama, blue grama, tall three-awn, annual grama, sand dropseed, burrograss and burroweed. Climate: Precipitation 11-12 inches annual. Mean annual temperature 58° F. (Willcox). Soil temperature at time of sampling: 24 inches 70° F., 48 inches 71° F., 72 inches 72° F. Parent Material: Old alluvium from andesite, rhyolite, rhyolite-tuff, quartzite, and granite. Topography: Nearly level valley slopes near the low end of a long alluvial fan. Slope is 1.5 percent very slightly convex, and with a southern aspect. Elevation: 4390 feet. Drainage: Well drained. Moderate surface runoff. Slowly permeable. Soil Moisture: Slightly moist - about 25 percent of feed capacity. Water table at 100-150 feet. Remarks: This is one of the most extensive soils in Southeastern Arizona. Most of it is rangeland but some areas are cultivated. Paired sample is S64Ariz-2-28. Field determinations of pH by Hellige-Truog indicator.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>64662 | 0-2 inches (0-5 cm), light brown (7.5YR 6/4) fine gravelly fine sandy loam, dark brown (7.5YR 4/4) when moist; weak medium platy structure; slightly hard when dry, very friable when moist, nonsticky and nonplastic when wet; common fine and medium roots; many fine interstitial pores; 15 percent fine gravel; pH 6.0; abrupt smooth boundary. |
| A12<br>RSL No.<br>64663 | 2-5 inches (5-13 cm), same colors; fine gravelly loam, weak fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; fine and medium roots; many fine interstitial and a few medium and coarse tubular pores; 20 percent fine gravel; pH 6.5; clear smooth boundary. |
| B2t<br>RSL No.<br>64664 | 5-9 inches (13-23 cm), brown (7.5YR 5/4) fine gravelly clay loam, reddish brown (5YR 4/3) when moist; weak fine and medium subangular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; many fine roots; common fine and a few medium tubular pores, and many fine exped pores; common thin discontinuous clay films on ped faces and pores; 20 percent fine and medium gravels; noneffervescent, pH 8.0; abrupt wavy boundary. |
| A2<br>RSL No.<br>64665 | 9-11 inches (23-28 cm), pinkish gray (7.5YR 7/2) fine gravelly heavy loam, brown to dark brown (7.5YR 4/4) when moist; massive; hard when dry, friable when moist, slightly sticky and plastic when wet; many fine roots; few fine tubular and common fine interstitial pores; 20 percent fine and medium gravel; pH 7.5; abrupt wavy boundary. |
| B21t<br>RSL No.<br>64666 | 11-19 inches (28-48 cm), reddish brown (5YR 4/3) dry and moist, (5YR 4/4) when crushed, clay; moderate to fine and medium prismatic breaking to strong fine and medium angular blocky structure; very hard when dry, firm when moist, sticky and very plastic when wet; common fine flattened exped roots; few fine tubular and common exped pores; continuous moderately thick clay films on ped faces and in pores; 10 percent fine gravel; noneffervescent; pH 8.0; clear wavy boundary. |
| B22tca<br>RSL No.<br>64667 | 19-25 inches (48-63 cm), reddish brown (5YR 5/4) and common fine distinct lime mottles of pinkish white (5YR 8/2) clay, reddish brown (5YR 4/4) and pink (5YR 7/3) when moist; moderate fine and medium prismatic breaking to moderate fine and medium angular blocky structure; very hard when dry, friable when moist, sticky and plastic when wet; few fine exped roots; common fine tubular and exped pores; thin continuous clay films on ped faces and in pores; 10 percent fine gravel; slightly effervescent in matrix and strong in mottles; pH 8.2; clear wavy boundary. |
| B3ca<br>RSL No.<br>64668 | 25-29 inches (63-74 cm), similar colors to above; gravelly sandy clay loam; massive breaking to weak medium and coarse angular blocky structure; very hard when dry, firm when moist, slightly sticky and plastic when wet; few roots; common fine and very fine tubular and fine interstitial pores; few thin clay films on peds and as bridges between sand grains; few to common fine black flecks on ped faces; 30 percent fine and medium gravel; slightly effervescent in matrix and strong to violent in mottles and lime veins; pH 8.2; clear smooth boundary. |
| C1ca<br>TSL No.<br>64669 | 29-39 inches (74-99 cm), pink (5YR 8/3 & 7/3) and common fine to medium faint mottles of light reddish brown (5YR 6/3) gravelly sandy loam, pink (5YR 7/3), light reddish brown (5YR 6/4), and reddish brown (5YR 4/4) when moist; massive and weakly cemented; very hard when dry, firm when moist, nonsticky and slightly plastic when wet; no roots; common fine tubular and interstitial pores; 30 percent fine and medium gravel; strongly effervescent in matrix and violent in lime segregations*; pH 8.2; abrupt wavy boundary. |
| C2ca<br>RSL No.<br>64670 | 39-57 inches (99-145 cm), mixed pink and light brown (7.5YR 7/4 & 6/4) with many fine veins and coatings of pinkish white (7.5YR 8/2) gravelly sandy loam, light brown and brown (7.5YR 6/4 & 5/4) with veins and coatings pink (7.5YR 7/4) when moist; massive and weakly cemented by CaCO3 and/or silica; very hard when dry, firm when moist, nonsticky and slightly plastic when wet; no roots; common fine tubular and interstitial pores; strongly and violently effervescent; 40 percent fine and medium gravel; pH 8.2; abrupt wavy boundary. |
| IIC3<br>RSL No.<br>64671 | 57-72 inches+ (145-183 cm), pinkish gray (7.5YR 7/2) with lime coatings on gravel pinkish white (7.5YR 8/2) sand and gravel, brown (7.5YR 5/4) and pink (7.5YR 7/4) when moist; massive breaking to single grain; hard when dry, very friable when moist, nonsticky and nonplastic when wet; no roots; many interstitial pores; 60-70 percent fine to coarse gravel; strongly effervescent; thin to moderately thick lime coating on gravels that is violently effervescent; pH 8.2. |

*Lime in the Ca horizons is variable and occurs as large 1-3 inch pockets, lenses and tongues. The profile is described in what appears to be the most calcareous part of the backhoe pit.

1/ The Gothard series is in a fine-loamy, mixed, thermic family of Typic Natrargids. This pedon has more than 35 percent clay.

CONSECUTIVE PEDON NUMBER C 67 51 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA TAXADJUNCT SOIL NO. S67 ARIZ. 7- 4 SAMPLE NO. 7 618-7 628 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC PALEARGID,FINE-LOAMY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CO. CLAYS 2- .2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 7 618 | 0- 0 | | | | | | | | | | | | | | | | | | |
| 7 619 | 0- 3 | A2 | 36.1 | 50.5 | 13.4 | 3.4 | 4.2 | 2.8 | 7.7 | 18.0 | 26.6 | 23.9 | | | | 49.5 | 9 | TR | 9Z N |
| 7 620 | 3- 8 | A+B | 39.5 | 43.1 | 17.4 | 6.7 | 6.1 | 3.2 | 7.1 | 16.4 | 22.8 | 20.3 | | | | 43.6 | 30 | TR | 30Z N |
| 7 621 | 8- 23 | B2 T | 36.9 | 26.1 | 37.0 | 7.9 | 7.9 | 3.3 | 5.4 | 12.4 | 13.7 | 12.4 | | | | 29.2 | 32 | TR | 32Z N |
| 7 622 | 23- 38 | B31TCA | SA55.5 | 19.3 | 25.2 | 18.7 | 10.2 | 3.8 | 6.7 | 16.1 | 12.3 | 7.0 | | | | 32.4 | 35 | TR | 35Z N |
| 7 623 | 38- 48 | B32TCA | SA62.7 | 20.5 | 16.8 | 15.6 | 11.2 | 5.0 | 9.8 | 21.1 | 15.3 | 5.2 | | | | 42.3 | 43 | TR | 43Z N |
| 7 624 | 48- 76 | B33TCA | 41.0 | 37.5 | 21.5 | 6.0 | 6.5 | 3.0 | 5.1 | 20.4 | 19.7 | 17.8 | | | 3 | 43.3 | 7 | TR | 7Z N |
| 7 625 | 76- 99 | C 1CA | 48.0 | 31.6 | 20.4 | 7.7 | 7.7 | 4.0 | 6.5 | 22.1 | 18.1 | 13.5 | | | 4 | 44.0 | 12 | TR | 12Z N |
| 7 626 | 99-122 | C 2CA | 62.1 | 23.8 | 14.1 | 12.3 | 12.1 | 5.7 | 7.3 | 24.7 | 15.2 | 8.6 | | | | 44.0 | 18 | TR | 18Z N |
| 7 627 | 122-152 | 2C 3CA | 77.8 | 9.2 | 13.0 | 34.0 | 28.6 | 7.3 | 4.1 | 3.9 | 5.2 | 4.0 | | | | 10.8 | 59 | 16 | 43Z N |
| 7 628 | 152-178 | 3C 4 | | | | | | | | | | | | | | | 47 | TR | 47Z N |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6G2B | ATTERBERG L I M I T LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 7 618 | 0- 0 | | | | | | | | | | | | | | | | | | | |
| 7 619 | 0- 3 | 0.07 | 0.016 | 7 | | 0.7 | | | 1.51 | 1.57 | 0.95 | | 17.7 | 9.0 | | 1.3 | 1.2 | | 9.9 | |
| 7 620 | 3- 8 | | 0.016 | 4 | | 0.8 | | | 1.47 | 1.53 | 0.81 | | 16.1 | 10.7 | | 1.3 | 1.1 | | 9.9 | |
| 7 621 | 8- 23 | | | 4 | | 0.7 | | | 1.25 | 1.37 | 0.82 | | 21.7 | 12.9 | | 3.1 | 2.5 | | 8.6 | |
| 7 622 | 23- 38 | | | 4 | | 0.5 | | | 1.53 | 1.58 | 0.76 | | 15.2 | 9.3 | | 1.1 | 0.8 | | 8.4 | |
| 7 623 | 38- 48 | | | 2 | | 0.4 | | | 1.56 | 1.60 | 0.69 | | 12.4 | 6.6 | | 0.8 | 0.6 | | 8.6 | |
| 7 624 | 48- 76 | | | 12 | | 0.4 | | | 1.38 | 1.51 | 0.96 | | 21.7 | 8.4 | | 3.0 | 2.9 | | 8.6 | |
| 7 625 | 76- 99 | | | 14 | | 0.4 | | | 1.43 | 1.60 | 0.93 | | 18.2 | 7.6 | | 3.8 | 3.5 | | 8.6 | |
| 7 626 | 99-122 | | | 10 | | 0.4 | | | 1.55 | 1.63 | 0.89 | | 14.2 | 5.6 | | 1.7 | 1.5 | | 8.8 | |
| 7 627 | 122-152 | | | 10 | | | | | 1.57 | 1.62 | 0.54 | | 12.3 | 5.5 | | 1.1 | 0.6 | | | |
| 7 628 | 152-178 | | | 5 | | 0.4 | | | 1.53 | 1.56 | 0.66 | | 14.6 | 5.7 | | 0.6 | 0.4 | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | --------MEQ/100G-------- | | | | | PCT. | -MEQ/100G | | MMHO | ---------------MEQ/1000 ML--------------- | | | | | | | | PPM | |
| 7 618 | 0- 0 | | | | | | | | | | | | | | | | | | | |
| 7 619 | 0- 3 | | TR | 4.6 | 1.7 | 6.4 | | 20.5 | 1.26 | 0.6 | 0.2 | 10.9 | 0.2 | | | 5.0 | 4.5 | | | 8.4 |
| 7 620 | 3- 8 | | | 6.8 | 1.7 | 8.5 | | 21.8 | 3.95 | 1.6 | 0.5 | 29.4 | 0.3 | | | 2.8 | 25.8 | | | 8.5 |
| 7 621 | 8- 23 | | | 14.8 | 1.2 | 16.0 | | 17.8 | 36.9 | 14.0 | 37.6 | 260.0 | 1.4 | | | 3.1 | 378.0 | | | 7.7 |
| 7 622 | 23- 38 | | | 12.8 | 0.7 | 13.5 | | 12.1 | 33.5 | 166.0 | 37.0 | 270.0 | 0.5 | | | 6.0 | 384.0 | | | 7.5 |
| 7 623 | 38- 48 | | | 9.5 | 0.4 | 9.9 | | 8.7 | 35.7 | 132.8 | 30.8 | 204.0 | 0.5 | | | 3.7 | 319.0 | | | 7.7 |
| 7 624 | 48- 76 | | | 11.1 | 0.4 | 11.5 | | 10.1 | 36.4 | 119.2 | 59.6 | 224.0 | 0.8 | | | 3.5 | 328.0 | | | 7.6 |
| 7 625 | 76- 99 | | | 9.8 | 0.4 | 10.2 | | 8.5 | 31.6 | 92.0 | 49.2 | 194.0 | 0.4 | | | 2.3 | 296.0 | | | 7.7 |
| 7 626 | 99-122 | | | 7.2 | 0.2 | 7.4 | | 6.1 | 19.8 | 54.8 | 28.8 | 129.6 | 0.2 | | | 2.5 | 165.0 | | | 8.0 |
| 7 627 | 122-152 | | | | | | | | | | | | | | | | | | | |
| 7 628 | 152-178 | | | 8.5 | 0.3 | 8.8 | | 8.2 | 19.0 | 29.8 | 4.5 | 144.0 | 0.8 | | | 1.6 | 11.5 | | | 8.0 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 618 | 0- 0 | | | | | | | | | | | | | | | |
| 7 619 | 0- 3 | 24.1 | 4.3 | 21 | 17 | | | MI 2 | | | | | | | | MI MICA |
| 7 620 | 3- 8 | 35.6 | 5.8 | 26 | 29 | | | | | | | | | | | MT MONTMORT |
| 7 621 | 8- 23 | 42.7 | 3.7 | 21 | 51 | | | MI 4 | MT 2 | KK 2 | | | | | | KK KAOLINIT |
| 7 622 | 23- 38 | 41.3 | 1.6 | 14 | 27 | | | | | | | | | | | |
| 7 623 | 38- 48 | 33.4 | 2.7 | 31 | 23 | | | | | | | | | | | |
| 7 624 | 48- 76 | 45.9 | 0.8 | 8 | 24 | | | MI 4 | MT 3 | KK 3 | | | | | | |
| 7 625 | 76- 99 | 46.2 | 1.0 | 12 | 23 | | | | | | | | | | | |
| 7 626 | 99-122 | 51.5 | 0.5 | 9 | 20 | | | | | | | | | | | |
| 7 627 | 122-152 | | | | | | | | | | | | | | | |
| 7 628 | 152-178 | 40.5 | 2.7 | 33 | 35 | | | MT 4 | MI 3 | KK 3 | | | | | | |

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## HARQUA GRAVELLY LOAM (taxadjunct) 1/

S67Ariz-7-4

Location: Maricopa County, Arizona. 40 feet north and 400 feet west of the southeast corner of Sec. 7, T. 1 S., R. 8 W., 16 miles west-southwest of Tonopah. Date of Sampling: October 10, 1967.
Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton, A. DeWall.
Classification: Typic Paleargid, fine-loamy, mixed, hyperthermic.
Vegetation: Barren. Use: Seasonal rangeland. Climate: Mean annual precipitation (est.) 6 inches. Mean annual air temperature 70° F.; January 51° F., July 92° F. Parent Material: Medium and moderately fine textured alluvium over gravelly alluvium from andesite tuff, granite and schist. Topography: Smooth nearly level lower fan slope. Less than 1 percent slope. Elevation: 1270 feet. Drainage: Well drained. Runoff is slow. Permeability is moderate. Soil Moisture: Dry. Remarks: Soil temperature at 20 inches 83° F., at 60 inches 81° F. Sampled from backhoe pit.

| HORIZON | DESCRIPTION |
|---|---|
| A2<br>RSL<br>67619 | 0-3 cm (0-1 inch), light yellowish brown (10YR 6/4) silt loam, dark brown (10YR 4/3) when moist; weak coarse platy structure; slightly hard when dry, friable when moist, sticky and plastic when wet; many very fine and fine, horizontal inped vesicular pores; about 8 percent gravel in soil. Varnished desert pavement of gravel covers 85 percent of the surface. Strongly effervescent; moderately alkaline (pH 8.3 thymol blue); abrupt smooth boundary. |
| A & B<br>RSL<br>67620 | 3-8 cm (1-3 inches), 50 percent pinkish white (5YR 8/2) and 50 percent reddish brown (5YR 5/4) gravelly clay loam, reddish brown (5YR 5/4 and 5YR 4/4) when moist; weak coarse platy structure; hard when dry, friable when moist, sticky and plastic when wet; common fine and very fine inped vesicular pores; few thin clay films in pores; about 30 percent very fine gravel; strongly effervescent; strongly alkaline (pH 9.5); abrupt smooth boundary. |
| B2tsa<br>RSL<br>67621 | 8-23 cm (3-9 inches), reddish brown (5YR 5/4) gravelly clay loam, reddish brown (5YR 4/4) when moist; weak very fine subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; many very fine interstitial pores; about 30 percent very fine gravel; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| B31tcasa<br>RSL<br>67622 | 23-38 cm (9-15 inches), reddish brown (5YR 5/4) gravelly clay loam, reddish brown (5YR 4/4); weak medium and coarse subangular blocky structure; very hard when dry, friable when moist, sticky and plastic when wet; many fine interstitial and tubular pores; few thin clay films in pores and on mineral grains; common fine pinkish white lime veins and medium rounded lime concretions, about 30-35 percent very fine gravel and concretions; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| B32tcasa<br>RSL<br>67623 | 38-48 cm (15-19 inches), reddish brown (5YR 4/4) gravelly clay loam, reddish brown (5YR 4/4) when moist; weak medium and coarse subangular blocky structure; very hard when dry, friable when moist, sticky and plastic when wet; many fine tubular and interstitial pores; few thin clay films in pores and on mineral grains; approximately 35 percent very fine gravel; common pinkish white medium lime veins, strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| B33tca<br>RSL<br>67624 | 48-76 cm (19-30 inches), light reddish brown (5YR 6/4) clay loam rounded concretions, reddish brown (5YR 4/4) when moist; massive; very hard when dry, friable when moist, sticky and plastic when wet; few fine tubular pores and common fine interstitial pores; few thin clay films in pores and on mineral grains; common reddish yellow medium lime veins and fine to medium, some fine gravel; strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C1ca<br>RSL<br>67625 | 76-99 cm (30-39 inches), light brown (7.5YR 6/4) loam, brown (7.5YR 5/4); massive; very hard when dry, friable when moist, slightly sticky and slightly plastic when wet; many fine and very fine tubular pores and common fine interstitial pores; few thin clay films in pores and on mineral grains; common medium pinkish white lime veins and rounded concretions, about 10 percent very fine gravel and nodules; violently effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C2ca<br>RSL<br>67626 | 99-122 cm (39-48 inches), pinkish white (7.5YR 7/2) gravelly sandy clay loam, brown (7.5YR 5/4) when moist; massive; very hard when dry; friable when moist, slightly sticky and slightly plastic when wet; many fine and very fine discontinuous vertical and horizontal closed tubular pores; very few clay films bridging sand grains; few fine pinkish white soft lime masses; about 15 percent very fine gravel and medium lime concretions, violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| IIC3ca<br>RSL<br>67627 | 122-152 cm (48 to 60 inches), light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 5/4) when moist; massive; very hard when dry, friable when moist, sticky and nonplastic when wet; many fine interstitial pores; very few clay films bridging sand grains; about 35 percent fine gravel; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| IIIC4<br>RSL<br>67628 | 152-178 cm (60-70 inches), light brown (7.5YR 6/4) very gravelly loamy sand, brown (7.5YR 5/4) when moist; massive; very hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; many fine and very fine interstitial pores; very few clay films in pores and bridging sand grains; about 40 percent fine gravel; slightly effervescent; moderately alkaline (pH 8.1). |

1/ The Harqua series is in a fine-loamy, mixed, hyperthermic family of Typic Haplargids. This pedon has an abrupt boundary between the A2 and B2t horizons and more than a 20 percent increase in clay.

CONSECUTIVE PEDON NUMBER C 69159 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TUBAC TAXADJUNCT SOIL NO. S69 ARIZ. 2-13 SAMPLE NO. 9 831-9 838 WILLCOX AREA

SOIL FAMILY: TYPIC PALEARGID,FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION <2 MM SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. 2-.2U | CLAYS FINE LT .2U | CLAYS CARBONATE 3A1A.02 | 1A2A INT. II .2- | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75- | II 20 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 9 831 | 0- 5 | A11 | 69.9 | 20.9 | 9.2 | 21.2 | 19.5 | 7.1 | 13.6 | 8.5 | 12.7 | 8.2 | 6.4 | 2.8 | | 29.0 | --G | -- | -- |
| 9 832 | 5- 31 | A12 | 66.2 | 22.1 | 11.7 | 13.3 | 19.5 | 11.4 | 14.5 | 7.5 | 12.8 | 9.3 | | | | 27.8 | --G | -- | -- |
| 9 833 | 31- 41 | A2 | 63.8 | 25.4 | 10.8 | 20.6 | 17.2 | 7.8 | 11.1 | 7.1 | 14.0 | 11.4 | 6.8 | 4.0 | | 27.2 | --G | -- | -- |
| 9 834 | 41- 61 | B21T | 51.5 | 11.5 | 37.0 | 25.4 | 12.3 | 4.2 | 6.0 | 3.6 | 6.1 | 5.4 | | | | 13.0 | --G | -- | -- |
| 9 835 | 61- 74 | B22T | 52.6 | 11.7 | 35.7 | 20.0 | 14.9 | 6.0 | 7.8 | 3.9 | 7.3 | 4.4 | 15.4 | 20.3 | | 15.3 | --G | -- | -- |
| 9 836 | 74-100 | B23T | 66.6 | 13.5 | 19.9 | 25.8 | 18.1 | 7.8 | 9.7 | 5.2 | 7.8 | 5.7 | | | | 18.1 | --G | -- | -- |
| 9 837 | 100-120 | B3 | 81.4 | 7.3 | 11.3 | 32.0 | 29.3 | 10.1 | 7.5 | 2.5 | 5.6 | 1.7 | | | | 11.3 | --G | -- | -- |
| 9 838 | 120-150 | C | 80.2 | 8.9 | 10.9 | 36.0 | 20.9 | 7.8 | 10.9 | 4.6 | 6.2 | 2.7 | | | | 16.5 | --G | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | I P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 9 831 | 0- 5 | 0.30 | 0.030 | | | 0.6 | NP | NP | 1.79 | 1.80 | 1.00 | | 5.0 | 3.0 | 0.2 | 0.2 | 5.0 | | | 4.3 |
| 9 832 | 5- 31 | 0.25 | 0.032 | | | 0.7 | | | 1.74 | 1.76 | 1.00 | | 6.9 | 3.9 | 0.4 | 0.4 | 5.6 | | | 5.2 |
| 9 833 | 31- 41 | 0.17 | | | | 0.9 | 16 | 14 | 1.80 | 1.84 | 1.00 | | 4.0 | 3.6 | 0.7 | 0.7 | 6.4 | | | 5.9 |
| 9 834 | 41- 61 | 0.25 | | | | 1.3 | | | 1.64 | 1.86 | 1.00 | | 17.5 | 15.6 | 4.3 | 4.3 | 7.3 | | | 7.0 |
| 9 835 | 61- 74 | 0.19 | | | | 1.1 | 55 | 20 | 1.70 | 1.91 | 1.00 | | 18.0 | 15.1 | 4.0 | 4.0 | 7.6 | 8.8 | | 7.4 |
| 9 836 | 74-100 | | | TR | | 0.7 | 34 | 17 | 1.76 | 1.87 | 1.00 | | 10.5 | 9.3 | 2.0 | 2.0 | 7.2 | 8.4 | | 7.1 |
| 9 837 | 100-120 | | | | | 0.5 | | | 1.77 | 1.86 | 1.00 | | 9.2 | 6.3 | 1.7 | 1.7 | 7.4 | 8.7 | | 7.3 |
| 9 838 | 120-150 | | | | | 0.4 | 27 | 20 | 1.83 | 1.90 | 1.00 | | 5.8 | 5.3 | 1.3 | 1.3 | 7.6 | 9.1 | | 7.3 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | ---------- | | MEQ/1000 | | ML | | | | PPM | |
| 9 831 | 0- 5 | | | 0.1 | 0.3 | 0.4 | | | 4.3 | | | | | | | | | | | |
| 9 832 | 5- 31 | | | 0.1 | 0.3 | 0.4 | | | 5.4 | | | | | | | | | | | |
| 9 833 | 31- 41 | | | 0.1 | 0.2 | 0.3 | | | 4.3 | | | | | | | | | | | |
| 9 834 | 41- 61 | | | 1.5 | 1.4 | 2.9 | | | 20.1 | | | | | | | | | | | |
| 9 835 | 61- 74 | | | 1.9 | 1.4 | 3.3 | | | 21.5 | 1.27 | 1.9 | 1.3 | 8.9 | 0.4 | | 2.6 | 3.1 | 7.1 | | 7.7 |
| 9 836 | 74-100 | | | 1.6 | 1.1 | 2.7 | | | 12.7 | 3.36 | 10.2 | 7.7 | 19.5 | 0.9 | | 2.4 | 23.8 | | | 7.3 |
| 9 837 | 100-120 | | | 1.2 | 0.4 | 1.6 | | | 8.2 | 2.89 | 6.9 | 4.7 | 19.3 | 0.6 | | 2.2 | 19.6 | | | 7.6 |
| 9 838 | 120-150 | | | 1.1 | 0.4 | 1.5 | | | 7.3 | 2.17 | 3.7 | 2.3 | 17.4 | 0.3 | | 2.4 | 12.9 | | | 7.6 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY 7A2E I | 7A2E II | 7A2E III | DTA 7A2E IV | 7A3 PCT. | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 831 | 0- 5 | | 0.1 | 2 | | | | MI 3 | KK 2 | | | | KK 3 | MI 2 | | MI MICA | 1 TRACE |
| 9 832 | 5- 31 | | 0.1 | 2 | | | | MI 3 | KK 2 | | | | | | | KK KAOLINIT | 2 SMALL |
| 9 833 | 31- 41 | | 0.1 | 2 | | | | MI 3 | KK 2 | | | | MI 3 | KK 3 | | | 3 MODERATE |
| 9 834 | 41- 61 | | 1.5 | 7 | | | | | | | | | | | | MT MONTMORT | 4 ABUNDANT |
| 9 835 | 61- 74 | 54.5 | 1.4 | 7 | 7 | | | MI 4 | KK 2 | MT 1 | | | MI 4 | MT 3 | KK 1 | | 5 DOMINANT |
| 9 836 | 74-100 | 36.1 | 0.9 | 7 | 7 | | | MI 4 | MT 2 | KK 2 | | | | | | | 6 INDETER. |
| 9 837 | 100-120 | 29.5 | 0.6 | 8 | 8 | | | | | | | | | | | | |
| 9 838 | 120-150 | 27.2 | 0.6 | 9 | 10 | | | MI 4 | MT 3 | KK 3 | | | | | | | |

SAMPLE PREPARATION CODES
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## TUBAC SANDY LOAM (taxadjunct) 1/
S69Ariz-2-13

Location: Cochise County, Arizona. 1850 feet north and 1650 feet west of the SE corner, Section 23, T17S, R24E. Date of Sampling: October 16, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Paleargid, fine-loamy, mixed, thermic.
Vegetation: Blue grama, three-awn, Lehmans lovegrass, spike dropseed, scattered burroweed, yucca, and mesquite. Use: Formerly livestock range, now subdivided for homesites. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Alluvium, dominantly from granite with some andesite, rhyolite, quartzite, and a limited amount of limestone. Topography: Nearly level to gently sloping convex fans and valley slopes. Slope, 0.3 percent, northeast facing. Elevation: 4380 feet. Drainage: Well drained. Runoff is medium. Permeability is moderately slow to slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator solution. This sample was not paired.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>69831 | 0 to 5 cm (0 to 2 inches), yellowish red (5YR 5/6) sandy loam, reddish brown (5YR 4/4) moist; weak thin platy and weak fine granular structure; slightly hard, very friable, nonsticky, nonplastic; many fine and medium roots; common fine vesicular and tubular pores; few fine gravel; noneffervescent; medium acid (pH 6.0); abrupt smooth boundary |
| A12<br>RSL<br>69832 | 5 to 31 cm (2 to 12 inches), yellowish red (5YR 5/6) sandy loam, reddish brown (5YR 4/4) moist; massive; slightly hard, very friable, nonsticky, nonplastic; common fine and medium roots; many very fine, fine and few coarse tubular pores; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| A2<br>RAL<br>69833 | 31 to 41 cm (12 to 16 inches), light brown (7.5YR 6/4) gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; hard, very friable, nonsticky, nonplastic; few very fine and fine roots; many fine vesicular and few fine tubular pores; 15 to 20 percent by volume of 2 to 5 mm angular granitic gravel; noneffervescent; neutral (pH 7.0); abrupt wavy boundary. |
| B21t<br>RSL<br>69834 | 41 to 61 cm (16 to 24 inches), red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; strong medium prismatic structure; very hard, friable, sticky, very plastic; common very fine and fine roots; few thin clay films on ped faces; common pressure faces; common black staining on faces of peds; noneffervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| B22t<br>RSL<br>69835 | 61 to 74 cm (24 to 29 inches), red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; strong medium prismatic structure; very hard, friable, sticky, very plastic; common very fine and fine roots; few thin clay films on ped faces; common pressure faces; common black staining on ped faces; 12 to 15 percent by volume of 2 to 5 mm angular granitic and quartzite gravel; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| B23t<br>RSL<br>69836 | 74 to 100 cm (29 to 40 inches), red (2.5YR 4/6) clay loam, dark red (2.5YR 3/6) moist; weak coarse prismatic structure; very hard, friable, sticky, plastic; common very fine and fine roots; few fine tubular pores; common pressure faces and common black staining on ped faces; 2 to 3 percent by volume of 2 to 5 mm angular granitic and quartzite gravel; slightly to strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| B3<br>RSL<br>69837 | 100 to 120 cm (40 to 48 inches), yellowish red (5YR 5/6) sandy loam, yellowish red (5YR 4/6) moist; massive; very hard, friable, nonsticky, slightly plastic; few fine roots; few fine tubular pores; many clay bridges and coatings on sand grains; contains about 10 percent by volume of 2 to 5 mm angular granitic and quartzite gravel; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| C<br>RSL<br>69838 | 120 to 150 cm (48 to 60 inches), reddish yellow (5YR 6/6) gravelly sandy loam, yellowish red (5YR 5/6) moist; massive; slightly hard, very friable, nonsticky, nonplastic; common thin clay bridges and coatings on sand grains; slightly effervescent; moderately alkaline (pH 8.0). |

1/ The Tubac series is in a fine, mixed, thermic family of Typic Paleargids. This pedon has less than 35 percent clay in its control section.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Paleargid, fine, mixed, thermic
SOIL Tubac gravelly loam SOIL Nos. S64Ariz-2-28 LOCATION Cochise County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64655 - 64661

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) Pct. of <2 mm | 1B1b Total Silt (0.05–0.002) Pct. of <2 mm | 1B1b Total Clay (<0.002) Pct. of <2 mm | Size class and particle diameter (mm) Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | (2–0.1) | Non carbonate clay | | Coarse fragments 1A2a: ≥2 Pct. of whole soil | 2–19 Pct. of <76 mm | 19–76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–2 | A11 | 65.9 | 28.7 | 5.4 | 6.1 | 12.6 | 11.1 | 23.0 | 13.1 | 19.1 | 9.6 | 44.6 | 52.8 | | | 19 | 17 | 2 |
| 2–6 | A12 | 62.3 | 28.5 | 9.2 | 7.0 | 11.7 | 9.9 | 20.7 | 13.0 | 17.3 | 11.2 | 41.7 | 49.3 | | | 34 | 29 | 5 |
| 6–11 | B1 | 56.1 | 27.2 | 16.7 | 12.7 | 12.7 | 7.6 | 13.7 | 9.4 | 16.3 | 10.9 | 33.2 | 46.7 | | | 44 | 38 | 6 |
| 11–21 | B21t | 26.3 | 15.0 | 58.7 | 7.5 | 7.1 | 2.8 | 5.2 | 3.7 | 6.5 | 8.5 | 13.1 | 22.6 | | | 31 | 24 | 7 |
| 21–35 | B22tca | 41.5 | 10.4 | 48.1 | 14.1 | 12.7 | 5.6 | 6.0 | 3.1 | 4.6 | 5.8 | 10.7 | 38.4 | | | 65 | 36 | 29 |
| 35–44 | B3tca | 61.1 | 15.2 | 23.7 | 17.0 | 19.1 | 9.6 | 10.4 | 5.0 | 7.1 | 8.1 | 17.3 | 56.1 | | | 56 | 34 | 16 |
| 44–70+ | C | 83.0 | 6.1 | 10.9 | 28.1 | 32.0 | 13.2 | 8.0 | 1.7 | 2.4 | 3.7 | 7.2 | 81.3 | | | 54 | 49 | 5 |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6E1b Carbonate as $CaCO_3$ 2/ Pct. | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | Bulk density 4A1f 1/3 bar g/cc | 4A1h Oven dry g/cc | Atterberg limits: Plastic limit (Pct. of <0.4 mm) | Liquid limit | Plastic index | Water content 4B1c 1/3 bar Pct. | 4B2 15 bar Pct. | 4D1 Extensibility COLE in./in. | 4D1 Extensibility COLE in./in. | 3B2 Cm | pH 8C1a 1:1 $H_2O$ | 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–2 | 0.25 | 0.029 | 9 | | | 1.59 | 1.60 | | | | 11.1 | 3.9 | 0.002 | 0.002 | 0.88 | 5.7 | 6.5 |
| 2–6 | 0.33 | 0.035 | 9 | | | 1.48 | 1.50 | | | | 13.2 | 4.7 | 0.003 | 0.003 | 0.78 | 6.3 | 6.7 |
| 6–11 | 0.43 | 0.044 | 10 | | | 1.43 | 1.48 | | | | 18.0 | 7.0 | 0.011 | 0.008 | 0.70 | 7.0 | 7.3 |
| 11–21 | 0.34 | 0.050 | | | | 1.20 | 1.53 | 22 | 76 | 54 | 40.1 | 21.6 | 0.083 | 0.067 | 0.83 | 7.5 | 8.2 |
| 21–35 | 0.20 | | | 3 | 1 | 1.27 | 1.39 | | | | 31.0 | 19.0 | 0.032 | 0.017 | 0.53 | 7.9 | 8.6 |
| 35–44 | 0.04 | | | tr. | tr. | 1.40 | 1.50 | | | | 21.3 | 10.8 | 0.022 | 0.014 | 0.60 | 7.7 | 8.6 |
| 44–70+ | 0.02 | | | tr. | tr. | 1.38 | 1.40 | 16 | 29 | 13 | 17.6 | 6.7 | 0.006 | 0.003 | 0.62 | 7.6 | 7.8 |

| Depth (In.) | Extractable bases 6N2b Ca | 6O2c Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 8A1 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity mmho/cm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | |
| 0–2 | 2.5 | 1.2 | 1.0 | 0.8 | 5.5 | 1.6 | 5.2 | | | | 1.0 | 0.6 | | | | | 0.35 |
| 2–6 | 3.9 | 1.5 | 1.0 | 0.7 | 7.1 | 1.3 | 6.7 | | | | 1.4 | 0.5 | | | | | 0.55 |
| 6–11 | 7.1 | 2.6 | 1.0 | 0.9 | 11.6 | | 10.2 | | 7.2 | 3.5 | 2.7 | 0.8 | - | 1.6 | 1.8 | | 1.34 |
| 11–21 | 26.0 | 9.5 | 2.9 | 2.4 | 40.8 | | 32.6 | | 9.8 | 4.6 | 7.4 | 0.8 | - | 1.5 | 7.6 | | 2.18 |
| 21–35 | 28.3 | 8.3 | 4.2 | 2.6 | 43.4 | | 29.6 | | 9.8 | 4.9 | 12.2 | 0.9 | - | 1.7 | 14.0 | | 2.76 |
| 35–44 | 15.3 | 4.5 | 4.4 | 2.0 | 26.2 | | 19.1 | | 9.8 | 4.6 | 18.4 | 0.7 | - | 2.0 | 18.7 | | 3.45 |
| 44–70+ | 7.8 | 2.1 | 4.0 | 1.8 | 15.7 | | 14.0 | | 6.4 | 2.3 | 16.0 | 0.5 | - | 1.6 | 13.9 | | 2.71 |

| Depth (In.) | 8A Water at Saturation Pct | 5D2 Exchangeable Na 2/ Pct. | 5B1b Exch. Na me./100 g. | 5E Sodium adsorption ratio | Clay mineralogy (<0.002 mm) 3A1: Mont. | Verm. | Mica 7A2 X-ray | Kaolin. |
|---|---|---|---|---|---|---|---|---|
| 0–2 | 23.8 | 19 | 1.0 | | | | | |
| 2–6 | 26.6 | 15 | 1.0 | | xx | - | xx | xx |
| 6–11 | 32.8 | 9 | 0.9 | 1 | xx | - | xx | |
| 11–21 | 72.2 | 7 | 2.4 | 3 | | | | |
| 21–35 | 58.4 | 12 | 3.5 | 4 | xx | - | xxx | tr. |
| 35–44 | 37.2 | 19 | 3.7 | 7 | | | | |
| 44–70+ | 28.7 | 26 | 3.6 | 8 | xxxx | - | xx | tr. |

1/ In percent of the whole soil including >2 mm.

2/ In percent of the <2 mm fraction; calculated assuming no carbonates in >2 mm fraction.

## TUBAC FINELY GRAVELLY LOAM
S64Ariz-2-28

Location: Cochise County, Arizona. 9 miles north and 3/4 mile east of Willcox, Arizona. 820 feet west and 375 feet north of the east 1/4 corner of Sec. 18, T. 12 S., R. 25 E. Date of Sampling: October 23, 1964.
Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, M. L. Richardson, James Jay and R. K. Preece.
Classification: Typic Paleargid, fine, mixed, thermic.
Vegetation: Grassland. Fair cover of blue and black grama, Rothrock grama and annual gramas. Climate: Precipitation 11-12 inches annual. Mean annual temperature 58° F. (Willcox). Soil temperature at time of sampling: 24 inches 70° F., 48 inches - 73° F., 72 inches 73° F. Parent Material: Old alluvium from andesite, rhyolite, rhyolite-tuff, quartzite, and granite. Topography: Nearly level valley slopes near the low end of a long alluvial fan. Slope is 1.6 percent, very slightly convex, and with a southern aspect. Elevation: 4470 feet. Drainage: Well drained. Moderate surface runoff. Slowly permeable. Soil Moisture: Slightly moist - about 25 percent of field capacity. Water table at 100-150 feet. Remarks: This is one of the most extensive soils in Southeastern Arizona. Most of it is rangeland but some areas are cultivated. Paired sample is S64Ariz-2-29. Field determination of pH by Hellige-Truog indicator.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL NO.<br>64655 | 0-2 inches (0-5 cm), light brown (7.5YR 6/4) fine sandy loam, brown (7.5YR 4/4) when moist; weak medium and coarse platy structure; slightly hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; common fine and medium roots; few fine tubular and many fine interstitial pores; 10 percent fine gravels; pH 5.5; abrupt smooth boundary. |
| A12<br>RSL No.<br>64656 | 2-6 inches (5-15 cm), reddish brown (5YR 5/3) finely gravelly heavy sandy loam, reddish brown (5YR 4/3) when moist; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; many fine and very fine roots; few fine tubular and common fine interstitial pores; 30 percent fine gravel; pH 5.5; clear smooth boundary. |
| A3<br>RSL No.<br>64657 | 6-11 inches (15-28 cm), reddish brown (5YR 5/3) finely gravelly clay loam, reddish brown (5YR 4/3) when moist; weak fine and medium subangular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; common fine and medium roots; common fine tubular and many fine interstitial pores; few thin clay films on ped faces and in pores; 30 percent fine gravel; pH 7.5; abrupt wavy boundary.* |
| B21t<br>RSL No.<br>64658 | 11-21 inches (28-53 cm), reddish brown (5YR 4/3) (5YR 4/4 when crushed) gravelly clay, same color moist; moderate medium prismatic breaking to moderate fine and medium angular blocky structure; very hard when dry, friable when moist, sticky and very plastic when wet; common exped flattened fine roots; few fine tubular and many exped pores; thin continuous clay films on ped faces and lining pores; 20 percent fine and medium gravel; noneffervescent; pH 8.0; clear wavy boundary. |
| B22tca<br>RSL No.<br>64659 | 21-35 inches (53-89 cm), reddish brown (5YR 5/4), with pink (5YR 7/3) common fine faint mottles (weathered gravels), lime flecks and thin patchy lime coating on gravel and common very fine mottles of black; gravelly clay, reddish brown (5YR 4/4), light reddish brown (5YR 6/3) and black, when moist; massive, breaking to moderate fine and medium subangular blocky structure; very hard when dry, friable when moist, sticky and plastic when wet; few fine roots; common fine tubular and many fine interstitial pores; many thin clay films on ped faces, gravels, and pore linings; 30 percent fine to coarse gravel; slight effervescence with HCl in matrix and strong effervescence in mottles and coatings; pH 8.2; gradual wavy boundary. |
| B3tca<br>RSL No.<br>64660 | 35-44 inches (89-112 cm), reddish brown (5YR 5/3 & 5/4) gravelly sandy clay loam, reddish brown (5YR 4/4) when moist; massive; very hard when dry, friable when moist, sticky and plastic when wet; few fine roots; common fine tubular and interstitial pores; few thin clay films on ped faces in pores and bridges; 35 percent fine to coarse gravel and 5 percent cobble; slight effervescence in spots with a few gravel coatings strong; pH 8.2; gradual wavy boundary. |
| C<br>RSL No.<br>64661 | 44-70 inches + (112-178 cm), light reddish brown (5YR 6/3) very gravelly loamy sand, reddish brown (5YR 4/3) when moist; massive; very hard when dry, friable when moist, nonsticky and nonplastic when wet; no roots; many fine interstitial pores; noneffervescent; pH 8.2. |

*A very thin intermittent pinkish gray (5YR 6/2) layer, dark reddish gray (5YR 4/2) when moist is present between B1t and B21t horizons.

CONSECUTIVE PEDON NUMBER C 69204 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TUBAC SOIL NO. S69 ARIZ. 10- 3 SAMPLE NO. 91085-91092 - WALNUT G.-TUCSON AREA

SOIL FAMILY: TYPIC PALEARGID,FINE,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | INT. II .2- .02 | COARSE FRAGMENTS- PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 91085 | 0- 1 | A11 | 49.7 | 40.9 | 9.4 | 12.0 | 4.9 | 3.4 | 12.2 | 17.2 | 23.7 | 17.2 | | | | 49.0 | 78A | 12 | 59 | 7 |
| 91086 | 1- 5 | A12 | 31.9 | 50.1 | 18.0 | 3.8 | 3.3 | 2.3 | 8.7 | 13.8 | 21.7 | 28.4 | | | | 41.3 | 10A | -- | 4 | 6 |
| 91087 | 5- 13 | A3 | 41.8 | 35.2 | 23.0 | 8.7 | 7.1 | 4.9 | 11.4 | 9.7 | 13.0 | 22.2 | | | | 29.2 | 23A | 3 | 4 | 16 |
| 91088 | 13- 36 | B21T | 21.4 | 20.2 | 58.4 | 2.6 | 3.8 | 2.9 | 5.9 | 6.2 | 7.9 | 12.3 | | | | 17.5 | 11A | -- | 4 | 7 |
| 91089 | 36- 51 | B22T | 27.2 | 17.6 | 55.2 | 7.3 | 5.0 | 3.3 | 5.9 | 5.7 | 9.2 | 8.4 | | | | 18.3 | 10A | -- | 4 | 6 |
| 91090 | 51- 69 | B3 T | 40.3 | 22.9 | 36.8 | 17.6 | 7.5 | 3.0 | 5.1 | 7.1 | 9.7 | 13.2 | | | 1 | 19.6 | 45A | 10 | 26 | 9 |
| 91091 | 69- 94 | C 1CA | 55.6 | 24.7 | 19.7 | 25.2 | 11.9 | 5.4 | 7.3 | 5.8 | 10.6 | 14.1 | | | 2 | 20.1 | 20A | -- | 9 | 11 |
| 91092 | 94-122 | C 2CA | 61.9 | 20.6 | 17.5 | 22.2 | 18.1 | 8.1 | 7.8 | 5.7 | 8.6 | 12.0 | | | 2 | 18.0 | 55A | 7 | 15 | 33 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-0.2 6E1B | EXT. IRON FE 6C2B | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 91085 | 0- 1 | 0.13 | 0.012 | | | 1.0 | | | 1.20 | | | 0.39 | | | 4.6 | | | 6.8 | | 6.7 |
| 91086 | 1- 5 | 0.11 | 0.014 | | | 1.1 | | | | 1.59 | 1.67 | 0.94 | | 13.5 | 7.4 | 1.6 | 1.5 | 7.2 | | 6.9 |
| 91087 | 5- 13 | | | | | 1.0 | | | 1.50 | | | 0.85 | | | 8.3 | | | 7.6 | 8.7 | 7.4 |
| 91088 | 13- 36 | | | | | 1.1 | | | 1.50 | | | 0.94 | | | 14.3 | | | 7.4 | 7.3 | 7.5 |
| 91089 | 36- 51 | | | 1 | | 1.1 | | | 1.50 | | | 0.94 | | | 13.2 | | | 7.3 | 7.9 | 7.5 |
| 91090 | 51- 69 | | | 10 | | 0.7 | | | 1.45 | | | 0.69 | | | 11.5 | | | 7.3 | 8.3 | 7.7 |
| 91091 | 69- 94 | | | 17 | | 0.6 | | | 1.45 | | | 0.88 | | | 8.3 | | | 7.4 | 8.5 | 7.9 |
| 91092 | 94-122 | | | 12 | | 0.7 | | | 1.45 | | | 0.60 | | | 8.1 | | | 7.7 | 8.8 | 7.8 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 584A 6N2E | MG 584A 6Q2D | NA 584A 6P2A | K 584A 6Q2A | SUM | BASE SAT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | 8A1 B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 91085 | 0- 1 | | | 0.3 | 0.8 | 1.1 | | | 10.0 | | | | | | | | | | | |
| 91086 | 1- 5 | | | 0.5 | 1.6 | 2.1 | | | 16.3 | | | | | | | | | | | |
| 91087 | 5- 13 | | | 1.4 | 2.2 | 3.6 | | | 20.4 | 3.51 | 15.7 | 2.6 | 14.5 | 1.4 | | 2.4 | 17.5 | 3.1 | | 7.7 |
| 91088 | 13- 36 | | | 4.3 | 2.5 | 6.8 | | | 28.1 | 15.9 | 114.2 | 27.7 | 45.1 | 1.6 | | 3.0 | 77.8 | 27.6 | | 7.4 |
| 91089 | 36- 51 | | | 4.6 | 2.0 | 6.6 | | | 26.1 | 25.4 | 160.9 | 39.9 | 63.9 | 2.3 | | 6.6 | 130.0 | 17.2 | | 7.9 |
| 91090 | 51- 69 | | | 3.7 | 1.3 | 5.0 | | | 17.1 | 19.6 | 146.3 | 46.2 | 53.6 | 1.3 | | 1.2 | 106.0 | 16.0 | | 7.4 |
| 91091 | 69- 94 | | | 2.2 | 0.7 | 2.9 | | | 8.7 | 13.0 | 81.4 | 29.1 | 41.5 | 1.1 | | 1.2 | 68.5 | 8.1 | | 7.5 |
| 91092 | 94-122 | | | 2.2 | 0.6 | 2.8 | | | 9.0 | 7.2 | 28.8 | 13.2 | 42.5 | 0.8 | | 0.8 | 36.7 | 6.4 | | 7.5 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT 8A SAT. PCT. | NA 584B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY DTA 7A2E I | 7A2E II | 7A2E III | 7A2E IV | 7A3 PCT. | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91085 | 0- 1 | | 0.3 | 3 | | | | MI | 3 | MT | 1 | KK | 1 | | |
| 91086 | 1- 5 | | 0.5 | 3 | | | | MI | 3 | MT | 1 | KK | 1 | | |
| 91087 | 5- 13 | 31.5 | 0.9 | 5 | 5 | | | MI | 2 | MT | 1 | KK | 1 | | |
| 91088 | 13- 36 | 51.1 | 2.0 | 7 | 5 | | | | | | | | | | |
| 91089 | 36- 51 | 45.3 | 1.7 | 7 | 6 | 0.2 | | | | | | | | | |
| 91090 | 51- 69 | 44.0 | 1.3 | 8 | 5 | | | MI | 3 | KK | 1 | | | | |
| 91091 | 69- 94 | 39.2 | 0.6 | 7 | 6 | | | | | | | | | | |
| 91092 | 94-122 | 42.2 | 0.4 | 5 | 9 | | | MI | 4 | MT | 3 | KK | 2 | | |

MINERAL CODE / RELATIVE AMOUNT

MI MICA 1 TRACE
MT MONTMORT 2 SMALL
KK KAOLINIT 3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## TUBAC VERY GRAVELLY LOAM
S69Ariz-10-3

Location: Pima County, Arizona. Approximately 100 feet east and 100 feet north of southwest corner of Sec. 7, T. 12 S., R. 10 E. About 14 miles west of Rillito on Silver Bell Road.
Description by: Y. H. Havens and D. M. Hendricks. Sampled by: Y. H. Havens and D. M. Hendricks.
Classification: Typic Paleargid, fine, mixed, thermic.
Vegetation: Bare - desert pavement. Climate: Mean annual temperature is approximately 68° F. Approximately 10 inches annual precipitation. Parent material: Mixed alluvium from andesite, basalt, granite and rhyolite. Topography: Gently sloping old fan. Elevation: 2,050 feet. Drainage: Well drained. Soil moisture: Dry.
Remarks: 80 to 95 percent of the surface covered with gravel--desert pavement.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>691085 | 0-1 cm (0-1/2 inch), light brown (7.5YR 6/4) very gravelly loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium vesicular pores; noneffervescent; neutral (pH 7.0); abrupt smooth boundary. |
| A12<br>RSL No.<br>691086 | 1-5 cm (1/2-2 inches), light brown (7.5YR 6/4) heavy loam, dark brown (7.5YR 4/4) moist; weak thick platy structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; many fine and medium vesicular pores; 10 percent gravel; noneffervescent; neutral (pH 6.9); abrupt smooth boundary. |
| A3<br>RSL No.<br>691087 | 5-13 cm (2-5 inches), reddish brown (2.5YR 5/4) clay loam, dark red (2.5YR 3/6) moist; moderate fine, medium and coarse subangular and angular blocky structure; hard, friable, sticky, plastic; few very fine and fine roots; common fine tubular and vesicular pores; common thin clay films on ped faces and in pores; 10 percent gravel; slightly effervescent in spots; moderately alkaline (pH 7.9); abrupt smooth boundary. |
| B21t<br>RSL No.<br>691088 | 13-36 cm (5-14 inches), red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; moderate fine and medium prismatic structure; hard, friable, sticky, plastic; few very fine and fine roots; common fine tubular pores; common thin clay films on ped faces and in pores; 5 percent gravel; noneffervescent; mildly alkaline (pH 7.6); clear wavy boundary. |
| B22t<br>RSL No.<br>691089 | 36-51 cm (14-20 inches), red (2.5YR 5/6) gravelly clay, dark red (2.5YR 3/6) moist; moderate medium and coarse subangular blocky structure; hard, friable, sticky, plastic; common fine tubular pores; common thin clay films on ped faces and in pores; 30 percent gravel; slightly effervescent in spots; neutral (pH 7.3); clear wavy boundary. |
| B3<br>RSL No.<br>691090 | 51-69 cm (20-27 inches), reddish brown (2.5YR 5/4) gravelly clay loam, dark reddish brown (2.5YR 3/4) moist; weak medium and coarse subangular blocky structure; very hard, friable, slightly sticky, plastic; common fine tubular pores; few thin clay films on ped faces and in pores; 30 to 35 percent gravel; common fine and medium distinct pinkish white (7.5YR 8/2) lime filaments and segregations, pinkish gray (7.5YR 7/2) moist; strongly effervescent; moderately alkaline (pH 7.9); clear wavy boundary. |
| C1ca<br>RSL No.<br>691091 | 69-94 cm (27-37 inches), mottled light brown (7.5YR 6/4) and pinkish white (8/2) very gravelly sandy clay loam, strong brown (7.5YR 5/6) and light brown (7.5YR 6/4) moist, mottles are many medium and large and distinct; massive--weakly cemented; very hard, friable, slightly sticky, slightly plastic; many fine and very fine tubular pores; 50 to 60 percent gravel; strongly effervescent; moderately alkaline (pH 8.3); clear wavy boundary. |
| C2ca<br>RSL No.<br>691092 | 94-122 cm (37-48 inches), mottled brown (7.5YR 5/4) and pinkish gray (7/2) very gravelly light sandy clay loam, yellowish red (5YR 4/6) and light reddish brown (5YR 6/3) moist; massive; weakly cemented in places; hard, friable, slightly sticky, slightly plastic; many medium and large pinkish gray (7.5YR 7/2) lime segregations and coatings; strongly effervescent; moderately alkaline (pH 8.3). |

CONSECUTIVE PEDON NUMBER C 71 12 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES AJO TAXADJUNCT SOIL NO. S71 ARIZ. 10-11 SAMPLE NO. 1 68-1 72 ORGAN PIPE MON AREA

SOIL FAMILY: PETROCALCIC PALEARGID,CLAYY-SKLTL,MXD,HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | SILTS CO. 2- .2U | CLAYS FINE LT .2U | CARBONATE 3A1A | 1A2A INT. COARSE FRAGMENTS II .2- | PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 1 | 68 | 0- | 5 | A1 | 53.4 | 28.2 | 18.4 | 5.0 | 5.9 | 4.4 | 12.7 | 25.4 | 21.5 | 6.7 | | | | 55.8 | 36A | 14 | 17 | 6 |
| 1 | 69 | 5- | 15 | B21T | 44.0 | 30.3 | 25.7 | 11.7 | 5.6 | 3.1 | 7.7 | 15.9 | 11.8 | 18.5 | | | | 32.7 | 68* | 34 | 25 | 6 |
| 1 | 70 | 15- | 33 | B22T | 39.9 | 18.3 | 41.8 | 13.9 | 4.2 | 2.5 | 6.1 | 13.2 | 10.0 | 8.3 | | | | 27.1 | 82* | 35 | 38 | 8 |
| 1 | 71 | 33- | 61 | B3 CA | 43.4 | 16.7 | 39.9 | 19.8 | 7.5 | 3.4 | 4.4 | 8.3 | 7.5 | 9.2 | | | | 18.1 | 68* | 34 | 24 | 8 |
| 1 | 72 | 61- | 91 | CCAM | 77.4 | 17.3 | 5.3 | 35.4 | 17.1 | 7.6 | 9.6 | 7.7 | 8.0 | 9.3 | | | 1 | 21.3 | G | | | |

| SAMPLE NO. | | DEPTH CM. | | ORG.MATTER CARBON 6A1A | NITRO GEN 6N1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 1 | 68 | 0- | 5 | 0.27 | 0.039 | TR | | 1.0 | | | 1.10 | | | 0.81 | | | 6.6 | | | 7.5 | | 7.2 |
| 1 | 69 | 5- | 15 | 0.38 | 0.050 | TR | | 1.2 | | | | 1.15 | 1.26 | 0.52 | 22.6 | 22.0 | 10.2 | 3.1 | 1.5 | 7.4 | | 7.3 |
| 1 | 70 | 15- | 33 | 0.30 | | 2 | | 0.9 | | | 1.15 | | | 0.34 | | | 13.8 | | | 7.8 | | 7.5 |
| 1 | 71 | 33- | 61 | | | 4 | | 0.7 | | | 1.30 | | | 0.49 | | | 16.5 | | | 7.9 | 8.7 | 7.8 |
| 1 | 72 | 61- | 91 | | | 21 | | 0.2 | | | 1.75 | | | 1.00 | | | 4.4 | | | 8.7 | | 8.0 |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MEQ/100G | | | | PCT. | MEQ/100G | | | MMHO | MEQ/1000 ML | | | | | | | PPM | |
| 1 | 68 | 0- | 5 | 10.5 | 4.1 | 0.1 | 2.0 | 16.7 | 95 | | 17.5 | | | | | | | | | | | |
| 1 | 69 | 5- | 15 | 17.4 | 6.7 | 0.2 | 2.6 | 26.9 | 99 | | 27.2 | | | | | | | | | | | |
| 1 | 70 | 15- | 33 | 22.1 | 7.3 | 1.0 | 1.7 | 32.1 | 100+ | | 31.7 | | | | | | | | | | | |
| 1 | 71 | 33- | 61 | 28.3 | 9.3 | 6.9 | 2.1 | 46.6 | 100+ | | 34.7 | 7.6 | 24.8 | 12.3 | 41.7 | 0.7 | | 4.0 | 68.4 | | | 7.5 |
| 1 | 72 | 61- | 91 | 17.7 | 2.8 | 1.4 | 0.9 | 22.8 | 100+ | | 13.0 | 0.77 | | | | | | | | | | |

| SAMPLE NO. | | DEPTH CM. | | WATER EXCHANGBLE AT SAT. 8A | NA 5B4B | NA 5D2 | SAR 5E | GYPSUM AMT. 6F1B | REQ. 6P3A | CLAY MINERALOGY LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 | L.T. .0002 MM X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCT. | MEQ. | PCT. | | PCT. | MEQ. | | | | | PCT. | | | |
| 1 | 68 | 0- | 5 | | 0.1 | 1 | | | | MT | 4 | MI | 3 | KK | 2 | | |
| 1 | 69 | 5- | 15 | | 0.2 | 1 | | | | MT | 4 | MI | 3 | KK | 2 | | |
| 1 | 70 | 15- | 33 | | 1.0 | 3 | | | | | | | | | | | |
| 1 | 71 | 33- | 61 | 64.5 | 4.2 | 12 | 10 | | 11.2 | MT | 4 | MI | 3 | KK | 1 | | |
| 1 | 72 | 61- | 91 | | 1.4 | 11 | | | | MT | 3 | MI | 1 | | | | |

MINERAL CODE / RELATIVE AMOUNT

MT MONTMORT 1 TRACE
MI MICA 2 SMALL
KK KAOLINIT 3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## AJO VERY GRAVELLY LOAM (taxadjunct) 1/
S71 Ariz-10-11-(1-5*)

Location: Pima County, Arizona. NW¼ of SE¼ of Section 35, T15S, R5W (projected) on Alamo Canyon Road, Organ Pipe Cactus National Monument. Date of Sampling: April 8, 1971.
Description by: Y. H. Havens, E. Chamberlin. Collectors: K. Flach, K. Vogt, E. Chamberlin.
Classification: Petrocalcic Paleargid, clayey-skeletal, mixed, hyperthermic.
Vegetation: Creosotebush, ocotillo, saguaro, triangle bursage, cholla cacti, paloverde, six-weeks grama and fluffgrass. Use: Desert rangeland. Climate: Mean annual precipitation 8 to 10 inches. Mean annual temperature 69° F.
Parent Material: Mixed alluvium from rhyolite, welded tuff, basalt, andesite and schist. Topography: Gently sloping--convex with slope of 2 percent. Elevation: 2200 feet. Drainage: Well drained, with moderately slow permeability. Soil Moisture: Dry.
Remarks: 65 percent of surface covered by gravel and cobble.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>7168 | 0 to 5 cm (0 to 2 inches), brown (7.5YR 5/4) very gravelly loam, dark brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, friable, slightly sticky, plastic; common very fine roots; common very fine vesicular and few fine tubular pores; 55 percent gravel by volume; noneffervescent; moderately alkaline (pH 8.0 thymol blue); abrupt wavy boundary. |
| B21t<br>RSL<br>7169 | 5 to 15 cm (2 to 6 inches), reddish brown (5YR 4/4) very gravelly clay loam, dark reddish brown (5YR 3/4) moist; weak fine and medium subangular blocky structure; slightly hard, friable, sticky, plastic; common very fine and fine and few medium roots; common very fine interstitial pores; few thin clay films on faces of peds and in pores; 60 percent gravel; noneffervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| B22t<br>RSL<br>7170 | 15 to 33 cm (6 to 13 inches), yellowish red (5YR 4/6) very gravelly clay loam, yellowish red (5YR 4/6) moist; weak fine and medium subangular blocky structure; hard, friable, sticky, plastic; many very fine and medium roots; common very fine interstitial and few very fine tubular pores; few thin clay films on faces of peds and in pores; 65 percent gravel; noneffervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| B3ca<br>RSL<br>7171 | 33 to 61 cm (13 to 24 inches), yellowish red (5YR 5/6) very gravelly clay loam, yellowish red (5YR 4/6) moist; massive; hard, friable, sticky, plastic; common very fine and fine roots; common very fine interstitial and few very fine tubular pores; few thin clay films in pores; 70 percent gravel; strongly effervescent; pinkish white (7.5YR 8/2) lime coatings on all gravel and few fine lime filaments; moderately alkaline (pH 8.2); clear wavy boundary. |
| Ccam<br>RSL<br>7172 | 61 to 91 cm (24 to 36 inches), white (N/8) and pink (7.5YR 7/4) petrocalcic horizon, pinkish gray (7.5YR 7/2) and light brown (7.5YR 6/4) moist; massive; violently effervescent; moderately alkaline (pH 8.3). |

1/ The Ajo series is in a loamy-skeletal, mixed, hyperthermic family of Petrocalcic Paleargids. This pedon has an argillic horizon with more than 35 percent clay.

CONSECUTIVE PEDON NUMBER C 71 22 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES LA PALMA TAXADJUNCT SOIL NO. S71 ARIZ. 7-10 SAMPLE NO. 1 135-1 141 CENT. MARICOPA AREA

SOIL FAMILY: PETROCALCIC PALEARGID,CRSE-SLTY,MXD,HYPRTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL SAND 2- .05 | TOTAL SILT .05- .002 | TOTAL CLAY LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. CLAY 2- .2U | FINE CLAY LT .2U | CARBONATE 3A1A | INT. II .2- .02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75- 20 PCT. OF LT 75 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 | | | | | | | | | | | | | 1A2A | | | | | |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 1 135 | 0- 4 | A11 | 39.8 | 53.6 | 6.6 | 0.3 | 0.9 | 1.1 | 9.6 | 27.9 | 38.1 | 15.5 | 4.1 | 2.5 | | 73.0 | A | | | |
| 1 136 | 4- 12 | A12 | 40.9 | 53.0 | 6.1 | 0.2 | 0.6 | 1.0 | 9.3 | 29.8 | 37.4 | 15.6 | | | | 74.1 | A | | | |
| 1 137 | 12- 19 | B1 T | 36.9 | 56.6 | 6.5 | 0.1 | 0.6 | 0.8 | 8.9 | 26.5 | 40.1 | 16.5 | 3.8 | 2.7 | | 73.2 | A | | | |
| 1 138 | 19- 29 | B2TCA | 31.3 | 48.4 | 20.3 | 0.5 | 0.9 | 1.0 | 7.8 | 21.1 | 32.2 | 16.2 | 14.5 | 5.8 | 8 | 58.9 | A | | | |
| 1 139 | 29- 46 | B3TCA | 25.0 | 43.6 | 31.4 | 0.7 | 0.9 | 1.4 | 6.0 | 16.0 | 24.3 | 19.3 | | | 14 | 44.5 | A | | | |
| 1 140 | 46- 68 | C1CA | 45.5 | 33.1 | 21.4 | 18.2 | 7.8 | 3.4 | 6.5 | 9.6 | 15.3 | 17.8 | | | 12 | 28.6 | G | | | |
| 1 141 | 68- 73 | C2CA SM | | | | | | | | | | | | | | | G | | | |

| SAMPLE NO. | DEPTH CM. | ORG. CARBON 6A1A -PERCENT-- | MATTER NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG LIMIT LL 4F1 PCT. | PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | GRAMS PER CC | | | | -PERCENT--- | | | -PERCENT-- | | | | |
| 1 135 | 0- 4 | 0.65 | 0.078 | 4 | | | | | 1.28 | 1.32 | 1.00 | 21.4 | 13.6 | 5.3 | 1.0 | 1.0 | 7.9 | | 7.3 | |
| 1 136 | 4- 12 | 0.24 | 0.033 | 5 | | | | | 1.42 | 1.45 | 1.00 | 21.8 | 12.1 | 4.7 | 0.7 | 0.7 | 8.5 | | 7.5 | |
| 1 137 | 12- 19 | 0.20 | | 5 | | | | | 1.56 | 1.59 | 1.00 | 25.5 | 16.1 | 5.0 | 0.6 | 0.6 | 9.2 | 9.9 | 8.0 | |
| 1 138 | 19- 29 | 0.23 | | 16 | | | | | 1.49 | 1.59 | 1.00 | 23.3 | 17.8 | 8.8 | 2.2 | 2.2 | 9.2 | 10.2 | 8.6 | |
| 1 139 | 29- 46 | | | 27 | | | | | 1.43 | 1.66 | 1.00 | 28.9 | 24.2 | 11.5 | 5.1 | 5.1 | 9.7 | 10.1 | 9.2 | |
| 1 140 | 46- 68 | | | 54 | | | | | 1.60 | 1.79 | 1.00 | 24.6 | 19.0 | 9.1 | 3.8 | 3.8 | 9.8 | 10.2 | 8.9 | |
| 1 141 | 68- 73 | | | 79 | | | | | 2.06 | 2.06 | 1.00 | 5.4 | 5.3 | 3.1 | | | 9.9 | 10.2 | 8.1 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | CEC NA- OAC 5A2A -MEQ/100G | NH4- OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -MEQ/100G | | | | | PCT. | | | | MEQ/1000 ML | | | | | | | | | |
| 1 135 | 0- 4 | 14.2 | 3.3 | 0.4 | 1.3 | 19.2 | 100+ | | 9.9 | | | | | | | | | | | |
| 1 136 | 4- 12 | 12.6 | 3.6 | 0.6 | 1.6 | 18.4 | 100+ | | 9.5 | | | | | | | | | | | |
| 1 137 | 12- 19 | 10.3 | 3.6 | 3.5 | 2.8 | 20.2 | 100+ | | 9.9 | 2.37 | 0.6 | 0.4 | 18.7 | 1.2 | | 4.3 | 13.8 | | | 8.6 |
| 1 138 | 19- 29 | 10.3 | 3.3 | 10.5 | 3.4 | 27.5 | 100+ | | 13.2 | 6.2 | 0.4 | 0.4 | 57.7 | 2.4 | | 9.9 | 38.9 | | | 8.6 |
| 1 139 | 29- 46 | 10.9 | 2.4 | 19.0 | 3.5 | 35.8 | 100+ | | 17.6 | 10.0 | 0.4 | 0.4 | 98.6 | 3.1 | 6.3 | 14.2 | 49.1 | 14.0 | | 9.3 |
| 1 140 | 46- 68 | 8.8 | 2.4 | 13.0 | 2.3 | 26.5 | 100+ | | 10.9 | 10.7 | 0.2 | 0.4 | 110.0 | 3.0 | 12.0 | 17.2 | 53.6 | 18.6 | | 9.4 |
| 1 141 | 68- 73 | 10.3 | 2.5 | 5.7 | 1.1 | 19.6 | 100+ | | 4.6 | 6.6 | 0.2 | 0.3 | 67.6 | 1.5 | 12.2 | 17.9 | 23.1 | 8.7 | | 9.4 |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA PCT. 7A3 | L.T. .0002 MM X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 135 | 0- 4 | | 0.4 | 4 | | | | MT 3 | MI 3 | KK 2 | | | MT 3 | MI 2 | | MT MONTMORT | 1 TRACE |
| 1 136 | 4- 12 | | 0.6 | 6 | | | | | | | | | | | | MI MICA | 2 SMALL |
| 1 137 | 12- 19 | 31.3 | 2.9 | 29 | 26 | | 1.2 | MT 2 | MI 2 | | | | MT 4 | MI 3 | | KK KAOLINIT | 3 MODERATE |
| 1 138 | 19- 29 | 45.1 | 7.9 | 60 | 91 | | 7.0 | MT 3 | MI 1 | | | | MT 5 | MI 2 | | | 4 ABUNDANT |
| 1 139 | 29- 46 | 47.2 | 14.4 | 82 | 100+ | | 11.7 | | | | | | | | | | 5 DOMINANT |
| 1 140 | 46- 68 | 37.5 | 8.9 | 81 | 100+ | | 7.1 | | | | | | | | | | 6 INDETER. |
| 1 141 | 68- 73 | 22.1 | 4.2 | 91 | 100+ | | 2.7 | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## LA PALMA VERY FINE SANDY LOAM (taxadjunct) 1/
S71Ariz-7-10(1-7)

Location: Maricopa County, Arizona. 1600 feet east and 1100 feet south of the NW corner of Sec. 2, T2N, R1W, about 9 miles west of Glendale. Date of Sampling: April 14, 1971.
Description by: W. Nettleton, J. Jay, G. Hartman, R. Schurig, F. Cook. Collectors: W. Nettleton, J. Jay, G. Hartman, R. Schurig, F. Cook.
Classification: Petrocalcic Paleargid, coarse-silty, mixed, hyperthermic.
Vegetation: Saltbush. Use: Desert range. Climate: Semiarid. 7 inches precipitation. Mean annual air temperature 70° F. Parent Material: Alluvium from acid, basic and neutral rocks. Topography: Nearly level valley plains. Slopes are 1 percent or less. Elevation: 1200 feet. Drainage: Well drained. Slow permeability to pan which is impermeable. Slow runoff. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A11 RSL 71135 | 0 to 4 cm (0 to 1-1/2 inches), light brown (7.5YR 6/4) very fine sandy loam, brown (7.5YR 5/4) moist; weak, thin platy structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; common fine tubular pores; strongly effervescent; moderately alkaline (pH 8.2 TB); abrupt smooth boundary. |
| A12 RSL 71136 | 4 to 12 cm (1-1/2 to 5 inches), light yellowish brown (10YR 6/4) very fine sandy loam, brown (7.5YR 4/4) moist; weak thin platy structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; common fine tubular pores; strongly effervescent; moderately alkaline (pH 8.3); clear smooth boundary. |
| B1t RSL 71137 | 12 to 19 cm (5 to 7½ inches), light brown (7.5YR 6/4) heavy very fine sandy loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; strongly to violently effervescent; common fine and medium pinkish white irregularly shaped soft lime masses; very strongly alkaline (pH 9.6); abrupt smooth boundary. |
| B2tca RSL 71138 | 19 to 29 cm (7½ to 11½ inches), yellowish red (5YR 5/6) and brown (7.5YR 5/4) light clay loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and plastic; common very fine and fine roots; common fine tubular pores; strongly effervescent to violently effervescent; common fine and medium pinkish white irregularly shaped soft lime masses, 2 percent fine pinkish white durinodes; very strongly alkaline (pH 9.4); clear smooth boundary. |
| B3tca RSL 71139 | 29 to 46 cm (11½ to 18 inches), light brown (7.5YR 6/4) heavy loam, brown (7.5YR 5/4) moist; pink (7.5YR 7/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine common fine tubular pores; strongly effervescent; common fine, medium and coarse pinkish white irregularly shaped soft lime masses; 1 percent fine gravel; gradual smooth boundary. |
| C1ca RSL 71140 | 46 to 68 cm (18 to 27 inches), light brown (7.5YR 6/4) heavy loam, brown (7.5YR 5/4) moist, pink (7.5YR 7/4) moist; massive, slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common fine tubular pores; many pinkish white strongly cemented to indurated fragments, violently effervescent; very strongly alkaline (pH 9.6); abrupt wavy boundary. |
| C2ca sim RSL 71141 | 68 to 73 cm (27 to 29 inches), pinkish white (7.5YR 8/2) silica indurated pan, pinkish gray moist; thin laminar layer on top, no fractures; extremely hard, violently effervescent; very strongly alkaline (pH 9.6). |

1/ The La Palma series is in a coarse-loamy, mixed, hyperthermic family of Petrocalcic Paleargids. This pedon has less coarse sand and more silt.

CONSECUTIVE PEDON NUMBER C 71 21 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES LA PALMA SOIL NO. S71 AR12. 7- 8 SAMPLE NO. 1 126-1 134 CENT. MARICOPA AREA

SOIL FAMILY: PETROCALCIC PALEARGID,CRSE-LOAMY,MXD,HYPRTHERMC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS-- CSI .05- .02 | FSI .02- .002 | CLAYS---- CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | INT. II .2- .02 | 1A2A COARSE FRAGMENTS- PCT. OF WHOLE SOIL I 75- PCT. | II 20-5 PCT. OF | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 1 126 | 0- 4 | A11 | 62.2 | 33.0 | 4.8 | 5.6 | 14.4 | 11.4 | 14.0 | 16.8 | 22.9 | 10.1 | | | | 46.2 | 5A | 1 | 2 | 2 |
| 1 127 | 4- 12 | A12 | 65.5 | 28.3 | 6.2 | 4.6 | 14.4 | 12.4 | 15.1 | 19.0 | 19.3 | 9.0 | | | | 45.4 | 3A | -- | 2 | 1 |
| 1 128 | 12- 18 | B1tcasa | 63.0 | 25.0 | 12.0 | 3.1 | 12.7 | 13.1 | 16.7 | 17.4 | 14.7 | 10.3 | | | | 40.3 | 20A | 17V | 2 | 1 |
| 1 129 | 18- 31 | B2tcasa | 61.9 | 17.5 | 20.6 | 4.4 | 16.6 | 15.2 | 16.4 | 9.3 | 9.1 | 8.4 | | | 6 | 25.8 | 4A | -- | 2 | 2 |
| 1 130 | 31- 42 | B31tca | 58.4 | 22.6 | 19.0 | 2.3 | 13.0 | 13.8 | 18.2 | 11.1 | 12.6 | 10.0 | | | 3 | 32.5 | 4A | -- | 3 | 1 |
| 1 131 | 42- 51 | B32tca | 57.0 | 26.5 | 16.5 | 1.8 | 9.2 | 12.7 | 19.8 | 13.5 | 15.3 | 11.2 | | | 1 | 38.9 | 2A | -- | 1 | TR |
| 1 132 | 51- 64 | C1casim | | | | | | | | | | | | | | | G | | | |
| 1 133 | 64- 82 | C 2CA | | | | | | | | | | | | | | | G | | | |
| 1 134 | 82-146 | C 3 | 57.9 | 26.0 | 16.1 | 1.5 | 7.2 | 12.0 | 23.3 | 13.9 | 15.3 | 10.7 | | | | 41.6 | A | | | |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A -PERCENT-- | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6F1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L I M I T LL 4F1 PCT. | PL 4F2 NO.40 | BULK DENSITY EST 1/3 4A1F | 1/3 BAR 4A1P GRAMS PER CC | ORY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C ----PERCENT--- | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | -----PH-------- H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 126 | 0- 4 | 0.37 | 0.044 | 1 | | | | | 1.69 | | 0.97 | | | | 3.3 | | | 8.2 | | 7.1 |
| 1 127 | 4- 12 | 0.04 | 0.011 | 1 | | | | | | 1.69 1.70 | 0.98 | | 16.8 | 12.1 | 3.6 | 0.2 | 0.2 | 9.1 | | 7.4 |
| 1 128 | 12- 18 | 0.26 | | 4 | | | | | 1.44 | | 0.88 | | | | 5.7 | | | 9.0 | 10.0 | 8.0 |
| 1 129 | 18- 31 | 0.12 | | 14 | | | | | | 1.44 1.80 | 0.98 | | 31.2 | 26.8 | 10.3 | 7.7 | 7.5 | 9.0 | 10.0 | 8.5 |
| 1 130 | 31- 42 | 0.08 | | 10 | | | | | | 1.39 1.75 | 0.98 | | 33.8 | 28.3 | 14.6 | 8.0 | 7.8 | 8.8 | 9.9 | 8.2 |
| 1 131 | 42- 51 | 0.08 | | 8 | | | | | | 1.35 1.63 | 0.99 | | 35.8 | 29.7 | 11.9 | 6.5 | 6.4 | 8.1 | 9.5 | 7.9 |
| 1 132 | 51- 64 | | | 61 | | | | | | 2.19 2.23 | 1.00 | | 8.0 | 7.4 | 5.1 | 0.6 | 0.6 | 9.0 | 10.0 | 8.0 |
| 1 133 | 64- 82 | | | 42 | | | | | 2.19 | | 1.00 | | | | 9.5 | | | 8.6 | 9.8 | 8.2 |
| 1 134 | 82-146 | | | 1 | | | | | | 1.56 1.72 | 1.00 | | 25.3 | 21.6 | 11.8 | 3.3 | 3.3 | 8.5 | 9.6 | 7.9 |

| SAMPLE NO. | DEPTH CM. | ----EXTRACTABLE BASES--- CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | --C E C-- NA- OAC 5A2A | NH4- OAC 5A6A | ------WATER EXTRACT FROM SATURATED PASTE 8A1 ----- EC 8A1A | CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G PCT. | | | | | | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 1 126 | 0- 4 | 8.8 | 1.6 | 1.1 | 0.5 | 12.0 | 100+ | | 7.5 | | | | | | | | | | | |
| 1 127 | 4- 12 | 11.5 | 1.1 | 2.6 | 1.0 | 16.2 | 100+ | | 7.5 | | | | | | | | | | | |
| 1 128 | 12- 18 | 11.4 | 1.2 | 7.0 | 0.2 | 19.8 | 100+ | | 8.6 | 7.5 | 1.4 | 0.5 | 63.7 | 0.3 | | 4.8 | 63.7 | | | 8.3 |
| 1 129 | 18- 31 | 11.8 | 1.7 | 15.4 | 0.6 | 29.5 | 100+ | | 11.0 | 8.8 | 0.7 | 0.3 | 88.9 | 0.2 | | 6.3 | 68.9 | 11.7 | | 8.8 |
| 1 130 | 31- 42 | 10.6 | 2.5 | 27.6 | 0.6 | 41.3 | 100+ | | 17.3 | 15.4 | 2.0 | 1.1 | 147.0 | 0.3 | | 5.3 | 110.0 | 31.2 | | 8.7 |
| 1 131 | 42- 51 | 29.2 | 2.5 | 29.7 | 0.6 | 62.0 | 100+ | | 18.0 | 23.7 | 25.7 | 4.4 | 214.0 | 0.4 | | 5.7 | 164.0 | 50.0 | | 8.5 |
| 1 132 | 51- 64 | 11.7 | 1.6 | 13.1 | 0.3 | 26.7 | 100+ | | 8.4 | 20.8 | 4.0 | 1.2 | 212.0 | 0.3 | | 4.4 | 164.0 | 25.2 | | 8.6 |
| 1 133 | 64- 82 | 12.1 | 2.1 | 26.9 | 0.5 | 41.6 | 100+ | | 14.9 | 21.0 | 7.6 | 2.0 | 208.0 | 0.3 | | 3.8 | 155.0 | 57.2 | | 8.5 |
| 1 134 | 82-146 | 5.6 | 1.9 | 30.5 | 0.5 | 38.5 | 100+ | | 18.6 | 15.1 | 1.4 | 1.0 | 147.0 | 0.2 | | 4.0 | 120.0 | 24.3 | | 8.6 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | -GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | --LESS THAN 0.002 MM--- -X RAY-- I 7A2E | II 7A2E | III 7A2F | IV 7A2E | DTA 7A3 PCT. | -L.T. .0002 MM- -X RAY- I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 126 | 0- 4 | | 1.1 | 15 | | | | MM 4 | KK 2 | | | | | | | MM MT/MICA | 1 TRACE |
| 1 127 | 4- 12 | | 2.6 | 35 | | | | MI 3 | KK 2 | | | | | | | KK KAOLINIT | 2 SMALL |
| 1 128 | 12- 18 | 30.4 | 5.1 | 59 | 65 | | 3.7 | | | | | | | | | | 3 MODERATE |
| 1 129 | 18- 31 | 68.8 | 9.3 | 84 | 100+ | | 7.1 | MT 5 | MI 2 | | | | | | | MI MICA | 4 ABUNDANT |
| 1 130 | 31- 42 | 82.6 | 15.5 | 89 | 100+ | | 9.9 | | | | | | | | | MT MONTMORT | 5 DOMINANT |
| 1 131 | 42- 51 | 70.7 | 14.6 | 81 | 55 | 1.6 | 8.5 | | | | | | | | | | 6 INDETER. |
| 1 132 | 51- 64 | 32.2 | 6.3 | 75 | 100+ | | 4.2 | | | | | | | | | | |
| 1 133 | 64- 82 | 68.1 | 12.7 | 86 | 95 | | 8.3 | | | | | | | | | | |
| 1 134 | 82-146 | 89.8 | 17.3 | 93 | 100+ | | 11.6 | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
V=NOT WEIGHED. VALUE CALCULATED FROM A VOLUME ESTIMATE.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

# LA PALMA SANDY LOAM
S71Ariz-7-8(1-9)

Location: Maricopa County, Arizona. 770 feet east and 2050 feet north of SW corner of Sec. 12, T1N, R6W.
Date of Sampling: April 13, 1971.
Decription by: W. D. Nettleton, J. E. Jay, G. W. Hartman, R. G. Schurig, F. Cook. Collectors: W. D. Nettleton, J. E. Jay, G. W. Hartman, R. G. Schurig, F. Cook.
Classification: Petrocalcic Paleargid, coarse-loamy, mixed, hyperthermic.
Vegetation: Four-wing saltbush, cholla cactus, mesquite. Use: Desert range. Climate: Semi-arid. 7 inches precipitation. Mean annual air temperature, 70°F. Parent Material: Old alluvium from acid, basic and neutral igneous rocks. Elevation: 1200 feet. Topography: Nearly level valley plains. Slopes are less than 1 percent. Drainage: Well drained, slow permeability. Medium runoff. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>71126 | 0 to 4 cm (0 to 1½ inches), pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; weak coarse platy structure; slightly hard, very friable, nonsticky, non-plastic; common very fine roots; common fine vesicular pores; noneffervescent; moderately alkaline (pH 8.2TB); abrupt smooth boundary. |
| A12<br>RSL<br>71127 | 4 to 12 cm (1½ to 5 inches),brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common fine tubular pores; weakly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. |
| B1tcasa<br>RSL<br>71128 | 12 to 18 cm (5 to 7 inches), light reddish brown (5YR 6/3) gravelly sandy loam; reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; very hard, very friable, nonsticky, slightly plastic; few fine, very fine and medium roots; common fine tubular pores; 30 percent medium and coarse gravel; strongly and violently effervescent; common coarse and medium pinkish white irregularly shaped soft lime masses, strongly alkaline (pH 9.0); clear wavy boundary. |
| B2tcasa<br>RSL<br>71129 | 18 to 31 cm (7 to 12 inches), light reddish brown (5YR 6/4) sandy clay loam, reddish brown (5YR 4/4) moist; strong medium columnar and prismatic structure; very hard, firm, sticky and plastic; few very fine roots; few fine tubular and common fine interstitial pores; weakly to strongly effervescent; common fine and medium pinkish white irregularly shaped soft lime masses,; very strongly alkaline (pH 9.6); clear wavy boundary. |
| B31tca<br>RSL<br>71130 | 31 to 42 cm (12 to 16½ inches), light brown (7.5YR 6/4) and light reddish brown (5YR 6/4) sandy clay loam, reddish brown (5YR 5/4 and 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common fine tubular pores; violently effervescent; common coarse pinkish white irregularly shaped soft lime masses; very strongly alkaline (pH 9.4); clear wavy boundary. |
| B32tca<br>RSL<br>71131 | 42 to 51 cm (16½ to 20 inches), light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky, plastic; very few fine roots; common fine tubular pores; strongly effervescent; common coarse pinkish white irregularly shaped soft lime masses and common fine extremely hard pinkish white durinodes; strongly alkaline (pH 8.9); abrupt wavy boundary. |
| C1casim<br>RSL<br>71132 | 51 to 64 cm (20 to 25 inches), pinkish white (7.5YR 8/2) lime silica cemented duripan with a thin laminar layer on the surface in places, pink when moist; massive; extremely hard; pan is strongly cemented in places; violently effervescent; strongly ly alkaline (pH 9.0); abrupt wavy boundary. |
| C2ca<br>RSL<br>71133 | 64 to 82 cm (25 to 32 inches), light brown (7.5YR 6/4) light clay loam, brown (7.5 YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; no roots; few fine tubular pores; strongly to violently effervescent; many coarse pinkish white irregularly shaped soft lime masses and lime filaments and common lime concretions; strongly alkaline (pH 9.0); clear wavy boundary. |
| C3<br>RSL<br>71134 | 82 to 146 cm (32 to 57½ inches), light brown (7.5YR 6/4) clay loam, dark brown (7.5 YR 4/4) and pink (5YR 7/4) moist; massive; hard, friable, slightly sticky, plastic; very few medium roots; few fine tubular pores; slightly effervescent; few fine pinkish white soft lime masses; strongly alkaline (pH 9.0). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Paleargid, fine, mixed, thermic
SOIL White House gravelly loam (taxadjunct) SOIL Nos. S64Ariz-2-25 LOCATION Cochise County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64648 - 64654

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (<0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 1A2a: >2 Pct. | 2 – 19 Pct. of <76 mm | 19 – 76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | | | |
| 0–2 | A1 | 61.7 | 25.2 | 13.1 | 6.0 | 8.5 | 8.3 | 21.7 | 17.2 | 16.6 | 8.6 | 47.3 | 44.5 | | | 34 | 24 | 10 |
| 2–8 | B1t | 47.0 | 22.5 | 30.5 | 4.9 | 6.8 | 5.7 | 15.8 | 13.8 | 14.1 | 8.4 | 38.1 | 33.2 | | | 64 | 19 | 45 |
| 8–17 | B21t | 21.7 | 15.7 | 62.6 | 3.2 | 3.6 | 2.4 | 6.3 | 6.2 | 9.0 | 6.7 | 19.2 | 15.5 | | | 16 | 12 | 4 |
| 17–22 | B22t | 14.1 | 11.8 | 74.1 | 2.1 | 2.8 | 1.8 | 3.8 | 3.6 | 6.3 | 5.5 | 12.1 | 10.5 | | | 29 | 17 | 12 |
| 22–31 | B23tca | 18.4 | 15.2 | 66.4 | 4.3 | 3.7 | 2.4 | 4.3 | 3.7 | 6.4 | 8.8 | 12.5 | 14.7 | | | 51 | 25 | 26 |
| 31–38 | B3tca | 25.4 | 17.2 | 57.4 | 8.5 | 5.5 | 3.1 | 4.8 | 3.5 | 6.6 | 10.6 | 12.6 | 21.9 | | | 66 | 46 | 20 |
| 38–53+ | Cca | 46.9 | 30.3 | 22.8 | 10.8 | 14.3 | 7.4 | 9.5 | 4.9 | 8.5 | 21.8 | 17.9 | 42.0 | | | 77 | 40 | 37 |
| | | | | | / | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | 3A1a Carbonate in <0.002 mm. Pct. | Bulk density 4A1f 1/3 bar g/cc | Bulk density 4A1h Oven dry g/cc | Atterberg limits: Plastic limit | Liquid limit | Plastic index (Pct. of <0.4 mm) | Water content 4B1c 1/3 bar Pct | Water content 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | 3B2 Cm | pH 8C1a 1:1 $H_2O$ | pH 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–2 | 0.57 | 0.055 | 10 | 1.4 | | | 1.49 | 1.53 | | | | 15.2 | 5.7 | 0.010 | 0.008 | 0.78 | 5.9 | 6.2 |
| 2–8 | 0.95 | 0.092 | 10 | 1.8 | | | 1.34 | 1.40 | | | | 17.7 | 9.9 | 0.016 | 0.008 | 0.53 | 6.7 | 6.9 |
| 8–17 | 0.91 | 0.097 | 9 | 1.0 | | | 1.28 | 1.54 | 24 | 75 | 51 | 33.8 | 20.5 | 0.062 | 0.056 | 0.92 | 7.4 | 7.6 |
| 17–22 | 0.57 | 0.071 | 8 | 2.7 | | | 1.25 | 1.50 | | | | 37.4 | 24.7 | 0.063 | 0.052 | 0.84 | 7.6 | 8.2 |
| 22–31 | 0.46 | 0.047 | 10 | 2.3 | 6 | | | | 28 | 84 | 56 | | 21.3 | | | | 7.9 | 8.6 |
| 31–38 | 0.29 | | | 2.1 | 28 | | 1.35 | 1.47 | | | | 27.7 | 21.4 | 0.027 | 0.013 | 0.50 | 7.9 | 8.8 |
| 38–53+ | 0.11 | | | 0.7 | 46 | 4 | 1.32 | 1.34 | 15 | 39 | 24 | 25.2 | 9.4 | 0.006 | 0.002 | 0.37 | 8.4 | 9.1 |

| Depth (In.) | Extractable bases 5B1a: 6N2b Ca | 602c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 601a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0–2 | 4.7 | 1.8 | 0.5 | 0.5 | 7.5 | 2.9 | 8.3 | | | | 1.2 | 0.2 | | | | | | 0.52 |
| 2–8 | 10.6 | 3.3 | 0.7 | 0.8 | 15.4 | 2.4 | 15.0 | | | | 1.4 | 0.2 | | | | | | 0.64 |
| 8–17 | 18.2 | 6.2 | 1.0 | 1.8 | 27.2 | | 26.1 | | | | 2.0 | 0.3 | | | | | | 0.64 |
| 17–22 | 22.4 | 8.5 | 2.2 | 2.1 | 35.2 | | 31.3 | | | | 3.5 | 0.4 | | | | | | 0.87 |
| 22–31 | 28.0 | 9.2 | 3.5 | 2.1 | 42.8 | | 29.7 | | 4.2 | 2.0 | 7.2 | 0.4 | | - | 1.7 | 4.9 | | 1.45 |
| 31–38 | 28.5 | 8.0 | 3.8 | 1.6 | 41.9 | | 25.9 | | 2.6 | 2.0 | 9.1 | 0.3 | | - | 1.9 | 6.9 | | 1.54 |
| 38–53+ | 20.2 | 3.3 | 2.7 | 0.5 | 26.7 | | 11.0 | | 2.6 | 1.3 | 21.1 | 0.2 | | - | 2.1 | 7.8 | | 1.54 |

| Depth (In.) | 8A Water at Saturation Pct. | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na me / 100 g | SAR | Clay mineralogy (<0.002 mm.) X-ray 7A: Montmorillonite | Vermiculite | Illite | Kaolinite |
|---|---|---|---|---|---|---|---|---|
| 0–2 | 31.3 | 6 | 0.5 | | tr. | - | xx | xx |
| 2–8 | 44.2 | 4 | 0.6 | | | | | |
| 8–17 | 64.0 | 3 | 0.9 | | | | | |
| 17–22 | 71.2 | 6 | 2.0 | | x | - | xx | xx |
| 22–31 | 69.5 | 10 | 3.0 | 4 | x | - | xx | xx |
| 31–38 | 68.4 | 12 | 3.2 | 6 | | | | |
| 38–53+ | 40.9 | 16 | 1.8 | 15 | x | - | xxx | x |

1/ In percent of whole soil including >2 mm.

x – detected
xx – moderate
xxx – abundant
xxxx – dominant

## WHITE HOUSE GRAVELLY LOAM (taxadjunct) 1/
S64Ariz-2-25

Location: Cochise County, Arizona. 15 miles south and 22-1/2 miles east of Willcox, Arizona via State Highway 186. 1180 feet north and 130 feet west of the south 1/4 corner of Sec. 13, T. 16 S., R. 28 E. Date of Sampling: October 22, 1964.
Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, M. L. Richardson, James Jay, and R. K. Preece.
Classification: Ustollic Paleargid, fine, mixed, thermic.
Vegetation: Grassland. Fair cover of black, blue, and hairy gramas. Climate: Precipitation 14 -15 inches annual. Mean annual temperature 57° F. (Chiricahua National Monument) Soil temperature at time of sampling: 24 inches 70° F., 48 inches 72° F. Parent Material: Old alluvium from ignimbrite, andesite and quartzite. Topography: Nearly level old valley terrace remnant, or old fan, from the Chiricahua Mountains. Slope is slightly convex with a 2 percent gradient to west southwest. Elevation: 4950 feet. Drainage: Well drained. Moderate surface runoff. Slowly permeable. Soil Moisture: Slightly moist - about 25 percent of field capacity. Water table 150-300 feet. Remarks: Colors of the B horizons are somewhat redder than normal. Compare with samples S64Ariz-2-28 and 29. Field determinations of pH by Hellige-Truog indicator.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>64648 | 0-2 inches (0-5 cm), reddish brown (5YR 5/4) gravelly light loam, dark reddish brown (5YR 3/4) when moist; moderate medium platy breaking to moderate fine granular structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; many fine and very fine roots; few fine tubular and many fine interstitial pores; 20-30 percent gravel; pH 6.0; abrupt smooth boundary. |
| B1t<br>RSL No.<br>64649 | 2-8 inches (5-20 cm), red (2.5YR 4/6) very gravelly heavy clay loam, dark reddish brown (2.5YR 3/4) when moist; moderate medium angular and subangular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; fine and very fine roots; few fine tubular and many fine interstitial pores; few thin clay films on ped faces; 50-60 percent fine to coarse gravel; pH 6.5; clear smooth boundary. |
| B21t<br>RSL No.<br>64650 | 8-17 inches (20-43 cm), red (2.5YR 4/6) clay, dark red (2.5YR 3/6) when moist; moderate medium prismatic breaking to moderate medium and fine angular blocky structure; very hard when dry, friable when moist, sticky and very plastic when wet; many exped pores; thin continuous clay films on ped faces and in pores, that are dark red (10YR 3/6) dry and moist; 5-10 percent gravel and a few cobble; pH 7.0 to 7.5; gradual smooth boundary. |
| B22t<br>RSL No.<br>64651 | 17-22 inches (43-56 cm), red (10R 4/6) gravelly clay. with clay films dark red (10R 3/6) both dry and moist; moderate medium and coarse prismatic breaking to moderate fine and medium angular blocky structure; very hard when dry, friable when moist, sticky and very plastic when wet; roots, pores and clay films as in B21t; 20 percent gravel; pH 8.0; gradual smooth boundary. |
| B23tca<br>RSL No.<br>64652 | 22-31 inches (56-79 cm), dark red (2.5YR 3/6) dry, moist, and crushed; gravelly clay; moderate fine and medium subangular blocky structure; very hard when dry, friable when moist, sticky and plastic when wet; common fine and very fine roots; few fine tubular and exped interstitial pores; few thin clay skins on ped faces in pores, bridges; 30 percent gravel and few cobble; slight effervescence in matrix and strong effervescence in spots; pH 8.2; gradual smooth boundary. |
| B3tca<br>RSL No.<br>64653 | 31-38 inches (79-97 cm), red (2.5YR 4/6) with common medium faint lime mottles of pink (5YR 7/4) gravelly clay, dark red (2.5YR 3/6) and light reddish brown (5YR 6/4 when moist; massive, breaking to moderate fine and medium subangular blocky structure; very hard when dry, friable when moist, sticky and plastic when wet; few thin clay films on ped faces and in pores; 30-40 percent fine, medium and coarse gravel; slightly effervescent in matrix and strong in mottles and common thin lime coatings on gravel; pH 8.2; clear smooth boundary. |
| Cca<br>RSL No.<br>64654 | 38-53 inches (97-135 cm), pink (5YR 8/2) with many fine and medium distinct mottles and iron stains of red (2.5YR 5/6) very gravelly loam, reddish yellow (5YR 6/6) and red (2.5YR 4/6) when moist; massive; extremely hard with weak cementation of lime, iron and silica; very firm when moist; slightly sticky and nonplastic when wet; few moderately thick clay films on gravel and as bridges; 60-70 percent gravel; strong effervescence in matrix and violent effervescence in mottles and thin lime coatings on gravels; pH 8.2. |

1/ The White House series is in a fine, mixed, thermic family of Ustollic Haplargids. This pedon has an argillic horizon with an abrupt upper boundary.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Paleargid, fine, montmorillonitic, mesic

SOIL Showlow loam (taxadjunct) SOIL Nos. S56Ariz-9-28 LOCATION Navajo County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 56173 - 56180

| Depth (In.) | Horizon | 1B1b Total Sand (2–0 05) Pct. of <2 mm | Total Silt (0 05–0.002) Pct. of <2 mm | Total Clay (< 0.002) Pct. of <2 mm | Sand Very coarse (2–1) Pct. of <2 mm | Sand Coarse (1–0.5) Pct. of <2 mm | Sand Medium (0 5–0 25) Pct. of <2 mm | Sand Fine (0.25–0 1) Pct. of <2 mm | Sand Very fine (0.1–0.05) Pct. of <2 mm | Silt 0.05–0.02 Pct. of <2 mm | Silt Int. III (0 02–0.002) Pct. of <2 mm | Int II (0.2–0 02) Pct. of <2 mm | (2–0 1) Pct. of <2 mm | 3A1a Carbonate clay Pct. of <2 mm | 3A1a Non carbonate clay Pct. of <2 mm | 1/ Coarse fragments 2A2 >2 Pct. | 2 – 19 Pct. of <76 mm | 19 -76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–2 | A1 | 62.1 | 19.4 | 18.5 | 6.6 | 14.1 | 13.0 | 19.9 | 8.5 | 10.9 | 8.5 | 30.2 | 53.6 | | | 36 | | |
| 2–6 | B21t | 45.9 | 16.6 | 37.5 | 4.3 | 9.2 | 10.6 | 15.6 | 6.2 | 8.5 | 8.1 | 23.0 | 39.7 | | | 20 | | |
| 6–14 | B22t | 35.4 | 11.0 | 53.6 | 5.9 | 8.7 | 7.6 | 9.9 | 3.3 | 5.0 | 6.0 | 13.4 | 32.1 | | | 8 | | |
| 14–20 | B23t | 55.9 | 9.8 | 34.3 | 14.8 | 14.9 | 10.5 | 12.4 | 3.3 | 3.9 | 5.9 | 13.5 | 52.6 | | | 34 | | |
| 20–27 | B24t | 52.0 | 8.1 | 39.9 | 7.2 | 13.7 | 11.4 | 14.7 | 5.0 | 3.1 | 5.0 | 16.0 | 47.0 | | | 11 | | |
| 27–33 | B31 | 56.2 | 9.4 | 34.4 | 9.7 | 17.0 | 11.9 | 12.8 | 4.8 | 3.6 | 5.8 | 15.3 | 51.4 | | | 16 | | |
| 33–46 | B32ca | 61.3 | 7.5 | 31.2 | 7.1 | 14.9 | 15.2 | 18.2 | 5.9 | 2.0 | 5.5 | 17.2 | 55.4 | | | 10 | | |
| 46–55 | C1 | 71.5 | 5.7 | 22.8 | 13.2 | 19.5 | 16.6 | 17.4 | 4.8 | 2.2 | 3.5 | 15.4 | 66.7 | | | 19 | | |

| Depth (In.) | 6A1a Organic carbon Pct | 6B1a Nitrogen Pct | C/N | 6C1b Free $Fe_2O_3$ Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | Bulk density 4A1f 1/3 bar g/cc | Bulk density 4A1h Oven dry g/cc | Bulk density g/cc | 3B2 Cm | Water content Pct | Water content 4B1c 1/3 bar Pct | Water content 4B2 15 bar Pct | 4D1 Extensibility LEf Pct | 4D1 Extensibility LE Pct. | pH 8C1b Saturated Paste | pH 8C1a $H_2O$ 1:1 | pH 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–2 | 2.12 | 0.148 | 14 | 1.4 | | | | | | | | 9.1 | | | 6.3 | | 6.6 |
| 2–6 | 1.22 | 0.083 | 15 | 1.8 | | | | | | | | 16.5 | | | 6.4 | | 6.5 |
| 6–14 | 0.98 | 0.060 | 16 | 2.1 | | | | | | | | 25.0 | | | 6.0 | | 6.2 |
| 14–20 | 0.46 | 0.034 | 14 | 1.9 | | | | | | | | 16.2 | | | 6.1 | | 6.4 |
| 20–27 | 0.31 | 0.020 | 16 | 1.4 | | | | | | | | 18.0 | | | 6.7 | | 6.8 |
| 27–33 | 0 16 | | | 1 3 | tr. | | | | | | | 18.1 | | | 7.3 | | 7.6 |
| 33–46 | 0.06 | | | 1.3 | | | | | | | | 14.8 | | | 7.6 | | 8.1 |
| 46–55 | 0.05 | | | 1.1 | | | | | | | | 12.3 | | | 7.7 | | 8.3 |

| Depth (In.) | Extractable bases 6N2b Ca meq/100 g | Extractable bases 602c Mg meq/100 g | Extractable bases 6P2a Na meq/100 g | Extractable bases 5B1a 6Q2a K meq/100 g | Sum of bases meq/100 g | 6H2a Ext. Acidity meq/100 g | Cation Exch. Capacity 5A2a NaOAc meq/100 g | Cation Exch. Capacity 5A6a $NH_4OAc$ meq/100 g | 6N1a 601a Ca + Mg meq/liter | 6P1a Na meq/liter | 6Q1a K meq/liter | 6I1a $CO_3$ meq/liter | 6J1a $HCO_3$ meq/liter | 6K1a Cl meq/liter | 6L1b $SO_4$ meq/liter | 8A1a Electrical conductivity mmho/cm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–2 | 14.0 | 4.1 | | | | 4.1 | 21.1 | | 4.4 | 0.4 | 0.3 | | 3.4 | – | | 0.4 |
| 2–6 | 22.8 | 7.3 | | | | 4.2 | 38.4 | | 3.4 | 0.6 | 0.1 | | 13.9 | – | | 0.3 |
| 6–14 | 33.7 | 11.1 | | | | 5.4 | 60.0 | | 2.7 | 0.9 | 0.1 | | 2.2 | – | | 0.3 |
| 14–20 | 21.8 | 7.7 | | | | 3.2 | 36.7 | | 2.2 | 1.2 | 0.1 | | 1.8 | – | | 0.3 |
| 20–27 | 24.6 | 9.6 | | | | 2.0 | 39.6 | | 1.8 | 1.4 | tr. | | 1.1 | 0.3 | | 0.3 |
| 27–33 | 22.5 | 8.6 | | | | | 35.5 | | 3.5 | 1.9 | 0.1 | | 2.4 | 1.0 | | 0.5 |
| 33–46 | 21.1 | 7.1 | | | | | 28.0 | | 2.9 | 2.3 | 0.1 | | 2.0 | 1.4 | | 0.5 |
| 46–55 | 17.2 | 5.3 | | | | | 23.1 | | 3.3 | 2.6 | 0.1 | | 2.1 | 1.9 | | 0.6 |

| Depth (In.) | 8A Water at Saturation Pct | Exch. bases 5B3b Ca meq /100 g | Exch. bases 5B1b 6Q2a K meq /100 g | Exch. bases 5B1b 6P2a Na meq /100 g | 5D2 Exchangeable Na Pct. | SAR | 5C3 Base Sat. Pct. | Clay mineralogy (<0.002 mm) 3A1 Mont. X-ray | Verm. X-ray | Mica 7A2 X-ray | Kaolin. X-ray |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–2 | 35.2 | | 0.5 | 0.1 | | | 82 | x | | | x |
| 2–6 | 54.5 | | 0.7 | 0.2 | | | 88 | xx | | | x |
| 6–14 | 73.2 | | 0.7 | 0.5 | | | 89 | xxx | | | x |
| 14–20 | 53.1 | | 0.5 | 0.3 | | | 90 | xxx | | | |
| 20–27 | 67.1 | | 0.5 | 0.6 | | | 95 | xxx | | | |
| 27–33 | 64.7 | | 0.5 | 0.6 | | | 100+ | xxx | | | |
| 33–46 | 55.9 | | 0.5 | 0.6 | | | 100+ | xxx | | | |
| 46–55 | 47.0 | | 0.3 | 0.5 | | | 100+ | xx | | | |

1/ Percent of the whole soil

SHOWLOW LOAM (taxadjunct) 1/
56Ariz-9-28-1 through 8

Location: Navajo County, Arizona near the E ¼ corner of Sec. 7, T 11 N, R 19 E or about 2.1 miles west of Cottonwood Wash on State Hwy. 160 about 300 feet north of highway. Date of Sampling: May 16, 1956. Collectors: J. D. Freeman, M. S. James, Gerald Kester, W. G. Harper, R. E. Nelson and George Wendt. Vegetation: Blue grama, pinon, ponderosa, juniper and oaks. Climate: Estimated about 18 inches precipitation. Nearest weather station (Pinedale): Mean annual temperature 48.9° F.; January average 29.4° F.; July average 69.4° F.; mean annual precipitation 18.84 inches. Parent Material: Tertiary or Quaternary alluvium high in quartzite pebbles but also containing sandstone, limestone and other rock material. Relief: On an undulating old valley plain. Slope 3 percent to the northeast. Elevation: 6,400 feet. Drainage: Well drained. Runoff is rapid; permeability very slow through the B horizon.
Remarks: Occasional rounded pebbles ranging up to 2 inches in diameter occur on the surface and form a slight gravel pavement in places. Many tongues of B24 and B3 material continue into the B32ca horizon.
Classification: Ustollic Paleargid, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>56173 | 0-2" -- Very dark grayish brown (10YR 3/2) dry, very dark brown (2/2) moist; loam; moderate very fine crumb or very fine granular; soft when dry, loose to very friable when moist, nonsticky and nonplastic when wet; many grass roots; moderately permeable; noncalcareous; pH 8; abrupt, smooth lower boundary. |
| B21t<br>RSL No.<br>56174 | 2-6" -- Dark reddish gray (5YR 4/2) dry, dark reddish brown (3/3) moist; clay; strong coarse to medium subangular blocky; very hard when dry, very firm when moist, very sticky and very plastic when wet; many tree roots; slowly permeable; noncalcareous; pH 6.5; clear, smooth lower boundary. |
| B22t<br>RSL No.<br>56175 | 6-14" -- Reddish brown (2.5YR 4/4) dry, (4/4) moist; clay; moderate medium to coarse prisms that break to strong coarse subangular blocky; many clay films and slickensides throughout; extremely hard when dry, extremely firm when moist, very plastic and very sticky when wet; tree roots common; very slowly permeable; noncalcareous; pH 6; clear, wavy lower boundary. |
| B23t<br>RSL No.<br>56176 | 14-20" -- Reddish brown (2.5YR 5/4) dry and moist; clay with many rounded pebbles; very weak medium to coarse prisms that break to weak medium to coarse subangular blocky; many clay films on the faces of aggregates are reddish brown (2.5YR 4/4) dry and moist; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; tree roots common; very slowly permeable; noncalcareous; pH 6.8; clear, wavy lower boundary. |
| B24t<br>RSL No.<br>56177 | 20-27" -- Reddish brown (2.5YR 4/4) dry, (4.5/4) moist; clay; very weak medium to coarse prisms that break to weak coarse to medium angular blocky; many clay films on the faces of peds; many slickensides; the faces of aggregates are reddish brown (2.5YR 4/4) moist; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; tree roots common; very slowly permeable; noncalcareous; pH 7.2; clear, wavy lower boundary. |
| B31<br>RSL No.<br>56178 | 27-33" -- Reddish brown (2.5YR 5/4) dry, (4.5/4) moist; heavy sandy clay loam; massive; very hard when dry, very firm when moist, sticky when wet; few tree roots; very slowly permeable; calcareous; pH 8; clear, wavy lower boundary. |
| B32ca<br>RSL No.<br>56179 | 33-46" -- Reddish brown (5YR 5/4) dry, (4/4) moist; sandy clay loam; massive and compact; very hard when dry, very firm when moist, slightly sticky and very plastic when wet; very few plant roots; slowly permeable; slightly calcareous where lime specks are apparent; gradual, wavy lower boundary. |
| C1<br>RSL No.<br>56180 | 46-55" -- Light reddish brown (5YR 6/4) dry, reddish brown (5/5) moist; sandy clay loam; massive and compact; hard when dry, slightly firm when moist, slightly sticky and plastic when wet; very few plant roots; slowly permeable; slightly calcareous in a few small spots where lime is apparent; pH 7.8. |

1/ The Showlow series is in a fine, montmorillonitic, mesic family of Ustollic Haplargids. This pedon has an argillic horizon that has an abrupt upper boundary.

CONSECUTIVE PEDON NUMBER C 71 8 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES GUNSIGHT SOIL NO. S71 ARIZ. 10- 1 SAMPLE NO. 1 48-1 53 ORGAN PIPE MON AREA

SOIL FAMILY: TYPIC CALCIORTHID,LOAMY-SKELETAL,MXD,HYPRTHRMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | SILTS-- CO. 2- .2U | CLAYS----- FINE LT .2U | CARBO NATE 3A1A | 1A2A INT. COARSE FRAGMENTS- II .2- .02 | PCT. OF WHOLE SOIL 75- 20 | I 20-5 | II 5-2 | III |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 1 | 48 | 0- | 5 | A1 | 64.0 | 30.9 | 5.1 | 18.8 | 7.4 | 3.4 | 10.1 | 24.3 | 22.3 | 8.6 | 3.6 | 1.5 | | 54.0 | 37A | 3 | 19 | 15 |
| 1 | 49 | 5- | 17 | B21 | 60.6 | 32.2 | 7.2 | 15.2 | 7.4 | 3.6 | 10.3 | 24.1 | 22.3 | 9.9 | 5.2 | 2.0 | | 54.0 | 37A | 5 | 19 | 14 |
| 1 | 50 | 17- | 31 | B22 | 61.0 | 29.9 | 9.1 | 18.8 | 7.6 | 3.4 | 9.5 | 21.7 | 19.3 | 10.6 | 6.1 | 3.0 | | 48.0 | 37A | 5 | 17 | 15 |
| 1 | 51 | 31- | 58 | C 1CA | 56.0 | 32.0 | 12.0 | 22.2 | 9.6 | 4.1 | 8.2 | 11.9 | 13.6 | 18.4 | | | 4 | 30.7 | 58A | 20 | 22 | 16 |
| 1 | 52 | 58- | 77 | C 2CA | 64.5 | 22.2 | 13.3 | 32.3 | 11.7 | 4.3 | 6.4 | 9.8 | 11.1 | 11.1 | | | 2 | 24.7 | 72* | 27 | 23 | 19 |
| 1 | 53 | 77- | 119 | C 3CA | 71.3 | 15.2 | 13.5 | 32.6 | 15.0 | 6.7 | 6.9 | 10.1 | 7.3 | 7.9 | | | 1 | 21.0 | 75* | 23 | 32 | 19 |

| SAMPLE NO. | | DEPTH CM. | | ORG. CAR- BON 6A1A | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L I M I T LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 1 | 48 | 0- | 5 | 0.16 | 0.024 | 2 | | 0.5 | | | 1.36 | | | 0.76 | | | 4.4 | | | 8.4 | | 7.7 |
| 1 | 49 | 5- | 17 | 0.17 | 0.024 | 5 | | 0.5 | | | | 1.36 | 1.37 | 0.77 | 24.5 | 16.3 | 5.3 | 0.2 | 0.2 | 8.5 | | 7.8 |
| 1 | 50 | 17- | 31 | 0.17 | | 6 | | 0.4 | | | | 1.26 | 1.28 | 0.78 | 25.5 | 15.4 | 5.8 | 0.5 | 0.4 | 8.5 | | 7.7 |
| 1 | 51 | 31- | 58 | | | 39 | | 0.3 | | | | 1.19 | 1.21 | 0.62 | 40.4 | 30.8 | 6.5 | 0.6 | 0.3 | 8.3 | 9.1 | 7.9 |
| 1 | 52 | 58- | 77 | | | 17 | | 0.3 | | | | 1.13 | 1.17 | 0.48 | 37.3 | 30.4 | 8.8 | 1.2 | 0.6 | 8.1 | 8.7 | 8.0 |
| 1 | 53 | 77- | 119 | | | 11 | | 0.3 | | | | 1.07 | 1.12 | 0.45 | 39.6 | 30.8 | 7.8 | 1.5 | 0.7 | 8.1 | 8.8 | 7.9 |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES--- CA 5B4A 6N2E | MG 5B4A 6G2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | --C E C-- NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1A | MG 6G1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | 8A1 SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 1 | 48 | 0- | 5 | 17.6 | 1.5 | 0.1 | 1.4 | 20.6 | 100+ | | 8.7 | | | | | | | | | | | |
| 1 | 49 | 5- | 17 | 18.6 | 1.2 | 0.1 | 0.6 | 20.5 | 100+ | | 8.5 | | | | | | | | | | | |
| 1 | 50 | 17- | 31 | 18.9 | 1.4 | 0.2 | 0.3 | 20.8 | 100+ | | 8.9 | | | | | | | | | | | |
| 1 | 51 | 31- | 58 | 16.7 | 1.3 | 2.0 | 0.2 | 20.2 | 100+ | | 5.1 | 4.99 | 12.2 | 2.6 | 32.3 | 0.2 | | 1.7 | 42.9 | | | 8.2 |
| 1 | 52 | 58- | 77 | 26.1 | 3.3 | 6.9 | 0.3 | 36.6 | 100+ | | 6.0 | 15.4 | 44.8 | 14.5 | 110.0 | 0.3 | | 2.7 | 131.0 | 43.0 | | 7.8 |
| 1 | 53 | 77- | 119 | 21.8 | 3.1 | 6.2 | 0.4 | 31.5 | 100+ | | 6.2 | 14.0 | 37.5 | 15.2 | 103.0 | 0.6 | | 1.1 | 108.0 | 47.4 | | 7.2 |

| SAMPLE NO. | | DEPTH CM. | | WATER EXCHANGBLE AT SAT. 8A | NA 5B4B | NA 5D2 | SAR 5E | -GYPSUM- AMT. 6F1B | REQ. 6P3A | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY DTA 7A2E I | 7A2E II | 7A2E III | 7A3 IV | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCT. | MEQ. | PCT. | | PCT. | MEQ. | | | | | | | | | |
| 1 | 48 | 0- | 5 | | 0.1 | 1 | | | | MT 4 | MI 3 | KK 1 | | | | | MT MONTMORT | 1 TRACE |
| 1 | 49 | 5- | 17 | | 0.1 | 1 | | | | MT 4 | MI 3 | KK 1 | | | | | MI MICA | 2 SMALL |
| 1 | 50 | 17- | 31 | | 0.2 | 2 | | | | | | | | | | | KK KAOLINIT | 3 MODERATE |
| 1 | 51 | 31- | 58 | 43.6 | 0.6 | 12 | 12 | | | MI 4 | MT 1 | KK 1 | | | | | | 4 ABUNDANT |
| 1 | 52 | 58- | 77 | 47.6 | 1.7 | 28 | 20 | 0.3 | | | | | | | | | | 5 DOMINANT |
| 1 | 53 | 77- | 119 | 47.9 | 1.3 | 20 | 20 | 0.3 | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.

## GUNSIGHT GRAVELLY SANDY LOAM
S71 Ariz-10-1-(1-7*)

Location: Pima County, Arizona. 3/16 mile west and 1/8 mile north of southeast corner, Section 31, T17S, R5W, Organ Pipe Cactus National Monument. Date of Sampling: April 5, 1971.
Description by: Y.H. Havens, E.Chamberlin. Collectors: K. Flach, E. Chamberlin, K. Vogt.
Classification: Typic Calciorthid, loamy-skeletal, mixed, hyperthermic.
Vegetation: Creosotebush, saguaro and cholla cacti, mesquite, paloverde, ironwood and triangle bursage. Use: Desert rangeland. Climate: Mean annual precipitation 9 inches. Mean annual air temperature 69° F. Parent Material: Mixed alluvium--dominantly quartzite, granite, schist and basic igneous rocks. Topography: Nearly level to gently sloping with slope of 1 percent. Elevation: 1450 feet. Drainage: Well drained with moderate permeability. Soil Moisture: Dry.
Remarks: 80 percent of surface covered with fine to coarse subangular gravel.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>7148 | 0 to 5 cm (0 to 2 inches), light brown (7.5YR 6/4) gravelly fine sandy loam, dark brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, very friable, nonsticky, slightly plastic; few very fine roots; few fine and medium tubular pores; 50 percent gravel; slightly effervescent; moderately alkaline (pH 8.1 thymol blue); abrupt wavy boundary. |
| B21<br>RSL<br>7149 | 5 to 18 cm (2 to 7 inches), light brown (7.5YR 6/4) very gravelly fine sandy loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and few medium roots; few fine tubular pores; 55 percent gravel; strongly effervescent; moderately alkaline (pH 8.1); clear wavy boundary. |
| B22<br>RSL<br>7150 | 18 to 30 cm (7 to 12 inches), light brown (7.5YR 6/4) gravelly light loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and common medium roots; few fine tubular pores; 45 percent gravel; violently effervescent; common fine pink (7.5YR 8/4) filaments of lime; moderately alkaline (pH 8.2); abrupt irregular boundary. |
| C1ca<br>RSL<br>7151 | 30 to 58 cm (12 to 23 inches), pinkish white (7.5YR 8/2) and pink (7.5YR 8/4) very gravelly light loam, brown (7.5YR 5/4) and light brown(7.5YR 6/4) moist; massive; hard and very hard, friable, slightly sticky, plastic; common very fine, fine and medium roots; few fine tubular and common fine interstitial pores; 60 percent gravel; 15 to 20 percent of horizon consists of krotovinas filled with soil materials from A and B horizons; krotovinas are 3 to 6 feet apart and up to 12 inches in diameter; violently effervescent; space between gravel is completely filled with limy soil material; moderately alkaline (pH 8.2); clear irregular boundary. |
| C2ca<br>RSL<br>7152 | 58 to 76 cm (23 to 30 inches),pinkish white (7.5YR 8/2) and pink (7.5YR 8/4) very gravelly sandy loam, brown (7.5YR 5/4) and light brown (7.5YR 6/4) moist; massive; hard, friable, slightly sticky, plastic; common very fine roots; few fine tubular and common fine interstitial pores; 60 to 70 percent gravel; 15 to 20 percent of horizon consists of krotovinas filled with soil materials from A and B horizons, krotovinas are 3 to 6 feet apart and up to 12 inches in diameter; violently effervescent; moderately alkaline (pH 8.3); clear wavy boundary. |
| C3ca<br>RSL<br>7153 | 76 to 119 cm (30 to 47 inches), light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 5/4) moist; massive; very hard, friable, slightly sticky, plastic; few very fine roots; many fine interstitial pores; 60 percent gravel; violently effervescent; many medium and coarse pinkish white (7.5YR 8/2) hard lime masses, pink (7.5YR 7/4) moist; moderately alkaline (pH 8.3); clear wavy boundary. |
| *C4-<br>RSL | 119 to 152 cm (47 to 60 inches), light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common fine interstitial pores; 70 percent gravel; violently effervescent; few medium and coarse pinkish white (7.5YR 8/2) lime masses, pink (7.5YR 7/4) moist; moderately alkaline (pH 8.3). |

*C4 horizon not sampled for characterization.

CONSECUTIVE PEDON NUMBER C 71 9 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES GUNSIGHT SOIL NO. S71 ARIZ. 10- 9 SAMPLE NO. 1 54-1 58 ORGAN PIPE MON AREA

SOIL FAMILY: TYPIC CALCIORTHID,LOAMY-SKELETAL,MXD,HYPRTHRMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS-- CO. .2U | CLAYS---- FINE .2U | CARBO NATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS- PCT. OF WHOLE SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 1 | 54 | 0- | 5 | A1 | 57.3 | 35.7 | 7.0 | 11.2 | 6.7 | 4.2 | 10.5 | 24.7 | 24.4 | 11.3 | | | | 55.9 | 51A | 10 | 31 | 10 |
| 1 | 55 | 5- | 25 | B2 | 55.9 | 36.7 | 7.4 | 14.4 | 7.7 | 4.1 | 9.2 | 20.5 | 23.0 | 13.7 | | | TR | 49.5 | 43A | 9 | 21 | 12 |
| 1 | 56 | 25- | 46 | C 1CA | 52.7 | 35.2 | 12.1 | 21.8 | 7.6 | 3.3 | 7.5 | 12.5 | 16.8 | 18.4 | | | 3 | 33.8 | 62* | 27 | 21 | 14 |
| 1 | 57 | 46- | 81 | C 2CA | 58.7 | 25.7 | 15.6 | 29.9 | 10.1 | 3.8 | 6.7 | 8.2 | 11.0 | 14.7 | | | 3 | 22.8 | 69* | 24 | 28 | 17 |
| 1 | 58 | 81- | 140 | C 3CA | 43.5 | 42.4 | 14.1 | 6.8 | 9.2 | 4.6 | 7.7 | 15.2 | 19.7 | 22.7 | | | 2 | 39.6 | 43* | 6 | 26 | 9 |

| SAMPLE NO. | | DEPTH CM. | | ORG. CAR-BON 6A1A | MATTER NITRO-GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | I M I T P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 1 | 54 | 0- | 5 | 0.15 | 0.022 | 3 | | 0.6 | | | 1.02 | | | 0.71 | | | 5.7 | | | 8.5 | | 7.7 |
| 1 | 55 | 5- | 25 | 0.16 | 0.022 | 12 | | 0.4 | | | | 1.02 | 1.03 | 0.78 | 41.5 | 27.4 | 5.3 | 0.3 | 0.3 | 8.5 | | 7.7 |
| 1 | 56 | 25- | 46 | 0.21 | | 33 | | 0.3 | | | | 1.06 | 1.08 | 0.60 | 47.5 | 41.0 | 7.4 | 0.6 | 0.4 | 8.4 | 9.4 | 7.9 |
| 1 | 57 | 46- | 81 | | | 21 | | | | | | 1.20 | 1.24 | 0.50 | 37.3 | 27.8 | 8.4 | 1.1 | 0.5 | 8.0 | 8.7 | 7.9 |
| 1 | 58 | 81- | 140 | | | 27 | | | | | | 1.12 | 1.19 | 0.76 | 41.4 | 29.0 | 11.6 | 2.0 | 1.5 | 8.0 | 8.7 | 7.9 |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MEQ/100G | | | | PCT. | | MMHO | MEQ/1000 ML | | | | | | | | | PPM | |
| 1 | 54 | 0- | 5 | 20.0 | 1.9 | 0.1 | 0.9 | 22.9 | 100+ | | 12.3 | | | | | | | | | | |
| 1 | 55 | 5- | 25 | 21.2 | 1.6 | 0.4 | 0.6 | 23.8 | 100+ | | 11.3 | | | | | | | | | | |
| 1 | 56 | 25- | 46 | 18.8 | 1.1 | 5.9 | 0.2 | 26.0 | 100+ | | 9.6 | 7.4 | 6.4 | 1.6 | 61.2 | 0.2 | | 2.4 | 62.2 | | | 8.0 |
| 1 | 57 | 46- | 81 | 21.5 | 2.0 | 8.9 | 0.4 | 32.8 | 100+ | | 10.4 | 13.3 | 35.8 | 7.8 | 100.0 | 0.2 | | 3.4 | 104.0 | 33.0 | | 7.7 |
| 1 | 58 | 81- | 140 | 29.5 | 3.6 | 10.4 | 0.5 | 44.0 | 100+ | | 12.4 | 15.2 | 40.5 | 11.7 | 113.0 | 0.2 | | 4.7 | 117.0 | 43.0 | | 7.6 |

| SAMPLE NO. | | DEPTH CM. | | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 54 | 0- | 5 | | 0.1 | 1 | | | | MI | 3 | MT | 2 | KK | 1 | | |
| 1 | 55 | 5- | 25 | | 0.4 | 4 | | | | MI | 4 | MT | 3 | KK | 1 | | |
| 1 | 56 | 25- | 46 | 46.7 | 3.0 | 32 | 31 | | | | | | | | | | |
| 1 | 57 | 46- | 81 | 53.5 | 3.5 | 34 | 21 | | 7.3 | MI | 5 | MT | 3 | KK | 1 | | |
| 1 | 58 | 81- | 140 | 61.3 | 3.5 | 28 | 22 | | | | | | | | | | |

MINERAL CODE: MI MICA, MT MONTMORT, KK KAOLINIT

RELATIVE AMOUNT: 1 TRACE, 2 SMALL, 3 MODERATE, 4 ABUNDANT, 5 DOMINANT, 6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.

## GUNSIGHT VERY GRAVELLY LOAM

S71 Ariz-10-9-(1-5*)

Location: Pima County, Arizona. ½ mile south and ¼ mile east of the northeast corner Section 2, T18S, R5W, Organ Pipe Cactus National Monument. Date of Sampling: April 8, 1971.
Description by: Y. H. Havens, E. Chamberlin. Collectors: K. Flach, K. Vogt, E. Chamberlin.
Classification: Typic Calciorthid, loamy-skeletal, mixed, hyperthermic.
Vegetation: Creosotebush, cholla cactus, ocotillo and sixweeks grama. Use: Desert rangeland. Climate: Mean annual precipitation 7 to 9 inches. Mean annual temperature 69° F. Parent Material: Mixed alluvium from basalt, andesitic and rhyolitic tuff and schist. Topography: Gently sloping, with 1 to 2 percent slope. Elevation: 1490 feet. Drainage: Well drained with moderate permeability. Soil Moisture: Dry.
Remarks: 50 to 60 percent of surface covered with gravel.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>7154 | 0 to 5 cm (0 to 2 inches), light brown (7.5YR 6/4) very gravelly loam, dark brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, very friable, nonsticky, slightly plastic; few very fine roots; many very fine and fine interstitial pores; 50 percent gravel by volume; strongly effervescent; moderately alkaline (pH 8.2 thymol blue); abrupt smooth boundary. |
| B2<br>RSL<br>7155 | 5 to 25 cm (2 to 10 inches), pink (7.5YR 7/4) very gravelly loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, nonsticky, slightly plastic; few fine and medium roots; violently effervescent; few fine pinkish white (7.5YR 8/2) lime filaments; moderately alkaline (pH 8.3); clear wavy boundary. |
| C1ca<br>RSL<br>7156 | 25 to 46 cm (10 to 18 inches), white (N/8) and pinkish gray (7.5YR 7/2) very gravelly loam, pinkish gray (7.5YR 7/2) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, slightly plastic; few fine and medium roots; common very fine interstitial pores; 70 percent gravel; violently effervescent; many large pinkish white (7.5YR 8/2) hard lime masses and all gravel is coated with lime; strongly alkaline (pH 8.5); gradual wavy boundary. |
| C2ca<br>RSL<br>7157 | 46 to 81 cm (18 to 32 inches), pinkish white (7.5YR 8/2), pinkish gray (7.5YR 7/2) and pink (7.5YR 7/4) very gravelly sandy loam, pinkish gray (7.5YR 7/2) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, plastic; few very fine roots; common very fine interstitial and few fine tubular pores; 75 percent gravel; violently effervescent; many large pinkish white (7.5YR 8/2) hard lime masses, and all gravel is coated with lime; moderately alkaline (pH 8.3); gradual wavy boundary. |
| C3ca<br>RSL<br>7158 | 81 to 140 cm (32 to 55 inches), pinkish white (7.5YR 8/2), pinkish gray (7.5YR 7/2) and pink (7.5YR 7/4) very gravelly loam, pinkish gray (7.5YR 7/2) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, plastic; common very fine interstitial and few fine tubular pores; 40 percent gravel; violently effervescent; many large hard pinkish white (7.5YR 8/2) lime masses and all gravel is coated with lime; moderately alkaline (pH 8.3). |

CONSECUTIVE PEDON NUMBER C 71 5 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HARQUA TAXADJUNCT SOIL NO. S71 ARIZ. 10- 5 SAMPLE NO. 1 26-1 32 ORGAN PIPE MON AREA

SOIL FAMILY: TYPIC CALCIORTHID,LOAMY-SKELETAL,MXD,HYPRTHRMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 1 | 26 | 0- | 3 | A2 | 29.1 | 56.0 | 14.9 | 2.4 | 1.8 | 1.2 | 5.1 | 18.6 | 23.9 | 32.1 | 14.0 | 0.9 | | 46.4 | 20A | 7 | 11 | 2 |
| 1 | 27 | 3- | 8 | B2tsa | 40.1 | 45.2 | 14.7 | 7.5 | 5.4 | 2.5 | 7.6 | 17.1 | 18.9 | 26.3 | 13.2 | 1.5 | | 41.6 | 31A | 6 | 17 | 7 |
| 1 | 28 | 8- | 23 | B31casa | 51.7 | 34.5 | 13.8 | 14.9 | 6.0 | 2.5 | 7.9 | 20.4 | 17.9 | 16.6 | 10.3 | 3.5 | TR | 44.2 | 45A | 17 | 18 | 10 |
| 1 | 29 | 23- | 36 | B32casa | | | | | | | | | | | | | | | 61A | 27 | 21 | 13 |
| 1 | 30 | 36- | 48 | C1casa | | | | | | | | | | | | | | | 74A | 37 | 23 | 14 |
| 1 | 31 | 48- | 68 | C2casa | | | | | | | | | | | | | | | 63A | 10 | 29 | 23 |
| 1 | 32 | 68- | 132 | C3casa | | | | | | | | | | | | | | | 62A | 9 | 30 | 23 |

| SAMPLE NO. | | DEPTH CM. | | ORG. MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-19 6E1B | EXT. IRON FE 6C2B | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | ORY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSIBILITY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | -PERCENT- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | -PERCENT- | | | | -PERCENT- | | | | |
| 1 | 26 | 0- | 3 | 0.05 | 0.013 | TR | | | | | | 1.44 | 1.52 | 0.88 | 19.1 | 16.2 | 7.2 | 1.8 | 1.6 | 8.4 | 9.0 | 7.6 |
| 1 | 27 | 3- | 8 | 0.07 | 0.016 | 4 | | | | | 1.44 | | | 0.81 | | | 10.2 | | | 8.1 | 9.2 | 8.1 |
| 1 | 28 | 8- | 23 | 0.12 | | 8 | | | | | | 1.23 | 1.27 | 0.72 | 34.3 | 21.2 | 7.0 | 1.1 | 0.8 | 7.9 | 8.5 | 7.9 |
| 1 | 29 | 23- | 36 | | | 19 | | | | | | | | 0.77 | | | 8.5 | 0.6 | 0.5 | 7.8 | | 7.8 |
| 1 | 30 | 36- | 48 | | | 29 | | | | | | 0.75 | 0.78 | 0.55 | 70.6 | 55.5 | 7.8 | 1.3 | 0.7 | 7.8 | | 7.8 |
| 1 | 31 | 48- | 68 | | | 30 | | | | | | 0.85 | 0.90 | 0.65 | 54.7 | 49.5 | 8.9 | 1.9 | 1.2 | 7.7 | | 7.8 |
| 1 | 32 | 68- | 132 | | | 25 | | | | | | 1.07 | 1.12 | 0.60 | 35.4 | 30.1 | 10.0 | 1.5 | 0.9 | 7.8 | | 7.8 |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 1 | 26 | 0- | 3 | 11.4 | 2.8 | 4.8 | 1.4 | 20.4 | 100+ | | | 17.4 | 4.36 | 3.4 | 1.0 | 37.9 | 0.4 | | 2.9 | 31.5 | | 0.8 | 7.6 |
| 1 | 27 | 3- | 8 | 21.4 | 3.6 | 13.4 | 1.2 | 39.6 | 100+ | | | 23.9 | 22.2 | 38.4 | 8.9 | 183.0 | 0.9 | | 2.9 | 191.0 | 9.0 | 0.3 | 7.6 |
| 1 | 28 | 8- | 23 | 19.5 | 4.5 | 12.3 | 0.6 | 36.9 | 100+ | | | 12.0 | 36.8 | 142.3 | 44.3 | 246.0 | 0.6 | | 3.3 | 353.0 | 27.5 | 5.4 | 7.5 |
| 1 | 29 | 23- | 36 | 27.1 | 5.2 | 11.9 | 0.4 | 44.6 | 100+ | | | 9.0 | | | | | | | | | | | |
| 1 | 30 | 36- | 48 | 30.1 | 5.5 | 11.2 | 0.3 | 47.1 | 100+ | | | 7.2 | | | | | | | | | | | |
| 1 | 31 | 48- | 68 | 25.4 | 5.2 | 12.8 | 0.3 | 43.7 | 100+ | | | 7.3 | | | | | | | | | | | |
| 1 | 32 | 68- | 132 | 22.7 | 5.5 | 14.3 | 0.3 | 42.8 | 100+ | | | 8.3 | | | | | | | | | | | |

| SAMPLE NO. | | DEPTH CM. | | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY --LESS THAN 0.002 MM--- X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | X RAY IV 7A2E | DTA 7A3 PCT. | MINERALOGY -L.T. .0002 MM- X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 26 | 0- | 3 | 27.5 | 3.8 | 22 | 26 | | 2.6 | | | | | | MI 3 | MT 2 | | | 1 TRACE |
| 1 | 27 | 3- | 8 | 39.8 | 6.1 | 26 | 38 | | 3.8 | | | | | | MI 3 | | | MI MICA | 2 SMALL |
| 1 | 28 | 8- | 23 | 41.7 | 2.1 | 17 | 25 | 0.1 | | | | | | | MI 5 | | | MT MONTMORT | 3 MODERATE |
| 1 | 29 | 23- | 36 | | 11.9 | 100+ | | | | | | | | | | | | | 4 ABUNDANT |
| 1 | 30 | 36- | 48 | | 11.2 | 100+ | | | | | | | | | | | | | 5 DOMINANT |
| 1 | 31 | 48- | 68 | | 12.8 | 100+ | | | | | | | | | | | | | 6 INDETER. |
| 1 | 32 | 68- | 132 | | 14.3 | 100+ | | | | | | | | | | | | | |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## HARQUA VERY GRAVELLY LOAM (taxadjunct) 1/

S71 Ariz-10-5-(1-7*)

Location: Pima County, Arizona. 3/16 mile west and 1/16 mile north of the southeast corner of Section 31, T17S, R5W, Organ Pipe Cactus National Monument. Date of Sampling: April 7,1971. Description by: Y. H. Havens, E. Chamberlin. Collectors: K. Flach, E.Chamberlin, K. Vogt. Classification: Typic Calciorthid, loamy-skeletal, mixed, hyperthermic.
Vegetation: Creosotebush and turks-head. Use: Desert rangeland. Climate: Mean annual precipitation 8 to 10 inches. Mean annual air temperature 69° F. Parent Material: Mixed alluvium from schist, granite, quartzite and basic igneous rocks. Topography: Nearly level with less than 1 percent slope. Elevation: 1450 feet. Drainage: Well drained with moderately slow permeability. Soil Moisture: Dry.
Remarks: 80 percent of surface covered with fine, medium and coarse subrounded gravel.

| HORIZON | DESCRIPTION |
|---|---|
| A2<br>RSL<br>7126 | 0 to 3 cm (0 to 1 inch), pink (7.5YR 7/4) very gravelly loam, brown (7.5YR 5/4) moist; weak medium platy structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine vesicular pores; 60 percent gravel by volume; slightly effervescent; moderately alkaline (pH 8.2 thymol blue); abrupt smooth boundary. |
| B2tsa<br>RSL<br>7127 | 3 to 8 cm (1 to 3 inches), yellowish red (5YR 5/6) gravelly light clay loam, yellowish red (5YR 4/6) moist; weak medium prismatic parting to moderate fine and medium subangular and angular blocky structure; hard, friable, sticky, plastic; common fine tubular pores; few thin clay films on faces of peds and in pores; 20 percent gravel; slightly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| B31casa<br>RSL<br>7128 | 8 to 23 cm (3 to 9 inches), light brown (7.5YR 6/4) gravelly loam, strong brown (7.5YR 5/6) moist; massive; soft, friable, slightly sticky, slightly plastic; few very fine roots; many very fine vesicular pores; 30 percent gravel; strongly effervescent; most of gravel have pinkish white (7.5YR 8/2) lime coating, pinkish gray (7.5YR 7/2) moist; moderately alkaline (pH 8.2); clear wavy boundary. |
| B32casa<br>RSL<br>7129 | 23 to 36 cm (9 to 14 inches), pinkish white (7.5YR 8/2) and pink (7.5YR 7/4) very gravelly loam, pinkish gray (7.5YR 7/2) and light brown (7.5YR 6/4) moist; massive; slightly hard, friable, slightly sticky, plastic; common fine interstitial pores; 55 percent gravel; violently effervescent; all gravel have pinkish white (7.5YR 8/2) lime coating, pinkish gray (7.5YR 7/2) moist; many pinkish white (7.5YR 8/2) slightly hard lime masses; moderately alkaline (pH 8.2); clear wavy boundary. |
| C1casa<br>RSL<br>7130 | 36 to 48 cm (14 to 19 inches), pinkish white (7.5YR 8/2) and pink (7.5YR 8/4) very gravelly loam, pinkish gray (7.5YR 7/2) and pink (7.5YR 7/4) moist; massive; very hard, friable, slightly sticky, plastic; common fine interstitial pores; 70 percent gravel weakly cemented; violently effervescent; many pinkish white (7.5YR 8/2) and pink (8/4) hard lime masses; moderately alkaline (pH 8.2); clear wavy boundary. |
| C2casa<br>RSL<br>7131 | 48 to 68 cm (19 to 27 inches), pinkish white (7.5YR 8/2) and pink (8/4) very gravelly sandy loam, pinkish gray (7.5YR 7/2) and pink (7/4), moist; massive; hard, friable, slightly sticky, slightly plastic; common fine interstitial and few fine tubular pores; 65 percent gravel; violently effervescent; many pinkish white (7.5YR 8/2) and pink (8/4) hard lime masses; all gravel is lime coated; moderately alkaline (pH 8.2); clear wavy boundary. |
| C3casa<br>RSL<br>7132 | 68 to 132 cm (27 to 52 inches), pinkish white (7.5YR 8/2) and pink (7.5YR 8/4 and 7/4) very gravelly sandy loam or very gravelly loam, pinkish gray (7.5YR 7/2) and light brown (7.5YR 6/4) moist; massive; hard, friable, slightly sticky, plastic; many fine and few very fine interstitial pores; 70 percent gravel; violently effervescent; many pinkish white (7.5YR 8/2) and pink (8/4) hard lime masses--all gravel is lime coated; moderately alkaline (pH 8.2). |

1/ The Harqua series is in a fine-loamy, mixed, hyperthermic family of Typic Haplargids. This pedon has a calcic horizon and lacks an argillic horizon.

CONSECUTIVE PEDON NUMBER C 67 58 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES PERRYVILLE SOIL NO. S67 ARIZ. 7- 9 SAMPLE NO. 7 681-7 687 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC CALCIORTHID,CRSE-LMY,CARBONATIC,HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. COARSE II | FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 PCT. OF | II 20-5 LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 7 681 | 0- 23 | AP | 42.6 | 39.9 | 17.5 | 5.4 | 7.3 | 4.4 | 9.7 | 15.8 | 19.4 | 20.5 | | | 3 | 40.7 | 20 | TR | 20Z | N |
| 7 682 | 23- 41 | C 1CA | 36.3 | 43.9 | 19.8 | 7.2 | 5.8 | 3.4 | 7.2 | 12.7 | 17.4 | 26.5 | | | 6 | 34.5 | 35 | TR | 35Z | N |
| 7 683 | 41- 69 | C 2CA | 36.9 | 45.0 | 18.1 | 7.6 | 6.6 | 4.0 | 7.5 | 11.2 | 15.0 | 30.0 | | | 6 | 30.7 | 43 | TR | 43Z | N |
| 7 684 | 69- 97 | C 3CA | 39.3 | 45.1 | 15.6 | 5.8 | 8.3 | 4.8 | 8.5 | 11.9 | 16.3 | 28.8 | | | 4 | 33.3 | 24 | TR | 24Z | N |
| 7 685 | 97-142 | C 4CA | | | | | | | | | | | | | | | 5 | TR | 5Z | N |
| 7 686 | 142-165 | C 5CA | | | | | | | | | | | | | | | 4 | TR | 4Z | N |
| 7 687 | 165-1832 | C 6CA | | | | | | | | | | | | | | | 55* | 21 | 27Z | N |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 | 19-2 | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSIBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | -PERCENT- | | | -PERCENT- | | | | |
| 7 681 | 0- 23 | 0.21 | 0.029 | 19 | | 0.4 | | | 1.28 | 1.32 | 0.89 | | 26.8 | 7.9 | 1.0 | 0.9 | | 9.0 | |
| 7 682 | 23- 41 | 0.10 | | 33 | | | | | 1.08 | 1.14 | 0.82 | | 36.3 | 8.8 | 1.8 | 1.5 | | 9.2 | |
| 7 683 | 41- 69 | 0.08 | | 36 | | 0.3 | | | 0.87 | 0.93 | 0.80 | | 51.7 | 8.8 | 2.2 | 1.8 | | 9.2 | |
| 7 684 | 69- 97 | 0.06 | | 34 | | | | | 0.85 | 0.89 | 0.91 | | 60.6 | 9.1 | 1.5 | 1.4 | | 9.1 | |
| 7 685 | 97-142 | 0.03 | | 36 | | | | | 1.56 | 1.61 | 0.97 | | 20.0 | 8.8 | 1.1 | 1.0 | | | |
| 7 686 | 142-165 | | | 24 | | | | | 1.54 | 1.58 | 0.98 | | 20.4 | 8.1 | 0.9 | 0.8 | | | |
| 7 687 | 165-183 | | | 10 | | | | | 1.47 | 1.49 | 0.60 | | 17.4 | 5.9 | 0.5 | 0.3 | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6D4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA-OAC 5A2A | NH4-OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA | MG | NA | K | CO3 | HCO3 | CL | SO4 | B | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 7 681 | 0- 23 | | | 0.4 | 0.5 | 0.9 | | | 9.0 | 1.14 | 5.2 | 2.0 | 3.3 | 0.3 | | 1.9 | 1.4 | | | 7.9 |
| 7 682 | 23- 41 | | | 0.9 | 0.5 | 1.4 | | | 6.8 | | | | | | | | | | | 8.1 |
| 7 683 | 41- 69 | | | 0.7 | 0.3 | 1.0 | | | 7.3 | | | | | | | | | | | 7.9 |
| 7 684 | 69- 97 | | | 0.8 | 0.3 | 1.1 | | | 7.8 | | | | | | | | | | | 7.8 |
| 7 685 | 97-142 | | | | | | | | | | | | | | | | | | | |
| 7 686 | 142-165 | | | | | | | | | | | | | | | | | | | |
| 7 687 | 165-183 | | | | | | | | | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT SAT. 8A | NA 5B4B | NA 5D2 | SAR 5E | GYPSUM AMT. 6F1B | REQ. 6P3A | CLAY MINERALOGY LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 | L.T. .0002 MM X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PCT. | MEQ. | PCT. | | PCT. | MEQ. | | | | | PCT. | | | |
| 7 681 | 0- 23 | 46.9 | 0.2 | 3 | 2 | | | MI 4 | MT 3 | KK 2 | | | | | |
| 7 682 | 23- 41 | | 0.9 | 13 | | | | | | | | | | | |
| 7 683 | 41- 69 | | 0.7 | 10 | | | | MI 4 | MT 3 | KK 2 | | | | | |
| 7 684 | 69- 97 | | 0.8 | 10 | | | | | | | | | | | |
| 7 685 | 97-142 | | | | | | | | | | | | | | |
| 7 686 | 142-165 | | | | | | | | | | | | | | |
| 7 687 | 165-183 | | | | | | | | | | | | | | |

MINERAL CODE: MI MICA, MT MONTMORT, KK KAOLINIT

RELATIVE AMOUNT: 1 TRACE, 2 SMALL, 3 MODERATE, 4 ABUNDANT, 5 DOMINANT, 6 INDETER.

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
*=THE 75-250MM FRACTION IS INCLUDED.

## PERRYVILLE LOAM
S-67-Ariz-7-9

Location: Maricopa County, Arizona. 615 feet north and 579 feet east of the SW corner of SE¼ of Section 9, T3N, R1E. Approximately 1½ miles NE of Sun City. Date of Sampling: October 13, 1967.
Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton.
Classification: Typic Calciorthid, coarse-loamy, carbonatic, hyperthermic.
Vegetation: None. Use: Cropland--idle. Climate: Mean annual precipitation 8.0 inches (Litchfield Park). Mean annual air temperature 70° F.; January 50° F., July 91° F. Parent Material: Alluvium from andesitic tuff, basalt, schist and granite. Topography: Nearly level old alluvial fan sloping less than 1 percent to the southeast. Elevation: 1220 feet. Drainage: Well drained. Moderate permeability. Medium runoff. Soil Moisture: Dry at time of sampling.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>67681 | 0 to 23 cm (0 to 9 inches), very pale brown (10YR 7/3) gravelly loam, brown (10YR 5/3) when moist; weak fine granular structure; slightly hard, friable, sticky and plastic; few fine roots; many (50 percent) medium and fine white extremely hard rounded lime concretions, 15-20 percent gravel (concretions); violently effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C1ca<br>RSL<br>67682 | 23 to 41 cm (9 to 16 inches), very pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) when moist; massive; hard, very friable, sticky and plastic; no roots; few fine tubular and many fine interstitial pores; many (60 percent) medium white rounded lime concretions, 35-40 percent gravel (concretions); violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C2ca<br>RSL<br>67683 | 41 to 69 cm (16 to 27 inches), very pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) when moist; massive; very hard, friable, sticky and plastic; no roots; common fine interstitial pores; many fine and medium (70 percent) white extremely hard rounded lime concretions, 35-40 percent gravel (concretions); violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C3ca<br>RSL<br>67684 | 69 to 97 cm (27 to 38 inches), very pale brown (10YR 7/3) gravelly loam, brown (10YR 5/3) when moist; slightly hard, friable, sticky and plastic; common fine tubular and many fine interstitial pores; many (80 percent) white fine and medium extremely hard rounded lime concretions, about 20-25 percent gravel (concretions); violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C4ca<br>RSL<br>67685 | 97 to 142 cm (38 to 56 inches), very pale brown (10YR 7/3) sandy loam, pale brown (10YR 6/3) when moist; massive; very hard, firm, slightly sticky, slightly plastic; many fine tubular pores; many (80 percent) white fine and medium soft lime masses and few extremely hard rounded lime concretions, violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C5ca<br>RSL<br>67686 | 142 to 165 cm (56 to 65 inches), very pale brown (10YR 7/3) sandy loam, dark yellowish brown (10YR 4/4) when moist; massive; very hard, firm, slightly sticky and slightly plastic; common fine tubular and interstitial pores; almost continuous white rounded soft lime masses and a few concretions that form a weakly cemented pan in places, 3-5 percent gravel (concretions), 10 percent cobbles discarded; violently effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| IIC6ca<br>RSL<br>67687 | 165 to 183 cm (65 to 72 inches), very pale brown (10YR 7/3) very gravelly loamy sand, brown (10YR 5/3) when moist; single grain; loose when dry and moist; nonsticky and nonplastic; many fine interstitial pores; about 50 percent quartzite, andesite gravel; strongly effervescent; moderately alkaline (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 67 59 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES PERRYVILLE SOIL NO. S67 ARIZ. 7-10 SAMPLE NO. 7 688-7 695 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC CALCIORTHID,CRSE-LMY,CARBONATIC,HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2- .02 | COARSE FRAGMENTS- PCT. OF WHOLE SOIL | I 75- 20 PCT. OF | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 7 688 | 0- 23 | AP1 | 48.8 | 36.3 | 14.9 | 4.6 | 7.6 | 5.6 | 12.3 | 18.7 | 20.3 | 16.0 | | | 2 | 46.4 | 19 | 2 | 17Z | N |
| 7 689 | 23- 38 | AP2 | 48.8 | 36.0 | 15.2 | 5.8 | 8.7 | 5.7 | 11.7 | 16.9 | 20.3 | 15.7 | | | 3 | 44.3 | 23 | TR | 23Z | N |
| 7 690 | 38- 58 | C 1CA | 37.0 | 44.7 | 18.3 | 6.6 | 6.6 | 3.9 | 8.3 | 11.6 | 17.2 | 27.5 | | | 8 | 33.7 | 36* | TR | -- | -- |
| 7 691 | 58- 81 | C 2CA | 36.8 | 43.2 | 20.0 | 8.9 | 6.7 | 4.0 | 7.1 | 10.1 | 15.2 | 28.0 | | | 8 | 29.4 | 46 | 16 | 30Z | N |
| 7 692 | 81-109 | C 3CA | 41.5 | 37.1 | 21.4 | 12.5 | 8.3 | 4.7 | 7.5 | 8.5 | 11.7 | 25.4 | | | 8 | 24.4 | 55 | 17 | 38Z | N |
| 7 693 | 109-1352 | C 4CA | | | | | | | | | | | | | | | 71 | 23 | 48Z | N |
| 7 694 | 135-1502 | C 5CA | | | | | | | | | | | | | | | 32 | TR | 32Z | N |
| 7 695 | 150-1653 | C 6CA | | | | | | | | | | | | | | | 88* | 50 | 36Z | N |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | P L 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | | |
| 7 688 | 0- 23 | 0.23 | 0.036 | 13 | | 0.4 | | | | 1.27 | 1.32 | 0.90 | | 33.1 | 7.0 | 1.3 | 1.2 | | 8.6 | |
| 7 689 | 23- 38 | | 0.032 | 14 | | | | | 1.27 | | | 0.87 | | | 7.6 | | | | 8.9 | |
| 7 690 | 38- 58 | | | 39 | | 0.3 | | | | 1.43 | 1.47 | 0.77 | | 22.0 | 7.9 | 0.9 | 0.7 | | 8.9 | |
| 7 691 | 58- 81 | | | 38 | | | | | 1.47 | | | 0.68 | | | 8.7 | | | | 9.0 | |
| 7 692 | 81-109 | | | 35 | | | | | | 1.52 | 1.54 | 0.59 | | 20.8 | 9.7 | 0.4 | 0.3 | | 8.9 | |
| 7 693 | 109-135 | | | 22 | | | | | 1.55 | | | 0.41 | | | 10.4 | | | | | |
| 7 694 | 135-150 | | | 39 | | | | | 1.58 | | | 0.78 | | | 9.3 | | | | | |
| 7 695 | 150-165 | | | 26 | | | | | | 1.60 | 1.60 | 0.18 | | 20.2 | 9.2 | | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 7 688 | 0- 23 | | | 0.2 | 0.4 | 0.6 | | | 9.4 | 2.46 | 14.7 | 5.3 | 2.3 | 0.2 | | 1.9 | 2.4 | | | 7.7 |
| 7 689 | 23- 38 | | | 0.6 | 0.8 | 1.4 | | | 9.3 | 0.98 | 5.3 | 2.2 | 2.3 | 0.2 | | 2.2 | 1.6 | | | 7.9 |
| 7 690 | 38- 58 | | | 0.7 | 0.3 | 1.0 | | | 6.6 | | | | | | | | | | | 7.9 |
| 7 691 | 58- 81 | | | 0.7 | 0.3 | 1.0 | | | 6.6 | | | | | | | | | | | 7.9 |
| 7 692 | 81-109 | | | 0.7 | 0.3 | 1.0 | | | 6.7 | | | | | | | | | | | 7.9 |
| 7 693 | 109-135 | | | | | | | | | | | | | | | | | | | |
| 7 694 | 135-150 | | | | | | | | | | | | | | | | | | | |
| 7 695 | 150-165 | | | | | | | | | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 688 | 0- 23 | 40.8 | 0.1 | 1 | 1 | | | MI 4 | MT 3 | KK 2 | | | | | | |
| 7 689 | 23- 38 | 46.9 | 0.5 | 5 | 1 | | | | | | | | | | | |
| 7 690 | 38- 58 | | 0.7 | 11 | | | | MI 5 | MT 3 | KK 2 | | | | | | |
| 7 691 | 58- 81 | | 0.7 | 11 | | | | | | | | | | | | |
| 7 692 | 81-109 | | 0.7 | 10 | | | | | | | | | | | | |
| 7 693 | 109-135 | | | | | | | | | | | | | | | |
| 7 694 | 135-150 | | | | | | | | | | | | | | | |
| 7 695 | 150-165 | | | | | | | | | | | | | | | |

MINERAL CODE
MI MICA
MT MONTMORT
KK KAOLINIT

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
*=THE 75-250MM FRACTION IS INCLUDED.

## PERRYVILLE LOAM 1/
S-67-Ariz-7-10

Location: Maricopa County, Arizona. 336 feet north and 348 feet east of SW corner of SE¼ Section 33, T4N, R1E. Approximately 4 miles NE of Sun City, Arizona. Date of Sampling: October 13, 1967.
Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton.
Classification: Typic Calciorthid, coarse-loamy, carbonatic, hyperthermic.
Vegetation: None--last crop was cotton. Use: Irrigated cropland. Climate: Mean annual precipitation 8 inches (Litchfield Park). Mean annual temperature 70° F; January 50° F., July 91° F. Parent Material: Alluvium from andesitic tuffs, granite, schist, and basalt. Topography: Nearly level old alluvial fan sloping less than 1 percent to the southwest. Elevation: 1200 feet. Drainage: Well drained. Moderate permeability. Medium runoff. Soil Moisture: Dry when sampled.

| HORIZON | DESCRIPTION |
|---|---|
| Ap1<br>RSL<br>67688 | 0 to 23 cm (0 to 9 inches), light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 5/4) when moist; weak fine granular structure; slightly hard, very friable, slightly sticky and plastic; common fine roots; few fine interstitial pores; many extremely hard fine and medium pinkish white rounded lime concretions, 15 to 20 percent gravel (concretions); violently effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| Ap2<br>RSL<br>67689 | 23 to 38 cm (9 to 15 inches), pinkish white (7.5YR 8/2) gravelly loam, brown (7.5YR 5/4 when moist; massive; slightly hard, very friable, slightly sticky and plastic; common fine roots; few fine interstitial pores; many (40 percent) fine and medium pinkish white extremely hard fine and medium rounded lime concretions, about 20-25 percent gravel (concretions); violently effervescent; moderately alkaline (pH 8.0); abrupt wavy boundary. |
| C1ca<br>RSL<br>67690 | 38 to 58 cm (15 to 23 inches), pinkish white (7.5YR 7/2) very gravelly loam, brown (7.5YR 5/4) when moist; massive; hard, very friable, sticky and plastic; few fine roots; few fine tubular and interstitial pores; many (70-80 percent) fine and medium pinkish white extremely hard rounded lime concretions and soft lime masses, about 35-40 percent gravel (concretions); violently effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C2ca<br>RSL<br>67691 | 58 to 81 cm (23 to 32 inches), very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular and many fine interstitial pores; many (70-80 percent)fine and medium pinkish white extremely hard rounded lime concretions and soft lime masses, about 50 percent gravel (concretions); violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C3ca<br>RSL<br>67692 | 81 to 109 cm (32 to 43 inches), pink (7.5YR 7/4) very gravelly loam, light brown (7.5YR 6/4) and pink (7.5YR 7/4) when moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine roots; few fine tubular and many fine interstitial pores; many fine and common medium pinkish white extremely hard rounded lime concretions, about 50-60 percent gravel of rounded quartzite, quartz, andesite, and few concretions; violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| IIC4ca<br>RSL<br>67693 | 109 to 135 cm (43 to 53 inches), pinkish white (7.5YR 7/2) very gravelly sandy loam, light brown (7.5YR 6/4) when moist; massive; hard, firm, slightly sticky and slightly plastic; no roots; common fine tubular and many fine interstitial pores; many medium and common fine pinkish white extremely hard rounded lime concretions and soft masses, about 60-75 percent gravel as above; violently effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| IIC5ca<br>RSL<br>67694 | 135 to 150 cm (53 to 59 inches), light gray (10YR 7/2) gravelly sandy loam, light brown (7.5YR 6/4) when moist; massive; very hard, firm, slightly sticky and slightly plastic; no roots; many fine interstitial pores; few fine and medium pinkish white (7.5YR 8/2) extremely hard rounded lime concretions and soft masses, about 25-35 percent gravel as above; violently effervescent; moderately alkaline (pH 8.0); abrupt broken boundary. |
| IIIC6ca<br>RSL<br>67695 | 150 to 165 cm (59 to 65 inches),very pale brown (10YR 7/3) very gravelly sandy loam, light brown (7.5YR 6/4) when moist; massive; extremely hard, firm, nonsticky and slightly plastic; many fine interstitial pores; few fine pinkish white (7.5YR 8/2) extremely hard rounded lime concretions and soft masses, about 80-90 percent gravel as above; violently effervescent; moderately alkaline (pH 8.0). |

1/ Carbonate in the 2-20 mm gravel is assumed sufficient to bring the control section average to 40 percent.

CONSECUTIVE PEDON NUMBER C 67 53 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES LAVEEN SOIL NO. S67 ARIZ. 7- 3 SAMPLE NO. 7 639-7 644 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC CALCIORTHID,COARSE-LOAMY,MXD,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | SILTS-- CO. .2U | CLAYS---- FINE LT .2U | CARBO NATE 3A1A | 1A2A INT. II .2- .02 | -COARSE FRAGMENTS- PCT. OF WHOLE 20 I 75- | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 7 639 | 0- 20 | AP | 54.0 | 34.4 | 11.6 | 8.0 | 11.0 | 5.3 | 8.8 | 20.9 | 22.4 | 12.0 | | | | 48.5 | 9 | TR | 9Z | N |
| 7 640 | 20- 38 | C 1 | 50.1 | 35.6 | 14.3 | 10.5 | 9.6 | 4.3 | 7.1 | 18.6 | 22.4 | 13.2 | | | | 45.2 | 9 | TR | 9Z | N |
| 7 641 | 38- 61 | C 2CA | 50.0 | 33.6 | 16.4 | 9.5 | 8.4 | 3.7 | 6.8 | 21.6 | 20.6 | 13.0 | | | | 46.3 | 12 | 3 | 9Z | N |
| 7 642 | 61- 84 | C 3CA | 47.9 | 34.9 | 17.2 | 8.5 | 8.3 | 3.7 | 6.5 | 20.9 | 17.6 | 17.3 | | | 3 | 42.3 | 9 | TR | 9Z | N |
| 7 643 | 84-112 | C 4CA | 47.7 | 34.7 | 17.6 | 7.3 | 7.0 | 3.6 | 6.5 | 23.3 | 19.0 | 15.7 | | | 3 | 46.2 | 9 | TR | 9Z | N |
| 7 644 | 112-168 | C 5CA | 40.4 | 41.4 | 18.2 | 8.0 | 7.1 | 4.2 | 6.1 | 15.0 | 16.9 | 24.5 | | | 4 | 35.4 | 11 | TR | 11Z | N |

| SAMPLE NO. | DEPTH CM. | ORG. CAR- BON 6A1A | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6F1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | I M I T PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | PH H2O 1/10 8C1A | PH CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 7 639 | 0- 20 | 0.23 | 0.029 | 5 | | 0.4 | | | 1.46 | 1.48 | 0.95 | | 18.9 | 5.9 | 0.5 | 0.4 | | 9.5 | | |
| 7 640 | 20- 38 | 0.17 | 0.021 | 7 | | 0.4 | | | 1.37 | 1.40 | 0.95 | | 19.1 | 6.2 | 0.7 | 0.7 | | 9.2 | | |
| 7 641 | 38- 61 | 0.11 | | 10 | | 0.3 | | | 1.34 | 1.40 | 0.94 | | 18.5 | 8.6 | 1.5 | 1.4 | | 9.3 | | |
| 7 642 | 61- 84 | 0.08 | | 15 | | | | | 1.44 | 1.51 | 0.95 | | 14.3 | 6.3 | 1.6 | 1.5 | | 9.4 | | |
| 7 643 | 84-112 | | | 12 | | | | | 1.45 | 1.51 | 0.95 | | 14.2 | 6.5 | 1.4 | 1.3 | | 9.6 | | |
| 7 644 | 112-168 | | | 29 | | 0.2 | | | 1.49 | 1.55 | 0.94 | | 19.8 | 7.7 | 1.3 | 1.2 | | 9.6 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | PCT. | MMHO | MEQ/100G | | | MEQ/1000 ML | | | | | | | | PPM | |
| 7 639 | 0- 20 | TR | 1.3 | 0.6 | 1.9 | | | 10.4 | 1.04 | 2.0 | 0.5 | 7.6 | 0.1 | | 6.7 | 1.4 | | | | 8.2 |
| 7 640 | 20- 38 | | 1.2 | 0.3 | 1.5 | | | 10.4 | | | | | | | | | | | | 8.0 |
| 7 641 | 38- 61 | | 1.6 | 0.2 | 1.8 | | | 9.4 | | | | | | | | | | | | 8.1 |
| 7 642 | 61- 84 | | 1.9 | 0.2 | 2.1 | | | 8.5 | 1.99 | 3.0 | 0.7 | 13.2 | 0.1 | | 1.9 | 4.8 | | | | 7.9 |
| 7 643 | 84-112 | | 1.4 | 0.2 | 1.6 | | | 8.7 | | | | | | | | | | | | 8.1 |
| 7 644 | 112-168 | | 1.4 | 0.2 | 1.6 | | | 6.8 | | | | | | | | | | | | 8.4 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | -GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A3 | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 639 | 0- 20 | 32.2 | 1.1 | 10 | 7 | | | MT 3 | MI 3 | KK 2 | | | | |
| 7 640 | 20- 38 | | 1.2 | 12 | | | | MI 4 | MT 3 | KK 2 | | | | |
| 7 641 | 38- 61 | | 1.6 | 17 | | | | MI 4 | MT 3 | KK 3 | | | | |
| 7 642 | 61- 84 | 42.3 | 1.3 | 16 | 10 | | | | | | | | | |
| 7 643 | 84-112 | | 1.4 | 16 | | | | | | | | | | |
| 7 644 | 112-168 | | 1.4 | 21 | | | | | | | | | | |

MINERAL CODE: MT MONTMORT, MI MICA, KK KAOLINIT

RELATIVE AMOUNT: 1 TRACE, 2 SMALL, 3 MODERATE, 4 ABUNDANT, 5 DOMINANT, 6 INDETER.

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## LAVEEN LOAM
S-67-Ariz-7-3

Location: Maricopa County, Arizona. 286 feet east and 534 feet south of the NW corner of the SW¼ Section 4, T1S, R9W., 16 miles west-southwest of Tonopah. Date of Sampling: October 10, 1967.
Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton, A. DeWall.
Classification: Typic Calciorthid, coarse-loamy, mixed, hyperthermic.
Vegetation: Last crop was safflower. Use: Cultivated. Climate: Mean annual precipitation is approximately 7 inches. Mean annual air temperature about 70° F; January 50° F., July 90° F. Parent Material: Alluvium from andesitic tuff, granite, schists, etc. Topography: Nearly level alluvial fan sloping less than 0.5 percent to the NE. Elevation: 1,200 feet. Drainage: Well drained with moderate permeability. Medium runoff. Soil Moisture: Moist.
Remarks: This sample represents the Laveen in the Harquahala Valley but is not modal for the series. Sampled from backhoe pit.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>67639 | 0 to 20 cm (0 to 8 inches), light yellowish brown (10YR 6/4) loam, dark brown (10YR 4/3) when moist; massive; slightly hard, very friable, nonsticky, slightly plastic; many fine roots; few fine and medium interstitial pores; strongly effervescent; moderately alkaline (pH 8.4); abrupt smooth boundary. |
| C1<br>RSL<br>67640 | 20 to 38 cm (8 to 15 inches), light yellowish brown (10YR 6/4)loam, dark brown (10YR 4/3) when moist; massive; slightly hard, very friable, slightly sticky, plastic; common very fine roots; common fine tubular and few fine interstitial pores; common fine white lime veins, about 5 percent gravel; violently effervescent; moderately alkaline (pH 8.2); clear smooth boundary. |
| C2ca<br>RSL<br>67641 | 38 to 61 cm (15 to 24 inches), light yellowish brown (10YR 6/4)loam, brown (7.5YR 5/4) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many fine tubular pores; many fine pinkish white lime veins and common pinkish white soft lime masses, about 5 percent gravel; violently effervescent; moderately alkaline; clear smooth boundary. |
| C3ca<br>RSL<br>67642 | 61 to 84 cm (24 to 33 inches), light yellowish brown (10YR 6/4) loam, brown (7.5YR 5/4) when moist; massive; hard, friable, slightly sticky, plastic; common fine roots; many fine tubular pores; many pinkish white fine lime veins and common medium soft lime masses, about 7 percent gravel or hard lime nodules; violently effervescent; moderately alkaline (pH 8.2); clear smooth boundary. |
| C4ca<br>RSL<br>67643 | 84 to 112 cm (33 to 44 inches), light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) when moist; massive; hard, firm, slightly sticky, plastic; no roots; many fine tubular pores; common pinkish white fine lime veins and many fine pinkish white soft lime masses, about 7 percent gravel or concretion; violently effervescent; moderately alkaline (pH 8.2); clear smooth boundary. |
| C5ca<br>RSL<br>67644 | 112 to 168 cm (44 to 66 inches), pinkish white (7.5YR 7/2) loam, brown (7.5YR 5/4) when moist; massive; very hard, very firm, sticky and plastic; no roots; few fine tubular pores; many (90 percent) medium pinkish white soft lime masses, about 10 percent gravel and concretions; violently effervescent; moderately alkaline (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 67 54 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES LAVEEN SOIL NO. S67 ARIZ. 7- 8 SAMPLE NO. 7 645-7 650 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC CALCIORTHID,COARSE-LOAMY,MXD,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05 | SANDS .05- .002 | SILTS LT .002 | CLAYS | VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II .2-.02 | COARSE FRAGMENTS- PCT. OF WHOLE SOIL | I 75-20 PCT. OF LT 75 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | | |
| 7 645 | 0- 36 | AP | 56.2 | 31.4 | 12.4 | | 5.4 | 11.1 | 8.6 | 14.4 | 16.7 | 20.6 | 10.8 | | | 45.4 | 4 | TR | 4Z | N | |
| 7 646 | 36- 46 | C 1 | 56.3 | 30.0 | 13.7 | | 7.2 | 11.9 | 8.0 | 12.8 | 16.4 | 19.0 | 11.0 | | | 1 42.6 | 6 | TR | 6Z | N | |
| 7 647 | 46- 66 | C 2CA | 52.3 | 31.8 | 15.9 | | 7.0 | 11.8 | 7.6 | 11.3 | 14.6 | 18.1 | 13.7 | | | 39.0 | 11 | TR | 11Z | N | |
| 7 648 | 66- 97 | C 3CA | | | | | | | | | | | | | | | 27 | TR | 27Z | N | |
| 7 649 | 97-142 | C 4CA | | | | | | | | | | | | | | | 23 | TR | 23Z | N | |
| 7 650 | 142-163 | C 5CA | | | | | | | | | | | | | | | 21 | TR | 21Z | N | |

| SAMPLE NO. | DEPTH CM. | ORG. MATTER CARBON 6A1A -PERCENT-- | NITROGEN 6B1A -- | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG LIMIT LL 4F1 PCT. | PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F GRAMS PER CC | DRY 4A1F | CM 4A1H 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSIBLITY LEF 4D1 -PERCENT--- | LE 4D1 -PERCENT-- | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 645 | 0- 36 | 0.33 | 0.039 | 5 | | 0.5 | | | 1.59 | 1.61 | 0.98 | | 14.6 | 5.3 | 0.4 | 0.4 | | 8.9 | |
| 7 646 | 36- 46 | 0.22 | 0.036 | 6 | | 0.5 | | | 1.55 | 1.59 | 0.96 | | 15.2 | 6.6 | 0.9 | 0.8 | | 9.0 | |
| 7 647 | 46- 66 | 0.14 | | 14 | | 0.3 | | | 1.32 | 1.38 | 0.94 | | 24.6 | 6.9 | 1.5 | 1.4 | | 9.0 | |
| 7 648 | 66- 97 | 0.09 | | 21 | | | | | 1.30 | 1.37 | 0.85 | | 24.3 | 7.6 | 1.8 | 1.5 | | 9.0 | |
| 7 649 | 97-142 | 0.07 | | 28 | | | | | 1.31 | 1.41 | 0.87 | | 23.6 | 9.1 | 2.5 | 2.1 | | 9.2 | |
| 7 650 | 142-163 | | | 34 | | | | | 1.39 | 1.44 | 0.88 | | 22.9 | 9.3 | 1.2 | 1.0 | | 9.2 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 7 645 | 0- 36 | | | 0.2 | 0.7 | 0.9 | | 10.8 | | 1.66 | 9.1 | 4.3 | 2.1 | 0.5 | | 4.0 | 5.1 | | | 8.0 |
| 7 646 | 36- 46 | | | 0.4 | 0.6 | 1.0 | | 10.1 | | | | | | | | | | | | 7.8 |
| 7 647 | 46- 66 | | | 0.3 | 0.3 | 0.6 | | 8.5 | | | | | | | | | | | | 7.9 |
| 7 648 | 66- 97 | | | 0.5 | 0.2 | 0.7 | | 8.7 | | | | | | | | | | | | 8.0 |
| 7 649 | 97-142 | | | 0.4 | 0.1 | 0.5 | | 7.9 | | | | | | | | | | | | 8.1 |
| 7 650 | 142-163 | | | 0.3 | 0.1 | 0.4 | | 7.5 | | | | | | | | | | | | 8.3 |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A SAT. PCT. | EXCHANGEBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY --LESS THAN 0.002 MM--- X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 PCT. | CLAY MINERALOGY -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 645 | 0- 36 | 31.6 | 0.1 | 1 | 1 | | | | | | | | | | | | 1 TRACE |
| 7 646 | 36- 46 | | 0.4 | 4 | | | | | | | | | | | | MI MICA | 2 SMALL |
| 7 647 | 46- 66 | | 0.3 | 4 | | | | | | | | | | | | MT MONTMORT | 3 MODERATE |
| 7 648 | 66- 97 | | 0.5 | 6 | | | | | | | | | | | | | 4 ABUNDANT |
| 7 649 | 97-142 | | 0.4 | 5 | | | | | | | | | | | | | 5 DOMINANT |
| 7 650 | 142-163 | | 0.3 | 4 | | | | | | | | | MI 3 MT 2 | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## LAVEEN LOAM
S-67-Ariz-7-8

Location: Maricopa County, Arizona. 400 feet north and 194 feet west of the SE corner of the NW¼, Section 17, T3N, R1E. Approximately 3 miles NE of Sun City, Arizona. Date of Sampling: October 11, 1967.
Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton.
Classification: Typic Calciorthid, coarse-loamy, mixed, hyperthermic.
Vegetation: Cotton. Use: Cultivated land. Climate: Mean annual precipitation est. 8.00 inches (Litchfield Park). Mean annual air temperature 70° F.; January 50· F., July 90° F. Parent Material: Medium textured old alluvium from many sources. Topography: Nearly level alluvial fan sloping less than 1 percent to the southwest. Elevation: 1250 feet. Drainage: Well drained with moderate permeability. Medium runoff. Soil Moisture: Moist.
Remarks: Sampled from backhoe pit.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>67645 | 0 to 36 cm (0 to 14 inches), pale brown (10YR 6/3) loam, dark brown (10YR 4/5) when moist; weak medium and fine subangular blocky and granular structure; hard, friable, slightly sticky, plastic; many fine roots; many fine interstitial pores; few fine pebbles; strongly effervescent; moderately alkaline (pH 8.0 thymol blue); abrupt smooth boundary. |
| C1<br>RSL<br>67646 | 36 to 46 cm (14 to 18 inches), light yellowish brown (10YR 6/4) loam, yellowish brown (7.5YR 5/4) and light gray (7.5YR 7/2) when moist; massive; hard, friable, slightly sticky and plastic; many fine roots; many fine and few medium tubular pores and common fine interstitial pores; few fine pinkish white soft lime masses and few (3 percent) fine pinkish white rounded lime concretions; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C2ca<br>RSL<br>67647 | 46 to 66 cm (18 to 26 inches), light yellowish brown (10YR 6/4) loam, brown (7.5YR 5/4) when moist; massive; hard, friable, sticky and plastic; many fine roots; common medium and fine tubular and few fine interstitial pores; common fine and medium pinkish white soft lime masses and many (10 percent) rounded lime concretions, violently effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| C3ca<br>RSL<br>67648 | 66 to 97 cm (26 to 38 inches), light yellowish brown (10YR 6/4) loam, brown (7.5YR 5/4) when moist; massive; very hard, friable, sticky and plastic; common fine roots; many very fine and fine tubular pores and few fine interstitial pores; common fine and medium pinkish white (7.5YR 8/2) soft lime masses and many (25 percent) pinkish white extremely hard rounded lime concretions, violently effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C4ca<br>RSL<br>67649 | 97 to 142 cm (38 to 56 inches), light yellowish brown (10YR 6/4) loam, brown (7.5YR 5/4) when moist; massive; hard, firm, sticky and plastic; few fine roots; many very fine and common fine tubular pores and few fine interstitial pores; common medium pinkish white (7.5YR 8/2) soft lime masses and many (25 percent) pinkish white medium extremely hard rounded lime concretions, violently effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C5ca<br>RSL<br>67650 | 142 to 163 cm (56 to 64 inches), light yellowish brown (10YR 6/4) loam, brown (7.5YR 5/4) and pinkish white (7.5YR 7/2) when moist; massive; hard, friable, sticky and plastic; few fine roots; many very fine tubular pores; common fine pinkish white soft lime masses and many (25 percent) pinkish white (7.5YR 8/2) extremely hard rounded lime concretions, violently effervescent; moderately alkaline (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 67 55 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES LAVEEN SOIL NO. S67 ARIZ. 7-13 SAMPLE NO. 7 651-7 657 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC CALCIORTHID,COARSE-LOAMY,MXD,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | INT. .2-.02 | -COARSE FRAGMENTS- I PCT. OF WHOLE 20 | II 75-20 | III 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 7 651 | 0- 15 | AP1 | 52.3 | 35.3 | 12.4 | 5.1 | 9.5 | 7.3 | 13.4 | 17.0 | 23.9 | 11.4 | | | 1 | 48.8 | 8 | TR | 8Z | N |
| 7 652 | 15- 38 | AP2 | 52.9 | 34.4 | 12.7 | 5.2 | 9.0 | 7.3 | 12.8 | 18.6 | 22.3 | 12.1 | | | 1 | 48.5 | 9 | TR | 9Z | N |
| 7 653 | 38- 61 | C 1 | 45.2 | 37.3 | 17.5 | 8.3 | 8.0 | 5.4 | 9.5 | 14.0 | 19.7 | 17.6 | | | 3 | 39.3 | 18 | TR | 18Z | N |
| 7 654 | 61- 97 | C 2CA | 40.3 | 39.5 | 20.2 | 6.5 | 6.7 | 4.6 | 8.7 | 13.8 | 19.6 | 19.9 | | | 4 | 38.7 | 12 | TR | 12Z | N |
| 7 655 | 97-127 | C 3CA | 33.3 | 46.9 | 19.8 | 7.8 | 5.7 | 3.6 | 6.6 | 9.6 | 13.2 | 33.7 | | | 6 | 26.7 | 30 | TR | 30Z | N |
| 7 656 | 127-213 | C 4CA | | | | | | | | | | | | | | | 15 | TR | 15Z | N |
| 7 657 | 213-249 | C 5 | | | | | | | | | | | | | -- | | 1 | TR | 1Z | N |

| SAMPLE NO. | DEPTH CM. | ORG. MATTER CARBON 6A1A -PERCENT-- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 PCT. | P L 4F2 NO.40 | BULK DENSITY FST 1/3 BAR 4A1F GRAMS | 1/3 BAR 4A1F PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 ----PERCENT--- | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | -----PH------- H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 651 | 0- 15 | 0.59 | 0.053 | 8 | | 0.4 | | | | 1.44 | 1.45 | 0.95 | | 19.4 | 6.2 | 0.2 | 0.2 | | 8.7 | |
| 7 652 | 15- 38 | 0.35 | 0.038 | 8 | | | | | | 1.50 | 1.54 | 0.95 | | 18.2 | 7.0 | 0.9 | 0.8 | | 9.0 | |
| 7 653 | 38- 61 | | | 16 | | 0.4 | | | | 1.60 | 1.64 | 0.88 | | 16.5 | 8.3 | 0.8 | 0.7 | | 9.2 | |
| 7 654 | 61- 97 | | | 20 | | | | | 1.40 | | | 0.93 | | | 9.2 | | | | 9.1 | |
| 7 655 | 97-127 | | | 39 | | | | | | 1.34 | 1.42 | 0.82 | | 20.7 | 8.4 | 2.0 | 1.6 | | 9.1 | |
| 7 656 | 127-213 | | | 32 | | | | | 1.34 | | | 0.92 | | | 9.5 | | | | 9.3 | |
| 7 657 | 213-249 | | | 31 | | | | | 1.34 | | | 0.99 | | | 9.7 | | | | 9.5 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A MEQ/1000 ML | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | MEQ/100G | | | MEQ/1000 | | | | | | | | | |
| 7 651 | 0- 15 | | | 1.6 | 2.0 | 3.6 | | | 8.5 | 4.50 | 15.1 | 16.8 | 29.6 | 5.1 | | 7.9 | 61.5 | | | 7.6 |
| 7 652 | 15- 38 | | | 0.7 | 0.9 | 1.6 | | | 8.7 | | | | | | | | | | | 7.9 |
| 7 653 | 38- 61 | | | 0.8 | 0.9 | 1.7 | | | 8.3 | | | | | | | | | | | 7.9 |
| 7 654 | 61- 97 | | | 1.0 | 1.0 | 2.0 | | | 8.1 | 1.68 | 4.0 | 2.2 | 7.7 | 0.5 | | 2.2 | 9.0 | | | 7.9 |
| 7 655 | 97-127 | | | 0.8 | 0.6 | 1.4 | | | 6.2 | | | | | | | | | | | 8.0 |
| 7 656 | 127-213 | | | 0.7 | 0.5 | 1.2 | | | 6.4 | | | | | | | | | | | 8.3 |
| 7 657 | 213-249 | | | 1.5 | 0.6 | 2.1 | | | 11.0 | | | | | | | | | | | 8.4 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGEABLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. |
|---|---|---|---|---|---|---|---|
| 7 651 | 0- 15 | 35.9 | 0.5 | 6 | 7 | | |
| 7 652 | 15- 38 | | 0.7 | 8 | | | |
| 7 653 | 38- 61 | | 0.8 | 10 | | | |
| 7 654 | 61- 97 | 48.5 | 0.6 | 8 | 4 | | |
| 7 655 | 97-127 | | 0.8 | 13 | | | |
| 7 656 | 127-213 | | 0.7 | 11 | | | |
| 7 657 | 213-249 | | 1.5 | 14 | | | |

CLAY MINERALOGY

| SAMPLE NO. | DEPTH CM. | <0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | <.0002 MM X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 651 | 0- 15 | | | | | | | | | |
| 7 652 | 15- 38 | | | | | | | | | |
| 7 653 | 38- 61 | | | | | | | | | |
| 7 654 | 61- 97 | | | | | | | | | |
| 7 655 | 97-127 | | | | | | | | | |
| 7 656 | 127-213 | | | | | | | | | |
| 7 657 | 213-249 | | | | | | | | | |

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## LAVEEN LOAM
S-67-Ariz-7-13

Location: Maricopa County, Arizona. 1090 feet north and 160 feet west of the SE corner of Section 6, T1S, R2E. 1 mile west of Laveen. Date of Sampling: October 12, 1967.
Description by: G. Hartman, S. Torrance. Collectors: D. Nettleton, D. Hendricks.
Classification: Typic Calciorthid, coarse-loamy, mixed, hyperthermic.
Vegetation: Last crop was safflower. Use: Cultivated land. Climate: Mean annual precipitation 7.6 inches Goulds Road. Mean annual air temperature 70° F; January 51° F, July 90° F. Parent Material: Medium textured alluvium from a wide range of materials. Topography: Nearly level stream terrace. Slope of less than 1 percent to the northeast. Elevation: 1030 feet. Drainage: Well drained. Moderate permeability, medium runoff. Soil Moisture: Moist at time of sampling. Sampled from backhoe pit.
Remarks: Modal profile. Last two horizons sampled with auger.

| HORIZON | DESCRIPTION |
|---|---|
| Ap1<br>RSL<br>67651 | 0 to 15 cm (0 to 6 inches), pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4) when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine interstitial pores; few mica flakes; strongly effervescent; moderately alkaline (pH 8.0 thymol blue); abrupt smooth boundary. |
| Ap2<br>(B)<br>RSL<br>67652 | 15 to 38 cm (6 to 15 inches), light brown (7.5YR 6/4) loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine tubular and few fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C1<br>RSL<br>67653 | 38 to 61 cm (15 to 24 inches), pink (7.5YR 7/4) loam, brown (7.5YR 5/4) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine interstitial and common fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C2ca<br>RSL<br>67654 | 61 to 97 cm (24 to 38 inches), pink (7.5YR 7/4) loam, brown (7.5YR 5/4) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine tubular and interstitial pores; common fine and medium pinkish white soft lime masses and few (5 to 10 percent) extremely hard rounded pinkish white lime concretions, violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C3ca<br>RSL<br>67655 | 97 to 127 cm (38 to 50 inches), pink (7.5YR 7/4) loam, brown (7.5YR 5/4) when moist; massive; hard, friable, slightly sticky and slightly plastic; few fine tubular and interstitial pores; many (40 percent) medium and coarse pinkish white soft lime masses and common (25 percent) medium and coarse pinkish white extremely hard rounded lime concretions; violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C4ca<br>RSL<br>67656 | 127 to 213 cm (50 to 84 inches), pink (7.5YR 7/4) loam, brown (7.5YR 5/4) when moist; massive; hard, friable, sticky and plastic; few fine tubular and interstitial pores; many (40 percent) medium and coarse pinkish white soft lime masses and common (20 percent) fine and medium pinkish white extremely hard rounded lime concretions, violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C5<br>RSL<br>67657 | 213 to 249 cm (84 to 98 inches), same as above but contains 5 percent rounded lime concretions and 30 percent soft lime masses. |

CONSECUTIVE PEDON NUMBER C 71 10 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES PERRYVILLE TAXADJUNCT SOIL NO. S71 ARIZ. 10- 8 SAMPLE NO. 1 59-1 63 ORGAN PIPE MON AREA

SOIL FAMILY: TYPIC CALCIORTHID,COARSE-LOAMY,MXD,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. 2-.2U | CLAYS FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 1 | 59 | 0- 5 | A1 | 59.2 | 34.4 | 6.4 | 14.2 | 8.9 | 6.1 | 11.5 | 18.5 | 19.3 | 15.1 | | | 44.2 | 31A | 1 | 16 | 13 |
| 1 | 60 | 5- 38 | C 1CA | 57.2 | 32.4 | 10.4 | 15.2 | 9.6 | 5.7 | 9.9 | 16.8 | 17.1 | 15.3 | | 2 | 39.2 | 39A | 1 | 18 | 19 |
| 1 | 61 | 38- 71 | C 2CA | 59.9 | 23.3 | 16.8 | 9.5 | 11.4 | 9.2 | 13.2 | 16.6 | 12.5 | 10.8 | | | 36.2 | 34A | -- | 15 | 18 |
| 1 | 62 | 71-100 | C 3CA | 47.7 | 34.8 | 17.5 | 10.4 | 6.5 | 4.1 | 8.2 | 18.5 | 15.7 | 19.1 | | 4 | 39.0 | 24A | 1 | 12 | 11 |
| 1 | 63 | 100-152 | 2C 4CA | 46.8 | 37.3 | 15.9 | 5.1 | 5.4 | 3.9 | 9.5 | 22.9 | 19.2 | 18.1 | | 3 | 47.9 | 11A | -- | 4 | 7 |

| SAMPLE NO. | | DEPTH CM. | ORG. CARBON 6A1A | MATTER NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L I M I T LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | ORY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. NO.40 | | GRAMS PER CC | | | | PERCENT | | | -PERCENT-- | | | | |
| 1 | 59 | 0- 5 | 0.07 | 0.012 | 8 | | 0.5 | | | 1.33 | 1.36 | 0.82 | 22.3 | 16.5 | 5.1 | 0.7 | 0.6 | 8.6 | | 7.7 |
| 1 | 60 | 5- 38 | 0.13 | 0.015 | 12 | | 0.5 | | | 1.14 | 1.21 | 0.79 | 35.5 | 26.4 | 6.3 | 2.0 | 1.6 | 8.4 | 9.3 | 7.8 |
| 1 | 61 | 38- 71 | 0.06 | | 8 | | 0.6 | | | 1.25 | 1.34 | 0.81 | 25.8 | 19.6 | 6.8 | 2.3 | 1.9 | 8.0 | 8.6 | 7.8 |
| 1 | 62 | 71-100 | | | 17 | | | | | 1.33 | 1.45 | 0.86 | 29.7 | 21.6 | 7.4 | 2.9 | 2.5 | 8.1 | 8.9 | 7.9 |
| 1 | 63 | 100-152 | | | 15 | | | | | 1.42 | 1.53 | 0.94 | 25.8 | 17.8 | 6.8 | 2.5 | 2.4 | 8.3 | 9.2 | 7.9 |

| SAMPLE NO. | | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1A | MG 6Q1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | 8A1 B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MEQ/100G | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | | |
| 1 | 59 | 0- 5 | 19.2 | 1.7 | 0.1 | 0.9 | 21.9 | 100+ | | 12.7 | | | | | | | | | | | |
| 1 | 60 | 5- 38 | 19.6 | 1.5 | 3.5 | 0.3 | 24.9 | 100+ | | 10.5 | 4.17 | 5.2 | 1.3 | 31.2 | 0.1 | | 1.7 | 33.0 | | | 8.0 |
| 1 | 61 | 38- 71 | 22.4 | 2.8 | 7.7 | 0.4 | 33.3 | 100+ | | 10.8 | 14.6 | 41.6 | 11.5 | 107.0 | 0.3 | | 3.0 | 116.0 | 44.4 | | 7.7 |
| 1 | 62 | 71-100 | 20.4 | 3.1 | 7.6 | 0.4 | 31.5 | 100+ | | 9.9 | 13.3 | 28.9 | 9.8 | 98.6 | 0.4 | | 3.6 | 104.0 | 27.0 | | 7.8 |
| 1 | 63 | 100-152 | 19.2 | 3.2 | 7.2 | 0.4 | 30.0 | 100+ | | 10.7 | 11.0 | 17.8 | 6.8 | 86.1 | 0.4 | | 2.1 | 83.6 | 25.5 | | 7.8 |

| SAMPLE NO. | | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 59 | 0- 5 | | 0.1 | 1 | | | | MT 4 | MI 3 | KK 1 | | | | | | MT MONTMORT | 1 TRACE |
| 1 | 60 | 5- 38 | 47.5 | 2.0 | 19 | 17 | | | MI 4 | MT 2 | KK 1 | | | | | | MI MICA | 2 SMALL |
| 1 | 61 | 38- 71 | 45.9 | 2.8 | 26 | 21 | 0.6 | | | | | | | | | | KK KAOLINIT | 3 MODERATE |
| 1 | 62 | 71-100 | 48.5 | 2.8 | 28 | 22 | 0.3 | | | | | | | | | | | 4 ABUNDANT |
| 1 | 63 | 100-152 | 46.4 | 3.2 | 30 | 25 | 0.1 | 0.5 | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## PERRYVILLE GRAVELLY SANDY LOAM (taxadjunct) 1/
S71 Ariz-10-8-(1-5*)

Location: Pima County, Arizona. ½ mile east and ½ mile south of northwest corner (projected) Section 20, T18S, R5W, Organ Pipe Cactus National Monument. Date of Sampling: April 7, 1971.
Description by: Y. H. Havens, E. Chamberlin. Collectors: K. Flach, K. Vogt, E. Chamberlin.
Classification: Typic Calciorthid, coarse-loamy, mixed, hyperthermic.
Vegetation: Creosotebush and bursage. Use: Desert rangeland. Climate: Mean annual precipitation 7 to 9 inches. Mean annual air temperature 69° F. Parent Material: Mixed alluvium from basalt, andesite and rhyolite. Topography: Gently sloping, convex, with 1 to 2 percent slope. Elevation: 1500 feet. Drainage: Well drained with moderate permeability. Soil Moisture: Dry.
Remarks: 60 percent of surface covered by gravel.

HORIZON

A1 RSL 7159 — 0 to 5 cm (0 to 2 inches), light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 5/4) moist; weak thick platy structure; slightly hard, very friable, nonsticky, nonplastic; many very fine and fine vesicular pores; 35 percent gravel by volume; strongly effervescent; moderately alkaline (pH 8.2 thymol blue); abrupt wavy boundary.

C1ca RSL 7160 — 5 to 38 cm (2 to 15 inches), pink (5YR 7/3) gravelly sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, nonsticky, slightly plastic; common very fine roots; few fine tubular pores; 40 percent gravel; violently effervescent; many fine and medium pinkish white (7.5YR 8/2) slightly hard lime masses and nearly all gravel is lime coated; strongly alkaline (pH 8.5); clear wavy boundary.

C2ca RSL 7161 — 38 to 71 cm (15 to 28 inches), light brown (7.5YR 6/4) gravelly loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; common very fine roots; few very fine, fine and medium tubular pores; 30 percent gravel; violently effervescent; common fine and medium pinkish white (7.5YR 8/2) lime masses (slightly hard), and part of gravel is lime coated; moderately alkaline (pH 8.4); clear wavy boundary.

C3ca RSL 7162 — 71 to 100 cm (28 to 39 inches), light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, plastic; many very fine and fine tubular pores; 15 to 20 percent gravel; violently effervescent; common medium and coarse slightly hard lime masses with thin lime coatings on some gravel; moderately alkaline (pH 8.3); gradual wavy boundary.

IIC4ca RSL 7163 — 100 to 152 cm (39 to 60 inches), light brown (7.5YR 6/4) heavy loam, brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, plastic; many very fine and fine tubular pores; 5 percent gravel; violently effervescent; common medium and coarse slightly hard lime masses with thin lime coatings on some gravel; moderately alkaline (pH 8.4).

1/ The Perryville series is in a coarse-loamy, carbonatic, family of Typic Calciorthids. This pedon has a control section with less than 40 percent carbonate.

CONSECUTIVE PEDON NUMBER C 71 11 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES RILLITO SOIL NO. S71 ARIZ. 10-10 SAMPLE NO. 1 64-1 67 ORGAN PIPE MON AREA

SOIL FAMILY: TYPIC CALCIORTHID,COARSE-LOAMY,MXD,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. .2U | CLAYS FINE LT .2U | CARBONATE 3A1A.02 | INT. COARSE FRAGMENTS I 75-20 PCT. OF WHOLE SOIL | II 20-5 PCT. OF LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | 29A | | |
| 1 | 64 | 0- 6 | A1 | 65.7 | 28.0 | 6.3 | 15.7 | 10.5 | 5.6 | 11.6 | 22.3 | 16.2 | 11.8 | | | 45.8 | 4 | 15 | 10 |
| 1 | 65 | 6- 35 | B2 | 60.0 | 29.1 | 10.9 | 17.6 | 9.5 | 4.8 | 9.4 | 18.7 | 9.9 | 19.2 | | 1 | 34.5 | 16 | 10 | 11 |
| 1 | 66 | 35- 68 | C 1CA | 42.9 | 37.9 | 19.2 | 11.5 | 7.6 | 4.0 | 7.6 | 12.2 | 25.9 | 12.0 | | 9 | 42.6 | 5 | 6 | 13 |
| 1 | 67 | 68-122 | C 2CA | 55.6 | 28.5 | 15.9 | 18.0 | 10.5 | 6.1 | 9.0 | 12.0 | 11.7 | 16.8 | | 6 | 28.8 | 6 | 17 | 23 |

| SAMPLE NO. | | DEPTH CM. | ORG. CAR- BON 6A1A -PERCENT- | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 PCT. | M I PL 4F2 NO.40 | T 4A1F | BULK DENSITY EST 1/3 BAR 4A1E | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 -PERCENT- | EXTENSBLTY LEF 4D1 | LE 4D1 -PERCENT- | -----PH------ H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | GRAMS PER CC | | | | | | | | | | |
| 1 | 64 | 0- 6 | 0.11 | 0.015 | 6 | | 0.5 | | | 1.16 | | | 0.85 | | | 3.7 | | | 8.5 | | 7.8 |
| 1 | 65 | 6- 35 | 0.17 | 0.022 | 12 | | 0.5 | | | | 1.16 | 1.19 | 0.80 | 31.4 | 21.1 | 4.9 | 0.9 | 0.7 | 8.4 | | 7.8 |
| 1 | 66 | 35- 68 | 0.17 | | 43 | | 0.3 | | | | 1.33 | 1.40 | 0.86 | 23.3 | 18.7 | 6.5 | 1.7 | 1.5 | 8.4 | 9.1 | 8.1 |
| 1 | 67 | 68-122 | | | 34 | | 0.4 | | | | 1.45 | 1.51 | 0.67 | 21.8 | 17.0 | 6.2 | 1.4 | 0.9 | 8.3 | 9.0 | 8.1 |

| SAMPLE NO. | | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C NA- OAC 5A2A -MEQ/100G | NH4- OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE CA 6N1A | MG 6O1A | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MEQ/100G | | | | | | | | | MEQ/1000 ML | | | | | | | | | |
| 1 | 64 | 0- 6 | 16.4 | 1.4 | 0.1 | 0.6 | 18.5 | 100+ | | 9.1 | | | | | | | | | | | |
| 1 | 65 | 6- 35 | 17.7 | 1.5 | 0.5 | 0.4 | 20.1 | 100+ | | 9.6 | | | | | | | | | | | |
| 1 | 66 | 35- 68 | 15.9 | 2.7 | 19.8 | 0.2 | 38.6 | 100+ | | 7.1 | 10.3 | 10.3 | 6.4 | 86.1 | 0.3 | | 2.1 | 91.8 | | | 7.9 |
| 1 | 67 | 68-122 | 20.8 | 3.3 | 17.9 | 0.3 | 42.3 | 100+ | | 8.1 | 13.3 | 26.9 | 16.4 | 116.0 | 0.3 | | 3.0 | 109.0 | 55.0 | | 7.9 |

| SAMPLE NO. | | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | -GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A3 | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 64 | 0- 6 | | 0.1 | 1 | | | | MT 3 | MI 3 | KK 1 | | | | |
| 1 | 65 | 6- 35 | | 0.5 | 5 | | | | MI 3 | MT 2 | KK 1 | | | | |
| 1 | 66 | 35- 68 | 50.9 | 15.4 | 100+ | 30 | | 0.2 | MT 4 | MI 4 | KK 1 | | | | |
| 1 | 67 | 68-122 | 42.7 | 12.9 | 100+ | 25 | 0.4 | | | | | | | | |

MINERAL CODE — RELATIVE AMOUNT

MT MONTMORT — 1 TRACE
MI MICA — 2 SMALL
KK KAOLINIT — 3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## RILLITO GRAVELLY SANDY LOAM
S71 Ariz-10-10-(1-4*)

Location: Pima County, Arizona. 3/8 mile south and 3/8 mile west of northeast corner, Section 10. T15S, R5W, Organ Pipe Cactus National Monument. Date of Sampling: April 8, 1971. E.Chamberlin
Description by: Y.H.Havens, E.Chamberlin. Collectors: K. Flach, K. Vogt.
Classification: Typic Calciorthid, coarse-loamy, mixed, hyperthermic.
Vegetation: Creosotebush, paloverde, ocotillo, saguaro and triangle bursage. Use: Desert rangeland. Climate: Mean annual precipitation 7 to 9 inches. Mean annual temperature 69° F. Parent Material: Mixed alluvium from rhyolite, rhyolitic tuff, basalt, and granitic rocks. Topography: Gently sloping--concave, with slope of 2 to 3 percent. Elevation: 1800 feet. Drainage: Well drained with moderate permeability. Soil Moisture: Dry.
Remarks: 50 percent of surface covered with gravel.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>7164 | 0 to 6 cm (0 to 2½ inches), light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 5/4) moist; weak medium platy structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine roots; common very fine and fine tubular pores; strongly effervescent; 40 percent gravel; moderately alkaline (pH 8.0 thymol blue); abrupt smooth boundary. |
| B2<br>RSL<br>7165 | 6 to 35 cm (2½ to 14 inches), light brown (7.5YR 6/4) gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; many very fine, fine and medium roots; common fine interstitial pores; 15 percent gravel; violently effervescent; pinkish white (7.5YR 8/2) lime coatings on underside of some gravel; moderately alkaline (pH 8.2); clear wavy boundary. |
| C1ca<br>RSL<br>7166 | 35 to 68 cm (14 to 27 inches), white (N/8) and light brown (7.5YR 6/4) gravelly loam, pink (7.5YR 7/4) and brown (7.5 YR 5/4) moist; massive; hard, friable, slightly sticky, plastic; few very fine and fine roots; common very fine tubular pores; 20 percent gravel; violently effervescent; many hard pinkish white (7.5YR 8/2) lime masses and lime coatings on all gravel; moderately alkaline (pH 8.4); clear wavy boundary. |
| C2ca<br>RSL<br>7167 | 68 to 122 cm (27 to 48 inches), pinkish white (7.5YR 8/2) weakly cemented gravelly sandy loam, light brown (7.5YR 6/4) moist; massive; very hard, very friable, slightly sticky, slightly plastic; few fine and medium roots; common very fine tubular pores; 40 to 50 percent gravel; violently effervescent; moderately alkaline (pH 8.4). |

CONSECUTIVE PEDON NUMBER C 69160 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES DRY LAKE TAXADJUNCT SOIL NO. S69 ARIZ. 2-14 SAMPLE NO. 9 839-9 842 WILLCOX AREA

SOIL FAMILY: USTOLLIC CALCIORTHID,SANDY OVER LOAMY,MXD,THRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 SAND | TOTAL FRACTION .05 .002 SILT | TOTAL FRACTION .002 CLAY | SANDS VCS 2-1 | SANDS CS 1- .5 | SANDS MS .5- .25 | SANDS FS .25- .10 | SANDS VFS .1- .05 | SILTS CSI .05- .02 | SILTS FSI .02- .002 | CLAYS CO. 2- .2U | CLAYS FINE LT .2U | CLAYS CARBONATE 3A1A.02 | INT. II .2- .02 | COARSE FRAGMENTS OF WHOLE SOIL 75- 20 | COARSE FRAGMENTS I PCT. | COARSE FRAGMENTS II 20-5 | COARSE FRAGMENTS III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 9 839 | 0- 23 | AP | 88.5 | 6.5 | 5.0 | 0.7 | 19.8 | 19.6 | 38.1 | 10.3 | 5.9 | 0.6 | | | 36.8 | --A | -- | -- | -- | -- |
| 9 840 | 23- 61 | A12 | 85.5 | 7.1 | 7.4 | 1.0 | 16.2 | 15.9 | 40.2 | 12.2 | 5.7 | 1.4 | | | 41.6 | --A | -- | -- | -- | -- |
| 9 841 | 61- 902C | 1CA | 57.9 | 19.5 | 22.6 | 1.4 | 9.7 | 11.4 | 24.6 | 10.8 | 10.2 | 9.3 | | 14 | 34.8 | --G | -- | -- | -- | -- |
| 9 842 | 90-1502C | 2CA | 40.9 | 29.2 | 29.9 | 2.1 | 5.2 | 7.0 | 18.0 | 8.6 | 11.6 | 17.6 | | 15 | 30.5 | --G | -- | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG. CAR- BON 6A1A -PERCENT-- | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | CARBONATE 19-2 6F1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 PCT. | ATTERBERG P L 4F2 PCT. | ATTERBERG I P T NO.40 | BULK DENSITY EST 1/3 4A1F | BULK DENSITY 8AR 4A1F | BULK DENSITY DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 8AR 4B1C | WATER CONTENT 1/3 BAR 4B1C | WATER CONTENT 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | EXTENSBLTY LE 4D1 | PH H2O 1/1 8C1A | PH H2O 1/10 8C1A | PH CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | GRAMS PER CC | | | | PERCENT | | | PERCENT | | | | |
| 9 839 | 0- 23 | 0.50 | 0.047 | 1 | | 0.1 | NP | NP | | 1.46 | 1.48 | 1.00 | | 5.5 | 3.1 | | 0.5 | 0.5 | 7.6 | | 7.5 |
| 9 840 | 23- 61 | 0.40 | 0.040 | 2 | | 0.1 | | | | 1.63 | 1.64 | 1.00 | | 5.5 | 4.4 | | 0.2 | 0.2 | 7.7 | | 7.8 |
| 9 841 | 61- 90 | 0.34 | | 29 | | TR | | | | 1.53 | 1.58 | 1.00 | | 17.7 | 10.9 | | 1.1 | 1.1 | 7.6 | 8.9 | 7.8 |
| 9 842 | 90-150 | 0.24 | | 39 | | TR | 53 | 31 | | 1.28 | 1.37 | 1.00 | | 25.3 | 16.0 | | 2.3 | 2.3 | 7.6 | 8.9 | 8.1 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- DAC 5A2A | C E C NH4- DAC 5A6A | WATER EXTRACT FROM SATURATED PASTE EC 8A1A | CA 6N1B | MG 6D1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 9 839 | 0- 23 | | | 0.1 | 1.4 | 1.5 | | | 5.8 | | | | | | | | | | | |
| 9 840 | 23- 61 | | | 0.1 | 1.3 | 1.4 | | | 5.9 | | | | | | | | | | | |
| 9 841 | 61- 90 | | | 0.4 | 1.0 | 1.4 | | | 4.9 | 0.96 | 4.4 | 2.4 | 5.4 | 1.0 | | 3.3 | 2.7 | | | 7.7 |
| 9 842 | 90-150 | | | 6.0 | 0.3 | 6.3 | | | 6.6 | 6.2 | 12.9 | 18.2 | 52.6 | 2.2 | | 2.5 | 31.8 | 46.3 | | 7.8 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | EXCHANGBLE NA 5D2 PCT. | EXCHANGBLE SAR 5E | GYPSUM AMT. 6F1B PCT. | GYPSUM REQ. 6P3A MEQ. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY I 7A2E | CLAY MINERALOGY II 7A2E | CLAY MINERALOGY III 7A2E | CLAY MINERALOGY IV 7A2E | DTA PCT. 7A3 | CLAY MINERALOGY L.T. .0002 MM X RAY I 7A2E | CLAY MINERALOGY II 7A2E | CLAY MINERALOGY III 7A2E | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 839 | 0- 23 | | 0.1 | 2 | | | | | | | | | | | | |
| 9 840 | 23- 61 | | 0.1 | 2 | | | | MI 3 | | | | | | | | MI MICA |
| 9 841 | 61- 90 | 46.9 | 0.1 | 3 | 3 | | | | | | | | | | | |
| 9 842 | 90-150 | 82.9 | 1.6 | 25 | 13 | | | MI 2 | | | | | | | | |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## DRY LAKE LOAMY SAND (taxadjunct) 1/
S69Ariz-2-14

Location: Cochise County, Arizona. 350 feet south and 250 feet east of the northwest corner of Sec. 10, T. 16 S., R. 25 E. West of Kansas Settlement Road, about 7½ miles east and 3 miles south of Cochise. Date of sampling: October 16, 1969. Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.

Classification: Ustollic Calciorthid, sandy over loamy, mixed, thermic.

Vegetation: Tumble weeds. Use: Idle cropland. Climate: Precipitation about 11 inches. Mean annual air temperature 58°F., January 41°F., July 78°F. Parent Material: Alluvium and lake sediments from acid and basic igneous rocks and sedimentary rocks. Topography: Nearly level to gently sloping and undulating lower fans, valley plains and lake margins. Slope, 0.2 percent, west facing. Elevation: 4185 feet. Drainage: Moderately well and well drained. Runoff is very slow. Permeability is rapid in the upper part but slow in the lower horizons. Soil Moisture: Dry when sampled.

Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This sample was not paired.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>69839 | 0 to 23 cm (0 to 9 inches), grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky, nonplastic; common fine and very fine roots; many fine interstitial and few fine tubular pores; few fine white rounded and irregularly shaped lime concretions; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| A12<br>RSL<br>69840 | 23 to 61 cm (9 to 24 inches), grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist, single grained; loose, nonsticky, nonplastic; common fine and very fine and few medium roots; few very fine tubular pores; common fine rounded and irregularly shaped white lime concretions; strongly effervescent; moderately alkaline (pH 8.2); clear irregular boundary. |
| IIC1ca<br>RSL<br>69841 | 61 to 90 cm (24 to 35½ inches), white (10YR 8/2) and very pale brown (10YR 7/3) heavy loam, very pale brown (10YR 7/3) and brown (10YR 5/3) moist; 5 percent of mass is in strata of brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; massive; very hard, friable, sticky, plastic; many very fine and fine roots; few fine tubular pores; very thin, less than 1 mm, laminar stratum at 24 inches, 25 to 30 percent by volume of large irregularly shaped soft lime masses; violently effervescent; strongly alkaline (pH 8.6); gradual wavy boundary. |
| IIC2ca<br>RSL<br>69842 | 90 to 150 cm (35½ to 59 inches), white (10YR 8/2) heavy loam or light clay loam, very pale brown (10YR 7/3) moist; massive; very hard, friable, sticky, plastic; few very fine and fine roots; few very fine and fine tubular pores; 25 to 30 percent by volume of large irregularly shaped soft lime masses; violently effervescent; strongly alkaline (pH 8.6). |

1/ The Dry Lake series is in a sandy over loamy, mixed, thermic family of Typic Calciorthids. This pedon has an average of 0.46 percent O.C. and a sand-clay ratio of 15 in the surface 40 cm.

U. S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Calciorthid, coarse-loamy, carbonatic, thermic

SOIL Karro loam SOIL No. S64Ariz-2-23 LOCATION Cochise County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64624 - 64630

| Depth (In.) | Horizon | 1B1b Total Sand (2–0 05) | Total Silt (0 05–0 002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0 1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0 002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non carbonate clay | Coarse fragments 1A2a: > 2 | 2 – 19 | 19 –76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Size class and particle diameter (mm) 3A1 | | | | | | | | | | | | | | Pct | Pct of < 76 mm | |
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0-7 | Ap1 | 48.4 | 33.5 | 18.1 | 2.5 | 6.2 | 7.5 | 19.5 | 12.7 | 15.5 | 18.0 | 39.5 | 35.7 | | 12 | 6 | 6 | |
| 7-12 | Ap2 | 44.5 | 35.6 | 19.9 | 2.2 | 4.7 | 6.7 | 19.2 | 11.7 | 16.0 | 19.6 | 38.9 | 32.8 | | 13 | 6 | 6 | |
| 12-20 | C1ca | 30.7 | 33.8 | 35.5 | 1.1 | 2.9 | 4.3 | 13.4 | 9.0 | 14.9 | 18.9 | 32.0 | 21.7 | | 18 | 4 | 4 | |
| 20-27 | C2ca | 23.7 | 35.0 | 41.3 | 1.6 | 2.0 | 2.9 | 10.1 | 7.1 | 11.7 | 23.3 | 24.9 | 16.6 | | 15 | | tr | |
| 27-42 | C3ca | 30.1 | 30.1 | 39.8 | 1.2 | 2.7 | 3.9 | 12.8 | 9.5 | 10.3 | 19.8 | 27.7 | 20.6 | | 17 | | tr | |
| 42-56 | C4ca | 26.7 | 24.0 | 49.3 | 2.2 | 3.6 | 3.9 | 10.8 | 6.2 | 8.0 | 16.0 | 20.4 | 20.5 | | 19 | | tr | |
| 56-75+ | C5ca | 21.7 | 37.1 | 41.2 | 1.9 | 3.9 | 3.4 | 7.8 | 4.7 | 6.4 | 30.7 | 15.7 | 17.0 | | 4 | | tr | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2b Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ 1/ | 3A1a Carbonate in <0.002 mm. | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density | 3B2 | Water content | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLEf | 4D1 Extensibility COLE | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct. | | Pct. | Pct. | Pct. | g/cc | g/cc | g/cc | Cm | Pct. | Pct. | Pct. | Pct | Pct. | | | |
| 0-7 | 0.84 | 0.084 | 10 | | 22 | 6 | 1.31 | 1.35 | | 0.97 | | 26.5 | 14.0 | 0.011 | 0.010 | | 7.9 | 8.6 |
| 7-12 | 0.60 | 0.071 | 8 | | 24 | 7 | 1.28 | 1.33 | | 0.97 | | 27.8 | 14.2 | 0.012 | 0.012 | | 8.0 | 8.6 |
| 12-20 | 0.30 | | | | 35 | 18 | 1.29 | 1.38 | | 0.98 | | 27.9 | 14.4 | 0.023 | 0.022 | | 8.1 | 8.7 |
| 20-27 | 0.23 | | | | 47 | 26 | | | | | | | 17.4 | | | | 8.0 | 8.7 |
| 27-42 | 0.18 | | | | 48 | 23 | 1.22 | 1.32 | | 1.00 | | 31.3 | 19.7 | 0.027 | 0.027 | | 8.0 | 8.7 |
| 42-56 | 0.13 | | | | 49 | 30 | | | | | | | 15.2 | | | | 8.1 | 8.7 |
| 56-75+ | 0.13 | | | | 79 | 37 | 1.50 | 1.56 | | 1.00 | | 20.1 | 10.3 | 0.015 | 0.015 | | 8.2 | 8.8 |

| Depth (In) | Extractable bases 5B1a: 6N2b Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch Capacity: 5A2a NaOAc | 5A1a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1b $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0-7 | 23.0 | 3.4 | 1.0 | 1.6 | 29.0 | | | 13.4 | 7.2 | 1.4 | 3.7 | 0.5 | - | 2.0 | 2.0 | | 1.28 |
| 7-12 | 22.4 | 3.4 | 1.0 | 1.6 | 28.4 | | | 12.8 | 7.0 | 1.6 | 4.3 | 0.4 | - | 1.8 | 2.5 | | 1.32 |
| 12-20 | 18.7 | 3.7 | 1.0 | 1.5 | 24.9 | | | 9.0 | 4.8 | 1.5 | 4.2 | 0.6 | - | 1.9 | 2.1 | | 1.13 |
| 20-27 | 21.7 | 5.0 | 1.0 | 1.1 | 28.8 | | | 9.6 | 5.8 | 2.4 | 3.8 | 0.6 | - | 1.9 | 1.8 | | 1.25 |
| 27-42 | 19.2 | 5.4 | 1.0 | 1.3 | 26.9 | | | 10.4 | 5.6 | 2.4 | 3.9 | 0.9 | - | 2.0 | 1.9 | | 1.29 |
| 42-56 | 20.3 | 3.1 | 0.8 | 1.3 | 25.5 | | | 9.2 | 5.9 | 1.6 | 4.6 | 0.8 | - | 1.8 | 2.7 | | 1.32 |
| 56-75+ | 17.5 | 2.7 | 1.0 | 0.6 | 21.8 | | | 3.2 | 6.1 | 2.6 | 5.6 | 0.9 | - | 1.7 | 3.3 | | 1.54 |

| Depth (In) | 8A Water at Saturation | Atterberg limits: Plastic limit | Atterberg limits: Liquid limit | Atterberg limits: Plastic index | 5D2 Exchangeable Na | 5B1b Exch. Na | Gypsum | Clay mineralogy (<0.002 mm) 3A1: Mont. | Verm. | Mica 7A2 | Kaolin. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. of <0.4 mm | | | Pct. | me/ 100g | Pct. | X-ray | | | |
| 0-7 | 48.1 | | | | 6 | 0.8 | | | | | |
| 7-12 | 50.8 | | | | 6 | 0.8 | | xx | xx | xx | tr |
| 12-20 | 55.9 | | | | 9 | 0.8 | | | | | |
| 20-27 | 58.6 | 31 | 65 | 34 | 8 | 0.8 | | | | | |
| 27-42 | 61.0 | 25 | 53 | 28 | 8 | 0.8 | | xx | xx | xx | tr |
| 42-56 | 54.7 | | | | 6 | 0.6 | | | | | |
| 56-75+ | 42.8 | | | | 25 | 0.8 | | | | | |

1/ Percent of whole soil including >2 mm.

KARRO LOAM
S64Ariz-2-23

Location: Cochise County, Arizona. 3-1/2 miles east and 14 miles south of Willcox, Arizona. 1075 feet north and 600 feet east of the south 1/4 corner of Sec. 11, T. 16 S., R. 24 E. Date of Sampling: October 21, 1964.
Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, M. L. Richardson, and R. K. Preece.
Classification: Ustollic Calciorthid, coarse-loamy, carbonatic, thermic.
Vegetation: Cropland. Climate: Precipitation about 11 inches annual. Mean annual temperature is 58°F. at Willcox. Mean January temperature is 41° F., mean July temperature 77° F. Soil temperature at time of sampling was: 24 inches 61° F., 48 inches 64° F., and 96 inches 65° F. Topography: Nearly level valley plain near Willcox Playa. Slopes are smooth and very slightly convex with gradient of 0.2 to 0.3 percent. Elevation: 4210 feet. Drainage: Well drained. Moderately permeable. Slow surface runoff. Soil Moisture: Moist - 50 to 75 percent field capacity. Remarks: Karro soils are associated with soils of the Gothard, Pima, and McAllister series and are in intermittent bodies surrounding the playa. Paired sample is S64Ariz-2-24. Field determinations of pH by thymol blue in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| AP1<br>RSL No.<br>64624 | 0-7 inches (1-18 cm), light brownish gray (10YR 6/2) loam, dark yellowish brown (10YR 3/4) when moist; massive, breaking to moderate fine granular structure; slightly hard when dry, friable when moist, slightly sticky and plastic when wet; common fine, medium, and coarse roots; many fine interstitial pores; violently effervescent with HCl; pH 8.2; clear smooth boundary. |
| AP2<br>RSL No.<br>64625 | 7-12 inches (18-30 cm), pale brown (10YR 6/3) with 25 percent light brown (7.5YR 6/4) loam, dark yellowish brown (10YR 3/4) when moist; massive, breaking to weak to moderate medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and plastic when wet; common fine, medium and coarse roots; many fine interstitial pores; violently effervescent; pH 8.2; clear wavy boundary. |
| C1ca<br>RSL No.<br>64626 | 12-20 inches (30-51 cm), light brown (7.5YR 6/4) and 25 percent pink (7.5YR 7/4) loam, brown (7.5YR 5/4) and light brown (7.5YR 6/4) when moist; massive; hard when dry, friable when moist, slightly sticky and plastic when wet; common fine and medium roots; common fine interstitial and tubular pores; violently effervescent; few fine and medium lime-silica(?) cemented nodules that are extremely hard and firm; pH 8.4; gradual smooth boundary. |
| C2ca<br>RSL No.<br>64627 | 20-27 inches (51-69 cm), mottled pinkish gray (7.5YR 7/2) and pinkish white (7.5YR 8/2) gravelly heavy loam, light brown (7.5YR 6/4) and pinkish gray (7.5YR 7/2) when moist; massive and weakly cemented; very hard when dry, friable when moist, slightly sticky and plastic when wet; few fine tubular and common intersitial pores; violently effervescent; approximately 50 percent fine and medium concretions that are extremely hard and very firm; pH 8.6; gradual smooth boundary. |
| C3ca<br>RSL No.<br>64628 | 27-42 inches (69-107 cm), mottled equal parts of pink (7.5YR 7/4) and pinkish white (7.5YR 8/2) gravelly heavy loam, light brown (7.5YR 6/4) and pinkish gray (7.5YR 7/2) when moist; weak medium and coarse prismatic breaking to moderate fine and medium angular blocky structure; very hard when dry, firm when moist, slightly sticky and plastic when wet; few fine roots; many fine and very fine tubular pores and common interstitial pores; approximately 35 percent fine and medium, hard and very fine concretions; violently effervescent; pH 8.6; clear wavy boundary. |
| C4ca<br>RSL No.<br>64629 | 42-56 inches (107-142 cm), similar to C3ca but containing 50 to 60 percent concretions with texture a very gravelly (concretions) heavy loam. |
| C5ca<br>RSL No.<br>64630 | 56-75 inches +(142-190 cm), mottled 75 percent white (N8) and 25 percent pinkish gray (7.5YR 7/2) clay loam, pinkish white (7.5YR 8/2) and pinkish gray (7.5YR 7/2) when moist; massive and weakly cemented, breaking to weak fine and medium subangular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; no roots; common fine interstitial and many fine and very fine tubular and a few medium tubular pores; violently effervescent; pH 8.6. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ustollic Calciorthid, coarse-loamy, carbonatic, thermic
SOIL Karro loam SOIL Nos. S64Ariz-2-24 LOCATION Cochise County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64631 - 64637

| Depth (In.) | Horizon | 1B1b Size class and particle diameter (mm) 3A1 Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | Non carbonate clay | | Coarse fragments 1A2a >2 Pct. | 1A2a 2–19 Pct. of <76 mm | 19–76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | | | |
| 0–13 | Ap1 | 50.4 | 32.4 | 17.2 | 4.1 | 9.8 | 8.4 | 17.2 | 10.9 | 14.5 | 17.9 | 35.1 | 39.5 | 12 | | 7 | 7 | |
| 13–22 | Ap2 | 47.2 | 34.5 | 18.3 | 3.4 | 8.1 | 7.5 | 16.3 | 11.9 | 16.6 | 17.9 | 37.9 | 35.3 | 12 | | 10 | 10 | |
| 22–32 | C1ca | 37.9 | 32.9 | 29.2 | 4.1 | 7.5 | 5.5 | 11.6 | 9.2 | 13.1 | 19.8 | 28.9 | 28.7 | 14 | | | tr. | |
| 32–42 | C2ca | 25.7 | 36.2 | 38.1 | 2.4 | 4.1 | 3.5 | 8.4 | 7.3 | 12.5 | 23.7 | 24.8 | 18.4 | 14 | | | tr. | |
| 42–53 | C3ca | 23.3 | 31.6 | 45.1 | 1.8 | 3.4 | 3.2 | 8.8 | 6.1 | 11.2 | 20.4 | 22.5 | 17.2 | 16 | | | tr. | |
| 53–106 | C4ca | 20.4 | 29.4 | 50.2 | 1.7 | 3.5 | 2.7 | 6.6 | 5.9 | 8.3 | 21.1 | 18.0 | 14.5 | 17 | | | tr. | |
| 106–110+ | IIC5 | 25.7 | 34.1 | 40.2 | 1.0 | 2.3 | 2.8 | 9.3 | 10.3 | 9.5 | 24.6 | 25.5 | 15.4 | 7 | | 27 | 25 | 2 |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | 3A1a Carbonate in <0.002 mm Pct. | Atterberg limits: Plastic limit Pct. of <0.4 mm | Liquid limit | Plastic index | | Water content: Pct. | Pct. | 4B2 15 bar Pct. | | | pH: 8C1a 1:1 $H_2O$ | 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–13 | 0.90 | 0.093 | 10 | | 27 | 5 | | | | | | | 14.8 | | | 7.8 | 8.3 |
| 13–22 | 0.60 | 0.067 | 9 | | 29 | 6 | | | | | | | 15.6 | | | 8.0 | 8.6 |
| 22–32 | 0.34 | | | | 46 | 15 | 30 | 58 | 28 | | | | 15.3 | | | 8.1 | 8.7 |
| 32–42 | 0.18 | | | | 60 | 24 | 22 | 45 | 23 | | | | 15.3 | | | 8.1 | 8.7 |
| 42–53 | 0.16 | | | | 55 | 29 | | | | | | | 14.7 | | | 8.1 | 8.7 |
| 53–106 | 0.11 | | | | 58 | 33 | | | | | | | 16.3 | | | 8.1 | 8.7 |
| 106–110+ | 0.03 | | | | 29 | 13 | | | | | | | 14.6 | | | 8.0 | 8.6 |

| Depth (In.) | Extractable bases 5B1a: 6N2b Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0–13 | 24.1 | 3.2 | 1.0 | 1.7 | 30.0 | | 15.1 | | 18.6 | 4.0 | 6.9 | 0.8 | | - | 2.2 | 5.0 | | 2.83 |
| 13–22 | 22.6 | 3.3 | 0.8 | 2.0 | 28.7 | | 14.5 | | 6.4 | 1.5 | 3.4 | 0.4 | | - | 2.3 | 2.5 | | 1.17 |
| 22–32 | 22.2 | 3.9 | 0.8 | 1.6 | 28.5 | | 9.4 | | 5.4 | 2.0 | 3.2 | 0.8 | | - | 2.8 | 2.2 | | 1.13 |
| 32–42 | 20.0 | 3.6 | 1.0 | 1.3 | 25.9 | | 10.9 | | 4.8 | 2.2 | 3.4 | 0.8 | | - | 2.0 | 2.2 | | 1.13 |
| 42–53 | 18.5 | 3.9 | 1.1 | 1.5 | 25.0 | | 11.5 | | 5.5 | 2.6 | 5.0 | 1.0 | | - | 2.2 | 2.2 | | 1.40 |
| 53–106 | 18.6 | 4.7 | 0.9 | 1.5 | 25.7 | | 9.6 | | 5.6 | 2.2 | 4.4 | 1.2 | | - | 2.2 | 2.1 | | 1.37 |
| 106–110+ | 22.4 | 4.7 | 0.9 | 2.0 | 30.0 | | 15.4 | | 4.9 | 2.0 | 3.2 | 0.8 | | - | 1.8 | 1.7 | | 1.09 |

| Depth (In.) | 8A Water at Saturation Pct. | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na me / 100 g | Gypsum Pct. | | | |
|---|---|---|---|---|---|---|---|
| 0–13 | 51.8 | 4 | 0.6 | | | | |
| 13–22 | 54.3 | 4 | 0.6 | | | | |
| 22–32 | 53.8 | 6 | 0.6 | | | | |
| 32–42 | 49.2 | 7 | 0.8 | | | | |
| 42–53 | 49.6 | 8 | 0.9 | | | | |
| 53–106 | 52.3 | 7 | 0.7 | | | | |
| 106–110+ | 59.9 | 4 | 0.7 | | | | |

1/ Percent of whole soil including >2 mm.

KARRO LOAM
S64Ariz-2-24

Location: Cochise County, Arizona. 5 miles east and 14 miles south of Willcox, Arizona via Kansas Settlement Road. 2000 feet north and 350 feet west of the southeast corner of Sec. 12, T. 16 S., R. 25 E. Date of Sampling: October 21, 1964.
Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, M. L. Richardson, and R. K. Preece.
Classification: Ustollic Calciorthid, coarse-loamy, carbonatic, thermic.
Vegetation: Cropland. Climate: Precipitation about 11 inches annual. Mean annual temperature is 58° F. at Willcox. Mean January temperature 41° F.; mean July temperature 77° F. Soil temperature at time of sampling was: 20 inches 62° F., 48 inches 64° F., 96 inches 68° F. Parent Material: Mixed alluvium, from rhyolite, ignimbrite, andesite, limestone and quartzite. Topography: Nearly level valley plain on Willcox Playa. Slopes are smooth and very slightly convex with gradient of 0.2 to 0.3 percent. Elevation: 4,240 feet. Drainage: Well drained. Moderately permeable. Slow surface runoff. Soil Moisture: Moist - 50-75 percent field capacity. Remarks: Karro soils are associated with soils of the Gothard, Pima, and McAllister series and are situated in intermittent bodies surrounding the playa. Paired sample is S64Ariz-2-23. Field determinations of pH by thymol blue in 1:5 dilution.

| HORIZONS | DESCRIPTION |
|---|---|
| Ap1<br>RSL No.<br>64631 | 0-13 inches (0-33 cm), light grayish brown (10YR 6/2) loam, brown to dark brown (10YR 4/3) when moist; massive, breaking to moderate and strong fine granular structure; many medium to coarse subrounded clods in upper part; slightly hard when dry, very friable when moist, slightly plastic when wet; common fine, medium, and coarse roots; many fine interstitial pores; violently effervescent lime disseminated; pH 8.4; gradual smooth boundary. |
| Ap2<br>RSL No.<br>64632 | 13-22 inches (33-56 cm) *, same colors; loam; massive, breaking to weak fine subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; common fine, medium, and large roots; many fine interstitial pores; violently effervescent; pH 8.4; abrupt irregular boundary. |
| C1ca<br>RSL No.<br>64633 | 22-32 inches (56-81 cm) *, mottled pale brown (10YR 6/3) and white (10YR 8/2) very gravelly loam, brown (10YR 5/3) and pale brown (10YR 6/3) when moist; silica(?); extremely hard when dry, firm when moist, non-sticky and slightly plastic; common fine, medium, and large (alfalfa) roots; many fine and very fine tubular pores both in matrix and concretions; 50-60 percent of volume is medium to large, extremely hard, extremely firm lime-silica(?) concretions; violently effervescent; pH 8.6; gradual smooth boundary. |
| C2ca<br>RSL No.<br>64634 | 32-42 inches (81-107 cm) *, mottled pink (7.5YR 7/3) and white (10YR 8.2) light clay loam; light brown (7.5YR 6/4) and very pale brown (10YR 7/3) when moist; massive, breaking to weak fine granular and subangular blocky structure; very hard when dry; firm when moist, slightly sticky and slightly plastic when wet; common fine, medium, and large (alfalfa) roots; many fine and very fine tubular pores both in matrix and concretions; about 10 percent extermely hard, extremely firm concretions; violently effervescent; pH 8.6; gradual smooth boundary. |
| C3ca<br>RSL No.<br>64635 | 42-53 inches (107-135 cm) with pinkish white (7.5YR 8/2) concretions very gravelly loam, light brown (7.5YR 6/4) and pink (7.5YR 7/4) when moist; massive, breaking to weak fine granular and subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; fine, medium and coarse roots; many fine and very fine tubular pores in matrix and concretions; violently effervescent; 50-60 percent 1/4 to 1 inch rounded to irregular shaped concretions (concretions included as gravel in texture designation); pH 8.6; clear smooth boundary. |
| C4ca<br>RSL No.<br>64636 | 53-106 inches (135-269 cm), mottled white (10YR 8/2) and very pale brown (7.5YR 7/4) clay loam, very pale brown (7.5YR 6/4) when moist; massive, breaking to weak fine subangular blocky structure; extremely hard when dry, extremely firm when moist, slightly sticky and plastic when wet; common fine, medium, and coarse roots; many very fine, fine and medium tubular pores; common (10-15 percent) 1/4 to 1 inch concretions; violently effervescent; pH 8.6; clear irregular boundary. |
| IIC5<br>RSL No.<br>64637 | 106-110 inches (269-279 cm), light brown (7.5YR 6/4) with a few coarse distinct mottles of white (N/8) clay, brown (7.5YR 4/4) and pink (7.5YR 7/4) when moist; massive, breaking to weak fine and medium subangular blocky structure; hard when dry, firm when moist, very plastic when wet; common fine, medium, and large roots; many very fine and fine and a few medium tubular pores; violently effervescent; pH 8.6. |

* Rodent burrows 2 to 6 inches across penetrate the horizon about every three feet, and extending in all directions. These cavities are filled with Ap materials mixed with nodules. This material was not sampled.

CONSECUTIVE PEDON NUMBER C 71 2 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES LOMITAS SOIL NO. S71 ARIZ. 10- 3 SAMPLE NO. 1 10-1 12 ORGAN PIPE MON AREA

SOIL FAMILY: LITHIC CAMBORTHID,LOAMY-SKELETAL,MXD,HYPRTHRMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | | DEPTH CM. | | HORZ. | TOTAL FRACTION <2 mm SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A,.02 | 1A2A INT. II | COARSE FRAGMENTS PCT. I 2-75 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | |
| 1 | 10 | 0- | 5 | A1 | 52.7 | 36.3 | 9.0 | 9.3 | 3.5 | 2.1 | 10.5 | 27.3 | 28.1 | 10.2 | 7.5 | 1.5 | | 62.8 | 80* | 46 | 20 | 5 |
| 1 | 11 | 5- | 25 | B2 | 47.9 | 39.6 | 12.5 | 10.4 | 2.9 | 1.9 | 9.3 | 23.4 | 25.4 | 14.2 | 9.8 | 2.7 | | 55.5 | 80* | 46 | 19 | 6 |
| 1 | 12 | 25- | 33 | C 1CA | 46.6 | 35.2 | 18.2 | 15.3 | 5.2 | 2.5 | 7.9 | 15.7 | 18.5 | 16.7 | | | 4 | 39.5 | 81* | 42 | 21 | 9 |

| SAMPLE NO. | | DEPTH CM. | | ORG.MATTER CARBON 6A1A -PERCENT- | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6F1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT EXT 6C2B FE -----PERCENT----- | PYROP EXT 6G7A AL | FE 6C5A | AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY 1/3 BAR PCT.NO.40 | DRY GRAMS PER CC | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C -----PERCENT----- | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEE 4D1 -PERCENT- | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 0- | 5 | 0.38 | 0.051 | 1 | | 0.7 | 0.1 | | | | | 1.30 | 1.33 | 0.34 | 23.1 | 18.7 | 5.9 | 0.8 | 0.3 |
| 1 | 11 | 5- | 25 | 0.31 | 0.045 | 5 | | 0.4 | TR | | | | | 1.45 | | 0.32 | | | 7.6 | | |
| 1 | 12 | 25- | 33 | 0.40 | | 31 | | 0.2 | TR | | | | | 1.65 | | 0.28 | | | 10.2 | | |

| SAMPLE NO. | | DEPTH CM. | | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 1 | 10 | 0- | 5 | 12.3 | 1.8 | 0.1 | 1.3 | 15.5 | | | 15.5 | 11.5 | 100+ | | 100+ | | 8.2 | 7.4 |
| 1 | 11 | 5- | 25 | 20.4 | 1.8 | 0.1 | 1.3 | 23.6 | | | 23.6 | 11.8 | 100+ | | 100+ | | 8.2 | 7.7 |
| 1 | 12 | 25- | 33 | 19.2 | 1.6 | 0.2 | 0.6 | 21.6 | | | 21.6 | 8.3 | 100+ | | 100+ | | 8.3 | 7.8 |

| SAMPLE NO | | DEPTH CM. | | CLAY MINERALOGY <.002 MM DTA 7A3 -PERCENT- | LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 0- | 5 | | MI 4 | MT 1 | KK 1 | | MI 3 | | | MI MICA | 1 TRACE |
| 1 | 11 | 5- | 25 | | MI 4 | MT 1 | KK 1 | | MI 3 | | | MT MONTMORT | 2 SMALL |
| 1 | 12 | 25- | 33 | | MI 5 | MT 1 | KK 1 | | | | | KK KAOLINIT | 3 MODERATE |
| | | | | | | | | | | | | | 4 ABUNDANT |
| | | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
**=THE 75-250MM FRACTION IS INCLUDED.

## LOMITAS VERY COBBLY LOAM

S71 Ariz-10-3-(1-4*)

Location: Pima County, Arizona. 1/8 mile east and 1/16 mile north of the southwest corner of Section 11, T18S, R5W, Organ Pipe Cactus National Monument. Date of Sampling: April 6, 1971.
Description by: Y.H.Havens, E.Chamberlin. Collectors: K. Flach, E. Chamberlin, K. Vogt.
Classification: Lithic Camborthid, loamy-skeletal, mixed, hyperthermic.
Vegetation: Triangle bursage, creosotebush, saguaro and organpipe cacti and paloverde. Use: Desert rangeland. Climate: Mean annual precipitation 7 to 9 inches. Mean annual air temperature 69° F. Parent Material: Andesite and welded andesitic tuff. Topography: Moderately steep--concave, with 25 percent slopes. Elevation: 1440 feet. Drainage: Well drained, with moderate permeability to bedrock. Soil Moisture: Dry.
Remarks: 70 percent of surface covered with angular gravel, cobbles and stones.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>7110 | 0 to 5 cm (0 to 2 inches), brown (7.5YR 5/4) very cobbly loam, dark brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, friable, nonsticky, slightly plastic; few very fine roots; common very fine tubular and vesicular and common medium tubular pores; 70 percent gravel and cobble by volume; slightly effervescent; moderately alkaline (pH 8.0 thymol blue); abrupt wavy boundary. |
| B2<br>RSL<br>7111 | 5 to 25 cm (2 to 10 inches), light brown (7.5YR 6/4) very gravelly loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky, slightly plastic; few very fine, fine and medium roots; common very fine interstitial and few fine tubular pores; 75 percent gravel and cobble by volume, strongly effervescent; gravel have pinkish white (5YR 8/2) lime coatings on undersides; moderately alkaline (pH 8.0); clear wavy boundary. |
| Cca<br>RSL<br>7112 | 25 to 33 cm (10 to 13 inches), light brown (7.5YR 6/4) very gravelly loam, dark brown (7.5YR 4/4) moist; massive; soft, very friable, slightly sticky, slightly plastic; common fine and medium roots; common fine interstitial pores;80 percent gravel and cobble by volume; violently effervescent; continuous pinkish white (5YR 8/2) lime coatings on all gravel and cobbles;moderately alkaline (pH 8.2);abrupt irregular boundary |
| R<br>RSL | 33 to 43 cm (13 to 17 inches), dusky red (10R 3/2) and reddish gray (10R 5/1) extremely hard andesitic tuff with continuous lime coating on upper surfaces and in fractures, dusky red (10R 3/3) and weak red (10R 4/3) moist; few fine roots in rock fractures. |

CONSECUTIVE PEDON NUMBER C 69206 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CAVE TAXADJUNCT SOIL NO. S69 ARIZ. 10- 5 SAMPLE NO. 91096-91100 WALNUT G.-TUCSON AREA

SOIL FAMILY: TYPIC PALEORTHID,LOAMY-SKELETAL,MXD,THRMC,SHLLW RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 | SANDS .05- .002 | SILTS .002- LT | CLAYS LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. CLAY 2- .2U | FINE CLAY LT .2U | CARBONATE CLAY NATE 3A1A | INT. II .2- .02 | COARSE FRAGMENTS PCT. OF WHOLE 75- 20 | I | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 91096 | 0- 3 | A1 | 71.2 | 22.0 | 6.8 | | 9.4 | 12.2 | 12.9 | 21.7 | 15.0 | 17.8 | 4.2 | | | 44.1 | 69A | -- | 46 | 23 | |
| 91097 | 3- 18 | C 1 | 63.7 | 27.3 | 9.0 | | 8.9 | 11.5 | 9.2 | 18.5 | 15.6 | 20.7 | 6.6 | | | 46.6 | 68A | -- | 53 | 15 | |
| 91098 | 18- 51 | C2cam | 63.2 | 25.7 | 11.1 | | 17.4 | 17.1 | 9.9 | 11.5 | 7.3 | 8.0 | 17.7 | | | 6 21.1 | --G | --G | --G | --G | |
| 91099 | 51- 81 | C3cam | 57.3 | 29.9 | 12.8 | | 17.8 | 11.5 | 6.7 | 11.5 | 9.8 | 11.0 | 18.9 | | | 6 27.4 | --G | --G | --G | --G | |
| 91100 | 81-104 | C4cam | 64.4 | 22.8 | 12.8 | | 26.9 | 13.9 | 7.5 | 9.5 | 6.6 | 7.1 | 15.7 | | | 4 18.7 | --G | --G | --G | --G | |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 91096 | 0- 3 | 0.73 | 0.082 | 1 | | 0.6 | | | 1.46 | 1.50 | 0.44 | 15.2 | 4.4 | 0.9 | 0.4 | 7.6 | 8.7 | 7.5 | |
| 91097 | 3- 18 | 0.46 | 0.046 | 1 | | 0.7 | | | 1.52 | 1.55 | 0.46 | 12.0 | 4.4 | 0.7 | 0.3 | 7.8 | | 7.7 | |
| 91098 | 18- 51 | 0.27 | | 56 | | 0.2 | | | | | 1.00 | | 6.7 | | | 7.2 | 8.3 | 7.9 | |
| 91099 | 51- 81 | | | 53 | | 0.2 | | | | | 1.00 | | 6.8 | | | 7.3 | 8.5 | 8.0 | |
| 91100 | 81-104 | | | 32 | | 0.2 | | | | | 1.00 | | 10.0 | | | 7.3 | 8.0 | 8.0 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | ----------MEQ/1000 ML---------- | | | | | | | | PPM | |
| 91096 | 0- 3 | | | 0.2 | 1.2 | 1.4 | | | 8.3 | 0.81 | 6.7 | 1.2 | 0.9 | 1.4 | | 8.2 | 0.2 | | | 7.5 |
| 91097 | 3- 18 | | | 0.2 | 1.3 | 1.5 | | | 7.5 | | | | | | | | | | | |
| 91098 | 18- 51 | | | 4.6 | 2.3 | 6.9 | | | 3.2 | 25.0 | 102.3 | 101.5 | 94.9 | 20.8 | | 3.3 | 275.0 | 25.2 | | 7.4 |
| 91099 | 51- 81 | | | 4.4 | 1.3 | 5.7 | | | 3.3 | 16.4 | 53.6 | 53.4 | 93.4 | 8.7 | | 1.8 | 162.0 | 26.8 | | 7.8 |
| 91100 | 81-104 | | | 2.2 | 1.1 | 3.3 | | | 4.1 | 8.8 | 43.7 | 31.5 | 37.4 | 3.5 | | 1.8 | 64.9 | 52.0 | | 7.8 |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY LESS THAN 0.002 MM L.T. .0002 MM X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | DTA IV 7A2E | DTA 7A3 PCT. | X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91096 | 0- 3 | 31.0 | 0.2 | 2 | TR | | | MI 2 | | | | | | | | MI MICA | 1 TRACE |
| 91097 | 3- 18 | | 0.2 | 3 | | | | MI 2 | | | | | | | | | 2 SMALL |
| 91098 | 18- 51 | 43.0 | 0.5 | 16 | 9 | 0.1 | | MI 3 | | | | | | | | | 3 MODERATE |
| 91099 | 51- 81 | 40.8 | 0.6 | 18 | 13 | 0.1 | | | | | | | | | | | 4 ABUNDANT |
| 91100 | 81-104 | 45.5 | 0.5 | 12 | 6 | 3.0 | | MI 4 | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## CAVE GRAVELLY SANDY LOAM (taxadjunct) 1/
S69Ariz-10-5

Location: Pima County, Arizona. 1,420 feet west and 50 feet north of southeast corner of Sec. 2, T. 15 S., R. 13 E., approximately 30 feet north of Drexel Road, about 3 miles south of intersection of Ajo Road and I-10 in Tucson. Date of sampling: October 9, 1969.
Description by: Y. H. Havens and D. M. Hendricks. Collectors: Y. H. Havens and D. M. Hendricks.
Classification: Typic Paleorthid, loamy-skeletal, mixed, thermic, shallow.
Vegetation: Creosote bush and annual grasses and weeds. Climate: Mean annual temperature is approximately 67-69° F. Mean annual precipitation 10-11 inches. Parent material: Mixed old alluvium from limestone, granite, rhyolite, andesite and sandstone.
Topography: Nearly level to gently sloping old fan. Elevation: 2,475 feet.
Drainage: Well drained. Soil moisture: Dry.
Remarks: 25 to 30 percent gravel on surface.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>691096 | 0-3 cm (0-1 inch), brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 4/4) moist; weak thick platy structure; slightly hard, very friable, nonsticky, nonplastic; common very fine and fine roots; common fine and very fine interstitial and vesicular and few fine tubular pores; 20 percent gravel; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C1<br>RSL No.<br>691097 | 3-18 cm (1-7 inches), light brown (7.5YR 6/4) gravelly fine sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; common very fine, fine and medium roots; few fine vesicular and interstitial pores; 30 to 35 percent gravel; strongly effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. |
| C2cam<br>RSL No.<br>691098 | 18-51 cm (7-20 inches), white (10YR 8/2) gravelly indurated layer with thin laminar layer on upper part, very pale brown (10YR 7/3) moist; massive; slightly hard; very few very fine roots; few fine vesicular pores; violently effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. |
| C3cam<br>RSL No.<br>691099 | 51-81 cm (20-32 inches), white (10YR 8/2) and very pale brown (10YR 8/3) strongly cemented gravelly layer, very pale brown (10YR 7/3) and light yellowish brown (10YR 6/4) moist; massive; extremely hard to very hard, very firm; very few very fine roots; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C4cam<br>RSL No.<br>691100 | 81-104 cm (32-41 inches), white (10YR 8/2) and very pale brown (10YR 8/3) strongly cemented gravelly layer, very pale brown (10YR 7/3) and light yellowish brown (10YR 6/4) moist; massive; very hard to extremely hard; very firm; very few very fine roots; violently effervescent; moderately alkaline (pH 8.2). |

1/ The Cave series is in a loamy, mixed, thermic, shallow family of Typic Paleorthids. This pedon has more than 35 percent coarse fragments by volume.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Paleorthid, loamy, carbonatic, thermic, shallow
SOIL Cave gravelly loam (taxadjunct) SOIL Nos. S64Ariz-2-31 LOCATION Cochise County, Arizona
SOIL SURVEY LABORATORY. Riverside, California LAB. Nos. 64581 - 64582

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 1A2a: >2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0–1 | A11 | 50.8 | 35.2 | 14.0 | 8.4 | 7.7 | 4.3 | 14.3 | 16.1 | 22.5 | 12.7 | 48.7 | 34.7 | | | 51 | 37 | 14 |
| 1–8 | A12 | 38.1 | 37.3 | 24.6 | 6.0 | 5.8 | 3.4 | 10.0 | 12.9 | 20.0 | 17.3 | 39.5 | 25.2 | | | 44 | 17 | 27 |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | | 6E1b Carbonate as $CaCO_3$ 1/ | 3A1a Carbonate in <0.002 mm. | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | | Water content: | Water content: 4B1c 1/3 bar | Water content: 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLEF | 3B2 | pH: 8C1a 1:1 | pH: 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | | Pct. | Pct. | g/cc | g/cc | g/cc | Pct. | Pct. | Pct | in./in. | in./in. | Cm | $H_2O$ | $H_2O$ |
| 0–1 | 0.90 | 0.079 | 11 | | 44 | 2 | 1.44 | 1.49 | | | 17.1 | 7.6 | 0.012 | 0.007 | 0.64 | 8.3 | 8.9 |
| 1–8 | 1.63 | 0.159 | 10 | | 46 | 6 | 1.22 | 1.28 | | | 18.3 | 11.5 | 0.017 | 0.013 | 0.74 | 8.2 | 8.7 |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | Cation Exch. Capacity: 5A 1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste: Ca | Mg | Na | K | | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0–1 | 27.4 | 1.6 | 0.2 | 0.8 | 30.0 | 13.7 | | | | | | | | | | | 0.65 |
| 1–8 | 32.7 | 1.8 | 0.2 | 0.5 | 35.2 | 19.9 | | | | | | | | | | | 0.57 |

| Depth (In.) | 8A Water at Saturation | 5D2 Exchangeable Na | 5B1b Exch. Na me / 100 g | Gypsum | | | |
|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | | | |
| 0–1 | 30.1 | 1 | 0.2 | | | | |
| 1–8 | 49.4 | 1 | 0.2 | | | | |

1/ Percent of whole soil including >2 mm.

## CAVE GRAVELLY LOAM (taxadjunct) 1/
S64Ariz-2-31

Location: Cochise County, Arizona. 2.8 miles from the Johnson mine. 1560 feet east and 1850 feet south of the NW corner of Sec. 14, T. 15 S, R. 22 E and about 100 feet east of the road. Date of Sampling: October 23, 1964

Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, R. K. Preece, M. L. Richardson.

Classification: Typic Paleorthid, loamy, carbonatic, thermic, shallow.

Vegetation: Brush-grass: Mortonia, beargrass wolfberry, few oak brush, yucca, sotol, guajillo, tall three-awn, slim tridens, sideoats grama, fluff grass. Climate: Precipitation estimated 14-15 inches annual. Parent Material: Alluvium from limestone. Topography: Smooth convex and gently undulating alluvial fan. Slope is 6 percent with a northeast aspect. Elevation: 4950 feet. Drainage: Well drained. Rapid surface runoff. Permeability is variable. Soil Moisture: Slightly moist, 25 percent of field capacity. Remarks: Paired sample is S64Ariz-2-30. Cave and Whitehead soils have similar profiles but occur on different land forms, have markedly different vegetation, and different parent materials. Field determinations of pH by thymol blue in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>64581 | 0-1 inch (0-3 cm), light brownish gray (10YR 6/2) with a very thin surface coating of brownish yellow (10YR 6/6) very gravelly loam, dark brownish gray (10YR 4/2) and dark yellowish brown (10YR 3/4) when moist; moderate medium and fine platy structure; slightly hard when dry, very friable when moist, slightly sticky and plastic when wet; common fine and medium roots; many fine discontinuous and a few fine continuous tubular pores; 60 percent fine gravel and pan fragments; violently effervescent with HCL; pH 8.2; abrupt smooth boundary. |
| A12<br>RSL No.<br>64582 | 1-8 inches (3-20 cm), brown (1-YR 5/3), gravelly loam, dark brown (10YR 3/3) when moist; moderate fine and medium subangular blocky breaking to moderate fine granular structure; slightly hard when dry, very friable when moist, slightly sticky and plastic when wet; many fine and medium roots; many fine tubular and interstitial pores; violently effervescent; 8.2; abrupt wavy boundary. |
| Ccam<br>(not sampled) | 8 inches (20 cm), indurated lime conglomerate pan which is laminar in top 1/2 to 1 inch. White (N8) pinkish gray (7.5YR 7/2) when moist; massive; extremely hard when dry, and extremely firm when moist; no roots except in fractures; no pores in top 1/2 inch but common tubular fine pores below; violently effervescent. |

1/ The Cave series is in a loamy, mixed, thermic, shallow family of Typic Paleorthids. This pedon has carbonatic mineralogy.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Paleorthid, loamy, mixed, thermic, shallow
SOIL Cave gravelly loam SOIL Nos. S64Ariz-2-30 LOCATION Cochise County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64579 - 64580

| Depth (In) | Horizon | 1B1b Total Sand (2-0.05) | Total Silt (0.05-0.002) | Total Clay (< 0.002) | Sand: Very coarse (2-1) | Sand: Coarse (1-0.5) | Sand: Medium (0.5-0.25) | Sand: Fine (0.25-0.1) | Sand: Very fine (0.1-0.05) | Silt: 0.05-0.02 | Silt: Int. III (0.02-0.002) | 3A1 Int. II (0.2-0.02) | (2-0.1) | | | Coarse fragments 1A2c: > 2 Pct | 2 - 19 Pct. of < 76 mm | 19 - 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Size class and particle diameter (mm) | | | | | | | | | | | | | | | | |
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0-1 | A11 | 48.2 | 32.4 | 19.4 | 5.8 | 7.3 | 4.9 | 15.5 | 14.7 | 19.5 | 12.9 | 44.5 | 33.5 | | | 38 | 31 | 7 |
| 1-5 | A12 | 42.1 | 32.6 | 25.3 | 7.3 | 7.3 | 4.2 | 12.1 | 11.2 | 19.1 | 13.5 | 38.4 | 30.9 | | | 37 | 21 | 16 |

| Depth (In) | 6A1a Organic carbon Pct | 6B1a Nitrogen Pct | C/N | | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | 3A1a Carbonate in <0.002 mm Pct. | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | Bulk density: g/cc | | Water content: Pct. | Water content: 4B1c 1/3 bar Pct | Water content: 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | 3B2 Cm | pH: 8C1a 1:1 $H_2O$ | pH: 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | 0.91 | 0.082 | 11 | | 36 | 5 | 1.34 | 1.40 | | | | 18.3 | 9.1 | 0.014 | 0.011 | 0.76 | 8.2 | 8.8 |
| 1-5 | 1.64 | 0.150 | 11 | | 33 | 6 | 1.21 | 1.28 | | | | 18.8 | 11.3 | 0.018 | 0.014 | 0.79 | 8.1 | 8.7 |

| Depth (In.) | Extractable bases 5B1a: 6N2b Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0-1 | 31.0 | 1.7 | 0.2 | 0.8 | 33.7 | | 16.2 | | | | | | | | | | | 0.98 |
| 1-5 | 34.8 | 2.0 | 0.2 | 0.4 | 37.4 | | 18.8 | | | | | | | | | | | 0.68 |

| Depth (In.) | 8A Water at Saturation Pct. | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na me / 100 g | Clay mineralogy (<0.002 mm): Montmorillonite | Vermiculite | Illite | Kaolinite |
|---|---|---|---|---|---|---|---|
| | | | | X-ray 7Å | | | |
| 0-1 | 34.1 | 1 | 0.2 | | | | |
| 1-5 | 49.3 | 1 | 0.2 | xxxx | - | xx | tr. |

1/ In percent of whole soil including >2 mm.

x - detected
xx - moderate
xxx - abundant
xxxx - dominant

## CAVE GRAVELLY LOAM
S64Ariz-2-30

Location: Cochise County, Arizona. 1.9 miles north of the Johnson mine. 700 feet east and 1000 feet south of the N 1/4 corner of Sec. 23, T. 15 S, R. 22 E, 100 feet east of road. Date of Sampling: October 23, 1964.
Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, R. K. Preece, and M. L. Richardson.
Classification: Typic Paleorthid, loamy, mixed, thermic, shallow.
Vegetation: Brush-grass: Mortonia scabrella (sandpaper bush), beargrass, yucca, wolfberry, sotol, black grama, sideoats grama, slim tridens, tall three-awn and fluffgrass. Brush is dominant. Climate: Precipitation estimated 14-15 inches annual. Mean annual temperature 58° F. (Willcox). Parent Material: Alluvium from limestone. Topography: Smooth convex and gently undulating alluvial fan. Slope is 5 percent with a northeast aspect. Elevation: 4950 feet. Drainage: Well drained. Rapid surface runoff. Permeability is variable. Soil Moisture: Slightly moist - 25 percent field capacity. Remarks: Cave and Whitehead soils have similar profiles but occur on different land forms, have markedly different vegetation, and different parent materials. Field determinations of pH by thymol blue in 1:5 dilution. Paired sample is S64Ariz-2-31.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>64579 | 0-1 inch (0-3 cm), light brownish gray (10YR 6/2), with a very thin surface crust of brownish yellow (10YR 6/6), very gravelly loam, dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4) when moist; friable when moist, slightly sticky and slightly plastic when wet; common fine and medium roots; many fine and very fine discontinuous and a few fine continuous tubular pores; 50-60 percent fine gravel and lime fragments; violently effervescent with HCl; pH 8.21; abrupt smooth boundary. |
| A12<br>RSL No.<br>64580 | 1-5 inches (3-13 cm), pinkish gray (7.5YR 6/2) gravelly loam, brown to dark brown (7.5YR 4/2) when moist; weak fine and many fine interstitial and common tubular pores; 40 percent fine gravel and lime fragments; violently effervescent; pH 8.2; abrupt smooth boundary. |
| Ccam<br>(Not sampled) | 5 inches (13 cm), indurated lime conglomerate pan with laminar layer in upper part. Pinkish white to white (7.5YR 8/2 & N8) that is pinkish gray (7.5YR 7/2) when moist; massive; extremely hard both dry and moist; no roots except in fractures; no pores; violently effervescent. |

**SOIL SURVEY LABORATORY** Riverside, California

**SOIL TYPE** Pastura gravelly loam **LOCATION** Yavapai County, Arizona

SOIL FAMILY: Ustollic Paleorthid, loamy, mixed, mesic, shallow

SOIL NOS. S59Ariz-13-1 **LAB. NOS.** 59393 - 59396 & 59396-A

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 3A1 0.2-0.02 | 0.02-0.002 | 2A2 > 2 ** | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-4 | $A_1$ | 1.6 | 5.2 | 6.7 | 16.4 | 12.5 | 35.6 | 22.0 | 42.0 | 16.1 | 39 | 1 |
| 4-13 | $C_1$ | 1.1 | 4.5 | 5.8 | 13.4 | 9.8 | 36.3 | 29.1 | 35.5 | 18.8 | 37 | cl |
| 13-20 | C2ca | 1.6 | 5.3 | 6.1 | 13.6 | 10.5 | 34.9 | 28.0 | 36.4 | 17.3 | 41 | cl |
| 20-38 | C3cam &C4ca | 2.7 | 8.2 | 6.5 | 11.4 | 8.7 | 35.7 | 26.8 | 28.1 | 23.1 | 41 | 1- cl |
| 20-24* | C3cam | | | | | | | | | | 20 | |

| 8C1b pH SATURATED PASTE 1:1 | 6I1a $CO_3$ meq./l. | 8C1a pH 1:10 | ORGANIC MATTER 6A1a ORGANIC CARBON % | 6B1a NITROGEN % | C/N | 6J1a $HCO_3$ meq./l. | 8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C. | 6E1b $CaCO_3$ equivalent % | 4A3a Bulk Density g./cc | MOISTURE TENSIONS 4B2 1/10 ATMOS. % | 4B2 1/3 ATMOS. % | 4B2 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.8 | - | 8.7 | 1.12 | 0.115 | 9.7 | 3.9 | 0.5 | 11 | | | | 11.4 |
| 7.6 | - | 8.7 | 1.07 | 0.121 | 8.8 | 2.8 | 0.5 | 21 | | | | 13.7 |
| 7.8 | - | 8.6 | 0.81 | 0.092 | 8.8 | 3.7 | 0.5 | 23 | | | | 12.7 |
| 8.0 | - | 8.9 | 0.44 | 0.052 | 8.5 | 2.5 | 1.0 | 64 | | | | 11.3 |
| 20-24 | Inch horizon* | | | | | | | 82 | | | | |

| 5A2a CATION EXCHANGE CAPACITY (Na) | EXTRACTABLE CATIONS 5B1a Ca 6N2b | 5B1a Mg 6O2c | 6H2a H | Exch. 5B1b Na 6P2a | Exch. 5B1b K 6Q2a | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE 8A1 6P1a Na | 6Q1a K | 6N1a Ca | 6O1a Mg | 6K1a Cl | 8A MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | | | | | |
| 24.2 | | | | <0.1 | 1.2 | | 0.1 | 0.3 | 4.0 | 0.6 | 0.0 | 36.8 |
| 24.4 | | | | <0.1 | 0.6 | | 0.2 | 0.1 | 4.4 | 0.4 | 0.2 | 46.4 |
| 25.3 | | | | <0.1 | 0.5 | | 0.2 | 0.1 | 4.0 | 0.8 | 0.1 | 42.9 |
| 9.9 | | | | 0.1 | 0.2 | | 1.9 | 0.1 | 5.2 | 3.4 | 1.1 | 43.4 |

* Riv. Lab. No. 59396-A -- Depth 20-24 inches - Strongly cemented calcium carbonate cap - C3cam horizon

** Percent of the whole soil

## PASTURA GRAVELLY LOAM

S59Ariz-13-1

Location: Yavapai County, Arizona. 1.5 miles north of Paulden on west side of Highway 89, 325 feet north of Milepost 339 in NW1/4 of Sec. 34, T. 18 N., R. 2 W. Date of Sampling: May 22, 1959.
Description by: Milo James. Collectors: Milo James and Rex Binnie.
Classification: Ustollic Paleorthid, loamy, mixed, mesic, shallow.
Vegetation: Grass aspect with approximate 10 percent crown density. Vegetation consists of ring muhly, black grama, sand dropseed, snakeweed, three-awn, Indianwheat and mallow, in order of occurrence.
Climate: Cold winters, cool summers, 12 inches precipitation, 54° F. mean annual temperature.
Parent Material: Fan alluvium from light gray crystalline Redwall limestone of Mississippian Age with possibly some basalt. Topography: Smooth convex slopes of 1½ percent to the southeast.
Elevation: 4,450 feet. Drainage: Well drained. Soil Moisture: Surface moist from recent shower.
Remarks: Thin scattering of chert fragments and occasional limestone gravel on surface. Limestone or chert gravel and small stones up to 4 inches throughout the lower sections - about 20 percent by volume but may vary considerably in short distances. Root distribution is normal to 30 inches, very few roots below.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>59393 | 0-4 inches (0-10 cm), brown (10YR 4/3) gravelly coarse loam, dark brown (10YR 3/3) moist; moderate very fine to fine granular; slightly hard when dry, very friable moist, slightly sticky and slightly plastic when wet; strongly calcareous; common fine and medium continuous and interstitial pores; numerous medium and fine roots; clear wavy boundary. |
| C1<br>RSL No.<br>59394 | 4-13 inches (10-33 cm), dark grayish brown (10YR 4/2) gravelly loam, few to numerous fine mycelia of lime, brown (10YR 4/3) moist; weak medium angular blocky breaking to weak fine granular; slightly hard when dry, very friable moist, sticky and plastic when wet; very strongly effervescent; common fine and medium continuous and interstitial pores; common fine and medium roots; few animal burrows; clear wavy boundary. |
| C2ca<br>RSL No.<br>59395 | 13-20 inches (33-51 cm), brown (10YR 4/3) gravelly loam, brown (10YR 4/3) moist, with common medium distinct very pale brown lime mottles; massive; slightly hard when dry, very friable moist, sticky and plastic when wet; very strongly effervescent with few small concretions of calcium; common fine and medium continuous and interstitial pores; common fine and medium roots; a few yellowish red (5YR 4/6) clay loam pipes, yellowish red (5YR 4/6) moist, and a few animal burrows; clear irregular boundary. |
| C3cam<br>RSL No.<br>59396A | 20-24 inches (51-61 cm), white (N 8/ ) indurated petrocalcic horizon, very pale brown (10YR 7/3) moist; very hard when dry, very firm when moist, nonsticky and nonplastic when wet; strongly effervescent; few fine pores and few fine roots; clear wavy boundary. |
| C4ca<br>RSL No.<br>59396 | 24-38 inches (61-97 cm), white (N 8/ ) gravelly loam, very pale brown (10YR 7/3) moist; massive except for the top of the horizon which has irregular horizontal laminae, 1/64 - 1/8 inch thick and for the vertical joints at approximately 6 foot intervals in rough hexagonal pattern; weakly cemented; hard when dry, friable moist, nonsticky and nonplastic when wet except for the horizontal laminae and vertical joints which are strongly cemented, very hard when dry, and very firm when moist; very strongly effervescent; few fine roots and few fine pores. |

CONSECUTIVE PEDON NUMBER C 69156 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES UNNAMED SOIL NO. S69 ARIZ. 2-10 SAMPLE NO. 9 814-9 815 WILLCOX AREA

SOIL FAMILY: TYPIC FLUVAQUENT,VERY-FINE,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | INT. II .2- .02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 9 814 | 0- 15 | | 0.3 | 9.9 | 89.8 | -- | -- | -- | 0.2 | 0.1 | 1.0 | 8.9 | | | 5 | 1.2 | --A | -- | -- | -- |
| 9 815 | 25- 50 | | 0.4 | 26.2 | 73.4 | -- | -- | -- | 0.2 | 0.2 | 5.2 | 21.0 | | | 9 | 5.5 | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L I M I T LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT.NO.40 | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 9 814 | 0- 15 | 0.26 | 0.077 | 9 | | 0.4 | | | 1.50 | | | 1.00 | | | 24.2 | | | 9.8 | 10.3 | 9.9 |
| 9 815 | 25- 50 | 0.38 | | 17 | | 0.1 | 82 | 30 | 1.50 | | | 1.00 | | | 30.1 | | | 9.6 | 10.2 | 9.8 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 9 814 | 0- 15 | | | 149.1 | 2.8 | 151.9 | | | 59.2 | 63. | 0.3 | 0.1 | 944.0 | 1.1 | 86.5 | 20.6 | 609.0 | 246.0 | | 9.7 |
| 9 815 | 25- 50 | | | 176.2 | 2.1 | 178.3 | | | 43.8 | 56.5 | 1.1 | 0.2 | 840.0 | 1.0 | 79.9 | 15.2 | 522.0 | 222.6 | | 9.8 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | -GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 PCT. | L.T. .0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 814 | 0- 15 | 75.3 | 78.0 | 100+ | 100+ | | | MI 3 | MT 1 | | | | | | | MI MICA | 1 TRACE |
| 9 815 | 25- 50 | 129.4 | 67.5 | 100+ | 100+ | | | MI 3 | MT 2 | KK 1 | | | | | | MT MONTMORT | 2 SMALL |
| | | | | | | | | | | | | | | | | KK KAOLINIT | 3 MODERATE |
| | | | | | | | | | | | | | | | | | 4 ABUNDANT |
| | | | | | | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

UNNAMED
S69Ariz-2-10

Location: Cochise County, Arizona. The Willcox Playa, east of the Southern Pacific Railroad tracks that cross the northwestern part of the playa--about midway between the northern and western margins. Date of Sampling: October 15, 1969.
Description by: None made. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Fluvaquent, very-fine, mixed, thermic.
Vegetation: Barren playa bed. Use: None. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 58°F., January 41°F., July 78°F. Flooded for long periods. Parent Material: Alluvium from andesite, rhyolite, quartzite, granite and limestone. Topography: Level playa floor. Slope, 0.1 percent or less. Elevation: 4136 feet. Drainage: Poorly to very poorly drained. Runoff is very slow. Permeability is very slow.
Remarks: No attempt was made to describe these samples or the profile. The samples were taken primarily to complete the toposequence sampling.

| | |
|---|---|
| RSL 69814 | 0 to 15 cm (0 to 6 inches) clay. |
| RSL 69815 | 25 to 50 cm (10 to 20 inches) clay. |

CONSECUTIVE PEDON NUMBER C 67 64 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES VINT SOIL NO. S67 ARIZ. 7-14 SAMPLE NO. 7 721-7 727 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC TORRIFLUVENT,SANDY,MIXED,HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 SAND | .05- .002 SILT | LT .002 CLAY | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | PCT. OF WHOLE SOIL | 1 75- 20 PCT. OF | II 20-5 | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 7 721 | 0- 23 | AP1 | 85.1 | 10.6 | 4.3 | 0.7 | 6.2 | 18.6 | 47.0 | 12.6 | 9.5 | 1.1 | | | | 43.8 | 1 | TR | 1Z | N |
| 7 722 | 23- 36 | AP2 | 88.6 | 7.7 | 3.7 | 0.4 | 5.6 | 19.4 | 50.5 | 12.7 | 6.7 | 1.0 | | | | 41.6 | TR | TR | -- | -- |
| 7 723 | 36- 58 | C 1 | | | | | | | | | | | | | | | TR | TR | --Z | -- |
| 7 724 | 58- 74 | C 2 | 96.3 | 2.0 | 1.7 | 0.2 | 10.2 | 35.3 | 47.7 | 2.9 | 1.4 | 0.6 | | | | 18.7 | TR | TR | --Z | -- |
| 7 725 | 74- 86 | C 3 | | | | | | | | | | | | | | | TR | TR | --Z | -- |
| 7 726 | 86-114 | C 4 | 92.7 | 4.9 | 2.4 | 1.2 | 6.0 | 13.3 | 57.2 | 15.0 | 3.1 | 1.8 | | | | 51.2 | 1 | TR | 1Z | N |
| 7 727 | 114-157 | 2C 5 | 97.2 | 1.5 | 1.3 | 10.8 | 43.7 | 30.4 | 11.6 | 0.7 | 0.6 | 0.9 | | -- | | 4.1 | 10 | TR | 10Z | N |

| SAMPLE NO. | DEPTH CM. | ORG. CAR- BON 6A1A -PERCENT-- | MATTER NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L I M I T LL 4F1 | PL 4F2 PCT.NO.40 | BULK DENSITY EST 1/3 BAR 4A1F GRAMS PER CC | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C -----PERCENT--- | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 721 | 0- 23 | 0.26 | 0.033 | TR | | | | | 1.27 | | | | | | 5.4 | | | 8.1 | | 7.2 |
| 7 722 | 23- 36 | 0.19 | | TR | | | | | | 1.27 | 1.27 | 1.00 | | 15.1 | 5.4 | | | 8.2 | | 7.4 |
| 7 723 | 36- 58 | | | 1 | | | | | 1.44 | | | | | | 6.4 | | | 8.3 | | 7.6 |
| 7 724 | 58- 74 | 0.02 | | TR | | | | | 1.44 | | | | | | | | | | | |
| 7 725 | 74- 86 | | | TR | | | | | 1.44 | | | | | | | | | | | |
| 7 726 | 86-114 | | | TR | | | | | | 1.44 | 1.44 | 0.99 | | 12.5 | | | | | | |
| 7 727 | 114-157 | | | TR | | | | | 1.44 | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES--- CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C-- NA- OAC 5A2A -MEQ/100G | NH4- OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A -MEQ/1000 | CO3 6I1A ML | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | | | | | | | | | | | | | |
| 7 721 | 0- 23 | | | 0.6 | 0.8 | 1.4 | | | 8.4 | 4.00 | 25.4 | 6.8 | 7.2 | 2.4 | | 2.8 | 8.5 | | | |
| 7 722 | 23- 36 | | | 0.6 | 0.9 | 1.5 | | | 7.4 | 3.07 | 17.5 | 6.0 | 5.8 | 1.1 | | 1.6 | 6.2 | | | |
| 7 723 | 36- 58 | | | | | | | | | | | | | | | | | | | |
| 7 724 | 58- 74 | | | 0.3 | 0.3 | 0.6 | | | 5.1 | | | | | | | | | | | |
| 7 725 | 74- 86 | | | | | | | | | | | | | | | | | | | |
| 7 726 | 86-114 | | | 0.9 | 0.8 | 1.7 | | | 11.0 | | | | | | | | | | | |
| 7 727 | 114-157 | | | 0.5 | 0.5 | 1.0 | | | 6.1 | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- -L.T. .0002 MM- X RAY DTA 7A2E I | 7A2E II | 7A2E III | 7A2E IV | 7A3 PCT. | X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 721 | 0- 23 | 29.4 | 0.4 | 5 | 2 | | | MT 3 | MI 3 | | | | | | | MT MONTMORT | 1 TRACE |
| 7 722 | 23- 36 | 31.2 | 0.4 | 6 | 2 | | | | | | | | | | | MI MICA | 2 SMALL |
| 7 723 | 36- 58 | | | | | | | | | | | | | | | | 3 MODERATE |
| 7 724 | 58- 74 | | 0.3 | 6 | | | | MT 2 | MI 2 | | | | | | | | 4 ABUNDANT |
| 7 725 | 74- 86 | | | | | | | | | | | | | | | | 5 DOMINANT |
| 7 726 | 86-114 | | 0.9 | 8 | | | | | | | | | | | | | 6 INDETER. |
| 7 727 | 114-157 | | 0.5 | 8 | | | | | | | | | | | | | |

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## VINT LOAMY FINE SAND
S67Ariz-7-14

Location: Maricopa County, Arizona. 1450 feet east and 200 feet south of the northwest corner of Sec. 19, T. 2 S., R. 7 E. Date of Sampling: October 13, 1967.
Description by: E. Adams, J. Saunders, J. Jay. Collectors: K. Flach, D. Nettleton, E. Adams, E. Chamberlin, J. Saunders, J. Jay.
Classification: Typic Torrifluvent, sandy, mixed, hyperthermic.
Vegetation: Fallow. Use: Cropland. Climate: Mean annual precipitation is about 8 inches. Mean annual air temperature is about 80° F. Temperature at 20 inches approximately 80° F. Parent Material: Mixed - acid and basic igneous and metamorphosed sedimentaries. Topography: Flood plains and low fans. Elevation: 1280 feet. Drainage: Well drained. Permeability is rapid. Soil Moisture: Slightly moist below 9 inches Remarks: This profile deviates slightly from the modal in that the C2 (23 to 29 inches) horizon is weak coarse subangular blocky structure rather than weak fine subangular blocky structure. Field determination of pH by thymol blue indicator in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| Ap1<br>RSL No.<br>67721 | 0-23 cm (0-9 inches), pale brown (10YR 6/3) loamy fine sand, dark brown (10YR 4/3) moist; massive with a weak platy structure at the upper 1/4 inch; soft when dry, very friable when moist, nonsticky and nonplastic when wet; many fine and medium roots; many fine interstitial pores; very slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| Ap2<br>RSL No.<br>67722 | 23-36 cm (9-14 inches), pale brown (10YR 6/3) loamy fine sand, dark brown (10YR 4/3) moist; massive; soft when dry, very friable when moist, nonsticky and nonplastic when wet; common fine roots; many fine interstitial pores; very slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C1<br>RSL No.<br>67723 | 36-58 cm (14-23 inches), pale brown (10YR 6/3) loamy fine sand, dark brown (10YR 4/3) moist; massive; soft when dry, very friable when moist, nonsticky and nonplastic when wet; common fine roots; many fine interstitial pores; very slightly effervescent; moderately alkaline (pH 8.0); there is a very dark brown (10YR 2/2) band about 1/16 inch thick; abrupt smooth boundary. |
| C2<br>RSL No.<br>67724 | 58-74 cm (23-29 inches), pale brown (10YR 6/3) loamy coarse sand, dark brown (10YR 4/3) moist; massive; soft when dry, very friable when moist, nonsticky and nonplastic when wet; few fine roots; many fine interstitial pores; very slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C3<br>RSL No.<br>67725 | 74-86 cm (29-34 inches), pale brown (10YR 6/3) loamy fine sand, dark brown (10YR 4/3) moist; very dark brown (10YR 2/2) bands 1/16 to 1/8 inch thick make up 25 percent of this horizon; soft when dry, very friable when moist, nonsticky and nonplastic when wet; few fine roots; many fine interstitial pores; very slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C4<br>RSL No.<br>67726 | 86-114 cm (34-45 inches), pale brown (10YR 6/3) loamy fine sand, dark brown (10YR 4/3) moist; very dark brown (10YR 2/2) bands 1/16 to 1/8 inch thick make up 15 percent of this horizon; soft when dry, very friable when moist, and nonsticky and nonplastic when wet; few fine roots; many fine interstitial pores; very slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| IIC5<br>RSL No.<br>67727 | 114-157 cm (45-62 inches), pale brown (10YR 6/3) sand, dark yellowish brown (10YR 4/4) moist; loose when dry, loose when moist, and nonsticky and nonplastic when wet; no roots; many fine interstitial pores; very slightly effervescent; moderately alkaline (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 67 48 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES GILMAN SOIL NO. S67 ARIZ. 7- 2 SAMPLE NO. 7 598-7 604 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC TORRIFLUVENT,CRS-LMY,MXD(CALC.),HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. 2-.2U | CLAYS FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 7 598 | 0- 15 | AP1 | 67.5 | 22.7 | 9.8 | 1.8 | 3.5 | 4.5 | 24.3 | 33.4 | 15.3 | 7.4 | | | | 64.7 | 2 | TR | 2Z | N |
| 7 599 | 15- 38 | AP2 | 68.0 | 22.3 | 9.7 | 1.8 | 3.6 | 5.1 | 24.5 | 33.0 | 14.4 | 7.9 | | | | 63.3 | 3 | TR | 3Z | N |
| 7 600 | 38- 66 | C 1 | 52.0 | 35.3 | 12.7 | 1.3 | 2.6 | 2.8 | 13.6 | 31.7 | 20.1 | 15.2 | | | | 60.9 | 1 | TR | 1Z | N |
| 7 601 | 66- 99 | C 2 | 48.0 | 38.7 | 13.3 | 0.7 | 1.2 | 1.3 | 11.5 | 33.3 | 22.6 | 16.1 | | | -- | 64.9 | TR | TR | -- | -- |
| 7 602 | 99-137 | C 3 | | | | | | | | | | | | | | | TR | TR | -- | -- |
| 7 603 | 137-165 | C 4 | | | | | | | | | | | | | | | 5 | TR | 5Z | N |
| 7 604 | 165-178 | 2C 5 | | | | | | | | | | | | | | | 48 | TR | 48Z | N |

| SAMPLE NO. | DEPTH CM. | ORG. MATTER CARBON 6A1A -PERCENT-- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 PCT. | I M I T PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F GRAMS | 1/3 BAR 4A1F PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 -PERCENT--- | EXTENSIBLITY LEF 4D1 -PERCENT-- | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 598 | 0- 15 | 0.19 | 0.030 | 1 | | 0.5 | | | | 1.68 | 1.70 | 0.99 | | 12.0 | 6.2 | 0.4 | 0.4 | | 9.3 | |
| 7 599 | 15- 38 | 0.21 | 0.029 | 1 | | | | | 1.68 | | | 0.98 | | | 6.4 | | | | 9.1 | |
| 7 600 | 38- 66 | | | 3 | | 0.5 | | | | 1.47 | 1.52 | 0.99 | | 17.0 | 8.1 | 1.1 | 1.1 | | 9.3 | |
| 7 601 | 66- 99 | | | 4 | | | | | | 1.38 | 1.45 | 1.00 | | 22.4 | 8.4 | 1.7 | 1.7 | | 9.4 | |
| 7 602 | 99-137 | | | 3 | | | | | 1.38 | | | 1.00 | | | 7.2 | | | | | |
| 7 603 | 137-165 | | | 3 | | | | | 1.38 | | | 0.97 | | | 6.4 | | | | | |
| 7 604 | 165-178 | | | 3 | | | | | 1.38 | | | 0.68 | | | 5.8 | | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM -MEQ/100G-------- | BASE SAT. PCT. | C E C NA- OAC 5A2A -MEQ/100G | NH4- OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A -MEQ/1000 ML---------- | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 598 | 0- 15 | | | 3.0 | 2.4 | 5.4 | | | 16.6 | 2.99 | 8.3 | 1.7 | 18.0 | 0.3 | | 4.1 | 4.9 | | | 7.8 |
| 7 599 | 15- 38 | | | 3.4 | 2.5 | 5.9 | | | 17.8 | 4.42 | 14.9 | 3.0 | 22.0 | 0.1 | | 2.3 | 6.6 | | | 7.8 |
| 7 600 | 38- 66 | | | 2.1 | 2.2 | 4.3 | | | 16.9 | 0.32 | | | | | | | | | | 8.2 |
| 7 601 | 66- 99 | | | 2.0 | 1.3 | 3.3 | | | 17.3 | | | | | | | | | | | 8.1 |
| 7 602 | 99-137 | | | | | | | | | | | | | | | | | | | 8.0 |
| 7 603 | 137-165 | | | | | | | | | | | | | | | | | | | 8.1 |
| 7 604 | 165-178 | | | | | | | | | | | | | | | | | | | 8.3 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | DTA IV 7A2E | DTA PCT. 7A3 | -L.T. .0002 MM- X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 598 | 0- 15 | 35.9 | 2.4 | 14 | 8 | | | MT 4 | MI 3 | KK 2 | | | | | | MT MONTMORT | 1 TRACE |
| 7 599 | 15- 38 | 31.0 | 2.7 | 15 | 7 | | | | | | | | | | | MI MICA | 2 SMALL |
| 7 600 | 38- 66 | | 2.1 | 12 | | | | MT 4 | MI 3 | KK 2 | | | | | | KK KAOLINIT | 3 MODERATE |
| 7 601 | 66- 99 | | 2.0 | 12 | | | | | | | | | | | | | 4 ABUNDANT |
| 7 602 | 99-137 | | | | | | | | | | | | | | | | 5 DOMINANT |
| 7 603 | 137-165 | | | | | | | | | | | | | | | | 6 INDETER. |
| 7 604 | 165-178 | | | | | | | | | | | | | | | | |

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## GILMAN VERY FINE SANDY LOAM

S-67-Ariz-7-2

Location: Maricopa County, Arizona. 150 feet east and 280 feet south of the NW corner of the NE¼ Section 26, T2N, R9W., 12 miles west of Tonopah. Date of Sampling: October 9, 1967. Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton, A. DeWall.
Classification: Typic Torrifluvent, coarse-loamy, mixed (calcareous), hyperthermic.
Vegetation: Cultivated--onions. Use: Cultivated crops. Climate: Mean annual precipitation 7 inches. Mean annual temperature 69° F., January 50° F., July 88° F. Parent Material: Alluvium from a wide variety of igneous and sedimentary rocks. Topography: Nearly level alluvial fan sloping less than 0.5 percent to the southwest. Elevation: 1280 feet. Drainage: Well drained, moderately permeable subsoil. Medium runoff. Soil Moisture: Moist.
Remarks: Particle size distribution run only on control section. Sampled from backhoe pit.

| HORIZON | DESCRIPTION |
|---|---|
| Ap1<br>RSL<br>67598 | 0 to 15 cm (0 to 6 inches), light yellowish brown (10YR 6/4) very fine sandy loam, dark brown (10YR 4/3) when moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0 thymol blue); abrupt smooth boundary. |
| Ap2<br>RSL<br>67599 | 15 to 38 cm (6 to 15 inches), light yellowish brown (10YR 6/4) very fine sandy loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common micro roots; few fine tubular and interstitial pores; strongly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. |
| C1<br>RSL<br>67600 | 38 to 66 cm (15 to 26 inches), light brown (7.5YR 6/4) loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, friable, sticky and plastic; many very fine and common micro roots; many very fine tubular pores and common fine tubular and interstitial pores; common fine white lime veins, strongly effervescent; moderately alkaline (pH 8.2); gradual smooth boundary. |
| C2<br>RSL<br>67601 | 66 to 99 cm (26 to 39 inches), light brown (7.5YR 6/4) very fine sandy loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine and common fine micro roots; many very fine and common fine tubular pores; common fine white lime veins, strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C3<br>RSL<br>67602 | 99 to 137 cm (39 to 54 inches), light brown (7.5YR 6/4) very fine sandy loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; very few micro roots; common fine and medium tubular pores and common fine interstitial pores; few fine white lime veins; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C4<br>RSL<br>67603 | 137 to 165 cm (54 to 65 inches), light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine tubular pores; about 1 percent rounded gravel; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| IIC5<br>RSL<br>67604 | 165 to 178 cm (65 to 70 inches), brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, very friable, nonsticky, slightly plastic; common medium and fine tubular pores; estimated 40 percent rounded gravel; weakly effervescent; moderately alkaline (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 67 50 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES GILMAN SOIL NO. S67 ARIZ. 7- 7 SAMPLE NO. 7 611-7 617 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC TORRIFLUVENT,CRS-LMY,MXD(CALC.),HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05-.002 | SILT .05-LT .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. 2-.2U | CLAYS FINE LT .2U | CLAYS CARBONATE 3A1A.02 | 1A2A INT. II .2-.02 | COARSE FRAGMENTS I 75-20 WHOLE SOIL | II 20-5 PCT. OF | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 7 611 | 0- 36 | AP | 52.6 | 36.8 | 10.6 | 5.2 | 6.5 | 5.6 | 14.4 | 20.9 | 26.4 | 10.4 | | | | 56.1 | 4 | TR | 4 -- |
| 7 612 | 36- 51 | B2 | 51.8 | 38.0 | 10.2 | 5.8 | 5.3 | 4.8 | 14.6 | 21.3 | 27.0 | 11.0 | | | | 57.3 | 3 | TR | 3Z N |
| 7 613 | 51- 71 | C 1 | 49.0 | 43.6 | 7.4 | 1.3 | 2.3 | 4.1 | 18.3 | 23.0 | 35.3 | 8.3 | | | | 69.6 | 1 | TR | 1Z N |
| 7 614 | 71- 91 | C 2 | 39.9 | 52.8 | 7.3 | 1.4 | 1.9 | 2.5 | 10.8 | 23.3 | 42.4 | 10.4 | | | | 72.7 | TR | TR | -- -- |
| 7 615 | 91-109 | C 3 | 51.4 | 41.1 | 7.5 | 1.5 | 2.7 | 4.3 | 16.6 | 26.3 | 32.3 | 8.8 | | | -- | 69.0 | 1 | TR | 1 -- |
| 7 616 | 109-127 | C 4 | | | | | | | | | | | | | | | 2 | TR | 2Z N |
| 7 617 | 127-152 | C 5 | | | | | | | | | | | | | | | 1 | TR | 1 -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A PERCENT | NITROGEN 6B1A PERCENT | CARBONATE AS CACO3 LT 2 6E1B PERCENT | CACO3 19-2 6E1B PERCENT | EXT. IRON FE 6C2B PCT. | ATTERBERG L L PCT. | I M I T P L 4F2 PCT. | BULK DENSITY EST 1/3 BAR 4A1F GRAMS PER CC | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C PERCENT | 1/3 BAR 4B1C PERCENT | 15 BAR 4B2 PERCENT | EXTENSBLTY LEF 4D1 PERCENT | LE 4D1 PERCENT | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 611 | 0- 36 | 0.42 | 0.052 | TR | | | | | | 1.66 | 1.70 | 0.97 | | 14.3 | 4.9 | 0.8 | 0.8 | | 8.8 | |
| 7 612 | 36- 51 | 0.19 | 0.029 | 1 | | | | | | 1.57 | 1.61 | 0.98 | | 13.7 | 5.9 | 0.8 | 0.8 | | 9.1 | |
| 7 613 | 51- 71 | | | 2 | | | | | | 1.45 | 1.48 | 0.99 | | 15.5 | 5.6 | 0.7 | 0.7 | | 9.2 | |
| 7 614 | 71- 91 | | | 2 | | | | | 1.45 | | | 1.00 | | | 6.1 | | | | 9.3 | |
| 7 615 | 91-109 | | | 2 | | | | | 1.43 | | | 0.99 | | | 4.7 | | | | 9.4 | |
| 7 616 | 109-127 | | | | | | | | | 1.37 | 1.44 | 0.99 | | 18.4 | 7.4 | 1.7 | 1.7 | | | |
| 7 617 | 127-152 | | | | | | | | 1.37 | | | 0.99 | | | 5.2 | | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C MEQ/100G | MG 5B3A 6O4C MEQ/100G | NA 5B4A 6P2A MEQ/100G | K 5B4A 6Q2A MEQ/100G | SUM | BASE SAT. PCT. | C E C NA-OAC 5A2A MEQ/100G | NH4-OAC 5A6A MEQ/100G | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE CA 6N1B MEQ/1000 ML | MG 6O1B MEQ/1000 ML | NA 6P1A MEQ/1000 ML | K 6Q1A MEQ/1000 ML | CO3 6I1A MEQ/1000 ML | HCO3 6J1A MEQ/1000 ML | CL 6K1A MEQ/1000 ML | SO4 6L1B MEQ/1000 ML | B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 611 | 0- 36 | | | 0.7 | 1.8 | 2.5 | | 11.3 | 3.48 | 14.8 | 5.5 | 10.2 | 3.0 | | 3.2 | 6.3 | | | | 7.6 |
| 7 612 | 36- 51 | | | 0.5 | 1.0 | 1.5 | | 10.9 | | | | | | | | | | | | 7.8 |
| 7 613 | 51- 71 | | | 0.6 | 0.6 | 1.2 | | 9.5 | | | | | | | | | | | | 8.1 |
| 7 614 | 71- 91 | | | 0.8 | 0.5 | 1.3 | | 10.1 | | | | | | | | | | | | 8.1 |
| 7 615 | 91-109 | | | 0.8 | 0.4 | 1.2 | | 9.5 | | | | | | | | | | | | 8.1 |
| 7 616 | 109-127 | | | | | | | | | | | | | | | | | | | 8.0 |
| 7 617 | 127-152 | | | | | | | | | | | | | | | | | | | 8.0 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 PCT. | L.T. .0002 MM X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 611 | 0- 36 | 30.4 | 0.4 | 3 | 3 | | | | | | | | | | | |
| 7 612 | 36- 51 | | 0.5 | 5 | | | | | | | | | | | | MI MICA |
| 7 613 | 51- 71 | | 0.6 | 6 | | | | MI 4 | KK 1 | | | | | | | KK KAOLINIT |
| 7 614 | 71- 91 | | 0.8 | 8 | | | | | | | | | | | | |
| 7 615 | 91-109 | | 0.8 | 8 | | | | | | | | | | | | |
| 7 616 | 109-127 | | | | | | | | | | | | | | | |
| 7 617 | 127-152 | | | | | | | | | | | | | | | |

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

## GILMAN LOAM
S-67-Ariz-7-7

Location: Maricopa County, Arizona. 63 feet east and 213 feet north of the SW corner Section 6, T2N, R1W., 4 miles northwest of Litchfield Park. Date of Sampling: October 10, 1967. Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton, A. DeWall.
Classification: Typic Torrifluvent, coarse-loamy, mixed (calcareous), hyperthermic.
Vegetation: Maize. Use: Cultivated land. Climate: Mean annual precipitation is approximately 7.7 inches. Mean annual air temperature 70° F.; January 52° F., July 90° F. Parent Material: Recent alluvium from a wide variety of igneous and sedimentary rocks. Topography: Nearly level alluvial fan sloping less than 0.5 percent to the southeast. Elevation: 1110 feet. Drainage: Well drained with moderate permeability. Medium runoff. Soil Moisture: Moist.
Remarks: Sampled from backhoe pit.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>67611 | 0 to 36 cm (0 to 14 inches), pale brown (10YR 6/3) loam, dark brown (10 YR 4/3) when moist; massive; hard, friable, sticky, plastic; common fine and medium roots; few fine tubular and interstitial pores; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| B2<br>RSL<br>67612 | 36 to 51 cm (14 to 20 inches), yellowish brown (10YR 5/4) loam with few fine faint pinkish white (7.5YR 8/2) lime veins, dark brown (10YR 4/3) and pink (7.5YR 7/4) when moist; massive; slightly hard, firm, sticky and plastic; common fine medium and coarse roots; few fine tubular and common fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C1<br>RSL<br>67613 | 51 to 71 cm (20 to 28 inches), light yellowish brown (10YR 6/4) very fine sandy loam, dark brown (10YR 4/4) when moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots; few fine tubular and many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C2<br>RSL<br>67614 | 71 to 91 cm (28 to 36 inches), light yellowish brown (10YR 6/4) very fine sandy loam, brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, nonsticky and slightly plastic; common fine and medium roots; few fine tubular and many fine interstitial pores; few fine pinkish white lime veins, violently effervescent; moderately alkaline. (pH 8.0); gradual smooth boundary. |
| C3<br>RSL<br>67615 | 91 to 109 cm (36 to 43 inches), light yellowish brown (10YR 6/4) very fine sandy loam, dark brown (10YR 4/4) when moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots; few fine tubular and common fine interstitial pores; violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C4<br>RSL<br>67616 | 109 to 127 cm (43 to 50 inches), light yellowish brown (10YR 6/4) loam, dark brown (7.5YR 4/4) when moist; massive; hard, friable, slightly sticky, plastic; common fine and medium roots; few fine tubular and common fine interstitial pores; few fine pinkish white lime veins; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C5<br>RSL<br>67617 | 127 to 152 cm (50 to 60 inches), light yellowish brown (10YR 6/4) very fine sandy loam, brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, nonsticky, slightly plastic; common fine and medium roots; few fine tubular and many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Torrifluvent, coarse-loamy, mixed, calcareous, mesic
SOIL Fruitland fine sandy loam (taxadjunct) SOIL Nos. 865Ariz-1-14 LOCATION Apache County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65713 - 65719

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments 1A2a: >2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0- 2 | A11 | 55.5 | 27.7 | 16.8 | 2.0 | 6.5 | 6.6 | 18.5 | 21.9 | 16.9 | 10.8 | 50.4 | 33.6 | 0 | 17 | - | - | - |
| 2- 9 | A12 | 44.4 | 36.0 | 19.6 | 0.5 | 2.0 | 2.6 | 14.4 | 24.9 | 20.3 | 15.7 | 55.4 | 19.5 | 0 | 20 | - | - | - |
| 9-24 | C1 | 64.2 | 22.4 | 13.4 | 0.3 | 3.1 | 6.9 | 25.9 | 28.0 | 13.6 | 8.8 | 58.0 | 36.2 | 0 | 13 | - | - | - |
| 24-30 | C2 | 22.2 | 51.7 | 26.1 | 0.2 | 0.5 | 0.7 | 5.4 | 15.4 | 20.7 | 31.0 | 40.2 | 6.8 | 0 | 26 | - | - | - |
| 30-34 | A11 | 61.6 | 22.4 | 16.0 | 6.9 | 10.5 | 8.9 | 18.6 | 16.7 | 11.3 | 11.1 | 38.8 | 44.9 | 0 | 16 | - | - | - |
| 34-39 | A12b | 62.2 | 23.8 | 14.0 | 7.9 | 12.3 | 9.0 | 18.9 | 14.1 | 12.4 | 11.4 | 36.6 | 48.1 | 0 | 14 | - | - | - |
| 39-65+ | C3b | 60.2 | 25.5 | 14.3 | 2.4 | 5.7 | 6.7 | 21.5 | 23.9 | 14.4 | 11.1 | 51.2 | 36.3 | 0 | 14 | - | - | - |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | 3B2 Cm | Water content: Pct. | Water content: 4B1c 1/3 bar | Water content: 4B2 15 bar | 4D1 Extensibility COLE f in./in. | 4D1 Extensibility COLE in./in. | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | Pct. | Pct. | Pct. | | | | | |
| 0- 2 | 1.13 | 0.092 | 12 | | 3 | | | | | | 10.8 | | | 7.3 | 7.8 | |
| 2- 9 | 0.50 | 0.044 | 11 | | 4 | 1.22 | 1.30 | 1.00 | | 22.8 | 13.1 | 0.021 | 0.021 | 7.5 | 8.0 | |
| 9-24 | 0.18 | | | | 4 | 1.31 | 1.36 | 1.00 | | 12.9 | 8.6 | 0.013 | 0.013 | 7.7 | 8.2 | |
| 24-30 | 0.44 | | | | 3 | 0.99 | 1.13 | 1.00 | | 35.1 | 21.2 | 0.046 | 0.046 | 7.6 | 8.1 | |
| 30-34 | 0.92 | | | | 3 | 1.27 | 1.34 | 1.00 | | 13.4 | 10.1 | 0.018 | 0.018 | 7.7 | 8.2 | |
| 34-39 | 0.46 | | | | 5 | 1.42 | 1.48 | 1.00 | | 13.1 | 8.5 | 0.015 | 0.015 | 7.7 | 8.3 | |
| 39-65+ | 0.13 | | | | 5 | 1.34 | 1.40 | 1.00 | | 15.3 | 8.8 | 0.014 | 0.014 | 8.1 | 8.5 | |

| Depth (In.) | Extractable bases: 6N2a Ca | 6O2a Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A2a NaOAc | 5A1a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0- 2 | 25.1 | 3.6 | 0.3 | 1.6 | 30.6 | | | 24.4 | 5.8 | 1.2 | 0.4 | 0.1 | - | 5.7 | 0.4 | | 0.62 |
| 2- 9 | 38.7 | 4.2 | 0.7 | 0.9 | 44.5 | | | 33.3 | 4.2 | 0.9 | 1.2 | 0.6 | - | 4.5 | 0.3 | | 0.53 |
| 9-24 | 28.0 | 3.1 | 1.9 | 0.5 | 33.5 | | | 23.2 | 2.0 | 0.4 | 3.6 | 0.1 | - | 4.6 | 0.2 | | 0.51 |
| 24-30 | 49.0 | 7.2 | 7.2 | 1.7 | 65.1 | | | 52.4 | 7.9 | 1.7 | 18.0 | 0.2 | - | 3.5 | 7.8 | 16.6 | 2.58 |
| 30-34 | 27.4 | 3.0 | 4.1 | 1.5 | 36.0 | | | 24.3 | 14.6 | 2.8 | 20.8 | 0.5 | - | 9.0 | 8.8 | 17.0 2/ | 3.04 |
| 34-39 | 26.1 | 2.8 | 3.2 | 0.3 | 32.4 | | | 22.0 | 6.8 | 1.8 | 13.5 | 0.4 | - | 6.8 | 6.7 | 6.8 2/ | 1.89 |
| 39-65+ | 28.4 | 3.6 | 2.5 | 0.7 | 35.2 | | | 23.3 | 2.2 | 0.7 | 5.0 | 0.2 | - | 3.6 | 2.4 | | 0.73 |

| Depth (In.) | 8A Water at Saturation Pct | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na meq / 100g | 6F1a Gypsum Pct. | 5C1 Base Sat. $NH_4OAc$ Pct. | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | < X-ray > | | | | |
| 0- 2 | 46.8 | tr. | tr. | | 100+ | xxxx | | | | |
| 2- 9 | 53.0 | 1 | 0.4 | | 100+ | | | | | |
| 9-24 | 41.7 | 7 | 1.7 | | 100+ | xxxx | | | | |
| 24-30 | 71.1 | 12 | 6.4 | tr. | 100+ | | | | | |
| 30-34 | 39.9 | 14 | 3.4 | tr. | 100+ | | | | | |
| 34-39 | 36.7 | 12 | 2.7 | | 100+ | | | | | |
| 39-65+ | 38.3 | 9 | 2.2 | | 100+ | xxxx | | | | |

1/ >2 mm not determined; data based on crushed samples of the whole soil.

Some of the >2 mm particles do not slake in water and cannot be separated consistently in sample preparation. All >2 mm fragments resemble the fine earth (<2 mm) fraction in water retention and chemical properties.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## FRUITLAND FINE SANDY LOAM (taxadjunct) 1/
S65Ariz-1-14

Location: Apache County, Arizona. A pit located 792 feet east of the center of Section 29, T. 7 N., R. 30 E. East of Highway 180 opposite Riggs Creek Road about 1-1/4 miles northeast of Nutrioso. Date of Sampling: September 23, 1965.
Collectors: M.L. Miller, K.N. Larson, J.E. Jay, R.E. Nelson, and B. Brasher.
Vegetation: Not cultivated. Grass aspect with 26 percent basal cover and 8 percent shrub canopy cover. Blue grama, western wheatgrass, mountain muhly, squirreltail, rabbitbrush, squawbush and very few Ponderosa pines and junipers. Climate: 17 inches ppt. 48°F. approximate M.A.T. Parent Material: Alluvium from volcanic tuff and ash. Relief: Smooth convex alluvial fans with 5 percent slope and north aspect at pit site. Elevation: 7,550 feet. Drainage: Runoff is slow. Soil is well drained. moderate to moderately rapid.
Remarks: This soil usually has some stratification. Angular to flat fragments of tuff from 2 mm to 1/2 inch thick and up to 1½ inches across, may occur at any depth in the profile. These are more numerous near the upper portions of alluvial fans where they may comprise 5 to 10 percent of the mass of the profile. Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate was obtained by observing reaction to dilute HCl.
Classification: Typic Torrifluvent, coarse-loamy, mixed, calcareous, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>65713 | 0 to 2 inches, light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) when moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; abundant fine roots; many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| A12<br>RSL No.<br>65714 | 2 to 9 inches, light gray (10YR 7/2) fine sandy loam, brown (10YR 5/3) when moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and plastic; abundant fine roots; many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C1<br>RSL No.<br>65715 | 9 to 24 inches, light brownish gray (10YR 6/2) fine sandy loam, brown (10YR 5/3) when moist; massive breaking to weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and plastic; plentiful fine roots; many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C2<br>RSL No.<br>65716 | 24 to 30 inches, light gray (10YR 7/2) loam, brown (10YR 5/3) when moist; massive breaking to weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; abundant fine roots; few fine tubular and common fine interstitial pores; violently effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| A11<br>RSL No.<br>65717 | 30 to 34 inches, grayish brown (2.5YR 5/2) fine sandy loam, dark brown (10YR 3/3) when moist; massive breaking to moderate fine subangular blocky and granular structure; slightly hard, very friable, slightly sticky and plastic; plentiful fine roots; few fine tubular and common fine interstitial pores; weakly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| A12b<br>RSL No.<br>65718 | 34 to 39 inches, grayish brown (2.5YR 5/2) sandy loam with few fine gravels scattered throughout, dark grayish brown (10YR 4/2) when moist; massive breaking to weak fine subangular blocky and granular structure; hard, very friable, nonsticky and slightly plastic; plentiful fine roots; few fine tubular and common fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C3b<br>RSL No.<br>65719 | 39 to 65 inches +, light gray (10YR 7/2) fine sandy loam with 10 percent gravels of which 2 percent are larger than 3/4 inch, brown (10YR 5/3); massive breaking to weak fine subangular blocky and granular structure; hard, very friable, nonsticky and slightly plastic; few fine roots; many fine interstitial and few fine tubular pores; violently effervescent; moderately alkaline (pH 8.2). |

There is a thin gravelly lense 1/4 inch thick between the C1 and C2 horizons, the pebbles are 2 mm to 1/4 inch in size.

1/ The Fruitland series is in a coarse-loamy, mixed (calcareous), mesic family of Typic Torriorthents. This pedon has an organic carbon content that decreases irregularly with depth.

CONSECUTIVE PEDON NUMBER C 69203 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES ANTHONY SOIL NO. S69 ARIZ. 10- 2 SAMPLE NO. 91079-91084 WALNUT G.-TUCSON AREA

SOIL FAMILY: TYPIC TORRIFLUVENT,CRSE-LOAMY,MXD,CALCAR.,THRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL SAND 2-.05 | FRACTION SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.20 | FINE LT .20 | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20 | II 20-5 PCT. OF | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 91079 | 0- 20 | AP1 | 71.6 | 18.4 | 10.0 | 2.6 | 8.6 | 13.4 | 31.8 | 15.2 | 11.8 | 6.6 | | | | 44.1 | 3A | -- | -- | 3 |
| 91080 | 20- 30 | AP2 | 68.7 | 21.5 | 9.8 | 3.7 | 7.5 | 11.1 | 29.5 | 16.9 | 14.3 | 7.2 | | | | 47.9 | --A | -- | -- | -- |
| 91081 | 30- 61 | C 1 | 65.3 | 25.6 | 9.1 | 2.7 | 6.9 | 9.8 | 26.6 | 19.3 | 17.2 | 8.4 | | | | 52.6 | --A | -- | -- | -- |
| 91082 | 61- 86 | C 2 | 67.8 | 24.8 | 7.4 | 6.0 | 10.8 | 9.2 | 26.4 | 15.4 | 15.3 | 9.5 | | | | 46.2 | --A | -- | -- | -- |
| 91083 | 86-107 | C 3 | 57.2 | 34.9 | 7.9 | 4.8 | 8.8 | 7.5 | 21.5 | 14.6 | 18.1 | 16.8 | | | | 45.6 | --A | -- | -- | -- |
| 91084 | 107-137 | 2TB | 61.5 | 17.9 | 20.6 | 7.1 | 12.3 | 9.3 | 18.6 | 14.2 | 12.1 | 5.8 | | | | 36.5 | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG. CARBON 6A1A -PERCENT-- | MATTER NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG LIMIT LL 4F1 PCT. | PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F GRAMS PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 ----PERCENT--- | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91079 | 0- 20 | 0.09 | 0.014 | 1 | | 0.5 | | | 1.65 | | | 0.98 | | | 4.5 | | | 7.7 | | 7.8 |
| 91080 | 20- 30 | 0.10 | | 2 | | 0.4 | | | | 1.69 | 1.72 | 1.00 | | 9.4 | 4.5 | 0.6 | 0.6 | 7.6 | | 7.8 |
| 91081 | 30- 61 | 0.09 | | 2 | | 0.5 | | | 1.60 | | | 1.00 | | | 4.2 | | | 7.7 | | 7.9 |
| 91082 | 61- 86 | | | 1 | | 0.4 | | | | 1.50 | 1.52 | 1.00 | | 18.5 | 3.9 | 0.4 | 0.4 | 7.8 | | 7.8 |
| 91083 | 86-107 | | | 1 | | 0.5 | | | 1.50 | | | 1.00 | | | 4.3 | | | 7.9 | | 7.9 |
| 91084 | 107-137 | | | TR | | 0.6 | | | | 1.42 | 1.56 | 1.00 | | 18.4 | 6.9 | 3.2 | 3.2 | 7.7 | 8.9 | 7.7 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | CEC NA+ OAC 5A2A -MEQ/100G | NH4+ OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A MEQ/1000 ML | HCO3 6J1A | CL 6K1A | SO4 6L1B | 8A1 B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91079 | 0- 20 | | | 0.3 | 0.9 | 1.2 | | | 6.9 | | | | | | | | | | | |
| 91080 | 20- 30 | | | 0.2 | 1.0 | 1.2 | | | 6.7 | | | | | | | | | | | |
| 91081 | 30- 61 | | | 0.4 | 1.2 | 1.6 | | | 7.0 | | | | | | | | | | | |
| 91082 | 61- 86 | | | 0.7 | 1.1 | 1.8 | | | 6.6 | | | | | | | | | | | |
| 91083 | 86-107 | | | 0.9 | 1.1 | 2.0 | | | 8.7 | | | | | | | | | | | |
| 91084 | 107-137 | | | 1.0 | 0.8 | 1.8 | | | 9.6 | 1.21 | 3.6 | 1.5 | 7.7 | 0.2 | | 2.7 | 1.7 | 8.1 | | 7.8 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91079 | 0- 20 | | 0.3 | 4 | | | | MI 4 | MT 2 | KK 2 | | | | | |
| 91080 | 20- 30 | | 0.2 | 3 | | | | | | | | | | | |
| 91081 | 30- 61 | | 0.4 | 6 | | | | MT 2 | MI 2 | KK 1 | | | | | |
| 91082 | 61- 86 | | 0.7 | 11 | | | | | | | | | | | |
| 91083 | 86-107 | | 0.9 | 10 | | | | MT 2 | MI 2 | KK 2 | | | | | |
| 91084 | 107-137 | 34.4 | 0.7 | 9 | 5 | | | MI 4 | KK 2 | MT 1 | | | | | |

| MINERAL CODE | RELATIVE AMOUNT |
|---|---|
| MI MICA | 1 TRACE |
| MT MONTMORT | 2 SMALL |
| KK KAOLINIT | 3 MODERATE |
| | 4 ABUNDANT |
| | 5 DOMINANT |
| | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## ANTHONY SANDY LOAM
S69Ariz-10-2

Location: Pima County, Arizona. Approximately 400 feet north and 1,600 feet west of the southeast corner of Sec. 18, T. 12 S., R. 11 E., on Glover Ranch. About 8 miles west of Rillito on Silver Bell Road.
Date of sampling: September 29, 1969.
Description by: Y. H. Havens and D. M. Hendricks. Collectors: Y. H. Havens and D. M. Hendricks.
Classification: Typic Torrifluvent, coarse-loamy, mixed, calcareous, thermic.
Vegetation: Idle cropland. Climate: Mean annual temperature approximately 68° F. Mean annual precipitation approximately 10 inches. Parent material: Mixed recent alluvial materials from granite, andesite, rhyolite, shale and some limestone. Topography: Nearly level fan. Elevation: 2,010 feet. Drainage: Well drained. Soil moisture: Dry.

| HORIZON | DESCRIPTION |
|---|---|
| Ap1<br>RSL No.<br>691079 | 0-20 cm (0-8 inches), light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky, nonplastic; few fine roots; few fine interstitial pores; 3 to 5 percent gravel; slightly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. |
| Ap2<br>RSL No.<br>691080 | 20-30 cm (8-12 inches), light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; weak thick platy structure; slightly hard, very friable, nonsticky, nonplastic; few gravel; slightly effervescent; moderately alkaline (pH 8.3); clear wavy boundary. |
| C1<br>RSL No.<br>691081 | 30-61 cm (12-24 inches), light yellowish brown (10YR 6/4) fine sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky, nonplastic; few very fine roots; few fine tubular pores; few gravel; slightly to strongly effervescent; strongly alkaline (pH 8.5); clear wavy boundary. |
| C2<br>RSL No.<br>691082 | 61-86 cm (24-34 inches), light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; common fine interstitial pores; few to common gravel; strongly effervescent; moderately alkaline (pH 8.4); gradual wavy boundary. |
| C3<br>RSL No.<br>691083 | 86-107 cm (34-42 inches), light brown (7.5YR 6/4) fine sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; few fine interstitial pores; few fine gravel; few very fine mica flakes; strongly effervescent; strongly alkaline (pH 8.5); clear smooth boundary. |
| IIB2tb<br>RSL No.<br>691084 | 107-137 cm (42-54 inches), yellowish red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few very fine roots; common very fine and fine tubular pores; common thin clay films on ped faces and in pores; few gravel; slightly effervescent; moderately alkaline (pH 8.2). |

U S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Torrifluvent, fine, mixed (calcareous), mesic
SOIL Navajo clay SOIL Nos. S62Ariz-9-1 LOCATION Navajo County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62337 - 62344

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: >2* Pct. | Coarse fragments 2A2: 2–19 Pct. of <76 mm | Coarse fragments 2A2: 19–76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | | | |
| 0- 5 | A | 2.8 | 43.7 | 53.5 | 0.0 | 0.0 | 0.1 | 0.6 | 2.1 | 4.0 | 39.7 | 6.6 | 0.7 | | | 2 | | |
| 5-20 | C1 | 1.6 | 42.4 | 56.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1.3 | 2.3 | 40.1 | 3.8 | 0.3 | | | 1 | | |
| 20-35 | C2 | 2.6 | 40.2 | 57.2 | 0.0 | 0.0 | 0.1 | 1.3 | 1.2 | 3.0 | 37.2 | 5.0 | 1.4 | | | 3 | | |
| 35-50 | C3 | 3.2 | 37.9 | 58.9 | 0.0 | 0.0 | 0.0 | 0.7 | 2.5 | 1.1 | 36.8 | 4.2 | 0.7 | | | 3 | | |
| 50-65 | C4 | 1.6 | 36.9 | 61.5 | 0.0 | 0.0 | 0.0 | 0.4 | 1.2 | 2.8 | 34.1 | 4.3 | 0.4 | | | 4 | | |
| 65-76 | C5 | 0.8 | 35.2 | 64.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.5 | 2.6 | 32.6 | 3.3 | 0.3 | | | 4 | | |
| 76-90 | C6 | 0.8 | 30.9 | 68.3 | 0.0 | 0.0 | 0.0 | 0.3 | 0.5 | 1.6 | 29.3 | 2.4 | 0.3 | | | 5 | | |
| 90-121 | C7 | 1.9 | 42.7 | 55.4 | 0.0 | 0.0 | 0.0 | 0.4 | 1.5 | 2.9 | 39.8 | 4.7 | 0.4 | | | 3 | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct | 3A1a Carbonate in <0.002 mm Pct. | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | g/cc | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct | Pct | 4D1 Extensibility in./in. | | | pH: 8C1b Sat. Paste | pH: 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 5 | 0.51 | 0.053 | 10 | 2.0 | 9 | 1 | 1.42 | 1.68 | | 23.6 | 17.6 | | 0.056 | | | 7.1 | 7.6 |
| 5-20 | 0.36 | | | 2.0 | 9 | 1 | 1.52 | 1.77 | | 22.3 | 18.5 | | 0.049 | | | 7.2 | 7.8 |
| 20-35 | 0.26 | | | 2.0 | 8 | 1 | 1.52 | 1.76 | | 25.4 | 18.7 | | 0.049 | | | 7.4 | 8.0 |
| 35-50 | 0.25 | | | 2.0 | 8 | 1 | 1.53 | 1.78 | | 23.5 | 18.6 | | 0.049 | | | 7.4 | 8.0 |
| 50-65 | 0.20 | | | 2.0 | 8 | 1 | 1.52 | 1.82 | | 25.1 | 20.0 | | 0.056 | | | 7.5 | 8.0 |
| 65-76 | 0.18 | | | 1.7 | 7 | 1 | 1.43 | 1.79 | | 29.0 | 20.5 | | 0.072 | | | 7.6 | 8.2 |
| 76-90 | 0.18 | | | 1.5 | 6 | 1 | | | | | 19.7 | | | | | 7.6 | 8.3 |
| 90-121 | 0.16 | | | 2.0 | 9 | 2 | | | | | 18.4 | | | | | 7.7 | 8.4 |

| Depth (In.) | Extractable bases: 6N2c Ca meq/100 g | Extractable bases: 6O2c Mg meq/100 g | Extractable bases: 6P2a Na meq/100 g | Extractable bases: 5B1a 6Q2a K meq/100 g | | Cation Exch. Capacity: 5A2a NaOAc meq/100 g | | | Water extract from saturated paste 8A1: 6N1a Ca meq/liter | 6O1a Mg meq/liter | 6P1a Na meq/liter | 6Q1a K meq/liter | | 6I1a $CO_3$ meq/liter | 6J1a $HCO_3$ meq/liter | 6K1a Cl meq/liter | $SO_4$ meq/liter | 8A1a Electrical conductivity mmho/cm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 5 | 67.5 | 16.6 | 32.5 | 1.4 | | 17.8 | | | 598 | 187 | 475 | 4.9 | | - | 0.4 | 1222 | | 91 |
| 5-20 | 54.7 | 13.0 | 25.1 | 1.5 | | 19.1 | | | 372 | 128 | 345 | 3.9 | | - | 0.4 | 845 | | 66 |
| 20-35 | 43.7 | 10.1 | 23.2 | 1.2 | | 20.9 | | | 186 | 107 | 294 | 2.5 | | - | 0.6 | 572 | | 49.0 |
| 35-50 | 33.6 | 10.9 | 22.6 | 1.2 | | 20.8 | | | 125 | 91.7 | 283 | 2.2 | | - | 0.6 | 492 | | 44.4 |
| 50-65 | 40.0 | 13.6 | 23.5 | 1.4 | | 21.0 | | | 104 | 81.7 | 271 | 1.8 | | - | 0.5 | 428 | | 40.0 |
| 65-76 | 34.9 | 13.8 | 25.3 | 1.5 | | 30.8 | | | 53.9 | 56.8 | 275 | 2.2 | | - | 0.5 | 362 | | 35.2 |
| 76-90 | 41.2 | 15.6 | 32.5 | 1.7 | | 42.7 | | | 68.4 | 58.0 | 269 | 1.4 | | - | 0.5 | 348 | | 35.4 |
| 90-121 | 24.5 | 11.5 | 20.0 | 1.2 | | 19.8 | | | 54.5 | 57.2 | 219 | 1.6 | | - | 0.6 | 308 | | 31.2 |

| Depth (In.) | 8A Water at Saturation Pct. | 5D1 Exchangeable Na Pct. | 5B1b Exch. (Na meq / 100 g) | Gypsum Pct. | Atterberg limits: Plastic limit Pct. of <0.4 mm | Atterberg limits: Liquid limit Pct. of <0.4 mm | Atterberg limits: Plastic index Pct. of <0.4 mm |
|---|---|---|---|---|---|---|---|
| 0- 5 | 65.4 | 8 | 1.4 | | | | |
| 5-20 | 64.1 | 10 | 2.0 | | 17 | 42 | 25 |
| 20-35 | 66.7 | 17 | 3.6 | | | | |
| 35-50 | 65.8 | 19 | 4.0 | | | | |
| 50-65 | 69.6 | 22 | 4.6 | | | | |
| 65-76 | 76.3 | 14 | 4.3 | | | | |
| 76-90 | 81.7 | 25 | 10.5 | | | | |
| 90-121 | 67.6 | 26 | 5.1 | | | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## NAVAJO CLAY
S62 Ariz-9-1

Location: Central Navajo County Area, Arizona. 1320 feet east and 50 feet north of the SW corner of Sec. 23, T20N, R15E. 6 miles NW of Winslow, Arizona. Date of Sampling: June 13, 1962.
Collectors: R.E. Nelson, Lothair Grant, Daryl Cox, R.W. Mitchell and Jim Jay.
Classification: Typic Torrifluvent, fine, mixed (calcareous), mesic.
Vegetation: This area is devoid of any perennial vegetation. Some annual weeds and grass may grow following summer or early spring rains. Use: Range. Climate: Precipitation is approximately 8" annually. The average temperature during the coldest season of the year is approximately 35° and during the warmest season of the year, 75°F. The mean annual temperature is approximately 55°F. Parent Material: Recent alluvium principally from the Moenkopi and Chinle formations but with some influence from limestone and basic igneous materials. Elevation: 4800 feet. Relief: Level to nearly level floodplain, slightly concave, slope approximately 0.2 percent to the northeast. Drainage: Well drained, slow runoff due to slope and position, very slow permeability.
Remarks: Modal profile. Color of crushed peds in all C horizons one value higher, reddish brown (2.5YR 5/4) when dry. Color of peds crushed and uncrushed same when moist. Examination and sampling done in backhoe pit to 76 inches. 76 to 121" taken out with auger.

| HORIZON | DESCRIPTION |
|---|---|
| | Surface soil is covered with network of cracks roughly hexagonal in shape, 12 to 18 inches across each polygon with cracks approximately 1/2 inch wide and 5 inches deep. A network of fine cracks covers each hexagon. |
| A<br>RSL<br>62337 | 0 to 5 inches, reddish brown (5YR 5/3) clay, reddish brown (5YR 4/3) when moist; weak medium and coarse platy structure; hard, firm, very sticky and very plastic; no roots; few fine discontinuous simple tubular and many fine interstitial pores; strongly effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. |
| C1<br>RSL<br>62338 | 5 to 20 inches, reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) when moist; weak medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; no roots; few fine discontinuous simple exped tubular and many interstitial pores; few small pressure faces; strongly effervescent; moderately alkaline, pH 8.0; gradual smooth boundary. |
| C2<br>RSL<br>62339 | 20 to 35 inches, reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) when moist; few pink (5YR 8/3) dry, light reddish brown (5YR 6/4) when moist, fine faint lime or gypsum mycelia and small soft segregations; nearly massive but with tendency toward weak medium angular blocky structure; very hard, very firm, very sticky and very plastic; no roots; few fine discontinuous simple exped tubular and many fine interstitial pores; few small slickensides and pressure faces; strongly effervescent; moderately alkaline, pH 8.0; gradual smooth boundary. |
| C3<br>RSL<br>62340 | 35 to 50 inches, color, texture, lime segregations, structure, roots, pores and reaction same as horizon above; many slickensides and pressure faces ranging up to 1-1/2 inches long; gradual smooth boundary. |
| C4<br>RSL<br>62341 | 50 to 65 inches, reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) when moist; few fine faint pink (5YR 6/3) dry, light reddish brown (5YR 6/4) moist; lime or gypsum mycelia and small, soft segregations; nearly massive but with tendency toward weak medium angular blocky structure; very hard, very firm, very sticky and very plastic; no roots; few fine discontinuous simple exped tubular and many fine interstitial pores; few small slickensides and pressure faces; strongly effervescent; moderately alkaline, pH 8.0; no natural boundary; rest of profile arbitrarily divided for sampling purposes. |
| C5<br>RSL<br>62342 | 65 to 76 inches, same as horizon above. |
| C6<br>RSL<br>62343 | 76 to 90 inches, same as horizon C4 - this portion taken with auger. |
| C7<br>RSL<br>62344 | 90 to 121 inches, same as C6. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Torrifluvent, fine, mixed (calcareous), mesic
SOIL Navajo clay SOIL Nos. S62Ariz-9-2 LOCATION Navajo County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62345 - 62352

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: (0.05–0.02) | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: > 2* | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0- 5 | A | 4.2 | 39.4 | 56.4 | 0.0 | 0.1 | 0.1 | 1.1 | 2.9 | 2.0 | 37.4 | 5.7 | 1.3 | | | 1 | | |
| 5-19 | C1 | 2.9 | 38.1 | 59.0 | 0.0 | 0.0 | 0.1 | 0.8 | 2.0 | 2.7 | 35.4 | 5.3 | 0.9 | | | 1 | | |
| 19-34 | C2 | 1.8 | 35.1 | 63.1 | 0.0 | 0.0 | 0.1 | 0.4 | 1.3 | 1.1 | 34.0 | 2.7 | 0.5 | | | 0 | | |
| 34-49 | C3 | 1.8 | 31.4 | 66.8 | 0.0 | 0.0 | 0.0 | 0.4 | 1.4 | 1.8 | 29.6 | 3.5 | 0.4 | | | 1 | | |
| 49-64 | C4 | 1.6 | 31.5 | 66.9 | 0.0 | 0.0 | 0.0 | 0.3 | 1.3 | 1.9 | 29.6 | 3.4 | 0.3 | | | 1 | | |
| 64-91 | C5 | 1.8 | 26.0 | 72.2 | 0.0 | 0.0 | 0.0 | 0.3 | 1.5 | 2.4 | 23.6 | 4.2 | 0.3 | | | 3 | | |
| 91-110 | C6 | 1.8 | 22.7 | 75.5 | 0.0 | 0.0 | 0.0 | 0.4 | 1.4 | 1.3 | 21.4 | 3.0 | 0.4 | | | 3 | | |
| 110-134+ | C7 | 1.8 | 29.3 | 68.9 | 0.0 | 0.0 | 0.0 | 0.4 | 1.4 | 3.3 | 26.0 | 5.0 | 0.4 | | | 5 | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | | 6E1b Carbonate as $CaCO_3$ | 3A1a Carbonate in <0.002 mm | Atterberg limits: Plastic limit | Liquid limit | Plastic index | | Water content: | 4B2 15 bar | | | pH: 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct | | | Pct. | Pct. | Pct. of <0.4 mm | | | | Pct. | Pct. | Pct. | | | |
| 0- 5 | 0.42 | 0.050 | 8 | | 9 | 1 | | | | | | 17.7 | | | 7.2 | 7.8 |
| 5-19 | 0.30 | | | | 8 | 2 | 17 | 44 | 27 | | | 18.4 | | | 7.4 | 7.8 |
| 19-34 | 0.20 | | | | 7 | 2 | | | | | | 20.6 | | | 7.5 | 8.0 |
| 34-49 | 0.17 | | | | 8 | 1 | | | | | | 20.0 | | | 7.5 | 8.1 |
| 49-64 | 0.18 | | | | 7 | 2 | | | | | | 21.5 | | | 7.5 | 8.1 |
| 64-91 | 0.18 | | | | 6 | 2 | | | | | | 24.0 | | | 7.6 | 8.1 |
| 91-110 | 0.18 | | | | 5 | 2 | | | | | | 25.7 | | | 7.6 | 8.2 |
| 110-134+ | 0.17 | | | | 6 | 2 | | | | | | 22.7 | | | 7.6 | 8.2 |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Cation Exch Capacity 5A2a NaOAc | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | meq/liter | | | | | | | | mmho/cm |
| 0- 5 | 60.7 | 20.9 | 27.9 | 1.4 | 20.0 | 600 | 170 | 500 | 4.1 | - | 0.5 | 1268 | | 86 |
| 5-19 | 50.5 | 9.8 | 19.0 | 1.4 | 21.7 | 282 | 77.4 | 320 | 2.7 | - | 0.5 | 657 | | 61 |
| 19-34 | 37.0 | 8.5 | 18.4 | 1.4 | 20.5 | 144 | 44.3 | 230 | 1.9 | - | 0.5 | 397 | | 34.5 |
| 34-49 | 37.9 | 8.9 | 18.2 | 1.4 | 24.9 | 110 | 42.5 | 200 | 1.7 | - | 0.5 | 345 | | 31.5 |
| 49-64 | 42.2 | 11.0 | 29.6 | 1.5 | 32.9 | 96.8 | 34.9 | 205 | 1.3 | - | 0.5 | 313 | | 31.6 |
| 64-91 | 44.9 | 14.5 | 29.8 | 1.8 | 44.6 | 96.6 | 44.5 | 244 | 1.5 | - | 0.5 | 363 | | 34.8 |
| 91-110 | 44.8 | 17.0 | 35.0 | 1.7 | 51.7 | 84.1 | 49.2 | 275 | 1.4 | - | 0.5 | 366 | | 36.4 |
| 110-134+ | 37.6 | 14.2 | 29.5 | 1.5 | 35.5 | 77.2 | 57.4 | 263 | 1.3 | - | 0.6 | 346 | | 35.2 |

| Depth (In.) | 8A Water at Saturation Pct. | 5D1 Exchangeable Na Pct | 5B1b Exch. Na meq / 100 g | Gypsum Pct. |
|---|---|---|---|---|
| 0- 5 | 58.8 | 15 | 2.9 | |
| 5-19 | 62.8 | | - | |
| 19-34 | 65.5 | 17 | 3.4 | |
| 34-49 | 70.4 | 17 | 4.2 | |
| 49-64 | 75.9 | 43 | 14.1 | |
| 64-91 | 79.6 | 23 | 10.4 | |
| 91-110 | 86.3 | 22 | 11.3 | |
| 110-134+ | 83.9 | 21 | 7.5 | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## NAVAJO CLAY
S62 Ariz-9-2

Location: Central Navajo County Area, Arizona. 1050 feet west and 1320 feet south of the NE corner of Sec. 23, R15E, T20N. 7 miles NW of Winslow, Arizona. Date of Sampling: June 13, 1962.
Collectors: R.E. Nelson, Lothair Grant, Daryl Cox, R.W. Mitchell and Jim Jay.
Classification: Typic Torrifluvent, fine, mixed (calcareous), mesic.
Vegetation: This area is devoid of any perennial vegetation. Some annual weeds and grass may grow following summer or early spring rains. Use: Rangeland. Climate: Precipitation is approximately 8" annually. The average temperature during the coldest season of the year is approximately 35° and during the warmest season of the year 75°F. The mean annual temperature is approximately 55°F. Parent Material: Recent alluvium principally from the Moenkopi and Chinle formations but with some influence from limestone and basic igneous materials. Elevation: 4800 feet. Relief: Level to nearly level floodplain, slightly concave, slope approximately 0.2 percent to the northeast. Drainage: Well drained, slow runoff due to slope and position, very slow permeability.
Remarks: Modal profile. Color of crushed peds in all C horizons one value higher, reddish brown (2.5YR 5/4) when dry - no change when crushed, in moist color.
Examination and sampling done in backhoe pit to 79 inches. 79" to 141" taken out with auger.

| HORIZON | DESCRIPTION |
|---|---|
| | Surface soil covered with network of cracks roughly hexagonal in shape, 12 to 18 inches across each polygon with cracks approximately 1/2 inch wide and 5 inches deep. A network of fine cracks covers each hexagon. |
| A<br>RSL<br>62345 | 0 to 5 inches, reddish brown (5YR 5/3) clay, reddish brown (5YR 4/3) when moist; weak medium and coarse platy structure; hard, firm, very sticky and very plastic; no roots; few fine discontinuous tubular and many fine interstitial pores; strongly effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. |
| C1<br>RSL<br>62346 | 5 to 19 inches, reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) when moist; weak medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; no roots; few fine inped tubular and many fine interstitial pores; few small pressure faces; strongly effervescent; moderately alkaline, pH 8.0; gradual smooth boundary. |
| C2<br>RSL<br>62347 | 19 to 34 inches, reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) when moist; nearly massive but with tendency toward weak medium angular blocky structure; very hard, very firm, very sticky and very plastic; no roots; few fine tubular and common fine interstitial pores; common small pressure faces; strongly effervescent; moderately alkaline, pH 8.0; gradual smooth boundary. |
| C3<br>RSL<br>62348 | 34 to 49 inches, same as horizon above (C2) but having common slickensides and pressure faces up to 1 inch in size and a gradual smooth boundary. |
| C4<br>RSL<br>62349 | 49 to 64 inches, reddish brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) when moist; few fine faint pink (5YR 8/3) dry and light reddish brown (5YR 6/4) moist lime and gypsum mycelia and small soft segregations; nearly massive but with tendency toward weak medium angular blocky structure; very hard, very firm, very sticky and very plastic; no roots; few fine tubular and common fine interstitial pores; common small slickensides and pressure faces; strongly effervescent; moderately alkaline, pH 8.0; gradual smooth boundary. |
| C5<br>RSL<br>62350 | 64 to 91 inches, same as horizon C4 above but with common fine faint pink (5YR 8/3) dry to light reddish brown (5YR 6/4) moist lime and gypsum mycelia and small soft segregations and common fine and medium dark reddish brown (5YR 3/2) when moist, stainings; no boundary - arbitrary separation for sampling. |
| C6<br>RSL<br>62351 | 91 to 110 inches, same as horizon above. Arbitrarily broken for sampling purposes. |
| C7<br>RSL<br>62352 | 110 to 134 inches, same as horizon above. Arbitrarily broken for sampling purposes. |

CONSECUTIVE PEDON NUMBER C 69158 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES GRABE SOIL NO. S69 ARIZ. 2-12 SAMPLE NO. 9 824-9 830 WILLCOX AREA

SOIL FAMILY: ANTHROPIC TORRIFLUVNT,CRS-LMY,MXD(CALCR.),THRMC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 — 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 SAND | .05- .002 SILT | LT .002 CLAY | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. 2- .2U | CLAYS FINE LT .2U | CARBONATE 3A1A.02 | INT. II .2-.02 | COARSE FRAGMENTS- PCT. OF WHOLE 20 | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 9 824 | 0- 5 | A11 | 29.1 | 56.1 | 14.8 | 4.3 | 7.5 | 4.3 | 7.0 | 6.0 | 16.9 | 39.2 | | | | 26.7 | --A | -- | -- | -- |
| 9 825 | 5- 25 | A12 | 25.3 | 52.3 | 22.4 | 6.0 | 7.4 | 3.5 | 5.3 | 3.1 | 12.0 | 40.3 | | | | 17.9 | --A | -- | -- | -- |
| 9 826 | 25- 53 | A13 | 38.4 | 41.0 | 20.6 | 9.4 | 11.8 | 5.9 | 7.4 | 3.9 | 12.3 | 28.7 | | | | 19.9 | --A | -- | -- | -- |
| 9 827 | 53- 76 | A14 | 42.9 | 38.4 | 18.7 | 8.8 | 13.3 | 6.6 | 8.4 | 5.8 | 12.3 | 26.1 | | | | 22.4 | --A | -- | -- | -- |
| 9 828 | 76-100 | A15 | 58.7 | 28.8 | 12.5 | 8.2 | 12.2 | 9.7 | 18.1 | 10.5 | 12.6 | 16.2 | | | | 32.9 | 1A | -- | TR | 1 |
| 9 829 | 100-150 | C | 72.9 | 19.4 | 7.7 | 14.8 | 26.4 | 13.4 | 12.3 | 6.0 | 10.3 | 9.1 | | | | 22.0 | --A | -- | -- | -- |
| 9 830 | 0- 25 | A1 | | | | | | | | | | | | | | | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG. MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | -PH- H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PCT. | PCT. NO.40 | | GRAMS PER CC | | | | -PERCENT- | | | -PERCENT- | | | | |
| 9 824 | 0- 5 | 0.86 | 0.080 | TR | | 1.0 | 26 | 21 | 1.30 | | | 1.00 | | | 8.2 | | | 7.0 | 8.5 | 7.0 |
| 9 825 | 5- 25 | 1.01 | 0.091 | 1 | | 1.0 | | | | 1.33 | 1.46 | 1.00 | | 19.8 | 10.4 | 3.2 | 3.2 | 7.7 | | 7.6 |
| 9 826 | 25- 53 | 0.65 | | 1 | | 0.8 | | | | 1.36 | 1.48 | 1.00 | | 17.2 | 9.1 | 2.9 | 2.9 | 7.5 | | 7.6 |
| 9 827 | 53- 76 | 0.57 | | 4 | | 0.7 | 33 | 20 | | 1.40 | 1.49 | 1.00 | | 16.4 | 8.4 | 2.1 | 2.1 | 7.4 | 8.4 | 7.6 |
| 9 828 | 76-100 | 0.35 | | 3 | | 0.6 | | | | 1.42 | 1.49 | 0.99 | | 13.3 | 5.1 | 1.6 | 1.6 | 7.6 | 8.7 | 7.6 |
| 9 829 | 100-150 | 0.19 | | 3 | | 0.5 | NP | NP | | 1.58 | 1.63 | 1.00 | | 8.5 | 4.1 | 1.0 | 1.0 | 7.7 | 8.9 | 7.6 |
| 9 830 | 0- 25 | | | 1 | | 0.8 | | | 1.32 | | | 1.00 | | | 7.8 | | | 7.5 | | 7.4 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 9 824 | 0- 5 | | | 0.1 | 1.7 | 1.8 | | 20.3 | | 9.8 | 2.1 | 67.9 | 59.3 | 0.6 | | 1.8 | 34.7 | 108.7 | | 7.7 |
| 9 825 | 5- 25 | | | 0.3 | 1.5 | 1.8 | | 24.5 | | | | | | | | | | | | |
| 9 826 | 25- 53 | | | 0.2 | 0.8 | 1.0 | | 22.3 | | | | | | | | | | | | |
| 9 827 | 53- 76 | | | 0.2 | 0.5 | 0.7 | | 18.1 | 3.06 | 27.3 | 4.0 | 2.3 | 0.5 | | | 2.1 | 2.1 | 4.4 | | 7.4 |
| 9 828 | 76-100 | | | 0.1 | 0.3 | 0.4 | | 11.6 | 1.06 | 8.8 | 1.5 | 2.1 | 0.3 | | | 2.6 | 2.7 | 2.0 | | 7.5 |
| 9 829 | 100-150 | | | 0.1 | 0.2 | 0.3 | | 7.9 | 0.66 | 5.8 | 1.0 | 2.0 | 0.2 | | | 2.3 | 1.0 | | | 7.8 |
| 9 830 | 0- 25 | | | 0.1 | 1.2 | 1.3 | | 16.9 | | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A SAT. PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY <2 MM LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A2E | DTA PCT. 7A3 | <2 MM L.T. .0002 MM X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 824 | 0- 5 | 38.0 | | | 10 | | | MT | 4 | MI | 3 | KK | 2 | | |
| 9 825 | 5- 25 | | 0.3 | 1 | | | | MT | 4 | MI | 3 | KK | 2 | | |
| 9 826 | 25- 53 | | 0.2 | 1 | | | | | | | | | | | |
| 9 827 | 53- 76 | 40.7 | 0.1 | 1 | 1 | | | MT | 4 | MI | 3 | KK | 2 | | |
| 9 828 | 76-100 | 28.4 | TR | TR | 1 | | | | | | | | | | |
| 9 829 | 100-150 | 26.2 | TR | 1 | 1 | | | MT | 4 | MI | 3 | KK | 2 | | |
| 9 830 | 0- 25 | | 0.1 | 1 | | | | | | | | | | | |

| MINERAL CODE | | RELATIVE AMOUNT | |
|---|---|---|---|
| MT | MONTMORT | 1 | TRACE |
| MI | MICA | 2 | SMALL |
| KK | KAOLINIT | 3 | MODERATE |
| | | 4 | ABUNDANT |
| | | 5 | DOMINANT |
| | | 6 | INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## GRABE LOAM
S69Ariz-2-12

Location: Cochise County, Arizona. 2,400 feet south and 800 feet west of the northeast corner of Sec. 4, T. 17 S., R. 24 E. West of Cochise Stronghold Road, about 5½ miles north and 5 miles west of Pearce. Date of sampling: October 16, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Anthropic Torrifluvent, coarse-loamy, mixed (calcareous), thermic.
Vegetation: Tobosa, giant sacaton, burroweed, yucca, scattered mesquite, Arizona cottontop, threeawn, black grama and spike dropseed. Use: Formerly livestock range, now subdivided for homesites. Climate: Precipitation about 11 or 12 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Alluvium from granite, limestone, rhyolite, andesite and quartzite. Topography: Nearly level concave alluvial fan. Slope, 0.2 percent, northeast facing. Elevation: 4360 feet. Drainage: Well drained. Runoff is medium to slow. Permeability is moderate. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This sample was not paired. A composite sample of 0 to 10 inches (0 to 25 cm) taken for organic carbon determination - four sites sampled approximately 20 feet N, E, S, and W of pit and composite sampled obtained (RSL 69830).

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>69824 | 0 to 5 cm (0 to 2 inches), brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; common very fine vesicular pores; 3 to 5 percent by volume of 1/4 to 1-1/2 inch rounded andesite, rhyolite, quartzite, and limestone gravel; very slightly effervescent; neutral (pH 7.0); abrupt smooth boundary. |
| A12<br>RSL<br>69825 | 5 to 25 cm (2 to 10 inches), dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, plastic; common very fine and fine and few medium roots; many fine, medium and coarse tubular pores; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| A13<br>RSL<br>69826 | 25 to 53 cm (10 to 21 inches), dark brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, plastic; common very fine and fine and few medium roots; many very fine and fine, and few coarse tubular pores; 2 or 3 percent by volume of 1/4 to 1-1/2 inch rounded andesite, rhyolite, quartzite, and limestone gravel; few fine white threads of soft lime; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| A14<br>RSL<br>69827 | 53 to 76 cm (21 to 30 inches), brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, friable, sticky, plastic; common very fine and few fine roots; many very fine and fine tubular pores; 2 to 3 percent by volume of 1/4 to 1-1/2 rounded andesite, rhyolite, quartzite and limestone gravel; many fine white threads of soft lime; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| A15<br>RSL<br>69828 | 76 to 100 cm (30 to 39½ inches), brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; many very fine tubular pores; 2 or 3 percent by volume of 1/4 to 1-1/2 inch rounded andesite, rhyolite, quartzite and limestone gravel; few fine white threads of soft lime; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| C<br>RSL<br>69829 | 100 to 150 cm (39½ -59 inches), pale brown (10YR 6/3) sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky, slightly plastic; few very fine, fine and medium roots; many very fine and fine tubular pores; 3 to 5 percent by volume of 1/8 to 1/2 inch rounded andesite, rhyolite, quartzite and limestone gravel; strongly effervescent; moderately alkaline (pH 8.0). |
| RSL<br>69830 | See Remarks. |

CONSECUTIVE PEDON NUMBER C 69170 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES GUEST SOIL NO. S69 ARIZ. 2-24 SAMPLE NO. 9 875-9 880 WILLCOX AREA

SOIL FAMILY: ANTHROPIC TORRIFLUVENT,FINE,MIXED(CALCR.),THRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | SILTS FSI .02-.002 | CO. CLAYS 2-.2U | FINE CLAYS LT .2U | CARBONATE 3A1A | 1A2A INT. 11 .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE 2O I 75-SOIL | II 20-5 PCT. OF LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 9 875 | 0- 20 | AP | 25.5 | 34.0 | 40.5 | 1.2 | 1.6 | 2.6 | 11.8 | 8.3 | 10.5 | 23.5 | | | | 25.8 | 5A | 1 | 3 | 1 |
| 9 876 | 20- 43 | A12 | 20.3 | 35.5 | 44.2 | 1.0 | 1.8 | 2.7 | 8.5 | 6.3 | 12.0 | 23.5 | | | | 23.3 | 1A | -- | -- | 1 |
| 9 877 | 43- 66 | A13 | 19.9 | 35.4 | 44.7 | 1.0 | 2.3 | 2.5 | 7.4 | 6.7 | 11.2 | 24.2 | | | | 22.4 | 1A | -- | -- | 1 |
| 9 878 | 66-100 | A14 | 22.6 | 34.2 | 43.2 | 1.0 | 2.4 | 2.9 | 8.9 | 7.4 | 10.1 | 24.1 | | | | 22.5 | 1A | -- | -- | 1 |
| 9 879 | 100-120 | AC | 23.2 | 33.3 | 43.5 | 0.9 | 2.5 | 3.1 | 9.0 | 7.7 | 10.2 | 23.1 | | | | 23.3 | 1A | -- | -- | 1 |
| 9 880 | 120-150 | B2TCAB | 38.2 | 19.5 | 42.3 | 7.3 | 8.7 | 5.8 | 11.2 | 5.2 | 6.0 | 13.5 | 42.0 | 0.3 | 4 | 16.2 | 2A | -- | -- | 2 |

| SAMPLE NO. | DEPTH CM. | ORG. MATTER CARBON 6A1A -PERCENT-- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG LIMIT LL 4F1 PCT. | PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 -----PERCENT--- | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | GRAMS PER CC | | | | | | | | | | |
| 9 875 | 0- 20 | 0.64 | 0.070 | 1 | | 0.7 | 40 | 21 | 1.35 | 1.67 | 0.98 | | 27.3 | 13.9 | 7.3 | 7.1 | 7.8 | 8.7 | 7.8 |
| 9 876 | 20- 43 | 0.41 | 0.036 | 1 | | 0.7 | | | 1.44 | 1.81 | 0.99 | | 25.4 | 16.2 | 7.9 | 7.9 | 7.7 | | 7.7 |
| 9 877 | 43- 66 | 0.36 | | 2 | | 0.7 | | | 1.43 | 1.81 | 0.99 | | 27.1 | 16.3 | 8.2 | 8.1 | 7.8 | 9.0 | 7.7 |
| 9 878 | 66-100 | 0.32 | | 2 | | 0.7 | | | 1.42 | 1.84 | 0.99 | | 28.7 | 17.0 | 9.0 | 9.0 | 7.9 | 9.1 | 7.7 |
| 9 879 | 100-120 | 0.23 | | 5 | | 0.7 | 48 | 21 | 1.38 | 1.75 | 0.99 | | 28.2 | 16.9 | 8.2 | 8.2 | 8.0 | 9.1 | 7.7 |
| 9 880 | 120-150 | | | 19 | | 0.6 | | | 1.42 | 1.79 | 0.99 | | 27.3 | 16.4 | 8.0 | 7.9 | 7.7 | 9.0 | 7.8 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6Q1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | 8A1 SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 9 875 | 0- 20 | | | 0.8 | 2.0 | 2.8 | | | 28.3 | 1.37 | 9.5 | 1.8 | 4.7 | 0.5 | | 6.9 | 1.5 | | | 7.8 |
| 9 876 | 20- 43 | | | 1.9 | 1.1 | 3.0 | | | 28.3 | | | | | | | | | | | |
| 9 877 | 43- 66 | | | 2.8 | 1.1 | 3.9 | | | 27.8 | 1.09 | 2.3 | 1.0 | 11.1 | 0.3 | | 3.8 | 3.1 | | | 7.9 |
| 9 878 | 66-100 | | | 3.2 | 1.1 | 4.3 | | | 27.4 | 0.94 | 2.0 | 0.8 | 13.0 | 0.3 | | 3.8 | 1.2 | 5.2 | | 7.8 |
| 9 879 | 100-120 | | | 4.0 | 1.0 | 5.0 | | | 26.5 | 1.35 | 1.9 | 0.9 | 11.3 | 0.1 | | 3.0 | 3.9 | 7.0 | | 7.7 |
| 9 880 | 120-150 | | | 3.9 | 1.0 | 4.9 | | | 24.0 | 2.06 | 5.4 | 2.1 | 15.4 | 0.2 | | 2.6 | 5.1 | 15.3 | | 7.6 |

| SAMPLE NO. | DEPTH CM. | WATER AT 1/3 BAR SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | OTA IV 7A2E | OTA PCT. 7A3 | -L.T. .0002 MM- X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 875 | 0- 20 | 53.1 | 0.6 | 2 | 2 | | | MT 3 | MI 3 | KK 1 | | | | | | MT MONTMORT | 1 TRACE |
| 9 876 | 20- 43 | | 1.9 | 7 | | | | MI 3 | MT 2 | KK 1 | | | | | | MI MICA | 2 SMALL |
| 9 877 | 43- 66 | 67.7 | 2.0 | 7 | 9 | | | | | | | | | | | KK KAOLINIT | 3 MODERATE |
| 9 878 | 66-100 | 69.9 | 2.3 | 8 | 11 | | | | | | | | | | | | 4 ABUNDANT |
| 9 879 | 100-120 | 71.5 | 3.2 | 12 | 10 | | | MT 3 | MI 3 | KK 2 | | | | | | | 5 DOMINANT |
| 9 880 | 120-150 | 65.9 | 2.9 | 12 | 8 | | | MT 2 | KK 1 | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

GUEST CLAY
S69Ariz-2-24

Location: Cochise County, Arizona. 100 feet south and 500 feet west of the northwest corner of Sec. 32, T. 16 S., R. 26 E. West of Kansas Settlement Road, about 6½ miles east and 7 miles north of Pearce. Date of sampling: October 22, 1969.

Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.

Classification: Anthropic Torrifluvent, fine, mixed (calcareous), thermic.

Vegetation: Tumbleweeds. Use: Idle irrigated cropland. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Alluvium principally from andesite and rhyolite with some limestone. Topography: Nearly level valley plain. Slope, 0.5 percent, west facing. Elevation: 4200 feet. Drainage: Well drained. Runoff is slow to medium. Permeability is slow. Soil Moisture: Dry when sampled.

Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This sample was not paired.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>69875 | 0 to 20 cm (0 to 8 inches), dark brown (10YR 4/3) clay, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure; hard to very hard, friable, very sticky, plastic; common very fine and fine roots; about 2 percent by volume of 1 inch rounded rhyolite, andesite and limestone gravel; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| A12<br>RSL<br>69876 | 20 to 43 cm (8 to 17 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; moderate medium and coarse subangular and angular blocky structure; very hard, friable, very sticky, very plastic; very few very fine roots; few fine and very fine tubular pores; few pressure faces; about 2 percent by volume of 1 inch rounded rhyolite, andesite and limestone gravel; slightly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| A13<br>RSL<br>69877 | 43 to 66 cm (17 to 26 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; weak medium and coarse angular and subangular blocky structure; very hard, firm, very sticky, very plastic; very few very fine roots; few very fine tubular pores; common pressure faces and a few slickensides; about 1 to 2 percent by volume of 1 inch rounded rhyolite, andesite and limestone gravel; slightly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| A14<br>RSL<br>69878 | 66 to 100 cm (26 to 39½ inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; massive; very hard, firm, very sticky, very plastic; very few very fine roots; few very fine tubular pores; common pressure faces and a few slickensides; about 1 to 2 percent by volume of 1 inch rounded rhyolite, andesite and limestone gravel; slightly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| AC<br>RSL<br>69879 | 100 to 120 cm (39½ - 47 inches), reddish brown (5YR 4/3) light clay, dark reddish brown (5YR 3/3) moist; massive; very hard, firm, sticky, plastic; very few very fine roots; few very fine tubular pores; common pressure faces; about 1 to 2 percent by volume of 1 inch rhyolite, andesite and limestone gravel; about 2 to 3 percent by volume of yellowish red medium irregularly shaped soft lime masses, lime coatings on gravel; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| B2tcab<br>RSL<br>69880 | 120 to 150 cm (47 to 59 inches), yellowish red (5YR 5/6) clay, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; very hard, friable, sticky, plastic; common fine and very fine tubular pores; common moderately thick clay films on faces of peds and in pores; common pressure faces; about 1 percent by volume of 1 inch rounded rhyolite, andesite and limestone gravel; about 30 percent by volume of large white irregularly shaped soft lime masses; strongly effervescent, violently effervescent in spots; moderately alkaline (pH 8.0). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Torriorthent, loamy-skeletal, carbonatic, mesic S62Ariz-3-34
SOIL FAMILY: Aridic Haplustoll, loamy-skeletal, carbonatic, mesic S62 Ariz-3-35

SOIL Winona gravelly fine sandy loam (taxadjunct) LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62357 - 62360

| Depth (In.) | Horizon | Size class and particle diameter (mm) Pct of < 2 mm: Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt (0.05–0.02) | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: > 2* Pct | Coarse fragments 2A2: 2 – 19 Pct. of < 76 mm | Coarse fragments 2A2: 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2½ | A1 | S62Ariz-3-34 | | | | | | | | | | | | | | 24 | | |
| 2½-9 | C1 | | | | | | | | | | | | | | | 23 | | |
| 0- 3 | A1 | S62Ariz-3-35 | | | | | | | | | | | | | | 18 | | |
| 3-10 | C1 | | | | | | | | | | | | | | | 23 | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | | 6E1b Carbonate as $CaCO_3$ Pct. | | Bulk density g/cc | Bulk density g/cc | Bulk density g/cc | | Water content Pct. | Water content Pct. | Water content Pct. | | | pH 8C1b Sat. Paste | pH 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2½ | 1.04 | 0.099 | 11 | | 1 | | | | | | | | | | | 7.9 | 8.2 |
| 2½-9 | 1.22 | 0.125 | 10 | | 4 | | | | | | | | | | | 8.0 | 8.4 |
| 0- 3 | 2.00 | 0.171 | 12 | | 1 | | | | | | | | | | | 8.0 | 8.1 |
| 3-10 | 1.24 | 0.123 | 10 | | 3 | | | | | | | | | | | 7.9 | 8.3 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases meq/100 g: Ca | Mg | Na | K | | | | | Water extract from saturated paste meq/liter: Ca | Mg | Na | K | | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity mmho/cm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| Depth (In.) | Water at Saturation Pct. | Exchangeable Na Pct | | Gypsum Pct. | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## WINONA GRAVELLY FINE SANDY LOAM (taxadjunct) 1/
S62Ariz-3-34

Supplemental to sample S62Ariz-3-33 as a check on C-N ratio and organic carbon.
Classification: Typic Torriorthent, loamy-skeletal, mixed, mesic.
Location: Central Coconino County Area, Arizona. 30 feet NW of sample site S62Ariz-3-33.
Vegetation: Barren area.
Remarks: Gravels ranging in size from 1/8 to 1/2 inch make up approximately 35 to 40 percent by volume, of the A1 horizon.
The surface 1/4 inch algal crust is noneffervescent but has a pH (Hellige-Truog) of 8.0 and is soft and porous. There are coatings of reprecipitated lime on all rock fragments throughout the profile which range in thickness from 1/8 to 1/2 inch. The depth to the R horizon ranges from 10 to 30 inches.
Examination and sampling done in a hand-dug pit.
The purpose of this sample is to check C-N ratio and organic carbon under sparse vegetative cover. Sample area involves approximately 60 square inches of essentially barren ground.
Percent volume of rock materials greater than 3/4 inch in diameter discarded from laboratory sample is: 2½-9" - 10 percent.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>62357 | 0 to 2½ inches, brown (7.5YR 5/4) gravelly fine sandy loam, dark brown (7.5YR 3/2) when moist; moderate fine granular structure; loose when dry and moist, nonsticky and slightly plastic when wet; plentiful fine roots; many fine interstitial pores; strongly effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. |
| C1<br>RSL<br>62358 | 2½ to 9 inches, brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/2) when moist; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful fine roots; few fine continuous simple tubular and many fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; gradual wavy boundary. |
| C2 and R | Same as described for Sample 3-33. |

1/ The Winona series is in a loamy, carbonatic, mesic family of Lithic Torriorthents. This pedon has more than 35 percent gravel and cobbles by volume, lacks a lithic contact within 20 inches, and does not have carbonatic mineralogy.

## WINONA GRAVELLY FINE SANDY LOAM (taxadjunct) 1/
S62Ariz-3-35

Supplemental to Sample S62Ariz-3-33 as a check on C-N ratio and organic carbon.
Classification: Aridic Haplustoll, loamy-skeletal, mixed, mesic.
Location: Central Coconino County Area, Arizona. 50 feet southwest of sample site S62Ariz-3-33.
Vegetation: Juniper tree with squirreltail grass understory.
Remarks: Gravels ranging in size from 1/8 to 1/2 inch make up approximately 35 to 40 percent by volume of the A1 horizon.
The surface 1/4 inch algal crust is noneffervescent but has a pH (Hellige-Truog) of 8.0 and is soft and porous. There are coatings of reprecipitated lime on all rock fragments throughout the profile which range in thickness from 1/8 to 1/2 inch. The depth to the R horizon ranges from 10 to 30 inches.
Purpose of this sample is to check C-N ratio and organic carbon under juniper cover. Sample taken approximately 5 feet from base of juniper which is approximately 119 years old. Sample under canopy of tree. Understory vegetation consists of squirreltail grass with approximately 10 percent ground cover density.

| HORIZON | DESCRIPTION |
|---|---|
| O1 | 1 to 0 inches, needles from juniper tree. |
| A1<br>RSL<br>62359 | 0 to 3 inches, brown (7.5YR 4/4) gravelly heavy fine sandy loam, dark brown (7.5YR 3/2) when moist; weak fine granular structure; loose when dry and moist, slightly sticky and slightly plastic when wet; few fine roots; common fine interstitial and few fine tubular pores; slight effervescence; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. |
| C1<br>RSL<br>62360 | 3 to 10 inches, brown (7.5YR 4/4) gravelly heavy loam, dark brown (7.5YR 3/2) when moist; moderate fine and medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; plentiful fine roots; common fine interstitial and few fine tubular pores; violently effervescent; moderately alkaline, pH 8.0; gradual wavy boundary. |
| C2 and R | Same as described for sample 3-33. |

1/ The Winona series is in a loamy, carbonatic, mesic family of Lithic Torriorthents. This pedon has a mollic epipedon, more than 35 percent gravel and cobbles by volume, and has mixed mineralogy.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Torriorthent, loamy-skeletal, carbonatic, mesic S62Ariz-3-37
SOIL FAMILY: Aridic Haplustoll, loamy-skeletal, carbonatic, mesic S62Ariz-3-38

SOIL **Winona gravelly fine sandy loam** (taxadjunct) LOCATION **Coconino County, Arizona**

SOIL SURVEY LABORATORY **Riverside, California** LAB. Nos. **62361 - 62364**

| Depth (In.) | Horizon | Size class and particle diameter (mm) — Total: Sand (2–0.05) | Total: Silt (0.05–0.002) | Total: Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | Coarse fragments: >2* Pct. | Coarse fragments: 2–19 Pct. of <76 mm | Coarse fragments: 19–76 Pct. of <76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of <2 mm | | | | | | | | | | | | | | |
| 0- 3 | A1 | S62Ariz-3-37 | | | | | | | | | | | | 29 | | |
| 3-12 | C1 | | | | | | | | | | | | | 37 | | |
| 0- 2 | A1 | S62Ariz-3-38 | | | | | | | | | | | | 30 | | |
| 2-10 | C1 | | | | | | | | | | | | | 34 | | |

| Depth (In.) | 6A1a Organic carbon Pct | 6B1a Nitrogen Pct | C/N | 6E1b Carbonate as $CaCO_3$ Pct. | Bulk density g/cc | Bulk density g/cc | Bulk density g/cc | Water content Pct. | Water content Pct | Water content Pct. | pH 8C1b Sat. Paste | pH 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 3 | 1.80 | 0.154 | 12 | 3 | | | | | | | 7.9 | 8.3 |
| 3-12 | 2.13 | 0.206 | 10 | 14 | | | | | | | 7.9 | 8.4 |
| 0- 2 | 2.60 | 0.212 | 12 | 9 | | | | | | | 8.0 | 8.2 |
| 2-10 | 1.97 | 0.186 | 11 | 18 | | | | | | | 7.9 | 8.1 |

| Depth (In.) | Extractable bases meq/100 g: Ca | Mg | Na | K | Water extract from saturated paste meq/liter: Ca | Mg | Na | K | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity mmho/cm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Depth (In.) | Water at Saturation Pct. | Exchangeable Na Pct. | Gypsum Pct. |
|---|---|---|---|

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## WINONA GRAVELLY FINE SANDY LOAM (taxadjunct) 1/
S62Ariz-3-37

Supplemental to Sample S62Ariz-3-36 as a check on C-N ratio and organic carbon.
Classification: Typic Torriorthent, loamy-skeletal, mixed, mesic.
Location: Central Coconino County Area, Arizona. 25 feet east of sample site S62Ariz-3-36.
Vegetation: Area of 432 square inches bare of vegetation.
Remarks: The surface algal crust, approximately 1/4" thick, is noneffervescent, but has a pH (Hellige-Truog) of 8.0. It is soft and porous.
There are coatings of reprecipitated lime on all rock fragments throughout the profile which range in thickness from 1/8 to 1/2 inch.
The depth to the R horizon ranges from approximately 10 to 30 inches.
Soil examined and sampled in a hand-dug pit.
This sample taken for comparison of C-N ratio and organic carbon under sparse vegetative cover.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>62361 | 0 to 3 inches, light brown (7.5YR 6/4) gravelly fine sandy loam, dark brown (7.5YR 4/2) when moist; weak fine granular structure; loose, dry and moist, nonsticky and slightly plastic when wet; few fine roots; many fine interstitial pores; strongly effervescent; moderately calcareous, pH (Hellige-Truog) 8.0; abrupt smooth boundary. 30 to 40 percent by volume of gravel 1/8 - 1/2 inch in diameter. |
| C1<br>RSL<br>62362 | 3 to 12 inches, brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/2) when moist; weak fine subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful fine and few medium roots; few fine continuous simple tubular and many fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; clear wavy boundary. 40 percent by volume of rock material greater than 3/4 inch in diameter discarded from laboratory sample. |
| C2 and R | Similar to sample S62Ariz-3-36. |

1/ The Winona series is in a loamy, carbonatic, mesic family of Lithic Torriorthents. This pedon does not have a lithic contact within 20 inches, it has less than 40 percent carbonates, and it has more than 35 percent gravel and cobbles by volume.

## WINONA GRAVELLY FINE SANDY LOAM (taxadjunct) 1/
S62Ariz-3-38

Supplemental to Sample S62Ariz-3-36 as a check on C-N ratio and organic carbon.
Classification: Aridic Haplustoll, loamy-skeletal, mixed, mesic.
Location: Central Coconino County Area, Arizona. 60 feet SE of sample site S62Ariz-3-36.
Vegetation: Juniper tree. Sample site 5 feet from base of tree on north side but still under the canopy. Age of tree is 66 years. 15 percent ground density cover of blue grama and squirreltail grass is present as an understory.
Remarks: Sampled for purpose of comparing C-N ratio and organic carbon under a juniper cover. There are 30 to 40 percent by volume of gravels ranging in size from 1/8 to 1/2 inch in the 0-2" depth.
The surface algal crust, approximately 1/4" thick, is noneffervescent but has a pH (Hellige-Truog) of 8.0. It is soft and porous.
There are coatings of reprecipitated lime on all rock fragments throughout the profile which range in thickness from 1/8 to 1/2 inch.
The depth to the R horizon ranges from approximately 10 to 30 inches.
Soil examined and sampled in a hand-dug pit.

| HORIZON | DESCRIPTION |
|---|---|
| 01 | 1 to 0 inches, juniper needles; abrupt smooth boundary. |
| A1<br>RSL<br>62363 | 0 to 2 inches, brown (7.5YR 4/2) gravelly fine sandy loam, dark brown (7.5YR 3/2) when moist; weak fine and medium granular structure; loose when dry and moist; slightly sticky and slightly plastic when wet; few fine roots; many fine interstitial pores; strongly effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. |
| C1<br>RSL<br>62364 | 2 to 10 inches, brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/2) when moist; weak fine subangular blocky structure; slightly hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; plentiful fine and few coarse roots; few fine continuous simple tubular and many fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; clear wavy boundary. 30 percent by volume of rock material greater than 3/4 inch in diameter discarded from laboratory sample. |
| C2 and R | Similar to sample S62Ariz-3-36. |

1/ The Winona series is in a loamy, carbonatic, mesic family of Lithic Torriorthents. This pedon has a mollic epipedon, more than 35 percent gravel and cobbles by volume, and a mixed mineralogy.

CONSECUTIVE PEDON NUMBER C 67 47 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES GILMAN TAXADJUNCT SOIL NO. S67 ARIZ. 7- 1 SAMPLE NO. 7 588-7 597 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC TORRIORTHENT,CRS-LMY,MXD(CALC.),HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CO. CLAYS 2-.2U | FINE CLAY LT .2U | CARBONATE 3A1A.02 | 1A2A INT. COARSE FRAGMENTS II .2-.02 WHOLE SOIL | PCT. OF 20 | I 75-PCT. OF SOIL | II 20-5 PCT. OF LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 7 588 | 0- 18 | AP1 | 52.8 | 37.9 | 9.3 | 1.4 | 2.0 | 2.2 | 13.8 | 33.4 | 24.1 | 13.8 | | | | 67.4 | 4 | TR | 4Z | N |
| 7 589 | 18- 36 | AP2 | 51.2 | 39.7 | 9.1 | -- | 1.7 | 2.2 | 13.5 | 33.8 | 25.5 | 14.2 | | | | 69.0 | 3 | TR | 3Z | N |
| 7 590 | 36- 58 | C 1 | 59.6 | 31.4 | 9.0 | 1.9 | 2.9 | 3.1 | 16.8 | 34.9 | 21.3 | 10.1 | | | | 67.7 | 4 | TR | 4Z | N |
| 7 591 | 58- 81 | C 2 | 49.3 | 40.7 | 10.0 | 2.1 | 3.3 | 3.2 | 13.9 | 26.8 | 29.3 | 11.4 | | | | 64.9 | 5 | TR | 5Z | N |
| 7 592 | 81-109 | C 3 | 53.4 | 34.3 | 12.3 | 5.1 | 6.9 | 4.8 | 13.4 | 23.2 | 24.3 | 10.0 | | | | 55.8 | 14 | TR | 14Z | N |
| 7 593 | 109-122 | A1 B | 48.1 | 37.7 | 14.2 | 3.2 | 5.2 | 3.8 | 12.2 | 23.7 | 27.2 | 10.5 | | | | 58.4 | 9 | TR | 9Z | N |
| 7 594 | 122-137 | A3 B | | | | | | | | | | | | | | | 14 | TR | 14Z | N |
| 7 595 | 137-150 | B21TB | 33.6 | 26.9 | 39.5 | 2.7 | 5.0 | 3.3 | 9.2 | 13.4 | 15.7 | 11.2 | | | | 34.5 | 29 | TR | 29Z | N |
| 7 596 | 150-170 | B22TCAB | | | | | | | | | | | | | | | 22 | TR | 22Z | N |
| 7 597 | 170-208 | C 4CAB | | | | | | | | | | | | | | | -- | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR-BON 6A1A -PERCENT- | NITRO-GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L L 4F1 | P I 4F2 | M I T 4A1F | EST. 1/3 BAR | BULK DENSITY 1/3 BAR | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEE 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | -----PERCENT------ | | | | PCT. | NO.40 | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT- | |
| 7 588 | 0- 18 | 0.23 | 0.032 | 2 | | 0.6 | | | | | | | | 1.50 | 1.53 | 0.98 | | 17.8 | 6.9 | 0.7 | 0.6 |
| 7 589 | 18- 36 | 0.20 | 0.029 | 2 | | | | | | | | | | 1.58 | 1.60 | 0.98 | | 13.9 | 7.0 | 0.4 | 0.4 |
| 7 590 | 36- 58 | 0.18 | | 3 | | 0.6 | | | | | | | | 1.46 | 1.47 | 0.98 | | 21.9 | 6.1 | 0.2 | 0.2 |
| 7 591 | 58- 81 | 0.17 | | 3 | | | | | | | | | | 1.44 | 1.47 | 0.97 | | 18.4 | 6.5 | 0.7 | 0.7 |
| 7 592 | 81-109 | 0.10 | | 3 | | | | | | | | | | 1.39 | 1.45 | 0.92 | | 23.0 | 6.6 | 1.4 | 1.3 |
| 7 593 | 109-122 | 0.07 | | 2 | | 0.6 | | | | | | | | 1.38 | 1.44 | 0.95 | | 17.4 | 7.1 | 1.4 | 1.4 |
| 7 594 | 122-137 | 0.06 | | 1 | | | | | | | | | 1.34 | | | 0.92 | | | 8.3 | | |
| 7 595 | 137-150 | 0.04 | | 7 | | 0.8 | | | | | | | | 1.30 | 1.41 | 0.83 | | 22.0 | 14.5 | 2.7 | 2.3 |
| 7 596 | 150-170 | | | 15 | | | | | | | | | | 1.39 | 1.51 | 0.87 | | 25.9 | 12.1 | 2.8 | 2.4 |
| 7 597 | 170-208 | | | 18 | | | | | | | | | 1.45 | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | -PERCENT- | | | | | |
| 7 588 | 0- 18 | | | 2.1 | 1.8 | 3.9 | | | 3.9 | 14.9 | | | | | 9.4 | 8.2 |
| 7 589 | 18- 36 | | | 1.4 | 1.6 | 3.0 | | | 3.0 | 14.5 | | | | | 9.2 | 7.9 |
| 7 590 | 36- 58 | | | 1.5 | 1.7 | 3.2 | | | 3.2 | 14.1 | | | | | 9.3 | 8.0 |
| 7 591 | 58- 81 | | | 1.5 | 1.2 | 2.7 | | | 2.7 | 13.8 | | | | | 9.3 | 8.1 |
| 7 592 | 81-109 | | | 1.6 | 0.7 | 2.3 | | | 2.3 | 13.5 | | | | | 9.4 | 8.1 |
| 7 593 | 109-122 | | | 1.7 | 0.5 | 2.2 | | | 2.2 | 14.6 | | | | | 9.3 | 7.9 |
| 7 594 | 122-137 | | | 1.9 | 0.5 | 2.4 | | | 2.4 | 14.5 | | | | | 9.3 | 8.0 |
| 7 595 | 137-150 | | | 2.4 | 0.8 | 3.2 | | | 3.2 | 20.1 | | | | | 9.2 | 7.7 |
| 7 596 | 150-170 | | | | | | | | | | | | | | | 8.0 |
| 7 597 | 170-208 | | | | | | | | | | | | | | | 8.0 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <2 MM LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2F IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 588 | 0- 18 | MT | 4 | MI | 2 | KK | 1 | | | | MT MONTMORT | 1 TRACE |
| 7 589 | 18- 36 | | | | | | | | | | MI MICA | 2 SMALL |
| 7 590 | 36- 58 | MT | 4 | MI | 3 | KK | 2 | | | | KK KAOLINIT | 3 MODERATE |
| 7 591 | 58- 81 | | | | | | | | | | | 4 ABUNDANT |
| 7 592 | 81-109 | | | | | | | | | | | 5 DOMINANT |
| 7 593 | 109-122 | MI | 4 | MT | 3 | KK | 2 | | | | | 6 INDETER. |
| 7 594 | 122-137 | | | | | | | | | | | |
| 7 595 | 137-150 | MI | 4 | MT | 3 | KK | 3 | | | | | |
| 7 596 | 150-170 | | | | | | | | | | | |
| 7 597 | 170-208 | | | | | | | | | | | |

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

# GILMAN VERY FINE SANDY LOAM (taxadjunct) 1/

S-67-Ariz-7-1

Location: Maricopa County, Arizona. 750 feet south and 306 feet west of the NE corner of Section 24, T2N, R9W., 11 miles west of Tonopah. Date of Sampling: October 9, 1967. Description by: S. Torrance, G. Hartman. Collectors: K. Flach, D. Nettleton, J. Jay, A.DeWall. Classification: Typic Torriorthent, coarse-loamy, mixed (calcareous), hyperthermic. Vegetation: Cotton. Use: Farmland. Climate: Mean annual precipitation 7 inches. Mean annual temperature 69° F.; January 50-80° F., July 88° F. Parent Material: Alluvium from a wide variety of igneous and sedimentary rocks. Topography: Nearly level alluvial fan sloping less than 0.5 percent to the southwest. Elevation: 1,290 feet. Drainage: Well drained with moderately permeable subsoils. Medium runoff. Soil moisture: Moist.

Remarks: Horizons C2 and C3 separated for sampling purposes. Sampled from backhoe pit.

| HORIZON | DESCRIPTION |
|---|---|
| Ap1<br>RSL<br>67588 | 0 to 18 cm (0 to 7 inches), pink (7.5YR 7/4) very fine sandy loam, brown (7.5YR 5/4) when moist; medium and coarse platy to moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many fine roots; few fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0 thymol blue); abrupt smooth boundary. |
| Ap2<br>RSL<br>67589 | 18 to 36 cm (7 to 14 inches), pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 4/3) when moist; massive; hard, friable; nonsticky and slightly plastic; many fine roots; common fine interstitial and few fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C1<br>RSL<br>67590 | 36 to 58 cm (14 to 23 inches), light brown (7.5YR 6/4) very fine sandy loam, brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, nonsticky and slightly plastic; many fine roots; many fine interstitial and few fine and medium tubular pores; strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C2<br>RSL<br>67591 | 58 to 85 cm (23 to 32 inches), pink (7.5YR 7/4) very fine sandy loam, brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, nonsticky and slightly plastic; many fine roots; common fine and medium tubular and many fine interstitial pores; very few very fine pinkish white lime veins, strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C3*<br>RSL<br>67592 | 85 to 109 cm (32 to 43 inches), pink (7.5YR 7/4) very fine sandy loam, yellowish brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; common fine and medium tubular and many fine interstitial pores; few fine pinkish white lime veins, violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| A1b<br>RSL<br>67593 | 109 to 122 cm (43 to 48 inches), pink (7.5YR 7/4) loam, brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few micro roots; many fine interstitial and few fine tubular pores; few fine pinkish white lime veins, violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| A3b<br>RSL<br>65594 | 122 to 137 cm (48 to 54 inches), pink (7.5YR 7/4) loam, brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, nonsticky and plastic; few micro roots; common fine and medium tubular pores and many fine interstitial pores; few fine lime veins, strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| B21tb<br>RSL<br>67595 | 137 to 150 cm (54 to 59 inches), reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) when moist; weak fine and medium subangular blocky structure; hard, firm, sticky and plastic; few micro roots; common fine and medium tubular and fine interstitial pores; few thin clay films on ped faces and in pores; common fine pink soft lime masses; violently effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| B22tcab<br>RSL<br>67596 | 150 to 170 cm (59 to 67 inches), reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) when moist; weak fine and medium subangular blocky structure; hard, firm, sticky and plastic; few micro roots; common fine and medium tubular and few fine interstitial pores; few thin clay films on ped faces and pores; common fine pink rounded soft lime masses; violently effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C4cab<br>RSL<br>67597 | 170 to 208 cm (67 to 82 inches), pink (7.5YR 7/4) loam, brown (7.5YR 5/4) when moist; massive; hard, friable, slightly sticky and slightly plastic; few micro roots; very few fine tubular and interstitial pores; many fine and medium pinkish white soft lime masses, violently effervescent; moderately alkaline (pH 8.0). |

*Horizon C2 and C3 separated for sampling purposes.

1/ The Gilman series is in a coarse-loamy, mixed (calcareous), hyperthermic family of Typic Torrifluvents. This pedon has a regular decrease in organic carbon.

CONSECUTIVE PEDON NUMBER C 67 49 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES GILMAN TAXADJUNCT SOIL NO. S67 ARIZ. 7- 6 SAMPLE NO. 7 605-7 610 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC TORRIORTHENT,CRS-LMY,MXD(CALC.),HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. 2-.2U | CLAYS FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 7 605 | 0- 13 | AP | 34.6 | 51.6 | 13.8 | 0.5 | 0.7 | 0.9 | 6.9 | 25.6 | 36.1 | 15.5 | | | | 66.9 | TR | TR | -- | -- |
| 7 606 | 13- 46 | B2 | 29.9 | 54.1 | 16.0 | 1.3 | 1.4 | 1.2 | 6.0 | 20.0 | 30.9 | 23.2 | | | | 55.2 | TR | TR | -- | -- |
| 7 607 | 46- 69 | B3 | 35.6 | 54.9 | 9.5 | 0.4 | 0.7 | 0.7 | 8.4 | 25.4 | 41.5 | 13.4 | | | | 73.5 | TR | TR | -- | -- |
| 7 608 | 69- 94 | C 1 | 41.7 | 51.0 | 7.3 | -- | 0.2 | 0.8 | 12.6 | 28.1 | 42.2 | 8.8 | | | | 79.8 | TR | TR | -- | -- |
| 7 609 | 94-130 | C 2 | 63.1 | 30.8 | 6.1 | 0.1 | 0.4 | 1.4 | 23.7 | 37.5 | 24.7 | 6.1 | | | | 80.3 | TR | TR | -- | -- |
| 7 610 | 130-163 | C 3 | | | | | | | | | | | | | | | -- | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6F1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | PI 4A1F | BULK DENSITY EST. 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT.NO.40 | | | GRAMS PER CC | | | PERCENT | | | PERCENT | |
| 7 605 | 0- 13 | 0.22 | 0.030 | 2 | | 0.6 | | | | | | | 1.56 | 1.63 | 1.00 | 20.3 | 7.2 | 1.5 | 1.5 | |
| 7 606 | 13- 46 | 0.11 | 0.020 | 2 | | 0.8 | | | | | | | 1.51 | 1.58 | 1.00 | 16.1 | 8.7 | 1.5 | 1.5 | |
| 7 607 | 46- 69 | 0.10 | | 1 | | | | | | | | | 1.42 | 1.49 | 1.00 | 17.2 | 6.4 | 1.6 | 1.6 | |
| 7 608 | 69- 94 | 0.07 | | 1 | | 0.7 | | | | | | | 1.45 | 1.49 | 1.00 | 23.0 | 4.8 | 0.9 | 0.9 | |
| 7 609 | 94-130 | 0.04 | | TR | | | | | | | | | 1.49 | 1.53 | 1.00 | 15.6 | 4.0 | 0.9 | 0.9 | |
| 7 610 | 130-163 | 0.07 | | | | | | | | | | | 1.49 | 1.54 | 1.00 | 16.8 | 4.9 | 1.1 | 1.1 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | CEC NH4-OAC 5A6A | BASE SATURATION SUM+ ACI-DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 7 605 | 0- 13 | | | 0.8 | 1.1 | 1.9 | | | 1.9 | 13.5 | | | | | | |
| 7 606 | 13- 46 | | | 0.8 | 0.6 | 1.4 | | | 1.4 | 17.3 | | | | | | |
| 7 607 | 46- 69 | | | 0.8 | 0.4 | 1.2 | | | 1.2 | 14.0 | | | | | | |
| 7 608 | 69- 94 | | | 0.6 | 0.3 | 0.9 | | | 0.9 | 10.9 | | | | | | |
| 7 609 | 94-130 | | | 0.5 | 0.3 | 0.8 | | | 0.8 | 8.3 | | | | | | |
| 7 610 | 130-163 | | | | | | | | | | | | | | | |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PERCENT | | | | |
| 7 605 | 0- 13 | MI 3 | MT 1 | KK 2 | | | | | | |
| 7 606 | 13- 46 | MT 4 | MI 3 | KK 2 | | | | | | |
| 7 607 | 46- 69 | | | | | | | | | |
| 7 608 | 69- 94 | MT 4 | MI 3 | KK 2 | | | | | | |
| 7 609 | 94-130 | | | | | | | | | |
| 7 610 | 130-163 | | | | | | | | | |

| CODE | |
|---|---|
| MI | MICA |
| MT | MONTMORT |
| KK | KAOLINIT |

| RELATIVE AMOUNT | |
|---|---|
| 1 | TRACE |
| 2 | SMALL |
| 3 | MODERATE |
| 4 | ABUNDANT |
| 5 | DOMINANT |
| 6 | INDETER. |

## GILMAN LOAM (taxadjunct) 1/
S-67-Ariz-7-6

Location: Maricopa County, Arizona. 63 feet west and 213 feet south of the NE corner of the NE¼, SW¼, Section 18, T2N, R1W., 6 miles northwest of Avondale. Date of Sampling: October 9, 1967.
Description by: S. Torrance, G. Hartman, J. Jay. Collectors: K. Flach, D. Nettleton.
Classification: Typic Torriorthent, coarse-loamy, mixed (calcareous), hyperthermic.
Vegetation: Grape vineyard. Use: Cultivated land. Climate: Mean annual precipitation is approximately 7.7 inches. Mean annual air temperature 70°F. January 52° F., July 90° F. Parent Material: Alluvium from a variety of igneous and sedimentary rocks. Topography: Level to nearly level alluvial fan sloping less than 0.5 percent to the southeast. Elevation: 1,105 feet. Drainage: Well drained, moderate permeability and medium runoff. Soil Moisture: Moist.
Remarks: Dr. Flach considered 5-18 inch horizon to be a cambic horizon with evidences of some clay movement. The same in 18-27" zone but less evident. Sampled from backhoe pit.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>67605 | 0 to 13 cm (0 to 5 inches), yellowish brown (10YR 5/4) loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, friable, sticky and plastic; many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| B2<br>RSL<br>67606 | 13 to 46 cm (5 to 18 inches), light yellowish brown (10YR 6/4)loam, dark brown (7.5YR 4/4) when moist; massive; hard, friable, sticky and plastic; few medium and common fine roots; few fine and medium and many very fine tubular pores; strongly effervescent; few fine white lime veins; moderately alkaline (pH 8.0); clear smooth boundary. |
| B3<br>RSL<br>67607 | 46 to 69 cm (18 to 27 inches), light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) when moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; many fine roots; many fine and very fine tubular pores and few medium tubular pores; few fine pinkish white lime veins, strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C1<br>RSL<br>67608 | 69 to 94 cm (27 to 37 inches), light yellowish brown (10YR 6/4) loam, dark brown (10YR 4/3) when moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; few fine and very fine tubular pores; weakly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C2<br>RSL<br>67609 | 94 to 130 cm (37 to 51 inches), light yellowish brown (10YR 6/4) very fine sandy loam, dark brown (10YR 4/3) when moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common fine and medium and few large roots; many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C3<br>RSL<br>67610 | 130 to 163 cm (51 to 64 inches), light yellowish brown (10YR 6/4) very fine sandy loam, dark yellowish brown (10YR 4/4) when moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common medium and large roots; few very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0). |

1/ The Gilman series is in a coarse-loamy, mixed (calcareous), hyperthermic family of Typic Torrifluvents. This pedon has a regular decrease in organic carbon.

CONSECUTIVE PEDON NUMBER C 67 60 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES PIMER TAXADJUNCT SOIL NO. S67 ARIZ. 7-11 SAMPLE NO. 7 696-7 701 CENTRAL ARIZONA AREA

SOIL FAMILY: TYPIC TORRIORTHENT,FN-SLTY,MXD(CALC.),HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | SILTS-- CO. 2- .2U | CLAYS---- FINE LT .2U | CARBONATE 3A1A.02 | INT. II .2- .02 WHOLE 20 | COARSE FRAGMENTS- PCT. OF SOIL I 75- | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | |
| 7 696 | 0- 20 | AP1 | 13.2 | 58.2 | 28.6 | 0.3 | 0.4 | 0.5 | 3.9 | 8.1 | 20.2 | 38.0 | | | | 31.1 | TR | TR | -- | -- |
| 7 697 | 20- 38 | AP2 | 12.9 | 57.6 | 29.5 | 0.2 | 0.3 | 0.4 | 2.9 | 9.1 | 22.8 | 34.8 | | | | 34.3 | TR | TR | -- | -- |
| 7 698 | 38- 58 | C 1 | 8.8 | 62.0 | 29.2 | -- | 0.1 | 0.2 | 1.5 | 7.0 | 22.3 | 39.7 | | | | 30.3 | TR | TR | -- | -- |
| 7 699 | 58- 76 | C 2 | 5.5 | 63.1 | 31.4 | -- | 0.1 | 0.1 | 1.0 | 4.3 | 17.2 | 45.9 | | | | 22.2 | TR | TR | -- | -- |
| 7 700 | 76-117 | C 3 | 9.3 | 72.9 | 17.8 | -- | 0.1 | 0.1 | 1.1 | 8.0 | 33.9 | 39.0 | | | | 42.6 | TR | TR | -- | -- |
| 7 701 | 117-178 | C 4 | 11.8 | 62.8 | 25.4 | 0.4 | 0.9 | 1.2 | 3.4 | 5.9 | 18.1 | 44.7 | | | | 26.0 | TR | TR | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG L L 4F1 | I M PL 4F2 | I T | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 7 696 | 0- 20 | 0.84 | 0.090 | 2 | | | | | | 1.36 | 1.62 | 1.00 | | 27.8 | 13.8 | 6.0 | 6.0 | | | 8.7 | |
| 7 697 | 20- 38 | 0.51 | 0.063 | 2 | | | | | | 1.41 | 1.68 | 1.00 | | 25.9 | 15.9 | 6.0 | 6.0 | | | 8.9 | |
| 7 698 | 38- 58 | 0.19 | | 4 | | | | | | 1.30 | 1.48 | 1.00 | | 29.8 | 15.3 | 4.4 | 4.4 | | | 9.0 | |
| 7 699 | 58- 76 | 0.15 | | 4 | | | | | | 1.22 | 1.40 | 1.00 | | 34.6 | 23.0 | 4.7 | 4.7 | | | 9.0 | |
| 7 700 | 76-117 | 0.10 | | 2 | | | | | | 1.29 | 1.38 | 1.00 | | 34.7 | 11.0 | 2.3 | 2.3 | | | 9.2 | |
| 7 701 | 117-178 | | | 1 | | | | | | 1.34 | 1.50 | 1.00 | | 32.3 | 18.4 | 3.8 | 3.8 | | | 9.2 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES--- CA 6N4C | MG 6B3A 6O4C | NA 6P2A | K 6Q2A | SUM | BASE SAT. PCT. | C E C--- NA- OAC 5A2A | NH4- OAC 5A6A | WATER EXTRACT FROM SATURATED PASTE EC MMHO 8A1A | CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | BA1 B 6T1A PPM | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | -MEQ/100G | | | MEQ/1000 ML | | | | | | | | | |
| 7 696 | 0- 20 | | | 1.1 | 2.1 | 3.2 | | | 26.7 | 1.94 | 7.5 | 5.2 | 6.1 | 0.8 | | 9.0 | 3.6 | | | 7.6 |
| 7 697 | 20- 38 | | | 1.1 | 1.8 | 2.9 | | | 37.1 | | | | | | | | | | | 7.7 |
| 7 698 | 38- 58 | | | 1.3 | 1.6 | 2.9 | | | 25.7 | | | | | | | | | | | 7.8 |
| 7 699 | 58- 76 | | | 1.8 | 1.2 | 3.0 | | | 30.2 | 1.39 | 3.5 | 2.4 | 6.4 | 0.3 | | 3.1 | 5.2 | | | 7.8 |
| 7 700 | 76-117 | | | 1.8 | 0.7 | 2.5 | | | 22.6 | | | | | | | | | | | 7.9 |
| 7 701 | 117-178 | | | 2.5 | 1.0 | 3.5 | | | 28.6 | 1.75 | 3.8 | 2.2 | 9.4 | 0.2 | | 2.7 | 7.2 | | | 7.8 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 584B MEQ. | NA 5O2 PCT. | SAR 5E | GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2F | III 7A2E | DTA IV 7A2F | PCT. 7A3 | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE | | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 696 | 0- 20 | 58.1 | 0.7 | 3 | 2 | | | MT 4 | MI 3 | KK 2 | | | | | | MT | MONTMORT | 1 TRACE |
| 7 697 | 20- 38 | | 1.1 | 3 | | | | | | | | | | | | MI | MICA | 2 SMALL |
| 7 698 | 38- 58 | | 1.3 | 5 | | | | MT 4 | MI 3 | KK 2 | | | | | | KK | KAOLINIT | 3 MODERATE |
| 7 699 | 58- 76 | 63.3 | 1.4 | 5 | 4 | | | | | | | | | | | | | 4 ABUNDANT |
| 7 700 | 76-117 | | 1.8 | 8 | | | | MT 5 | MI 2 | KK 2 | | | | | | | | 5 DOMINANT |
| 7 701 | 117-178 | 52.8 | 2.0 | 7 | 5 | | | | | | | | | | | | | 6 INDETER. |

## PIMER SILTY CLAY LOAM (taxadjunct) 1/

S-67-Ariz-7-11

Location: Maricopa County, Arizona. 902 feet west and 121 feet south of the SE corner of the NE¼ of the NE¼, Section 11, T1N, R1E., 2 miles east of Tolleson. Date of Sampling: October 13, 1967.
Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton, A. DeWall.
Classification: Typic Torriorthent, fine-silty, mixed (calcareous), hyperthermic.
Vegetation: Maize. Use: Irrigated cropland. Climate: Mean annual precipitation is approximately 7 inches. Mean annual temperature 68° F.; January 52° F., July 90° F. Parent Material: Alluvium derived from a wide variety of rocks including acid and basic igneous, quartzite, shale and limestone.
Topography: Nearly level low terrace sloping less than 0.5 percent to the south.
Elevation: 1060 feet. Drainage: Well drained with moderately slow permeability. Slow runoff. Soil Moisture: Moist at time of sampling.

| HORIZON | DESCRIPTION |
|---|---|
| Ap1<br>RSL<br>67696 | 0 to 20 cm (0 to 8 inches), brown (10YR 5/3) clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; common fine roots; common fine tubular and interstitial pores; strongly effervescent; moderately alkaline (pH 8.0 thymol blue); abrupt smooth boundary. |
| Ap2<br>RSL<br>67697 | 20 to 38 cm (8 to 15 inches), brown (10YR 5/3) silty clay loam, dark grayish brown (10YR 4/2) when moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; common fine roots; common tubular pores and few fine interstitial pores; common thin clay films on ped faces and common thick clay films in pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C1<br>RSL<br>67698 | 38 to 59 cm (15 to 23 inches), brown (10YR 5/3) clay loam, dark yellowish brown (10YR 4/4) when moist; massive; hard, friable, sticky and plastic; common fine roots; common fine tubular and few fine interstitial pores; common thin clay films on ped faces and common thick clay films in pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C2<br>RSL<br>67699 | 59 to 76 cm (23 to 30 inches), brown (10YR 5/3) clay loam, dark brown (7.5YR 4/4) when moist; massive; hard, friable, sticky and plastic; common fine roots; many fine tubular and few fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C3<br>RSL<br>67700 | 76 to 117 cm (30 to 46 inches), pale brown (10YR 6/3 crushed) loam, dark brown (10YR 4/3) when moist; massive; hard, friable, slightly sticky and plastic; many fine and medium tubular pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C4<br>RSL<br>67701 | 117 to 178 cm (46 to 70 inches), brown (10YR 5/3) clay loam, dark brown (7.5YR 4/4) when moist; massive; hard, friable, sticky and plastic; common fine tubular and few fine interstitial pores; few fine pinkish white lime veins; strongly effervescent; moderately alkaline (pH 8.0). |

1/ The Pimer series is in a fine-silty, mixed (calcareous), hyperthermic family of Anthropic Torrifluvents. This pedon lacks an anthropic epipedon and has a regular decrease in organic carbon to less than 0.2 percent at 30 to 46 inches.

CONSECUTIVE PEDON NUMBER C 67 61 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES PIMER TAXADJUNCT SOIL NO. S67 ARIZ. 7-12 SAMPLE NO. 7 702-7 707 CENTRAL ARIZONA ARI

SOIL FAMILY: TYPIC TORRIORTHENT,FN-SLTY,MXD(CALC.),HYPRTHRMC RIVERSIDE SOIL SURVEY LABORATOR

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION <2 MM | SANDS 2-.05 | SILTS .05-.002 | CLAYS LT .002 | VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS- WHOLE 20 PCT. OF SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | | |
| 7 702 | 0- 20 | AP | 16.5 | 59.2 | 24.3 | | 0.3 | 0.5 | 0.7 | 4.5 | 10.5 | 21.6 | 37.6 | | | | 35.3 | TR | TR | -- | -- |
| 7 703 | 20- 38 | B2 T | 16.4 | 58.7 | 24.9 | | 0.1 | 0.5 | 0.7 | 4.7 | 10.4 | 21.2 | 37.5 | | | | 35.1 | TR | TR | -- | -- |
| 7 704 | 38- 56 | B3 | 19.1 | 58.8 | 22.1 | | 0.1 | 0.2 | 0.4 | 7.3 | 11.1 | 15.9 | 42.9 | | | | 33.1 | TR | TR | -- | -- |
| 7 705 | 56- 76 | C 1 | 8.8 | 72.9 | 18.3 | | 0.1 | 0.2 | 0.3 | 1.9 | 6.3 | 32.4 | 40.5 | | | | 40.1 | TR | TR | -- | -- |
| 7 706 | 76- 99 | C 2 | 20.9 | 50.3 | 28.8 | | 0.9 | 2.5 | 2.8 | 6.2 | 8.5 | 15.2 | 35.1 | | | | 27.4 | TR | TR | -- | -- |
| 7 707 | 99-130 | C 3 | 47.6 | 34.6 | 17.8 | | 3.6 | 7.2 | 6.9 | 14.0 | 15.9 | 20.0 | 14.6 | | | | 43.6 | TR | TR | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG. CARBON 6A1A -PERCENT-- | MATTER NITROGEN 6B1A -PERCENT-- | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | CACO3 19-2 6E1B -PERCENT- | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 PCT. | I M PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F GRAMS | 1/3 BAR 4A1F PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C -PERCENT--- | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 -PERCENT-- | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 702 | 0- 20 | 0.64 | 0.076 | 3 | | 1.1 | | | | 1.48 | 1.67 | 1.00 | | 25.7 | 12.5 | 4.1 | 4.1 | | 8.5 | |
| 7 703 | 20- 38 | 0.48 | 0.061 | 3 | | 1.2 | | | | 1.56 | 1.76 | 1.00 | | 24.2 | 13.2 | 4.1 | 4.1 | | 8.8 | |
| 7 704 | 38- 56 | 0.17 | | 3 | | | | | | 1.32 | 1.42 | 1.00 | | 28.6 | 11.8 | 2.5 | 2.5 | | 9.0 | |
| 7 705 | 56- 76 | | | 3 | | | | | 1.20 | | | 1.00 | | | 10.4 | | | | 9.2 | |
| 7 706 | 76- 99 | | | 2 | | 1.1 | | | | 1.15 | 1.31 | 1.00 | | 37.7 | 13.2 | 4.4 | 4.4 | | 9.1 | |
| 7 707 | 99-130 | | | 1 | | | | | 1.15 | | | 1.00 | | | 7.9 | | | | 9.1 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. PCT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT PAST 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 7 702 | 0- 20 | | | 1.5 | 1.8 | 3.3 | | | 24.3 | 4.40 | 19.1 | 11.9 | 11.0 | 1.2 | | 4.4 | 20.2 | | | 7.6 |
| 7 703 | 20- 38 | | | 1.2 | 1.6 | 2.8 | | | 25.2 | 1.43 | 4.8 | 3.5 | 5.0 | 0.5 | | 4.5 | 5.6 | | | 7.7 |
| 7 704 | 38- 56 | | | 1.9 | 0.7 | 2.6 | | | 26.4 | 1.54 | 3.8 | 3.0 | 6.9 | 0.2 | | 2.6 | 7.3 | | | 7.9 |
| 7 705 | 56- 76 | | | 2.2 | 0.6 | 2.8 | | | 25.4 | 1.59 | 3.4 | 2.7 | 2.1 | 0.1 | | 2.2 | 7.4 | | | 7.9 |
| 7 706 | 76- 99 | | | 2.5 | 0.5 | 3.0 | | | 28.4 | 1.76 | 3.6 | 2.7 | 9.4 | 0.1 | | 2.5 | 9.0 | | | 7.8 |
| 7 707 | 99-130 | | | 1.4 | 0.4 | 1.8 | | | 15.6 | 1.35 | 2.8 | 1.6 | 6.8 | 0.1 | | 2.0 | 5.2 | | | 7.8 |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM- AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E | DTA IV 7A2E | DTA PCT. 7A3 | -L.T. .0002 MM- X RAY I 7A2E | X RAY II 7A2E | X RAY III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 702 | 0- 20 | 52.5 | 0.9 | 4 | 3 | | | MT 5 | MI 3 | KK 2 | | | | | |
| 7 703 | 20- 38 | 50.6 | 0.9 | 4 | 2 | | | MT 5 | MI 2 | KK 2 | | | | | |
| 7 704 | 38- 56 | 50.6 | 1.6 | 6 | 4 | | | | | | | | | | |
| 7 705 | 56- 76 | 49.7 | 2.1 | 8 | 1 | | | | | | | | | | |
| 7 706 | 76- 99 | 51.4 | 2.0 | 7 | 5 | | | MT 5 | MI 2 | KK 2 | | | | | |
| 7 707 | 99-130 | 30.0 | 1.2 | 8 | 5 | | | | | | | | | | |

MINERAL CODE / RELATIVE AMOUNT

MT MONTMORT 1 TRACE
MI MICA 2 SMALL
KK KAOLINIT 3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

# PIMER CLAY LOAM (taxadjunct) 1/
S-67-Ariz-7-I2

Location: Maricopa County, Arizona. 700 feet south, 570 feet west of the NE corner of the NW¼ Section 33, T2N, R1E., 1½ miles north of Tolleson. Date of Sampling: October 14, 1967. Description by: G. Hartman, S. Torrance, J. Jay. Collectors: K. Flach, D. Nettleton.
Classification: Typic Torriorthent, fine-silty, mixed (calcareous), hyperthermic.
Vegetation: Cotton. Use: Cultivated land. Climate: Mean annual precipitation is about 7 inches. Mean annual temperature 68° F; January 52° F., July 90° F. Parent Material: Alluvium from a wide variety of rock materials including acid and basic igneous, quartzite, shale and limestone. Topography: Nearly level low terrace sloping less than 0.5 percent to the southeast. Elevation: 1040 feet. Drainage: Well drained, moderately slow permeability. Slow runoff. Soil Moisture: Moist at time of sampling.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>67702 | 0 to 20 cm (0 to 8 inches), brown (10YR 5/3) clay loam, dark brown (7.5YR 4/3) when moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few fine tubular pores and many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0 thymol blue); abrupt smooth boundary. |
| B2t<br>RSL<br>67703 | 20 to 38 cm (8 to 15 inches), brown (10YR 5/3) clay loam, dark brown (7.5YR 4/3) when moist; massive; hard, firm, sticky, plastic; common fine tubular and interstitial pores; few thin clay films on ped faces and thick clay films in pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| B3<br>RSL<br>67704 | 38 to 56 cm (15 to 22 inches), brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/3) when moist; massive; hard, friable, sticky and plastic; common fine tubular and few fine interstitial pores; few medium pinkish white lime veins, strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C1<br>RSL<br>67705 | 56 to 76 cm (22 to 30 inches), light yellowish brown (10YR 6/4) heavy loam, dark brown (7.5YR 4/4) when moist; massive; hard, very friable, sticky and plastic; many fine and medium tubular and few fine interstitial pores; very few thin clay films on ped faces and thick clay films in pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C2<br>RSL<br>67706 | 76 to 99 cm (30 to 39 inches), pale brown (10YR 6/3) clay loam, dark brown (7.5YR 4/4) and pink (7.5YR 7/4) when moist; massive; slightly hard, very friable, sticky and plastic; many fine and medium tubular and few fine interstitial pores; very few thin clay films on ped faces and thick clay film in pores; few fine pinkish white lime veins, strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C3<br>RSL<br>67707 | 99 to 130 cm (39 to 51 inches), light brown (7.5YR 6/4) loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, friable, slightly sticky, plastic; many fine tubular and common fine interstitial pores; few fine faint pinkish white lime veins, strongly effervescent; moderately alkaline (pH 8.0). |

1/ The Pimer series is in a fine-silty, mixed (calcareous), hyperthermic family of Anthropic Torrifluvents. This pedon lacks an anthropic epipedon and has a regular decrease in organic carbon to less than 0.2 percent at a depth of 15-22 inches.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic

SOIL Winona gravelly loam SOIL Nos. S62Ariz-3-27 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62313 - 62316

| Depth (In.) | Horizon | 1B1b Size class and particle diameter (mm) 3A1 Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt 0.05–0.02 | Int. III (0.02–0.002) | Int II (0.2–0.02) | (2–0.1) | Coarse fragments 2A2 > 2* Pct. | 2 – 19 Pct. of < 76 mm | 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | |
| 0- 2 | A | 33.9 | 52.3 | 13.8 | 3.8 | 2.8 | 1.7 | 6.3 | 19.3 | 32.1 | 20.2 | 55.8 | 14.6 | 32 | | |
| 2-12 | C1 | 26.6 | 47.1 | 26.3 | 2.1 | 2.3 | 1.5 | 5.7 | 15.0 | 24.2 | 22.9 | 43.0 | 11.6 | 42 | | |
| 12-20 | C2 | 32.7 | 36.5 | 30.8 | 4.5 | 4.0 | 3.0 | 8.9 | 12.3 | 17.7 | 18.8 | 35.7 | 20.4 | 64 | | |
| 20-23+ | R | Rock | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | 3A1a Carbonate in <0.002 mm Pct. | Atterberg limits Plastic limit | Liquid limit | Plastic index Pct. of <0.4 mm | Water content 4B2 15 bar Pct. | Pct. | pH 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 2 | 1.75 | 0.163 | 11 | 0.6 | 5 | - | | | | 10.0 | | 7.5 | 8.0 |
| 2-12 | 1.94 | 0.203 | 10 | 0.5 | 20 | 8 | 22 | 39 | 17 | 15.1 | | 7.6 | 8.2 |
| 12-20 | 2.21 | 0.222 | 10 | 0.4 | 45 | 18 | | | | 15.2 | | 7.8 | 8.3 |
| 20-23+ | | Rock | | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Cation Exch. Capacity 5A2a NaOAc | Water extract from saturated paste 8A1 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | meq/liter | | | | | | | | mmho/cm |
| 0- 2 | 18.3 | 3.3 | 0.1 | 1.4 | 23.6 | 7.3 | 1.1 | 0.3 | 0.5 | 7.7 | - | 0.2 | | 0.76 |
| 2-12 | 31.7 | 3.7 | 0.2 | 0.6 | 28.4 | 4.5 | 0.9 | 0.3 | 0.2 | 4.6 | - | 0.2 | | 0.51 |
| 12-20 | 26.6 | 5.0 | 0.2 | 0.2 | 23.0 | 4.1 | 1.9 | 0.5 | 0.1 | 5.0 | - | 0.4 | | 0.56 |
| 20-23+ | | Rock | | | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation Pct | 5D1 Exchangeable Na Pct | 5B1b Exch. Na meq / 100 g | Gypsum Pct |
|---|---|---|---|---|
| 0- 2 | 37.4 | 0.4 | 0.1 | |
| 2-12 | 52.3 | 0.7 | 0.2 | |
| 12-20 | 56.7 | 0.8 | 0.2 | |
| 20-23+ | | Rock | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## WINONA GRAVELLY LOAM
S62Ariz-3-27

Location: Central Coconino County Area, Arizona, at center of Sec. 17, T26N, R2E, 32 miles W. and 31 miles N of Flagstaff. Date of Sampling: June 11, 1962.
Collectors: R.E. Nelson, Lothair Grant, R.M. Mitchell, Larry Haverfield, J.E. Jay.
Classification: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic.
Vegetation: The vegetation at the sample site is blue grama and squirreltail with approximately 30 percent ground density. Other vegetation in the general area is ring muhly, snakeweed, chamiza and rabbitbrush. Use: Rangeland. Climate: Precipitation ranges from 12 to 14". The average January temperature is approximately 30° F. and the average July temperature is 70° F. The mean annual temperature is 50° to 55° F. Parent Material: Hard, massive, dense, yellow limestone member of the Kaibab formation. Elevation: 5950 feet. Relief: Gently undulating plains, slightly convex, slope 4 percent to the east. Drainage: Well drained; slow runoff; moderately permeable subsoil.
Remarks: This is probably the most extensive kind of soil developed on this formation. The Kaibab formation is the largest single area of exposed limestone in the United States.

| HORIZON | DESCRIPTION |
|---|---|
| A<br>RSL<br>62313 | 0 to 2 inches, pale brown (10YR 6/3) gravelly loam, dark brown (10YR 4/3) when moist; very weak coarse platy breaking to weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; very few very fine roots; few very fine continuous simple tubular and many very fine interstitial pores; violently effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. 5 percent by volume of coarse fragments greater than 3/4" discarded from laboratory sample - gravels consist dominantly of irregularly shaped weathered fragments of limestone and a scattering of subangular chert fragments ranging up to 3/4" in diameter. |
| C1<br>RSL<br>62314 | 2 to 12 inches, brown (10YR 5/3) cobbly loam, dark brown (10YR 3/3) when moist; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine and fine roots; few very fine and fine continuous vertical simple tubular and many fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; clear wavy boundary. 25 percent by volume of coarse fragments greater than 3/4" discarded from laboratory sample. 20 percent by volume of rock fragments larger than 3" in diameter discarded from BPR samples. Cobbles are limestone fragments oriented with the solution pitted face upward and lime drips downward. In the upper part of the profile the vertical axis exceeds the horizontal axis. However, with an increase in depth, the cobbles get larger until the horizontal axis exceeds the vertical axis. |
| C2<br>RSL<br>62315 | 12 to 20 inches, light gray (10YR 7/2) cobbly loam, pale brown (10YR 6/3) when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; plentiful very fine and fine roots; common very fine continuous simple tubular and many fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; abrupt irregular boundary. 30 percent by volume of rock material larger than 3/4" in diameter discarded from laboratory sample. |
| R<br>RSL<br>62316 | 20 to 23 inches +, yellow (10YR 8/6) massive, extremely hard dense dolomitic limestone, yellow (10YR 7/8) when moist. This limestone is irregularly jointed and is slightly weathered on its upper surface and along the joint faces. A thin layer of reprecipitated lime (1/16 to 1/8 inch thick) is generally present on the upper surface of this layer. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic

S62Ariz-3-28

SOIL Winona gravelly loam SOIL Nos. S62Ariz-3-29 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62353 - 62356

| Depth (In.) | Horizon | Size class and particle diameter (mm) — Total: Sand (2–0.05) | Total: Silt (0.05–0.002) | Total: Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: ≥ 2* | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0–1½ | A1 | S62Ariz-3-28 | | | | | | | | | | | | | | 45 | | |
| 1½–9 | C1 | | | | | | | | | | | | | | | 34 | | |
| 0– 3 | A1 | S62Ariz-3-29 | | | | | | | | | | | | | | 31 | | |
| 3–10 | C1 | | | | | | | | | | | | | | | 44 | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | | 6E1b Carbonate as $CaCO_3$ | | Bulk density | | | | Water content | | | | | pH 8C1b Sat. Paste | pH 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | | Pct. | | g/cc | g/cc | g/cc | | Pct. | Pct. | Pct | | | | |
| 0–1½ | 1.84 | 0.186 | 10 | | 16 | | | | | | | | | | | 8.0 | 8.9 |
| 1½–9 | 2.43 | 0.229 | 11 | | 19 | | | | | | | | | | | 8.0 | 8.5 |
| 0– 3 | 2.10 | 0.175 | 12 | | 15 | | | | | | | | | | | 7.9 | 8.4 |
| 3–10 | 1.80 | 0.161 | 11 | | 20 | | | | | | | | | | | 7.9 | 8.5 |

| Depth (In.) | Extractable bases: Ca | Mg | Na | K | | | | | Water extract from saturated paste: Ca | Mg | Na | K | | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |

| Depth (In.) | Water at Saturation Pct. | Exchangeable Na Pct. | | Gypsum Pct. | | | |
|---|---|---|---|---|---|---|---|

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## WINONA GRAVELLY LOAM
S62Ariz-3-28

Supplemental to Sample S62Ariz-3-27 as a check on C/N ratio and organic carbon.

Classification: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic.

Location: Central Coconino County Area, Arizona. 75 feet southwest of sample S62Ariz-3-27.

Vegetation: Bare area.

Remarks: Barren area approximately 3 square feet in area. Examination made in hand-excavated pit. 50-60 percent by volume of gravels ranging in size from 1/8 to 1/2"with few up to 3 inches in diameter are present in the surface 0-1½ inches. Gravels are irregularly shaped weathered fragments of limestone and a scattering of somewhat rounded chert fragments. Cobbles consist of limestone fragments oriented with the solution pitted face upward and lime drips downward. In the upper part of the profile the vertical axis exceeds the horizontal axis. However, with an increase in depth, the cobbles get larger until the horizontal axis exceeds the vertical axis.

Percent by volume of rock material greater than 3/4" in diameter discarded from laboratory sample is:

0 - 1½" - 5 percent
1½ - 9" - 25 percent

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>62353 | 0 to 1½ inches, pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 4/3) when moist; weak medium and coarse platy; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine discontinuous tubular and many very fine interstitial pores; violently effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. |
| C1<br>RSL<br>62354 | 1½ to 9 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) when moist; weak medium and coarse subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; few fine and medium tubular and many very fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; clear wavy boundary. |
| C2 | Similar to number S62Ariz-3-27. |
| R | Not sampled. |

## WINONA GRAVELLY LOAM
S62Ariz-3-29

Supplemental to Sample S62Ariz-3-27 as a check on C/N ratio and organic carbon.

Classification: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic.

Location: Central Coconino County Area, Arizona. 700' northeast of sample S62Ariz-3-27.

Vegetation: Approximately 50 percent ground density consisting of sand dropseed, Indian ricegrass, blue grama, ring muhly, squirreltail, snakeweed and rabbitbrush.

Remarks: Examination made in hand-excavated pit. 50-60 percent by volume of gravels ranging in size from 1/8 to 1/2 with few up to 3 inches in diameter are present in the surface 0-3 inches. Gravels are irregularly shaped weathered fragments of limestone and a scattering of somewhat rounded chert fragments. Cobbles consist of limestone fragments oriented with the solution pitted face upward and lime drips downward. In the upper part of the profile the vertical axis exceeds the horizontal axis. However, with an increase in depth, the cobbles get larger until the horizontal axis exceeds the vertical axis.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>62355 | 0 to 3 inches, pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) when moist; weak medium coarse platy structure; slightly hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; common very fine continuous simple tubular and many very fine interstitial pores; violently effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt wavy boundary. |
| C1<br>RSL<br>62356 | 3 to 10 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) when moist; weak medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine roots; common very fine continuous vertical simple tubular and many very fine interstitial pores; violently effervescent; moderately alkaline; pH 8.0; clear wavy boundary. |
| C2 | Similar to number S62Ariz-3-27. |
| R | Not sampled. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

**SOIL FAMILY:** Lithic Torriorthent, loamy-skeletal, carbonatic, mesic

SOIL Winona very gravelly loam SOIL Nos. S62Ariz-3-30 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62317 - 62320

| Depth (In) | Horizon | 1B1b Total: Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: > 2* Pct. | 2 – 19 Pct. of < 76 mm | 19 –76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0- 2 | A1 | 55.4 | 32.1 | 12.5 | 0.7 | 4.0 | 7.5 | 20.6 | 22.6 | 17.8 | 14.3 | 52.9 | 32.8 | | | 26 | | |
| 2-12 | C1 | 48.9 | 29.5 | 21.6 | 0.4 | 3.1 | 6.4 | 18.6 | 20.4 | 15.1 | 14.4 | 46.6 | 28.5 | | | 29 | | |
| 12-15 | C2 | 44.9 | 27.1 | 28.0 | 0.7 | 3.1 | 6.2 | 18.0 | 16.9 | 12.3 | 14.8 | 39.9 | 28.0 | | | 49 | | |
| 15+ | R | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | | 6E1b Carbonate as $CaCO_3$ Pct. | 3A1a Carbonate in <0.002 mm Pct. | Atterberg limits: Plastic limit | Liquid limit | Plastic index (Pct. of <0.4 mm) | | Water content: 4B2 15 bar Pct. | Pct. | | | pH: 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 2 | 1.50 | 0.140 | 11 | | 3 | - | | | | | 7.6 | | | | 7.7 | 8.2 |
| 2-12 | 1.60 | 0.167 | 10 | | 14 | 6 | 22 | 36 | 14 | | 11.9 | | | | 7.8 | 8.4 |
| 12-15 | 1.90 | 0.206 | 9 | | 29 | 14 | | | | | 13.9 | | | | 7.9 | 8.3 |
| 15+ | | Rock | | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Cation Exch. Capacity: 5A2a NaOAc | | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0- 2 | 23.2 | 2.4 | 0.2 | 1.2 | 19.5 | | 4.9 | 0.6 | 0.3 | 0.4 | | - | 6.7 | 0.3 | | 0.74 |
| 2-12 | 25.9 | 2.6 | 0.1 | 0.6 | 22.3 | | 5.5 | 0.9 | 0.3 | 0.2 | | - | 5.3 | 0.3 | | 0.62 |
| 12-15 | 26.3 | 2.9 | 0.1 | 0.2 | 23.9 | | 5.3 | 1.2 | 0.5 | 0.1 | | - | 4.4 | 0.2 | | 0.59 |
| 15+ | | Rock | | | | | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation Pct | 5D1 Exchangeable Na Pct | 5B1b Exch. Na meq / 100 g | Gypsum Pct. | Clay Mineralogy (<0.002 mm): Montmorillonite 7A2 X-ray | Vermiculite 7A2 X-ray | Mica 7A2 X-ray | | Kaolin % DTA 7A3 |
|---|---|---|---|---|---|---|---|---|---|
| 0- 2 | 33.8 | 1.0 | 0.2 | | xx | t | x | | 13 |
| 2-12 | 43.0 | 0.4 | 0.1 | | | | | | |
| 12-15 | 52.0 | 0.4 | 0.1 | | xx | t | x | | 14 |
| 15+ | | Rock | | | | | | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## WINONA VERY GRAVELLY LOAM
S62Ariz-3-30

Location: Central Coconino County Area, Arizona. 1800 feet south and 500 feet east of the NW corner, Sec. 35, T29N, R1E, 31 miles W. and 45 miles N. of Flagstaff. Date of Sampling: June 11, 1962.
Collectors: R.E. Nelson, Lothair Grant, R.W. Mitchell, Larry Haverfield, J.E. Jay.
Classification: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic.
Vegetation: At the sample site the vegetation consisted of blue grama and squirreltail grasses with approximately 50 percent ground density. Use: Rangeland. Climate: Precipitation is approximately 14". The average January temperature is approximately 30° F. and the average July temperature is approximately 70°F. The mean annual temperature is approximately 50° to 55° F. Parent Material: Hard, massive, yellow limestone member of the Kaibab formation. Elevation: 5900 feet. Relief: Undulating plains, slightly convex, slope 4 percent to the east. Drainage: Well drained, slow runoff, moderately permeable subsoil.
Remarks: Gravels consist dominantly of irregularly shaped weathered fragments of limestone and a scattering of subangular chert fragments ranging up to 3/4 inch with a few ranging up to 3 inches in diameter.
Cobbles and stones consist of limestone fragments oriented with the solution pitted face upward and lime drips downward. In the upper part of the profile the vertical axis exceeds the horizontal axis. However, with an increase in depth the cobbles get larger until the horizontal axis exceeds the vertical axis.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>62317 | 0 to 2 inches, brown (7.5YR 5/4) very gravelly loam, dark brown (7.5YR 4/4) when moist; weak very fine subangular blocky structure; loose when dry, very friable when moist, slightly sticky and slightly plastic when wet; few very fine roots; many very fine interstitial pores; strongly effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. 5 percent by volume of coarse fragments greater than 3/4 inch in diameter discarded from laboratory sample. |
| C1<br>RSL<br>62318 | 2 to 12 inches, brown (7.5YR 5/4) cobbly and stony loam, dark brown (7.5YR 4/4) when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine roots; few fine and medium continuous vertical simple tubular and many fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary. 35 percent by volume of coarse fragments over 3 inches discarded from BPR sample. 50 percent by volume of fragments greater than 3/4 inch discarded from laboratory sample. |
| C2<br>RSL<br>62319 | 12 to 15 inches, light yellowish brown (10YR 6/4) cobbly and stony loam, dark yellowish brown (10YR 4/4) when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial and few fine tubular pores; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary. 40 percent by volume coarse fragments greater than 3/4 inch in diameter discarded from laboratory sample. |
| R<br>RSL<br>62320 | 15 to 17 inches +, pale yellow (5Y 7/4) massive dense limestone, light yellowish brown (5YR 6/4) when moist, with irregularly spaced joints and seams, extremely hard, extremely firm, effervescent, moderately alkaline, pH 8.0. A thin layer of reprecipitated lime (1/16 to 1/8 inch thick) is generally present on the upper surface of this layer. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic

SOIL Winona gravelly loamy fine sand . SOIL Nos. S62Ariz-3-31 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62321 - 62324

| Depth (In.) | Horizon | 1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) | Total: Silt (0.05–0.002) | Total: Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: > 2* | Coarse fragments 2A2: 2 – 19 | Coarse fragments 2A2: 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct of < 2 mm | | | | | | | | | | | | | | Pct | Pct. of < 76 mm | |
| 0- 3 | A1 | 91.9 | 5.4 | 2.7 | 4.3 | 17.2 | 17.4 | 24.1 | 28.9 | 4.3 | 1.1 | 48.1 | 63.0 | | | 5 | | |
| 3-12 | C1 | 66.6 | 21.2 | 12.2 | 2.0 | 7.4 | 9.6 | 18.9 | 28.7 | 12.2 | 9.0 | 54.3 | 37.9 | | | 23 | | |
| 12-19 | C2 | 49.3 | 28.1 | 22.6 | 2.4 | 4.9 | 4.9 | 12.7 | 24.4 | 12.2 | 15.9 | 46.2 | 24.9 | | | 45 | | |
| 19+ | R | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | | 6E1b Carbonate as $CaCO_3$ | 3A1a Carbonate in <0.002 mm | Atterberg limits: Plastic limit | Atterberg limits: Liquid limit | Atterberg limits: Plastic index | | Water content: | 4B2 15 bar | | | pH: 8C1b Sat. Paste | pH: 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct | | | Pct | Pct. | Pct. of <0.4 mm | | | | Pct. | Pct. | | | | |
| 0- 3 | 0.31 | 0.025 | 12 | | 3 | tr. | | | | | | 2.7 | | | 7.9 | 8.5 |
| 3-12 | 0.55 | 0.061 | 9 | | 13 | 4 | 18 | 24 | 6 | | | 7.3 | | | 7.9 | 8.6 |
| 12-19 | 1.02 | 0.109 | 9 | | 40 | 15 | | | | | | 10.3 | | | 8.0 | 8.5 |
| 19+ | | Rock | | | | | | | | | | | | | | |

| Depth (In) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | Cation Exch. Capacity 5A2a NaOAc | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | meq/liter | | | | | | | | mmho/cm |
| 0- 3 | 11.8 | 0.9 | 0.1 | 0.5 | 7.0 | 5.2 | 0.6 | 0.4 | 0.4 | - | 4.4 | 0.2 | | 0.55 |
| 3-12 | 23.4 | 3.5 | 0.2 | 0.4 | 14.8 | 2.7 | 1.9 | 0.7 | 0.1 | - | 3.3 | 0.2 | | 0.41 |
| 12-19 | 24.1 | 5.3 | 0.3 | 0.1 | 16.0 | 2.7 | 1.7 | 1.3 | 0.1 | - | 3.6 | 0.3 | | 0.49 |
| 19+ | | Rock | | | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation | 5D1 Exchangeable Na | 5B1b Exch. Na meq / 100 g | Gypsum |
|---|---|---|---|---|
| | Pct | Pct | | Pct. |
| 0- 3 | 25.3 | 1.4 | 0.1 | |
| 3-12 | 34.2 | 0.7 | 0.1 | |
| 12-19 | 45.1 | 1.9 | 0.3 | |
| 19+ | | Rock | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## WINONA GRAVELLY LOAMY FINE SAND
S62Ariz-3-31

Location: Central Coconino County Area, Arizona. 133 feet west and 4230 feet south of the NE corner of Sec. 1, R12E, T20N. 33 miles E. of Flagstaff. Date of Sampling: June 12, 1962.
Collectors: Lothair Grant, Larry Haverfield, Daryl Cox and James E. Jay.
Classification: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic.
Vegetation: The vegetation at the sample site consisted of black grama, New Mexico needle and thread grass and snakeweed. Ground density is approximately 35 percent. Use: Rangeland. Climate: Precipitation approximately 10 inches. The average January temperature is approximately 38° F. and the average July temperature is approximately 70°F. The mean annual temperature is approximately 50° to 55°F. Parent Material: Dense, hard, white, fine grained calcareous sandstone member of the Kaibab formation. Elevation: 5450 feet. Relief: Gently undulating plains, slightly convex, slope 2 percent to the north. Drainage: Well drained, slow runoff, moderately permeable subsoil.
Remarks: Gravels consist of irregularly shaped fragments of sandstone and caliche ranging in size from 1/8 to 3/4" in diameter. Stones cover approximately 5 percent of the area at the sample site. At blowout sites stones occupy approximately 40 percent of the area. The average stone cover for the soil surface is approximately 20 percent.
The calcareous sandstone bedrock is more highly weathered in some localities than in others and can be dug into with a spade and bar at these points.

| HORIZON | DESCRIPTION |
|---|---|
| | Thin layer of very dark brown (10YR 2/2) volcanic cinders, black (10YR 2/1) when moist cover approximately 60 percent of the surface of the soil. |
| A1 RSL 62321 | 0 to 3 inches, brown (7.5YR 5/4) gravelly loamy fine sand, dark brown (7.5YR 4/4) when moist; single grained, loose when dry and moist, nonsticky and nonplastic when wet; few very fine roots; many very fine interstitial pores; strongly effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. |
| C1 RSL 62322 | 3 to 12 inches, brown (7.5YR 5/4) light loam, dark brown (7.5YR 4/4) when moist; weak fine and medium subangular blocky breaking to weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; abundant very fine roots; few very fine continuous simple tubular and many very fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary. 30 percent by volume rock fragments greater than 3/4 inches in diameter discarded from laboratory sample. |
| C2 RSL 62323 | 12 to 19 inches, light gray to pink (7.5YR 7/2) gravelly loam, light brown (7.5YR 6/4) when moist; nearly massive with tendency to break to weak fine subangular blocky and weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; few very fine continuous simple tubular and common very fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; abrupt irregular boundary. 20 percent by volume of rock fragments greater than 3/4 inch in diameter discarded from laboratory sample. |
| R RSL 62324 | 19 to 20 inches +, white (10YR 8/2) fine grained sandstone, light gray (10YR 7/2) when moist; massive; extremely hard, extremely firm; very few very fine discontinuous tubular pores; violently effervescent; moderately alkaline, pH 8.2. |

*BPR sample taken. 50 percent of volume of coarse fragments greater than 3 inches in diameter discarded.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic

SOIL Winona gravelly loamy fine sand SOIL Nos. S62Ariz-3-32 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62325 - 62328

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Size class and particle diameter (mm) 3A1 Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: ≥ 2* Pct. | 2 – 19 Pct of < 76 mm | 19 – 76 Pct of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0- 3 | A1 | 85.5 | 9.8 | 4.7 | 3.1 | 15.0 | 12.7 | 21.7 | 33.0 | 6.7 | 3.1 | 55.2 | 52.5 | | | 7 | | |
| 3-10 | C1 | 70.0 | 17.5 | 12.5 | 1.7 | 7.9 | 7.6 | 20.6 | 32.2 | 7.3 | 10.2 | 55.5 | 37.8 | | | 30 | | |
| 10-18 | C2 | 57.8 | 24.2 | 18.0 | 1.3 | 4.3 | 4.0 | 17.9 | 30.3 | 12.5 | 11.7 | 56.8 | 27.5 | | | 55 | | |
| 18-24+ | R | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct | 6B1a Nitrogen Pct. | C/N | | 6E1b Carbonate as $CaCO_3$ Pct | 3A1a Carbonate in <0.002 mm Pct. | Atterberg limits Plastic limit | Liquid limit | Plastic index Pct. of <0.4 mm | | Water content: Pct. | 4B2 15 bar Pct | Pct. | | | pH: 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 3 | 0.51 | 0.047 | 11 | | 5 | 1 | | | | | | 3.3 | | | | 8.0 | 8.5 |
| 3-10 | 0.79 | 0.086 | 9 | | 11 | 3 | 19 | 22 | 3 | | | 5.0 | | | | 8.0 | 8.6 |
| 10-18 | 1.25 | 0.125 | 10 | | 39 | 11 | | | | | | 11.3 | | | | 7.9 | 8.5 |
| 18-24+ | | Rock | | | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | | Cation Exch. Capacity 5A2a NaOAc | | | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0- 3 | 15.9 | 1.3 | 0.1 | 0.6 | | 9.1 | | | 5.2 | 0.9 | 0.3 | 0.5 | | - | 5.4 | 0.2 | | 0.57 |
| 3-10 | 24.1 | 2.4 | 0.1 | 0.7 | | 16.9 | | | 2.9 | 0.9 | 0.4 | 0.2 | | - | 3.6 | 0.1 | | 0.39 |
| 10-18 | 22.0 | 3.4 | 0.1 | 0.5 | | 14.5 | | | 3.3 | 1.3 | 0.6 | 0.4 | | - | 4.2 | 0.1 | | 0.50 |
| 18-24+ | | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation Pct. | 5D1 Exchangeable Na Pct. | 5B1b Exch. Na meq / 100 g | Gypsum Pct. |
|---|---|---|---|---|
| 0- 3 | 27.1 | 1.1 | 0.1 | |
| 3-10 | 33.9 | 0.6 | 0.1 | |
| 10-18 | 44.3 | 0.7 | 0.1 | |
| 18-24+ | | Rock | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## WINONA GRAVELLY LOAMY FINE SAND
S62Ariz-3-32

Location: Central Coconino County Area, Arizona. 2120 feet west and 1584 feet south of the NE corner of Sec. 2, T20N, R12E. 32 miles E of Flagstaff. Date of Sampling: June 12, 1962.
Collectors: Lothair Grant, Larry Haverfield, Daryl Cox, James E. Jay.
Classification: Lithic Torriorthent, loamy-skeletal, carbonatic, mesic.
Vegetation: 40 percent ground density cover of black grama and snakeweed. Use: Rangeland. Climate: Precipitation is approximately 10 inches. The average January temperature is approximately 38° F. and the average July temperature is approximately 70°F. The mean annual temperature is approximately 50° - 55°F. Parent Material: Dense, hard, white, fine grained, calcareous sandstone member of the Kaibab formation. Elevation: 5500 feet. Relief: Gently undulating plain, slightly convex, slope 2 percent to the north. Drainage: Well drained, slow runoff, moderately permeable subsoil.
Remarks: Gravels consist of irregularly shaped fragments of sandstone and caliche ranging in size from 1/8 to 3/4" in diameter. Stones cover approximately 10 percent in sample area, 30 to 40 percent in blowout areas and average approximately 20 percent of the landscape area.
This calcareous sandstone bedrock is more highly weathered in some localities than in others and can be dug into with a spade and bar at these points.

| HORIZON | DESCRIPTION |
|---|---|
| | There is a thin layer of very dark brown (10YR 2/2) volcanic cinders, black (10YR 2/1) when moist covering approximately 60 percent of the surface of the soil. |
| A1<br>RSL<br>62325 | 0 to 3 inches, brown (7.5YR 5/4) gravelly loamy fine sand, dark brown (7.5YR 4/4) when moist; single grained; loose when dry and moist, nonsticky and nonplastic when wet; few very fine roots; many very fine interstitial pores; strongly effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. |
| C1<br>RSL<br>62326 | 3 to 10 inches, brown (7.5YR 5/4) heavy fine sandy loam, dark brown (7.5YR 4/4) when moist; weak fine and medium subangular blocky breaking to very weak very fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; abundant very fine and fine roots; few very fine continuous simple tubular and many very fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary. 60 percent by volume coarse fragments greater than 3/4 inch in diameter discarded from laboratory sample. |
| C2<br>RSL<br>62327 | 10 to 18 inches, light gray to pink (7.5YR 7/2) very gravelly light loam, brown (7.5YR 5/4) when moist; massive; hard, friable, slightly sticky and slightly plastic; plentiful very fine and fine roots; few very fine continuous simple tubular and many very fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; abrupt irregular boundary. 50 percent by volume coarse fragments greater than 3/4 inch in diameter discarded from laboratory sample. |
| R<br>RSL<br>62328 | 18 to 24 in. +, pinkish white (7.5YR 8/2) fine grained sandstone, light brown (7.5YR 6/4) when moist; massive; extremely hard, extremely firm, nonsticky and nonplastic; violently effervescent; moderately alkaline, pH 8.2. |

* BPR sample taken. 30 percent by volume of coarse fragments greater than 3" in size discarded.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Torriorthent, loamy-skeletal, mixed, nonacid, thermic
SOIL Cellar very stony and gravelly sandy loam SOIL Nos. S65Ariz-13-21 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65393 - 65394

| Depth (In.) | Horizon | 1B1b Total Sand (2–0 05) | Total Silt (0 05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0 5) | Sand: Medium (0.5–0 25) | Sand: Fine (0 25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0 02 | Silt: Int. III (0.02–0 002) | Int. II (0.2–0.02) | (2–0.1) | | | * Coarse fragments 1A2a ≥ 2 Pct. | 2 – 19 Pct. of < 2 mm | 19 – 76 Pct. of < 76mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | 3A1 | | | | | | |
| 0-1 | A1 | 68.8 | 22.8 | 8.4 | 19.6 | 18.6 | 7.8 | 13.0 | 9.8 | 16.8 | 6.0 | 33.2 | 59.0 | 0 | 8 | 18 | 18 | 0 |
| 1-8 | C1 | 77.9 | 12.8 | 9.3 | 17.9 | 21.1 | 10.9 | 18.4 | 9.6 | 8.5 | 4.3 | 27.3 | 68.3 | 0 | 9 | 51 | 22 | 29 |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | Bulk density: g/cc | Water content: Pct. | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH: 8C1a $H_2O$ 1:1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | 1.69 | 0.128 | 13 | 0.3 | - | | | | | | 5.2 | | | 7.2 | |
| 1-8 | 0.35 | 0.032 | 11 | 0.3 | - | | | | | | 3.7 | | | 7.4 | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | Cation Exch. Capacity: 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 $NH_4OAc$ Pct. | Base saturation: Pct |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | |
| 0-1 | 10.5 | 2.2 | 0.1 | 0.7 | 13.5 | | 12.0 | | | 100+ | |
| 1-8 | 7.1 | 2.2 | 0.1 | 0.5 | 9.9 | | 9.1 | | | 100+ | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| 0-1 | xxxx | | xx | x | |
| 1-8 | xxxx | | xx | t | |

* All values from characterization sample.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## CELLAR VERY STONY AND GRAVELLY SANDY LOAM
S65Ariz-13-21

Location: Western Yavapai County Area, Arizona. About 9 miles southwest of Congress Junction, Arizona, to Merritt Pass then 1/2 mile northwest. 1/4 mile west of southeast corner of Sec. 20, T8N, R7W. Photo #1161. AMS Project 134, Lot FA. Date of Sampling: May 26, 1965.
Collectors: Havens, Buol, Wiesner, Wendt
Vegetation: Desert shrub-grass. Creosotebush, ocotillo, saguaro, palo verde, tobosa, big galleta, three-awn, and buckwheat. Climate: Mean annual precipitation 11 inches. Mean annual temperature 64°F. Parent Material: Granite and granite gneiss. Relief: Moderately steep hills on a 30 percent convex east facing, midslope. Elevation: 3000 feet. Drainage: Medium runoff, moderately permeable and well drained.
Remarks: This soil is on granite and granite gneiss in desert areas under a desert shrub-grass cover. It is on moderately steep and steep hills or mountains. Rock outcrops range from few to many and stones and cobbles are common. About 30-40 percent of the sampled area was covered by stones and about 30-40 percent of the adjacent area is rock outcrop. Hellige-Truog field kit was used to determine the pH. This soil was sampled to compare with the Barkerville samples numbered S65 Ariz-13-2, S-65 Ariz-13-3 and S65 Ariz-13-15.
Classification: Lithic Torriorthent, loamy-skeletal, mixed, nonacid, thermic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No. 65393 | 0 to 1 inch, pale brown (10YR 6/6) very stony and gravelly sandy loam, dark brown (10YR 4/3) when moist; weak fine and medium platy structure; slightly hard, friable, nonsticky and nonplastic; plentiful fine roots; few fine tubular and common fine interstitial pores, 30-40 percent stones; 40 percent fine gravels; noneffervescent; neutral (pH 7.0); abrupt wavy boundary. |
| C1<br>RSL No. 65394 | 1 to 8 inches, brown (7.5YR 5/4) stony very gravelly sandy loam, brown (7.5YR 4/4) when moist; rock controlled and weak fine subangular blocky structure; hard, friable, nonsticky and nonplastic; abundant fine and very fine roots; common fine tubular and many fine interstitial pores; very few thin, oriented clay as bridges, in pores and on gravel faces; 80 percent gravel and highly weathered granite; noneffervescent; neutral (pH 7.0); abrupt irregular boundary. |
| R<br>No sample. | 8 to 9 inches plus, white (5YR N8/) granite bedrock with yellowish red (5YR 4/6) stains in rock fractures; extremely hard, extremely firm; few very fine roots along fractures; very few fine interstitial pores; noneffervescent to slightly effervescent; mildly alkaline (pH 7.5). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Ustorthent, sandy-skeletal, mixed, mesic, shallow
Barkerville cobbly and gravelly sandy

SOIL loam SOIL Nos. S65Ariz-13-2 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65210 - 65213

| Depth (In.) | Horizon | 1B1b Total Sand (2–0 05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand Very coarse (2–1) | Sand Coarse (1–0.5) | Sand Medium (0.5–0.25) | Sand Fine (0.25–0.1) | Sand Very fine (0.1–0.05) | Silt (0 05–0 02) | Silt Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments 1A2a > 2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct of < 76mm | |
| 0-3 | A1 | 81.2 | 10.6 | 8.2 | 21.5 | 21.7 | 12.4 | 18.8 | 6.8 | 5.2 | 5.4 | 21.3 | 74.4 | 0 | 8 | 32 | 32 | 0 |
| 3-8 | C1 | 82.4 | 10.3 | 7.3 | 14.6 | 21.5 | 13.4 | 23.5 | 9.4 | 5.2 | 5.1 | 26.1 | 73.0 | 0 | 7 | 18 | 18 | 0 |
| 8-25 | C2 | 86.8 | 8.6 | 4.6 | 19.7 | 24.6 | 17.5 | 22.2 | 7.8 | 4.8 | 3.8 | 23.4 | 79.0 | 0 | 5 | 24 | 24 | 0 |
| Composite A | | | | | | | | | | | | | | | | 27 | 27 | 0 |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | Bulk density 4A1f 1/3 bar g/cc | 4A1h Oven dry g/cc | | Water content Pct. | 4B1c 1/3 bar Pct. | 4B2 15 bar Pct | 4D1 Extensibility COLE in./in. | 4D1 Extensibility COLE in./in. | pH 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 0.45 | 0.036 | 13 | 0.5 | - | | | | | | 3.8 | | | 7.0 | | |
| 3-8 | 0.25 | | | 0.7 | - | | | | | | 4.6 | | | 6.7 | | |
| 8-25 | 0.04 | | | 0.8 | - | | | | | | 2.9 | | | 6.7 | | |
| Composite A | 1.29 | 0.100 | 13 | 0.7 | - | | | | | | 5.6 | | | 6.2 | | |

| Depth (In.) | Extractable bases 5B1a 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | 5A3a Sum | | 6G1d KCl Ext. $Al^{+++}$ | | | | | | Base saturation 5C1 $NH_4OAc$ Pct. | Pct |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | | | | | | | |
| 0-3 | 6.6 | 2.3 | 0.1 | 0.2 | 9.2 | | 9.9 | | | | | | | | | 93 | |
| 3-8 | 12.5 | 3.1 | 0.1 | 0.1 | 15.8 | | 15.4 | | | | | | | | | 100+ | |
| 8-25 | 9.4 | 1.9 | 0.2 | 0.1 | 11.6 | | 11.3 | | | | | | | | | 100+ | |
| Composite A | 10.5 | 3.2 | 0.2 | 0.4 | 14.3 | | 14.9 | | | | | | | | | 96 | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| 0-3 | xxx | - | - | t | |
| 3-8 | xxxx | - | - | t | |
| 8-25 | xxxx | - | xx | t | |

* All values from characterization sample.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## BARKERVILLE COBBLY AND GRAVELLY SANDY LOAM
S65Ariz-13-2

Location: Western Yavapai County Area, Arizona. About 5½ miles southeast of Wagoner, Arizona on the road to Crown King, then ½ mile north of the road. 2/10 mile south of the northeast corner of Sec. 5, T9N, R2W. Photo #1170, AMS-Project 134, Lot FA. Date of Sampling: May 4, 1965.
Collectors: Dr. Nettleton, Bob Muerisse.
Vegetation: Grassland: Sideoats grama, Arizona cottontop, three-awn, snakeweed, false mesquite, catclaw, prickly pear cactus, and annuals. Climate: Mean annual precipitation 14 to 15". Mean annual temperature 57°F. Soil temperature at time of sampling 70°F. at 20". Parent Material: Granite and closely related rocks. Relief: Steep mountain. Sample located midway on south facing, 35 percent, convex. Elevation: 4150 feet. Drainage: Medium runoff, moderately permeable and well drained.
Remarks: This soil is found on granite under a grass cover. It occurs on moderately steep to steep mountains at elevations of 3500 to 6000 feet. 5 to 10 percent of the surface is covered by stones and rock outcrop. Hellige-Truog field kit was used to determine pH. Paired samples are S65 Ariz-13-3 and S65 Ariz-13-15.
Classification: Typic Ustorthent, sandy-skeletal, mixed, mesic, shallow.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65210 | 0 to 3 inches, reddish brown (5YR 5/3) gravelly sandy loam, dark reddish brown (5YR 3/3) when moist; single grain and weak fine and medium granular structure; loose and slightly hard, very friable nonsticky and nonplastic; very few, very fine and fine roots; many micro and very fine interstitial pores; 40 percent fine gravel; 25 percent of surface covered by cobble; noneffervescent; neutral (pH 6.8); clear wavy boundary. |
| C1<br>RSL No.<br>65211 | 3 to 8 inches, dark reddish brown (5YR 3/4) dry and moist, highly weathered granite rock which breaks to a very gravelly sandy loam; massive structure; very hard, firm, nonsticky and nonplastic; very few, very fine, fine and medium roots; many micro and very fine interstitial pores; 50 percent gravel; noneffervescent; neutral (pH 7.0); gradual wavy boundary. |
| C2<br>RSL No.<br>65212 | 8 to 25 inches plus, strong brown (7.5YR 5/6) very gravelly highly weathered granite (grus), yellowish red (5YR 5/6) when moist; massive structure; very hard, very firm; nonsticky and nonplastic; very few, very fine, fine, medium and coarse roots; many micro and very fine interstitial pores; noneffervescent; neutral (pH 7.0); roots penetrate to about 3 feet. |

RSL
65213 Composite A sampled for checking.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Ustorthent, sandy-skeletal, mixed, mesic, shallow

SOIL Barkerville cobbly and gravelly sandy loam SOIL Nos. S65Ariz-13-3 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65214 - 65217

| Depth (In) | Horizon | 1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) | Total: Silt (0.05–0.002) | Total: Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | ★ Coarse fragments 1A2a: > 2 Pct. | 2 – 19 Pct. of < 76mm | 19 – 76 Pct. of < 76mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0-4 | A1 | | | | | | | | | | | | | | | 17 | 17 | 0 |
| 4-10 | C1 | | | | | | | | | | | | | | | 15 | 15 | 0 |
| 10-26+ | C2 | | | | | | | | | | | | | | | 13 | 13 | 0 |
| Composite | A | | | | | | | | | | | | | | | 17 | 17 | 0 |

| Depth (In) | 6A1a Organic carbon Pct | 6B1a Nitrogen Pct. | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct | Bulk density: 4A1f 1/3 bar g/cc | 4A1h Oven dry g/cc | g/cc | Water content: Pct. | 4B1c 1/3 bar Pct. | 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-4 | 1.77 | 0.113 | 16 | | - | | | | | | 7.8 | | | 7.2 | | |
| 4-10 | 0.14 | 0.013 | 11 | | - | | | | | | 3.2 | | | 7.4 | | |
| 10-26+ | 0.05 | | | | - | | | | | | 3.3 | | | 7.2 | | |
| Composite A | 1.03 | 0.068 | 15 | | - | | | | | | 7.1 | | | 7.1 | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 N $NH_4OAc$ Pct. | Pct. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | |
| 0-4 | 15.9 | 4.4 | 0.2 | 0.4 | 20.9 | | 20.1 | | | 100+ | |
| 4-10 | 10.5 | 3.6 | 0.2 | 0.1 | 14.4 | | 11.7 | | | 100+ | |
| 10-26+ | 10.4 | 3.5 | 0.2 | 0.1 | 14.2 | | 12.4 | | | 100+ | |
| Composite A | 15.0 | 4.7 | 0.2 | tr. | 19.9 | | 19.3 | | | 100+ | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |

* All values from characterization sample.

## BARKERVILLE COBBLY AND GRAVELLY SANDY LOAM
S65Ariz-13-3

Location: Western Yavapai County Area, Arizona. About 6 miles southeast of Wagoner, Arizona on the road to Crown King, then 1/10 mile north of the road. 4/10 mile east and 4/10 mile south of northeast corner Sec. 5, T9N, R2W. Photo #1170, AMS, Project 134, Lot FA. Date of Sampling: May 4, 1965.
Collectors: Nettleton and Meurisse
Vegetation: Brush. Shrub live oak, skunkbush, mountain mahogany, desert ceanothus, catclaw, sideoats grama, Arizona cottontop, Snakeweed and annuals. Climate: Mean annual precipitation 14 to 15". Mean annual temperature 57°F. Temperature at time of sampling 66°F. at 20". Parent Material: Granite and closely related rocks. Relief: Steep mountains. Sample located on south facing, convex, 35 percent midslope. Elevation: 4200 feet. Drainage: Medium runoff, moderately permeable and well drained.
Classification: Typic Ustorthent, sandy-skeletal, mixed, mesic, shallow.
Remarks: This soil is on granite under a chaparral cover. It occurs on moderately steep to steep mountains at elevations of 3500 to 6000 feet. 5 to 10 percent of the surface is covered by stones and rock outcrops. Hellige-Truog field kit was used to determine pH. Paired samples are S65 Ariz-13-2 and S65 Ariz-13-15.

| HORIZON | DESCRIPTION |
|---|---|
| 01-02 | 1/2 to 0 inch, undecomposed and partially decomposed leaves and twigs from brush. |
| A1<br>RSL No.<br>65214 | 0 to 4 inches, dark grayish brown (10YR 4/2) cobbly and gravelly sandy loam, very dark grayish brown (10YR 3/2) when moist; weak fine platy and weak fine and medium granular structure; slightly hard, friable, nonsticky and slightly plastic; few very fine, plentiful fine and medium roots; many micro and very fine interstitial pores; 40 percent fine gravels 2 mm to 1/2 inch in diameter; 25 percent surface covered by cobbles and fine stones; noneffervescent; mildly alkaline (pH 7.4); clear smooth boundary. |
| C1<br>RSL No.<br>65215 | 4 to 10 inches, yellowish brown (10YR 5/4) and light gray (10YR 7/2) highly decomposed granite breaking to very gravelly sandy loam, dark yellowish brown and (10YR 4/4) and light yellowish brown (10YR 6/4) when moist; massive; hard, friable, nonsticky and nonplastic; few very fine, fine and medium roots; many micro and very fine interstitial pores; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| C2<br>RSL No.<br>65216 | 10 to 26 inches plus, yellowish brown (10YR 5/4) and light gray (10YR 7/2) very gravelly weathered granite (Grus), dark yellowish brown (10YR 4/4) and light yellowish brown (10YR 6/4) when moist; massive; very hard, firm, nonsticky and nonplastic; very few very fine, fine and medium roots, roots penetrate to about 6 feet in nearby areas; many micro and fine interstitial pores; noneffervescent; neutral (pH 7.0). |
| RSL No.<br>65217 | Composite of A taken as supplemental sample. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Ustorthent, loamy-skeletal, mixed, acid, frigid, shallow

SOIL Mirabal gravelly sandy loam(taxadjunct) SOIL Nos. S65Ariz-13-14 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65218 - 65220

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | 3A1 (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments 1A2a > 2 | 2 - 19 | 19–76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0-3 | A1 | 75.2 | 18.0 | 6.8 | 15.7 | 21.0 | 11.7 | 18.8 | 8.0 | 8.2 | 9.8 | 25.7 | 67.2 | 0 | 7 | 26** | 15 | 3 |
| 3-9 | C1 | 69.5 | 21.2 | 9.3 | 14.3 | 20.4 | 10.8 | 16.6 | 7.4 | 7.5 | 13.7 | 23.1 | 62.1 | 0 | 9 | 25** | 13 | 5 |
| 9-26 | C2 | 57.1 | 25.2 | 17.7 | 18.7 | 19.3 | 7.0 | 8.3 | 3.8 | 4.1 | 21.1 | 11.9 | 53.3 | 0 | 18 | 52** | 21 | 9 |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density | 3B2 | Water content | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | Cm | Pct. | Pct. | Pct. | in./in. | in./in. | | | |
| 0-3 | 1.66 | 0.066 | 25 | 0.7 | - | 1.13 | 1.16 | | 0.87 | | 11.9 | 5.1 | 0.008 | 0.007 | 5.0 | | |
| 3-9 | 0.58 | 0.028 | 21 | 0.8 | - | 1.40 | 1.42 | | 0.85 | | 9.3 | 5.3 | 0.004 | 0.003 | 4.5 | | |
| 9-26 | 0.39 | | | 0.5 | - | 1.67 | 1.70 | | 0.59 | | 13.2 | 7.2 | 0.005 | 0.003 | 4.9 | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 $NH_4OAc$ | 5C3 Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | Pct | Pct. |
| 0-3 | 3.6 | 1.2 | 0.1 | 0.8 | 5.7 | 8.8 | 12.2 | 14.5 | 1.1 | 47 | 39 |
| 3-9 | 1.2 | 1.1 | 0.1 | 0.6 | 3.0 | 8.4 | 9.2 | 11.4 | 3.0 | 33 | 26 |
| 9-26 | 6.3 | 1.9 | 0.2 | 0.4 | 8.8 | 3.8 | 11.6 | 12.6 | 0.8 | 76 | 70 |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | KaoHn |
|---|---|---|---|---|
| | X-ray | | | |
| 0-3 | xxx | - | x | xx |
| 3-9 | xx | - | x | xxx |
| 9-26 | xxx | - | t | xxx |

* All values from characterization sample (5Kg)(except as noted).

** >2 mm includes field volume estimate of >76 mm.

\- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## MIRABAL GRAVELLY SANDY LOAM (taxadjunct) 1/
S65Ariz-13-14

Location: Western Yavapai County Area, Arizona. About 5.2 miles northwest of Crown King, Arizona or 2.3 miles southeast of the Wagoner turnoff on the Senator Highway in a pit on the east side of the highway. In the SE¼ NW¼, Sec. 9, T10N, R1W. EGE 1959. Photo 25-172. Date of Sampling: May 10, 1965.
Collectors: Nettleton, Meurisse, Wendt
Vegetation: Pine - Brush. Ponderosa pine, Gambel oak, Manzanita, Fendlers ceanothus and deergrass. Climate: Mean annual precipitation 25". Mean annual temperature 45°F. Soil temperature at time of sampling 47°F. at 18". Parent Material: Highly weathered granite and closely related materials. Relief: Moderately steep mountains. Sampled on a 27 percent convex, midslope of mountain with a southern exposure. Elevation: 6150 feet. Drainage: Medium runoff, moderately permeable and well drained.
Remarks: This soil is on granite under a pine-chaparral vegetation. It is on moderately steep to steep mountains above 6000 feet in elevation. A few cobbles (about 5 percent) are in the A1 and C1 horizons. Pockets (20-30 percent) of less weathered, extremely hard rock occur in the C2 horizon. The C2 horizon is dominantly hard rock. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-1.
Classification: Typic Ustorthent, loamy-skeletal, mixed, acid, frigid, shallow.

| HORIZON | DESCRIPTION |
|---|---|
| O1 | 2 to 0 inches, partially decomposed pine needles. Noneffervescent abrupt smooth boundary. A few stones and cobbles. Occasional outcrops of granite in vicinity. |
| A1<br>RSL No.<br>65218 | 0 to 3 inches, gray (10YR 5/1) finely gravelly sandy loam, very dark gray (10YR 3/1) when moist; strong fine and medium granular structure; slightly hard, friable, nonsticky and nonplastic; abundant very fine and few medium and coarse roots; many fine interstitial pores; 5 percent cobbles; 30 percent fine gravel; noneffervescent; slightly acid (pH 6.3); clear, smooth boundary. |
| C1<br>RSL No.<br>65219 | 3 to 9 inches, pale brown (10YR 6/3) finely gravelly sandy loam, dark brown (10YR 4/3) when moist; massive; slightly hard, friable, nonsticky and slightly plastic; plentiful very fine, fine and medium roots; common fine tubular and many interstitial pores: 5 percent cobbles, about 25 percent fine gravel; noneffervescent; very strongly acid (pH 5.0); clear wavy boundary. |
| C2<br>RSL No.<br>65220 | 9 to 26 inches, pale brown (10YR 6/3) very gravelly highly weathered granite (grus), yellowish brown (10YR 5/4) when moist; massive; hard to very hard, friable to very firm; plentiful medium and coarse roots; few common interstitial pores; very few thin clay films in cracks of rock; pockets of extremely hard, less weathered rock are 20 to 30 percent of the profile; noneffervescent; very strongly acid (pH 5.0); clear irregular boundary. |
| C-R | 26 inches, plus, less weathered granite similar to C2 horizon but is dominantly extremely hard granite rock. |

1/ The Mirabal series is in a loamy-skeletal, mixed, nonacid, frigid family of Typic Ustorthents. This pedon has a control section with pH of <5.5 in water 1:1, and depth of soil is less than 20 inches.

U S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic ustortnent, loamy-skeletal, mixed, nonacid, frigid, shallow

SOIL Mirabal gravelly sandy loam (taxadjunct) SOIL Nos. S65Ariz-13-1 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65207 - 65209

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand (Pct. of < 2 mm) Very coarse (2–1) | Sand Coarse (1–0 5) | Sand Medium (0.5–0.25) | Sand Fine (0 25–0.1) | Sand Very fine (0.1–0.05) | Silt 0.05–0.02 | Silt Int. III (0.02–0.002) | 3A1 Int. II (0.2–0 02) | (2–0.1) | | | * Coarse fragments 1A2a ≥ 2 Pct | 2 - 19 Pct of < 76mm | 19 - 76 Pct of < 76mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-5 | A1 | | | | | | | | | | | | | | | 32 | 32 | 0 |
| 5-14 | C1 | | | | | | | | | | | | | | | 18 | 18 | 0 |
| 14-29+ | C2 | | | | | | | | | | | | | | | 24 | 24 | 0 |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | | Bulk density 4A1f 1/3 bar g/cc | 4A1h Oven dry g/cc | g/cc | | Water content Pct. | 4B1c 1/3 bar Pct. | 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-5 | 1.46 | 0.069 | 21 | 0.4 | - | | | | | | | | 4.0 | | | 5.9 | | |
| 5-14 | 0.39 | 0.021 | 19 | 0.5 | - | | | | | | | | 3.5 | | | 5.9 | | |
| 14-29+ | 0.35 | | | 0.5 | - | | | | | | | | 3.3 | | | 6.1 | | |

| Depth (In ) | Extractable bases 5B1a 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | 5A3a Sum | | 6G1d KCl Ext. $Al^{+++}$ | | | | | | Base saturation 5C1 $NH_4OAc$ Pct. | 5C3 Sum Pct. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | | | | | | | |
| 0-5 | 5.4 | 1.2 | 0.1 | 0.4 | 7.1 | 4.4 | 9.7 | 11.5 | | - | | | | | | 73 | 62 |
| 5-14 | 4.6 | 1.1 | 0.1 | 0.2 | 6.0 | 2.5 | 8.0 | 8.5 | | 0.1 | | | | | | 75 | 71 |
| 14-29+ | 6.0 | 1.6 | 0.2 | 0.2 | 8.0 | 2.0 | 9.4 | 10.0 | | 0.1 | | | | | | 85 | 80 |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| 0-5 | - | xx | xx | xx | |
| 5-14 | | | | | |
| 14-29+ | | | | | |

* Percent <19 mm; see profile description for estimates >19 mm.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## MIRABAL GRAVELLY SANDY LOAM (taxadjunct) 1/
S65Ariz-13-1

Location: Western Yavapai County Area, Arizona. About 3.5 miles south of Crown King, Arizona on road to Horsethief recreation area, then 200 feet north of road on a northwest slope in the NW¼ of Sec. 36, T9½N, R1W. EGE 1960 photo: 45-143. Date of sampling: May 3, 1965.
Collectors: Flach, Alexander, Nettleton, Jay, Meurisse, and Wendt.
Vegetation: Mixed conifer. Ponderosa pine, Douglas fir, Gambel oak and muttongrass. Climate: Mean annual precipitation 25". Mean annual temperature 45°F. Soil temperature at time of sampling: 49°F. at 12", 49°F. at 20", 45°F. at 12" in shade. Parent Material: Highly weathered granite and closely related materials. Relief: Moderately steep mountains. Sampled about 100 feet from top of ridge on 28 percent convex, northwest slope. Elevation: 6,700 feet. Drainage: Medium runoff, moderate permeability and well drained.
Remarks: This soil is on moderately steep to steep mountains above 6000 feet in elevation. A few granite outcrops are throughout the area. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-14.
Classification: Typic Ustorthent, loamy-skeletal, mixed, nonacid, frigid, shallow.

| HORIZON | DESCRIPTION |
|---|---|
| O1 | 1 to 0 inch, partially decomposed pine needles. Noneffervescent; abrupt smooth boundary. Few stones and cobbles. |
| A1<br>RSL No.<br>65207 | 0 to 5 inches, grayish brown (10YR 5/2) finely gravelly sandy loam, dark brown (10YR 3/3) when moist; massive breaking to weak fine and medium granular structure; slightly hard, very friable, nonsticky and slightly plastic; plentiful fine, medium and coarse roots; many fine and medium interstitial pores; 20 percent very hard rock fragments 3-10" in diameter; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| C1<br>RSL No.<br>65208 | 5 to 14 inches, light gray (10YR 7/2) finely gravelly sandy loam with common to many cobbles, dark brown (10YR 4/3) when moist; massive; slightly hard, very friable, nonsticky and slightly plastic; abundant fine, medium and coarse roots; many fine and medium interstitial pores; 40 percent by volume very hard rock fragments 3-10" in diameter, and 20 percent very hard gravel size rock fragments; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| C2<br>RSL No.<br>65209 | 14 to 29 inches plus, white (10YR 8/0) and yellowish brown (10YR 5/8) dry and moist, highly weathered granite (grus); massive; very hard, very firm; (weathered rock is slightly hard and friable); noneffervescent; medium acid; (pH 6.0). |

1/ The Mirabal series is in a loamy-skeletal, mixed, nonacid, frigid family of Typic Ustorthents. This pedon has a depth of soil of less than 20 inches.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Ustorthent, sandy, mixed, mesic, shallow
Barkerville gravelly sandy
SOIL loam (taxadiunct) SOIL Nos. S65Ariz-13-15 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65221 - 65224

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) Pct. of < 2 mm | Total Silt (0.05–0.002) Pct. of < 2 mm | Total Clay (< 0.002) Pct. of < 2 mm | Sand Very coarse (2–1) Pct. of < 2 mm | Sand Coarse (1–0.5) Pct. of < 2 mm | Sand Medium (0.5–0.25) Pct. of < 2 mm | Sand Fine (0.25–0.1) Pct. of < 2 mm | Sand Very fine (0.1–0.05) Pct. of < 2 mm | Silt 0.05–0.02 Pct. of < 2 mm | Silt Int. III (0.02–0.002) Pct. of < 2 mm | 3A1 Int. II (0.2–0.02) Pct. of < 2 mm | (2–0.1) Pct. of < 2 mm | | | * Coarse fragments 1A2a > 2 Pct. of whole soil | 2 - 19 Pct. of < 76mm | 19–76 Pct. of < 76mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-3 | A1 | | | | | | | | | | | | | | | 11 | 11 | 0 |
| 3-19 | C1 | | | | | | | | | | | | | | | 11 | 11 | 0 |
| 19-27+ | C2 | | | | | | | | | | | | | | | 14 | 14 | 0 |
| Composite | A | | | | | | | | | | | | | | | 10 | 10 | 0 |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct | 6B1a Nitrogen Pct | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | Bulk density 4A1f 1/3 bar g/cc | 4A1h Oven dry g/cc | g/cc | Water content Pct. | 4B1c 1/3 bar Pct. | 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 1.25 | 0.085 | 15 | | - | | | | | | 4.3 | | | 6.7 | | |
| 3-19 | 0.19 | | | | - | | | | | | 3.8 | | | 6.1 | | |
| 19-27+ | 0.14 | | | | - | | | | | | 3.9 | | | 6.1 | | |
| Composite A | 1.52 | 0.109 | 14 | | - | | | | | | 5.0 | | | 7.0 | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a 6N2a Ca meq/100 g | 6O2a Mg meq/100 g | 6P2a Na meq/100 g | 6Q2a K meq/100 g | Sum of bases meq/100 g | 6H2a Ext. Acidity meq/100 g | Cation Exch. Capacity 5A1a $NH_4OAc$ meq/100 g | 5A3a Sum meq/100 g | 6G1d KCl Ext. $Al^{+++}$ meq/100 g | Base saturation 5C1 $NH_4OAc$ Pct. | 5C3 Sum Pct. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 7.5 | 1.1 | 0.1 | 0.2 | 8.9 | 2.3 | 9.9 | 11.2 | | 90 | 79 |
| 3-19 | 6.7 | 1.3 | 0.2 | 0.1 | 8.3 | 2.2 | 9.0 | 10.5 | | 92 | 79 |
| 19-27+ | 6.1 | 1.9 | 0.1 | 0.1 | 8.2 | 2.0 | 9.1 | 10.2 | | 90 | 80 |
| Composite A | 9.2 | 1.4 | 0.1 | 0.2 | 10.9 | 2.7 | 11.8 | 13.6 | | 92 | 80 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A Mont. (X-ray) | Verm. (X-ray) | Mica (X-ray) | Kaolin (X-ray) |
|---|---|---|---|---|
| 0-3 | | | | |
| 3-19 | | x | x | xxx |
| 19-27+ | | | | |
| Composite A | | | | |
| | | | | |
| | | | | |

* All values from characterization sample.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## BARKERVILLE GRAVELLY SANDY LOAM (taxadjunct) 1/
S65Ariz-13-15

Location: Western Yavapai County Area, Arizona. 5.3 miles from Crown King, Arizona toward Prescott and 75 feet on the right side of the Senator Highway, or about 2 miles toward Crown King from the Wagoner turnoff on Senator Highway and 75 feet to left of road. NW¼ Sec. 9, T10N, R1W. EGE Photo #25-172. Date of Sampling: May 10, 1965.
Collectors: Nettleton, Meurisse, Wendt
Vegetation: Brush - mountain mahogany, silk tassel and oakbrush (65 percent crown cover). Climate: Mean annual precipitation 25". Mean annual temperature 49°F. Soil temperature at time of sampling 58°F. at 20". Parent Material: Granite and closely related rocks. Relief: Steep mountains. Sample located on a south facing, 33 percent convex midslope. Elevation: 6150 feet. Drainage: Medium runoff, moderately permeable and well drained.
Remarks: This soil is on granite under a chaparral cover. It is at elevations of 3500 to 6200 feet on moderately steep to steep mountains; rock outcrops and stones are common (5-10 percent of surface area). Roots penetrate 3 to 6 feet into the granite in fractures. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-2 and S65 Ariz-13-3.
Classification: Typic Ustorthent, sandy, mixed, mesic, shallow.

| HORIZON | DESCRIPTION |
|---|---|
| O1 | ½ to 0 inch, undecomposed chaparral litter. |
| A1<br>RSL No.<br>65221 | 0 to 3 inches, dark grayish brown (10YR 4/2) finely gravelly sandy loam, very dark brown (10YR 2/2) when moist; moderate fine granular structure; slightly hard, very friable, non-sticky and nonplastic; abundant very fine and few fine roots; many interstitial and moderate very fine tubular pores; 30-40 percent fine gravels; noneffervescent; neutral (pH 7.0); clear wavy boundary. This horizon is 6-8 inches thick under shrubs. |
| C1<br>RSL No.<br>65222 | 3 to 19 inches, light brown (7.5YR 6/4) decomposed granite (grus), brown (7.5YR 4/4) when moist; massive; hard, very firm, nonsticky and nonplastic; abundant fine and few medium and coarse roots; common fine tubular and few interstitial pores; few thin patchy clay films or coatings in seams and on faces of less weathered rock; noneffervescent; slightly acid (pH 6.5); clear wavy boundary. |
| C2<br>RSL No.<br>65223 | 19 to 27 inches plus, pink (7.5YR 7/4) grus, brown (7.5YR 4/4) when moist; massive, very hard, very firm, nonsticky and nonplastic; few very fine, fine and medium roots; common fine tubular and fine interstitial pores; very few thin, patchy clay films or coatings in seams and on faces of less weathered rock; noneffervescent; medium acid (pH 6.0). |
| RSL No.<br>65224 | Composite of A - supplemental sample. |

1/ The Barkerville series is in a sandy-skeletal, mixed, mesic, shallow family of Typic Ustorthents. This pedon has fewer coarse fragments than the Barkerville series.

CONSECUTIVE PEDON NUMBER C 67 46 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES ANTHO TAXADJUNCT SOIL NO. S67 ARIZ. 7-15 SAMPLE NO. 7 583-7 587 CENTRAL ARIZONA ARI

SOIL FAMILY: TYPIC TORRIPSAMMENT,MIXED, HYPERTHERMIC RIVERSIDE SOIL SURVEY LABORATOR

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION <2 | SANDS 2-.05 | SILTS .05-.002 | CLAYS .002 LT | VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | CO. CLAYS 2-.2U | FINE CLAYS LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 7 583 | 0- 18 | AP | 72.2 | 20.3 | 7.5 | | 12.0 | 15.8 | 10.7 | 18.5 | 15.2 | 15.0 | 5.3 | | | | 40.6 | 13 | TR | 13Z | N |
| 7 584 | 18- 46 | C 1 | 72.7 | 19.8 | 7.5 | | 12.4 | 17.0 | 11.1 | 17.3 | 14.9 | 15.1 | 4.7 | | | | 39.5 | 14 | TR | 14Z | N |
| 7 585 | 46- 61 | C 2 | 77.0 | 16.9 | 6.1 | | 15.1 | 20.2 | 12.6 | 17.1 | 12.0 | 12.8 | 4.1 | | | | 33.5 | 20 | TR | 20Z | N |
| 7 586 | 61- 91 | C 3 | 80.0 | 13.9 | 6.1 | | 16.6 | 25.1 | 14.2 | 15.7 | 8.4 | 10.2 | 3.7 | | | | 26.1 | 32 | 5 | 27Z | N |
| 7 587 | 91-127 | C 4 | 82.8 | 12.0 | 5.2 | | 18.1 | 26.3 | 14.2 | 15.5 | 8.7 | 9.1 | 2.9 | | | | 25.3 | 23 | TR | 23Z | N |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-19 6E1B | EXT. IRON FE 6C2B | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 7 583 | 0- 18 | 0.14 | 0.019 | TR | | 0.6 | | | 1.55 | 1.55 | 0.92 | | 10.7 | 3.5 | | | | | 8.7 | |
| 7 584 | 18- 46 | 0.12 | 0.012 | TR | | 0.5 | | | 1.75 | 1.75 | 0.90 | | 10.7 | 3.6 | | | | | 8.5 | |
| 7 585 | 46- 61 | 0.07 | | TR | | 0.5 | | | 1.72 | 1.72 | 0.86 | | 7.2 | 2.9 | | | | | 9.3 | |
| 7 586 | 61- 91 | 0.04 | | TR | | | | | 1.42 | 1.44 | 0.80 | | 12.7 | 2.9 | | 0.5 | 0.4 | | 9.4 | |
| 7 587 | 91-127 | 0.04 | | TR | | | | | 1.68 | 1.68 | 0.84 | | 6.4 | 2.6 | | | | | 9.3 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4C | MG 5B3A 6O4C | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A MMHO | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT PAST 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 7 583 | 0- 18 | | | 0.8 | 0.5 | 1.3 | | | 7.0 | 2.29 | 7.6 | 2.0 | 12.8 | 0.4 | | 3.1 | 0.5 | | | 7.7 |
| 7 584 | 18- 46 | | | 0.6 | 0.4 | 1.0 | | | 6.6 | | | | | | | | | | | 7.5 |
| 7 585 | 46- 61 | | | 0.4 | 0.3 | 0.7 | | | 5.8 | | | | | | | | | | | 8.1 |
| 7 586 | 61- 91 | | | 0.3 | 0.3 | 0.6 | | | 5.1 | 0.53 | 1.2 | 0.3 | 3.3 | 0.1 | | 2.3 | 1.5 | | | 8.1 |
| 7 587 | 91-127 | | | 0.3 | 0.3 | 0.6 | | | 5.4 | | | | | | | | | | | 8.1 |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A2E | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 583 | 0- 18 | 23.3 | 0.5 | 7 | 6 | | | | | | | | | | | |
| 7 584 | 18- 46 | | 0.6 | 9 | | | | | | | | | | | | |
| 7 585 | 46- 61 | | 0.4 | 7 | | | | | | | | | | | | |
| 7 586 | 61- 91 | 20.6 | 0.2 | 5 | 4 | | | | | | | | | | | |
| 7 587 | 91-127 | | 0.3 | 6 | | | | | | | | | | | | |

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

# ANTHO SANDY LOAM (taxadjunct) 1/

S-67-Ariz-7-15

Location: Maricopa County, Arizona. 150 feet north, 450 feet west of the E¼ corner of Section 33, T2S, R7E., 2½ miles east of Chandler Heights. Description by: E. Adams, E. Chamberlin. Collectors: K. Flach, D. Nettleton, D. Hendricks, J. Jay.

Classification: Typic Torripsamment, mixed, hyperthermic.

Vegetation: Citrus trees. Use: Cropland, irrigated. Climate: Mean annual precipitation 8 inches (est.). Mean annual temperature 70° F., January 50° F., July 90° F. Parent Material: Alluvium from acid igneous and some basalt rocks. Topography: Simple lower slopes of alluvial fans. Slope of 1 ss than 1 percent facing north. Elevation: 1,300 feet. Drainage: Well drained, moderately rapid permeability. Medium runoff. Soil moisture: Moist at time of sampling.

Remarks: pH delineations by thymol blue indicator in 1:5 dilution. This profile is slightly coarser textured below 24 inches than is modal for the series. Soil temperature at 20 inches approximately 80° F.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>67583 | 0 to 18 cm (0 to 7 inches), light brown (7.5YR 6/4), sandy loam, brown (7.5YR 4/4) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few fine and medium roots; few fine tubular and many fine interstitial pores; noneffervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| C1<br>RSL<br>67584 | 18 to 46 cm (7 to 18 inches), light brown (7.5YR 6/4), sandy loam, brown, (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few fine roots; few fine tubular and many fine interstitial pores; noneffervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C2<br>RSL<br>67585 | 46 to 61 cm (18 to 24 inches), light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few fine tubular and many fine interstitial pores; about 20 percent fine gravel; effervescent; moderately alkaline (pH 8.0); clear smooth boundary. |
| C3<br>RSL<br>67586 | 61 to 91 cm (24 to 36 inches), light brown (7.5YR 6/4) light gravelly sandy loam, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few fine tubular and many fine interstitial; about 25 percent fine gravel; effervescent; moderately alkaline (pH 8.0); diffuse boundary. |
| C4<br>RSL<br>67587 | 91 to 127 cm (36 to 50 inches), light brown (7.5YR 6/4) light gravelly sandy loam, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few fine tubular and many fine interstitial pores; about 20 percent fine gravel; effervescent; moderately alkaline (pH 8.0). |

1/ The Antho series is in a coarse-loamy, mixed (calcareous), hyperthermic family of Typic Torrifluvents. This pedon has a sandy particle-size.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Torripsamment, mixed, mesic

SOIL Sheppard loamy sand SOIL Nos. S65Ariz-1-13 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65700 - 65703

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments: ≥ 2 Pct. | 1A2a Coarse fragments: 2 – 19 Pct. of < 76mm | 1A2a Coarse fragments: 19 – 76 Pct. of < 76mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0-10 | A1 | 96.2 | 2.1 | 1.7 | 0.1 | 11.2 | 33.6 | 44.7 | 6.6 | 1.7 | 0.4 | 26.6 | 89.6 | 0 | 2 | - | - | - |
| 10-25 | C1 | 96.0 | 1.3 | 2.7 | 0.4 | 14.9 | 36.5 | 39.8 | 4.4 | 1.0 | 0.3 | 20.3 | 91.6 | 0 | 3 | - | - | - |
| 25-40 | C2 | 95.9 | 1.5 | 2.6 | 0.4 | 13.7 | 34.8 | 43.5 | 3.5 | 1.2 | 0.3 | 19.6 | 92.4 | 0 | 3 | - | - | - |
| 40-70+ | C3 | 93.5 | 2.0 | 4.5 | 0.5 | 2.2 | 21.0 | 62.5 | 7.3 | 1.5 | 0.5 | 35.2 | 86.2 | 0 | 5 | - | - | - |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | Bulk density: g/cc | Water content: Pct. | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH: 8C1a $H_2O$ 1:1 | pH | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-10 | 0.23 | 0.014 | 16 | | - | | | | | | 1.6 | | | 6.9 | | |
| 10-25 | 0.21 | | | | - | | | | | | 1.7 | | | 7.0 | | |
| 25-40 | 0.14 | | | | - | | | | | | 1.6 | | | 7.1 | | |
| 40-70+ | 0.11 | | | | - | | | | | | 2.1 | | | 7.3 | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | | 6G1d KCl Ext. $Al^{+++}$ | | | | | Base saturation: 5C1 $NH_4OAc$ Pct | Base saturation Pct. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | | | | | | |
| 0-10 | 2.0 | 0.7 | 0.2 | 0.3 | 3.2 | | 2.3 | | | | | | | | 100+ | |
| 10-25 | 2.5 | 0.6 | 0.3 | 0.3 | 3.7 | | 3.0 | | | | | | | | 100+ | |
| 25-40 | 2.2 | 0.4 | 0.2 | 0.2 | 3.0 | | 2.8 | | | | | | | | 100+ | |
| 40-70+ | 3.5 | 0.6 | 0.2 | 0.2 | 4.5 | | 4.0 | | | | | | | | 100+ | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |

1/ From characterization sample (5kg) except as noted.

## SHEPPARD LOAMY SAND
S65Ariz-1-13

Location: Apache County, Arizona. A pit located 100 feet north of the south quarter corner of Section 22, T. 17 N., R. 29 E., approximately 23 miles north of Saint Johns on the Witch Well Ranch. Date of Sampling: September 22, 1965.
Collectors: M.L. Miller, K.N. Larson, J.E. Jay, R.E. Nelson and B. Brasher.
Vegetation: Never cultivated. Grass-juniper aspect. 20 percent basal cover; 15 percent juniper crown cover. Indian rice grass, sand dropseed, blue grama, sand sage, one-seed juniper, Mormon tea, spike muhly. Climate: 13 inches ppt. 50°F. approximate M.A.T. Parent Material: Eolian sands of Tertiary age. Relief: Dunes on undulating plains. Convex-complex 7 percent slope with a slight southwest aspect at pit site. Near top of low dune. Elevation: 6300 feet. Drainage: Runoff is slow. Soil is somewhat excessively drained. Ground water is very deep. Permeability is moderately rapid to rapid.
Remarks: Wind erosion activity and deposition at pit site is moderate. Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate obtained by observing reaction to dilute HCl. In this pit there are some spots between 10 and 70 inches that effervesce.
Classification: Typic Torripsamment, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65700 | 0 to 10 inches, brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; plentiful fine and medium roots; many fine interstitial pores; nonefferves-cent; neutral (pH 7.0); clear smooth boundary. |
| C1<br>RSL No.<br>65701 | 10 to 25 inches, brown (7.5YR 5/4) loamy sand, dark brown (7.5YR 4/4) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine, medium and large roots; many fine interstitial pores; noneffervescent; moderately alkaline (pH 8.0); diffuse boundary. |
| C2<br>RSL No.<br>65702 | 25 to 40 inches, brown (7.5YR 5/4) loamy sand, dark brown (7.5YR 4/4) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine, medium and large roots; many fine interstitial pores; noneffervescent; moderately alkaline (pH 8.0); diffuse boundary. |
| C3<br>RSL No.<br>65703 | 40 to 70 inches +, brown (7.5YR 5/4) loamy sand, dark brown (7.5YR 4/4) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine, medium and large roots; many fine interstitial pores; noneffervescent; moderately alkaline (pH 8.0). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Argic Cryoboroll, fine-loamy, mixed

SOIL Cambern sandy loam (taxadjunct) SOIL Nos. S65Ariz-1-17 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65687 - 65692

| Depth (In.) | Horizon | 1B1b Total Sand (2-0.05) | Total Silt (0.05-0.002) | Total Clay (< 0.002) | Sand: Very coarse (2-1) | Sand: Coarse (1-0.5) | Sand: Medium (0.5-0.25) | Sand: Fine (0.25-0.1) | Sand: Very fine (0.1-0.05) | Silt: 0.05-0.02 | Silt: Int. III (0.02-0.002) | Int. II (0.2-0.02) | (2-0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments 1A2a: ≥ 2 | 2 - 19 | 19 - 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0- 3 | A11 | 49.3 | 34.6 | 16.1 | 4.7 | 7.4 | 7.8 | 19.0 | 10.4 | 15.5 | 19.1 | 36.1 | 38.9 | 0 | 16 | | | |
| 3- 8 | A12 | 50.8 | 30.8 | 18.4 | 5.7 | 7.8 | 7.9 | 19.3 | 10.1 | 12.3 | 18.5 | 32.4 | 40.7 | 0 | 18 | | | |
| 8-13 | B21t | 45.1 | 24.5 | 30.4 | 3.8 | 6.4 | 7.5 | 18.6 | 8.8 | 8.4 | 16.1 | 27.2 | 36.3 | 0 | 30 | | | |
| 13-19 | B22t | 36.0 | 22.2 | 41.8 | 2.9 | 5.2 | 5.9 | 14.6 | 7.4 | 7.7 | 14.5 | 22.8 | 28.6 | 0 | 42 | | | |
| 19-28 | B3 | 46.0 | 23.4 | 30.6 | 5.6 | 9.2 | 7.6 | 14.8 | 8.8 | 8.9 | 14.5 | 26.2 | 37.2 | 0 | 31 | | | |
| 28-34+ | R | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | | 3B2 | Water content | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct. | | Pct. | Pct. | | g/cc | g/cc | g/cc | Cm | Pct | Pct. | Pct. | in./in. | in./in. | | | |
| 0- 3 | 1.11 | 0.078 | 14 | 1.0 | - | | 1.42 | 1.50 | | 1.00 | | 19.0 | 10.7 | 0.019 | 0.019 | 6.6 | | |
| 3- 8 | 0.97 | 0.070 | 14 | 1.0 | - | | 1.54 | 1.65 | | 1.00 1/ | | 18.1 | 10.0 | 0.021 | 0.021 | 6.6 | | |
| 8-13 | 0.59 | | | 0.5 | tr. | | 1.41 | 1.75 | | 1.00 1/ | | 28.4 | 14.8 | 0.076 | 0.076 | 6.7 | | |
| 13-19 | 0.36 | | | 0.5 | tr. | | 1.37 | 1.79 | | 1.00 1/ | | 31.6 | 20.5 | 0.093 | 0.093 | 6.9 | | |
| 19-28 | 0.19 | | | 0.8 | - | | 1.48 | 1.69 | | 1.00 1/ | | 25.9 | 17.4 | 0.044 | 0.044 | 7.2 | | |
| 28-34+ | | | | | - | | 1.75 | 1.84 | | 1.00 1/ | | 14.6 | 14.2 | 0.016 | 0.016 | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 $NH_4OAc$ | 5C3 Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | Pct. | Pct. |
| 0- 3 | 11.2 | 3.8 | 0.4 | 0.6 | 16.0 | 4.0 | 17.8 | 20.0 | | 90 | 80 |
| 3- 8 | 12.6 | 4.2 | 0.5 | 0.4 | 17.7 | 3.6 | 19.5 | 21.3 | | 91 | 83 |
| 8-13 | 16.3 | 7.1 | 0.8 | 0.4 | 24.6 | 4.0 | 27.2 | 28.6 | | 90 | 86 |
| 13-19 | 21.2 | 10.6 | 1.1 | 0.5 | 33.4 | 3.7 | 36.2 | 37.1 | | 92 | 90 |
| 19-28 | 22.1 | 10.2 | 1.4 | 0.4 | 34.1 | | 36.2 | | | 94 | |
| 28-34+ | | | | | | | | | | | |

| Depth (In.) | Clay mineralogy (≤0.002 mm) 7A: Mont. | Verm. | Mica | KaolHn. |
|---|---|---|---|---|
| | X-ray | | | |
| 0- 3 | xx | | x | |
| 3- 8 | | | | |
| 8-13 | | | | |
| 13-19 | xxxx | | | t |
| 19-28 | | | | |
| 28-34+ | | | | |

1/ >2 mm not determined; data based on crushed samples of the whole soil.
Some of the >2 mm particles do not slake in water but they cannot be separated consistently in sample preparation. All >2 mm fragments resemble the fine earth (<2 mm ) fraction in water retention and chemical properties.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

Micromorphology

65687 Weathered basic tuff fragments and mineral grains.
65690 Stress oriented clay on ped faces and within the matrix, a few clay skins in pores.
65691 Weathered basic tuff with many clay skins in fracture planes and in pores.
65692 Weathered basic tuff.

## CAMBERN SANDY LOAM (taxadjunct) 1/
S65Ariz-1-17

Location: Apache County, Arizona. A pit located 1320 feet west and 396 feet south of the east quarter corner of Section 18, T. 5 N., R. 31 E. About 2 miles southeast of Alpine. About 3/4 of a mile southwest of the matched pedon. Date of Sampling: September 23, 1965. Collectors: M.L. Miller, K.N. Larson, J.E. Jay, R.E. Nelson and B. Brasher. Vegetation: Cultivated field that was seeded to grass less than 5 years ago. Present vegetation is a 32 percent basal cover of ryegrass, alta fescue and smooth brome. Climate: 22 inches ppt. 43.4°F. approximate M.A.T. Parent Material: Basic tuff. Relief: Side slope of low ridge, smooth convex 4 percent slope with east aspect at pit site. Elevation: 8000 feet. Drainage: Runoff is medium. Soil is well drained.

Remarks: Depth to the R horizon ranges from 20 to 30 inches in this area. Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate was obtained by observing reaction to dilute HCl. Paired pedon is Sample No. S65 Ariz-1-16. This pedon has a mollic epipedon, and an argillic horizon. The mean summer soil temperature at a 20-inch depth is probably less than 60° F.

Classification: Argic Cryoboroll, fine-loamy, mixed.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>65687 | 0 to 3 inches, dark gray (10YR 4/1) heavy sandy loam, very dark brown (10YR 2/2) when moist; moderate medium and coarse platy structure that breaks to moderate fine granular; slightly hard, very friable, slightly sticky and slightly plastic; plentiful fine roots; many fine tubular and interstitial pores; 10 percent of surface covered with tuff gravels; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| A12<br>RSL No.<br>65688 | 3 to 8 inches, dark gray (10YR 4/1) clay loam, very dark brown (10YR 2/2) when moist; weak medium and coarse angular and subangular blocky structure that breaks to moderate fine granular; hard, friable, sticky and plastic; plentiful fine roots; common fine tubular and many fine interstitial pores; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| B21t<br>RSL No.<br>65689 | 8 to 13 inches, brown (10YR 5/3) clay, dark brown (10YR 4/3) when moist, organic stain on surfaces of peds is very dark brown (10YR 2/2) both dry and moist; weak coarse prismatic structure that breaks to strong medium angular blocky; very hard, firm, sticky and very plastic; few fine roots; few fine tubular and common fine interstitial pores; continuous thick clay films on ped faces; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B22t<br>RSL No.<br>65690 | 13 to 19 inches, dark grayish brown (10YR 4/2) gravelly clay, dark grayish brown (10YR 4/2) when moist, organic stain on surface of peds is very dark brown (10YR 2/2) both dry and moist; massive breaking to strong medium and coarse angular blocky structure; very hard, firm, sticky and very plastic; few fine roots; few fine tubular and common fine interstitial pores; continuous thick clay films on ped faces; noneffervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| B3<br>RSL No.<br>65691 | 19 to 28 inches, dark brown (10YR 3/3) very gravelly clay, yellowish brown (10YR 5/4) when moist; massive; very hard, firm, sticky and plastic; few fine roots; many fine interstitial pores; common moderately thick clay film in pores; gravel is pale brown (10YR 6/3) dry or moist, weathered tuff; noneffervescent; moderately alkaline (pH 8.0) abrupt wavy boundary. |
| R<br>RSL No.<br>65692 | 28 to 34 inches +, very pale brown (10YR 7/3) tuff that is slightly weathered on the surface, dark brown (10YR 4/3) when moist; massive; extremely hard, extremely firm; filaments of lime on the underside of interfaces. |

1/ The Cambern series is in a fine-loamy, mixed family of Argic Pachic Cryoborolls. This pedon has a mollic epipedon that is only 10 inches thick.

The B3 horizon consists of weathered tuff with tongues of the B22t surrounding all weathered pieces.

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Brolliar clay loam **LOCATION** Coconino County, Arizona

SOIL FAMILY: Argic Cryoboroll, fine, montmorillonitic

SOIL NOS. S56Ariz-3-8 **LAB. NOS.** 561103-561110

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 3A1 0.2-0.02 | 0.02-0.002 | 1/ > 2 | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1½-0 | O2 | Did not run - Organic Matter | | | | | | | | | | |
| 0-1 | A11 | 1.0 | 3.6 | 2.6 | 2.5 | 6.8 | 63.2 | 20.3 | 39.9 | 31.4 | 0 | sil |
| 1-4 | A12 | 0.7 | 3.2 | 2.5 | 2.4 | 5.7 | 59.3 | 26.2 | 34.4 | 31.8 | 4 | sil |
| 4-10 | B1t | 1.6 | 3.5 | 2.5 | 2.0 | 4.8 | 55.9 | 29.7 | 31.4 | 30.4 | 1 | sicl |
| 10-18 | B21t | 0.1 | 0.5 | 0.5 | 0.9 | 2.6 | 27.0 | 68.4 | 14.3 | 15.7 | <1 | c |
| 18-32 | B22t | 0.1 | 0.2 | 0.2 | 0.7 | 2.1 | 25.8 | 70.9 | 11.6 | 16.7 | 1 | c |
| 32-35 | C+R | 0.9 | 1.0 | 0.6 | 1.2 | 2.8 | 36.4 | 57.1 | 17.3 | 22.7 | 35 | c |
| 35+ | Dr | not analyzed | | | | | | | | | | |

| 8C1a pH 1:1 | pH 1:5 | pH 1:10 | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a Free Iron $\%Fe_2O_3$ | ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C | 2/ $H_2O$ % | 4A2a Bulk Density g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Organic - did not run. | | | | | | | | | -- | | | |
| 5.9 | | | 3.21 | 0.113 | 28 | 3.5 | | 2.6 | 1.45 | | | |
| 5.6 | | | 2.39 | 0.075 | 32 | 3.6 | | 1.3 | 1.58 | | | |
| 5.5 | | | 1.35 | 0.062 | 22 | 3.8 | | 2.3 | 1.67 | | | |
| 5.7 | | | 0.91 | 0.062 | 15 | 3.1 | | 13.2 | 1.66 | | | |
| 6.2 | | | 0.89 | 0.050 | 18 | 2.5 | | 9.5 | 1.84 | | | |
| 6.7 | | | 0.76 | 0.037 | 20 | 1.8 | | 10.8 | 1.79 | | | |

| 5A3a CATION EXCHANGE CAPACITY Sum | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q1a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|
| | ← milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | |
| -- No analysis -- | | | | | | | | |
| 33.7 | 14.8 | 7.0 | 11.1 | 0.07 | 0.75 | 67 | | |
| 32.0 | 13.7 | 6.1 | 11.7 | 0.09 | 0.43 | 63 | | |
| 33.0 | 15.8 | 6.7 | 10.3 | 0.02 | 0.17 | 69 | | |
| 54.6 | 29.6 | 14.8 | 9.3 | 0.27 | 0.60 | 83 | | |
| 64.0 | 35.3 | 21.2 | 6.4 | 0.47 | 0.64 | 90 | | |
| 60.8 | 36.3 | 19.9 | 3.3 | 0.58 | 0.76 | 94 | | |

1/ Percent of <1-inch material

2/ $H_2O$ content at corresponding bulk density

## BROLLIAR CLAY LOAM*
S56Ariz-3-8

Location: Coconino County, Arizona. In the SE ¼ SE ¼ Sec. 16, T. 17 N., R. 9 E. 105 feet west of the gravelled highway, 4.1 miles south of the southern tip of Mormon Lake. About 21 miles south southeast of Flagstaff. Date of Sampling: September 22, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Open stand of ponderosa pine, with sparse understory of pine reproduction, mountain muhly, fescue, few annual weeds. Has been logged, at least partly, at some time in the past. Site index of 59 for ponderosa pine. No evidence of burning. Climate: Estimated 22 to 23 inches percipitation per year. Nearest weather station (Flagstaff): Mean annual temperature 44° F.; January average 24° F.; July average 56° F.; mean annual precipitation 20.27 inches. Parent Material: Residium from weathering of olivine basalt, probably with some weathered cinders and ash. Relief: Rolling and hilly upland (old volcano field). 4 percent slope, slightly convex, toward the northwest. Elevation: About 7,400 feet. Drainage: Well drained (well aerated). Medium runoff. Very slow or slow permeability.
Remarks: Pebbles and stones of basalt are scattered through the profile. A moderate number of basalt cobbles, stones and boulders lie on the surface at this site; in some nearby spots the soil is very stony. Intended to pair with profile S56Ariz-3-9 but the correspondence is not good.
Classification: Argic Cryoboroll, fine, montmorillonitic.

| HORIZON | DESCRIPTION |
|---|---|
| O1 | 3-1½" -- Pine needles, twigs and branches. Abrupt, smooth boundary. |
| (Not Sampled) | |
| O2 | 1½-0" -- Mor humus layer that is nearly black (10YR 2/1.5) when moist. Abrupt, smooth |
| BSL No. 561103 | lower boundary. |
| A11 | 0-1" -- Brown (9YR 5/3) clay loam, dark brown (9YR 3/3) when moist; moderate fine platy |
| BSL No. 561104 | structure; hard, friable, plastic, sticky; common roots; common medium, fine and very fine tubular pores; many black hard spherical concretions ¼ to 1 mm in diameter; abrupt, smooth lower boundary. |
| A12 | 1-4" -- Dark brown (9YR 4/3) clay loam, very dark brown (9YR 2/2) when moist; with common |
| BSL No. 561105 | faint grayish patches on ped surfaces; weak coarse prismatic, breaking to weak coarse subangular blocky and finally to moderate medium and fine platy structure; very hard, firm, plastic, sticky; many roots; no clay skins; common medium, fine and very fine tubular pores; many hard black and dark reddish brown spherical concretions ¼ to 1 mm in diameter; clear, wavy lower boundary. |
| B1t | 4-10" -- Dark brown (7.5YR 4/3) heavy clay loam, very dark brown (7.5YR 2.5/3) when moist; |
| BSL No. 561106 | weak coarse prismatic, breaking to moderate coarse and medium subangular blocky structure; very hard, firm, very plastic, sticky; has faint grayish patches and threads on and in the peds; many roots (moist) of any horizon; few thin patchy clay skins on vertical surfaces and in pores; many medium, fine and very fine tubular pores; many hard black and dark reddish brown spherical concretions ¼ to 1 mm in diameter; clear, wavy lower boundary. |
| B21t | 10-18" -- Reddish brown (6YR 4/3) clay, dark reddish brown (6YR 3.5/3) when moist; weak |
| BSL No. 561107 | very coarse prismatic, breaking to weak coarse and medium, angular and subangular blocky structure; few small slickensides; extremely hard, very firm, very plastic, very sticky; common roots; thin patchy clay skins on all surfaces and in pores; few fine and very fine tubular pores; common roots; very few pieces of charcoal 1 to 2 mm in diameter; few hard black and dark reddish brown spherical concretions 1/4 to 3/4 mm in diameter; gradual wavy lower boundary. |
| B22t | 18-32" -- Dark brown (7.5YR 4/2.5 dry, 4/3, moist) clay; many moderately large intersect- |
| BSL No. 561108 | ing slickensides produce an imbricated mass of overlapping, crude, thick lozenge-shaped aggregates; extremely hard, very firm, very plastic, very sticky; many moderately thick patches of clay skins on all surfaces and in pores; few fine and very fine tubular pores; few black spherical concretions 1/4 to 3/4 mm in diameter; few roots; gradual wavy lower boundary. |
| C + R | 32-35" -- Coarsely mottled dark reddish gray (5YR 4.5/2) and dark brown (7.5YR 4/2) clay, |
| BSL No. 561109 | reddish brown (5YR 4/3) and dark brown (7.5YR 3/2) when moist, with numerous pebbles and cobbles of hard weathered basalt; common small slickensides produce imbricated mass; extremely hard, very firm, very plastic, very sticky; common patchy clay skins on all surfaces and in pores; very few roots; few hard black spherical concretions less than ½ mm in diameter; abrupt, irregular lower boundary. |
| Dr(?) | 35"+ -- Hard, weathered, dark gray olivine basalt. |
| BSL No. 561110 | |

*Identified in original notes as Unnamed Podzolic Soil

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Brolliar clay loam **LOCATION** Coconino County, Arizona

SOIL FAMILY: Argic Cryoboroll, fine, montmorillonitic

SOIL NOS. S56Ariz-3-9 **LAB. NOS.** 561111-561119

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | 2A2 > 2 1/ | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1½ | $A_2$ | 0.9 | 2.1 | 2.1 | 4.1 | 7.9 | 63.1 | 19.8 | 39.3 | 34.2 | 3 | sil |
| 1½-3 | $A_3$ | 0.5 | 1.9 | 2.1 | 3.6 | 7.3 | 59.0 | 25.6 | 35.7 | 32.7 | 3 | sil |
| 3-7 | $B_1$ | 0.4 | 2.0 | 2.3 | 3.7 | 6.6 | 54.9 | 30.1 | 32.7 | 30.8 | 5 | sicl |
| 7-10 | $B_{21t}$ | 0.4 | 1.8 | 2.2 | 3.8 | 7.0 | 47.2 | 37.6 | 29.4 | 27.1 | 2 | sicl |
| 10-14 | $B_{22t}$ | 0.3 | 1.0 | 1.2 | 2.6 | 4.5 | 31.0 | 59.4 | 19.0 | 18.2 | 0 | c |
| 14-25 | $B_{23t}$ | 0.4 | 1.0 | 1.3 | 3.0 | 4.2 | 28.8 | 61.3 | 16.1 | 18.7 | 0 | c |
| 25-36 | $B_{24t}$ | 0.6 | 1.3 | 1.6 | 3.4 | 4.3 | 31.5 | 57.3 | 17.6 | 20.1 | 2 | c |
| 36-60 | $C_1$ | not analyzed | | | | | | | | | | |
| 60-72+ | $C_2$ | not analyzed | | | | | | | | | | |

| pH 8C1a 1:1 | 1:5 | 1:10 | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a Free Iron $\%Fe_2O_3$ | ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C. | 2/ $H_2O$ % | 4A2a Bulk Density g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.0 | | | 3.03 | 0.103 | 29 | 4.0 | | | -- | | | |
| 6.0 | | | 2.24 | 0.067 | 33 | 4.4 | | 3.63 | 1.52 | | | |
| 5.7 | | | 1.81 | 0.083 | 22 | 4.2 | | 1.57 | 1.46 | | | |
| 6.0 | | | 1.39 | 0.065 | 21 | 4.5 | | 2.42 | 1.68 | | | |
| 5.9 | | | 0.98 | 0.053 | 18 | 3.4 | | 4.72 | 1.88 | | | |
| 6.8 | | | 0.60 | 0.042 | 14 | 2.7 | | 5.75 | 1.88 | | | |
| 7.2 | | | 0.40 | 0.031 | 13 | 3.0 | | 4.64 | 1.92 | | | |

| 5A3a CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q1a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE Na | K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | | |
| 36.6 | 16.3 | 6.0 | 13.5 | 0.01 | 0.78 | 63 | | | |
| 35.0 | 16.5 | 6.2 | 11.6 | 0.01 | 0.70 | 67 | | | |
| 36.7 | 17.5 | 7.6 | 11.1 | 0.01 | 0.50 | 70 | | | |
| 40.8 | 19.5 | 10.2 | 10.6 | 0.01 | 0.46 | 74 | | | |
| 57.8 | 29.4 | 18.1 | 9.6 | 0.09 | 0.56 | 83 | | | |
| 60.6 | 34.2 | 21.2 | 4.5 | 0.17 | 0.51 | 92 | | | |

1/ Percent of <1-inch material

2/ $H_2O$ content at corresponding bulk density

## BROLLIAR CLAY LOAM*
S56Ariz-3-9

Location: Coconino County, Arizona. 275 feet east of Mormon Lake highway, in the SW ¼ SW ¼ Sec. 22, T. 17 N., R. 9 E. 5.1 miles south of the southern tip of Mormon Lake. 22 miles south southeast of Flagstaff. Date of Sampling: September 22, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Ponderosa pine, open stands in places, rather dense stand in others; sparse understory of pine reproduction, mountain muhly, bromegrass and locust (Robinia sp.). Climate: Estimated 22 to 23 inches precipitation per year. Nearest weather station (Flagstaff): Mean annual temperature 44° F.; January average 24° F.; July average 56° F.; mean annual precipitation 20.27 inches. Parent Material: Weathered volcanic cinders and ash, with little admixture of weathered basalt. Relief: Rolling upland, in an old volcano field. 2 percent slope, slightly convex, towards the south. Elevation: About 7,500 feet. Drainage: Well drained (well aerated). Medium runoff. Slow or very slow permeability.
Remarks: Intended to pair with profile S56Ariz-3-8, but the correspondence is not good. Profile is noncalcareous throughout.
Classification: Argic Cryoboroll, fine, montmorillonitic.

| HORIZON | DESCRIPTION |
|---|---|
| O1 | ½-0" -- Loose pine needles. Not sampled. |
| A2<br>BSL No.<br>561111 | 0-1½" -- Brown (9YR 4/3) silt loam or heavy loam, dark brown (9YR 2.5/2) when moist; moderate fine platy structure; slightly hard, friable, plastic, slightly sticky; many roots; common medium, fine and very fine tubular pores; few hard black and dark red spherical concretions; abrupt, slightly wavy lower boundary. |
| A3<br>BSL No.<br>561112 | 1½-3" -- Dark brown (7.5YR 3.5/3) silty clay loam, dark reddish brown (6YR 3/2) when moist; moderate coarse and medium subangular blocky, breaking to moderate medium platy, and finally to weak fine granular structure; very hard, friable, very plastic, very sticky; many roots; many worm casts; many medium, fine and very fine tubular and interstitial pores; few hard black and dark red spherical concretions; clear, slightly wavy lower boundary. |
| B1<br>BSL No.<br>561113 | 3-7" -- Dark reddish gray (6YR 3.5/2) heavy clay loam, dark reddish brown (5YR 3/2) when moist; weak very coarse prismatic, breaking to moderate medium and fine subangular blocky, and finally to weak fine granular structure; very hard, friable, very plastic, very sticky; no clay skins observed; many fine and very fine tubular and interstitial pores; many roots; few hard black and dark red spherical concretions 1/4 to 1 mm in diameter; contains a few small grains that look like quartz; clear, slightly wavy lower boundary. |
| B21t<br>BSL No.<br>561114 | 7-10" -- Dark reddish gray (5YR 4/2) clay, dark reddish brown (5YR 3/2) when moist; weak very coarse prismatic, breaking to strong fine and very fine blocky structure; extremely hard, very firm, very plastic, very sticky; thin patchy clay skins on all surfaces and in pores; many roots; common fine and very fine tubular pores; common hard black and dark red spherical concretions ¼ to 1 mm in diameter; contains a few grains that seem to be quartz; gradual, wavy lower boundary. |
| B22t<br>BSL No.<br>561115 | 10-14" -- Reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/3) when moist, with common medium and coarse mottles of dark reddish gray (dry); weak very coarse prismatic breaking to moderate medium blocky structure; extremely hard, very firm, very plastic, very sticky; thin patchy clay skins on all surfaces and in pores; few small slickensides; common roots; few fine and very fine tubular pores; common hard black spherical concretions ¼ to 1 mm in diameter; gradual, wavy lower boundary. |
| B23t<br>BSL No.<br>561116 | 14-25" -- Reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/4) when moist; common intersecting slickensides produce crude, thick, lozenge-shaped aggregates; extremely hard, very firm, very plastic, very sticky; few roots; common fine and very fine tubular pores; common hard black spherical concretions ¼ to 1 mm in diameter; arbitrary lower boundary (for sampling). |
| B24t<br>BSL No.<br>561117 | 25-36" -- Reddish brown (5YR 3.5/3) clay, dark reddish brown (5YR 3/4) when moist; common intersecting slickensides produce crude, thick lozenge-shaped aggregates; extremely hard, very firm, very plastic, very sticky; few roots; few fine and very fine tubular pores; common bits of weathered basalt and cinders; common hard black spherical concretions ¼ to 1 mm in diameter; gradual, wavy lower boundary. |
| C1<br>BSL No.<br>561118 | 36-60" -- Very porous, strongly weathered cinders that are mottled strong brown and dark brown when dry, strong brown and dark yellowish brown when moist. Consists of gritty, earthy material around dark gray weathered cinders; cinders can be broken in the hand; contains clayey bands that resemble the material of the B24t horizon; thin patchy clayskins on some surfaces; pinkish clay can be seen forming in pores of cinders; gradual lower boundary. |
| C2<br>BSL No.<br>561119 | 60-72"+ -- Fresher, weathered cinders; strong brown and yellowish brown when dry, strong brown and dark yellowish brown when moist; consists of gritty, earthy material around hard, dark gray weathered cinders; massive, slightly coherent. |

*Identified in original notes as Unnamed Podzolic Soil

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Argic Cryoboroll, fine, montmorillonitic

SOIL Friana loam (taxadjunct) SOIL Nos. S62Ariz-3-19 LOCATION Coconino County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62265 - 62271

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: > 2* | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0- 3 | A11 | 15.3 | 57.3 | 27.4 | 1.4 | 3.4 | 2.3 | 3.8 | 4.4 | 21.0 | 36.3 | 27.4 | 10.9 | | | 2 | | |
| 3-11 | A12 | 17.0 | 52.3 | 30.7 | 2.4 | 3.9 | 2.7 | 3.5 | 4.5 | 18.8 | 33.5 | 25.3 | 12.5 | | | 9 | | |
| 11-20 | B1 | 26.7 | 35.7 | 37.6 | 6.0 | 7.0 | 2.9 | 4.6 | 6.2 | 16.0 | 19.7 | 25.0 | 20.5 | | | 30 | | |
| 20-38 | B21t | 8.0 | 39.6 | 52.4 | 0.5 | 1.4 | 0.9 | 1.9 | 3.3 | 16.5 | 23.1 | 21.0 | 4.7 | | | 8 | | |
| 38-55 | B22t | 9.5 | 37.2 | 53.3 | 1.2 | 1.7 | 1.1 | 2.1 | 3.4 | 14.5 | 22.7 | 19.2 | 6.1 | | | 7 | | |
| 55-74 | C1 | 54.2 | 34.7 | 11.1 | 0.5 | 3.7 | 7.6 | 24.2 | 18.2 | 19.3 | 15.4 | 51.3 | 36.0 | | | 4 | | |
| 74-92+ | C2 | 59.1 | 33.0 | 7.9 | 0.6 | 4.7 | 10.7 | 25.5 | 17.6 | 17.7 | 15.3 | 49.1 | 41.5 | | | 5 | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | Carbonate as $CaCO_3$ | Bulk density | | | Water content: 4B2 15 bar | | pH: 8C1b Sat. Paste | 8C1c 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | Pct. | Pct. | | |
| 0- 3 | 3.96 | 0.208 | 19 | 3.5 | | | | | 15.3 | | 6.3 | 6.8 |
| 3-11 | 1.77 | 0.134 | 13 | 3.3 | | | | | 15.6 | | 6.1 | 6.7 |
| 11-20 | 0.70 | 0.065 | 11 | 5.5 | | | | | 17.5 | | 6.3 | 6.9 |
| 20-38 | 0.21 | | | 2.4 | | | | | 24.8 | | 7.1 | 7.8 |
| 38-55 | 0.12 | | | 2.6 | | | | | 25.4 | | 7.4 | 8.1 |
| 55-74 | 0.04 | | | 1.7 | | | | | 27.3 | | 7.4 | 8.0 |
| 74-92+ | 0.03 | | | 1.7 | | | | | 24.8 | | 7.2 | 7.9 |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 6H2a Ext. Acidity | Cation Exch. Capacity 5A2a NaOAc | Water extract from saturated paste: Ca | Mg | Na | K | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0- 3 | 20.0 | 8.2 | 0.2 | 0.7 | 11.4 | 39.0 | | | | | | | | | |
| 3-11 | 18.3 | 8.5 | 0.2 | 0.2 | 8.6 | 35.9 | | | | | | | | | |
| 11-20 | 18.0 | 8.8 | 0.4 | 0.2 | 8.5 | 36.6 | | | | | | | | | |
| 20-38 | 28.2 | 16.1 | 0.6 | 0.4 | 2.9 | 49.0 | | | | | | | | | |
| 38-55 | 28.3 | 17.8 | 0.8 | 0.5 | 1.4 | 50.1 | | | | | | | | | |
| 55-74 | 32.4 | 35.0 | 1.1 | 0.4 | 2.8 | 73.2 | | | | | | | | | |
| 74-92+ | 37.4 | 25.6 | 1.2 | 0.4 | 2.7 | 69.4 | | | | | | | | | |

| Depth (In.) | Water at Saturation Pct. | Exchangeable Na Pct. | | Gypsum Pct. | 5C3 Base Sat. (sum) Pct. | | |
|---|---|---|---|---|---|---|---|
| 0- 3 | | | | | 72 | | |
| 3-11 | | | | | 76 | | |
| 11-20 | | | | | 76 | | |
| 20-38 | | | | | 94 | | |
| 38-55 | | | | | 97 | | |
| 55-74 | | | | | 98 | | |
| 74-92+ | | | | | 96 | | |

* Percent of <19 mm.; see profile description for estimates of >19 mm.

## FRIANA LOAM (taxadjunct) 1/
S62Ariz-3-19

Location: Beaver Creek Area, Arizona. NE 1/4 of SW 1/4, Sec. 12, T16N, R9E, Coconino County, Arizona, Photo DGJ-9-86. 18 miles E. and 27 miles S. of Flagstaff, Arizona. Date of Sampling: June 5, 1962.
Collectors: M.S. James, Y.H. Havens, Stanley Buol, L.H. Grant, Truman Anderson, R.E. Nelson and J.E. Jay.
Classification: Argic Cryoboroll, fine, montmorillonitic.
Vegetation: Western wheatgrass, pussytoes, Arizona bluegrass and dandelion. Use: Rangeland. Climate: 20-22" precipitation - subhumid, mean annual temperature 45°F. Parent Material: Ash, cinders and tuff. Elevation: 7200 feet. Relief: Nearly level, 0-1 percent slope. Drainage: Well (?) drained, slow permeability.
Remarks: Modal profile.

| HORIZON | DESCRIPTION |
|---|---|
| A11 RSL 62265 | 0 to 3 inches, brown-dark brown (10YR 4/3) loam, dark brown (7.5YR 3/2) moist; moderate medium and coarse platy structure breaking to moderate fine granular structure; hard, friable, slightly sticky and plastic; plentiful fine and few medium roots; few fine tubular and many fine interstitial pores; few fine gravel; slightly acid (pH 6.5); abrupt wavy boundary. |
| A12 RSL 62266 | 3 to 11 inches, brown-dark brown (7.5YR 4/2) loam, dark reddish brown (5YR 3/2) moist; weak fine and medium subangular blocky structure breaking to moderate fine granular structure; hard, friable, sticky and plastic; plentiful fine and few medium roots; few fine tubular and many fine interstitial pores; slightly acid (pH 6.5); gradual wavy boundary. |
| B1 RSL 62267 | 11 to 20 inches, reddish brown (5YR 4/3) clay loam or light clay, dark reddish brown (5YR 3/4) moist; weak coarse prismatic structure breaking to moderate medium and coarse subangular blocky structure; thin patchy clay films; hard, friable, slightly sticky and plastic; plentiful fine and few medium roots; few fine tubular and many fine interstitial pores; common fine gravel; few fine manganese shots; slightly acid (pH 6.5); noneffervescent; gradual wavy boundary. |
| B21t RSL 62268 | 20 to 38 inches, reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/4) moist; weak coarse prismatic structure in upper B2 and strong medium to coarse angular blocky structure which breaks to strong fine angular blocky structure; very hard, friable, very sticky and very plastic; continuous clay films; common slickensides 3" across; few fine roots; few fine tubular and common fine interstitial pores; common fine manganese shots; moderately alkaline (pH 8.0); noneffervescent; clear irregular boundary. |
| B22t RSL 62269 | 38 to 55 inches, same as above horizon. This horizon was divided 20-38" and 38-55" for characterization samples. |
| C1 RSL 62270 | 55 to 74 inches, brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 4/4) moist, with many fine reddish yellow (7.5YR 6/8) and gray weathered cinder fragments; this horizon consists of weathered ash, cinders, and tuff; some clay in cracks and seams; massive; very hard, firm, nonsticky and slightly plastic; few fine roots; many fine tubular and few fine interstitial pores; moderately alkaline (pH 8.0); noneffervescent. |
| C2 RSL 62271 | 74 to 92 inches +, same as above horizon (55-74"). The C1 horizon was divided for characterization samples. |

1/ Friana is in a fine, montmorillonitic family of Argic Pachic Cryoborolls. This pedon has a chroma of 4 below 11 inches.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Argic Cryoboroll, fine, montmorillonitic
SOIL Luna sandy loam (taxadjunct) SOIL Nos. S65Ariz-1-16 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65693 - 65699

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments 1A2a: > 2 Pct. | 2 – 19 Pct. of < 76mm | 19 – 76 Pct. of < 76mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0- 3 | A11 | 58.9 | 24.4 | 16.7 | 3.9 | 5.4 | 10.2 | 29.8 | 9.6 | 11.6 | 12.8 | 37.3 | 49.3 | 0 | 17 | | | |
| 3- 7 | A12 | 57.1 | 22.6 | 20.3 | 3.9 | 4.7 | 9.8 | 29.8 | 8.9 | 10.5 | 12.1 | 35.5 | 48.2 | 0 | 20 | | | |
| 7-14 | B21t | 34.3 | 20.9 | 44.8 | 0.9 | 1.9 | 5.5 | 18.7 | 7.3 | 8.6 | 12.3 | 26.7 | 27.0 | 0 | 45 | | | |
| 14-21 | B22t | 35.3 | 24.5 | 40.2 | 0.6 | 1.6 | 4.4 | 19.2 | 9.5 | 10.6 | 13.9 | 31.9 | 25.8 | 0 | 40 | | | |
| 21-28 | B3 | 50.3 | 17.6 | 32.1 | 4.9 | 5.4 | 8.3 | 23.9 | 7.8 | 7.3 | 10.3 | 28.0 | 42.5 | 0 | 32 | | | |
| 28-41 | R1 | | | | | | | | | | | | | | | | | |
| 41-54 | R2 | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct | 6B1a Nitrogen Pct. | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | Bulk density: g/cc | 3B2 1/ Cm | Water content: Pct. | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 3 | 1.40 | 0.098 | 14 | 1.0 | - | 1.54 | 1.66 | | 1.00 | | 17.8 | 8.8 | 0.025 | 0.025 | 6.2 | | |
| 3- 7 | 1.01 | 0.088 | 11 | 0.9 | - | | | | | | | 10.1 | | | 6.0 | | |
| 7-14 | 0.68 | | | 0.8 | - | | | | | | | 21.2 | | | 6.4 | | |
| 14-21 | 0.36 | | | 0.2 | - | 1.45 | 1.81 | | 1.00 | | 27.1 | 20.3 | 0.078 | 0.078 | 7.0 | | |
| 21-28 | 0.19 | | | 0.3 | - | | | | | | | 15.6 | | | 7.6 | | |
| 28-41 | | | | 0.4 | - | 1.52 | 1.60 | | 1.00 | | 20.4 | 12.5 | 0.017 | 0.017 | | | |
| 41-54 | | | | 1.2 | - | 1.68 | 1.78 | | 1.00 | | 17.6 | 11.7 | 0.020 | 0.020 | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 $NH_4OAc$ Pct | 5C3 Sum Pct. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | |
| 0- 3 | 8.6 | 3.5 | 0.3 | 0.6 | 13.0 | 4.8 | 15.9 | 17.8 | | 82 | 73 |
| 3- 7 | 9.6 | 3.9 | 0.4 | 0.3 | 14.2 | 4.6 | 18.1 | 18.8 | | 78 | 76 |
| 7-14 | 20.6 | 10.5 | 0.9 | 0.5 | 32.5 | 5.0 | 37.0 | 37.5 | | 88 | 87 |
| 14-21 | 21.2 | 11.0 | 1.1 | 0.4 | 33.7 | | 35.5 | | | 95 | |
| 21-28 | 19.4 | 9.6 | 1.4 | 0.4 | 30.8 | | 28.7 | | | 100+ | |
| 28-41 | | | | | | | | | | | |
| 41-54 | | | | | | | | | | | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| 0- 3 | xxx | | | t | |
| 3- 7 | | | | | |
| 7-14 | | | | | |
| 14-21 | xxxx | | | t | |
| 21-28 | | | | | |
| 28-41 | | | | | |
| 41-54 | | | | | |

1/ >2 mm not determined; data based on crushed samples of the whole soil.
Some of the >2 mm particles do not slake in water but they cannot be separated consistently in sample preparation. All >2 mm fragments resemble the fine earth (<2 mm ) fraction in water retention and chemical properties.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## LUNA SANDY LOAM (taxadjunct) 1/
S65Ariz-1-16

Location: Apache County, Arizona. A pit located 924 feet east and 20 feet north of the east quarter corner of Section 18, T. 5 N., R. 31 E. About 2½ miles southeast of Alpine, south of U. S. Highway 180. Date of Sampling: September 23, 1965.
Collectors: M.L. Miller, K.N. Larson, J.E. Jay, R.E. Nelson, and B. Brasher.
Vegetation: Cultivated field that was seeded to grass more than 5 years ago. Present vegetation is a 32 percent basal cover of smooth brome, ryegrass, and alta fescue. Climate: 22 inches ppt. 43.4° F. approximate M.A.T. Parent Material: Basic ash-flow tuff. Relief: Low ridges, smooth convex 2 percent slope with north aspect at pit site. Elevation: 8000 feet. Drainage: Runoff is medium. Soil is well drained. Ground water is deep. Permeability is slow to very slow.
Remarks: Depth to the R horizon ranges from 20 to 30 inches in this area. Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate was obtained by observing reaction to dilute HCl. Paired pedon is sample No. S65 Ariz-1-17. This pedon has a mollic epipedon and an argillic horizon. The mean summer soil temperature at 20-inch depth is probably less than 60° F.
Classification: Argic Cryoboroll, fine, montmorillonitic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>65693 | 0 to 3 inches, very dark grayish brown (10YR 3/2) heavy fine sandy loam, very dark brown (10YR 2/2) when moist; weak fine and medium platy structure that breaks to moderate and strong fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; abundant fine roots; few fine tubular pores; 10 percent cover of gravel on surface; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| A12<br>RSL No.<br>65694 | 3 to 7 inches, very dark grayish brown (10YR 3/2) clay loam, very dark brown (10YR 2/2) when moist; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and plastic; abundant fine roots; few fine tubular pores; noneffervescent; medium acid (pH 6.0); abrupt wavy boundary. |
| B21t<br>RSL No.<br>65695 | 7 to 14 inches, dark brown (10YR 3/3) clay, dark brown (10YR 3/3) when moist; organic stain on surfaces of peds is brown (10YR 4/3) both dry and moist; moderate coarse prismatic structure, breaking to strong medium and coarse angular blocky; very hard, firm, sticky and very plastic; plentiful fine roots; common fine interstitial, and few fine and medium tubular pores; thick continuous clay film on ped faces; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B22t<br>RSL No.<br>65696 | 14 to 21 inches, brown (10YR 5/3) clay, brown (10YR 5/3) when moist; organic stain on surfaces of peds is brown (10YR 5/3), brown (10YR 4/3) when moist; weak coarse prismatic structure breaking to strong fine, medium and coarse angular blocky; very hard, firm, sticky and very plastic; plentiful fine roots; few fine tubular and common fine interstitial pores; many thick clay films on ped faces and in pores; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B3<br>RSL No.<br>65697 | 21 to 28 inches, weathered tuff, crushes to brown (7.5YR 4/4) sandy clay loam, brown (10YR 5/3) when moist; surfaces of peds are dark brown (7.5YR 3/2) dry or moist, massive to weak very coarse angular blocky (rock structure), very hard, firm, sticky and plastic; few fine roots; common fine interstitial and few fine tubular pores; common thick clay films on ped faces; noneffervescent; moderately alkaline (pH 8.0); abrupt wavy boundary. |
| R1<br>RSL No.<br>65698 | 28 to 41 inches, very pale brown (10YR 7/3) slightly cemented tuff, brown (10YR 5/3) when moist; massive; extremely hard, firm, nonsticky and nonplastic; filaments of lime in crevices; noneffervescent to strongly and violently effervescent in crevices; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| R2<br>RSL No.<br>65699 | 41 to 54 inches +, very pale brown (10YR 7/3) strongly cemented tuff, brown (10YR 5/3) when moist; massive (somewhat platy); extremely hard, extremely firm; this layer is similar to the R horizon in matched pit. |

1/ The Luna series is in a fine, montmorillonitic family of Argic Pachic Cryoborolls. This pedon has a mollic epipedon that is only 12 inches thick.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Argic Pachic Cryoboroll, fine-loamy, mixed
SOIL Cambern sandy loam SOIL Nos. S65Ariz-1-18 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65666 - 65671

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments 1A2a: > 2 Pct. | 2 – 19 Pct. of < 2 mm | 19 – 76 Pct. of < 76mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0- 3 | A11 | 55.5 | 30.8 | 13.7 | 3.2 | 7.8 | 7.0 | 18.5 | 19.0 | 17.1 | 13.7 | 46.8 | 36.5 | 0 | 14 | | | |
| 3-10 | A12 | 57.3 | 29.1 | 13.6 | 2.2 | 7.2 | 7.0 | 20.7 | 20.2 | 16.5 | 12.6 | 49.8 | 37.1 | 0 | 14 | | | |
| 10-14 | B1 | 46.5 | 32.4 | 21.1 | 3.3 | 7.0 | 5.8 | 14.8 | 15.6 | 17.9 | 14.5 | 42.6 | 30.9 | 0 | 21 | | | |
| 14-20 | B21t | 37.8 | 35.0 | 27.2 | 2.7 | 6.0 | 4.8 | 11.9 | 12.4 | 16.8 | 18.2 | 36.4 | 25.4 | 0 | 27 | | | |
| 20-22 | B22t | 40.0 | 33.6 | 26.4 | 3.5 | 6.9 | 5.2 | 12.5 | 11.9 | 13.3 | 20.3 | 32.6 | 28.1 | 0 | 26 | | | |
| 22-34 | R | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | Bulk density: g/cc | 3B2 1/ Cm | Water content: Pct. | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 3 | 2.63 | 0.162 | 16 | 0.9 | - | 1.20 | 1.25 | | 1.00 | | 16.2 | 10.8 | 0.015 | 0.015 | 6.2 | | |
| 3-10 | 1.53 | 0.092 | 17 | 0.9 | - | 1.33 | 1.41 | | 1.00 | | 16.9 | 9.9 | 0.018 | 0.018 | 6.4 | | |
| 10-14 | 1.14 | | | 0.9 | - | 1.32 | 1.45 | | 1.00 | | 21.4 | 12.9 | 0.033 | 0.033 | 6.7 | | |
| 14-20 | 1.05 | | | 1.0 | - | 1.36 | 1.55 | | 1.00 | | 25.9 | 15.8 | 0.045 | 0.045 | 6.8 | | |
| 20-22 | 0.80 | | | 1.2 | - | 1.38 | 1.56 | | 1.00 | | 26.4 | 16.4 | 0.042 | 0.042 | 6.8 | | |
| 22-34 | | | | 0.4 | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 $NH_4OAc$ Pct. | 5C3 Sum Pct |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | |
| 0- 3 | 13.1 | 4.4 | 0.3 | 3.3 | 21.1 | 6.4 | 23.9 | 27.5 | | 88 | 77 |
| 3-10 | 12.5 | 4.3 | 0.4 | 2.4 | 19.6 | 4.4 | 22.1 | 24.0 | | 89 | 82 |
| 10-14 | 15.8 | 6.4 | 0.4 | 1.5 | 24.1 | 3.6 | 26.4 | 27.7 | | 91 | 87 |
| 14-20 | 19.5 | 8.6 | 0.5 | 1.1 | 29.7 | 3.8 | 31.3 | 33.5 | | 95 | 89 |
| 20-22 | 20.2 | 9.4 | 0.6 | 1.0 | 31.2 | 4.3 | 33.1 | 35.5 | | 94 | 88 |
| 22-34 | | | | | | | | | | | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |
| 0- 3 | xx | | | |
| 3-10 | | | | |
| 10-14 | | | | |
| 14-20 | | | | |
| 20-22 | xxxx | | | |
| 22-34 | | | | |

1/ >2 mm not determined; data based on crushed samples of the whole soil.

Some of the >2 mm particles do not slake in water but they cannot be separated consistently in sample preparation. All >2 mm fragments resemble the fine earth (<2 mm ) fraction in water retention and chemical properties.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

Micromorphology

65666 Weathered basic tuff fragments.

65670 Many thin to moderately thick clay skins in pores.

## CAMBERN SANDY LOAM
S65Ariz-1-18

Location: Apache County, Arizona. A pit located 300 feet south and 50 feet west of the southeast corner of Section 16, T. 5 N., R. 31 E., about 3 miles east of Alpine.
Date of Sampling: September 23, 1965.
Collectors: M.L. Miller, K.N. Larson, J.E. Jay, R.E. Nelson, and B. Brasher.
Vegetation: Never cultivated. Ponderosa pine-grass aspect with 45 percent pine crown cover and 27 percent grass basal cover. Mountain muhly, squirreltail. annual weeds, Ponderosa pine. Climate: 22 inches ppt. 43.4° F. approximate M.A.T.
Parent Material: Shallow local colluvial and alluvial material from and on Tertiary age basic ash-flow tuff. Relief: Side slope of mountain valley, smooth convex 11 percent slope with northeast aspect at pit site. Elevation: 8000 feet. Drainage: Runoff is medium. Soil is well drained. Ground water is deep. Permeability is moderately slow.
Remarks: 1/4 inch thick O1 horizon of pine needles was present at the time of sampling. Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate was obtained by observing reaction to dilute HCl. Paired pedon is Sample No. S65Ariz-1-21. This pedon has a mollic epipedon, an argillic horizon and a mean summer soil temperature at a 20-inch depth that is probably less than 60° F. When pit was opened September 23, 1:30 P.M., air temperature was 62° F. and soil temperature was 55° F.
Classification: Argic Pachic Cryoboroll, fine-loamy, mixed.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>65666 | 0 to 3 inches, dark gray (10YR 4/1), fine sandy loam, very dark brown (10YR 2/2) when moist; moderate medium platy breaking to moderate fine granular structure; slightly hard, very friable, nonsticky and slightly plastic; abundant fine and medium roots; many fine interstitial and few fine tubular pores; noneffervescent, slightly acid (pH 6.5); clear smooth boundary. |
| A12<br>RSL No.<br>65667 | 3 to 10 inches, dark gray (10YR 4/1) loam, very dark brown (10YR 2/2) when moist; massive breaking to moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; abundant fine and plentiful medium roots; many fine interstitial and few fine tubular pores; noneffervescent; neutral (pH 7.0); gradual smooth boundary. |
| B1<br>RSL No.<br>65668 | 10 to 14 inches, dark gray (10YR 4/1) clay loam, very dark brown (10YR 2/2) when moist; moderate medium and coarse subangular blocky structure; hard, firm, sticky and plastic; abundant fine and few medium roots; common fine interstitial and few fine tubular pores; common thin clay films on ped faces and in pores; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B21t<br>RSL No.<br>65669 | 14 to 20 inches, dark gray (10YR 4/1) fine clay loam, very dark brown (10YR 2/2) when moist; moderate medium and coarse subangular blocky structure; hard, firm, sticky and plastic; abundant fine and few medium roots; common fine interstitial and few fine tubular pores; common thin clay films on ped faces and in pores; noneffervescent; neutral (pH 7.0); clear smooth boundary. |
| B22t<br>RSL No.<br>65670 | 20 to 22 inches, very dark grayish brown (10YR 3/2) light clay, very dark brown (10YR 2/2) when moist; massive; hard, firm, sticky and plastic; abundant fine and few medium roots; common fine interstitial and tubular pores; many moderate clay films on ped faces and in pores; noneffervescent; neutral (pH 7.0); abrupt irregular boundary. |
| R<br>RSL No.<br>65671 | 22 to 34 inches, white (N 8/) tuff, pinkish gray (7.5YR 6/2) when moist, with tongues 3 mm to 1 inch thick of the B22t horizon extending approximately 12 inches into the seams and fractures; massive; extremely hard, extremely firm; few fine and medium roots in fractures; few fine interstitial pores in interfaces; common moderately thick clay films in seams; noneffervescent; mildly alkaline (pH 7.5). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Argic Pachic Cryoboroll, fine-loamy, mixed
SOIL Cambern sandy loam SOIL Nos. S65Ariz-1-21 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65672 - 65678

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments 1A2a > 2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0- 3 | A11 | 59.6 | 28.6 | 11.8 | 2.4 | 6.8 | 7.1 | 26.3 | 17.0 | 15.4 | 13.2 | 48.3 | 42.6 | 0 | 12 | | | |
| 3- 8 | A12 | 55.6 | 30.9 | 13.5 | 3.9 | 7.8 | 7.1 | 21.5 | 15.3 | 15.0 | 15.9 | 44.1 | 40.3 | 0 | 14 | | | |
| 8-11 | B1 | 55.3 | 30.4 | 14.3 | 3.2 | 7.0 | 6.9 | 21.6 | 16.6 | 14.4 | 16.0 | 44.9 | 38.7 | 0 | 14 | | | |
| 11-20 | B21t | 51.8 | 28.4 | 19.8 | 3.7 | 7.9 | 6.8 | 18.8 | 14.6 | 14.1 | 14.3 | 40.6 | 37.2 | 0 | 20 | | | |
| 20-23 | B22t | 47.4 | 29.8 | 22.8 | 3.6 | 7.3 | 6.1 | 16.0 | 14.4 | 14.5 | 15.3 | 39.0 | 33.0 | 0 | 23 | | | |
| 23-34+ | R | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density | Water content: | Water content: 4B1c 1/3 bar | Water content: 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct | | Pct. | Pct. | g/cc | g/cc | g/cc | Pct. | Pct. | Pct. | in./in. | in./in. | | | |
| 0- 3 | 3.88 | 0.174 | 22 | 0.8 | - | | | | | | 13.0 | | | 6.3 | | |
| 3- 8 | 1.73 | 0.089 | 19 | 0.8 | - | | | | | | 10.4 | | | 6.3 | | |
| 8-11 | 1.62 | | | 0.9 | - | | | | | | 10.8 | | | 6.3 | | |
| 11-20 | 1.21 | | | 0.9 | - | | | | | | 13.4 | | | 6.3 | | |
| 20-23 | 0.98 | | | 0.8 | - | | | | | | 14.9 | | | 6.3 | | |
| 23-34+ | | | | 0.4 | - | | | | | | | | | | | |
| Partially weathered tuff | | | | 0.4 | | | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 $NH_4OAc$ | 5C3 Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | Pct. | Pct. |
| 0- 3 | 14.1 | 5.0 | 0.3 | 2.0 | 21.4 | 7.4 | 24.7 | 28.8 | | 87 | 74 |
| 3- 8 | 12.9 | 5.1 | 0.5 | 1.7 | 20.2 | 5.8 | 23.4 | 26.0 | | 86 | 78 |
| 8-11 | 13.1 | 5.7 | 0.5 | 1.6 | 20.9 | 4.9 | 24.1 | 25.8 | | 87 | 81 |
| 11-20 | 16.4 | 8.4 | 0.6 | 1.5 | 26.9 | 5.1 | 29.7 | 32.0 | | 91 | 84 |
| 20-23 | 18.1 | 10.5 | 0.6 | 1.4 | 30.6 | 4.9 | 34.4 | 35.5 | | 89 | 86 |
| 23-34+ | | | | | | | | | | | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |

1/ >2 mm not determined; data based on crushed samples of the whole soil.

Some of the >2 mm particles do not slake in water but they cannot be separated consistently in sample preparation. All >2 mm fragments resemble the fine earth (<2 mm ) fraction in water retention and chemical properties.

## CAMBERN SANDY LOAM
S65Ariz-1-21

Location: Apache County, Arizona. A pit located 1320 feet south of the center of Section 22, T. 5 N., R. 31 E., about 4 miles southeast of Alpine. Date of Sampling: September 22, 1965.
Collectors: M.L. Miller, K.N. Larson, J.E. Jay, R.E. Nelson, and B. Brasher.
Vegetation: Never cultivated. Ponderosa pine-grass aspect with 55 percent pine crown cover and 24 percent grass basal cover. Squirreltail, mountain muhly, annual weeds, Ponderosa pine. Climate: 22 inches ppt. 43.4° F. approximate M.A.T. Parent Material: Shallow local colluvial and alluvial material from and on Tertiary age basic and ash-flow tuff. Relief: Side slope of mountain, smooth convex 6 percent slope with north aspect at pit site. Elevation: 8000 feet. Drainage: Runoff is medium. Soil is well drained. Ground water is deep. Permeability is moderately slow.
Remarks: A 1/4 inch thick 01 horizon of pine needles was present at the time of sampling. Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate was obtained by observing reaction to dilute HCl. Paired pedon is sample No. S65Ariz-1-18. This pedon has a mollic epipedon, an argillic horizon and a mean summer soil temperature at a 20-inch depth that is probably less than 60° F. When pit was opened September 22 at 2:30 P.M. air temperature was 62° F. and soil temperature was 55° F. Depth to R ranges from 20 to 50 inches.
Classification: Argic Pachic Cryoboroll, fine-loamy, mixed.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>65672 | 0 to 3 inches, dark gray (10YR 4/1) fine sandy loam, very dark brown (10YR 2/2) when moist; moderate medium and fine granular structure; slightly hard, very friable, nonsticky and slightly plastic; abundant fine and medium roots; many fine interstitial pores; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| A12<br>RSL No.<br>65673 | 3 to 8 inches, dark gray (10YR 4/1) light loam or sandy loam, very dark brown (10YR 2/2) when moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; abundant fine and medium roots; many fine interstitial and few fine tubular pores; noneffervescent; medium acid (pH 6.0); gradual smooth boundary. |
| B1<br>RSL No.<br>65674 | 8 to 11 inches, dark gray (10YR 4/1) clay loam, very dark brown (10YR 2/2) when moist; weak and medium subangular blocky structure; hard, friable, sticky and plastic; plentiful fine and medium and few large roots; abundant fine interstitial and few fine tubular pores; few rounded pebbles; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| B21t<br>RSL No.<br>65675 | 11 to 20 inches, dark gray (10YR 4/1) clay loam, very dark brown (10YR 2/2) when moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; plentiful fine and medium and few large roots; common fine tubular and many fine interstitial pores; common thin clay films on ped faces and in pores; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| B22t<br>RSL No.<br>65676 | 20 to 23 inches, dark gray (10YR 4/1) light clay, very dark brown (10YR 2/2) when moist; massive, breaking to moderate medium subangular blocky structure; hard, firm, sticky and very plastic; few medium and large roots; many fine interstitial and common fine tubular pores; common thin clay film on ped faces and in pores, common thin clay bridges; noneffervescent; slightly acid (pH 6.5); abrupt irregular boundary. |
| R<br>RSL No.<br>65677 | 23 to 34 inches +, pinkish white (7.5YR 8/2) tuff, pink (7.5YR 7/4) when moist, with tongues 3 mm to 1 inch thick of the B22t horizon extending approximately 12 inches into the seams and fractures; massive; extremely hard, extremely firm; few fine roots in fractures; common fine interstitial pores in interfaces; many thin clay films in seams; noneffervescent; slightly acid (pH 6.5). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Argic Pachic Cryoboroll, fine, montmorillonitic
SOIL Friana loam SOIL Nos. S62Ariz-3-20 LOCATION Coconino County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62272 - 62279

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: ≥ 2* Pct. | 2 – 19 Pct. of < 76 mm | 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0- 2 | A11 | 3.8 | 74.7 | 21.5 | 0.2 | 0.3 | 0.2 | 0.6 | 2.5 | 38.8 | 35.9 | 41.7 | 1.3 | | | 1 | | |
| 2- 8 | A12 | 2.8 | 67.3 | 29.9 | 0.1 | 0.1 | 0.1 | 0.4 | 2.1 | 27.4 | 39.9 | 29.7 | 0.7 | | | 4 | | |
| 8-17 | A13 | 4.5 | 65.9 | 29.6 | 0.2 | 0.5 | 0.4 | 0.7 | 2.7 | 32.1 | 33.8 | 35.2 | 1.8 | | | 3 | | |
| 17-31 | B21t | 5.4 | 56.1 | 38.5 | 0.2 | 0.6 | 0.7 | 1.4 | 2.5 | 22.5 | 33.6 | 25.8 | 2.9 | | | 3 | | |
| 31-44 | B22t | 12.7 | 44.4 | 42.9 | 0.2 | 1.4 | 2.2 | 3.7 | 5.2 | 24.5 | 19.9 | 31.9 | 7.5 | | | 3 | | |
| 44-56 | B3 | 23.8 | 40.1 | 36.1 | 0.7 | 2.7 | 3.6 | 9.2 | 7.6 | 20.3 | 19.8 | 33.2 | 16.2 | | | 4 | | |
| 56-68 | C1 | 39.5 | 34.6 | 25.9 | 7.8 | 8.7 | 8.6 | 8.7 | 5.7 | 17.1 | 17.5 | 26.5 | 33.8 | | | 8 | | |
| 68-90+ | C2 | 26.7 | 33.5 | 39.8 | 0.2 | 1.4 | 3.1 | 10.8 | 11.2 | 14.0 | 19.5 | 31.9 | 15.5 | | | 18 | | |

| Depth (In) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | Carbonate as $CaCO_3$ Pct. | Bulk density: 4A1f 1/3 bar g/cc | 4A1h Oven dry g/cc | | Water content: 4B1c 1/3 bar Pct. | 4B2 15 bar Pct. | | 4D1 Extensibility in./in. | | pH: 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 2 | 3.80 | 0.256 | 15 | | 1.17 | 1.29 | | 31.0 | 14.1 | | 0.031 | | 6.2 | 6.5 |
| 2- 8 | 2.79 | 0.190 | 15 | | 1.20 | 1.40 | | 28.3 | 16.3 | | 0.049 | | 6.1 | 6.6 |
| 8-17 | 1.31 | 0.096 | 14 | | 1.40 | 1.82 | | 27.0 | 15.1 | | 0.084 | | 6.2 | 6.8 |
| 17-31 | 1.14 | 0.084 | 14 | | | | | | 20.0 | | | | 6.6 | 7.3 |
| 31-44 | 0.42 | 0.041 | 10 | | 1.40 | 1.83 | | 28.9 | 22.3 | | 0.088 | | 6.8 | 7.4 |
| 44-56 | 0.22 | | | | 1.47 | 1.84 | | 25.9 | 21.1 | | 0.072 | | 7.1 | 7.5 |
| 56-68 | 0.10 | | | | 1.52 | 1.74 | | 21.9 | 16.1 | | 0.045 | | 7.2 | 7.6 |
| 68-90+ | 0.04 | | | | 1.24 | 1.64 | | 37.1 | 34.0 | | 0.088 | | 7.0 | 7.4 |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | 6H2a Ext. Acidity | Cation Exch. Capacity 5A2a NaOAc | | Water extract from saturated paste: Ca | Mg | Na | K | | $CO_3$ | $HCO_3$ | Cl | $SO_4$ | Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0- 2 | 16.4 | 6.0 | 0.1 | 1.1 | 8.7 | 31.0 | | | | | | | | | | | |
| 2- 8 | 20.5 | 7.9 | 0.1 | 0.5 | 9.8 | 37.6 | | | | | | | | | | | |
| 8-17 | 19.7 | 8.5 | 0.2 | 0.3 | 6.6 | 32.8 | | | | | | | | | | | |
| 17-31 | 23.6 | 9.9 | 0.3 | 0.3 | 5.7 | 37.8 | | | | | | | | | | | |
| 31-44 | 21.9 | 11.2 | 0.5 | 0.3 | 5.5 | 39.1 | | | | | | | | | | | |
| 44-56 | 22.0 | 11.1 | 0.5 | 0.3 | 4.7 | 38.0 | | | | | | | | | | | |
| 56-68 | 19.0 | 9.0 | 0.5 | 0.2 | 4.2 | 33.2 | | | | | | | | | | | |
| 68-90+ | 31.2 | 16.8 | 0.6 | 0.6 | 1.9 | 50.9 | | | | | | | | | | | |

| Depth (In) | Water at Saturation Pct. | Exchangeable Na Pct. | | Gypsum Pct. | 5C3 Base Sat. (sum) Pct. | Clay Mineralogy (<0.002 mm) 7A2 X-ray: Montmorillonite | Vermiculite | Mica | | Kaolin % DTA 7A3 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0- 2 | | | | | 73 | | | | | |
| 2- 8 | | | | | 75 | xx | - | x | | 14 |
| 8-17 | | | | | 81 | | | | | |
| 17-31 | | | | | 86 | | | | | |
| 31-44 | | | | | 86 | xxx | t | - | | 14 |
| 44-56 | | | | | 88 | | | | | |
| 56-68 | | | | | 87 | | | | | |
| 68-90+ | | | | | 96 | xxx | t | xx | | 8 |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## FRIANA LOAM
S62Ariz-3-20

Location: Long Valley Area, Arizona. Center of Sec. 22, T15N, R9E, Coconino County, Arizona, photo DGJ-9-24. 29 miles S. and 15 miles E. of Flagstaff. Date of Sampling: June 5, 1962.
Collectors: M.S. James, Stanley Buol, R.E. Nelson, J.E. Jay, Truman Anderson, L.H. Grant and Y.H. Havens.
Classification: Argic Pachic Cryoboroll, fine, montmorillonitic.
Vegetation: Western wheatgrass, bluegrass, iris, cheatgrass, dandelion. Use: Rangeland.
Climate: 20-22" precipitation, subhumid, mean annual temperature 45°F. Parent Material: Cinder, ash and alluvium from basalt. Elevation: 6725 feet. Relief: Nearly level.
Drainage: Well drained (?), slow permeability.
Remarks: Modal profile.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>62272 | 0 to 2 inches, dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure breaking to strong fine granular structure; slightly hard, very friable, nonsticky and plastic; abundant fine roots; many fine interstitial pores; medium acid (pH 6.0); abrupt smooth boundary. |
| A12<br>RSL<br>62273 | 2 to 8 inches, dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium prismatic breaking to moderate fine subangular blocky and strong fine granular structure; hard, friable, sticky and plastic; abundant fine roots; few fine tubular and many fine interstitial pores; slightly acid (pH 6.5); clear wavy boundary. |
| A13<br>RSL<br>62274 | 8 to 17 inches, dark grayish brown (10YR 4/2) clay loam, very dark brown (10YR 2/2) moist; weak medium prismatic breaking to moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; plentiful fine roots; many fine interstitial pores; slightly acid (pH 6.5); clear wavy boundary. |
| B21t<br>RSL<br>62275 | 17 to 31 inches, grayish brown (10YR 5/2) heavy clay loam, very dark brown (10YR 2/2) moist; moderate medium angular and subangular blocky structure; very hard, friable, sticky and very plastic; plentiful fine roots; few fine tubular and common fine interstitial pores; neutral (pH 7.0) noneffervescent; gradual irregular boundary. |
| B22t<br>RSL<br>62276 | 31 to 44 inches, brown-dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; weak medium and coarse subangular and angular blocky structure; common small and large slickensides; very hard, firm, very sticky and very plastic; few fine roots; few fine tubular and many fine interstitial pores; many fine manganese shots; mildly alkaline (pH 7.5); noneffervescent; gradual smooth boundary. |
| B3<br>RSL<br>62277 | 44 to 56 inches, brown (7.5YR 5/4) clay, brown-dark brown (7.5YR 4/4) moist; weak medium angular blocky structure; very hard, firm, sticky and plastic; few small slickensides; few manganese coatings and stains; few fine manganese shots; common fine tubular and interstitial pores; moderately alkaline (pH 8.0); noneffervescent; abrupt wavy boundary. |
| C1<br>RSL<br>62278 | 56 to 68 inches, brown (7.5YR 5/4) clay loam or sandy clay loam, brown-dark brown (7.5YR 4/4) moist; massive; (stratified and horizontally bedded weathered ash and cinders); hard, friable, slightly sticky and plastic; few fine tubular and common fine interstitial pores; common fine manganese shots; moderately alkaline (pH 8.0); noneffervescent; abrupt wavy boundary. |
| C2<br>RSL<br>62279 | 68 to 90 inches +, mottled light brown (7.5YR 6/4) and strong brown (7.5YR 5/6) loam, reddish brown (5YR 4/4) moist; massive and rock structure; extremely hard, friable, slightly sticky and slightly plastic; few fine tubular and interstitial pores; few fine manganese shots; ped faces have clay films; moderately alkaline (pH 8.0); noneffervescent. |

* Sampled for BPR.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Cryoboroll, loamy-skeletal, mixed
SOIL Bushvalley cobbly fine sandy loam SOIL Nos. S65Ariz-1-22 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65663 - 65665

| Depth (In) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: (0.05–0.02) | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments 1A2a >2 | 2–19 | 19–76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0- 4 | A1 | 59.4 | 26.6 | 14.0 | 5.0 | 8.4 | 6.9 | 21.7 | 17.4 | 14.1 | 12.5 | 45.2 | 42.0 | 0 | 14 | - | - | - |
| 4- 8 | B2 | | | | | | | | | | | | | | | - | - | - |
| 8-14+ | R | | | | | | | | | | | | | | | - | - | - |

| Depth (In) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | | 3B2 | Water content | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct | | Pct. | Pct. | | g/cc | g/cc | g/cc | Cm | Pct | Pct. | Pct. | in./in. | in./in. | | | |
| 0- 4 | 1.26 | 0.080 | 16 | 1.1 | - | | 1.39 | 1.45 | | 1.00 | | 20.7 | 11.3 | 0.015 | 0.015 | 6.7 | | |
| 4- 8 | | | | | | | 1.73 | 1.80 | | 1.00 | | 13.4 | 10.5 | 0.012 | 0.012 | | | |
| 8-14+ | | | | | | | 1.73 | 1.75 | | 1.00 | | 13.1 | 9.7 | 0.005 | 0.005 | | | |

| Depth (In) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 $NH_4Oac$ | 5C3 Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | Pct. | Pct. |
| 0- 4 | 18.7 | 7.6 | 1.4 | 0.9 | 28.6 | 3.6 | 31.2 | 32.2 | | | 92 | 89 |
| 4- 8 | | | | | | | | | | | | |
| 8-14+ | | | | | | | | | | | | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin. | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| 0- 4 | xx | | | - | |
| 4- 8 | | | | | |
| 8-14+ | | | | | |

1/ >2 mm not determined; data based on crushed samples of the whole soil.
Some of the >2 mm particles do not slake in water and cannot be separated consistently in sample preparation. All >2 mm fragments resemble the fine earth (<2 mm ) fraction in water retention and chemical properties.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## BUSHVALLEY COBBLY FINE SANDY LOAM
S65Ariz-1-22

Location: Apache County, Arizona. A pit located 1452 feet north and 396 feet east of the south quarter corner of Section 2, T. 5 N., R. 30 E. About 1/4 mile northwest of Alpine. Date of Sampling: September 24, 1965.
Collectors: M.L. Miller, K.N. Larson, J.E. Jay, R.E. Nelson, and B. Brasher.
Vegetation: Never cultivated. Ponderosa pine-grass aspect with 60 percent pine crown cover and 12 percent grass basal cover. Blue grama, squirrel tail, mountain muhly, annual weeds, Ponderosa pine. Climate: 22 inches ppt. 43.4° F. approximate M.A.T. Parent Material: Ash-flow tuff. Relief: Smooth convex 17 percent slope on mountainside with southwest aspect at pit site. Elevation: 8000 feet. Drainage: Runoff is rapid. Soil is well drained. Ground water is deep. Permeability is moderate.
Remarks: Depth to R horizon ranges from 6 to 18 inches in this series. This soil is found on slopes of from 1 to 40 percent. Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate was obtained by observing reaction to dilute HCl. This pedon has a mollic epipedon, a lithic contact at less than 20 inches and a mean summer soil temperature that is probably less than 60° F.
Classification: Lithic Cryoboroll, loamy-skeletal, mixed.

| HORIZON | DESCRIPTION |
|---|---|
| O1 | ½ to 0 inches, pine needles. |
| A1 | 0 to 4 inches, dark brown (7.5YR 4/2) flaggy fine sandy loam, dark brown (7.5YR |
| RSL No. | 3/2) when moist; moderate medium subangular blocky structure; slightly hard, very |
| 65663 | friable, slightly sticky and slightly plastic; abundant fine and medium roots; many fine interstitial and few fine tubular pores; noneffervescent; neutral (pH 7.0); abrupt smooth boundary. |
| B2 | 4 to 8 inches, dark brown (7.5YR 4/2) very flaggy clay loam, dark brown (7.5YR |
| RSL No. | 3/2) when moist; broken cobbles are light brown (7.5YR 6/4) dry, and brown (7.5YR |
| 65664 | 5/4) when moist; rock controlled structure; slightly hard, very friable, sticky and plastic; abundant fine and plentiful medium roots; many fine interstitial pores; 90 percent by volume, flagstones; noneffervescent; slightly acid (pH 6.5); abrupt smooth boundary. |
| R | 8 to 14 inches +, light brown (7.5YR 6/4) tuff, brown (7.5YR 5/4) when moist; |
| RSL No. | massive; extremely hard, extremely firm; abundant fine and plentiful medium roots |
| 65665 | in cracks; common fine and medium interstitial pores; many thin clay films on rock interfaces; noneffervescent; slightly acid (pH 6.5). |

Stones in the B2 horizon are 1/4 to 1/2 inch thick and 3 to 10 inches long.

R horizon has been described by a geologist as Consolidated ash-flow tuff.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Torrifluventic Haploboroll, cindery
Bandera gravelly (cindery) loam (taxadiunct) SOIL Nos. S65Ariz-1-19 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65657 - 65662

| Depth (In.) | Horizon | 1B1b Total: Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments: > 2 | 2 – 19 | 19 – 76 | 1A2a |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | | |
| 0- 2 | A11 | 41.9 | 44.8 | 13.3 | 8.8 | 9.1 | 5.1 | 10.2 | 8.7 | 20.3 | 24.5 | 34.5 | 33.2 | 0 | 13 | 32 | 32 | 0 | |
| 2- 9 | A12 | 35.3 | 47.9 | 16.8 | 8.0 | 7.9 | 4.1 | 8.4 | 6.9 | 17.0 | 30.9 | 28.6 | 28.4 | 0 | 17 | 34 | 33 | 1 | 2/ |
| 9-19 | C1 | 47.0 | 41.9 | 11.1 | 11.7 | 12.7 | 5.6 | 9.9 | 7.1 | 16.1 | 25.8 | 28.3 | 39.9 | 1 | 10 | 51 | 39 | 7 | 3/ |
| 19-36 | IIC2ca | | | | | | | | | | | | | | | 100 | | | |
| 36-60+ | IIC3 | | | | | | | Whole soil basis | | | 4/ | | | | | 100 | | | |
| 0- 2 | A11 | | | | | | | | | | | | | | | 32 | 32 | 0 | |
| 2- 9 | A12 | | | | | | | | | | | | | | | 34 | 33 | 1 | |
| 9-19 | C1 | | | | | | | | | | | | | | | 51 | 39 | 7 | |
| 19-36 | IIC2ca | | | | | | | | | | | | | | | 100 | | | |
| 36-60+ | IIC3 | | | | | | | | | | | | | | | 100 | | | |
| Cinder mulch 4-0 inches | | | | | | | | | | | | | | | | 100 | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | | Bulk density: 4A1f 1/3 bar | 4A1h Oven dry | | 3B2 Cm | Water content: | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLE | 4D1 Extensibility COLE | pH: 8C1b Saturated Paste | 8C1a $H_2O$ 1:1 | 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | | g/cc | g/cc | g/cc | | Pct. | Pct. | Pct. | in./in. | in./in. | | | |
| 0- 2 | 2.23 | 0.167 | 13 | 2.1 | - | | | | | | | | 12.8 | | | | 7.2 | |
| 2- 9 | 3.03 | 0.261 | 12 | 2.7 | - | | 0.96 5/ | 0.98 5/ | | | | 25.4 | 16.7 | | 0.006 | | 7.5 | |
| 9-19 | 2.13 | | | 2.2 | 6 | | | | | | | | 16.0 | | | 7.4 | 8.4 | |
| 19-36 | | | | | | | | | | | | | | | | | | |
| 36-60+ | | | | | | | | Whole soil basis | | | 4/ | | | | | | | |
| 0- 2 | | | | | | | | | | | | | 9.4 | | | | | |
| 2- 9 | | | | | | | | | | | | | 13.1 | | | | | |
| 9-19 | | | | | | | 1.01 6/ | 1.01 6/ | | | | 17.1 6/ | 12.6 | | 0.000 6/ | | | |
| 19-36 | 0.30 | | | 0.4 | 2 | | 1.10 | 1.10 | | | | 13.3 | 6.4 | | 0.001 | | | |
| 36-60+ | 0.41 | | | 0.3 | 1 | | 1.13 | 1.13 | | | | 14.9 | 5.8 | | 0.000 | | | |
| Cinder mulch 4-0 inches | | | | 0.6 | | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases: 6N2a Ca | 6O2a Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A2a NaOAc | 5A1a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0- 2 | 19.6 | 6.3 | 0.4 | 0.4 | 26.7 | | | 28.9 | | | | | | | | | | |
| 2- 9 | 31.5 | 10.4 | 0.5 | 0.7 | 43.1 | | | 44.7 | | | | | | | | | | |
| 9-19 | 29.4 | 16.8 | 3.2 | 0.6 | 50.0 | | | 37.1 | 4.3 | 5.2 | 9.2 | 0.8 | | - | 5.5 | 5.2 | | 1.83 |
| 19-36 | | | | | | | | | | | | | | | | | | |
| 36-60+ | | | | | | | | Whole soil basis | | | 4/ | | | | | | | |
| 0- 2 | 13.0 7/ | 4.8 7/ | 0.2 | 1.4 | 18.0 7/ | | | 21.5 | | | | | | | | | | |
| 2- 9 | 23.7 | 8.1 | 0.3 | 1.0 | 32.1 | | | 38.2 | | | | | | | | | | |
| 9-19 | 17.5 | 11.1 | 2.3 | 3.2 | 30.9 | | | 37.1 | | | | | | | | | | |
| 19-36 | 7.5 | 3.8 | 6.4 | 2.1 | 17.7 | | | 15.1 | | | | | | | | | | |
| 36-60+ | 8.3 | 2.6 | 2.1 | 0.9 | 13.0 | | | 14.4 | | | | | | | | | | |
| Mulch | 4.8 | 1.5 | 0.3 | 0.7 | 6.6 | | | 8.3 | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation | 5D2 Exchangeable Na | 5B1b Exch. Na meq / 100g | Base Sat.: 5C1 $NH_4OAc$ | 5C1 $NH_4OAc$ 4/, 7/ | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | Calcite |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct | Pct. | < X-ray > | | | | |
| 0- 2 | | | | 92 | | | | | | |
| 2- 9 | | | | 96 | | t | | | - | - |
| 9-19 | 64.1 | 7 | 2.6 | 100+ | | - | | | - | - |
| 19-36 | | | | | | | | | | |
| 36-60+ | | | | Whole soil basis 4/ | | | | | | |
| 0- 2 | | | | | 84 | | - = looked for but not found | | | |
| 2- 9 | | | | | 84 | | t = trace | | | |
| 9-19 | | | | | 83 | | v = small | | | |
| 19-36 | | | | | 100+ | | xx = moderate | | | |
| 36-60+ | | | | | 90 | | xxx = abundant | | | |
| Mulch | | | | | 80 | | xxxx = dominant | | | |

1/ From characterization sample (5 kg) except as noted.
2/ 19-76 mm from field measurements (>50 kg).
3/ 19-76 mm from field measurements (>50 kg); >2 mm includes volume estimate of >76 mm.
4/ Determined on ground whole soil samples except as noted in footnotes 5 and 6.
5/ Bulk density of <2 mm ; the weight and volume of >2 mm material are excluded from values.
6/ Cinder only; the bulk density of the whole soil is probably lower and 1/3 bar water is probably higher.
7/ Ca and Mg extracted with 1 N KCl in 0.2 N triethanolamine; Ca and Mg determined by EDTA.

## BANDERA GRAVELLY (CINDERY) LOAM (taxadjunct) 1/
S65Ariz-1-19

Location: Apache County, Arizona. A pit located 100 feet east and 100 feet south of the center of Sec. 28, T. 10 N., R. 29 E. Approximately 9 miles northwest of Springerville, on Photo No. 4642. Date of Sampling: September 21, 1965.
Collectors: M.L. Miller, J.E. Jay, R.E. Nelson and B. Brasher.
Vegetation: Never cultivated. Grass with basal density of 30 percent. Blue grama and a few annuals. Few scattered cholla cactus. Climate: 12 inches ppt. 46° F. approximate M.A.T. Parent Material: Basaltic cinders. Relief: Lower slope of cinder cone. Smooth-convex 8 percent slope facing northeast at pit site. Elevation: 6600 feet. Drainage: Run-off is slow. Soil is well drained. Ground water is very deep. Permeability is moderately rapid.
Classification: Torrifluventic Haploboroll, cindery.
Remarks: Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate obtained by observing reaction to dilute HCl.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>65657 | 0 to 2 inches, brown (10YR 5/3) gravelly (cindery) loam, dark brown (10YR 3/3) when moist; weak medium and coarse platy breaking to weak fine granular structure; slightly hard, very friable, nonsticky and slightly plastic; plentiful fine roots; many fine interstitial and few fine tubular pores; surface covered with cinders ranging from 2 mm to 3/4-inch in diameter; noneffervescent; slightly acid (pH 6.5); clear smooth boundary. |
| A12<br>RSL No.<br>65658 | 2 to 9 inches, dark brown (10YR 4/3) very gravelly (cindery) loam, very dark grayish brown (10YR 3/2) when moist; massive breaking to weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; abundant fine roots; many fine interstitial pores; noneffervescent ; moderately alkaline (pH 8.0); gradual smooth boundary. |
| C1<br>RSL No.<br>65659 | 9 to 19 inches, dark grayish brown (10YR 4/2) very gravelly (cindery) loam, very dark grayish brown (10YR 3/2) when moist; massive breaking to weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; abundant fine roots; many fine interstitial pores; slightly to strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| IIC2ca<br>RSL No.<br>65660 | 19 to 36 inches, very dark gray (5YR 3/1) and gray (5YR 5/1)* cinders, dark reddish brown (5YR 2/2) and (5YR 3/3) when moist, with many light gray (5YR 7/1) medium to large lime mottles or coatings, dark reddish brown (5YR 3/3) when moist; massive; loose, loose, nonsticky and nonplastic; few fine roots; many fine interstitial pores; strongly effervescent to noneffervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| IIC3<br>RSL No.<br>65661 | 36 to 60 inches, black cinders, (N 2/) dry or moist, with common fine distinct white (N 8/) mottles; thin coating on surface of cinders is brown (7.5YR 5/4), dark brown (7.5YR 3/2) when moist; single grain; loose, nonsticky and nonplastic; few fine roots; many fine interstitial pores; strongly effervescent to noneffervescent; moderately alkaline (pH 8.0); cinders have abundant fine and medium vesicular pores, some tubular pores. |

1/ The Bandera series is in a cindery family of Torriorthentic Haploborolls. This pedon has more than 0.3 percent organic carbon to a depth of 60 inches.

* 8 mm to 3 inches - 5 percent greater than 3 inches, 30 percent of surface is lime mottles, grading to common fine mottles at 36 inches.

IIC3 - Cinders are brittle - 5 percent are greater than 3 inches.

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Springerville clay (taxadjunct) **LOCATION** Coconino County, Arizona

SOIL FAMILY: Vertic Haploboroll, fine, montmorillonitic

SOIL NOS. S56Ariz-3-3 **LAB. NOS.** 561063-561069

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 3A1 0.2-0.02 | 0.02-0.002 | 2A2 > 2 1/ | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | $A_{11}$ | 0.2 | 0.3 | 0.3 | 1.2 | 3.6 | 36.6 | 57.8 | 16.9 | 24.1 | 0 | c |
| 1-4 | $A_{12}$ | 0.2 | 0.2 | 0.2 | 1.1 | 3.6 | 37.5 | 57.2 | 16.5 | 25.3 | 0 | c |
| 4-8 | $A_{13}$ | 0.3 | 0.2 | 0.2 | 1.1 | 3.3 | 37.7 | 57.2 | 16.6 | 25.2 | 0 | c |
| 8-13 | $A_{14}$ | 0.2 | 0.2 | 0.2 | 1.1 | 3.3 | 38.0 | 57.0 | 16.1 | 25.9 | 0 | c |
| 13-22 | $C_1$ | 0.1 | 0.2 | 0.2 | 1.0 | 3.2 | 37.7 | 57.6 | 16.0 | 25.6 | 2 | c |
| 22-28 | $C_2$ | 0.2 | 0.2 | 0.2 | 0.7 | 2.5 | 41.8 | 54.4 | 33.2 | 31.7 | 1 | sic |
| 28+ | R | not analyzed | | | | | | | | | | |

| pH 8C1a 1:1 | 1:5 | 1:10 | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a Free Iron % $Fe_2O_3$ | ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C. | 2/ $H_2O$ % | Bulk Density 4A2a g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.7 | | | 1.16 | 0.089 | 13.0 | 1.6 | | | -- | | | |
| 6.7 | | | 0.86 | 0.068 | 12.6 | 1.5 | | 4.2 | 1.76 | | | |
| 6.8 | | | 0.75 | 0.038 | 19.7 | 1.6 | | 5.8 | 1.89 | | | |
| 7.1 | | | 0.77 | 0.062 | 12.4 | 1.7 | | 7.0 | 1.84 | | | |
| 7.4 | | | 0.74 | 0.060 | 12.3 | 1.6 | | 6.6 | 1.88 | | | |
| 7.6 | | | 0.66 | 0.054 | 12.2 | 1.6 | | 7.2 | 1.88 | | | |

| 5A3a CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q2a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE Na | K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil | | | | | | milliequivalents per liter | | |
| 51.2 | 29.0 | 15.4 | 5.0 | 0.15 | 1.63 | 90 | | | |
| 52.2 | 31.9 | 14.4 | 4.7 | 0.19 | 1.00 | 91 | | | |
| 52.4 | 32.4 | 14.7 | 4.2 | 0.27 | 0.90 | 92 | | | |
| 53.2 | 32.3 | 15.3 | 4.2 | 0.42 | 0.95 | 92 | | | |
| 55.0 | 33.1 | 17.6 | 2.8 | 0.58 | 0.93 | 95 | | | |

1/ Percent of <1-inch material

2/ $H_2O$ content at corresponding bulk density

## SPRINGERVILLE CLAY* (taxadjunct) 1/
S56Ariz-3-3

Location: Coconino County, Arizona. In NW ¼ Sec. 15, T. 19 N., R. 9 E. 1½ miles east of Mormon Lake highway, along road to Ashurst Lake. About 14 miles southeast of Flagstaff. Date of Sampling: September 19, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Sparse cover of western wheatgrass, thistles, dandelion, pricklypear cactus, snakeweed, annual and perennial weeds. Climate: Estimated 21 to 22 inches precipitation per year. Nearest weather station (Flagstaff): Mean annual temperature 45.6° F.; January average 27.2° F.; July average 65.2° F.; mean annual precipitation 20.27 inches. Parent Material: Weathered basalt (Tertiary?), with admixture of some weathered cinders and ash. Relief: Gently sloping shoulder or terrace-like slope ringing a shallow depression in a large basalt plateau. Lies some 8 or 10 feet above the floor of the depression and about 15 feet below the higher portions of the local landscape. About 2 percent plane, slope toward northwest. No gilgai at this site, but some parts of the soil area have weak (4-6") gilgai. Elevation: About 7,140 feet. Drainage: Well or moderately well drained. Runoff, medium. Permeability, very slow. Water never ponds on this soil.
Classification: Vertic Haploboroll, fine, montmorillonitic.
Remarks: Paired with S56Ariz-3-6. Surface is slightly to very stony. Stones are basalt, from a few inches to 2 feet in diameter. A very few hard, rounded lime concretions ¼ to 1/8 inch in diameter on the surface and in the soil.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561063 | 0-1" -- Dark grayish brown (9YR 3.5/2) clay, very dark grayish brown (9YR 3/2) when moist; strong very fine granular except for ¼-inch soft surface crust, which is weak medium platy, breaking to strong very fine granular; very hard, firm, very plastic, very sticky; many roots; many fine and very fine interstitial pores; very slightly calcareous; abrupt, slightly wavy lower boundary. |
| A12<br>BSL No.<br>561064 | 1-4" -- Clay of same color as the A11; moderate coarse prismatic, breaking to weak thick platy, and in turn to moderate very fine granular structure; extremely hard, very firm, very plastic, very sticky; many roots; few fine tubular pores; noncalcareous; clear, wavy lower boundary. |
| A13<br>BSL No.<br>561065 | 4-8" -- Very dark grayish brown (9YR 3/2) clay, very dark brown (9YR 2/2) when moist; strong very coarse prismatic structure; few slickensides produce lozenge-shaped very coarse peds; extremely hard, very firm, very plastic, very sticky; many roots; few fine and very fine tubular pores; few black spherical concretions 1 to 2 mm. in diameter; noncalcareous; gradual, wavy lower boundary. |
| A14<br>BSL No.<br>561066 | 8-13" -- Clay of the same color as the A13; moderate very coarse prismatic structure; many slickensides produce lozenge-shaped very coarse peds that break to moderate coarse and medium blocks; extremely hard, very firm, very plastic, very sticky; common roots; few black spherical concretions 1 to 2 mm in diameter; few fine and very fine tubular pores; noncalcareous; gradual, wavy lower boundary. |
| C1<br>BSL No.<br>561067 | 13-22" -- Clay of the same color as the A13; weak very coarse prismatic structure; numerous slickensides produce lozenge-shaped peds that break to moderate coarse and medium irregular blocks; extremely hard, very firm, very plastic, very sticky; few roots; few black spherical concretions 1 to 2 mm in diameter; few fine and very fine tubular pores; noncalcareous; gradual, wavy lower boundary. |
| C2<br>BSL No.<br>561068 | 22-28" -- Clay of the same color as the A13; massive with many slickensides that produce weak coarse lozenge-shaped peds; few tiny white hard spots that effervesce, otherwise noncalcareous; extremely hard, very firm, very plastic, very sticky; few roots; few black spherical concretions 1 to 2 mm in diameter; few fine and very fine tubular pores; abrupt, irregular lower boundary. |
| R<br>BSL No.<br>561069 | 28"+ -- Dark gray, hard, porous, weathered olivine basalt. Many of the olivine crystals have weathered to ochreous colors. Slightly magnetic. Flecked with white calcium carbonate. |

*This profile was identified as Unnamed Grayish Brown Grumusol in original notes

1/ The Springerville series is in a fine, montmorillonitic, mesic family of Typic Chromusterts. This pedon has a mean annual temperature of less than 47° F.

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Springerville clay (taxadjunct) **LOCATION** Coconino County, Arizona

SOIL FAMILY: Vertic Haploboroll, fine, montmorillonitic

SOIL NOS. S56Ariz-3-4 **LAB. NOS.** 561070-561077

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 | | | | | | | | | 2A2 | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | > 2 1/ | |
| 0-1 | $A_{11}$ | 0.1 | 0.4 | 0.5 | 2.6 | 9.0 | 41.2 | 46.2 | 30.7 | 21.5 | 5 | sic |
| 1-4 | $A_{12}$ | 0.4 | 0.3 | 0.4 | 2.1 | 6.8 | 38.7 | 51.3 | 25.9 | 21.0 | 0 | c |
| 4-10 | $C_1$ | 0.4 | 1.4 | 0.2 | 1.3 | 4.8 | 32.9 | 59.0 | 21.3 | 17.4 | 0 | c |
| 10-22 | $C_2$ | 0.7 | 1.1 | 0.3 | 1.4 | 5.2 | 36.3 | 55.0 | 22.6 | 19.9 | 0 | c |
| 22-29 | $C_3$ | 0.4 | 0.7 | 0.3 | 1.6 | 5.1 | 42.4 | 49.5 | 23.6 | 25.1 | 0 | sic |
| 29-32 | $C_{ca}$ | 0.4 | 0.6 | 0.3 | 1.1 | 3.0 | 41.7 | 52.9 | 19.0 | 26.4 | 20 | sic |
| 32-35 | R | not analyzed | | | | | | | | | | |
| 35-37 | C'ca | 5.4 | 5.0 | 2.5 | 3.4 | 3.2 | 27.5 | 53.0 | 10.1 | 22.5 | 45 | c |

| | pH | | ORGANIC MATTER | | | 6C1a Free Iron | 6E1b | 2/ | 4A2a | MOISTURE TENSIONS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8C1a | 1:5 | 1:10 | 6A1b ORGANIC CARBON | 6B2a NITROGEN | C/N | % $Fe_2O_3$ | $CaCO_3$ equivalent | $H_2O$ | Bulk Density | 1/10 ATMOS. | 1/3 ATMOS. | 15 ATMOS. |
| 1:1 | | | % | % | | | % | % | g/cc | % | % | % |
| 7.0 | | | 1.29 | 0.103 | 12.5 | 1.8 | | | -- | | | |
| 6.8 | | | 0.93 | 0.078 | 11.9 | 2.0 | | 5.4 | 1.76 | | | |
| 6.9 | | | 0.66 | 0.047 | 14.0 | 1.9 | | 5.6 | 1.85 | | | |
| 7.2 | | | 0.63 | 0.057 | 11.0 | 1.9 | | 5.6 | 1.88 | | | |
| 7.7 | | | 0.54 | 0.043 | 12.6 | 1.8 | 3 | 7.9 | 1.86 | | | |
| 7.6 | | | 0.60 | 0.043 | 14.0 | 1.8 | 4 | | -- | | | |
| 7.8 | | | 0.26 | | | 1.2 | 26 | | | | | |

| 5A3a CATION EXCHANGE CAPACITY | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q2a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE Na | K | MOISTURE AT SATURATION |
|---|---|---|---|---|---|---|---|---|---|
| (Sum) | milliequivalents per 100g. soil | | | | | | milliequivalents per liter | | % |
| 44.4 | 28.0 | 11.3 | 3.6 | 0.07 | 1.45 | 92 | | | |
| 48.6 | 32.1 | 11.9 | 3.8 | 0.11 | 0.70 | 92 | | | |
| 56.1 | 38.4 | 13.0 | 3.7 | 0.21 | 0.84 | 93 | | | |
| 51.1 | 34.2 | 12.8 | 3.0 | 0.26 | 0.80 | 94 | | | |

1/ Percent of <1-inch fraction

2/ $H_2O$ content at corresponding bulk density

## SPRINGERVILLE CLAY* (taxadjunct) 1/
S56Ariz-3-4

Location: Coconino County, Arizona. In SE ¼ Sec. 15, T. 19 N., R. 9 E., 1.8 miles east of Mormon Lake Highway along road to Ashurst Lake. About 14 miles southeast of Flagstaff. Date of Sampling: September 20, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Fair to sparse cover of western wheatgrass, ring muhly, blue grama, snakeweed (G. lucida), thistle, dandelion and other weeds, vetch. A few junipers and pines. Climate: Estimated about 21 to 22 inches precipitation per year. Nearest weather station (Flagstaff): Mean annual temperature 45.6° F.; January average 27.2° F.; July average 65.2° F.; mean annual precipitation 20.2 inches. Parent Material: Weathered basalt (Tertiary?), with some admixture of weathered cinders and ash. Relief: Near crest of low, gentle ridge between two dry lakes (Pickett and Post lakes) on a large, undulating basalt plateau. About 20 feet higher in elevation than site of S56Ariz-3-3. About 1½ percent convex, slope toward the north. No microrelief at this site, but there is faint gilgai in a few places in the area. Elevation: About 7,150 feet. Drainage: Well drained (well aerated). Runoff, medium. Permeability, very slow.
Remarks: Pair with S56Ariz-3-5. There are scattered basalt stones and boulders on the surface. There are a few hard, irregularly rounded lime concretions on the soil surface.
Classification: Vertic Haploboroll, fine, montmorillonitic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561070 | 0-1" -- Brown (7.5YR 4/3) clay or silty clay, dark brown (7.5YR 3/2) when moist; strong very fine granular except for 1/8 to 1/4 inch soft surface crust, which breaks to granules; hard, friable, very plastic, very sticky; matrix very slightly calcareous to noncalcareous; common lime concretions on soil surface, from 1/8 to 3/4 inch in diameter; common small hard basalt pebbles; porous; abrupt, slightly wavy lower boundary. |
| A12<br>BSL No.<br>561071 | 1-4" -- Brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) when moist; moderate coarse and medium prismatic, breaking to moderate coarse and medium subangular blocky, and finally to strong fine and very fine granular structure; very hard, firm, very plastic, very sticky; many roots; common fine and very fine tubular pores; noncalcareous except for a very few hard lime concretions; clear, wavy lower boundary. |
| C1<br>BSL No.<br>561072 | 4-10" -- Clay of the same color as the A12; moderate very coarse prismatic, breaking to moderate coarse and medium subangular blocky, and finally to weak fine and very fine granular structure; extremely hard, very firm, very plastic, very sticky; common roots; few fine and very fine tubular pores; noncalcareous matrix; in a few spots there are hard, rounded lime concretions from 1/8 to 1/4 inch in diameter; gradual, wavy lower boundary. |
| C2<br>BSL No.<br>561073 | 10-22" -- Clay of the same color as the A12; moderate very coarse prismatic, breaking to strong coarse and medium blocky structure; extremely hard, very firm, very plastic, very sticky; common roots; very few black spherical concretions about 1 mm in diameter; few fine and very fine tubular pores; noncalcareous matrix; in places there are a few hard, rounded, white lime concretions 1/8 to 1/4 inch in diameter; gradual, wavy lower boundary. |
| C3<br>BSL No.<br>561074 | 22-29" -- Clay of the same color as the A12; massive with numerous slickensides that produce 3/4 to 2 inch thick plates that break to weak or moderate coarse and medium blocks; extremely hard, very firm, very plastic, very sticky; very few pebbles of hard, weathered basalt; common roots; few fine and very fine tubular pores; very few black spherical concretions about 1 mm in diameter; matrix moderately calcareous; few soft, white lime concretions from 1/8 to 1/2 inch in diameter; gradual, wavy lower boundary. |
| Cca<br>BSL No.<br>561075 | 29-32" -- Clay of the same color as the A12, with common fine and medium white mottles and a few medium mottles of dark reddish brown (moist); numerous intersecting slickensides produce thick platy structure; extremely hard, very firm, very plastic, very sticky; few roots, forming a thin mat on the upper surface of the underlying rock; nearly nonporous; few thin, patchy clay skins; moderately calcareous, with common soft lime concretions 1/8 to 1/2 inch in diameter; abrupt, irregular lower boundary. |
| R<br>BSL No.<br>561076 | 32-35" -- Dark gray, hard, weathered, olivine basalt, flecked with white calcium carbonate. Slightly magnetic. Under surfaces of rock fragments have 1/8 to 1/4 inch thick lime crust. Abrupt, irregular lower boundary. |
| C'ca<br>BSL No.<br>561077 | 35-37" -- Upper 1/4 to 1/2 inch is pinkish white (7.5YR 8/2) caliche, pinkish gray when moist; below is mottled reddish brown (5YR 5/3 and 4/3) clay, darker (5YR 4/4 and 3/3) when moist; clay is gritty; many slickensides intersect to produce weak, crude fine and very blocky; extremely hard, very firm, very plastic, very sticky; no roots; many black spherical concretions less than 1/2 mm in diameter; matrix of clay is noncalcareous; abrupt, irregular lower boundary. |
| R<br>(Not sampled). | 37"+ -- Dark gray, hard, weathered, olivine basalt. |

*Identified in original notes as Unnamed Brown Grumusol

1/ The Springerville series is in a fine, montmorillonitic, mesic family of Typic Chromusterts. This pedon has a mean annual temperature of less than 47° F.

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Springerville stony silty clay (taxadjunct) **LOCATION** Coconino County, Arizona

SOIL FAMILY: Vertic Haploboroll, fine, montmorillonitic

SOIL NOS. S56Ariz-3-5 **LAB. NOS.** 561078-561084

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 3A1 0.2-0.02 | 0.02-0.002 | 2A2 >2 1/ | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | $A_{11}$ | 0.2 | 0.8 | 0.7 | 3.5 | 7.3 | 38.4 | 49.1 | 25.1 | 23.0 | 0 | c |
| 1-3 | $A_{12}$ | 0.2 | 0.9 | 0.7 | 3.2 | 7.0 | 35.7 | 52.3 | 23.0 | 22.0 | 0 | c |
| 3-9 | $A_{13}$ | 0.2 | 0.8 | 0.8 | 3.1 | 7.0 | 35.6 | 52.5 | 23.0 | 21.9 | 0 | c |
| 9-17 | $C_1$ | 0.4 | 0.8 | 0.6 | 3.0 | 6.9 | 35.3 | 52.5 | 22.8 | 22.2 | 2 | c |
| 17-26 | $C_2$ | 0.4 | 0.7 | 0.6 | 2.7 | 6.5 | 38.9 | 50.2 | 22.6 | 24.7 | 0 | c |
| 26-31 | $C_{ca}$ | 0.7 | 1.2 | 0.9 | 2.6 | 5.8 | 39.1 | 49.7 | 20.4 | 26.2 | 3 | c/sic |
| 31+ | R | not analyzed | | | | | | | | | | |

| pH 8C1a 1:1 | 1:5 | 1:10 | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a Free Iron % $Fe_2O_3$ | ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C. | 2/ $H_2O$ % | 4A2a Bulk Density g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.8 | | | 1.22 | 0.079 | 15.4 | 1.7 | | | --- | | | |
| 6.7 | | | 0.91 | 0.066 | 13.8 | 1.7 | | 5.1 | 1.70 | | | |
| 6.9 | | | 0.63 | 0.055 | 11.4 | 1.6 | | 5.2 | 1.84 | | | |
| 7.5 | | | 0.55 | 0.045 | 12.2 | 1.7 | | 7.0 | 1.88 | | | |
| 7.7 | | | 0.45 | 0.040 | 11.2 | 1.6 | 2 | 8.1 | 1.84 | | | |
| 7.8 | | | 0.43 | 0.041 | 10.5 | 1.6 | 4 | 7.2 | 1.87 | | | |

| 5A3a CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6Q2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q2a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE Na | K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil | | | | | | milliequivalents per liter | | |
| 41.9 | 22.0 | 14.7 | 3.4 | 0.12 | 1.65 | 92 | | | |
| 44.1 | 24.6 | 13.4 | 4.6 | 0.18 | 1.36 | 90 | | | |
| 47.1 | 27.2 | 15.2 | 3.7 | 0.25 | 0.78 | 92 | | | |
| 47.4 | 28.7 | 15.5 | 2.0 | 0.45 | 0.76 | 96 | | | |

1/ Percent of <1-inch material

2/ $H_2O$ content at corresponding bulk density

## SPRINGERVILLE STONY SILTY CLAY* (taxadjunct) 1/
S56Ariz-3-5

Location: Coconino County, Arizona. In the NW ¼ NE ¼ Sec. 25, T. 19 N., R. 9 E. About 1 mile southeast of Ashurst Lake. About 15 miles southeast of Flagstaff. Date of Sampling: September 20, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Sparse cover of ring muhly, blue grama, western wheatgrass, wolftail (Hordeum sp.), snakeweed, thistle; very little stunted juniper. Climate: Estimated about 21 to 22 inches precipitation per year. Nearest weather station (Flagstaff): Mean annual temperature 45.6° F.; January average 27.2° F.; July average 65.2° F.; mean annual precipitation 20.2 inches. Parent Material: Weathered olivine basalt (Tertiary?) that is coarser grained and more porous than that under S56Ariz-3-4. Probably some admixture of weathered cinders and ash. Relief: Near crest of a low, gently sloping ridge in a large, rolling basalt plateau. About 1½ percent slope, convex, toward the south. Very slight microrelief, probably due to wind erosion and deposition. The high spots of the microrelief are around tufts of muhly and other grasses. Elevation: About 7,200 feet. Drainage: Well drained (well aerated). Runoff, medium. Permeability,
Classification: Vertic Haploboroll, fine, montmorillonitic.
Remarks: Pair with S56Ariz-3-4, although S56Ariz-3-5 has a stonier surface. Surface of soil is stony to very stony. The stones are subrounded basalt, from ½ to 14 inches in diameter. Bits of hard, weathered basalt from ¼ to 2 inches in diameter are scattered throughout the profile. Hard, irregularly rounded lime concretions may be found in places on the soil surface.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561078 | 0-1" -- Brown (7.5YR 4/2) stony silty clay, dark brown (7.5YR 3.5/2) when moist; strong very fine granular, except for a soft surface crust 1/8 to 1/4 inch in diameter, that breaks to granules; hard, friable, very plastic, very sticky; few roots; very porous; noncalcareous; abrupt, slightly wavy lower boundary. |
| A12<br>BSL No.<br>561079 | 1-3" -- Brown (7.5YR 4/2) stony silty clay, dark brown (7.5YR 3/2) when moist; moderate medium and coarse prismatic, breaking to moderate coarse and medium subangular blocky and finally to strong very fine granular structure; very hard, firm, very plastic, very sticky; many roots; few black spherical concretions less than 1 mm in diameter; common fine and very fine tubular pores; clear, wavy lower boundary. |
| A13<br>BSL No.<br>561080 | 3-9" -- Silty clay or clay of the same color as the A12; strong very coarse prismatic, breaking to moderate coarse and medium subangular blocky, and finally to weak fine and very fine granular structure; extremely hard, very firm, very plastic, very sticky; common roots; concretions and pores as in A12; noncalcareous; gradual, wavy lower boundary. |
| C1<br>BSL No.<br>561081 | 9-17" -- Silty clay or clay of the same color as the A12; moderate very coarse prismatic, breaking to moderate coarse and medium angular blocky structure; many slickensides, oriented at angles of 25 to 45° to the horizontal; few black spherical concretions from 1 to 2 mm. in diameter; few hard white lime concretions 1/8 to 1/4 inch in diameter; few fine and very fine tubular pores; matrix is noncalcareous; gradual, wavy lower boundary. |
| C2<br>BSL No.<br>561082 | 17-26" -- Silty clay or clay of the same color as the A12; many intersecting slickensides produced thick lozenge-shaped peds that break to moderate coarse and medium irregular angular blocks; slickensides oriented at angles of 20 to 35° with the horizontal; few roots; common black spherical concretions 1 to 2 mm in diameter; few fine and very fine tubular pores; matrix noncalcareous; few to common hard white lime concretions 1/8 to 1/4 inch in diameter; gradual, wavy lower boundary. |
| Cca<br>BSL No.<br>561083 | 26-31" -- Silty clay or clay of same basic color as the A12, with common fine and medium white mottles due to lime concretions; many intersecting slickensides produce thick lozenge-shaped aggregates that break to weak coarse and medium irregular angular blocks; few thin patchy clay skins; few block spherical concretions less than 1 mm in diameter; few fine and very fine tubular pores; matrix slightly to moderately calcareous; common soft and semihard lime concretions 1/4 to 3/4 inch in diameter; few roots, forming a mat on the upper surface of the underlying rock; abrupt, irregular lower boundary. |
| R<br>BSL No.<br>561084 | 31"+ -- Hard, weathered, dark gray olivine basalt; slightly magnetic. |

*This profile was identified in original notes as Unnamed Brown Grumusol

1/ The Springerville series is in a fine, montmorillonitic, mesic family of Typic Chromusterts. This pedon has a mean annual temperature of less than 47° F.

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Springerville stony silty clay (taxadjunct) **LOCATION** Coconino County, Arizona

SOIL FAMILY: Vertic Haploboroll, fine, montmorillonitic

SOIL NOS. S56Ariz-3-6 **LAB. NOS.** 561085-561093

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | 2A2 > 2 1/ | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | $A_{11}$ | 0.6 | 0.9 | 0.8 | 2.4 | 4.6 | 38.5 | 52.2 | 21.8 | 22.8 | 0 | c |
| 1-3 | $A_{12}$ | 0.6 | 1.2 | 0.9 | 2.1 | 4.1 | 34.9 | 56.2 | 18.9 | 21.5 | 1 | c |
| 3-11 | $A_{13}$ | 0.8 | 1.3 | 0.8 | 2.1 | 4.3 | 34.0 | 56.7 | 18.8 | 20.8 | 0 | c |
| 11-23 | $A_{14}$ | 1.1 | 1.5 | 1.0 | 2.3 | 4.2 | 35.1 | 54.8 | 19.1 | 21.7 | <1 | c |
| 23-32 | AC | 1.4 | 1.4 | 0.8 | 2.1 | 3.9 | 35.6 | 54.8 | 18.8 | 22.1 | 0 | c |
| 32-40 | C1ca | 1.0 | 1.2 | 0.7 | 1.8 | 3.7 | 34.4 | 57.2 | 16.6 | 22.6 | 0 | c |
| 40-51 | C2ca | 0.6 | 0.8 | 0.6 | 1.4 | 3.4 | 35.9 | 57.3 | 15.6 | 24.8 | 3 | c |
| 51-60 | $C_1$ | 0.6 | 0.9 | 0.7 | 1.5 | 3.5 | 32.7 | 60.1 | 15.1 | 22.1 | 4 | c |
| 60 | R | not analyzed | | | | | | | | | | |

| pH 8C1a | | | ORGANIC MATTER 6A1b ORGANIC CARBON | 6B2a NITROGEN | | 6C1a Free Iron | 6E1b | 2/ | 4A2a | MOISTURE TENSIONS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1:1 | 1:5 | 1:10 | % | % | C/N | %$Fe_2O_3$ | $CaCO_3$ equivalent % | $H_2O$ % | Bulk Density g/cc | 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
| 6.5 | | | 1.64 | 0.123 | 13.3 | 1.9 | | | -- | | | |
| 6.7 | | | 1.09 | 0.093 | 11.7 | 2.0 | | 4.1 | 1.69 | | | |
| 6.9 | | | 0.78 | 0.068 | 11.5 | 2.1 | | 4.5 | 1.84 | | | |
| 7.3 | | | 0.68 | 0.066 | 10.3 | 2.1 | | 6.9 | 1.91 | | | |
| 7.7 | | | 0.53 | 0.048 | 11.0 | 2.0 | 2 | 6.0 | 1.93 | | | |
| 7.7 | | | 0.34 | 0.036 | 9.4 | 1.7 | 2 | 7.8 | 1.89 | | | |
| 7.6 | | | 0.12 | 0.018 | 6.7 | 1.3 | 2 | 8.5 | 1.90 | | | |
| 7.6 | | | 0.08 | 0.018 | 4.4 | 1.4 | 1 | 10.2 | 1.80 | | | |

| 5A3a CATION EXCHANGE CAPACITY | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q2a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE Na | K | MOISTURE AT SATURATION |
|---|---|---|---|---|---|---|---|---|---|
| (Sum) | milliequivalents per 100g. soil | | | | | | milliequivalents per liter | | % |
| 48.5 | 24.2 | 16.7 | 5.8 | 0.20 | 1.57 | 88 | | | |
| 50.4 | 27.9 | 16.0 | 5.2 | 0.30 | 1.03 | 90 | | | |
| 53.0 | 30.1 | 17.5 | 4.2 | 0.56 | 0.66 | 92 | | | |
| 52.2 | 29.4 | 18.1 | 3.0 | 1.02 | 0.68 | 94 | | | |

1/ Percent of <1-inch fraction

2/ $H_2O$ content at corresponding bulk density

## SPRINGERVILLE STONY SILTY CLAY* (taxadjunct) 1/
S56Ariz-3-6

Location: Coconino County, Arizona. In the NW ¼ SE ¼ Sec. 25, T. 19 N., R. 9 E. About 16 miles southeast of Flagstaff. Date of Sampling: September 21, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Fairly good cover of western wheatgrass, blue grama, muhly, snakeweed, pricklypear cactus, few annual weeds. Climate: Estimated 21 to 22 inches precipitation per year. Nearest weather station (Flagstaff): Mean annual temperature 45.6° F.; January average 27.2° F.; July average 65.2° F.; mean annual precipitation 20.27 inches. Parent Material: Weathered olivine basalt (Tertiary?), plus some local slope wash, and probably some residium from weathering of cinders and ash. Relief: Low, gently sloping fan or fan-terrace around an intermittent lake which is located on a large, rolling basalt plateau. Three or four feet above the floor of the intermittent lake. Subdued (3 to 6 inches) gilgai microrelief at this site. In some spots the gilgai is pronounced. About 1 percent slope, very slightly convex, toward the east. Elevation: About 7,130 feet. Drainage: Well drained (well aerated). Runoff, medium. Permeability, very slow.
Classification: Vertic Haploboroll, fine, montmorillonitic.
Remarks: Pair with S56Ariz-3-3. Surface here is stony to very stony in most places, nearly stony in a few places. Stones are basalt, and are mostly rounded. Weathered basalt pebbles, gravels and cobbles are scattered sparsely throughout the profile, are more numerous in the lower part. Black concretions are mostly rounded, but some of the larger ones are oval and odd-shaped, and some of these seem to have formed around a grain of weathered basalt. In places on the soil surface there are a few hard, white irregularly subrounded lime concretions 1/8 to 1/2 inch in diameter.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561085 | 0-1" -- Dark grayish brown (10YR 4/1.5) stony silty clay, very dark brown (10YR 2.5/2) when moist; strong very fine granular, except for 1/8 inch thick soft surface crust, which breaks to granules; hard, friable, very plastic, very sticky; few roots; very porous; noncalcareous except for an occasional small lime concretion; abrupt, slightly wavy lower boundary. |
| A12<br>BSL No.<br>561086 | 1-3" -- Dark grayish brown (9YR 4/2) stony silty clay, very dark grayish brown (9YR 3/2) when moist; moderate very coarse prismatic, breaking to strong medium subangular blocky, and finally to strong very fine and fine granular structure; extremely hard, very firm, very plastic, very sticky; many roots; few black spherical concretions, less than 1 mm in diameter; matrix noncalcareous, but contains a few hard lime concretions 1/8 to 1/4 inch in diameter; clear wavy lower boundary. |
| A13<br>BSL No.<br>561087 | 3-11" -- Dark grayish brown (9YR 3.5/2) silty clay or clay, very dark grayish brown (9YR 3/2) when moist; moderate very coarse prismatic, break to moderate coarse and medium subangular blocky structure; extremely hard, very firm, very plastic, very sticky; common roots; few small slickensides; common black spherical concretions 1/4 to 2 mm in diameter; noncalcareous matrix, with occasional hard lime concretion 1/8 to 3/8 inch in diameter; gradual, wavy lower boundary. |
| A14<br>BSL No.<br>561088 | 11-23" -- Dark grayish brown (9YR 4/2) silty clay or clay, very dark brown (9YR 2.5/2) when moist; weak very coarse prismatic, breaking to very coarse plates and finally to weak coarse irregular angular and subangular blocky structure; extremely hard, very firm, very plastic, very sticky; common slickensides; common roots along cracks, few in peds; many black spherical concretions 1/4 to 3 mm in diameter; matrix noncalcareous, with common hard lime concretions 1/8 to 3/8 inch in diameter; gradual, wavy lower boundary. |
| AC<br>BSL No.<br>561089 | 23-32" -- Brown (7.5YR 4/2) silty clay or clay, dark brown (7.5YR 3/2) when moist; many intersecting slickensides produce thick lozenge-like aggregates that break to weak coarse blocks; extremely hard, very firm, very plastic, very sticky; few roots; many black spherical concretions 1/4 to 3 mm in diameter; noncalcareous matrix, but with common hard lime concretions 1/8 to 3/8 inch in diameter; gradual, wavy lower boundary. |
| C1ca<br>BSL No.<br>561090 | 32-40" -- Finely indistinctly mottled reddish brown and brown (6YR 4/3 and 7.5YR 4/2) silty clay or clay, mottled dark reddish brown and dark brown (6YR 3/4 and 7.5YR 3/2) when moist; many intersecting slickensides produce very thick plates and lozenge-like aggregates; extremely hard, very firm, very plastic, very sticky; few roots; few thin patchy clay skins; few black spherical concretions 1/4 to 2 mm in diameter; matrix noncalcareous, but contains many hard lime concretions 1/8 to 1/2 inch in diameter; gradual wavy lower boundary. |
| C2ca<br>BSL No.<br>561091 | 40-51" -- Reddish brown (6YR 4/3) silty clay or clay, dark reddish brown (6YR 3.5/4) when moist, with few fine and medium mottles of dark brown (moist); many intersecting slickensides produce weak thick plates and lozenge-shaped aggregates; extremely hard, very firm, very plastic, very sticky; very few roots; few black spherical concretions 1/4 to 2 mm in diameter; matrix noncalcareous, but contains common hard lime concretions 1/8 to 5/8 inch in diameter; diffuse lower boundary. |
| C1<br>BSL No.<br>561092 | 51-60" -- Reddish brown (6YR 4/3) silty clay or clay, dark reddish brown (6YR 3.5/4) when moist; massive, with few slickensides; extremely hard, very firm, very plastic, very sticky; very few roots; numerous weathered basalt fragments; few black spherical concretions 1/4 to 2 mm in diameter; matrix noncalcareous, but contains few hard lime concretions 1/8 to 1/2 inch in diameter; abrupt, irregular lower boundary. |
| R<br>BSL No.<br>561093 | 60"+ -- Hard, weathered, dark gray olivine basalt. Slightly magnetic. |

*This profile was identified in original notes as Unnamed Grayish Brown Grumusol

1/ The Springerville series is in a fine, montmorillonitic, mesic family of Typic Chromusterts. This pedon has a mean annual temperature of less than 47° F.

**OIL SURVEY LABORATORY** Beltsville, Maryland

**OIL TYPE** Springerville clay (taxadjunct) **LOCATION** Coconino County, Arizona

SOIL FAMILY: Vertic Haploboroll, very-fine, montmorillonitic

SOIL NOS. S56Ariz-3-2 **LAB. NOS.** 561056-561062

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | 2A2 > 2 | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | $A_{11}$ | 0.0 | 0.0 | 0.0 | 0.2 | 1.1 | 29.9 | 68.8 | 9.5 | 21.5 | 0 | c |
| 1-7 | $A_{12}$ | 0.0 | 0.0 | 0.0 | 0.2 | 1.0 | 29.3 | 69.5 | 8.0 | 22.4 | 0 | c |
| 7-15 | $C_{g1}$ | 0.0 | 0.0 | 0.0 | 0.2 | 1.5 | 31.5 | 66.8 | 10.8 | 22.3 | 0 | c |
| 15-23 | $C_{g2}$ | 0.0 | 0.0 | 0.0 | 0.1 | 1.1 | 31.6 | 67.2 | 10.5 | 22.2 | 0 | c |
| 23-34 | $C_{g3}$ | 0.0 | 0.1 | 0.1 | 0.2 | 1.2 | 31.6 | 66.8 | 10.3 | 22.6 | 0 | c |
| 34-49 | $C_{g4}$ | 0.0 | 0.1 | 0.0 | 0.1 | 1.1 | 33.0 | 65.7 | 10.7 | 23.4 | 0 | c |
| 49-58 | C | 0.0 | 0.1 | 0.1 | 0.5 | 2.2 | 38.3 | 58.8 | 15.2 | 25.7 | 0 | c |

| 8C1a pH 1:1 | pH 1:5 | pH 1:10 | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a Free Iron % $Fe_2O_3$ | ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C | 1/ $H_2O$ % | 4A2a Bulk Density g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.0 | | | 2.11 | 0.179 | 11.8 | 1.0 | | | -- | | | |
| 5.9 | | | 1.67 | 0.142 | 11.7 | 1.2 | | 10.0 | 1.72 | | | |
| 6.2 | | | 0.86 | 0.092 | 9.4 | 1.5 | | 6.9 | 1.84 | | | |
| 6.5 | | | 0.68 | 0.061 | 11.1 | 1.3 | | 8.1 | 1.89 | | | |
| 6.8 | | | 0.54 | 0.058 | 9.3 | 1.1 | | 9.5 | 1.87 | | | |
| 7.2 | | | 0.43 | 0.046 | 9.3 | 1.2 | | 10.1 | 1.61 | | | |
| 7.5 | | | 0.23 | 0.030 | 7.7 | 2.2 | | 12.6 | 1.78 | | | |

| 5A3a CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q2a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE Na | K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | | |
| 58.8 | 28.1 | 16.0 | 11.8 | 0.24 | 2.62 | 80 | | | |
| 62.6 | 31.6 | 16.6 | 11.8 | 0.36 | 2.24 | 81 | | | |
| 58.6 | 30.2 | 16.9 | 9.0 | 0.48 | 2.05 | 85 | | | |
| 55.7 | 29.1 | 17.9 | 6.1 | 0.62 | 1.96 | 89 | | | |
| 55.8 | 29.5 | 19.2 | 4.4 | 0.69 | 2.06 | 92 | | | |
| 54.6 | 29.4 | 19.4 | 3.3 | 0.96 | 1.58 | 94 | | | |
| 51.2 | 28.4 | 18.4 | 2.0 | 1.13 | 1.25 | 96 | | | |

1/ $H_2O$ content at corresponding bulk density

## SPRINGERVILLE CLAY (taxadjunct) 1/

S56Ariz-3-2

Location: Coconino County, Arizona. Near the center of Pickett Lake, an intermittent lake basin in the NW ¼ Section 15, Twp. 19 N., R. 9 E. About 20 miles southeast of Flagstaff. Date of Sampling: September 19, 1956.
Collectors: W. M. Johnson, J. G. Cady, Milo James and Reuben Nelson.
Vegetation: Sparse cover of sedges, with trace of prostrate pigweed (Amaranthus sp.), rabbitbrush (Chrysothamnus sp.) and mallow. Nearly barren. Climate: Estimated 21 to 22 inches rainfall per year. Nearest weather station (Flagstaff): Mean annual temperature 45.6° F.; January average 27.2° F.; July average 65.2° F.; mean annual precipitation 20.27 inches.
Parent Material: Local alluvium washed from surrounding Grumusols that have developed in residium from olivine basalt. Relief: Level floor of a small intermittent lake (12 - 15 acres) in a rolling basalt plateau. Smooth, level. No gilgai at this point, but there is subdued gilgai around the margin of the lake floor. Elevation: About 7,130 feet. Drainage: Poorly drained. Water may stand for 6 to 8 months at a time. No runoff. Permeability very slow.
Remarks: There are helical gastropod shells scattered over the soil surface. There is a network of cracks 2 to 4 inches in width on the surface; these cracks are spaced 3 to 5 feet apart, making a crude polygonal pattern; they extend to a depth of 3½ feet. A paper envelope of concretions was taken for separate analysis.
Classification: Vertic Haploboroll, very-fine, montmorillonitic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561056 | 0-1" -- Very dark gray (10YR 3/1) clay, black (2.5/1) when moist; the surface ¼ inch is a hard crust with many cracks; the remainder is strong very fine granular structure; very hard, firm, very plastic, very sticky; many roots; noncalcareous; abrupt, slightly wavy lower boundary. |
| A12<br>BSL No.<br>561057 | 1-7" -- Very dark gray (10YR 3/1) clay, black (2/1) when moist; moderate very coarse prismatic, breaking to moderate coarse and medium subangular blocky structure; extremely hard, very firm, very plastic, very sticky; has few fine and medium mottles of dark yellowish brown (moist) around roots and root channels; many roots; no clay films; noncalcareous; clear, wavy lower boundary. |
| Cg1<br>BSL No.<br>561058 | 7-15" -- Dark gray (2.5Y 4/1) clay mottled with reddish yellow (7.5YR 5/6, dry), very dark gray (2.5Y 3/1) when moist; with common fine and medium mottles of dark yellowish brown (10YR 3/4); mottles most common in interiors of peds; many slickensides, mostly horizontal to about 30° angle, produce plates and lenticular peds 1 to 2 inches thick, and these break to moderate fine blocks; extremely hard, extremely firm, very plastic, very sticky; common roots; may have a few thin patches of clay films on some vertical surfaces; few hard spherical black and reddish brown concretions, ½ to 5 mm in diameter; noncalcareous; arbitrary boundary for sampling. |
| Cg2<br>BSL No.<br>561059 | 15-23" -- Clay, very slightly lighter colored than horizon above when moist, otherwise similar to Cg1. Common roots. Noncalcareous. Gradual, wavy lower boundary. |
| Cg3<br>BSL No.<br>561060 | 23-34" -- Dark gray (5Y 4/1) clay with few medium and fine mottles of dark yellowish brown, about same color when moist; very many slickensides produce thick plates and lenticular peds that break to weak medium and fine blocks; extremely hard, very firm, very plastic, very sticky; few spherical black shot as in horizon above (but fewer here); few roots; noncalcareous; may have few thin patchy clay films on some vertical surfaces; gradual, wavy lower boundary. |
| Cg4<br>BSL No.<br>561061 | 34-49" -- Dark gray (5Y 4/1) clay with many fine and medium mottles of dark yellowish brown, about same color when moist; common slickensides produce thick plates and lenticular peds that do not break down to smaller peds; extremely hard, very firm, very plastic, very sticky; very few spherical black concretions; few roots; noncalcareous; clear, irregular lower boundary. |
| C<br>BSL No.<br>561062 | 49-58" -- Brown clay with commonly fine and medium mottles of gray (5Y 5/1), dark yellowish brown with dark gray mottles when moist; massive with common slickensides at angle of 30° to 45° with the vertical; extremely hard, very firm, very plastic, very sticky; very few roots; common hard black spherical concretions, mostly less than 1 mm diameter; matrix noncalcareous but contains very few hard, irregular, nodular carbonate concretions. |

1/ The Springerville series is in a fine, montmorillonitic, mesic family of Typic Chromusterts. This pedon has a mean annual temperature of less than 47° F., has more than 60 percent clay, and has mottles within 7 inches of the surface.

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Springerville clay (taxadjunct) **LOCATION** Coconino County, Arizona

SOIL FAMILY: Vertic Haploboroll, very-fine, montmorillonitic

SOIL NOS. S56Ariz-3-7 **LAB. NOS.** 561094-561102

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 3A1 0.2-0.02 | 0.02-0.002 | > 2 | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | $A_{11}$ | 0.1 | 0.1 | 0.1 | 0.3 | 2.2 | 40.7 | 56.5 | 16.7 | 26.5 | 0 | sic/c |
| 1-3½ | $A_{12}$ | 0.0 | 0.1 | 0.1 | 0.3 | 2.1 | 37.4 | 60.0 | 14.6 | 25.1 | 0 | c |
| 3½-7 | $A_{13}$ | 0.2 | 0.1 | 0.0 | 0.2 | 1.8 | 35.5 | 62.2 | 11.2 | 26.2 | 0 | c |
| 7-15 | $A_{14}$ | 0.0 | 0.1 | 0.0 | 0.2 | 1.7 | 34.6 | 63.4 | 10.5 | 25.9 | 0 | c |
| 15-22 | $A_{15}$ | 0.0 | 0.1 | 0.0 | 0.2 | 1.6 | 34.0 | 64.1 | 10.4 | 25.3 | 0 | c |
| 22-32 | $A_{16}$ | 0.2 | 0.1 | 0.1 | 0.2 | 1.5 | 34.4 | 63.5 | 10.5 | 25.7 | 0 | c |
| 32-42 | AC | 0.1 | 0.2 | 0.1 | 0.2 | 1.8 | 35.7 | 61.9 | 11.1 | 26.6 | 0 | c |
| 42-54 | $C_1$ | 0.2 | 0.3 | 0.1 | 0.4 | 2.1 | 38.6 | 58.3 | 12.6 | 28.3 | 0 | c |
| 54-62+ | $C_2$ | 0.3 | 0.3 | 0.2 | 0.4 | 2.0 | 40.6 | 56.2 | 12.3 | 30.6 | 0 | c |

| 8C1a pH 1:1 | pH 1:5 | pH 1:10 | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a Free Iron $\%Fe_2O_3$ | ELECTRICAL CONDUCTIVITY EC ×10³ MILLIMHOS PER CM @25°C | 1/ $H_2O$ % | 4A2a Bulk Density g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.4 | | | 1.28 | 0.102 | 12 | 1.0 | | | -- | | | |
| 6.1 | | | 1.12 | 0.100 | 11 | 0.9 | | 5.1 | 1.84 | | | |
| 6.3 | | | 0.97 | 0.092 | 10 | 0.8 | | 6.1 | 1.80 | | | |
| 6.4 | | | 0.87 | 0.084 | 10 | 0.8 | | 7.5 | 1.86 | | | |
| 6.5 | | | 0.78 | 0.073 | 11 | 0.9 | | | | | | |
| 6.7 | | | 0.97 | 0.060 | 16 | 0.8 | | | | | | |
| 6.9 | | | 0.67 | 0.046 | 14 | 0.7 | | 9.5 | 1.86 | | | |
| 7.2 | | | 0.37 | 0.033 | 11 | 0.9 | | 6.8 | 1.97 | | | |
| 7.5 | | | 0.25 | 0.024 | 10 | 1.1 | | | | | | |

| 5A3a CATION EXCHANGE CAPACITY (Sum.) | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q1a 5B1a K | BASE SAT. % 5C3 | 6E1e $CaCO_3$ Equiv. % | K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil → | | | | | | | | |
| 49.7 | 26.9 | 15.3 | 6.3 | 0.22 | 1.76 | 87 | | | |
| 50.9 | 27.7 | 14.9 | 6.6 | 0.23 | 1.43 | 87 | | | |
| 54.9 | 31.4 | 17.1 | 5.0 | 0.32 | 1.08 | 91 | | | |
| 56.3 | 32.6 | 18.0 | 4.2 | 0.51 | 1.00 | 92 | | | |
| 56.9 | 32.6 | 18.2 | 4.4 | 0.64 | 1.05 | 92 | | | |
| 58.4 | 34.4 | 18.4 | 3.6 | 0.94 | 1.04 | 94 | | | |
| 54.9 | 31.9 | 18.1 | 2.8 | 1.13 | 0.94 | 95 | | | |
| 52.9 | 30.4 | 18.0 | 2.4 | 1.23 | 0.84 | 95 | | | |

1

1/ Bulk density at moisture given

## SPRINGERVILLE CLAY (taxadjunct) 1/

S56Ariz-3-7

Location: Coconino County, Arizona. In the NW ¼ SW ¼ Sec. 30, T. 19 N., R. 10 E. About 18 miles southeast of Flagstaff. Date of Sampling: September 21, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Sparse cover of annual weeds, with a few small patches of western wheatgrass. Most of the surface is bare. Climate: Estimated 21 to 22 inches precipitation per year. Nearest weather station (Flagstaff): Mean annual temperature 45.6° F.; January average 27.2° F.; July average 65.2° F.; mean annual precipitation 20.27 inches. Parent Material: Local alluvium derived from adjacent alluvial fans and low hills, from soils derived from olivine basalt, cinders and ash. Relief: Level floor of unnamed intermittent lake. Slight microrelief caused by sloughing of loose surface soil into deep, wide cracks. Level slope. Elevation: About 7,125 feet. Drainage: Poorly drained. Well aerated when dry, poorly aerated when moist or wet. No runoff. Very slow permeability. May be ponded for months at a time.
Remarks: Pair with profile S56Ariz-3-2. There are a few hard, white, rounded lime concretions in all horizons, and, in spots, a few lying on the soil surface.
Classification: Vertic Haploboroll, very-fine, montmorillonitic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561094 | 0-1" -- Dark gray (10YR 4/1) clay, very dark gray (10YR 3/1) when moist; the surface 1/8 to 1/4 inch is a hard, cracked massive crust; the rest of the horizon has strong fine and very fine granular structure; hard, firm, very plastic, very sticky; many roots, most of them oriented horizontally; noncalcareous; abrupt, slightly wavy lower boundary. |
| A12<br>BSL No.<br>561095 | 1-3½" -- Dark gray (10YR 4.5/1) clay, very dark gray (10YR 3/1) when moist; weak coarse prismatic, breaking to weak medium and thick platy, and finally to moderate fine and very fine granular structure; extremely hard, very firm, very plastic, very sticky; common roots; few black spherical concretions less than 1 mm. in diameter; noncalcareous; clear, slightly wavy lower boundary. |
| A13<br>BSL No.<br>561096 | 3½-7" -- Very dark gray (10YR 3.5/0.5) clay, black (10YR 2/1) when moist, with few faint fine dark brown (moist) mottles; weak very coarse prismatic, breaking to moderate fine and very fine subangular blocky structure; extremely hard, very firm, very plastic, very sticky; many roots; common fine and very fine tubular pores; few small slickensides; few black spherical concretions less than 1 mm in diameter; noncalcareous; gradual wavy lower boundary. |
| A14<br>BSL No.<br>561097 | 7-15" -- Very dark gray (10YR 3.5/0.5) clay, black (10YR 2/0.6) when moist; weak very coarse prismatic, breaking along slickensides to lozenge-shaped aggregates 3/4 to 2 inches thick; extremely hard, very firm, very plastic, very sticky; common roots; common fine and very fine tubular pores; common black spherical concretions 1 to 3 mm in diameter; noncalcareous; gradual wavy lower boundary. |
| A15<br>BSL No.<br>561098 | 15-22" -- Dark gray (10YR 4/0.8) clay, black (10YR 2/0.8) when moist, with few faint medium dark brown mottles (moist); many intersecting slickensides produce thick lozenge-shaped aggregates that break to weak coarse and very coarse irregular blocks; extremely hard, very firm, very plastic, very sticky; few roots; few fine and very fine tubular pores; few hard black spherical concretions 1 to 3 mm. in diameter; noncalcareous; gradual wavy lower boundary. |
| A16<br>BSL No.<br>561099 | 22-32" -- Indistinctly mottled very dark gray (10YR 3.5/0.8) and very dark grayish brown (10YR 3.5/2) clay, mottled black and very dark brown (10YR 2/0.8 and 2/2) when moist; many intersecting slickensides produce lozenge-shaped aggregates that are thick and well-formed; extremely hard, very firm, very plastic, very sticky; very few roots; few fine and very fine tubular pores; common black hard spherical concretions 1 to 3 mm. in diameter; noncalcareous; gradual wavy lower boundary. |
| AC<br>BSL No.<br>561100 | 32-42" -- Coarsely mottled brown (7.5YR 4/2) and dark gray (10YR 3.5/1) clay, coarsely mottled dark brown (7.5YR 3.5/2) and black (10YR 2/1) when moist; many large intersecting slickensides produce strong, coarse lozenge-shaped aggregates; extremely hard, very firm, very plastic, very sticky; very few roots; few fine and very fine tubular pores; many hard black spherical concretions 1 to 3 mm. in diameter; gradual wavy lower boundary. |
| C1<br>BSL No.<br>561101 | 42-54" -- Brown (7.5YR 4.5/2) clay, dark brown (7.5YR 3.5/2) when moist; common large intersecting slickensides produce moderate or weak coarse lozenge-shaped aggregates; extremely hard, very firm, very plastic, very sticky; very few roots; few fine and very fine tubular pores; many hard black spherical concretions ½ to 2 mm in diameter; noncalcareous; gradual, wavy lower boundary. |
| C2<br>BSL No.<br>561102 | 54-62"+ -- Reddish brown (6.5YR 5/3) clay, dark reddish brown (6.5YR 3.5/2) when moist; common large intersecting slickensides produce weak coarse lozenge-shaped aggregates; extremely hard, very firm, very plastic, very sticky; very few roots; few thin patchy clay skins; many hard black spherical concretions ½ to 2 mm in diameter; common hard, rounded lime concretions ¼ to ½ inch in diameter. |

1/ The Springerville series is in a fine, montmorillonitic, mesic family of Typic Chromusterts. This pedon has more than 60 percent clay, mottles within 3½ inches of the surface, and a mean annual temperature of less than 47° F.

CONSECUTIVE PEDON NUMBER C 69163 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES BARKERVILLE VARIANT SOIL NO. S69 ARIZ. 2-17 SAMPLE NO. 9 849-9 851 WILLCOX AREA

SOIL FAMILY: TYPIC ARGIUSTOLL,LOAMY,MIXED,THERMIC,SHALLOW RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBO NATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS OF WHOLE 20 | 75-20-5 | 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | |
| 9 849 | 0- 8 | A1 | 70.3 | 20.3 | 9.4 | 13.4 | 14.4 | 11.9 | 20.6 | 10.0 | 11.4 | 8.9 | | | | 32.3 | 31A | 4 | 13 | 14 |
| 9 850 | 8- 23 | B2T | 65.9 | 21.2 | 12.9 | 11.7 | 18.0 | 10.9 | 16.0 | 9.3 | 11.1 | 10.1 | | | | 28.9 | 27A | 3 | 8 | 16 |
| 9 851 | 23- 97 | C | 79.6 | 13.5 | 6.9 | 28.1 | 23.1 | 10.2 | 12.5 | 5.7 | 7.0 | 6.5 | | | | 19.1 | --G | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR-BON 6A1A | NITRO-GEN 6B1A | CARBONATE AS CACO3 LT 2 | 2-20 | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | PERCENT | | | -PERCENT- | |
| 9 849 | 0- 8 | 0.68 | 0.066 | | | 1.1 | 0.1 | | | NP | NP | 1.61 | 1.66 | 0.79 | 9.1 | 4.1 | 1.0 | 0.8 | |
| 9 850 | 8- 23 | 0.73 | 0.056 | | | 1.0 | 0.1 | | | 23 | 17 | 1.38 | 1.45 | 0.84 | 8.4 | 5.4 | 1.7 | 1.4 | |
| 9 851 | 23- 97 | 0.10 | | | | 0.9 | 0.1 | | | | | 2.32 | 2.37 | 1.00 | 4.5 | 4.4 | 0.7 | 0.7 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 849 | 0- 8 | | | 0.1 | 0.5 | 0.6 | | | 0.6 | 9.3 | | | | | 6.5 | 6.2 |
| 9 850 | 8- 23 | | | 0.1 | 0.4 | 0.5 | | | 0.5 | 12.7 | | | | | 6.8 | 6.4 |
| 9 851 | 23- 97 | | | 0.2 | 0.3 | 0.5 | | | 0.5 | 8.6 | | | | | 7.4 | 7.4 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | <0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 849 | 0- 8 | MI 5 | KK 4 | MT 2 | | | | | | | MI MICA | 1 TRACE |
| 9 850 | 8- 23 | MI 5 | KK 3 | MT 2 | | | | | | | KK KAOLINIT | 2 SMALL |
| 9 851 | 23- 97 | MI 5 | MT 2 | KK 2 | | | | | | | MT MONTMORT | 3 MODERATE |
| | | | | | | | | | | | | 4 ABUNDANT |
| | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## BARKERVILLE GRAVELLY HEAVY SANDY LOAM variant 1/

S69Ariz-2-17

Location: Cochise County, Arizona. 1,200 feet west and 400 feet north of the southeast corner of Sec. 33, T. 14 S., R. 27 E. Near State Highway 186 about 15 miles east and 5 miles south of Cochise. Date of sampling: October 17, 1969. Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Argiustoll, loamy, mixed, thermic, shallow.
Vegetation: Blue grama, sideoats grama, green sprangletop, cane beardgrass, three-awn, pricklypear, burroweed, and mesquite. Use: Livestock range. Climate: Precipitation about 14 inches. Mean annual air temperature 57°F., January 41°F., July 74°F. Parent Material: Granitic rock. Topography: Strongly sloping convex hills. Slope, 13 percent, south-southwest facing. Elevation: 5350 feet. Drainage: Well drained. Surface runoff is slow to medium. Permeability is moderate to bedrock. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator solution. This sample paired with S69Ariz-2-18.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>69849 | 0 to 8 cm (0 to 3 inches), dark grayish brown (10YR 4/2) gravelly heavy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; many fine and medium roots; few fine tubular pores; 40 to 45 percent surface cover of 2 to 30 mm angular granitic gravel, occasional granitic rock outcrop; about 30 percent by volume of 2 to 10 mm angular granitic gravel; noneffervescent; slightly acid (pH 6.5); abrupt wavy boundary. |
| B2t<br>RSL<br>69850 | 8 to 23 cm (3 to 9 inches), dark grayish brown (10YR 4/2) gravelly heavy sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; common fine tubular and few coarse tubular pores; about 15 to 20 percent by volume of 2 to 10 mm angular granitic gravel; noneffervescent; slightly acid (pH 6.5); abrupt irregular boundary. |
| C<br>RSL<br>69851 | 23 to 97 cm (9 to 38 inches), reddish yellow (5YR 6/6), dark grayish brown (10YR 4/2) and white (10YR 8/1) weathered granite, light gray (10YR 7/1), very dark grayish brown (10YR 3/2) and yellowish red (5YR 5/6) moist; massive; very hard, firm, nonsticky, nonplastic; tongues of dark grayish brown gravelly sandy loam in seams and joints of original bedrock extending 30 inches; many fine and medium roots in seams and tongues; few thin reddish yellow clay films and dark grayish brown coatings on rock faces; noneffervescent; slightly acid (pH 6.5). |

1/ The Barkerville series is in a loamy, mixed, mesic, shallow family of Udorthentic Haplustolls. This pedon has an argillic horizon.

CONSECUTIVE PEDON NUMBER C 69164 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES BARKERVILLE VARIANT SOIL NO. S69 ARIZ. 2-18 SAMPLE NO. 9 852-9 854 WILLCOX AREA

SOIL FAMILY: TYPIC ARGIUSTOLL,LOAMY,MIXED,THERMIC,SHALLOW RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | 1A2A INT. II .2-.02 | -COARSE FRAGMENTS- PCT. OF WHOLE 20 I 75- 20-5 | II 5-2 | III |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 9 852 | 0- 5 | A1 | 70.6 | 20.8 | 8.6 | 12.0 | 22.9 | 14.0 | 15.4 | 6.3 | 9.7 | 11.1 | | | | 23.3 | 57A | 14 | 30 | 13 |
| 9 853 | 5- 18 | B2T | 61.9 | 24.1 | 14.0 | 13.5 | 16.2 | 10.9 | 14.7 | 6.6 | 11.0 | 13.1 | | | | 25.1 | 52A | 6 | 34 | 12 |
| 9 854 | 18- 71 | C | 61.8 | 20.2 | 18.0 | 23.6 | 18.2 | 8.0 | 8.6 | 3.4 | 7.5 | 12.7 | | | | 14.7 | --G | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6G2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L L 4F1 | I M I T PL 4F2 | 1/3 BAR 4A1F | BULK DENSITY EST. 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | -PERCENT- | | | | PCT. | NO.40 | GRAMS PER CC | | | | -PERCENT- | | | -PERCENT- | |
| 9 852 | 0- 5 | 0.71 | 0.045 | | | 0.7 | 0.1 | | | NP | NP | | 1.51 | 1.59 | 0.57 | | 10.3 | 4.3 | 1.7 | 1.0 |
| 9 853 | 5- 18 | 0.76 | 0.057 | | | 0.8 | 0.1 | | | 23 | 17 | | 1.41 | 1.47 | 0.63 | | 10.9 | 6.2 | 1.4 | 0.9 |
| 9 854 | 18- 71 | 0.67 | 0.077 | | | 0.8 | 0.1 | | | | | 1.50 | | | 1.00 | | | 9.7 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6U2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA- CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 852 | 0- 5 | | | 0.1 | 0.5 | 0.6 | | | 0.6 | 9.2 | | | | | 6.1 | 5.5 |
| 9 853 | 5- 18 | | | 0.2 | 0.3 | 0.5 | | | 0.5 | 13.3 | | | | | 6.4 | 6.0 |
| 9 854 | 18- 71 | | | 0.2 | 0.4 | 0.6 | | | 0.6 | 19.9 | | | | | 6.5 | 6.3 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 852 | 0- 5 | | | | | | | | | |
| 9 853 | 5- 18 | MI 5 | MT 2 | KK 2 | | | | | | |
| 9 854 | 18- 71 | MT 4 | MI 4 | KK 2 | | | | | | |

MINERAL CODE: MI MICA, MT MONTMORT, KK KAOLINIT

RELATIVE AMOUNT: 1 TRACE, 2 SMALL, 3 MODERATE, 4 ABUNDANT, 5 DOMINANT, 6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## BARKERVILLE GRAVELLY SANDY LOAM variant 1/
S69Ariz-2-18

Location: Cochise County, Arizona. 2,000 east and 400 feet south of northwest corner of Sec.3, T. 15 S., R. 27 E. South of State Highway 186, about 3½ miles north and 20 miles east of Cochise. Date of sampling: October 17, 1969.
Description by: R. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Argiustoll, loamy, mixed, thermic, shallow.
Vegetation: Blue grama, sideoats grama, cane beardgrass, three-awn, burroweed, yucca, and mesquite. Use: Livestock range. Climate: Precipitation about 14 inches. Mean annual air temperature 57°F., January 41°F., July 74°F. Parent Material: Granitic rock. Topography: Strongly sloping convex hills. Slope, 11 percent, southwest facing. Elevation: 5270 feet. Drainage: Well drained. Surface runoff is slow to medium. Permeability is moderate to bedrock. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator solution. This sample paired with S69Ariz-2-17. The C horizon has tongues of dark grayish brown (10YR 4/2) gravelly sandy loam soil material in rock fractures and cracks that extend to a depth of 24 inches.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>69852 | 0 to 5 cm (0 to 2 inches), dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure in upper 1/2 inch, weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; many fine and medium roots; common fine and medium roots; common fine and medium tubular pores; 40 to 45 percent cover of 2 to 30 mm angular granitic on surface, occasional granitic rock outcrop; about 30 percent by volume of 2 to 10 mm angular granitic gravel; noneffervescent; slightly acid (pH 6.5); abrupt wavy boundary. |
| B2t<br>RSL<br>69853 | 5 to 18 cm (2 to 7 inches), dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; common fine tubular pores; about 20 percent by volume of 2 to 10 mm angular granitic gravel; noneffervescent; slightly acid (pH 6.5); abrupt irregular boundary. |
| C<br>RSL<br>69854 | 18 to 71 cm (7 to 28 inches), reddish yellow (5YR 6/6), dark grayish brown (10YR 4/2) and white (10YR 8/1) weathered granite, yellowish red (5YR 5/6), very dark grayish brown (10YR 3/2) and white (10YR 8/2) moist; massive; very hard, firm; common fine and medium roots in seams and fissures in rock; few thin yellowish red clay films and dark grayish brown coatings on rock faces; noneffervescent; slightly acid (pH 6.5). |

1/ The Barkerville series is in a loamy, mixed, mesic, shallow family of Udorthentic Haplustolls. This pedon has an argillic horizon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Argiustoll, fine, montmorillonitic, mesic

SOIL Thunderbird cobbly clay loam SOIL Nos. S65Ariz-13-13 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65246 - 65251

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments 1A2a: > 2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0-3 | A1 | 15.2 | 65.9 | 18.9 | 1.4 | 2.2 | 1.2 | 2.8 | 7.6 | 35.7 | 30.2 | 44.8 | 7.6 | 0 | 19 | 22 | 17 | 5 |
| 3-12 | B1t | 8.3 | 55.0 | 36.7 | 0.8 | 0.8 | 0.7 | 1.7 | 4.3 | 30.2 | 24.8 | 35.4 | 4.0 | 0 | 37 | **10 | 3 | 2 |
| 12-21 | B21t | 4.5 | 35.6 | 59.9 | 0.3 | 0.7 | 0.5 | 1.1 | 1.9 | 17.7 | 17.9 | 20.2 | 2.6 | 0 | 60 | 2 | 2 | 0 |
| 21-29 | B22t | 7.1 | 33.0 | 59.9 | 0.6 | 1.5 | 1.1 | 1.7 | 2.2 | 13.6 | 19.4 | 16.7 | 4.9 | 0 | 60 | 2 | 2 | 0 |
| 29-40 | IIB3tca | 52.5 | 28.2 | 19.3 | 13.4 | 14.6 | 7.4 | 11.4 | 5.7 | 9.8 | 18.4 | 21.7 | 46.8 | 0 | 19 | 2 | 2 | 0 |
| 40-81+ | IIC | 71.1 | 21.5 | 7.4 | 20.8 | 20.0 | 9.3 | 14.3 | 6.7 | 7.9 | 13.6 | 22.2 | 64.4 | 0 | 7 | 4 | 4 | 0 |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density | 3B2 | Water content: 4B1c 1/3 bar | Water content: 4B2 15 bar | 4D1 Extensibility COLE | 4D1 Extensibility COLE | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | Cm | Pct. | Pct. | in./in. | in./in. | | | |
| 0-3 | 1.35 | 0.104 | 13 | 0.8 | - | | | | | | 9.8 | | | | 6.8 | |
| 3-12 | 1.08 | 0.086 | 13 | 1.0 | - | 1.35 | 1.60 | | 0.94 | | 26.4 | 16.8 | 0.059 | 0.055 | | 6.8 | |
| 12-21 | 0.65 | 0.064 | 10 | 1.2 | - | 1.21 | 1.78 | | 0.99 | | 41.6 | 26.4 | 0.137 | 0.135 | | 7.5 | |
| 21-29 | 0.54 | 0.049 | 11 | 1.2 | 1 | 1.13 | 1.56 | | 0.99 | | 46.3 | 29.0 | 0.113 | 0.112 | | 7.9 | |
| 29-40 | 0.20 | | | 0.9 | 2 | 0.95 | 1.10 | | 0.99 | | 45.1 | 14.7 | 0.049 | 0.049 | | 8.1 | |
| 40-81+ | 0.06 | | | 0.9 | 1 | 0.97 | 0.98 | | 0.98 | | 44.1 | 11.5 | - | - | | 8.0 | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A2a NaOAc | 5A1a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1a $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0-3 | 11.7 | 5.5 | 0.2 | 0.7 | 18.1 | | | 20.2 | | | | | | | | | |
| 3-12 | 18.1 | 9.2 | 0.6 | 0.9 | 28.8 | | | 31.3 | | | | | | | | | |
| 12-21 | 29.4 | 17.5 | 2.1 | 0.9 | 49.9 | | | 50.5 | 0.6 | 0.9 | 3.2 | 3.2 | - | 3.4 | 27.6 | | 0.43 |
| 21-29 | 40.7 | 21.7 | 3.1 | 0.8 | 66.3 | | | 58.2 | 1.5 | 1.2 | 5.0 | 0.2 | - | 2.2 | 0.4 | | 0.73 |
| 29-40 | 30.1 | 12.7 | 3.1 | 0.5 | 46.4 | | | 35.3 | 6.4 | 4.3 | 11.8 | 0.1 | - | 2.4 | 2.5 | 6.7 | 2.27 |
| 40-81+ | 28.4 | 8.9 | 2.5 | 0.4 | 40.2 | | | 33.0 | 7.5 | 4.1 | 11.3 | 0.1 | - | 1.9 | 13.2 | 1.3 | 2.47 |

| Depth (In.) | 8A Water at Saturation | 5D2 Exchangeable Na | 5B1b Exch. Na meq / 100g | Gypsum | 5C1 Base Sat. | Clay mineralogy (<0.002 mm.) 7A: Mont. | Verm. | Mica | Kaolin. |
|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | X-ray | | | |
| 0-3 | | | | | 90 | xxx | | xx | x |
| 3-12 | | | | | 92 | xxx | | xx | x |
| 12-21 | 85.3 | 3 | 1.8 | | 99 | xxxx | | t | x |
| 21-29 | 98.5 | 4 | 2.6 | | 100+ | xxxx | | t | x |
| 29-40 | 53.3 | 7 | 2.5 | | 100+ | xxxx | | - | t |
| 40-81+ | 43.2 | 6 | 2.1 | | 100+ | xxxx | | - | - |

* All values from characterization sample (5Kg) (except as noted).

** >2 mm. includes field volume estimate of >76 mm.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## THUNDERBIRD COBBLY CLAY LOAM

S65Ariz-13-13

Location: Western Yavapai County Area, Arizona. About 2 miles east of the junction of the Rancho Moana and Williamson Valley roads on the county road between Skull Valley and Williamson Valley. NE¼ Sec. 12, T15N, R4W. Photo EGE 22-73. Date of Sampling: May 7, 1965.
Collectors: Flach, Nettleton, Jay, Meurisse, Winkelaar, Wiesner, Wendt.
Vegetation: Juniper-grass. Juniper, oakbrush, algerita, blue grama, sideoats grama, and beargrass. Climate: Mean annual precipitation 14-16". Mean annual temperature 54°F. Soil temperature at time of sampling 59°F. at 20" and 60°F. at 60". Parent Material: Basalt and cinders. Relief: Strongly sloping or rolling plain on a 9 percent convex, south facing slope. Elevation: 5,000 feet. Drainage: Medium runoff, moderately slowly permeable, and well drained.
Remarks: This soil is on basalt or cinders, under a juniper-grass cover. It is on nearly level to strongly sloping plains at elevations of 4000 to 6000 feet. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-17.
Classification: Typic Argiustoll, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65246 | 0 to 3 inches, grayish brown (10YR 5/2) very cobbly loam, very dark brown (10YR 2/2) when moist, weak medium platy breaking to strong fine granular structure; hard, firm, sticky and plastic; many very fine and fine roots; many interstitial and vesicular and common fine tubular pores; 30 percent cobbles, 50 percent gravels; about 80 percent of the surface is covered by cobble and gravel; noneffervescent; neutral (pH 7.0); clear, smooth boundary. |
| B1t<br>RSL No.<br>65247 | 3 to 12 inches, grayish brown (10YR 5/2) heavy clay loam; dark brown (7.5YR 3/2) when moist; weak medium prismatic breaking to moderate fine and medium subangular blocky structure; hard, firm, sticky and very plastic; many very fine and fine roots; common fine tubular and many fine interstitial pores; few moderately thick clay film on ped faces and in pores; few scattered, <5 percent gravels and cobbles; noneffervescent; neutral (pH 7.0); gradual wavy boundary. |
| B21t*<br>RSL No.<br>65248 | 12 to 21 inches, brown (7.5YR 4/4) dry and moist clay; moderate medium and coarse prismatic; very hard, firm, sticky and very plastic; plentiful very fine and fine roots; common very fine and fine tubular and many interstitial pores; many moderately thick clay films on ped faces and in pores; noneffervescent; mildly alkaline (pH 7.5); gradual wavy boundary. |
| B22t<br>RSL No.<br>65249 | 21 to 29 inches, brown (7.5YR 4/4) dry and moist clay; strong fine and medium angular blocky structure; very hard, firm, sticky and very plastic; moderate very fine and fine roots; common very fine and fine tubular and many interstitial pores; many fine and medium slickensides and pressure faces; 2-10 percent fine and medium gravels; noneffervescent; moderately alkaline (pH 8.0); clear, wavy boundary. |
| IIB3tca<br>RSL No.<br>65250 | 29 to 40 inches, brown (7.5YR 4/4) dry and moist very gravelly clay, (gravels are black basalt cinders 7.5YR 2/N); massive to moderate fine subangular blocky structure; hard, firm, sticky and plastic; few fine roots; slightly to violently effervescent; $CaCO_3$ occurs as common fine distinct few medium and an occasional large (up to 4") irregular soft white to yellow mottles masses. One pocket is 4" in diameter; moderately alkaline (pH 8.0); clear, wavy boundary. |
| IIC<br>RSL No.<br>65251 | 40 to 81 inches plus, black (7.5YR N2/) and reddish yellow (7.5YR 8/6) weathered basalt cinders with a few pockets of white (N8/) lime coated cinders. Pockets are 3 to 20" in diameter. 10 percent of mass is soil material of clay texture. Cinders are weakly cemented. |

*Sampled for BPR. B21t and B22t horizons combined for BPR sample.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Argiustoll, fine, montmorillonitic, mesic
SOIL Thunderbird cobbly clay loam SOIL Nos. S65Ariz-13-17 LOCATION Yavapai County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65252 - 65255

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt (0.05–0.002) | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments 1A2g >2 Pct | 2 – 19 Pct. of < 76 mm | 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0-2 | A1 | 21.9 | 56.7 | 21.4 | 5.5 | 5.5 | 2.7 | 3.8 | 4.4 | 28.3 | 28.4 | 34.6 | 17.5 | 0 | 21 | | 17 | 0 |
| 2-7 | B1t | 11.5 | 50.7 | 37.8 | 1.7 | 2.5 | 1.4 | 2.4 | 3.5 | 21.6 | 29.1 | 26.4 | 8.0 | 0 | 38 | | 6 | 0 |
| 7-28 | B21t&B22t | 8.8 | 42.1 | 49.1 | 1.4 | 2.0 | 1.2 | 1.9 | 2.3 | 14.9 | 27.2 | 18.2 | 6.5 | 0 | 49 | | 3 | 0 |
| 28-31 | Cca | 35.4 | 38.4 | 26.2 | 5.8 | 6.2 | 3.5 | 9.2 | 10.7 | 11.0 | 27.4 | 27.5 | 24.7 | 1 | 25 | | 10 | 0 |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | 6C2a Ext. Iron as Fe Pct. | 6E1b Carbonate as $CaCO_3$ Pct. | Bulk density: 4A1f 1/3 bar g/cc | Bulk density: 4A1h Oven dry g/cc | g/cc | Water content: Pct. | Water content: 4B1c 1/3 bar Pct. | Water content: 4B2 15 bar Pct. | 4D1 Extensibility COLEF in./in. | 4D1 Extensibility COLE in./in. | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | 2.85 | 0.198 | 14 | | - | | | | | | 12.3 | | | | 6.8 | |
| 2-7 | 1.17 | 0.100 | 12 | | - | | | | | | 16.6 | | | | 6.8 | |
| 7-28 | 0.70 | 0.064 | 11 | | - | | | | | | 22.6 | | | | 7.5 | |
| 28-31 | 0.37 | | | | 9 | | | | | | 29.2 | | | | 8.0 | |

| Depth (In.) | Extractable bases: 6N2a Ca | 6O2a Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A2a NaOAc | 5A1a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0-2 | 13.4 | 6.3 | 0.2 | 1.4 | 21.3 | | | 23.2 | | | | | | | | | |
| 2-7 | 20.5 | 10.5 | 0.2 | 0.7 | 31.9 | | | 33.1 | | | | | | | | | |
| 7-28 | 25.6 | 15.8 | 1.0 | 0.7 | 43.1 | | | 42.2 | | | | | | | | | |
| 28-31 | 41.9 | 24.7 | 3.4 | 0.6 | 70.6 | | 62.3 | 54.3 | 2.4 | 2.1 | 6.6 | 0.1 | | - | 4.00 | 2.2 | 1.07 |

| Depth (In.) | 8A Water at Saturation Pct. | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na meq / 100g | Gypsum Pct. | 5C1 Base Sat. Pct. | Atterberg limits: Plastic limit Pct. of <0.4 mm | Liquid limit | Plastic index |
|---|---|---|---|---|---|---|---|---|
| 0-2 | | | | | 92 | | | |
| 2-7 | | | | | 96 | | | |
| 7-28 | | | | | 100+ | 20 | 73 | 53 |
| 28-31 | 82.2 | 5 | 2.9 | | 100+ | | | |

* All values from characterization sample.

## THUNDERBIRD COBBLY CLAY LOAM
S65Ariz-13-17

Location: Western Yavapai County Area, Arizona. About 2/10 mile southeast of the Rancho Moana road on the county road between Skull Valley and Williamson Valley, then about 300 feet east of road. NE¼, Sec. 11, T15N, R4W. Photo EGE 22-155. Date of Sampling: May 11, 1965.
Collectors: Nettleton, Wendt, Meurisse, Wiesner, and Winkelaar.
Vegetation: Juniper-grass. Juniper, algerita, blue grama, tobosa, and mimosa. Climate: Mean annual precipitation 12-14". Mean annual temperature 54°F. Soil temperature at time of sampling 60°F. at 22". Parent Material: Basalt and cinders. Relief: Moderately sloping plains on an 8 percent convex west facing slope. Elevation: 4850 feet. Drainage: Medium runoff, moderately slow to slowly permeable and well drained.
Remarks: This soil is formed on basalt under a juniper-grass cover. It is on nearly level to strongly sloping plains at elevations of 4,000 to 6,000 feet. About 30 percent of the surface is covered by cobbles and 20 percent is covered by gravels. Hellige-Truog field kit was used to determine pH. Paired sample is S65 Ariz-13-13.
Classification: Typic Argiustoll, fine, montmorillonitic, mesic

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65252 | 0 to 2 inches, grayish brown (10YR 5/2) cobbly loam, dark brown (10YR 3/2) when moist; strong fine platy breaking to moderate very fine granular structure; slightly hard, friable, nonsticky and slightly plastic; abundant very fine and fine roots; many interstitial and common fine and very fine tubular pores; 30 percent cobbles and 20 percent gravels (basalt fragments and cinders); noneffervescent; neutral (pH 7.0); clear, smooth boundary. |
| B1t<br>RSL No.<br>65253 | 2 to 7 inches, dark gray (10YR 4/1) heavy clay loam, very dark brown (10YR 2/2) when moist; moderate fine and very fine subangular blocky structure; hard, firm, sticky and plastic; abundant fine and very fine roots, common very fine tubular pores; common (5-10 percent) cobbles and gravels; noneffervescent; mildly alkaline (pH 7.5); clear wavy boundary. |
| B21t*<br>RSL No.<br>65254 | 7 to 13 inches, dark gray (10YR 4/1) clay, very dark grayish brown (10YR 3/2) when moist; moderate medium and coarse prismatic, breaking to moderate medium and coarse subangular blocky structure; very hard, firm, sticky and plastic; abundant very fine roots; common very fine and fine tubular pores; common fine and medium pressure cutans and slickensides; common (5-10 percent) cobbles and gravels; noneffervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| B22t<br>RSL No.<br>combined<br>with<br>65254 | 13 to 28 inches, dark gray (10YR 4/1) clay, very dark grayish brown (10YR 3/2) when moist; weak medium and coarse angular blocky structure; very hard, firm, sticky and plastic; abundant very fine roots; common very fine and fine tubular pores; common fine and medium pressure cutans and slickensides; common (5-10 percent) cobbles and gravels; noneffervescent; moderately alkaline (pH 8.0); clear, wavy boundary. |
| Cca<br>RSL No.<br>65255 | 28 to 31 inches, brown (7.5YR 5/4) gravelly clay loam, strong brown (7.5YR 5/6) and reddish yellow (7.5YR 7/6) when moist; massive; very hard, firm, slightly sticky and plastic; plentiful very fine roots; few fine tubular pores; few thin clay film in pores; 30 percent gravel; violently effervescent; moderately alkaline (pH 8.2); abrupt irregular boundary. |
| R | 31 inches plus, dark gray (7.5YR N/4) basalt bedrock with tongues of soil material similar to Cca horizon extending 6-15 inches into R horizon. |

* Sampled for BPR. B21t and B22t combined for BPR sample.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Argiustoll, fine, montmorillonitic, mesic

SOIL Showlow gravelly sandy loam (taxadjunct) SOIL Nos. S65Ariz-13-18 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65276 - 65282

| Depth (In.) | Horizon | 1B1b Size class and particle diameter (mm) Total: Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Noncarbonate clay | * Coarse fragments 1A2a > 2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0-2 | A1 | 66.5 | 24.3 | 9.2 | 14.8 | 14.6 | 8.3 | 16.6 | 12.2 | 12.8 | 11.5 | 34.6 | 54.3 | 0 | 9 | 25 | 21 | 4 |
| 2-5 | B1t | 56.3 | 17.2 | 26.5 | 11.5 | 12.8 | 7.4 | 14.7 | 9.9 | 9.5 | 7.7 | 27.9 | 46.4 | 0 | 27 | 23 | 22 | 1 |
| 5-10 | B21t | 44.8 | 12.7 | 42.5 | 11.0 | 10.3 | 5.5 | 10.4 | 7.6 | 5.8 | 6.9 | 19.3 | 37.7 | 0 | 43 | 25 | 20 | 5 |
| 10-26 | B22t | 49.0 | 12.1 | 38.9 | 13.6 | 11.6 | 5.4 | 10.9 | 7.5 | 5.2 | 6.9 | 19.0 | 41.5 | 0 | 39 | 23 | 20 | 3 |
| 26-45 | B3t | 52.4 | 12.2 | 35.4 | 15.5 | 11.9 | 5.8 | 12.1 | 7.1 | 5.3 | 6.9 | 19.0 | 45.3 | 0 | 35 | 35 | 32 | 3 |
| 45-55 | C1ca | 60.4 | 13.8 | 25.8 | 19.2 | 15.5 | 7.5 | 12.1 | 6.1 | 5.3 | 8.5 | 17.7 | 54.3 | 0 | 26 | 40 | 36 | 4 |
| 55-68 | C2ca | 68.9 | 13.3 | 17.8 | 19.1 | 17.5 | 9.5 | 16.2 | 7.6 | 5.7 | 7.6 | 20.9 | 61.3 | 0 | 18 | 58 | 40 | 18 |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Carbonate as $CaCO_3$ crushed whole soil | Bulk density: 4A1f 1/3 bar | 4A1h Oven dry | | Water content: | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLE | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct | | Pct. | Pct. | | g/cc | g/cc | g/cc | Pct. | Pct. | Pct | in./in. | in./in. | | | |
| 0-2 | 0.73 | 0.059 | 12 | 1.1 | - | | | | | | | 3.9 | | | 6.9 | | |
| 2-5 | 0.79 | 0.080 | 10 | 1.0 | - | | | | | | | 11.0 | | | 6.6 | | |
| 5-10 | 0.71 | 0.072 | 10 | 1.0 | - | | | | | | | 18.8 | | | 6.4 | | |
| 10-26 | 0.35 | 0.038 | 9 | 0.8 | - | | | | | | | 17.8 | | | 6.5 | | |
| 26-45 | 0.10 | | | 0.5 | - | | | | | | | 17.8 | | | 7.2 | | |
| 45-55 | 0.05 | | | 0.5 | tr. | tr. | | | | | | 15.7 | | | 8.0 | | |
| 55-68 | 0.02 | | | 0.6 | | | | | | | | 8.8 | | | 8.1 | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | CEC clay | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 $NH_4OAc$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | Pct | Pct. |
| 0-2 | 5.5 | 2.6 | 0.1 | 0.3 | 8.5 | | 8.7 | | 94 | | 98 | |
| 2-5 | 13.4 | 5.6 | 0.1 | 0.5 | 19.6 | | 21.6 | | 82 | | 91 | |
| 5-10 | 21.5 | 10.4 | 0.2 | 0.8 | 32.9 | | 36.6 | | 86 | | 89 | |
| 10-26 | 23.1 | 11.9 | 0.3 | 0.6 | 35.9 | | 38.1 | | 98 | | 94 | |
| 26-45 | 22.7 | 10.7 | 0.4 | 0.4 | 34.2 | | 35.8 | | 101 | | 96 | |
| 45-55 | 14.8 | 5.8 | 0.5 | 0.3 | 21.4 | | 21.3 | | 83 | | 100 | |
| 55-68 | 12.3 | 5.0 | 0.5 | 0.3 | 18.1 | | 19.2 | | 108 | | 94 | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |

* All values from characterization sample.

## SHOWLOW GRAVELLY SANDY LOAM (taxadjunct) 1/
S65Ariz-13-18

Location: Western Yavapai County Area, Arizona. About 1 mile northwest of junction with the Rancho Moana road on the county road between Skull Valley and Williamson Valley, then ½ mile southwest of road. NW¼ Sec. 3, T15N, R4W. Photo EGE #33-204. Date of Sampling: May 14, 1965.
Collectors: Nettleton, Wendt, Meurisse, Wiesner
Vegetation: Brush-grass. Oakbrush, algerita, some juniper, blue grama, sideoats grama and snakeweed. Climate: Mean annual precipitation 14". Mean annual temperature 55°F. Soil temperature at time of sampling 60°F. at 20". Parent Material: Mixed alluvium from granite, schist and some basalt. Relief: Moderately sloping, midslope on 5 percent, convex, west facing alluvial fan. Elevation: 5,000 feet. Drainage: Medium runoff, moderately slowly permeable and well drained.
Remarks: This soil is formed in old alluvium, dominantly from granite and schist with some basalt, under a chaparral-type vegetation. It is on gently to steeply sloping alluvial fans at elevations of 4000 to 6000 feet. Hellige-Truog field kit was used to determine pH. Paired samples are S65 Ariz-13-9 and S65 Ariz-13-12.
Classification: Typic Argiustoll, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65276 | 0 to 2 inches, gray (10YR 5/1) gravelly sandy loam, very dark brown (10YR 2/2) when moist; weak medium and coarse platy structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine and fine roots; many very fine and fine vesicular pores; 50 percent fine and medium gravel, surface has thin gravel pavement; noneffervescent; neutral (pH 7.0); clear, wavy boundary. |
| B1t<br>RSL No.<br>65277 | 2 to 5 inches, dark brown (10YR 3/3) dry and moist finely gravelly clay loam; moderate very fine and fine subangular blocky structure; hard, friable, sticky and plastic; abundant very fine and fine roots; many very fine and fine interstitial and common very fine and fine tubular pores; few thin clay films on ped faces; 20 percent fine gravels and a few cobbles; noneffervescent; neutral (pH 7.0); clear wavy boundary. Tongues of this horizon extend to 26". |
| B21t*<br>RSL No.<br>65278 | 5 to 10 inches, brown (7.5YR 4/2) finely gravelly clay, dark brown (7.5YR 3/2) when moist; weak fine and medium subangular blocky structure; very hard, firm, sticky and plastic; abundant very fine and fine roots; common fine interstitial pores; common thin clay films on ped faces and many pressure faces; 25 percent fine gravel and a few cobble; noneffervescent; neutral (pH 7.0); clear, smooth boundary. |
| B22t<br>RSL No.<br>65279 | 10 to 26 inches, reddish brown (5YR 4/4) finely gravelly clay, dark reddish brown (5YR 3/4) when moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; plentiful fine and medium roots; common very fine and fine tubular and many fine interstitial pores; common moderately thick clay films on ped faces and many pressure faces; 25 percent fine gravels;noneffervescent; moderately alkaline (pH 7.8); clear, wavy boundary. |
| B3t<br>RSL No.<br>65280 | 26 to 45 inches, reddish brown (5YR 5/4) gravelly clay loam, reddish brown (5YR 4/4) when moist; weak, medium subangular blocky structure (25 percent of horizon consists of pockets of pink (5YR 7/4) massive gravelly clay loam, reddish brown (5YR 4/4) when moist, similar to C1ca horizon but noneffervescent.) Very hard, firm, sticky and plastic; few fine and very fine roots; few very fine and fine tubular and common fine interstitial pores; common moderately thick clay films on ped faces and common pressure faces; 30 percent fine and medium gravel with a few cobble; noneffervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| C1ca*<br>RSL No.<br>65281 | 45 to 55 inches, pink (5YR 7/3) very gravelly clay loam, yellowish red (5YR 5/6) when moist; massive; very hard, firm, slightly sticky and plastic; few fine and very fine roots; very few fine tubular and common fine interstitial pores; few pressure faces; 60-70 percent gravel; non to slightly effervescent; pockets of CaCO3 common, tonguing into C2 horizon; moderately alkaline (pH 8.0); gradual irregular boundary. |
| C2ca<br>RSL No.<br>65282 | 55 to 68 inches, light reddish brown (5YR 6/4) gravelly sandy clay loam, reddish brown (5YR 5/4) when moist; massive; hard, friable, slightly sticky and plastic; few fine roots; common fine tubular and many fine interstitial pores; 60-70 percent gravels; non to strongly effervescent; moderately alkaline (pH 8.0). |

* Sampled for BPR.

1/ The Showlow series is in a fine, montmorillonitic, mesic family of Ustollic Haplargids. This pedon has a mollic epipedon.

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Ziegler silty clay loam (taxadjunct) **LOCATION** Apache County, Arizona

SOIL FAMILY: Typic Argiustoll, fine, montmorillonitic, mesic

SOIL NOS. S56Ariz-1-2 **LAB. NOS.** 561130-561136

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | > 2 | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-3 | $A_{11}$ | 2.4 | 2.1 | 1.3 | 3.2 | 9.5 | 62.5 | 19.0 | 37.9 | 36.1 | 25 | sil |
| 3-5 | $A_{12}$ | 2.0 | 1.6 | 0.8 | 2.1 | 6.3 | 58.8 | 28.4 | 28.6 | 37.8 | 14 | sicl |
| 5-8 | B1 | 1.0 | 1.2 | 0.6 | 1.7 | 4.9 | 52.0 | 38.6 | 25.2 | 32.9 | 8 | sicl |
| 8-14 | B21t | 0.6 | 0.7 | 0.5 | 1.2 | 2.8 | 26.5 | 67.7 | 11.9 | 18.2 | 2 | c |
| 14-23 | B22t | 1.0 | 1.1 | 0.7 | 1.6 | 2.8 | 25.4 | 67.4 | 11.0 | 18.2 | 5 | c |
| 23-27 | B23t | 1.2 | 2.6 | 2.4 | 7.0 | 9.6 | 48.9 | 28.3 | 27.8 | 35.0 | 11 | cl |
| 27-36 | C1 | 20.5 | 33.5 | 13.1 | 14.3 | 5.4 | 9.3 | 3.9 | 16.0 | 5.5 | 12 | lcos/s |

| DEPTH INCHES | pH 8C1a 1:1 | pH 1:5 | pH 1:10 | ORGANIC MATTER 6A1b ORGANIC CARBON % | ORGANIC MATTER 6B2a NITROGEN % | C/N | 6C1a Free Iron $\%Fe_2O_3$ | ELECTRICAL CONDUCTIVITY EC $\times 10^3$ MILLIMHOS PER CM @25°C | $H_2O$ % | Bulk Density | MOISTURE TENSIONS 1/10 ATMOS. % | MOISTURE TENSIONS 1/3 ATMOS. % | MOISTURE TENSIONS 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-3 | 6.5 | | | 2.05 | 0.090 | 23 | 2.6 | | | | | | |
| 3-5 | 6.4 | | | 1.88 | 0.091 | 21 | 2.8 | | | | | | |
| 5-8 | 6.4 | | | 1.40 | 0.087 | 16 | 2.6 | | | | | | |
| 8-14 | 6.5 | | | 0.98 | 0.085 | 12 | 2.2 | | | | | | |
| 14-23 | 6.9 | | | 0.83 | 0.064 | 13 | 1.9 | | | | | | |
| 23-27 | 7.4 | | | 0.30 | 0.035 | 8 | 1.8 | | | | | | |
| 27-36 | 7.8 | | | 0.17 | 0.012 | 14 | 1.4 | | | | | | |

| DEPTH INCHES | CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS 5B1a 6N2b Ca | EXTRACTABLE CATIONS 5B1a 6O2b Mg | EXTRACTABLE CATIONS 6H2a H | EXTRACTABLE CATIONS 5B1a 6P2a Na | EXTRACTABLE CATIONS 5B1a 6Q1a K | BASE SAT. % 5C3 | 6E1e $CaCO_3$ Equiv. % | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|
| | | milliequivalents per 100g. soil → | | | | | | | |
| 0-3 | 23.7 | 12.0 | 5.3 | 5.5 | 0.01 | 0.92 | 77 | | |
| 3-5 | 28.2 | 14.9 | 6.6 | 6.0 | 0.01 | 0.74 | 79 | | |
| 5-8 | 32.2 | 16.8 | 7.9 | 6.8 | 0.10 | 0.58 | 79 | | |
| 8-14 | 50.4 | 26.1 | 15.8 | 7.2 | 0.48 | 0.82 | 86 | | |
| 14-23 | 59.4 | 27.8 | 25.2 | 5.0 | 0.61 | 0.82 | 92 | | |
| 23-27 | | | | | | | | 2 | |
| 27-36 | | | | | | | | 3 | |

## ZIEGLER SILTY CLAY LOAM* (taxadjunct) 1/
S56Ariz-1-2

Location: Apache County, Arizona, in the S1/2NW ¼, Sec. 31, T. 10 N., R. 24 E. 1.85 miles west-southwest of Pinon. Date of Sampling: September 24, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Open stand of pinon pine, alligator juniper, ponderosa pine, few small oak, with sparse understory of blue grama, fescue, western wheatgrass, and annual weeds. Climate: Estimated about 18 to 20 inches precipitation per year. Nearest weather station (Springerville): Mean annual temperature 48.7° F.; January average 31.1° F.; July average 66.9° F.; mean annual precipitation 12.11 inches; mean annual precipitation (Show Low) 18.4 inches. Parent Material: Weathered volcanic cinders and ash, with included basalt "bombs". Said to be Tertiary in age. Relief: Near base of steeply sloping old cinder cone. 12 percent slope, plane, toward north. Elevation: About 7,120 feet. Drainage: Well drained (well aerated). Medium runoff. Slow permeability. Remarks: Single profile--no pair.
Classification: Typic Argiustoll, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| O1 + O2 (not sampled) | ½-0" -- Needles and twigs, with thin mor humus layer below. Abrupt, smooth lower boundary. |
| A11 BSL No. 561130 | 0-3" -- Dark reddish gray (4YR 4/2) slightly gritty silt loam; dark reddish brown (4YR 3/2) when moist; very weak thin platy structure--mulch-like; soft, very friable, slightly plastic, slightly sticky; few roots; very porous; contains scattered cinders of pebble and cobble size; noncalcareous; abrupt, smooth lower boundary. |
| A12 BSL No. 561131 | 3-5" -- Weak red (2.5YR 4/2) slightly gritty light silty clay loam, very dusky red (2.5YR 2.5/2) when moist; moderate thin platy structure; hard, friable, plastic, slightly sticky; many roots; very porous; contains scattered cinders of gravel and cobble size; noncalcareous; clear, smooth lower boundary. |
| B1 BSL No. 561132 | 5-8" -- Silty clay of the same color as the A12, containing scattered cinders of gravel and cobble size; weak coarse and medium subangular blocky, breaking to strong moderate and coarse granular structure; very hard, firm, very plastic, very sticky; many roots; very porous; no clay skins observed; noncalcareous; clear, wavy lower boundary. |
| B21t BSL No. 561133 | 8-14" -- Dusky red (2.5YR 3.5/2) clay, dark reddish brown (2.5YR 3/3) when moist; strong medium and fine prismatic, breaking to weak medium blocky structure; extremely hard, very firm, very plastic, very sticky; moderate, continuous clay skins; common roots; common fine and very fine pores; few coarse sand and gravel-size cinders; noncalcareous; clear, wavy lower boundary. |
| B22t BSL No. 561134 | 14-23" -- Dark reddish brown (2.5YR 3.5/3 dry, 3/4 moist) clay containing scattered cinders of coarse sand and fine gravel size; weak very coarse prismatic, breaking to weak coarse and medium subangular blocky structure; extremely hard, very firm, very plastic, very sticky; continuous clay skins; common slickensides; few roots; few fine and very fine pores; noncalcareous; abrupt, wavy lower boundary. |
| B23t BSL No. 561135 | 23-27" -- Reddish brown (2.5YR 4/3) gritty clay, dark reddish brown (2.5YR 3.5/5) when moist; weak medium and fine subangular blocky structure; extremely hard, very firm, very plastic, very sticky; there is a stone line in the upper 1½ inches of this horizon, the stones consisting of hard, dense, rounded cinders; the clay matrix below contains many grains and small pebbles of cinder; very few roots; few small slickensides; moderate, continuous clay skins; few fine and very fine pores; noncalcareous; abrupt, wavy lower boundary. |
| C1 BSL No. 561136 | 27-36"+-- This may be an old truncated B horizon. It is reddish brown (2.5YR 5/3) when dry, dark reddish brown (2.5YR 3/4) when moist, and has common fine and medium black mottles ($MnO_2$?) and white films and threads on many of the peds. The material looks clayey and has what appears to be moderately thick clay skins on all surfaces. In place it is very compact and very hard to dig, and has high bulk density. It digs out in plates ½ to 3/4 inch thick that break easily to strong very fine blocks. Hard when dry and moist. Cannot be moistened and rubbed to a plastic mass--it remains harsh and crisp to the feel. The white mottles are calcareous, but the matrix is noncalcareous. On the tops of some of the thick plates is a lime crust 1 to 2 mm thick. |

*Identified in original notes as Unnamed Soil on Cinders

1/ The Ziegler series is in a clayey over fragmental, montmorillonitic, mesic family of Typic Argiustolls. This pedon has less than 35 percent gravel and cobbles by volume.

CONSECUTIVE PEDON NUMBER C 69168 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES LUZENA SOIL NO. S69 ARIZ. 2-22 SAMPLE NO. 9 865-9 867 WILLCOX AREA

SOIL FAMILY: LITHIC VERTIC ARGIUSTOLL,CLAYEY,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE .2U | CARBO NATE 3A1A.02 | INT. II .2-.05 | COARSE FRAGMENTS PCT. OF WHOLE 20 I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | | |
| 9 865 | 0- 8 | A1 | 60.3 | 22.5 | 17.2 | 12.1 | 10.6 | 8.2 | 18.0 | 11.4 | 11.4 | 11.1 | | | | 33.4 | 56A | 37 | 18 | 1 |
| 9 866 | 8- 25 | B21T | 24.6 | 13.7 | 61.7 | 3.8 | 5.0 | 3.3 | 7.9 | 4.6 | 5.2 | 8.5 | | | | 14.2 | 32A | 14 | 16 | 2 |
| 9 867 | 25- 43 | B22T | 21.5 | 15.2 | 63.3 | 4.0 | 3.9 | 2.8 | 6.3 | 4.5 | 5.7 | 9.5 | | | | 13.9 | 40A | -- | 37 | 3 |

PCT. OF LT 75

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT EXT FE 6C2B | AL 6G7A | PYROP EXT FE 6C5A | AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | PI 4A1F | BULK DENSITY 1/3 BAR 4A1F | ORY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | -PERCENT- | |
| 9 865 | 0- 8 | 1.54 | 0.115 | | | 0.6 | 0.1 | | | 28 | 21 | 1.25 | | 0.62 | | | | 8.5 | | |
| 9 866 | 8- 25 | 1.40 | 0.126 | | | 0.9 | 0.1 | | | | | | 1.17 | 1.60 | 0.83 | 36.5 | 25.4 | 11.0 | 8.8 | |
| 9 867 | 25- 43 | 0.69 | 0.075 | 1 | | 0.8 | 0.1 | | | 77 | 33 | | 1.19 | 1.66 | 0.77 | 38.2 | 27.6 | 11.7 | 8.6 | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 865 | 0- 8 | | | 0.2 | 1.5 | 1.7 | | | 1.7 | 13.9 | | | | | 5.9 | 5.4 |
| 9 866 | 8- 25 | | | 0.4 | 3.4 | 3.8 | | | 3.8 | 35.9 | | | | | 6.8 | 6.6 |
| 9 867 | 25- 43 | | | 0.6 | 3.9 | 4.5 | | | 4.5 | 39.4 | | | | | 7.5 | 7.3 |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 865 | 0- 8 | MI 4 | MT 2 | KK 2 | | | | | | | MI MICA |
| 9 866 | 8- 25 | MI 3 | MT 2 | KK 2 | | | | | | | MT MONTMORT |
| 9 867 | 25- 43 | MI 4 | MT 2 | KK 2 | | | | | | | KK KAOLINIT |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## LUZENA GRAVELLY LOAM
S69Ariz-2-22

Location: Cochise County, Arizona. 1,980 feet west and 660 feet north of southeast corner of Sec. 13, T. 17 S., R. 28 E. East of State Highway 181, about 22 miles east and 3½ miles north of Pearce. Date of sampling: October 21, 1969.

Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.

Classification: Lithic Vertic Argiustoll, clayey, mixed, mesic.

Vegetation: Black grama, cane beardgrass, green sprangletop, and some yucca. Use: Livestock range. Climate: Precipitation about 16 to 17 inches. Mean annual air temperature 57°F., January 41°F., July 74°F. Parent Material: Rhyolite. Topography: Moderately sloping convex hills. Slope, 7 percent, south facing. Elevation: 5050 feet. Drainage: Well drained. Runoff is medium to rapid. Permeability is slow. Soil Moisture: Dry when sampled.

Remarks: Field determinations of pH by Hellige-Truog indicator solution. This sample paired with S69Ariz-2-26.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>69865 | 0 to 8 cm (0 to 3 inches), brown (10YR 5/3) gravelly loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; common very fine and fine tubular pores; about 40 percent surface cover of subangular rhyolite gravel and cobbles, 25 percent of the cover is 1/4 to 2 inch gravel and 15 percent is 3 to 6 inch cobble; horizon contains about 25 percent by volume of 1/4 to 1 1/2 inch subangular rhyolite gravel and 10 percent by volume of 3 to 6 inch cobbles; noneffervescent; medium acid (pH 6.0); clear smooth boundary. |
| B21t<br>RSL<br>69866 | 8 to 25 cm (3 to 10 inches), reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/3) moist; moderate fine and medium subangular and angular blocky structure; very hard, friable, sticky, very plastic; common fine and medium roots; few fine tubular pores; common thin clay films on ped faces; about 10 percent by volume of 1/4 to 1 1/2 inch subangular rhyolite gravel; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B22t<br>RSL<br>69867 | 25 to 43 cm (10 to 17 inches), reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular and angular blocky structure; very hard, friable, sticky, very plastic; common very fine and fine roots; common moderately thick clay films on ped faces; noneffervescent; neutral (pH 7.0); abrupt irregular boundary. |
| R | 43 to 48 cm (17 to 19 inches), light gray (5Y 7/2) fractured rhyolite bedrock olive gray (5Y 5/2) moist; massive; extremely hard; with few tongues of clay soil material in rock fractures and cracks; few medium and coarse roots; slightly effervescent on surface of rock; neutral (pH 7.0). |

CONSECUTIVE PEDON NUMBER C 69172 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES LUZENA SOIL NO. S69 ARIZ. 2-26 SAMPLE NO. 9 884-9 886 WILLCOX AREA

SOIL FAMILY: LITHIC VERTIC ARGIUSTOLL,CLAYEY,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | PCT. OF LT 75 | |
| 9 884 | 0- 5 | A1 | 65.6 | 21.2 | 13.2 | 7.8 | 15.8 | 11.5 | 19.0 | 11.5 | 11.3 | 9.9 | | | | 33.8 | 38A | 15 | 12 | 11 |
| 9 885 | 5- 20 | B21T | 19.7 | 14.3 | 66.0 | 3.9 | 3.4 | 2.3 | 6.1 | 4.0 | 5.9 | 8.4 | | | | 13.5 | 6A | -- | 2 | 4 |
| 9 886 | 20- 41 | B22T | 11.3 | 11.2 | 77.5 | 2.2 | 1.8 | 1.4 | 3.5 | 2.4 | 3.5 | 7.7 | | | | 7.9 | 3A | -- | 1 | 2 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR-BON 6A1A | NITRO-GEN 6B1A | CARBONATE AS CACO3 LT 2 6F1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY 1/3 BAR 4A1F | 15 BAR 4A1F | ODRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PERCENT | | PERCENT | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 9 884 | 0- 5 | 1.12 | 0.098 | | | | | | | | | 1.25 | | 0.78 | | | | 7.2 | | |
| 9 885 | 5- 20 | 0.91 | 0.101 | | | | | | | 68 | 34 | | 1.06 | 1.58 | 0.98 | | 48.2 | 25.9 | 14.2 | 13.8 |
| 9 886 | 20- 41 | 0.60 | 0.081 | 1 | | | | | | | | | 1.02 | 1.55 | 0.99 | | 54.3 | 32.7 | 15.0 | 14.7 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI-DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 884 | 0- 5 | | | 0.1 | 1.3 | 1.4 | | | 1.4 | 12.7 | | | | | 6.3 | 5.7 |
| 9 885 | 5- 20 | | | 0.5 | 5.0 | 5.5 | | | 5.5 | 38.8 | | | | | 6.9 | 6.7 |
| 9 886 | 20- 41 | | | 0.7 | 5.8 | 6.5 | | | 6.5 | 44.5 | | | | | 7.4 | 7.3 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 884 | 0- 5 | MI 3 | MT 2 | | | | | | | |
| 9 885 | 5- 20 | MT 2 | MI 2 | KK 1 | | | | | | |
| 9 886 | 20- 41 | | | | | | | | | |

| MINERAL CODE | RELATIVE AMOUNT |
|---|---|
| MI MICA | 1 TRACE |
| MT MONTMORT | 2 SMALL |
| KK KAOLINIT | 3 MODERATE |
| | 4 ABUNDANT |
| | 5 DOMINANT |
| | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## LUZENA VERY GRAVELLY LOAM
S69Ariz-2-26

Location: Cochise County, Arizona. 1,000 feet south and 2,000 feet east of the northwest corner of Sec. 13, T. 17 S., R. 28 E. East of State Highway 181, about 4 miles north and 22 miles east of Pearce. Date of sampling: October 23, 1969. Description by: D. Richmond, K. Dunstan. Collectors: D. Richmond, K. Dunstan. Classification: Lithic Vertic Argiustoll, clayey, mixed, mesic. Vegetation: Sideoats grama, hairy grama, cane beardgrass, yucca, pricklypear, and a few juniper. Use: Livestock range. Climate: Precipitation about 17 to 18 inches. Mean annual air temperature 57°F., January 41°F., July 74°F. Parent Material: Rhyolite. Topography: Moderately steep convex hills. Slope, 25 percent, southwest facing. Elevation: 5120 feet. Drainage: Well drained. Runoff is medium to rapid. Permeability is slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator solution. This sample paired with S69Ariz-2-22.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>69884 | 0 to 5 cm (0 to 2 inches), dark brown (7.5YR 4/2) very gravelly loam, dark reddish brown (5YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; common fine and medium tubular pores; surface cover of about 80 percent subangular rhyolite fragments of which approximately 50 percent is 1/2 to 5 cm gravel and 30 percent is 8 to 20 cm cobbles; noneffervescent; medium acid (pH 6.0); abrupt wavy boundary. |
| B21t<br>RSL<br>69885 | 5 to 20 cm (2 to 8 inches), dark reddish gray (5YR 4/2) clay, dark brown (5YR 3/2) moist; moderate fine and medium angular and subangular blocky structure; very hard, firm, sticky, very plastic; many fine and medium roots; few very fine tubular pores; common thin clay films on faces of peds; common pressure faces; approximately 5 percent by volume 8.5 to 10 mm subangular rhyolite gravel; noneffervescent; neutral (pH 7.0); clear wavy boundary. |
| B22t<br>RSL<br>69886 | 20 to 41 cm (8 to 16 inches), dark brown (10YR 4/3) clay, dark brown (10YR 3/3) moist; moderate fine and medium angular and subangular blocky structure; very hard, firm, sticky, very plastic; many fine and medium roots; few very fine tubular pores; common thin clay films on faces of peds; common pressure faces; about 5 percent by volume of 5 to 10 mm subangular rhyolite gravel; noneffervescent; neutral (pH 7.0); abrupt irregular boundary. |
| R | 41 to 51 cm (16 to 20 inches), light yellowish brown (10YR 6/4) and very dark gray (10YR 3/1) fractured rhyolite bedrock, dark brown (10YR 4/3) and black (10YR 2/1) moist; massive; extremely hard; few very fine roots in fractures; contain thin lime coating on faces in fractures; violently effervescent on fracture faces, rock is noneffervescent; slightly acid (pH 6.5). |

CONSECUTIVE PEDON NUMBER C 69161 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES ELFRIDA TAXADJUNCT SOIL NO. S69 ARIZ. 2-15 SAMPLE NO. 9 843-9 846 WILLCOX AREA

SOIL FAMILY: TYPIC CALCIUSTOLL,FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE | INT. II 3A1A.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. | | | |
| 9 843 | 0- 33 | AP | 12.6 | 56.1 | 31.3 | 0.1 | 0.6 | 1.0 | 5.1 | 5.8 | 17.0 | 39.1 | | | | 26.2 | --A | -- | -- | -- |
| 9 844 | 33- 56 | A12 | 20.5 | 51.1 | 28.4 | 0.4 | 1.1 | 1.9 | 8.3 | 8.8 | 17.7 | 33.4 | | | 4 | 31.9 | --A | -- | -- | -- |
| 9 845 | 56- 83 | C 1CA | 28.3 | 50.8 | 20.9 | 1.1 | 2.5 | 3.0 | 10.6 | 11.1 | 19.3 | 31.5 | | | 6 | 37.2 | --A | -- | -- | -- |
| 9 846 | 83-125 | C 2CA | 35.0 | 33.1 | 31.9 | 4.4 | 7.0 | 4.3 | 10.5 | 8.8 | 12.2 | 20.9 | | | 13 | 27.5 | --G | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG. CARBON 6A1A | MATTER NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT.NO.40 | | GRAMS PER CC | | | | -----PERCENT----- | | | -PERCENT-- | | | | |
| 9 843 | 0- 33 | 0.92 | 0.097 | 2 | | | 35 | 22 | | 1.37 | 1.56 | 1.00 | | 25.8 | 14.4 | 4.4 | 4.4 | 7.6 | | 7.7 |
| 9 844 | 33- 56 | 0.60 | 0.065 | 11 | | | | | | 1.28 | 1.40 | 1.00 | | 28.1 | 14.4 | 3.0 | 3.0 | 7.4 | | 7.7 |
| 9 845 | 56- 83 | 0.37 | | 22 | | | 33 | 23 | | 1.28 | 1.33 | 1.00 | | 28.7 | 12.2 | 1.3 | 1.3 | 7.5 | 8.7 | 7.7 |
| 9 846 | 83-125 | 0.36 | | 39 | | | | | | 1.54 | 1.59 | 1.00 | | 21.9 | 17.3 | 1.1 | 1.1 | 7.6 | 8.7 | 7.8 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | CEC NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 9 843 | 0- 33 | | | 0.8 | 2.5 | 3.3 | | | 24.7 | | | | | | | | | | | |
| 9 844 | 33- 56 | | | 1.0 | 2.2 | 3.2 | | | 18.7 | | | | | | | | | | | |
| 9 845 | 56- 83 | | | 0.7 | 2.4 | 3.1 | | | 13.5 | 1.60 | 9.9 | 3.5 | 6.2 | 1.1 | | 2.4 | 5.3 | 13.0 | | 7.7 |
| 9 846 | 83-125 | | | 0.6 | 2.2 | 2.8 | | | 12.8 | 1.12 | 5.8 | 3.4 | 3.9 | 0.9 | | 2.6 | 3.5 | | | 7.8 |

| SAMPLE NO. | DEPTH CM. | WATER AT 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY DTA I 7A2E | II 7A2E | III 7A2E | IV 7A3 PCT. | -L.T. .0002 MM- X RAY 1 7A2E | II 7A2E | III 7A2E | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 843 | 0- 33 | | 0.8 | 3 | | | | MI 4 | MT 2 | KK 2 | | | | | MI MICA |
| 9 844 | 33- 56 | | 1.0 | 5 | | | | MI 3 | MT 1 | KK 1 | | | | | MT MONTMORT |
| 9 845 | 56- 83 | 47.8 | 0.4 | 3 | 2 | | | | | | | | | | KK KAOLINIT |
| 9 846 | 83-125 | 64.0 | 0.4 | 3 | 2 | | | | | | | | | | |

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

## ELFRIDA SILTY CLAY LOAM (taxadjunct) 1/
S69Ariz-2-15

Location: Cochise County, Arizona. 700 feet west and 600 feet south of northeast corner of Sec. 11, T. 16 S., R. 25 E. West of Kansas Settlement Road, about 9 miles west and 3½ miles south of Cochise.
Date of sampling: October 16, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Calciustoll, fine-loamy, mixed, thermic.
Vegetation: After cotton crop. Use: Irrigated cropland. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 58°F., January 41°F., July 78°F. Parent Material: Alluvium from limestone, rhyolite and sedimentary rocks. Topography: Level to nearly level valley plain and alluvial fan. Slope, 0.2 percent, west facing. Elevation: 4220 feet. Drainage: Well drained. Runoff is medium to slow. Permeability is moderately slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This sample paired with S69Ariz-2-11.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>69843 | 0 to 33 cm (0 to 13 inches), grayish brown (10YR 5/2) silty clay loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, sticky, plastic; few fine and coarse roots; few fine interstitial and tubular pores; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary. |
| A12<br>RSL<br>69844 | 33 to 56 cm (13 to 22 inches), brown (10YR 5/3) silty clay loam, dark brown (7.5YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, friable, sticky, plastic; few fine and coarse roots; few very fine and fine tubular pores; strongly effervescent; moderately alkaline (pH 8.2); abrupt boundary. |
| C1ca<br>RSL<br>69845 | 56 to 83 cm (22 to 33 inches), pinkish gray (7.5YR 7/2) loam or heavy loam, brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, slightly plastic; few fine and medium roots; common very fine and fine tubular pores; about 25 percent by volume of large irregularly shaped lime masses; violently effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. |
| C2ca<br>RSL<br>69846 | 83 to 125 cm (33 to 49 inches), pinkish white (7.5YR 8/2) and pink (7.5YR 7/4) loam, pink (7.5YR 7/4) and light brown (7.5YR 6/4) moist; massive; hard, friable, slightly sticky, slightly plastic; few fine roots; common very fine and fine tubular pores; about 15 to 20 percent by volume of large irregularly shaped soft lime masses; violently effervescent; moderately alkaline (pH 8.2). |

1/ The Elfrida series is in a fine-loamy, mixed, thermic family of Pachic Caliustolls. This pedon has a mollic epipedon less than 50 cm thick.

CONSECUTIVE PEDON NUMBER C 68144 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HATHAWAY SOIL NO. S68 ARIZ. 12-15 SAMPLE NO. 81035-81041 E.PIMA-SANTA CRU AREA

SOIL FAMILY: ARIDIC CALCIUSTOLL,LOAMY-SKELETAL,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | INT. COARSE FRAGMENTS 1A2A .2- OF WHOLE | PCT. I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 81035 | 0- 13 | A11 | 67.6 | 15.6 | 16.8 | 18.8 | 13.6 | 11.0 | 17.4 | 6.8 | 6.9 | 8.7 | | | | 22.2 | 69A | 49 | 17 | 3 |
| 81036 | 13- 25 | A12 | 57.8 | 20.6 | 21.6 | 11.8 | 11.1 | 9.7 | 17.6 | 7.6 | 8.1 | 12.5 | | | 3 | 24.7 | 53A | 17 | 23 | 13 |
| 81037 | 25- 33 | C 1CA | 54.3 | 24.2 | 21.5 | 8.6 | 10.3 | 9.5 | 17.4 | 8.5 | 8.7 | 15.5 | | | 4 | 26.3 | 53A | 16 | 23 | 14 |
| 81038 | 33- 51 | C 2CA | 60.5 | 22.2 | 17.3 | 12.7 | 12.7 | 10.0 | 17.5 | 7.6 | 6.9 | 15.3 | | | 3 | 22.9 | 56A | 23 | 24 | 9 |
| 81039 | 51- 79 | C 3CA | 69.8 | 19.4 | 10.8 | 11.6 | 14.6 | 13.1 | 21.4 | 9.1 | 6.2 | 13.2 | | | 2 | 25.4 | 70A | 38 | 24 | 8 |
| 81040 | 79- 99 | C 4CA | 75.4 | 16.0 | 8.6 | 16.4 | 18.2 | 14.1 | 20.5 | 6.2 | 6.3 | 9.7 | | | 1 | 21.5 | 77A | 44 | 28 | 5 |
| 81041 | 99-1172 | C 5CA | 60.7 | 27.1 | 12.2 | 13.2 | 13.1 | 9.3 | 15.9 | 9.2 | 11.2 | 15.9 | | | 1 | 28.7 | 9A | -- | 7 | 2 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A -PERCENT- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B -PERCENT- | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LL 4F1 PCT. | PL 4F2 NO.40 | BULK DENSITY EST. 1/3 BAR 4A1F GRAMS PER CC | 1/3 BAR 4A1H | DRY 3B2 | CM WATER CONTENT 1/10 BAR 4B1C -PERCENT- | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 -PERCENT- | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81035 | 0- 13 | 1.64 | 0.163 | 7 | | 0.6 | 0.1 | | | 34 | 23 | 1.06 | 1.13 | 0.52 | | 23.9 | 9.1 | 2.2 | 1.1 |
| 81036 | 13- 25 | 1.31 | 0.135 | 13 | | 0.5 | TR | | | | | 1.13 | 1.19 | 0.68 | | 20.9 | 10.4 | 1.7 | 1.2 |
| 81037 | 25- 33 | 1.08 | 0.111 | 19 | | 0.5 | TR | | | 34 | 24 | 1.09 | 1.15 | 0.68 | | 25.1 | 10.4 | 1.8 | 1.2 |
| 81038 | 33- 51 | 0.84 | 0.086 | 19 | | 0.5 | 0.1 | | | | | 1.13 | 1.18 | 0.65 | | 21.2 | 8.5 | 1.5 | 0.9 |
| 81039 | 51- 79 | 0.45 | | 18 | | 0.4 | TR | | | NP | NP | 1.37 | 1.37 | 0.44 | | 15.7 | 6.5 | | |
| 81040 | 79- 99 | 0.23 | | 16 | | 0.4 | 0.2 | | | | | 2.00 | 2.00 | 0.28 | | 5.6 | 5.9 | | |
| 81041 | 99-117 | | | 13 | | 0.5 | TR | | | 27 | 20 | 1.66 | 1.72 | 0.94 | | 14.2 | 7.5 | 1.2 | 1.1 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B3A 6N4B | MG 5B3A 6O4B | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | CEC NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81035 | 0- 13 | 38.9 | 0.9 | 0.1 | 0.5 | 40.4 | | | 40.4 | 19.2 | 100+ | | 100+ | | 7.8 | 7.3 |
| 81036 | 13- 25 | 40.4 | 0.6 | 0.1 | 0.3 | 41.4 | | | 41.4 | 19.6 | 100+ | | 100+ | | 8.0 | 7.4 |
| 81037 | 25- 33 | 32.6 | 0.5 | 0.1 | 0.3 | 33.5 | | | 33.5 | 18.2 | 100+ | | 100+ | | 8.0 | 7.5 |
| 81038 | 33- 51 | 28.1 | 0.5 | 0.1 | 0.2 | 28.9 | | | 28.9 | 15.0 | 100+ | | 100+ | | 8.0 | 7.5 |
| 81039 | 51- 79 | 29.9 | 2.2 | 0.1 | 0.1 | 32.3 | | | 32.3 | 10.9 | 100+ | | 100+ | | 8.1 | 7.5 |
| 81040 | 79- 99 | 25.2 | 1.8 | 0.1 | 0.1 | 27.2 | | | 27.2 | 10.3 | 100+ | | 100+ | | 8.2 | 7.5 |
| 81041 | 99-117 | 28.3 | 2.2 | 0.2 | 0.2 | 30.9 | | | 30.9 | 17.4 | 100+ | | 100+ | | 8.2 | 7.5 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|
| 81035 | 0- 13 | MT 4 | MI 3 | KK 2 | | | | | | |
| 81036 | 13- 25 | | | | | | | | | |
| 81037 | 25- 33 | MT 3 | MI 2 | KK 1 | | | | | | |
| 81038 | 33- 51 | | | | | | | | | |
| 81039 | 51- 79 | MT 2 | MI 2 | | | | | | | |
| 81040 | 79- 99 | | | | | | | | | |
| 81041 | 99-117 | | | | | | | | | |

| CODE | MINERAL | RELATIVE AMOUNT |
|---|---|---|
| MT | MONTMORT | 1 TRACE |
| MI | MICA | 2 SMALL |
| KK | KAOLINIT | 3 MODERATE |
| | | 4 ABUNDANT |
| | | 5 DOMINANT |
| | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

Santa Cruz County Area

## HATHAWAY GRAVELLY SANDY LOAM

S68 Ariz-12-15-1 through 7

Location: Santa Cruz County, Arizona, 4½ miles northwest of Sonoita, 660 feet north of Gardner Canyon Road and 2.8 miles west of State Highway 83. Approximately 1500 feet south and 400 feet east of NW corner Section 3, T20S, R16E, 75 feet up from base of slope. Photo 13-73. Date of Sampling: October 11, 1968. Description by: Havens, James and Clemmons. Collectors: Nettleton and Brasher. Classification: Aridic Calciustoll, loamy-skeletal, mixed, thermic. Vegetation: Grass-minor brush. Brush: Guajillo, mimosa, century plant. Grass: Sideoats grama, purple grama, black grama, wolftail, three-awn. Climate: Mean annual temperature 62°F. Mean annual precipitation 16 to 17 inches. Parent Material: Mixed alluvium from andesite, rhyolite, tuffs, quartzite and limestone. Topography: Deeply dissected old alluvial fans. 50 percent slope. South aspect. Elevation: 4600 feet. Drainage: Well drained. Soil Moisture: Slightly moist.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-13 cm) |
| A11 RSL 681035 | 0 to 5 inches, brown (7.5YR 5/2) gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many fine interstitial pores; 35 percent gravel; strongly effervescent; mildly alkaline (pH 7.8); clear wavy boundary. |
| A12 RSL 681036 (13-25 cm) | 5 to 10 inches, brown (7.5YR 5/2) gravelly loam, dark brown (7.5YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; few fine and medium tubular pores; 25 percent gravel; violently effervescent; moderately alkaline; clear wavy boundary. |
| C1ca RSL 681037 (25-33 cm) | 10 to 13 inches, grayish brown (10YR 5/2) very gravelly loam, with common medium and large distinct light gray (10YR 7/2) lime segregations, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; few fine and medium tubular pores; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C2ca RSL 681038 (33-51 cm) | 13 to 20 inches, light gray (10YR 7/2) very gravelly sandy loam, light brownish gray (10YR 6/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; few fine and medium tubular pores; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C3ca RSL 681039 (51-79 cm) | 20 to 31 inches, pinkish gray (7.5YR 6/2) and pinkish white (7.5YR 8.2) very gravelly sandy loam, brown (7.5YR 5/2) and pinkish gray (7.5YR 6/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; few fine and medium tubular pores; violently effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. |
| C4ca RSL 681040 (79-99 cm) | 31 to 39 inches, pinkish gray (7.5YR 6/2) and light brown (7.5 YR 6/4) very gravelly sandy loam, brown (7.5YR 5/2) and (5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; common fine interstitial pores; violently effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. |
| IIC5ca RSL 681041 (99-117 cm) | 39 to 46 inches, light reddish brown (5YR 6/3) sandy loam, reddish brown (5YR 4/4) moist, with many medium and large distinct pinkish white (10YR 8/2) lime segregations and mottles, mottles are light gray (10YR 7/2) moist; massive; hard, friable, nonsticky and nonplastic; few fine roots; few very fine and fine tubular pores; strongly to violently effervescent; moderately alkaline (pH 8.2). |

CONSECUTIVE PEDON NUMBER C 69207 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HATHAWAY SOIL NO. S69 ARIZ. 2- 1 SAMPLE NO. 91101-91107 WALNUT G.-TUCSON AREA

SOIL FAMILY: ARIDIC CALCIUSTOLL,LOAMY-SKELETAL,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 — 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | CSI .05-.02 | FSI .02-.002 | SILTS CO. 2-.2U | CLAYS FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE 1 | II 75-20 | III 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 91101 | 0- 3 | A11 | 70.8 | 17.4 | 11.8 | 10.5 | 15.1 | 12.9 | 21.9 | 10.4 | 10.1 | 7.3 | | | 1 | 31.9 | 79A | 5 | 59 | 15 |
| 91102 | 3- 25 | A12 | 67.7 | 16.0 | 16.3 | 21.0 | 14.9 | 10.6 | 15.3 | 5.9 | 7.3 | 8.7 | | | 4 | 20.9 | 68A | 7 | 38 | 23 |
| 91103 | 25- 51 | C 1CA | 56.9 | 20.7 | 22.4 | 26.7 | 11.8 | 5.7 | 8.5 | 4.2 | 6.6 | 14.1 | | | 10 | 15.1 | 91A | 28 | 37 | 26 |
| 91104 | 51- 76 | C 2CA | 56.7 | 27.2 | 16.1 | 21.5 | 14.2 | 7.1 | 9.3 | 4.6 | 15.8 | 11.4 | | | 6 | 24.9 | 65A | 6 | 41 | 18 |
| 91105 | 76-102 | C 3CA | 68.8 | 15.7 | 15.5 | 30.5 | 16.6 | 8.0 | 9.0 | 4.7 | 6.0 | 9.7 | | | 3 | 15.2 | 75A | 8 | 50 | 17 |
| 91106 | 102-119 | C 4CA | 54.6 | 23.7 | 21.7 | 17.0 | 13.4 | 7.5 | 11.1 | 5.6 | 8.9 | 14.8 | | | 6 | 20.3 | 75A | 42 | 25 | 8 |
| 91107 | 103-137 | 2B2tcab | 84.4 | 2.6 | 13.0 | 48.4 | 28.6 | 4.7 | 2.3 | 0.4 | 0.8 | 1.8 | | | | 2.0 | 51A | -- | 5 | 46 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 19-2 6E1B | EXT. IRON FE 6C2B | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT-- | | -PERCENT- | | PCT. | PCT. | NO.40 | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 91101 | 0- 3 | 0.65 | 0.066 | 9 | | 0.7 | | | | 1.27 | 1.35 | 0.37 | | 18.6 | 5.2 | 2.1 | 0.7 | 7.6 | | 7.7 |
| 91102 | 3- 25 | 1.12 | 0.129 | 14 | | 0.5 | | | 1.25 | | | 0.50 | | | 8.4 | | | 7.6 | | 7.7 |
| 91103 | 25- 51 | 0.97 | 0.072 | 27 | | 0.4 | | | | 1.20 | 1.27 | 0.18 | | 25.1 | 10.5 | 1.9 | 0.3 | 7.4 | 8.4 | 7.6 |
| 91104 | 51- 76 | 0.49 | | 25 | | 0.3 | | | | 1.38 | 1.38 | 0.50 | | 20.2 | 6.8 | | | 7.4 | 8.3 | 7.7 |
| 91105 | 76-102 | 0.32 | | 11 | | 0.4 | | | 1.38 | | | 0.38 | | | 7.6 | | | 7.4 | 8.4 | 7.7 |
| 91106 | 102-119 | | | 25 | | 0.3 | | | 1.38 | | | 0.39 | | | 9.5 | | | 7.4 | 8.5 | 7.8 |
| 91107 | 103-137 | | | 1 | | 0.6 | | | | 1.41 | 1.55 | 0.65 | | 15.7 | 8.1 | 3.2 | 2.0 | 7.5 | | 7.8 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | WATER EXTRACT FROM SATURATED PASTE EC 8A1A | CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | --------MEQ/100G-------- | | | | | PCT. | -MEQ/100G | | MMHO | ---------MEQ/1000 ML--------- | | | | | | | | PPM | |
| 91101 | 0- 3 | | | 0.2 | 0.6 | 0.8 | | | 10.7 | | | | | | | | | | | |
| 91102 | 3- 25 | | | 0.2 | 0.6 | 0.8 | | | 13.6 | | | | | | | | | | | |
| 91103 | 25- 51 | | | 0.2 | 0.2 | 0.4 | | | 12.4 | 1.98 | 24.7 | 2.1 | 2.1 | 0.2 | | 2.3 | 0.7 | 27.7 | | 7.5 |
| 91104 | 51- 76 | | | 0.3 | 0.2 | 0.5 | | | 9.6 | 2.28 | 29.3 | 2.9 | 1.6 | 0.2 | | 1.7 | 1.1 | 33.6 | | 7.5 |
| 91105 | 76-102 | | | 0.6 | 0.3 | 0.9 | | | 11.4 | 2.44 | 25.3 | 5.3 | 3.0 | 0.2 | | 2.5 | 4.4 | 28.6 | | 7.5 |
| 91106 | 102-119 | | | 0.7 | 0.3 | 1.0 | | | 11.6 | 1.64 | 13.3 | 4.4 | 4.7 | 0.2 | | 2.2 | 3.6 | 17.2 | | 7.6 |
| 91107 | 103-137 | | | 0.7 | 0.4 | 1.1 | | | 14.9 | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER EXCHANGBLE AT SAT. 8A PCT. | NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A2E | DTA PCT. 7A3 | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91101 | 0- 3 | | 0.2 | 2 | | | | MT 4 | MI 2 | KK 1 | | | | | |
| 91102 | 3- 25 | | 0.2 | 1 | | | | MT 3 | | | | | | | |
| 91103 | 25- 51 | 41.9 | 0.1 | 1 | 1 | 0.1 | | MT 3 | | | | | | | |
| 91104 | 51- 76 | 36.3 | 0.2 | 3 | TR | 0.2 | | | | | | | | | |
| 91105 | 76-102 | 34.8 | 0.5 | 4 | 1 | 0.1 | | MT 3 | MI 1 | | | | | | |
| 91106 | 102-119 | 43.7 | 0.5 | 4 | 2 | | | | | | | | | | |
| 91107 | 103-137 | | 0.7 | 5 | | | | | | | | | | | |

MINERAL CODE: MT MONTMORT; MI MICA; KK KAOLINIT

RELATIVE AMOUNT: 1 TRACE; 2 SMALL; 3 MODERATE; 4 ABUNDANT; 5 DOMINANT; 6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## HATHAWAY GRAVELLY SANDY LOAM
S69Ariz-2-1

Location: Cochise County, Arizona. 2,640 feet east and 500 feet north of southwest corner of Sec. 32, T. 19 S., R. 23 E., south side of road. About 5-1/2 miles NE of Tombstone along Bennett Ranch Road. Date of sampling: September 25, 1969.
Description by: Y. H. Havens and D. M. Hendricks. Collectors: Y. H. Havens and D. M. Hendricks.
Classification: Aridic Calciustoll,loamy-skeletal, mixed, thermic.
Vegetation: Whitethorn, tarbush, Mormon tea, guayule, yucca, fairy duster, desert zinnia, fluffgrass, snakeweed, croton, and black grama. Climate: Mean annual temperature approximately 63° F. Mean annual precipitation approximately 14 inches. Parent material: Mixed alluvium--dominantly limestone with some andesite, rhyolite and quartzite. Topography: Moderately sloping, 5 to 7 percent slope. Elevation: Approximately 4,625 feet. Drainage: Well drained. Soil moisture: Dry.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>691101 | 0-3 cm (0-1 inch), grayish brown (10YR 5/2) gravelly sandy loam, dark brown (10YR 3/3) moist; weak thick platy structure; slightly hard, very friable, nonsticky, slightly plastic; common fine and very fine roots; many very fine and fine vesicular, and few very fine tubular pores; 40 percent gravel; few cobbles; strongly effervescent; moderately alkaline (pH 8.1); abrupt smooth boundary. |
| A12<br>RSL No.<br>691102 | 3-25 cm (1-10 inches), grayish brown (10YR 5/2) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine, and few medium and coarse roots; common fine interstitial and few fine tubular pores; 30 to 40 percent gravel; strongly to violently effervescent; moderately alkaline (pH 8.2); clear smooth boundary. |
| C1ca<br>RSL No.<br>691103 | 25-51 cm (10-20 inches), pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky, slightly plastic; common very fine and fine, and few medium and coarse roots; common fine interstitial pores; 25 to 30 percent gravel and few cobbles; many fine and large distinct white (N/8) and light gray (7/2) lime segregations and masses; violently effervescent; moderately alkaline (pH 8.1); gradual wavy boundary. |
| C2ca<br>RSL No.<br>691104 | 51-76 cm (20-30 inches), white (10YR 8/2) and light gray (7/2) very gravelly loam, very pale brown (10YR 7/3) and brown (5/3) moist; massive; slightly hard to hard, friable, slightly sticky, slightly plastic; common fine and very fine roots; common fine interstitial pores; 60 percent gravel, few cobbles; violently effervescent; moderately alkaline (pH 8.2); gradual irregular boundary. |
| C3ca<br>RSL No.<br>691105 | 76-102 cm (30-40 inches), white (10YR 8/2) and light gray (7/2) very gravelly loam, very pale brown (10YR 7/3) and brown (5/3) moist; this horizon has pockets and discontinuous layers of light reddish brown (5YR 6/4) gravelly sandy clay loam soil material which is slightly effervescent, reddish brown (5YR 4/4) moist; massive; hard, friable, slightly sticky, slightly plastic; common fine and very fine roots; common fine interstitial pores; 50 to 60 percent gravel and cobble; violently effervescent; moderately alkaline (pH 8.2); gradual irregular boundary. |
| C4ca<br>RSL No.<br>691106 | 102-119 cm (40-47 inches), white (10YR 8/2) and light gray (7/2) very cobbly loam or very cobbly heavy sandy loam, light gray (10YR 7/2) and brown (5/3) moist, with tongues of light reddish brown (5YR 6/4) gravelly sandy clay loam soil material in tongues, yellowish red (5YR 4/6) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine and very fine roots; common fine interstitial pores; 70 percent coarse fragments; violently effervescent; mildly alkaline (pH 7.6); abrupt irregular boundary. |
| IIB2tcab<br>RSL No.<br>691107 | 119-137 cm (47-54 inches), light reddish brown (5YR 6/4) very gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure near massive; hard, friable, slightly sticky, slightly plastic; few very fine roots; few fine interstitial and tubular pores; few thin clay films on ped faces and in pores; 50 to 60 percent gravel; common fine distinct light gray (10YR 7/2) lime filaments and segregations, light brownish gray (10YR 6/2) moist; slightly to strongly effervescent; moderately alkaline (pH 8.0). |

CONSECUTIVE PEDON NUMBER C 69165 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES COGSWELL TAXADJUNCT SOIL NO. S69 ARIZ. 2-19 SAMPLE NO. 9 855-9 857 WILLCOX AREA

SOIL FAMILY: ARIDIC CALCIUSTOLL,FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION | | | SANDS | | | | | SILTS | | CLAYS | | | 1A2A INT. | COARSE FRAGMENTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | II .2- .02 | PCT. OF WHOLE SOIL | I 75- 20 | II 20-5 PCT. OF | III 5-2 LT 75 |
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 9 855 | 0- 25 | AP | 35.5 | 33.2 | 31.3 | 2.7 | 6.9 | 6.7 | 11.7 | 7.5 | 14.2 | 19.0 | | | | 28.0 | --A | -- | -- | -- |
| 9 856 | 25- 51 | A12 | 28.2 | 32.0 | 39.8 | 2.1 | 5.3 | 5.1 | 8.9 | 6.8 | 13.5 | 18.5 | | | 5 | 25.0 | --A | -- | -- | -- |
| 9 857 | 51- 76 | A13 | 33.2 | 30.5 | 36.3 | 3.4 | 5.6 | 5.1 | 11.7 | 7.4 | 13.8 | 16.7 | | | 6 | 27.9 | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A -PERCENT- | NITROGEN 6B1A -PERCENT- | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B -PERCENT- | SESQUIOXIDES DI-CIT EXT FE 6C2B | AL 6G7A | PYROP EXT FE 6C5A | AL 6G5A | ATTERBERG LIMIT EST. LL 4F1 | PL 4F2 | BULK DENSITY 1/3 BAR PCT.NO.40 4A1F | DRY 4A1F GRAMS PER CC 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | -------PERCENT------- | | | | | | | | | ----PERCENT--- | | | -PERCENT- | |
| 9 855 | 0- 25 | 0.94 | 0.062 | 4 | | | | | | | | | | 1.00 | | | 12.2 | | |
| 9 856 | 25- 51 | 0.46 | 0.065 | 27 | | | | | | | | | | 1.00 | | | 15.6 | | |
| 9 857 | 51- 76 | 0.41 | 0.035 | 14 | | | | | | | | | | 1.00 | | | 15.9 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACIDITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACIDITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | ----PERCENT---- | | | | | |
| 9 855 | 0- 25 | | | 0.6 | 2.6 | 3.2 | | | 3.2 | 20.8 | | | | | 7.8 | 7.6 |
| 9 856 | 25- 51 | | | 1.5 | 1.6 | 3.1 | | | 3.1 | 21.9 | | | | | 8.0 | 8.0 |
| 9 857 | 51- 76 | | | 2.1 | 1.3 | 3.4 | | | 3.4 | 19.9 | | | | | 8.2 | 8.2 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <2 MM LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 855 | 0- 25 | | | | | | | | | | | 1 TRACE |
| 9 856 | 25- 51 | | | | | | | | | | MT MONTMORT | 2 SMALL |
| 9 857 | 51- 76 | MT 3 | MI 3 | KK 1 | | | | | | | MI MICA | 3 MODERATE |
| | | | | | | | | | | | KK KAOLINIT | 4 ABUNDANT |
| | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## COGSWELL CLAY LOAM (taxadjunct) 1/
S69Ariz-2-19

Location: Cochise County, Arizona. 500 feet south and 350 feet east of northwest corner of Sec. 4, T. 13 S., R. 24 E. South of Ft. Grant Road, about 4 miles west and 6 miles north of Willcox. Date of sampling: October 17, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Aridic **Calciustoll**, fine-loamy, mixed, thermic.
Vegetation: Cropland, after cotton. Use: Irrigated cropland. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 58°F., January 41°F., July 78°F. Parent Material: Alluvium from acid and basic igneous rocks with some sedimentary rocks. Topography: Level to nearly level swales, valley plains and old lake margins. Slope, 0.2 percent, southwest facing. Elevation: 4227 feet. Drainage: Well drained. Runoff is slow. Permeability is slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This sample paired with S69Ariz-2-27. The Ap, A12 and A13 horizons sampled primarily for textural analysis and organic matter. The A13 horizon was also checked for mineralogy.

| HORIZON | DESCRIPTION |
|---|---|
| Ap<br>RSL<br>69855 | 0 to 25 cm (0 to 10 inches), brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak medium and fine granular and subangular blocky structure; hard, friable, slightly sticky, plastic; many fine and medium roots; common fine and medium tubular pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| A12<br>RSL<br>69856 | 25 to 51 cm (10 to 20 inches), brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; hard, friable, slightly sticky, plastic; many fine and medium roots; few very fine and fine tubular pores; many pressure faces; strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. |
| A13<br>RSL<br>69857 | 51 to 76 cm (20 to 30 inches), brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; weak medium subangular and angular blocky structure; very hard, firm, sticky, plastic; few fine and medium roots; few very fine and fine tubular pores; many pressure faces; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| Cca | 76 to 132 cm (30 to 52 inches), light brown (7.5YR 6/4) clay loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, sticky, plastic; few very fine tubular pores; approximately 30 percent by volume medium and large irregularly shaped pinkish white soft lime masses; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| B2tcab | 132 to 152 cm (52 to 60 inches), mottled light brown (7.5YR 6/4) and reddish yellow (7.5YR 6/6) heavy clay loam, brown (7.5YR 5/4), and reddish yellow (7.5YR 6/6) moist; mottles are many, fine and distinct; weak medium prismatic parting to weak fine and medium subangular blocky structure; hard, friable, slightly sticky, plastic; few very fine and fine tubular pores; common thin clay films on ped faces; 20 to 25 percent by volume of medium and large irregularly shaped pinkish white soft lime masses; violently effervescent; moderately alkaline (pH 8.2). |

1/ The Cogswell series is in a fine, mixed, thermic family of Pachic Calciustolls. This pedon has a control section with less than 35 percent clay and a mollic epipedon less than 50 cm. thick.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Calciustoll, loamy, mixed, mesic
SOIL Rudd gravelly loam (taxadjunct) SOIL Nos. S65Ariz-1-6 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65652 - 65656

| Depth (in.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt (0.05–0.002) | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments >2 | 1A2a 2–19 | 1A2a 19–76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct | Pct of < 76mm | |
| 0- 2 | A11 | 43.4 | 37.1 | 19.5 | 6.9 | 7.1 | 5.9 | 13.3 | 10.2 | 19.6 | 17.5 | 36.9 | 33.2 | 2 | 18 | 20 | | 2/ |
| 2-10 | A12 | 29.0 | 37.8 | 33.2 | 2.6 | 3.4 | 4.0 | 10.9 | 8.1 | 14.8 | 23.0 | 28.8 | 20.9 | 10 | 23 | 20 | | 2/ |
| 10-13 | C1 | 32.9 | 34.4 | 32.7 | 4.1 | 5.8 | 5.1 | 10.6 | 7.3 | 12.2 | 22.2 | 25.5 | 25.6 | 13 | 20 | 54 | 8 | 44 3/ |
| 13-24+ | R | | | | | | | | | | | | | | | | | 4/ |
| Rock from C1 | | | | | | | | | | | | | | | | | | 4/ |

| Depth (in.) | 6A1a Organic carbon | 6B1a Nitrogen | 6B1a C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density 4A1f 1/3 bar | Bulk density 4A1h Oven dry | Water content 4B1c 1/3 bar | Water content 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH 8C1a $H_2O$ 1:1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct | Pct. | | Pct. | Pct. | g/cc | g/cc | Pct. | Pct | in./in. | in./in. | |
| 0- 2 | 2.02 | 0.173 | 12 | | 11 | | | | 12.3 | | | 8.1 |
| 2-10 | 2.74 | 0.262 | 10 | | 26 | | | | 19.6 | | | 8.0 |
| 10-13 | 2.90 | | | | 40 | | | | 19.2 | | | 8.0 |
| 13-24+ | | | | | 4 | | | | | | | |
| Rock from C1 | | | | | 41 | 2.23 | 2.24 | | 7.7 | | | |

| Depth (in.) | Extractable bases 5B1a 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | Cation Exch. Capacity 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation 5C1 $NH_4OAc$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | Pct |
| 0- 2 | 35.3 | 2.1 | 0.3 | 1.7 | 39.4 | | 24.3 | | | 100+ |
| 2-10 | 40.9 | 2.1 | 0.3 | 0.7 | 44.0 | | 30.1 | | | 100+ |
| 10-13 | 33.7 | 2.7 | 0.4 | 0.4 | 37.2 | | 25.0 | | | 100+ |
| 13-24+ | | | | | | | | | | |

| Depth (in.) | Clay mineralogy (<0.002 mm) 7A Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |
| 0- 2 | | | | |
| 2-10 | | | | |
| 10-13 | xx | | | t |
| 13-24+ | | | | |

1/ From characterization sample (5 kg) except as noted.
2/ 2-19 and 19-76 mm not separated.
3/ 2-19 mm from characterization sample, 19-76 mm from field volume estimate. >2 mm includes volume estimate of >76 mm.
4/ >2 mm not determined. Characterization sample ground whole.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## RUDD GRAVELLY LOAM (taxadjunct) 1/

S65Ariz-1-6

Location: Apache County, Arizona. A pit located in the NE¼ of the SE¼ of the NE¼ of Sec. 13, T. 9 N., R. 28 E., 150 feet north and 30 feet west of gate from Highway 60. Photo No. 4643. Approximately 3½ miles northwest of Springerville. Date of Sampling: September 21, 1965.

Collectors: M.L. Miller, J.E. Jay, R.E. Nelson and B. Brasher.

Vegetation: Never cultivated. Grass aspect. Basal density of 35 percent. Blue grama, ring muhly, needle-and-thread, wolftail, native annuals. Climate: 12 inches ppt. 48° approximate M.A.T. Parent Material: Basalt flow of Quaternary age. Relief: Gently sloping plain, convex-complex 1 percent slope with south aspect at pit site. Elevation: 6975 feet. Drainage: Runoff is medium. Soil is well drained. Ground water is very deep. Permeability is moderate.

Remarks: Determination of pH was made with a Hellige-Truog field kit. Depth to R horizon ranges from 9 to 20 inches. Measure of free carbonate obtained by observing reaction to dilute HCl. This soil is mapped in a complex of Apache gravelly loam and very stony loam, 0 to 8 percent slopes (approximately 60 percent gravelly loam and 40 percent very stony loam, with some basalt rock outcrop in the very stony loam).

Classification: Lithic Calciustoll, loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>65652 | 0 to 2 inches, grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) when moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; abundant fine and few medium roots; many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary. |
| A12<br>RSL No.<br>65653 | 2 to 10 inches, grayish brown (10YR 5/2) or dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) when moist; weak to moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; abundant fine and few medium roots; few fine tubular and many fine interstitial pores; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C1*<br>RSL No.<br>65654 | 10 to 13 inches, grayish brown (10YR 5/2) gravelly loam with a few cobbles and stones; very dark grayish brown (10YR 3/2) when moist; massive; slightly hard, very friable, slightly sticky and plastic; abundant fine roots; many fine interstitial pores; violently effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. |
| R**<br>RSL No.<br>65655 | 13 to 24 inches plus, very dark gray (10YR 3/1) basalt bedrock, black (10YR 2/1) when moist, with white (10YR 8/1) lime coatings on rock surfaces and in pockets on rock fractures, light gray (10YR 7/2) when moist; massive; extremely hard, extremely firm; plentiful fine roots on interfaces; violently effervescent outside, noneffervescent inside; moderately alkaline (pH 8.2). |

* Variations in thickness of C1 from 1 inch to 6 inches.

** Lime coating on all rock surfaces, along fracture planes, some lime drips on underside of coarse fragments.

1/ The Rudd series is in a loamy-skeletal, mixed, mesic family of Lithic Calciustolls. This pedon has somewhat fewer coarse fragments.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Calciustoll, loamy, mixed, mesic

SOIL Rudd gravelly loam (taxadiunct) SOIL Nos. S65Ariz-1-20 LOCATION Apache County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65645 - 65650

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Size class and particle diameter (mm) 3A1 Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Silt: Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | 1/ Coarse fragments 1A2a: > 2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0- 2 | A11 | 57.0 | 26.5 | 16.5 | 6.8 | 17.5 | 11.8 | 13.7 | 7.2 | 14.0 | 12.5 | 28.0 | 49.8 | 0 | 17 | 47 | 12 | 21 |
| 2-10 | A12 | 41.1 | 29.1 | 29.8 | 3.1 | 9.1 | 8.4 | 12.5 | 8.0 | 12.1 | 17.0 | 26.8 | 33.1 | 9 | 21 | 47 | 12 | 21 |
| 10-13 | C | 44.2 | 27.4 | 28.4 | 6.6 | 11.7 | 9.2 | 11.2 | 6.5 | 10.9 | 16.5 | 23.2 | 37.7 | 14 | 1 | 27 | | |
| 13-24+ | R | | | | | | | | | | | | | | | | | |
| 3/4 - 3" | rock from A12 | | | | | | | | | | | | | | | | | |
| 3/4 - 3" | rock from C1 | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density: | 3B2 | Water content: | Water content: 4B1c 1/3 bar | Water content: 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | pH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct | g/cc | g/cc | g/cc | Cm | Pct | Pct. | Pct | in./in. | in./in. | | | |
| 0- 2 | 1.47 | 0.125 | 12 | | 7 | | | | | | | 9.3 | | | 8.0 | | |
| 2-10 | 2.09 | 0.224 | 9 | | 22 | 1.13 | 1.19 | | 0.73 | | 26.3 | 16.1 | 0.019 | 0.014 | 8.0 | | |
| 10-13 | 2.43 | | | | 40 | | | | | | | 16.0 | | | 8.0 | | |
| 13-24+ Rock from A12 | | | | | 7<br>12 | | | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | Cation Exch. Capacity: 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation 5C1 $NH_4OAc$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | Pct | Pct. |
| 0- 2 | 26.1 | 2.3 | 0.3 | 0.9 | 29.6 | | 19.4 | | | 100+ | |
| 2-10 | 33.2 | 2.3 | 0.3 | 0.7 | 36.5 | | 23.8 | | | 100+ | |
| 10-13 | 24.8 | 1.9 | 0.3 | 0.4 | 27.4 | | 19.1 | | | 100+ | |
| 13-24+ | | | | | | | | | | | |

| Depth (In.) | Clay mineralogy 6/ (<0.002 mm) 7A1: Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |
| 0- 2 | | | | |
| 2-10 | xxx | | | t |
| 10-13 | xx | | | - |
| 13-24+ | | | | |

1/ From characterization sample (5 kg) except as noted.
2/ Estimated to be the same as A12 horizon.
3/ 2-19 mm from characterization sample, 19-76 mm from field weights. >2 mm includes volume estimate of >76 mm.
4/ 2-19 and 19-76 mm not separated.
5/ >2 mm not determined. Characterization sample ground whole.
6/ After dithionite-citrate treatment.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## RUDD GRAVELLY LOAM (taxadjunct) 1/
S65Ariz-1-20

Location: Apache County, Arizona. A pit located 1848 feet north and 396 feet east of the center of Section 11, T. 9 N., R. 28 E. Approximately 5½ miles northwest of Springerville, on Photo No. 4643. Date of Sampling: September 21, 1965.
Collectors: M.L. Miller, J.E. Jay, R.E. Nelson and B. Brasher.
Vegetation: Never cultivated. Grass with a basal density of 37 percent. Blue grama, ring muhly, needle-and-thread, wolftail, native annuals. Climate: 12 inches ppt. 48°F. approximate M.A.T. Parent Material: Basalt flow of Quaternary age. Relief: Gently sloping plain, convex-complex 1 percent slope with northwest aspect at pit site. Elevation: 6750 feet. Drainage: Runoff is medium. Soil is well drained. Ground water is very deep. Permeability is moderate.
Remarks: Determination of pH was made with a Hellige-Truog field kit. Measure of free carbonate was obtained by observing reaction to dilute HCl. Depth to R horizon ranges from 9 to 20 inches. This soil is mapped in a complex of Apache gravelly loam and very stony loam, 0 to 8 percent slopes (approximately 60 percent gravelly loam and 40 percent very stony loam, with some basalt rock outcrop in the very stony loam).
Classification: Lithic Calciustoll, loamy, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>65645 | 0 to 2 inches, grayish brown (10YR 5/2) gravelly loam, dark brown (7.5YR 3/2) when moist; weak fine granular structure; weakly coherent, very friable, slightly sticky and slightly plastic; abundant fine and medium roots; many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary. |
| A12<br>RSL No.<br>65646 | 2 to 10 inches, dark grayish brown (10YR 4/2) loam, dark brown (7.5YR 3/2) when moist; weak and moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; abundant fine and medium roots; few fine tubular and many fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C*<br>RSL No.<br>65647 | 10 to 13 inches, grayish brown (10YR 5/2) gravelly loam with a few cobbles, dark brown (10YR 3/3) when moist; massive; slightly hard, very friable, slightly sticky and plastic; abundant fine and medium roots; many fine interstitial pores; violently effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. |
| R**<br>RSL No.<br>65648 | 13 to 24 inches +, dark gray (N4/) basalt bedrock, black (N2/) when moist, with white (N8/) lime coatings on rock surfaces and in pockets on rock fractures, pinkish gray (7.5YR 7/2) when moist; massive; extremely hard, extremely firm, plentiful fine roots on interfaces; violently effervescent outside, noneffervescent inside; moderately alkaline (pH 8.2). |

1/ The Rudd series is in a loamy-skeletal, mixed, mesic family of Lithic Calciustolls. This pedon has somewhat fewer coarse fragments.

* Variations in thickness of C from 1 inch to 6 inches.

** Lime coating on all rock surfaces, along fracture planes, some lime drips on underside of coarse fragments.

CONSECUTIVE PEDON NUMBER C 69157 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES ELFRIDA TAXADJUNCT SOIL NO. S69 ARIZ. 2-11 SAMPLE NO. 9 816-9 823 WILLCOX AREA

SOIL FAMILY: PACHIC CALCIUSTOLL,COARSE-LOAMY,CARBON.,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | SILTS CO. 2- .2U | CLAYS FINE LT .2U | CARBONATE 3A1A | INT. 1A2A .02 WHOLE SOIL | COARSE FRAGMENTS I 75- PCT. | II 20-5 OF 20 | III 5-2 LT 75 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 9 816 | 0- 5 | A11 | 29.1 | 52.1 | 18.8 | 1.9 | 5.6 | 3.3 | 10.3 | 8.0 | 18.5 | 33.6 | | | 3 | 32.9 | --A | -- | -- | -- |
| 9 817 | 5- 28 | A12 | 21.1 | 50.2 | 28.7 | 1.0 | 2.6 | 2.3 | 8.7 | 6.5 | 16.2 | 34.0 | | | 10 | 28.4 | --A | -- | -- | -- |
| 9 818 | 28- 51 | A13 | 19.6 | 43.6 | 36.8 | 1.2 | 2.2 | 1.8 | 8.6 | 5.8 | 13.7 | 29.9 | | | 16 | 25.2 | --A | -- | -- | -- |
| 9 819 | 51- 71 | A14 | 21.5 | 42.9 | 35.6 | 1.7 | 2.8 | 2.2 | 8.8 | 6.0 | 14.2 | 28.7 | | | 18 | 25.9 | --A | -- | -- | -- |
| 9 820 | 71- 94 | A15CA | 35.5 | 35.4 | 29.1 | 1.1 | 2.7 | 2.6 | 19.4 | 9.7 | 12.0 | 23.4 | | | 17 | 34.5 | --A | -- | -- | -- |
| 9 821 | 94-120 | C 1CA | 43.9 | 38.4 | 17.7 | 1.7 | 2.0 | 1.6 | 22.8 | 15.8 | 13.9 | 24.5 | | | 9 | 48.6 | --A | -- | -- | -- |
| 9 822 | 120-160 | 2C 2 | 8.7 | 55.6 | 35.7 | 0.4 | 1.1 | 0.7 | 3.5 | 3.0 | 17.4 | 38.2 | | | 5 | 23.1 | --A | -- | -- | -- |
| 9 823 | 0- 25 | A1 | | | | | | | | | | | | | | | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG. CARBON 6A1A PERCENT | MATTER NITROGEN 6B1A PERCENT | CARBONATE AS CACO3 LT 2 6E1B PERCENT | 19-2 6E1B PERCENT | EXT. IRON FE 6C2B PCT. | ATTERBERG L L 4F1 PCT. | I M I T PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F GRAMS | 1/3 BAR 4A1F PER CC | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C PERCENT | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 PERCENT | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 816 | 0- 5 | 1.36 | 0.137 | 17 | | 0.2 | 33 | 28 | | 1.13 | 1.20 | 1.00 | | 24.4 | 13.8 | 2.0 | 2.0 | 7.8 | 8.9 | 7.8 |
| 9 817 | 5- 28 | 1.20 | 0.129 | 28 | | 0.2 | | | | 1.13 | 1.21 | 1.00 | | 32.9 | 15.7 | 2.3 | 2.3 | 7.7 | 8.8 | 7.8 |
| 9 818 | 28- 51 | 1.19 | | 38 | | 0.1 | | | | 1.18 | 1.30 | 1.00 | | 31.6 | 16.1 | 3.3 | 3.3 | 7.8 | 8.9 | 8.0 |
| 9 819 | 51- 71 | 0.98 | | 45 | | 0.1 | 45 | 25 | | 1.28 | 1.39 | 1.00 | | 29.4 | 16.2 | 2.8 | 2.8 | 7.9 | 9.0 | 9.3 |
| 9 820 | 71- 94 | 0.53 | | 42 | | 0.1 | 35 | 20 | | 1.30 | 1.37 | 1.00 | | 18.8 | 11.2 | 1.8 | 1.8 | 8.0 | 8.9 | 8.4 |
| 9 821 | 94-120 | | | 33 | | 0.1 | | | | 1.58 | 1.66 | 1.00 | | 12.5 | 5.8 | 1.7 | 1.7 | 7.8 | 9.0 | 8.3 |
| 9 822 | 120-160 | | | 18 | | 0.3 | | | | 1.35 | 1.68 | 1.00 | | 30.7 | 14.8 | 7.6 | 7.6 | 7.9 | 8.9 | 8.2 |
| 9 823 | 0- 25 | | | 25 | | 0.2 | | | 1.13 | | | 1.00 | | | 15.1 | | | 7.8 | | 7.7 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA+ OAC 5A2A | NH4+ OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE CA | MG | NA | K | CO3 | HCO3 | CL | SO4 | B | PH SAT. PASTE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | PCT. | MEQ/100G | | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 9 816 | 0- 5 | | | 0.3 | 2.7 | 3.0 | | 20.6 | 0.82 | 5.3 | 1.3 | 1.1 | 1.4 | | 6.1 | 1.3 | | | | 7.8 |
| 9 817 | 5- 28 | | | 0.3 | 2.0 | 2.3 | | 19.1 | 0.86 | 4.3 | 1.8 | 1.9 | 1.0 | | 4.3 | 1.3 | 1.5 | | | 7.6 |
| 9 818 | 28- 51 | | | 3.0 | 1.7 | 4.7 | | 15.4 | 3.85 | 6.7 | 7.6 | 22.7 | 1.9 | | 4.0 | 19.3 | 20.0 | | | 7.8 |
| 9 819 | 51- 71 | | | 6.2 | 1.4 | 7.6 | | 13.4 | 10.3 | 13.4 | 69.8 | 64.0 | 2.0 | | 2.8 | 48.4 | 91.5 | | | 8.0 |
| 9 820 | 71- 94 | | | 6.2 | 0.9 | 7.1 | | 8.7 | 14.5 | 26.7 | 107.5 | 84.6 | 2.3 | | 1.2 | 81.4 | 138.8 | | | 7.9 |
| 9 821 | 94-120 | | | 3.4 | 0.4 | 3.8 | | 6.5 | 10.7 | 26.8 | 75.1 | 64.0 | 1.2 | | 1.6 | 46.2 | 115.4 | | | 7.9 |
| 9 822 | 120-160 | | | 6.9 | 1.0 | 7.9 | | 20.8 | 0.96 | 6.7 | 1.8 | 1.0 | 1.2 | | 3.9 | 3.8 | | | | 7.1 |
| 9 823 | 0- 25 | | | 0.2 | 2.3 | 2.5 | | 20.1 | | | | | | | | | | | | |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. 6F1B PCT. | REQ. 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E | II 7A2E | III 7A2E | DTA IV 7A3 | -L.T. .0002 MM- X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 816 | 0- 5 | 48.6 | 0.2 | 1 | 1 | | | MT 3 | MI 2 | KK 1 | | | | |
| 9 817 | 5- 28 | 54.3 | 0.2 | 1 | 1 | | | MT 3 | MI 2 | KK 1 | | | | |
| 9 818 | 28- 51 | 64.0 | 1.5 | 10 | 8 | | | | | | | | | |
| 9 819 | 51- 71 | 62.2 | 2.2 | 17 | 10 | | | | | | | | | |
| 9 820 | 71- 94 | 50.2 | 1.9 | 22 | 10 | 0.8 | | MT 3 | MI 2 | KK 1 | | | | |
| 9 821 | 94-120 | 38.7 | 0.9 | 14 | 9 | 0.7 | | | | | | | | |
| 9 822 | 120-160 | 66.0 | 6.8 | 33 | TR | | | | | | | | | |
| 9 823 | 0- 25 | | 0.2 | 1 | | | | | | | | | | |

| MINERAL CODE | RELATIVE AMOUNT |
|---|---|
| MT MONTMORT | 1 TRACE |
| MI MICA | 2 SMALL |
| KK KAOLINIT | 3 MODERATE |
| | 4 ABUNDANT |
| | 5 DOMINANT |
| | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

## ELFRIDA LOAM (taxadjunct) 1/
S69Ariz-2-11

Location: Cochise County, Arizona. 950 feet north and 2,350 feet west of the southeast corner of Sec. 10, T. 16 S., R. 24 E. East of U. S. Highway 666, about 4½ miles north and 2 miles east of Cochise. Date of sampling: October 16, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Pachic Calciustoll, coarse-loamy, carbonatic, thermic.
Vegetation: Tobosa, fluffgrass, burrograss, scattered alkali sacaton and mesquite. Use: Livestock range. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 60°F., January 42°F., July 78°F. Parent Material: Alluvium from acid and basic igneous rock and limestone. Topography: Level and nearly level alluvial fan near old lake margins. Slope, 0.2 percent, east facing. Elevation: 4135 feet. Drainage: Well drained. Runoff is medium to slow. Permeability is moderately slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This sample paired with S69Ariz-2-15. Composite sample of 0 to 10 inches (0 to 25 cm) taken for organic carbon determination - four sites sampled approximately 20 feet N, E, S, and W of pit and composite sample obtained (RSL 69823).

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>69816 | 0 to 5 cm (0 to 2 inches), grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; weak thick platy structure; slightly hard, very friable, slightly sticky, slightly plastic; many fine and medium and few coarse roots; common fine and coarse roots; common fine and coarse tubular pores; few fine white irregularly shaped soft masses and threads of lime; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| A12<br>RSL<br>69817 | 5 to 28 cm (2 to 11 inches), brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine and and medium subangular blocky structure; slightly hard, friable, slightly sticky, plastic; many fine and medium and few coarse roots; common fine and coarse tubular pores; few fine white irregularly shaped soft masses and threads of lime; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| A13<br>RSL<br>69818 | 28 to 51 cm (11 to 20 inches), brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, plastic; many fine and medium and few coarse roots; few very fine and fine tubular pores; few fine irregularly shaped white soft masses and threads of lime; strongly effervescent; moderately alkaline (pH 8.2); gradual wavy boundary. |
| A14<br>RSL<br>69819 | 51 to 71 cm (20 to 28 inches), brown (10YR 5/3) heavy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; hard, friable, sticky, plastic; common fine and medium and few coarse roots; few very fine and fine tubular pores; common fine white irregularly shaped soft masses and threads of lime; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| A15ca<br>RSL<br>69820 | 71 to 94 cm (28 to 37 inches), pale brown (10YR 6/3) light loam, dark brown (10YR 4/3) moist; massive; hard, friable, slightly sticky, slightly plastic; few fine medium and coarse roots; few very fine and fine tubular pores; common medium and large krotovinas; about 25 to 30 percent by volume of medium and large white irregularly shaped soft masses of lime; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C1ca<br>RSL<br>69821 | 94 to 120 cm (37 - 47½ inches), light gray (10YR 7/2) fine sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard to hard, friable, slightly sticky, slightly plastic; few fine and coarse roots; about 20 percent by volume of medium and large white irregularly shaped soft masses of lime; violently effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. |
| IIC2<br>RSL<br>69822 | 120 to 160 cm (47½ - 63 inches), light brownish gray (10YR 6/2) clay, dark grayish brown (10YR 4/2) moist, with many medium distinct yellowish brown (10YR 5/4) mottles, dark yellowish brown (10YR 4/4) moist; massive parting to moderate fine and medium subangular blocky structure; very hard, friable, sticky, plastic; few fine and medium roots; about 15 to 20 percent by volume of white fine and medium irregularly shaped soft masses of lime; strongly effervescent; moderately alkaline (pH 8.2). |
| RSL<br>69823 | See Remarks. |

1/ The Elfrida series is in a fine-loamy, mixed, thermic family of Pachic Calciustolls. This pedon has a control section with less than 18 percent clay and more than 40 percent carbonate.

CONSECUTIVE PEDON NUMBER C 69173 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES COGSWELL SOIL NO. S69 ARIZ. 2-27 SAMPLE NO. 9 887-9 888 WILLCOX AREA

SOIL FAMILY: PACHIC CALCIUSTOLL,FINE,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL SAND 2-.05 | FRACTION SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.20 | FINE LT .20 | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS I PCT. OF WHOLE 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | |
| 9 887 | 25- 51 | A12 | 12.3 | 40.4 | 47.3 | 1.5 | 2.7 | 1.0 | 3.3 | 3.8 | 12.0 | 28.4 | | | 3 | 18.0 | --A | -- | -- | -- |
| 9 888 | 51- 76 | A13 | 11.0 | 40.1 | 48.9 | 0.8 | 2.1 | 1.2 | 2.9 | 4.0 | 11.1 | 29.0 | | | 3 | 17.0 | --A | -- | -- | -- |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | MOIST 1/3 BAR 4A1F | TEST. 1/3 BAR 4A1H | BULK DENSITY DRY 382 | CM | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PERCENT | | | | PCT.NO.40 | | | | GRAMS PER CC | | PERCENT | | | -PERCENT- | |
| 9 887 | 25- 51 | 0.77 | 0.069 | 8 | | | | | | | | | | 1.00 | | | | 18.8 | | |
| 9 888 | 51- 76 | 0.71 | | 9 | | | | | | | | | | 1.00 | | | | 21.0 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 887 | 25- 51 | | | 1.0 | 2.0 | 3.0 | | | 3.0 | 27.0 | | | | | 8.0 | 7.8 |
| 9 888 | 51- 76 | | | 2.2 | 1.9 | 4.1 | | | 4.1 | 28.0 | | | | | 8.3 | 8.0 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM MINERAL X RAY I 7A2E | II 7A2E | III 7A2E | CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 887 | 25- 51 | | | | | | | | | | |
| 9 888 | 51- 76 | | | | | | | | | | |

RELATIVE AMOUNT

1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

# COGSWELL CLAY
S69Ariz-2-27

Location: Cochise County, Arizona. 1,500 feet south and 250 feet west of the northeast corner of Sec. 7, T. 17 S., R. 25 E. Northwest of State Highway 181, about 6 miles north and 21 miles east of Pearce. Date of sampling: October 23, 1969. Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Pachic Calciustoll, fine, mixed, thermic.
Vegetation: Cropland, after grain sorghum. Use: Irrigated cropland. Climate: Precipitation about 11 to 12 inches. Mean annual air temperature 58°F., January 41°F., July 78°F. Parent Material: Alluvium, principally from rhyolite, andesite, limestone. Topography: Nearly level concave swale. Slope, 0.2 percent, north facing. Elevation: 4180 feet. Drainage: Well drained. Runoff is slow. Permeability is slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. This sample paired with S69Ariz-2-19.

| HORIZON | DESCRIPTION |
|---|---|
| Ap | 0 to 25 cm (0 to 10 inches), brown (10YR 5/3) light clay, dark brown (10YR 3/3) moist; weak fine granular structure; hard, friable, sticky, plastic; common fine and medium roots; few very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. |
| A12<br>RSL<br>69887 | 25 to 51 cm (10 to 20 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; moderate fine subangular blocky structure; very hard, friable, sticky, plastic; few fine and medium roots; common fine and very fine tubular pores; few to common pressure faces; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary. |
| A13<br>RSL<br>69888 | 51 to 76 cm (20 to 30 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/3) moist; moderate fine subangular blocky structure; very hard, friable, sticky, plastic; few fine and medium roots; common very fine and fine tubular pores; few to common pressure faces; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C1ca | 76 to 110 cm (30 to 44 inches), reddish yellow (5YR 6/6) clay loam, yellowish red (5YR 4/6) moist; massive; slightly hard, friable, sticky, slightly plastic; many fine and very fine tubular pores; 30 to 35 percent by volume of 1/8 to 1/2 inch irregularly shaped lime concretions and fine and medium irregularly shaped pinkish white soft lime masses; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C2ca | 110 to 145 cm (44 to 58 inches), pinkish gray (7.5YR 7/2) gravelly clay loam, light brown (7.5YR 6/4) moist; massive; slightly hard, friable, sticky, slightly plastic; many fine and very fine tubular pores; 25 to 35 percent by volume of 1/8 to 1/2 inch irregularly shaped lime concretions and fine and medium irregularly shaped white soft lime masses; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| C3ca | 145 to 160 cm (58 to 64 inches), pinkish gray (7.5YR 7/2) light clay, light brown (7.5YR 6/4) moist; massive; slightly hard, friable, sticky, plastic; common very fine tubular pores; about 15 percent by volume of fine and medium irregularly shaped white soft lime masses; strongly effervescent; moderately alkaline (pH 8.2). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Petrocalcic Caliustoll, loamy, mixed, thermic, shallow
SOIL Kimbrough gravelly loam SOIL Nos. S64Ariz-2-26 LOCATION Cochise County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64638 - 64642

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 3A1 >2 Pct. | 2 – 19 Pct. of < 76 mm | 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0–11 | A1 | 48.7 | 34.7 | 16.6 | 10.9 | 8.9 | 5.9 | 12.9 | 10.1 | 20.0 | 14.7 | 37.9 | 38.6 | | | 48 | 30 | 18 |
| 11–15 | C1cam | | | | | | | | | | | | | | | | | |
| 15–21 | IIC2 | 51.9 | 32.0 | 16.1 | 9.6 | 11.2 | 6.3 | 13.1 | 11.7 | 16.1 | 15.9 | 35.8 | 40.2 | | | 42 | 38 | 4 |
| 21–41 | IIIC3ca | | | | | | | | | | | | | | | | | |
| 41–45 | IVCl | 85.6 | 10.0 | 4.4 | 36.2 | 23.2 | 9.0 | 11.4 | 5.8 | 6.5 | 3.5 | 18.8 | 79.8 | | | 59 | 52 | 7 |
| | | Recalculated data based on the whole soil (< 2 mm and > 2 mm) | | | | | | | | | | | | | | | | |
| 0–11 | A1 | 25.3 | 18.0 | 8.6 | 5.7 | 4.6 | 3.1 | 6.7 | 5.2 | 10.4 | 7.6 | 19.7 | 20.1 | | | 48 | 30 | 18 |
| 11–15 | C1cam | | | | | | | | | | | | | | | | | |
| 15–21 | IIC2 | 30.1 | 18.6 | 9.3 | 5.6 | 6.5 | 3.6 | 7.6 | 6.8 | 9.3 | 9.2 | 20.8 | 23.3 | | | 42 | 38 | 4 |
| 21–41 | IIIC3ca | | | | | | | | | | | | | | | | | |
| 41–45 | IVCl | 35.1 | 4.1 | 1.8 | 14.8 | 9.5 | 3.7 | 4.7 | 2.4 | 2.7 | 1.4 | 7.7 | 32.7 | | | 59 | 52 | 7 |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | | 6E1b Carbonate as $CaCO_3$ 1/ Pct. | 3A1a Carbonate in < 0.002 mm Pct. | Bulk density g/cc | Bulk density g/cc | Bulk density g/cc | | Water content Pct. | Water content Pct. | 4B2 15 bar Pct. | Atterberg limits: Plastic limit Pct. of < 0.4 mm | Atterberg limits: Liquid limit Pct. of < 0.4 mm | Atterberg limits: Plastic index Pct. of < 0.4 mm | pH 8C1a 1:1 $H_2O$ | pH 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–11 | 1.70 | 0.152 | 11 | | 16 | 5 | | | | | | | 9.8 | 23 | 34 | 11 | 7.9 | 8.4 |
| 11–15 1/ | 0.38 | | | | 60 | | | | | | | | 12.8 | 26 | 34 | 8 | 8.1 | 8.7 |
| 15–21 | 0.78 | 0.080 | 10 | | 26 | 7 | | | | | | | 8.9 | | | | 8.0 | 8.6 |
| 21–41 1/ | 0.06 | | | | 27 | | | | | | | | 3.2 | 22 | 25 | 3 | 8.4 | 9.0 |
| 41–45 | 0.03 | | | | 1 | | | | | | | | 3.9 | | | | 8.8 | 9.1 |
| | Recalculated data based on the whole soil (< 2 mm and > 2 mm) | | | | | | | | | | | | | | | | | |
| 0–11 | 0.88 | 0.079 | 11 | | 16 | 3 | | | | | | | 5.1 | | | | 7.9 | 8.4 |
| 11–15 | 0.38 | | | | 60 | | | | | | | | 12.8 | | | | 8.1 | 8.7 |
| 15–21 | 0.45 | 0.046 | 10 | | 26 | 4 | | | | | | | 5.2 | | | | 8.0 | 8.6 |
| 21–41 | 0.06 | | | | 27 | | | | | | | | 8.9 | | | | 8.4 | 9.0 |
| 41–45 | 0.01 | | | | tr. | | | | | | | | 1.6 | | | | 8.8 | 9.1 |

| Depth (In.) | Extractable bases: 6N2b Ca | 6O2c Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0–11 | 29.5 | 1.4 | 0.7 | 0.5 | 32.1 | | 16.4 | | 6.6 | 0.5 | 1.7 | 0.3 | | - | 2.8 | 2.1 | | 0.87 |
| 11–15 1/ | 19.6 | 0.7 | 0.9 | 0.2 | 21.4 | | 5.5 | | 8.0 | 0.8 | 1.5 | 10.4 | | - | 2.0 | 1.2 | | 0.78 |
| 15–21 | 25.4 | 1.4 | 0.7 | 0.3 | 28.7 | | 12.7 | | 5.9 | 0.9 | 2.6 | 9.4 | | - | 2.4 | 2.2 | | 1.10 |
| 21–41 1/ | 14.2 | 1.0 | 0.7 | 0.1 | 16.0 | | 4.7 | | 2.5 | 0.5 | 9.6 | 12.8 | | - | 3.0 | 4.4 | | 1.06 |
| 41–45 | 14.8 | 1.6 | 1.7 | 0.1 | 18.2 | | 9.6 | | 5.4 | 1.2 | 4.9 | 11.6 | | - | 2.1 | 2.7 | | 1.11 |
| | Recalculated data based on the whole soil (< 2 mm and > 2 mm) | | | | | | | | | | | | | | | | | |
| 0–11 | 15.3 | 0.7 | 0.4 | 0.3 | 16.7 | | 8.5 | | 6.6 | 0.5 | 1.7 | 0.3 | | - | 2.8 | 2.1 | | 0.87 |
| 11–15 | 19.6 | 0.7 | 0.9 | 0.2 | 21.4 | | 5.5 | | 8.0 | 0.8 | 1.5 | 10.4 | | - | 2.0 | 1.2 | | 0.78 |
| 15–21 | 14.7 | 0.4 | 0.5 | 0.1 | 16.6 | | 7.4 | | 5.9 | 0.9 | 2.6 | 9.4 | | - | 2.4 | 2.2 | | 1.10 |
| 21–41 | 14.2 | 1.0 | 0.7 | 0.1 | 16.0 | | 4.7 | | 2.5 | 0.5 | 9.6 | 12.8 | | - | 3.0 | 4.4 | | 1.06 |
| 41–45 | 6.1 | 0.6 | 0.7 | tr. | 7.5 | | 3.9 | | 5.4 | 1.2 | 4.9 | 11.6 | | - | 2.1 | 2.7 | | 1.11 |

| Depth (In.) | 8A Water at Saturation Pct. | 5D2 Exchangeable Na 1/ Pct. | 5B1b Exch. Na / 100g | Clay mineralogy (<0.002 mm.) X-ray: Montmorillonite | Vermiculite | Illite | Kaolinite |
|---|---|---|---|---|---|---|---|
| 0–11 | 50.2 | 4 | 0.6 | xxxx | - | xx | tr. |
| 11–15 1/ | 43.8 | 14 | 0.8 | | | | |
| 15–21 | 44.3 | 5 | 0.6 | xxxx | - | x | tr. |
| 21–41 1/ | 28.4 | 11 | 0.5 | | | | |
| 41–45 | 22.8 | 17 | 1.6 | xxxx | - | tr. | tr. |
| | Recalculated data based on the whole soil | | | | | | |
| 0–11 | 26.1 | 4 | 0.3 | xxxx | - | xx | tr. |
| 11–15 | 43.8 | 14 | 0.8 | | | | |
| 15–21 | 25.7 | 5 | 0.3 | xxxx | - | x | tr. |
| 21–41 | 28.4 | 11 | 0.5 | | | | |
| 41–45 | 9.3 | 7 | 0.6 | xxxx | - | tr. | tr. |

1/ All determinations reported in this line or column were made on crushed samples of the whole soil. Results reported as percent or meq /100 g or g /cc are for the whole soil including the >2 mm. fraction. If these data are compared to other data on this data sheet, the effect of the >2 mm. fraction has to be taken into consideration. Recalculated data are given below.

x - detected
xx - moderate
xxx - abundant
xxxx - dominant

## KIMBROUGH GRAVELLY LOAM
S64Ariz-2-26

Location: Cochise County, Arizona. 29 miles ESE of Willcox, Arizona via State Highway 186. 1/2 mile NNE on a ranch road which intersects Highway 186 at a small cemetery. Pit is 400 feet east of ranch road on ridgetop. Approximately 560 feet south and 150 feet west of the northeast corner of Sec. 23, T. 16 S., R. 28 E. Date of Sampling: October 22, 1964.
Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, M. L. Richardson, and R. K. Preece.
Classification: Petrocalcic Calliustoll, loamy, mixed, thermic, shallow.
Vegetation: Grassland. Fair cover of black and sideoats grama, wolftail, tall three-awn, plains lovegrass, fluffgrass, shrubby buckwheat, winterfat, and blue grama. Climate: Precipitation 14-15 inches annual. Mean annual temperature 57° F. (Chiricahua National Monument). Soil temperature at time of sampling: 9 inches - 74° F., 24 inches - 73° F., 72 inches - 74° F. Parent Material: Old valley fill material containing rhyolite tuff, andesite, quartzite, limestone, basalt, shale and granite. Topography: Undulating to gently rolling remnants of dissected valley terraces. Smooth convex longitudinal slope of 2 percent and lateral slopes of 5 to 6 percent. Drainage: Well drained. Moderately permeable. Moderate runoff. Soil Moisture: Slightly moist - 25 percent of field capacity. Water table at 100 to 200 feet. Remarks: Rodents have burrowed throughout the profile both horizontally and vertically. Burrows are 6 to 12 inches in diameter and are backfilled with a mixture of surface soil and caliche fragments. Paired sample is S65Ariz-2-27. Field determinations of pH by thymol blue in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>64638 | 0-11 inches (0-28 cm), gray (10YR 5/1) gravelly loam, very dark grayish brown (10YR 3/2) when moist; moderate fine granular structure; slightly hard when dry, friable when moist, nonsticky and slightly plastic when wet; many fine and very fine roots; many fine interstitial pores; 30-40 percent fine and medium gravel; strongly effervescent with HCl; pH 8.0; abrupt smooth boundary. |
| C1cam<br>RSL No.<br>64639 | 11-15 inches (28-38 cm), white (N8) indurated pan, very pale brown (10YR 7/3) when moist; massive and indurated, upper 1/2 inch is laminar; extremely hard when dry, extremely firm when moist; no roots; common medium and coarse tubular pores below top 1/2 inch; 30-40 percent fine and medium gravel; violently effervescent; pH 8.20; abrupt irregular boundary. |
| IIC2<br>RSL No.<br>64640 | 15-21 inches (38-53 cm) (This is essentially a filled rodent burrow -- see Remarks.) Grayish brown (10YR 5/2) gravelly loam, dark brown (10YR 3/3) when moist; common fine and medium pan fragments that are white (8/N) dry, and very pale brown (10YR 7/3) moist; massive, breaking to weak fine granular structure; slightly hard when dry, friable when moist, nonsticky and plastic when wet; common fine and very fine roots; many fine interstitial pores; 30-40 percent gravel; strong and violent effervescence; pH 8.2. Abrupt wavy boundary. |
| IIIC3ca<br>RSL No.<br>64641 | 21-41 inches (53-104 cm), white (N8) gravelly lime pan: light brown (7.5YR 6/4) when moist; massive and strongly cemented; extremely hard when dry, extremely firm when moist; few fine roots; common fine tubular pores; violently effervescent; 40-50 percent gravel; pH 8.2; abrupt wavy boundary. |
| IVC4<br>RSL No.<br>64642 | 41-45 inches (104-114 cm), light brownish gray (10YR 6/2) with white (N8( thin lime coatings very gravelly loamy sand, grayish brown (10YR 5/2) and light gray (10YR 7/2) when moist; single grain; loose when dry, friable when moist, nonsticky and nonplastic when wet; few fine roots; common fine tubular and many interstitial pores; 60-70 percent fine and medium gravel; strongly and violently effervescent; pH 8.2; abrupt irregular boundary. |
| VC5ca<br>(not sampled) | 45-49 inches (114-124 cm), white (N8) gravelly caliche, light brown (7.5YR 6/4) when moist; massive and strongly cemented; extremely hard when dry, extremely firm when moist, nonsticky and nonplastic when wet; few fine roots; few coarse tubular pores; 40-50 percent fine and medium gravel; violently effervescent; pH 8.4; abrupt wavy boundary. |
| VIC6<br>(not sampled) | 49-60 inches (124-152 cm), pinkish gray (7.5YR 6/2) sand and gravel, brown (7.5YR 5/2) when moist; single grain; loose when dry, nonsticky and nonplastic when wet; few fine roots; many interstitial pores; 50-60 percent fine and medium gravel; strongly effervescent; pH 8.4; abrupt wavy boundary. |
| VIIC7ca | 60-79 inches (152-201 cm), white (N8) gravelly caliche, light brown (7.5YR 6/4) when moist; massive and strongly cemented; extremely hard when dry, extremely firm when moist; no roots; common fine and medium tubular pores; 40-50 percent gravel; violently effervescent; pH 8.4. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Petrocalcic Calciustoll, loamy, mixed, thermic, shallow
SOIL Kimbrough gravelly loam SOIL Nos. S64Ariz-2-27 LOCATION Cochise County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64643 - 64647

| Depth (In) | Horizon | 1B1b Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Size class and particle diameter (mm) Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 1A2a: > 2 Pct. | 2 – 19 Pct. of < 76 mm | 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0–12 | A1 | 60.2 | 24.3 | 15.5 | 7.6 | 9.0 | 7.6 | 21.6 | 14.4 | 15.3 | 9.0 | 43.3 | 45.8 | | | 27 | 25 | 2 |
| 12–20 | C1cam | | | | | | | | | | | | | | | | | |
| 20–34 | IIC2 | 51.6 | 30.4 | 18.0 | 5.7 | 8.1 | 6.2 | 17.5 | 14.1 | 14.2 | 16.2 | 39.5 | 37.5 | | | 31 | 20 | 11 |
| 34–53 | IIIC3ca | | | | | | | | | | | | | | | | | |
| 53–80+ | IVC4 | 79.8 | 12.2 | 8.0 | 23.1 | 20.2 | 10.0 | 19.3 | 7.2 | 5.8 | 6.4 | 24.2 | 72.6 | | | 60 | 60 | tr. |
| | | Recalculated data based on the whole soil (<2 mm and >2 mm) | | | | | | | | | | | | | | | | |
| 0–12 | A1 | 43.9 | 17.7 | 11.3 | 5.5 | 6.6 | 5.5 | 15.8 | 10.5 | 11.2 | 6.6 | 31.6 | 33.4 | | | 27 | 25 | 2 |
| 12–20 | C1ca | | | | | | | | | | | | | | | | | |
| 20–34 | IIC2 | 35.6 | 21.0 | 12.4 | 3.9 | 5.6 | 4.3 | 12.1 | 9.7 | 9.8 | 11.2 | 27.2 | 25.9 | | | 31 | 20 | 11 |
| 34–53 | IIIC3ca | | | | | | | | | | | | | | | | | |
| 53–80+ | IVC4 | 31.9 | 4.9 | 3.2 | 9.2 | 8.1 | 4.0 | 7.7 | 2.9 | 2.3 | 2.6 | 9.7 | 29.0 | | | 60 | 60 | tr. |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | | 6E1b Carbonate as $CaCO_3$ 1/ Pct | 3A1a Carbonate in < 0.002 mm Pct. | Bulk density 4A1f 1/3 bar g/cc | 4A1h Oven dry g/cc | Atterberg limits Plastic limit | Liquid limit | Plastic index Pct. of < 0.4 mm | Water content 4B1c 1/3 bar Pct. | 4B2 15 bar Pct | 4D1 Extensibility COLE in./in. | 4D1 Extensibility COLE in./in. | 3B2 Cm | pH 8C1a 1:1 $H_2O$ | 8C1a 1:10 $H_2O$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–12 | 1.03 | 0.104 | 10 | | 8 | 3 | 1.34 | 1.40 | 21 | 29 | 8 | 17.6 | 8.9 | 0.015 | 0.012 | 0.84 | 8.0 | 8.5 |
| 12–20 1/ | 0.28 | | | | 58 | | | | 24 | 30 | 6 | | 8.2 | | | | 8.3 | 8.8 |
| 20–34 | 0.62 | 0.063 | 10 | | 23 | 5 | | | | | | | 9.1 | | | | 7.9 | 8.5 |
| 34–53 1/ | 0.13 | | | | 46 | | | | 21 | 32 | 11 | | 5.9 | | | | 8.3 | 8.9 |
| 53–80+ | 0.04 | | | | 2 | | | | | | | | 7.1 | | | | 8.5 | 9.2 |
| | | Recalculated data based on the whole soil (<2 mm and >2 mm) | | | | | | | | | | | | | | | | |
| 0–12 | 0.75 | 0.76 | 10 | | 8 | 2 | 1.55 | | | | | 12.8 | 6.5 | --- | 0.012 | --- | 8.0 | 8.5 |
| 12–20 | 0.28 | | | | 58 | | | | | | | | 8.2 | | | | 8.3 | 8.8 |
| 20–34 | 0.43 | 0.043 | 10 | | 23 | 3 | | | | | | | 6.3 | | | | 7.9 | 8.5 |
| 34–53 | 0.13 | | | | 46 | | | | | | | | 5.9 | | | | 8.3 | 8.9 |
| 53–80+ | 0.02 | | | | 2 | | | | | | | | 2.8 | | | | 8.5 | 9.2 |

| Depth (In.) | Extractable bases 6N2b Ca | 6O2c Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | 5A3a Sum | Water extract from saturated paste 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 8A1 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0–12 | 27.1 | 1.5 | 0.8 | 0.5 | 29.9 | | 15.7 | | | | 1.0 | 0.2 | | | | | | 0.65 |
| 12–20 1/ | 20.8 | 0.9 | 0.6 | 0.3 | 22.6 | | 6.6 | | | | 1.3 | 0.2 | | | | | | 0.62 |
| 20–34 | 26.3 | 1.6 | 0.7 | 0.3 | 28.9 | | 13.9 | | 9.2 | 1.0 | 1.8 | 0.1 | | - | 2.0 | 1.2 | | 1.12 |
| 34–53 1/ | 21.7 | 1.6 | 0.7 | 0.2 | 24.2 | | 8.9 | | | | 1.7 | 0.1 | | | | | | 0.58 |
| 53–80+ | 22.0 | 2.4 | 3.5 | 0.3 | 28.2 | | 17.0 | | 2.5 | 0.8 | 11.6 | 0.1 | | | 2.7 | 4.7 | | 1.59 |
| | Recalculated data based on the whole soil (<2 mm and >2 mm) | | | | | | | | | | | | | | | | | |
| 0–12 | 19.8 | 1.1 | 0.6 | 0.4 | 21.9 | | 11.5 | | | | 1.0 | 0.2 | | | | | | 0.65 |
| 12–20 | 20.8 | 0.9 | 0.6 | 0.3 | 22.6 | | 6.6 | | | | 1.3 | 0.2 | | | | | | 0.62 |
| 20–34 | 18.1 | 1.1 | 0.5 | 0.2 | 19.9 | | 9.6 | | 9.2 | 1.0 | 1.8 | 0.1 | | - | 2.0 | 1.2 | | 1.12 |
| 34–53 | 21.7 | 1.6 | 0.7 | 0.2 | 24.2 | | 8.9 | | | | 1.7 | 0.1 | | | | | | 0.58 |
| 53–80+ | 8.8 | 1.0 | 1.4 | 0.1 | 11.3 | | 6.8 | | 2.5 | 0.8 | 11.6 | 0.1 | | - | 2.7 | 4.7 | | 1.59 |

| Depth (In.) | 8A Water at Saturation Pct. | 5D2 Exchangeable Na Pct. | 5B1b Exch. Na me / 100 g | Gypsum Pct. |
|---|---|---|---|---|
| 0–12 | 42.7 | 5 | 0.8 | |
| 12–20 1/ | 36.4 | 9 | 0.6 | |
| 20–34 | 44.0 | 4 | 0.6 | |
| 34–53 1/ | 39.4 | 7 | 0.6 | |
| 53–80+ | 30.7 | 18 | 3.1 | |
| | Recalculated data based on the whole soil | | | |
| 0–12 | 31.2 | 5 | 0.6 | |
| 12–20 | 36.4 | 9 | 0.6 | |
| 20–34 | 30.4 | 4 | 0.4 | |
| 34–53 | 39.4 | 7 | 0.6 | |
| 53–80+ | 12.3 | 18 | 1.2 | |

1/ All determinations reported in this line or column were made on crushed samples of the whole soil. Results reported as percent or meq /100 g or g /cc. are for the whole soil including the >2 mm fraction. If these data are compared to other data on this data sheet, the effect of the >2 mm. fraction has to be taken into consideration. Recalculated data are given below.

## KIMBROUGH GRAVELLY LOAM
S64Ariz-2-27

Location: Cochise County, Arizona. Approximately 30 miles southeast of Willcox, Arizona. 3/4 mile south and 1.3 miles west of the intersection of State Highways 181 and 186 leading to the Chiricahua National Monument. 1400 feet north and 400 feet west of the south 1/4 corner of Sec. 35, T 16 S, R. 28 E. Date of Sampling: October 22, 1964.
Description by: James Jay and M. L. Richardson. Collectors: K. W. Flach, B. Brasher, James Jay, M. L. Richardson, and R. K. Preece.
Classification: Petrocalcic Calciustoll, loamy, mixed, thermic, shallow.
Vegetation: Grassland. Good cover of black and sideoats grama, blue grama, sand dropseed, tall three-awn, wolftail, plains lovegrass, shrubby buckwheat and a few yucca. Climate: Precipitation 14-15 inches annual. Soil temperature at time of sampling: 12 inches - 64° F., 24 inches - 68° F., 72 inches - 70° F. Parent Material: Old valley fill materials containing rhyolite tuff, andesite, quartzite, limestone, basalt, shale and granite. Topography: Undulating to gently rolling remnants of dissected valley terraces. Smooth convex longitudinal slope of 2 percent and lateral slopes of 5 to 6 percent. Elevation: 4950 feet. Drainage: Well drained. Moderately permeable. Moderate runoff. Soil Moisture: Slightly moist, about 25 percent of field capacity. Water table at 100 to 200 feet. Remarks: Cave soils have similar profile but occur on footslopes and fans of limestone hills. Whitehead soils have grass vegetation whereas Cave soils have dominantly xerophytic brush vegetation. Paired sample is S64Ariz-2-26. Field determination of pH by thymol blue in 1:5 dilution.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>64643 | 0-12 inches (0-30 cm), rayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) when moist; moderate fine and medium granular structure; slightly hard, friable when moist, slightly sticky and plastic when wet; many fine and medium roots, many fine interstitial and a few fine and medium tubular pores; 30 percent fine and medium gravel; rodent burrows*; strongly effervescent with HCl; pH 8.2; abrupt wavy boundary. |
| C1cam<br>RSL No.<br>64644 | 12-20 inches (30-51 cm), pinkish white (7.5YR 8/2) gravelly lime pan, pink (7.5YR 7/4) when moist; massive and indurated (top 1/2 inch is laminar); extremely hard when dry, extremely firm when moist; no roots in laminar layer, few fine roots below; common medium and coarse tubular pores below laminar layer; 40-50 percent gravel; rodent burrows*; violently effervescent; pH 8.2; abrupt wavy boundary. |
| IIC2<br>RSL No.<br>64645 | 20-34 inches (51-86 cm), (Essentially a filled rodent burrow*). Pinkish gray (7.5YR 6/2) gravelly loam with common fine and medium lime fragments that are pinkish white (7.5YR 8.2), brown to dark brown (7.5YR 4/2) and pink (7.5YR 7/4) when moist; massive breaking to moderate fine and medium granular structure; slightly hard when dry, friable when moist, slightly sticky and plastic when wet; many fine roots; many interstitial and common fine and medium tubular pores; 40 percent fine and medium gravel; violently effervescent; pH 8.2 |
| IIIC3ca<br>RSL No.<br>64646 | 34-53 inches (86-135 cm), pinkish white (7.5YR 8/2) gravelly loam pink (7.5YR 7/4) when moist; massive and strongly cemented; extremely hard when dry, extremely firm when moist, nonsticky and nonplastic when wet; few fine roots; few fine and medium tubular and common interstitial pores; 40-50 percent gravel; violently effervescent; pH 8.2; clear smooth boundary. |
| IVC4<br>RSL No.<br>64647 | 53-80 inches +(135-203 cm), pinkish gray (7.5YR 6/2) with many fine distinct veins and seams of lime that are pinkish gray (7.5YR 7/2), very gravelly loamy sand, brown (7.5YR 5/2) and pinkish gray (7.5YR 6/2) when moist; single grain and in parts weakly cemented; loose to hard when dry, friable when moist, nonsticky and nonplastic when wet; no roots, many interstitial pores; 70 percent fine gravel; strongly and violently effervescent; pH 8.2. |

*Rodents have burrowed through the pans and worked vertically and horizontally at intervals of about 5 to 20 feet. These burrows are backfilled with a mixture of materials from all horizons. Roots and water enter the softer lower horizons through these fractures, making the material somewhat effective for root growth and water retention.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aridic Haplustoll, loamy-skeletal, carbonatic, mesic
SOIL Winona gravelly fine sandy loam (taxadjunct) SOIL Nos. S62Ariz-3-33 LOCATION Coconino County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62329 - 62332

| Depth (In.) | Horizon | 1B1b Total: Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | Coarse fragments 2A2: > 2* Pct. | 2 – 19 Pct. of < 76 mm | 19 – 76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0- 3 | A1 | 68.3 | 20.1 | 11.6 | 1.2 | 3.6 | 11.6 | 28.2 | 28.7 | 13.0 | 7.1 | 59.3 | 39.6 | | | 23 | | |
| 3-10 | C1 | 58.3 | 26.1 | 15.6 | 1.1 | 3.0 | 8.8 | 22.4 | 23.0 | 17.1 | 9.0 | 57.2 | 35.3 | | | 22 | | |
| 10-27 | C2 | 61.7 | 21.9 | 16.4 | 1.3 | 4.0 | 10.0 | 23.4 | 23.0 | 11.7 | 10.2 | 52.4 | 38.7 | | | 43 | | |
| 27+ | R | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct. | C/N | | 6E1b Carbonate as $CaCO_3$ Pct. | 3A1a Carbonate in <0.002 mm. Pct. | Bulk density g/cc | g/cc | g/cc | | Water content: Pct | 4B2 15 bar Pct. | Pct | | | pH: 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 3 | 1.77 | 0.144 | 12 | | 2 | - | | | | | | 6.6 | | | | 7.7 | 8.1 |
| 3-10 | 2.19 | 0.177 | 12 | | 7 | 2 | | | | | | 9.5 | | | | 7.8 | 8.2 |
| 10-27 | 1.72 | 0.135 | 13 | | 15 | 4 | | | | | | 10.0 | | | | 7.9 | 8.4 |
| 27+ | | Rock | | | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2c Ca | 6O2c Mg | 6P2a Na | 6Q2a K | | Cation Exch. Capacity 5A2a NaOAc | | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0- 3 | 19.9 | 1.4 | 0.2 | 0.7 | | 16.7 | | 7.0 | 0.6 | 0.5 | 0.4 | | - | 7.2 | 0.3 | | 0.72 |
| 3-10 | 29.8 | 1.7 | 0.2 | 0.6 | | 22.9 | | 5.0 | 0.8 | 0.3 | 0.2 | | - | 5.0 | 0.1 | | 0.52 |
| 10-27 | 26.0 | 3.3 | 0.2 | 0.3 | | 21.1 | | 5.6 | 1.2 | 0.8 | 0.1 | | - | 5.6 | 0.3 | | 0.70 |
| 27+ | | Rock | | | | | | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation Pct. | 5D1 Exchangeable Na Pct | 5B1b Exch. Na meq / 100 g | Gypsum Pct. |
|---|---|---|---|---|
| 0- 3 | 35.9 | 1 | 0.1 | |
| 3-10 | 45.7 | 1 | 0.2 | |
| 10-27 | 46.2 | 1 | 0.2 | |
| 27+ | | Rock | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## WINONA GRAVELLY FINE SANDY LOAM (taxadjunct) 1/
S62Ariz-3-33

Location: Central Coconino County Area, Arizona. 1320 feet east and 530 feet north of the SW corner of Sec. 26, T15N, R14E. 35 miles S and 50 miles E of Flagstaff. Date of Sampling: June 14, 1962.
Collectors: R. Nelson, L. Grant, D. Cox, R.W. Mitchell, L. Haverfield, C.C. Michaels and J.E. Jay.
Classification: Aridic Haplustoll, loamy-skeletal, carbonatic, mesic.
Vegetation: The vegetation at the sample site consists of blue grama and squirreltail grasses with a ground cover density of approximately 50 percent. Use: Rangeland. Climate: Annual precipitation is approximately 15 inches. The average cool season temperature is approximately 33° F. and the average warm season temperature is approximately 69°F. The mean annual temperature is approximately 51°F. Parent Material: Pink to light reddish brown fine grained, calcareous, massive hard, dense sandstone member of the Kaibab formation. There are many irregularly spaced seams and joints in this sandstone. Elevation: 5800 feet. Relief: Undulating plain, convex, slope 20 percent to the north. Drainage: Well drained, slow runoff, moderate permeability.
Remarks: The surface 1/4 inch algal crust is noneffervescent but has a pH (Hellige-Truog) of 8.0 and is soft and porous. There are coatings of reprecipitated lime on all rock fragments throughout the profile which range in thickness from 1/8 to 1/2 inch. The depth to the R horizon ranges from 10 to 30 inches.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>62329 | 0 to 3 inches, brown (7.5YR 5/4) gravelly fine sandy loam, dark brown (7.5YR 3/2) when moist; weak fine granular structure; loose when dry and moist; nonsticky and slightly plastic when wet; plentiful fine and medium roots; many fine interstitial pores; strongly effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. 35-40 percent by volume of gravel 1/8-1/2 inch diameter. |
| C1<br>RSL<br>62330 | 3 to 10 inches, brown (7.5YR 4/2) gravelly light loam, dark brown (7.5YR 3/2) when moist; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant fine and medium roots; few fine continuous simple tubular and common fine interstitial pores; strongly effervescent; moderately alkaline, pH 8.0; abrupt wavy boundary. 10 percent by volume gravel greater than 3/4" in diameter discarded from laboratory sample. |
| C2<br>RSL<br>62331 | 10 to 27 inches, brown (7.5YR 5/4) stony and cobbly loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful fine and medium roots; few fine continuous simple tubular and common fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; abrupt irregular boundary. 35 percent by volume gravel greater than 3/4 inch in diameter discarded from laboratory sample. |
| R<br>RSL<br>62332 | 27 to 29 inches +, pink (5YR 8/3) fine grained, hard, dense calcareous sandstone, pink (5YR 7/3) when moist. This is a calcareous sandstone member of the Kaibab formation. Violently effervescent, moderately alkaline, pH 8.2; irregularly jointed and cracked. |

1/ The Winona series is in a loamy, carbonatic, mesic family of Lithic Torriorthents. This pedon has a mollic epipedon, more than 35 percent gravel and cobbles by volume, and less than 40 percent carbonate.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aridic Haplustoll, loamy-skeletal, carbonatic, mesic
SOIL Winona gravelly fine sandy loam (tax-adjunct) SOIL Nos. S62Ariz-3-36 LOCATION Coconino County, Arizona
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62333 - 62336

| Depth (In) | Horizon | 1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2-0 05) | Total: Silt (0 05-0.002) | Total: Clay (< 0.002) | Sand: Very coarse (2-1) | Sand: Coarse (1-0 5) | Sand: Medium (0.5-0.25) | Sand: Fine (0.25-0 1) | Sand: Very fine (0.1-0.05) | Silt: 0.05-0.02 | Silt: Int. III (0.02-0.002) | Int. II (0.2-0.02) | (2-0.1) | | | Coarse fragments 2A2: > 2* Pct. | 2 - 19 Pct. of < 76 mm | 19 -76 Pct. of < 76 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0- 2 | A1 | 56.0 | 32.9 | 11.1 | 2.4 | 2.1 | 4.6 | 17.7 | 29.2 | 22.8 | 10.1 | 66.7 | 26.8 | | | 34 | | |
| 2-12 | C1 | 50.9 | 30.4 | 18.7 | 1.5 | 2.4 | 3.5 | 16.5 | 27.0 | 17.4 | 13.0 | 58.0 | 23.9 | | | 39 | | |
| 12-22 | C2 | 56.9 | 23.4 | 19.7 | 2.5 | 7.1 | 6.9 | 16.8 | 23.6 | 10.2 | 13.2 | 45.4 | 33.3 | | | 56 | | |
| 22+ | R | Rock | | | | | | | | | | | | | | | | |

| Depth (In) | 6A1a Organic carbon Pct. | 6B1a Nitrogen Pct | C/N | | 6E1b Carbonate as $CaCO_3$ Pct. | 3A1a Carbonate in <0.002 mm Pct. | Bulk density g/cc | g/cc | g/cc | | Water content Pct. | 4B2 15 bar Pct. | Pct. | | | pH 8C1b Sat. Paste | 8C1a 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- 2 | 1.74 | 0.159 | 11 | | 6 | 1 | | | | | | 7.4 | | | | 7.8 | 8.2 |
| 2-12 | 2.22 | 0.229 | 10 | | 18 | 6 | | | | | | 10.8 | | | | 7.8 | 8.3 |
| 12-22 | 1.58 | 0.115 | 14 | | 47 | 13 | | | | | | 13.4 | | | | 8.0 | 8.4 |
| 22+ | | Rock | | | | | | | | | | | | | | | |

| Depth (In) | Extractable bases 5B1a: 6N2c Ca | 6O2a Mg | 6P2a Na | 6Q2a K | | Cation Exch. Capacity 5A2a NaOAc | | | Water extract from saturated paste 8A1: 6N1a Ca | 6O1a Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | | | mmho/cm |
| 0- 2 | 24.1 | 1.2 | 0.2 | 1.0 | | 19.5 | | | 7.2 | 0.6 | 0.3 | 0.5 | | - | 7.0 | 0.2 | | 0.71 |
| 2-12 | 31.3 | 1.7 | 0.2 | 0.7 | | 23.5 | | | 5.5 | 0.8 | 0.3 | 0.3 | | - | 5.6 | 0.1 | | 0.58 |
| 12-22 | 20.1 | 2.6 | 0.1 | 0.3 | | 15.9 | | | 4.2 | 1.9 | 0.7 | 0.3 | | - | 4.9 | 0.3 | | 0.64 |
| 22+ | | Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation Pct. | 5D1 Exchangeable Na Pct. | 5B1b Exch. Na meq / 100 g | Gypsum Pct | | | |
|---|---|---|---|---|---|---|---|
| 0- 2 | 41.2 | 1.0 | 0.2 | | | | |
| 2-12 | 54.4 | 0.9 | 0.2 | | | | |
| 12-22 | 51.9 | 0.6 | 0.1 | | | | |
| 22+ | | Rock | | | | | |

* Percent of <19 mm ; see profile description for estimates of >19 mm.

## WINONA GRAVELLY FINE SANDY LOAM (taxadjunct) 1/
S62Ariz-3-36

Location: Central Coconino County Area, Arizona. 1000 feet west of the E 1/4 corner of Sec. 26, T15N, R14E. Date of Sampling: June 14, 1962.
Collectors: R. Nelson, L. Grant, D. Cox, L. Haverfield, C.C. Michaels, R.W. Mitchell and J.E. Jay.
Classification: Aridic Haplustoll, loamy-skeletal, carbonatic, mesic.
Vegetation: At the sample site with a 25 percent ground cover density the vegetation consists of blue grama, winterfat and needle and thread grass. Use: Rangeland. Climate: Annual precipitation is approximately 15 inches. The average temperature in the cool season is approximately 33° F. and the average temperature in the warm season is approximately 69°F. The mean annual temperature is approximately 51°F. Parent Material: Pink to light reddish brown, fine grained, calcareous, massive, hard, dense sandstone member of the Kaibab formation. There are many irregularly spaced seams and joints in this sandstone. Elevation: 5800 feet. Relief: Undulating plains, slightly convex, slope 2 percent to the north. Drainage: Well drained, slow runoff, moderate permeability.
Remarks: The surface algal crust, approximately 1/4" thick, is noneffervescent, but has a pH (Hellige-Truog) of 8.0. There are coatings of reprecipitated lime on all rock fragments throughout the profile which range in thickness from 1/8 to 1/2 inch.
The depth to the R horizon ranges from approximately 10 to 30 inches.
Examination and sampling done in a hand-dug pit.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL<br>62333 | 0 to 2 inches, brown (7.5YR 5/4) gravelly fine sandy loam, dark brown (7.5YR 3/2) when moist; weak fine granular structure; loose dry and moist, slightly sticky and slightly plastic when wet; plentiful fine roots; many fine interstitial pores; strongly effervescent; moderately alkaline, pH (Hellige-Truog) 8.0; abrupt smooth boundary. 5 percent by volume of rock material greater than 3/4 inch in diameter discarded from laboratory sample. |
| C1<br>RSL<br>62334 | 2 to 12 inches, brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/2) when moist; weak fine subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant fine and medium roots; few fine continuous simple tubular and many fine interstitial pores; violently effervescent; moderately alkaline, pH 8.0; clear wavy boundary. 40 percent by volume of rock material greater than 3/4 inch in diameter discarded from laboratory sample. |
| C2<br>RSL<br>62335 | 12 to 22 inches, pink (7.5YR 7/4) stony loam, brown (7.5YR 5/4) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful fine and medium roots; few fine continuous simple tubular and many fine interstitial pores; violently effervescent; moderately alkaline, pH 8.2; abrupt irregular boundary. 50 percent by volume of rock material greater than 3/4 inch in diameter discarded from laboratory sample. |
| R<br>RSL<br>62336 | 22 to 24 inches +, pink (5YR 8/3) fine grained hard, dense, calcareous sandstone, pink (5YR 7/3) when moist. This is a calcareous sandstone member of the Kaibab formation; strongly effervescent, moderately alkaline, pH 8.2; irregularly jointed and cracked. |

1/ The Winona series is in a loamy-skeletal, carbonatic, mesic family of Lithic Torriorthents. This pedon has a mollic epipedon.

CONSECUTIVE PEDON NUMBER C 69149 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MABRAY SOIL NO. S69 ARIZ. 2- 3 SAMPLE NO. 9 767-9 769 WILLCOX AREA

SOIL FAMILY: LITHIC HAPLUSTOLL,LOAMY-SKELETAL,CARBONTC,THRMC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II .2-.02 WHOLE SOIL | COARSE FRAGMENTS PCT. OF I 75-20 PCT. OF | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | |
| 9 767 | 0- 8 | A11 | 23.3 | 48.5 | 28.2 | 1.9 | 1.6 | 1.4 | 7.5 | 10.9 | 28.6 | 19.9 | | | 3 | 44.7 | 65* | 41 | 16 | 2 |
| 9 768 | 8- 23 | A12 | 59.1 | 27.6 | 13.3 | 10.8 | 9.2 | 7.0 | 19.5 | 12.6 | 13.4 | 14.2 | | | | 38.1 | 84* | 73 | 7 | 1 |
| 9 769 | 23- 33 | C CA | 47.3 | 30.8 | 21.9 | 13.5 | 10.7 | 5.2 | 9.5 | 8.4 | 14.1 | 16.7 | | | 8 | 28.0 | 95* | 72V | 13 | 5 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR-BON 6A1A | NITRO-GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT EXT FE 6C2B | AL 6G7A | PYROP EXT FE 6C5A | AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY 1/3 EST. 4A1F | 1/3 DRY 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PERCENT | | | | PCT.NO.40 | | GRAMS PER CC | | | | -PERCENT- | | | -PERCENT- | |
| 9 767 | 0- 8 | 2.04 | 0.208 | 13 | | 0.5 | 0.1 | | | 43 | 28 | | 1.18 | 1.31 | 0.54 | 23.0 | 14.9 | 3.5 | 1.9 | |
| 9 768 | 8- 23 | 1.46 | 0.143 | 2 | | 1.6 | 0.1 | | | | | 1.25 | | | 0.28 | | 6.8 | | | |
| 9 769 | 23- 33 | 1.10 | 0.074 | 67 | | 0.1 | TR | | | | | 1.35 | | | 0.10 | | 6.8 | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6Q2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM ACI-DITY 6H2A | SUM AL 6G1E | NH4-OAC 5G1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 767 | 0- 8 | | | 0.4 | 0.6 | 1.0 | | | 1.0 | 31.9 | | | | | 7.6 | 7.2 |
| 9 768 | 8- 23 | | | 0.4 | 0.6 | 1.0 | | | 1.0 | 16.2 | | | | | 7.6 | 7.3 |
| 9 769 | 23- 33 | | | 0.5 | 0.2 | 0.7 | | | 0.7 | 10.9 | | | | | 7.6 | 7.6 |

| SAMPLE NO | DEPTH CM. | CLAY MINERALOGY <.002 MM DTA 7A3 | <.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV |
|---|---|---|---|---|---|---|
| | | -PERCENT- | | | | |
| 9 767 | 0- 8 | | MT 3 | MI 1 | KK 1 | |
| 9 768 | 8- 23 | | MI 3 | CL 3 | MT 2 | |
| 9 769 | 23- 33 | | MT 2 | MI 1 | KK 1 | |

| MINERAL CODE | | RELATIVE AMOUNT | |
|---|---|---|---|
| MT | MONTMORT | 1 | TRACE |
| MI | MICA | 2 | SMALL |
| KK | KAOLINIT | 3 | MODERATE |
| CL | CHLORITE | 4 | ABUNDANT |
| | | 5 | DOMINANT |
| | | 6 | INDETER. |

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.
V=NOT WEIGHED. VALUE CALCULATED FROM A VOLUME ESTIMATE.

## MABRAY VERY GRAVELLY LOAM
S69Ariz-2-3

Location: Cochise County, Arizona. 1,200 feet north and 200 feet east of southwest corner of Sec. 25, T. 14 S., R. 26 E. North of State Highway 186 about 4½ miles south and 11 miles east of Willcox. Date of Sampling: October 14, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Lithic Haplustoll, loamy-skeletal, carbonatic, thermic.
Vegetation: Sideoats grama, three-awn, ocotillo, yucca, pricklypear, and sage. Use: Livestock range. Climate: Precipitation about 13 to 15 inches. Mean annual air temperature is 60°F., January 42°F., July 78°F. Parent Material: Limestone. Topography: Smooth, convex, moderately steep hills. Slope, 17 percent, south facing. Elevation: 4650 feet. Drainage: Well drained. Runoff is medium to rapid. Permeability is moderate. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator and thymol blue 1:5 dilution. Paired with sample S69Ariz-2-4.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>69767 | 0 to 8 cm (0 to 3 inches), grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; about 80 percent of surface is covered by angular limestone gravel and cobbles; 50 to 60 percent gravel of 1/4 to 1-1/2 inches in size and 20 to 30 percent cobbles of 3 to 6 inches in size; pendants and thin coatings of secondary lime on bottom of all stone fragments; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary. |
| A12<br>RSL<br>69768 | 8 to 23 cm (3 to 9 inches), grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular and subangular blocky structure; slightly hard, very friable, sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; about 30 percent by volume of 1/2 to 2 inch angular limestone gravel and 20 percent by volume of 4 to 8 inch angular limestone cobbles; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. |
| Cca<br>RSL<br>69769 | 23 to 33 cm (9 to 13 inches), brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine and very fine granular structure; soft, very friable, sticky, slightly plastic; common very fine and fine roots; about 50 percent by volume of 2 to 3 inch angular limestone gravel and 40 percent by volume of 4 to 8 inch angular limestone cobbles; violently effervescent; moderately alkaline (pH 8.2); abrupt irregular boundary. |
| R | 33 to 41 cm (13 to 16 inches), gray (10YR 6/1), fractured limestone bedrock, gray (10YR 5/1) moist, white (10YR 8/2) coatings of secondary lime. The crevices are filled with brown (10YR 5/3) light silty clay loam soil, dark brown (10YR 3/3) moist; violently effervescent; moderately alkaline. |

CONSECUTIVE PEDON NUMBER C 69150 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MABRAY SOIL NO. S69 ARIZ. 2- 4 SAMPLE NO. 9 770-9 772 WILLCOX AREA

SOIL FAMILY: LITHIC HAPLUSTOLL,LOAMY-SKELETAL,CARBON.,THERMC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE 20 | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 9 770 | 0- 8 | A11 | 60.4 | 26.7 | 12.9 | 8.0 | 8.6 | 7.9 | 22.7 | 13.2 | 12.6 | 14.1 | | | 40.0 | 63* | 43 | -- | 4 | |
| 9 771 | 8- 28 | A12 | 46.8 | 32.8 | 20.4 | 6.0 | 6.9 | 5.5 | 16.0 | 12.4 | 14.6 | 18.2 | | | 36.7 | 89* | 75 | 6 | 2 | |
| 9 772 | 28- 36 | C CA | 43.9 | 32.5 | 23.6 | 5.0 | 5.4 | 4.7 | 16.1 | 12.7 | 13.5 | 19.0 | | | 1 36.6 | 94* | 78V | 7 | 2 | |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A -PERCENT- | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | 1/3 BAR 4A1F | ORY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PERCENT | | | | PCT. | | NO.40 GRAMS PER CC | | | | PERCENT | | | -PERCENT- | |
| 9 770 | 0- 8 | 1.40 | 0.137 | 2 | | | | | | | | 1.18 | | 0.57 | | | | 6.8 | | |
| 9 771 | 8- 28 | 1.99 | 0.186 | 1 | | | | | | | | 1.25 | | 0.21 | | | | 9.3 | | |
| 9 772 | 28- 36 | 2.37 | 0.237 | 7 | | | | | | | | 1.35 | | 0.11 | | | | 12.7 | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI-DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 9 770 | 0- 8 | | | 0.5 | 0.7 | 1.2 | | | 1.2 | 16.3 | | | | | 7.6 | 7.4 |
| 9 771 | 8- 28 | | | 0.4 | 0.4 | 0.8 | | | 0.8 | 24.4 | | | | | 7.6 | 7.4 |
| 9 772 | 28- 36 | | | 0.4 | 0.3 | 0.7 | | | 0.7 | 22.7 | | | | | 7.6 | 7.5 |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 770 | 0- 8 | MT 3 | KK 3 | MI 2 | | | | | | | MT MONTMORT | 1 TRACE |
| 9 771 | 8- 28 | CL 5 | MI 3 | | | | | | | | KK KAOLINIT | 2 SMALL |
| 9 772 | 28- 36 | | | | | | | | | | MI MICA | 3 MODERATE |
| | | | | | | | | | | | CL CHLORITE | 4 ABUNDANT |
| | | | | | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.
V=NOT WEIGHED. VALUE CALCULATED FROM A VOLUME ESTIMATE.

## MABRAY VERY GRAVELLY LOAM
S69Ariz-2-4

Location: Cochise County, Arizona. 1,600 feet south and 600 feet east of the northwest corner of Sec. 24, T. 16 S., R. 23 E. About 6 miles south and 2½ miles west of Cochise. Date of sampling: October 14, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Lithic Haplustoll, loamy-skeletal, carbonatic, thermic.
Vegetation: Black grama, sideoats grama, ocotillo, mesquite, agave, and pricklypear. Use: Livestock range. Climate: Precipitation about 13 to 15 inches. Mean annual temperature is 60°F., January 42°F., July 78°F.
Parent Material: Limestone. Topography: Smooth, convex, moderately steep limestone hills. Slope, 22 percent, northeast facing. Elevation: 4450 feet. Drainage: Well drained. Runoff is medium to rapid. Permeability is moderatel Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by Hellige-Truog indicator and thymol blue in 1:5 dilution. Paired with sample S69Ariz-2-3.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>69770 | 0 to 8 cm (0 to 3 inches), dark brown (10YR 4/3) very gravelly loam, dark brown (7.5YR 3/2) moist; weak fine granular and weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine roots; common fine interstitial and tubular pores; about 80 percent of surface covered with angular limestone gravels and cobbles; about 60 percent by volume of 1/4 to 2-1/2 inch gravel and about 20 percent of 3 to 5 inch cobbles; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| A12<br>RSL<br>69771 | 8 to 28 cm (3 to 11 inches), dark brown (7.5YR 4/2) very gravelly loam, dark brown (7.5YR 3/2) moist; moderate fine granular and weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine roots; common fine interstitial and tubular pores; about 50 percent by volume of 1/4 to 2-1/2 inch angular limestone gravel and 30 percent of 3 to 5 inch cobbles; slightly effervescent, mildly alkaline (pH 7.8); abrupt wavy boundary. |
| Cca<br>RSL<br>69772 | 28 to 36 cm (11 to 14 inches), reddish brown (5YR 4/3) very gravelly loam, dark reddish brown (5YR 3/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common very fine, fine and medium roots; few fine interstitial pores; 45 to 50 percent by volume of 1/4 to 2 inch angular limestone gravel and 30 to 40 percent of 4 to 8 inch cobbles pinkish white lime coatings on all fragments; strongly effervescent; mildly alkaline (pH 7.8); abrupt irregular boundary. |
| R | 36 to 46 cm (14 to 18 inches), reddish gray (5YR 5/2) and light gray (5YR 7/1) limestone bedrock, dark reddish brown (5YR 3/2) and reddish gray (5YR 5/2) moist; massive; extremely hard; few very fine roots in rock fractures; violently effervescent. |

CONSECUTIVE PEDON NUMBER C 68143 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES FARAWAY SOIL NO. S68 ARIZ. 2- 7 SAMPLE NO. 81031-81034 E.PIMA-SANTA CRU AREA

SOIL FAMILY: LITHIC HAPLUSTOLL LOAMY-SKELETAL,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE 20 | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | | |
| 81031 | 0- 5 | A11 | 71.7 | 17.9 | 10.4 | 10.6 | 12.7 | 10.7 | 24.1 | 13.6 | 9.6 | 8.3 | | | | 37.3 | 58A | 38 | 12 | 8 |
| 81032 | 5- 30 | A12 | 65.2 | 20.0 | 14.8 | 5.9 | 10.6 | 9.9 | 24.0 | 14.8 | 10.3 | 9.7 | | | | 39.2 | 70A | 53 | 11 | 6 |
| 81033 | 30- 43 | R | | | | | | | | | | | | | | | --G | --G | --G | --G |
| 81034 1/ | 0- 0 | | 34.3 | 27.9 | 37.8 | 9.7 | 4.2 | 2.9 | 9.6 | 7.9 | 14.4 | 13.5 | | | | 28.2 | --G | --G | --G | --G |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L L 4F1 | P I 4F2 | M I T 4A1F | BULK DENSITY EST. 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | PERCENT | | | | PCT. | NO.40 | | GRAMS PER CC | | | PERCENT | | | -PERCENT- | |
| 81031 | 0- 5 | 1.49 | 0.104 | | | 1.1 | TR | | | | | | 1.31 | | 0.60 | | | 7.4 | | |
| 81032 | 5- 30 | 1.35 | | | | 0.9 | TR | | | | | | 1.44 | | 0.45 | | | 8.6 | | |
| 81033 | 30- 43 | | | | | 0.2 | TR | | | | | | | 2.46 2.47 | 1.00 | | 2.8 | 2.2 | 0.1 | 0.1 |
| 81034 | 0- 0 | | | | | | | | | | | | | 2.29 2.34 | 1.00 | | 4.2 | | 0.7 | 0.7 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6D2D | NA 5B4A 6P2A | K 5B4A 6D2A | SUM | EXT. ACI- DITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4- OAC 5A6A | BASE SATURATION SUM+ ACI- DITY | SUM+ AL | NH4- OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81031 | 0- 5 | 9.8 | 2.6 | 0.1 | 0.4 | 12.9 | | | 12.9 | 12.6 | 100+ | | 100+ | | 6.2 | 5.5 |
| 81032 | 5- 30 | 10.1 | 2.9 | 0.1 | 0.4 | 13.5 | | | 13.5 | 15.1 | 100+ | | 89 | | 6.1 | 5.4 |
| 81033 | 30- 43 | 4.0 | 1.3 | 0.1 | 0.5 | 5.9 | | | 5.9 | 5.0 | 100+ | | 100+ | | 7.5 | 6.3 |
| 81034 | 0- 0 | | | | | | | | | | | | | | | |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | <.002 MM X RAY I 7A2E | II 7A2E | III 7A2E | IV 7A2E | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY I 7A2E | II 7A2E | III 7A2E |
|---|---|---|---|---|---|---|---|---|---|---|
| 81031 | 0- 5 | MT 2 | MI 2 | KK 1 | | | | | | |
| 81032 | 5- 30 | MT 2 | MI 2 | KK 1 | | | | | | |
| 81033 | 30- 43 | MI 2 | MT 1 | | | | | | | |
| 81034 | 0- 0 | | | | | | | | | |

| CODE | MINERAL | RELATIVE AMOUNT |
|---|---|---|
| MT | MONTMORT | 1 TRACE |
| MI | MICA | 2 SMALL |
| KK | KAOLINIT | 3 MODERATE |
| | | 4 ABUNDANT |
| | | 5 DOMINANT |
| | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.
1/ = Ground sample of weathered rock.

## FARAWAY VERY COBBLY SANDY LOAM

S68 Ariz-2-7-1 through 3

Location: Cochise County, Arizona, approximately 12½ miles N.E. of Lochiel, Arizona, 1700 feet north and 1000 feet east of SW corner Section 17, T23S, R19E, 200 feet north of Highway 83 and 300 feet east of entrance to Parker Canyon recreation area. Photo AMS 663. F.S. EEX-22-42. Date of Sampling: October 17, 1968.
Description by: Havens, Richardson and Clemmons. Collectors: Nettleton and Brasher.
Classification: Lithic Haplustoll, loamy-skeletal, mixed, mesic.

Vegetation: Juniper, oak, few piñon pine. Grasses: sprucetop grama, deergrass, sideoats grama, bluestem, three-awn, blue grama, plains lovegrass and wolftail. Climate: Mean annual temperature 56°F. Mean annual precipitation 18-20 inches. Parent Material: Dacite (fractured). Topography: Mountain slope - 15 percent slope, north aspect. Elevation: 5600 feet. Drainage: Well drained. Medium runoff. Soil Moisture: Moist.
Remarks: This site was paired with S68 Ariz-2-6-1 through 5.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-5 cm) |
| A11 RSL 681031 | 0 to 2 inches, dark grayish brown (10YR 4/2) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium roots; common fine interstitial pores; noneffervescent; medium acid (pH 6.0); abrupt smooth boundary. |
| A12 RSL 681032 (5-30 cm) | 2 to 12 inches, dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, fine and medium roots; common fine interstitial pores; noneffervescent; medium acid (pH 6.0); abrupt irregular boundary. |
| R RSL 681033 (30-46 cm) | 12 to 18 inches plus, reddish gray (10R 5/1) fractured extremely hard dacite bedrock with soil material from A12 in fractures, weak red (10R 4/2) moist, with many fine distinct pale red (10R 6/4) and pink (5YR 8/3) grains or crystals; massive; extremely hard, extremely firm; common fine and medium roots. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Haplustoll, loamy-skeletal, mixed, mesic

SOIL Moano gravelly loam SOIL Nos. S65Ariz-13-10 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65238 - 65239

| Depth (in.) | Horizon | 1B1b Total Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Size class and particle diameter (mm) Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | 3A1 Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments 1A2a > 2 | 2 - 19 | 19 - 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0-3 | A1 | 39.8 | 42.2 | 18.0 | 9.2 | 9.2 | 4.5 | 8.6 | 8.3 | 20.0 | 22.2 | 32.8 | 31.5 | 0 | 18 | 28 | 26 | 2 |
| 3-9 | AC | 38.7 | 37.3 | 24.0 | 10.7 | 10.4 | 4.5 | 7.1 | 6.0 | 13.0 | 24.3 | 22.8 | 32.7 | 0 | 24 | 56 | 44 | 12 |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density 4A1f 1/3 bar | 4A1h Oven dry | | Water content 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH 8C1a $H_2O$ 1:1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | Pct. | Pct. | Pct. | in./in. | in./in. | |
| 0-3 | 2.64 | 0.170 | 16 | 2.3 | - | | | | | 9.7 | | | 6.3 | |
| 3-9 | 1.43 | 0.076 | 18 | 1.9 | - | | | | | 12.4 | | | 5.8 | |

| Depth (In.) | Extractable bases 5B1a 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity 5A1a $NH_4OAc$ | 5A3a Sum | 6G1d KCl Ext. $Al^{+++}$ | Base saturation 5C1 $NH_4OAc$ | 5C3 Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | Pct. | Pct. |
| 0-3 | 16.7 | 3.9 | 0.2 | 0.4 | 21.2 | 5.2 | 23.7 | 26.4 | | 89 | 80 |
| 3-9 | 22.3 | 6.0 | 0.2 | 0.2 | 28.7 | 7.0 | 32.4 | 35.7 | | 88 | 80 |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A Mont. | Verm. | Mica | Kaolin |
|---|---|---|---|---|
| | X-ray | | | |
| 0-3 | xxxx | - | x | xx |
| 3-9 | xxxx | t | - | xx |

* All values from characterization sample.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## MOANO GRAVELLY LOAM
S65Ariz-13-10

Location: Western Yavapai County, Arizona. About 1½ miles northwest of Mayer, Arizona on State Highway #69, then 1 mile west on an old mine road. 1/2 mile south and 2/10 mile east of northwest corner Sec. 16, T12N, R1E. Photo #326. AMS, Project 134, Lot FA. Date of Sampling: May 6, 1965.
Classification: Lithic Haplustoll, loamy-skeletal, mixed, mesic.
Collectors: Flach, Nettleton, Jay, Wendt.
Vegetation: Brush. Oakbrush, deerbrush, mountain mahogany, squawbush, manzanita, and snakeweed.
Climate: Mean annual precipitation 12-14". Mean annual temperature 57°F. Soil temperature at time of sampling 60°F. at 4". Parent Material: Schist and phyllite. Relief: Moderately steep, convex hill on a 23 percent east facing slope. Elevation: 4675 feet. Drainage: Medium runoff, moderately permeable and well drained.
Remarks: This soil is formed on hills of vertically oriented schist and phyllite under a brush vegetation. It is on gently sloping to steep hills. Hellige-Truog field kit was used to determine pH. Paired samples are S65 Ariz-13-11, S65 Ariz-13-19 and S65 Ariz-13-20.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65238 | 0 to 3 inches, brown (10YR 4/3) gravelly loam, very dark grayish-brown (10YR 3/2) when moist; moderate medium and fine granular structure; slightly hard, very friable; slightly sticky and plastic; few fine roots; many fine interstitial pores; 30-50 percent fine medium schist gravel; noneffervescent; neutral (pH 7.2); clear irregular boundary. |
| AC<br>RSL NO.<br>65239 | 3 to 9 inches, brown (10YR 4/3) very gravelly loam slightly finer textured than A horizon, very dark grayish brown (10YR 3/2) when moist; massive; slightly hard, very friable, slightly sticky and plastic; abundant fine and medium roots; many fine and medium interstitial pores; 75 percent gravel; noneffervescent; neutral (pH 7.0); gradual irregular boundary. |
| CR | 9 to 13 inches plus, olive brown (2.5Y 4/4) and light gray (N 7/0) hard vertically oriented weathered phyllite; extremely hard; plentiful fine roots; common thin and moderately thick clay films on rock faces in joints; noneffervescent; neutral (pH 7.0). |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Haplustoll, loamy-skeletal, mixed, mesic

SOIL Moano gravelly loam SOIL Nos. S65Ariz-13-11 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65240 - 65241

| Depth (In.) | Horizon | 1B1b Total Sand (2-0.05) | Total Silt (0.05-0.002) | Total Clay (<0.002) | Sand: Very coarse (2-1) | Sand: Coarse (1-0.5) | Sand: Medium (0.5-0.25) | Sand: Fine (0.25-0.1) | Sand: Very fine (0.1-0.05) | Silt: 0.05-0.02 | Silt: Int. III (0.02-0.002) | Int. II (0.2-0.02) | (2-0.1) | | | ★ Coarse fragments 1A2a: ≥ 2 Pct. | 2 - 19 Pct. of <76mm | 19 - 76 Pct. of <76mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | | | |
| 0-3 | A1 | | | | | | | | | | | | | | | 46 | 33 | 13 |
| 3-9 | AC | | | | | | | | | | | | | | | 59 | 25 | 34 |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonates as $CaCO_3$ | | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | | Water content: 4B1c 1/3 bar | Water content: 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct | | Pct. | Pct | | g/cc | g/cc | g/cc | Pct | Pct. | Pct | in./in. | in./in. | | | |
| 0-3 | 0.66 | 0.065 | 10 | | - | | | | | | | 6.1 | | | 5.9 | |
| 3-9 | 0.73 | 0.080 | 9 | | - | | | | | | | 8.7 | | | 6.3 | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | | 6G1d KCl Ext. $Al^{+++}$ | | | | | | Base saturation: 5C1 $NH_4OAc$ | 5C3 Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | | | | | | Pct. | Pct. |
| 0-3 | 5.4 | 1.6 | 0.1 | 0.6 | 7.7 | 5.5 | 11.9 | 13.2 | | | | | | | | 65 | 58 |
| 3-9 | 12.4 | 2.8 | 0.1 | 0.4 | 15.7 | 6.0 | 19.0 | 21.7 | | | | | | | | 83 | 72 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

★ All values from characterization sample.

## MOANO GRAVELLY LOAM
S65Ariz-13-11

Location: Western Yavapai County, Arizona. About 1 mile east of Mayer, Arizona on ranch road, then 2/10 miles north on east-facing slope of schist hill. 1/10 mile north and 1/10 mile west of southeast corner of Sec. 14, T12N, R1E. Photo #326. AMS Project 134, Lot FA.
Date of Sampling: May 6, 1965.
Collectors: Flach, Nettleton, Jay, Meurisse, Wendt
Vegetation: Grass. Sideoats grama, three-awn, squirreltail, tridens, snakeweed, mesquite and annuals.
Climate: Mean annual precipitation 12". Mean annual temperature 57°F. Temperature at time of sampling 71°F. at 9". Parent Material: Schist and phyllite. Relief: Moderately steep, 27 percent convex, east-facing slope, hill. Elevation: 4600 feet. Drainage: Medium runoff, moderately permeable and well drained.
Remarks: This soil is formed on hills of vertically oriented schist and phyllite under a grass-brush vegetation. It is on gently sloping to steep hills. Hellige-Truog field kit was used to determine pH. Paired samples are S65 Ariz-13-10, S65 Ariz-13-19 and S65 Ariz-13-20.
Classification: Lithic Haplustoll, loamy-skeletal, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65240 | 0 to 3 inches, brown (10YR 4/3) very gravelly loam, very dark grayish-brown (10YR 3/2) when moist; strong fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; abundant fine roots; many fine interstitial pores; 75 percent schist gravel with gravel surface pavement; noneffervescent; strongly acid (pH 5.5); clear smooth boundary. |
| AC<br>RSL No.<br>65241 | 3 to 9 inches, brown (7.5YR 4/2) very gravelly heavy loam, dark brown (7.5YR 3/2) when moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; abundant fine and medium roots; many fine interstitial pores; 75 percent gravel;noneffervescent; slightly acid (pH 6.5); gradual irregular boundary. |
| CR | 9 to 13 inches plus, brown (7.5YR 4/2) and very dark gray (N3/0) very hard vertically oriented weathered phyllite with soil material covering faces of rocks. Iron coatings on fracture faces. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Haplustoll, loamy-skeletal, mixed, mesic

SOIL Moano gravelly loam SOIL Nos. S65Ariz-13-19 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65242 - 65243

| Depth (In.) | Horizon | 1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non-carbonate clay | * Coarse fragments 1A2a: > 2 | 2 - 19 | 19 - 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0-4 | A1 | 54.3 | 35.0 | 10.7 | 13.1 | 14.2 | 6.5 | 12.4 | 8.1 | 18.3 | 16.7 | 32.9 | 46.2 | 0 | 11 | 41 | 23 | 18 |
| 4-9 | AC | 52.4 | 37.2 | 10.4 | 12.0 | 14.1 | 6.3 | 10.9 | 9.1 | 19.1 | 18.1 | 33.9 | 43.3 | 0 | 10 | 41 | 33 | 8 |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | 4A1h Oven dry | | 3B2 | Water content: | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | Cm | Pct | Pct. | Pct | in./in. | in./in. | | | |
| 0-4 | 2.79 | 0.145 | 19 | | - | 0.81 | 0.91 | | 0.82 | | 25.4 | 10.4 | 0.040 | 0.032 | 7.1 | | |
| 4-9 | 0.91 | 0.059 | 15 | | - | 1.33 | 1.39 | | 0.74 | | 18.3 | 10.3 | 0.014 | 0.011 | 6.9 | | |

| Depth (in.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | | 6G1d KCl Ext. $Al^{+++}$ | Base saturation: 5C1 $NH_4OAc$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | Pct | Pct. |
| 0-4 | 22.5 | 7.1 | 0.1 | 0.2 | 29.9 | | 31.3 | | | | 96 | |
| 4-9 | 26.5 | 9.5 | 0.2 | 0.1 | 36.3 | | 38.3 | | | | 95 | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | X-ray | | | | |
| 0-4 | xxxx | x | - | x | |
| 4-9 | xxxx | xx | - | x | |

* All values from characterization sample.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

## MOANO GRAVELLY LOAM
S65Ariz-13-19

Location: Western Yavapai County, Arizona. About 3 miles northwest of Mayer on State Highway #69, then west 3/4 mile on old mine road, on schist hill with east-facing slope. 2/10 mile west and 3/10 mile south of NE corner, Sec. 8, T12N, R1E. Photo #326. AMS Project 134, Lot FA.
Date of Sampling: May 12, 1965.
Collectors: Flach, Nettleton, James, Meurisse, Wendt.
Vegetation: Brush-Manzanita. Climate: Mean annual precipitation 12". Mean annual temperature 57°F. Temperature at time of sampling 60°F. at 12". Parent Material: Schist and phyllite.
Relief: Moderately steep, convex, hill on a 25 percent east-facing slope. Elevation: 4,800 feet.
Drainage: Medium runoff, moderately permeable and well drained.
Remarks: This soil is formedon hills of vertically oriented schist and phyllite under a brush vegetation. It is on gently sloping to steep hills. Hellige-Truog field kit was used to determine pH. Paired samples are S65 Ariz-13-10, S65 Ariz-13-11 and S65Ariz-13-20.
Classification: Lithic Haplustoll, loamy-skeletal, mixed, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65242 | 0 to 4 inches, brown (7.5YR 4/4) finely gravelly loam, dark brown (7.5YR 3/2) when moist; strong, very fine and fine granular structure; soft, friable, slightly sticky and plastic; plentiful very fine and fine roots; many interstitial pores; 40 percent schist gravel; noneffervescent; mildly alkaline (pH 7.5); clear, irregular boundary. |
| AC<br>RSL No.<br>65243 | 4 to 9 inches, strong brown (7.5YR 5/6) dry and moist very gravelly loam; massive or rock controlled structure; slightly hard, friable, slightly sticky and plastic; abundant fine, medium, and few coarse roots; many interstitial pores; 70 percent gravel; noneffervescent; neutral (pH 7.0); clear, irregular boundary. |
| CR | 9 inches plus, strong brown (7.5YR 5/6) foliated vertically oriented rock varying in hardness from soft to hard; common clay coatings on rock faces. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Lithic Haplustoll, loamy-skeletal, mixed, mesic

SOIL Moano gravelly loam SOIL Nos. S65Ariz-13-20 LOCATION Yavapai County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65244 - 65245

| Depth (In.) | Horizon | 1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) | Silt (0.05–0.002) | Clay (< 0.002) | Sand: Very coarse (2–1) | Coarse (1–0.5) | Medium (0.5–0.25) | Fine (0.25–0.1) | Very fine (0.1–0.05) | Silt: 0.05–0.02 | Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | | | * Coarse fragments 1A2a: > 2 | 2 - 19 | 19–76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76mm | |
| 0-3 | A1 | | | | | | | | | | | | | | | 33 | 21 | 12 |
| 3-9 | AC | | | | | | | | | | | | | | | 30 | 24 | 6 |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C2a Ext. Iron as Fe | 6E1b Carbonate as $CaCO_3$ | | Bulk density: 4A1f 1/3 bar | 4A1h Oven dry | | | Water content: | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility COLEF | 4D1 Extensibility COLE | pH: 8C1a $H_2O$ 1:1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | | g/cc | g/cc | g/cc | | Pct. | Pct. | Pct. | in./in. | in./in. | | | |
| 0-3 | 0.91 | 0.064 | 14 | | - | | | | | | | | 6.8 | | | 6.9 | | |
| 3-9 | 0.62 | 0.046 | 13 | | - | | | | | | | | 6.7 | | | 7.0 | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases 5B1a: 6N2a Ca | 6O2a Mg | 6P2a Na | 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A1a $NH_4OAc$ | 5A3a Sum | | 6G1d KCl Ext. $Al^{+++}$ | | | | | | Base saturation: 5C1 $NH_4OAc$ | 5C3 Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | | | | | | | Pct | Pct. |
| 0-3 | 15.5 | 5.5 | 0.2 | 0.1 | 21.3 | 4.1 | 23.4 | 25.4 | | | | | | | | 91 | 84 |
| 3-9 | 23.0 | 6.7 | 0.1 | 0.1 | 29.9 | 4.3 | 32.3 | 34.2 | | | | | | | | 92 | 87 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| Depth (In.) | Clay mineralogy (<0.002 mm) 7A: Mont. | Verm. | Mica | Kaolin | |
|---|---|---|---|---|---|
| | < X-ray > | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

* All values from characterization sample.

## MOANO GRAVELLY LOAM
S65Ariz-13-20

Location: Western Yavapai County, Arizona. One mile northeast of Mayer, Arizona on schist hill with east exposure, near a spring development. 2/10 mile east and 1/10 mile south of northwest corner of Sec. 23, T12N, R1E. Photo #326. AMS Project 134, Lot FA. Date of Sampling: May 12, 1965.
Classification: Lithic Haplustoll, loamy-skeletal, mixed, mesic.
Collectors: Flach, Nettleton, James, Meurisse, Wendt.
Vegetation: Grass-brush. Sideoats grama, blue grama, three-awns, false mesquite, oakbrush, deerbrush, and snakeweed. Climate: Mean annual precipitation 10-12". Mean annual temperature 57°F. Temperature of soil at time of sampling 67°F. at 20". Parent Material: Schist and phyllite. Relief: Moderately steep, convex hill on 18 percent east facing slope. Elevation: 4,500 feet. Drainage: Medium runoff, moderately permeable and well drained.
Remarks: This soil is formed on hills of vertically oriented schist and phyllite hills under a grass-brush vegetation. It is on gently sloping to steep hills. Outcrops are common and a few cobble and stone size schist fragments are in the profile. Hellige-Truog field kit was used to determine pH. Paired samples are S65 Ariz-13-10, S65 Ariz-13-11 and S65Ariz-19.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>65244 | 0 to 3 inches, brown (7.5YR 4/4) gravelly loam, dark brown (7.5YR 3/2) when moist; moderate very fine and fine granular structure; soft, very friable, slightly sticky and slightly plastic; plentiful very fine and fine roots; many fine interstitial pores; 50 percent gravel and a surface pavement of gravel; noneffervescent; neutral (pH 7.0); clear,irregular boundary. |
| AC<br>RSL No.<br>65245 | 3 to 9 inches, brown (7.5YR 4/4) dry and moist very gravelly loam; massive or rock controlled structure; slightly hard, friable, slightly sticky and slightly plastic; abundant fine and medium and few coarse roots; many fine interstitial pores; 70 percent soft schist fragments gravel size; noneffervescent; moderately alkaline (pH 8.0); clear, irregular boundary. |
| CR | 9 to 14 inches plus, olive (5Y 4/4) and olive brown (2.5Y 4/4) foliated, vertically oriented hard rock with some soil material coating rock faces in fractures. May be some clay coatings. |

CONSECUTIVE PEDON NUMBER C 68142 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES FARAWAY TAXADJUNCT SOIL NO. S68 ARIZ. 2- 6 SAMPLE NO. 81026-81030 E.PIMA-SANTA CRU AREA

SOIL FAMILY: LITHIC HAPLUSTOLL,COARSE-LOAMY,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | SILTS CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBO NATE 3A1A | INT. II .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | PCT. OF LT 75 | | | |
| 81026 | 0- 8 | A11 | 68.8 | 24.0 | 7.2 | 21.9 | 19.0 | 9.4 | 12.4 | 6.1 | 10.6 | 13.4 | | | | 23.1 | 48A | 18 | 7 | 23 |
| 81027 | 8- 20 | A12 | 65.7 | 25.9 | 8.4 | 18.4 | 18.7 | 9.0 | 12.6 | 7.0 | 9.6 | 16.3 | | | | 22.6 | 46A | 14 | 10 | 22 |
| 81028 | 20- 33 | C | 69.0 | 21.1 | 9.9 | 25.6 | 21.6 | 8.0 | 9.1 | 4.7 | 6.9 | 14.2 | | | | 16.1 | 36A | 24 | 5 | 7 |
| 81029 | 33- 48 | R1 | | | | | | | | | | | | | | | --G | --G | --G | --G |
| 81030 | 48- 61 | R2 | | | | | | | | | | | | | | | --G | --G | --G | --G |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A -PERCENT- | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG L I M I T LL 4F1 | PL 4F2 | EST. 1/3 1/3 BAR 4A1F | BULK DENSITY DRY BAR 4A1F | 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEF 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PERCENT | | | | PCT. | NO.40 | GRAMS PER CC | | | | PERCENT | | | PERCENT | |
| 81026 | 0- 8 | 0.97 | 0.057 | | | 0.6 | TR | | | NP | NP | | 1.31 | 1.33 | 0.69 | | 13.1 | 5.5 | 0.5 | 0.3 |
| 81027 | 8- 20 | 0.61 | 0.034 | | | 0.5 | TR | | | NP | NP | | 1.44 | 1.45 | 0.68 | | 12.6 | 5.4 | 0.2 | 0.2 |
| 81028 | 20- 33 | 0.40 | | | | 0.5 | TR | | | NP | NP | | 1.78 | 1.84 | 0.73 | | 11.8 | 6.2 | 1.1 | 0.8 |
| 81029 | 33- 48 | | | | | 0.3 | 0.1 | | | | | | 2.20 | 2.27 | 1.00 | | 7.0 | 6.7 | 1.0 | 1.0 |
| 81030 | 48- 61 | | | | | 0.3 | TR | | | | | | 2.26 | 2.32 | 1.00 | | 5.8 | 6.2 | 0.9 | 0.9 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACIDITY 6H2A | KCL EXT. AL 6G1E | C E C SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACIDITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | PERCENT | | | | | |
| 81026 | 0- 8 | 22.2 | 5.1 | 0.8 | 0.6 | 28.7 | | | 28.7 | 12.2 | 100+ | | 100+ | | 5.9 | 5.1 |
| 81027 | 8- 20 | 3.5 | 1.7 | 0.1 | 0.4 | 5.7 | 5.0 | | 10.7 | 8.8 | 53 | | 65 | | 4.9 | 4.1 |
| 81028 | 20- 33 | 3.5 | 4.3 | 0.1 | 0.5 | 8.4 | 3.2 | 0.7 | 11.6 | 10.9 | 72 | 92 | 77 | | 5.1 | 4.3 |
| 81029 | 33- 48 | 4.2 | 4.1 | 0.1 | 0.6 | 9.0 | | | 9.0 | 9.6 | 100+ | | 94 | | 6.2 | 6.0 |
| 81030 | 48- 61 | 2.8 | 2.6 | 0.1 | 0.6 | 6.1 | | | 6.1 | 6.5 | 100+ | | 94 | | 6.3 | 5.7 |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E 1 | 7A2E II | 7A2E III | MINERAL CODE | RELATIVE AMOUNT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81026 | 0- 8 | MT 2 | MI 2 | KK 1 | | | | | | | MT MONTMORT | 1 TRACE |
| 81027 | 8- 20 | MT 2 | MI 2 | KK 2 | | | | | | | MI MICA | 2 SMALL |
| 81028 | 20- 33 | MT 3 | MI 2 | KK 2 | | | | | | | KK KAOLINIT | 3 MODERATE |
| 81029 | 33- 48 | MT 2 | MI 2 | KK 2 | | | | | | | | 4 ABUNDANT |
| 81030 | 48- 61 | MT 2 | MI 2 | KK 2 | | | | | | | | 5 DOMINANT |
| | | | | | | | | | | | | 6 INDETER. |

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

FARAWAY VERY COBBLY LOAM (taxadjunct) 1/
S68 Ariz-2-6-1 through 5

Location: Cochise County, Arizona, approximately 12 miles N.E. of Lochiel, Arizona and 8 miles south-southeast of Canelo, 150 feet upslope and west of the north end of Parker Canyon Lake waterline. Approximately 800 feet S and 600 feet E of NW corner Section 18, T23S, R19E. Photo AMS 663, F.S. EEX-15-164. Date of Sampling: October 17, 1968.
Description by: Havens, Richardson and Clemmons. Collectors: Nettleton and Brasher.
Classification: Lithic Haplustoll, coarse-loamy, mixed, mesic.
Vegetation: Oak, juniper, chihuahua pine, pinon pine, squawberry bush, agave, deergrass, sideoats grama. Climate: Mean annual temperature 56°F. Mean annual precipitation 18-20 inches. Parent Material: Fractured dacite. Topography: Mountain - lower slope - 55 percent slope, east aspect. Elevation: 5,475 feet. Drainage: Well drained. Rapid runoff. Soil moisture: Slightly moist.
Remarks: This site was paired with S68 Ariz-2-7-1 through 3.

| HORIZON | DESCRIPTION |
|---|---|
| | (0-8 cm) |
| A11 | 0 to 3 inches, grayish brown (10YR 5/2) very cobbly loam, dark brown |
| RSL | (10YR 3/3) moist; moderate fine granular structure; slightly hard, |
| 681026 | friable, nonsticky and nonplastic; common fine and medium roots; |
| | common fine interstitial pores; 60 percent coarse fragments; |
| | noneffervescent; medium acid (pH 6.0); abrupt smooth boundary. |
| A12 | 3 to 8 inches, brown (7.5YR 5/2) gravelly sandy loam, dark brown |
| RSL | (7.5YR 3/2) moist; moderate medium granular and weak fine subangular |
| 681027 | blocky structure; slightly hard, friable, nonsticky and slightly |
| (8-20 cm) | plastic; common fine and medium roots; common fine interstitial pores; |
| | 40 percent coarse fragments; noneffervescent; strongly acid (pH 5.5); |
| | abrupt wavy boundary. |
| C | 8 to 13 inches, pinkish gray (7.5YR 7/2) very gravelly and cobbly |
| RSL | sandy loam, brown (7.5YR 5/2) moist; weak medium and coarse subangular |
| 681028 | blocky structure; hard, friable, slightly sticky and slightly plastic; |
| (20-33 cm) | many fine, medium and coarse roots; few fine interstitial pores; |
| | weathered dacite rock; noneffervescent; medium acid (pH 6.0); abrupt |
| | irregular boundary. |
| R1 | 13 to 19 inches, reddish gray (10R 6/1) weathered and fractured dacite |
| RSL | bedrock coated with light gray (10YR 7/1) soil material, dark reddish |
| 681029 | gray (10R 4/1) and brown (10YR 5/3) moist; bedrock is tilted or is at |
| (33-48 cm) | angle of approximately 45 percent to surface of soil; massive; very hard, |
| | firm; common fine and very fine roots in fractures; noneffervescent; |
| | strongly acid (pH 5.5); abrupt wavy boundary. |
| R2 | 19 to 24 inches plus, reddish gray (10R 5/1) extremely hard fractured |
| RSL | dacite bedrock, dark reddish gray (10R 4/1) moist; massive; extremely |
| 681030 | hard, extremely firm; few fine roots in fractures; noneffervescent. |
| (48-61 cm) | |

1/ The Faraway series is in a loamy-skeletal, mixed, mesic family of Lithic Haplustolls. This pedon has less than 35 percent coarse fragments by volume in its control section.

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Ziegler silty clay loam (taxadjunct) **LOCATION** Apache County, Arizona

SOIL FAMILY: Petrocalcic Paleustoll, fine, montmorillonitic, mesic

SOIL NOS. S56Ariz-1-1 **LAB. NOS.** 561120-561129

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | 1/ > 2 | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | $A_{11}$ | 3.0 | 2.2 | 1.3 | 3.4 | 8.6 | 55.0 | 26.5 | 34.0 | 31.7 | 39 | sil/sic |
| 2-4 | $A_{12}$ | 2.0 | 1.5 | 0.9 | 2.5 | 6.0 | 46.7 | 40.4 | 25.3 | 29.0 | 21 | sic/sicl |
| 4-8 | B21t | 0.8 | 1.3 | 0.8 | 2.3 | 5.2 | 39.2 | 50.4 | 21.6 | 24.2 | 11 | c/sic |
| 8-15 | B22t | 1.2 | 1.4 | 0.9 | 2.3 | 4.9 | 35.8 | 53.5 | 19.6 | 22.5 | 26 | c |
| 15-20 | B23t | 0.8 | 0.9 | 0.6 | 1.6 | 3.5 | 30.6 | 62.0 | 15.4 | 19.8 | 3 | c |
| 20-23 | B24tca | 1.8 | 2.1 | 1.2 | 2.4 | 4.4 | 40.8 | 47.3 | 17.1 | 29.6 | 11 | sic/c |
| 23-26 | B25tca | 3.8 | 3.2 | 1.6 | 3.4 | 5.6 | 45.5 | 36.9 | 18.0 | 35.4 | 46 | sicl |
| 26-46 | C1cam | not analyzed | | | | | | | | | | |
| 46-49 | C2ca | | | | | | | | | | | |
| 49-70 | C3 | | | | | | | | | | | |

| DEPTH INCHES | pH 8C1a 1:1 | 1:5 | 1:10 | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a Free Iron $\%Fe_2O_3$ | ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C | $H_2O$ Bulk Density % | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-2 | 7.6 | | | 2.95 | 0.170 | 17 | 2.2 | | | | | |
| 2-4 | 7.3 | | | 2.02 | 0.132 | 15 | 2.2 | | | | | |
| 4-8 | 7.1 | | | 1.54 | 0.112 | 14 | 2.4 | | | | | |
| 8-15 | 7.0 | | | 1.34 | 0.106 | 13 | 2.3 | | | | | |
| 15-20 | 7.3 | | | 1.03 | 0.070 | 15 | 2.2 | | | | | |
| 20-23 | 7.8 | | | 0.74 | 0.052 | 14 | 2.0 | | | | | |
| 23-26 | 7.8 | | | 0.85 | 0.056 | 15 | 1.9 | | | | | |
| 26-46 | | | | | | | 1.0 | | | | | |
| 46-49 | | | | | | | 1.0 | | | | | |
| 49-70 | | | | | | | -- | | | | | |

| DEPTH INCHES | 5A3a CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS (milliequivalents per 100g. soil) 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q1a 5B1a K | BASE SAT. % 5C3 | 6E1e $CaCO_3$ Equiv. | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|
| 0-2 | 36.2 | 27.4 | 5.4 | 2.2 | 0.01 | 1.20 | 94 | | |
| 2-4 | 38.4 | 25.2 | 8.4 | 3.9 | 0.01 | 0.88 | 90 | | |
| 4-8 | 46.6 | 28.5 | 12.3 | 4.9 | 0.06 | 0.82 | 89 | | |
| 8-15 | 48.2 | 27.9 | 14.3 | 4.9 | 0.18 | 0.96 | 90 | | |
| 15-20 | | | | | | | | 2 | |
| 20-23 | | | | | | | | 4 | |
| 23-26 | | | | | | | | 6 | |
| 26-46 | | | | | | | | 31 | |
| 46-49 | | | | | | | | 7 | |
| 49-70 | | | | | | | | | |

1/ Percent of <1 inch fraction

## ZIEGLER SILTY CLAY LOAM* (taxadjunct) 1/
S56Ariz-1-1

Location: Apache County, Arizona. Near center of Sec. 10, T. 10 N., R. 24 E. 3.45 miles east of Apache-Navajo County line, and 0.3 miles north of U. S. Highway 60. 10 yards west of west end of cinder pit. 14 miles east of Show Low. Date of Sampling: September 24, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Juniper-grass cover. Juniper (J. monocarpa), pinon pine (about 200-300 trees per acre), Algerita sp., scattered patches of blue grama, muhly, three-awn grass. Much of the soil surface is bare and covered with a pavement of coarse cinders. Few alligator-bark juniper, few prickly-pear cactus. Climate: Estimated about 18 to 20 inches precipitation per year. Nearest weather station (Springerville): Mean annual temperature 48.7° F.; January average 31.1° F.; July average 66.9° F.; mean annual precipitation 12.11 inches; mean annual precipitation (Show Low) 18.4inches.
Parent Material: Coarse, black, volcanic cinders with many basalt "bombs". Probably ultra-basic. Bombs of basalt are high in olivine crystals. Tertiary in age. Relief: Steeply sloping side of cinder cone. About one-third the way up the south slope of the cone. 24 percent slope, plane, toward the south. Elevation: About 6,950 feet. Drainage: Well drained. Medium runoff. Moderate permeability. Remarks: Single profile--not paired.
Classification: Petrocalcic Paleustoll, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561120 | 0-2" -- Reddish brown (5YR 4/3) gravelly silt loam, dark reddish brown (5YR 3/3) when moist; weak thin platy structure; very soft, very friable, slightly plastic, nonsticky; few roots; very porous; noncalcareous; abrupt, smooth lower boundary. |
| A12<br>BSL No.<br>561121 | 2-4" -- Reddish brown (5YR 3.5/2.5) gravelly silty clay loam, dark reddish brown (5YR 3/2) when moist; moderate medium platy, breaking to weak fine and very fine granular structure; many roots; very porous; no clay skins; noncalcareous; abrupt, slightly wavy lower boundary. |
| B21t<br>BSL No.<br>561122 | 4-8" -- Dusky red (2.5YR 3/2) gravelly silty clay, dark reddish brown (2.5YR 3/3) when moist; weak medium subangular blocky, breaking to strong coarse and medium granular structure; very hard, firm, very plastic, very sticky; many thin patchy clay skins; many roots; very porous; noncalcareous; clear, wavy lower boundary. |
| B22t<br>BSL No.<br>561123 | 8-15" -- Dusky red (2.5YR 3/2) gravelly silty clay, dark reddish brown (2.5YR 3/2.5) when moist, with fine red spots, due to weathering pebbles; moderate medium subangular blocky, breaking to strong fine and very fine subangular blocky structure; extremely hard, very firm, very plastic, very sticky; many roots; thin, continuous clay skins; many fine and very fine pores; noncalcareous; clear, wavy lower boundary. |
| B23t<br>BSL No.<br>561124 | 15-20" -- Reddish brown (2.5YR 3.5/3) gravelly clay, dark reddish brown (2.5YR 3/4) when moist; strong medium and fine prismatic, breaking to moderate medium and fine angular and subangular blocky structure; extremely hard, very firm, very plastic, very sticky; thin, continuous clay skins that are slightly duller colored than interiors of peds; common roots; common medium and fine pores; few fine dark red spots due to weathering mineral grains; noncalcareous; clear, wavy lower boundary. |
| B24tca<br>BSL No.<br>561125 | 20-23" -- Reddish brown (2.5YR 4/4) gravelly clay, dark reddish brown (2.5YR 3/4) when moist; weak medium and fine prismatic, breaking to strong fine and very fine angular and subangular blocky structure; extremely hard, very firm, very plastic, very sticky; thin, continuous clay skins; common medium and fine pores; common roots; matrix is noncalcareous, but contains common hard, rounded lime concretions $\frac{1}{4}$ to 2 mm in diameter; gradual, wavy lower boundary. |
| B25tca<br>BSL No.<br>561126 | 23-26" -- Reddish brown (5YR 4/3 dry, 4/4 moist) very gravelly silty clay; moderate fine and very fine subangular blocky structure; extremely hard, very firm, very plastic, very sticky; thin, continuous clay skins; few roots; strongly calcareous; abrupt, wavy lower boundary. |
| C1cam<br>BSL No.<br>581127 | 26-46" -- Very pale brown (10YR 8/3) caliche, pale brown (10YR 6/3) when moist; includes many black cinders; very few roots penetrate small holes and cracks; indurated; varies in thickness from 3 inches to more than 2 feet; in places there are several of these caliche layers separated by layers of strongly calcareous but not cemented cinders; gradual, wavy lower boundary. |
| C2ca<br>BSL No.<br>561128 | 46-49" -- Black (dry and moist) loose cinders that appear to be slightly weathered. Each cinder has a stalagmitic coat of calcium carbonate on its under side. Gradual lower boundary. |
| C3<br>BSL No.<br>561129 | 10-20 ft. -- Black (dry and moist) loose cinders. Sharp and fresh in appearance. Non-calcareous. |

*Identified in original notes as Unnamed Brown Soil

1/ The Ziegler series is in a clayey over fragmental, montmorillonitic, mesic family of Typic Argiustolls. This pedon has a petrocalcic horizon and less than 35 percent gravel and cobble.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Chromustert, fine, montmorillonitic, mesic

SOIL Springerville clay SOIL Nos. S56Ariz-9-31 LOCATION Navajo County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 56190 - 56194

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non carbonate clay | 1/ Coarse fragments 2A2: > 2 | 2 – 19 | 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct. | Pct. of < 76 mm | |
| 0–2 | A1 | 6.3 | 41.2 | 52.5 | 0.6 | 0.5 | 0.4 | 2.0 | 2.8 | 21.4 | 19.8 | 25.5 | 3.5 | | | 3 | | |
| 2–14 | C1 | 5.6 | 39.9 | 54.5 | 0.5 | 0.3 | 0.5 | 1.6 | 2.7 | 21.4 | 18.5 | 25.3 | 2.9 | | | 0 | | |
| 14–28 | C2 | 5.7 | 40.9 | 53.4 | 0.3 | 0.4 | 0.5 | 1.8 | 2.7 | 21.2 | 19.7 | 25.1 | 3.0 | | | 1 | | |
| 28–46 | C3 | 10.2 | 36.8 | 53.0 | 2.9 | 2.0 | 1.0 | 1.8 | 2.5 | 16.8 | 20.0 | 20.4 | 7.7 | | | 12 | | |
| 46+ | R | | | | | Not sampled | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C1b Free $Fe_2O_3$ | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density | 3B2 Cm | Water content | 4B1c 1/3 bar | 4B2 15 bar | 4D1 Extensibility LEf | 4D1 Extensibility LE | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct. | | Pct. | Pct. | g/cc | g/cc | g/cc | | Pct. | Pct | Pct | Pct | Pct. | | | |
| 0–2 | 0.83 | 0.062 | 13 | 2.0 | | | | | | | | 21.1 | | | 6.6 | | 6.6 |
| 2–14 | 0.72 | 0.051 | 14 | 2.0 | | | | | | | | 22.0 | | | 6.5 | | 6.7 |
| 14–28 | 0.64 | 0.050 | 13 | 2.0 | | | | | | | | 21.7 | | | 6.9 | | 6.9 |
| 28–46 | 0.26 | | | 1.8 | 5 | | | | | | | 23.1 | | | 7.5 | | 7.8 |
| 46+ | | | | | | | | | | | | | | | | | |

| Depth (In.) | Extractable bases: 6N2b Ca | 6O2c Mg | 6P2a Na | 5B1a 6Q2a K | Sum of bases | 6H2a Ext. Acidity | Cation Exch Capacity: 5A2a NaOAc | 5A6a $NH_4OAc$ | Water extract from saturated paste 8A1: 6N1a 6O1a Ca + Mg | 6P1a Na | 6Q1a K | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1b $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | meq/liter | | | | | | | mmho/cm |
| 0–2 | 27.9 | 11.4 | | | | 4.1 | 51.4 | | 2.9 | 0.6 | 0.1 | | 2.5 | – | | 0.3 |
| 2–14 | 29.2 | 11.5 | | | | 4.0 | 55.1 | | 1.9 | 0.9 | 0.1 | | 1.6 | – | | 0.3 |
| 14–28 | 21.0 | 7.5 | | | | 2.1 | 52.3 | | 2.2 | 1.6 | 0.1 | | 1.9 | 0.3 | | 0.4 |
| 28–46 | 29.5 | 23.6 | | | | – | 54.5 | | 7.6 | 5.4 | 0.1 | | 1.9 | 8.8 | | 1.4 |
| 46+ | | | | | | | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation | Exch. bases: 5B3b Ca | 5B1b 6Q2a K | 5B1b 6P2a Na | 5D2 Exchangeable Na | 5C3 Base Sat. | Gypsum | Clay mineralogy (<0.002 mm) 3A1: Mont. | Verm. | Mica 7A2 X-ray | Kaolin. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | meq./100 g. | | | Pct. | Pct. | Pct. | | | | |
| 0–2 | 64.7 | | 1.1 | 0.3 | | 91 | | x | | | |
| 2–14 | 64.0 | | 0.8 | 0.5 | | 91 | | xx | | | x |
| 14–28 | 68.0 | | 0.7 | 0.8 | | 93 | | xx | | | |
| 28–46 | 76.1 | | 0.7 | 1.6 | | | | xx | | | |
| 46+ | | | | | | | | | | | |

1/ Percent of whole soil 4 inches, 20 percent 4-6 inches cobbles in C3 horizon discarded.

## SPRINGERVILLE CLAY
56Ariz-9-31-1 through 4

Location: Navajo County, Arizona NE corner of the NW ¼ of SW ¼, Sec. 13, T 9 N, R 22 E, 2 miles north of Lakeside. Date of Sampling: May 1956.
Collectors: M. S. James, Gerald Kester, R. E. Nelson, and George Wendt.
Vegetation: Blue grama, downy chess, western wheatgrass, juniper, alfileria, wild garlic.
Climate: About 20 inches precipitation. Nearest weather station (Lakeside): Mean annual temperature 47.2° F.; January average 26.9° F.; July average 67.1° F.; mean annual precipitation 22.08 inches. Parent Material: Basalt lava flows. Relief: Smooth upland plain with 0 to 1 percent slope to northeast. Elevation: 6,700 feet. Drainage: Well drained. Slow to very slow runoff; permeability is very slow; however, the initial infiltration into cracks is very rapid.
Classification: Typic Chromustert, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>56190 | 0-2" -- Dark brown (7.5YR 3.5/2) dry, (3/2) moist; clay; moderate very fine granular mulch; loose when dry, very friable when moist, sticky and very plastic when wet; few plant roots; noncalcareous; pH 6.5; abrupt, wavy lower boundary. |
| C1<br>RSL No.<br>56191 | 2-14" -- Dark reddish gray (5YR 3.5/2) dry, dark reddish brown (3/1.5) moist; clay; weak medium to coarse subangular and angular blocky; common clay films and a few slickensides; extremely firm when moist, sticky and very plastic when wet; many plant roots; noncalcareous; pH 7; gradual, wavy lower boundary. |
| C2<br>RSL No.<br>56192 | 14-28" -- Dark reddish gray (5YR 3.5/2) dry, dark reddish brown (5YR 3/2) moist; clay; strong medium and coarse angular blocky; many slickensides on oblique angles ranging from a 5 to 45° angle; extremely hard when dry, firm when moist, sticky and very plastic when wet; plant roots common; noncalcareous; pH 7.5; gradual, wavy lower boundary. |
| C3<br>RSL No.<br>56193 | 28-46" -- Dark brown (7.5YR 3.5/2) dry, (3/2) moist; cobbly clay with an estimated 20 percent of rounded basalt cobbles that range from 4 to 6 inches in diameter; weak coarse angular blocky; extremely hard when dry, firm when moist, very plastic when wet; few plant roots; very strongly calcareous with few large prominent white lime mottlings (7.5YR 8/2) dry and moist; pH 8. |
| R<br>RSL No.<br>56194 | 46"+ -- Bed of hard basalt boulders; close to solid basalt rock. |

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Chromustert, fine, montmorillonitic, mesic

SOIL Springerville clay SOIL Nos. S56Ariz-9-32 LOCATION Navajo County, Arizona

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 56195 - 56199

| Depth (In.) | Horizon | 1B1b Total Sand (2–0.05) | Total Silt (0.05–0.002) | Total Clay (< 0.002) | Sand: Very coarse (2–1) | Sand: Coarse (1–0.5) | Sand: Medium (0.5–0.25) | Sand: Fine (0.25–0.1) | Sand: Very fine (0.1–0.05) | Silt: 0.05–0.02 | Silt: Int. III (0.02–0.002) | Int. II (0.2–0.02) | (2–0.1) | 3A1a Carbonate clay | 3A1a Non carbonate clay | Coarse fragments 2A2: > 2 | Coarse fragments 2A2: 2 – 19 | Coarse fragments 2A2: 19 – 76 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pct. of < 2 mm | | | | | | | | | | | | | | Pct | Pct. of < 76 mm | |
| 0–2 | A1 | 14.6 | 36.1 | 49.3 | 0.3 | 0.7 | 1.1 | 5.2 | 7.3 | 20.0 | 16.1 | 30.9 | 7.3 | | | 11 | | |
| 2–17 | C1 | 11.1 | 35.0 | 53.9 | 0.3 | 0.5 | 1.0 | 3.7 | 5.6 | 19.3 | 15.7 | 27.5 | 5.5 | | | 0 | | |
| 17–30 | C2 | 10.4 | 36.8 | 52.8 | 0.2 | 0.4 | 0.9 | 3.6 | 5.3 | 21.0 | 15.8 | 28.8 | 5.1 | | | 0 | | |
| 30–43 | C3ca | 16.9 | 29.5 | 53.6 | 6.6 | 3.8 | 1.5 | 2.5 | 2.5 | 12.9 | 16.6 | 16.9 | 14.4 | | | 31 | | |
| 43+ | R | Basalt Rock | | | | | | | | | | | | | | | | |

| Depth (In.) | 6A1a Organic carbon | 6B1a Nitrogen | C/N | 6C1b Free $Fe_2O_3$ | 6E1b Carbonate as $CaCO_3$ | Bulk density: 4A1f 1/3 bar | Bulk density: 4A1h Oven dry | Bulk density | 3B2 | Water content: 4B1c 1/3 bar | Water content: 4B2 15 bar | 4D1 Extensibility LEf | 4D1 Extensibility LE | pH: 8C1b Saturated Paste | pH: 8C1a $H_2O$ 1:1 | pH: 8C1a $H_2O$ 1:10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | Pct | | Pct. | Pct. | g/cc | g/cc | g/cc | Cm | Pct | Pct. | Pct | Pct | | | |
| 0–2 | 1.26 | 0.091 | 14 | 2.0 | | | | | | | 18.0 | | | 6.4 | | 6.6 |
| 2–17 | 0.79 | 0.067 | 12 | 2.1 | | | | | | | 21.5 | | | 6.2 | | 6.3 |
| 17–30 | 0.73 | 0.062 | 12 | 2.2 | | | | | | | 22.2 | | | 6.7 | | 6.7 |
| 30–43 | 0.39 | | | 1.4 | 19 | | | | | | 22.1 | | | 7.6 | | 8.0 |
| 43+ | | | | | Basalt Rock | | | | | | | | | | | |

| Depth (In.) | Extractable bases: 6N2b Ca 5B1a | 6O2c Mg 5B1a | 6P2a Na 5B4a | 6Q2a K 5B4a | Sum of bases | 6H2a Ext. Acidity | Cation Exch. Capacity: 5A2a NaOAc | 5A6a $NH_4OAc$ | | Water extract from saturated paste 8A1: 6N1a 6O1a Ca + Mg | 6P1a Na | 6Q1a K | | 6I1a $CO_3$ | 6J1a $HCO_3$ | 6K1a Cl | 6L1b $SO_4$ | 8A1a Electrical conductivity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | meq/100 g | | | | | | | | | meq/liter | | | | | | | | mmho/cm |
| 0–2 | 24.6 | 11.4 | | | | 4.7 | 50.2 | | | 3.2 | 0.4 | 0.2 | | | 2.6 | – | | 0.3 |
| 2–17 | 26.4 | 11.4 | | | | 5.0 | 51.2 | | | 1.9 | 0.7 | tr. | | | 1.7 | – | | 0.2 |
| 17–30 | 26.8 | 11.5 | | | | 3.5 | 52.6 | | | 2.3 | 1.4 | tr. | | | 2.0 | – | | 0.3 |
| 30–43 | 29.1 | 21.8 | | | | | 51.2 | | | 3.3 | 2.6 | tr. | | | 2.6 | 1.3 | | 0.6 |
| 43+ | | | | | Basalt Rock | | | | | | | | | | | | | |

| Depth (In.) | 8A Water at Saturation | Exch. bases: 5B3b Ca | 5B1b K 6Q2a | 5B1b Na 6P2a | 5D2 Exchangeable Na | SAR | Base Sat. 5C3 | Clay mineralogy (<0.002 mm) 3A1: Mont. | Verm. | Mica 7A2 X-ray | Kaolin. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pct. | meq /100 g | | | Pct. | | Pct. | | | | |
| 0–2 | 59.9 | | 1.3 | 0.2 | | | 89 | xx | | | |
| 2–17 | 65.1 | | 0.7 | 0.4 | | | 89 | xx | | | |
| 17–30 | 68.8 | | 0.7 | 0.6 | | | 92 | xx | | | x |
| 30–43 | 75.4 | | 0.5 | 1.0 | | | | xxx | | | x |
| 43+ | | | | | Basalt Rock | | | | | | |

## SPRINGERVILLE CLAY
56Ariz-9-32-1 through 4

Location: Navajo County, Arizona NE corner of the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$, Sec. 24, T 9 N, R 22 E, in Forest Service pasture. One mile north of Lakeside. Date of Sampling: May 1956.
Collectors: M. S. James, W. G. Harper, Gerald Kester, R. E. Nelson and George Wendt.
Vegetation: Western wheatgrass, blue grama, juniper, wild garlic and snakeweed. Climate: About 20 inches precipitation. Nearest weather station (Lakeside): Mean annual temperature 47.2° F.; January average 26.9° F.; July average 67.1° F.; mean annual precipitation 22.08 inches.
Parent Material: Basalt lava flows. Relief: Smooth plain with less than 1 percent slope to northeast. Elevation: 6,700 feet. Drainage: Slow drainage; infiltration into cracks would be rapid.
Classification: Typic Chromustert, fine, montmorillonitic, mesic.
Remarks: Soil was moist throughout. Very slight wind and water erosion. Many subangular or rounded basalt cobbles and boulders ranging from 3 to 12 inches in diameter are common on the surface.

| HORIZON | DESCRIPTION |
|---|---|
| A1<br>RSL No.<br>56195 | 0-2" -- Dark brown (7.5YR 3.5/2) dry, (3/2) moist; clay; strong very fine granular; loose when dry, friable when moist, very plastic and very sticky when wet; few grass roots; slowly permeable; noncalcareous; pH 7; abrupt, wavy lower boundary. |
| C1<br>RSL No.<br>56196 | 2-17" -- Dark reddish gray (5YR 4/2) dry, dark brown (5YR 4/3) moist; clay; weak platy in upper 4 inches over weak very coarse prisms that break to strong coarse angular blocky; extremely hard when dry, extremely firm when moist, very plastic when wet; many grass roots; very slowly permeable; noncalcareous; pH 6.3; gradual, wavy lower boundary. |
| C2<br>RSL No.<br>56197 | 17-30" -- Reddish brown (5YR 4/3) dry, dark reddish brown (5YR 3/3) moist; clay; strong coarse subangular blocky; many slickensides 5 to 45° angles; extremely hard when dry, very firm when moist, very plastic and very sticky when wet; grass roots common; very slowly permeable; noncalcareous; pH 6.5; clear, wavy lower boundary. |
| C3ca<br>RSL No.<br>56198 | 30-43" -- Dark reddish gray (5YR 4/2.5) dry, (5YR 3/2.5) moist; clay; with few coarse prominent lime splotches, white (5YR 8/1) dry, and pink (5YR 8/3) moist; massive; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; few grass roots; very strongly calcareous; pH 8.3. |
| R<br>RSL No.<br>56199 | 43"+ -- Basalt cobble and boulders that contain many vesicules ranging from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. Some of these vesicules contain calcium carbonate. |

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**OIL TYPE** Springerville stony silty clay **LOCATION** Yavapai County, Arizona

SOIL FAMILY: Typic Chromustert, fine, montmorillonitic, mesic

SOIL NOS. S56Ariz-13-5 **LAB. NOS.** 561026-561032

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) | | | | | | | 3A1 | | 2A2 | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | > 2 1/ | |
| 0-1 | $A_{11}$ | 0.2 | 0.6 | 0.6 | 1.9 | 8.6 | 54.4 | 33.7 | 44.9 | 19.3 | 8 | sicl |
| 1-5 | $A_{12}$ | 0.5 | 0.6 | 0.5 | 1.3 | 6.7 | 50.6 | 39.8 | 37.0 | 21.1 | 3 | sicl/sic |
| 5-12 | $C_1$ | 0.5 | 0.5 | 0.4 | 1.1 | 6.1 | 57.2 | 34.2 | 37.4 | 26.6 | 4 | sicl |
| 12-19 | $C_2$ | 0.5 | 0.7 | 0.5 | 1.3 | 6.8 | 45.0 | 45.2 | 38.0 | 14.6 | 1 | sic |
| 19-29 | $C_3$ | 0.5 | 0.6 | 0.4 | 1.2 | 6.2 | 51.6 | 39.5 | 37.0 | 21.5 | 2 | sicl/sic |
| 29-36 | $C_4$ | 0.3 | 0.6 | 0.4 | 1.0 | 5.6 | 52.1 | 40.0 | 36.2 | 22.2 | 1 | sicl/sic |
| 36+ | R | Not analysed | | | | | | | | | | |

| 8C1a pH $H_2O$ 1:1 | 8C1c pH KCl | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a "Free" $Fe_2O_3$ % | ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C. | 2/ $H_2O$ % | 4A2a Bulk Density g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.3 | | 0.80 | 0.065 | 12.3 | 1.3 | | | -- | | | |
| 6.0 | | 0.59 | 0.056 | 10.5 | 1.4 | | 2.2 | 1.78 | | | |
| 6.8 | | 0.49 | 0.049 | 10.0 | 1.3 | | 3.1 | 1.89 | | | |
| 7.3 | | 0.49 | 0.045 | 10.9 | 1.4 | | 2.1 | 1.94 | | | |
| 7.7 | | 0.47 | 0.046 | 10.2 | 1.2 | | 3.7 | 1.78 | | | |
| 7.8 | | 0.47 | 0.042 | 11.2 | 1.2 | | 3.0 | 1.92 | | | |

| 5A3a CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q2a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | |
| 36.4 | 22.7 | 8.2 | 4.3 | 0.15 | 1.07 | 88 | | |
| 39.1 | 25.4 | 8.7 | 4.2 | 0.20 | 0.61 | 89 | | |
| 38.5 | 27.5 | 7.9 | 2.2 | 0.32 | 0.56 | 94 | | |
| 37.9 | 27.9 | 7.7 | 1.2 | 0.56 | 0.57 | 97 | | |
| 41.0 | 30.5 | 8.4 | 0.6 | 0.85 | 0.63 | 98 | | |
| 42.6 | 31.6 | 8.8 | 0.4 | 1.17 | 0.65 | 99 | | |

1/ Percent of <1-inch material

2/ $H_2O$ content at corresponding bulk density

## SPRINGERVILLE STONY SILTY CLAY*
S56Ariz-13-5-1 through 7

Location: Yavapai County, Arizona. 2¼ miles south and .55 mile east of Sunset Point Lookout. (Black Canyon area). Date of Sampling: September 17, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: About 30 percent cover of tobosa grass, pricklypear cactus, white-thorn (Acacia gregii?), few annual weeds. Many patches of bare earth. Climate: Estimated 12 inches annual precipitation. Nearest weather station (Cordes): Mean annual temperature 60.8° F.; January average 42.8° F.; July average 80.2° F.; mean annual precipitation 12.73 inches. Parent Material: Tertiary basalt flow. Apparently consists of weathered basalt, cinders and ash. Basalt is high in olivine, is ultrabasic. Relief: Broadly undulating basalt plateau. 2 percent convex, slope toward northwest. No gilgai microrelief. Elevation: About 3,340 feet. Drainage: Well drained. Runoff medium. Permeability slow or very slow.
Remarks: There is a scattered pavement of basalt cobbles, stones and boulders on the surface and in the upper 4 inches of the soil. There are scattered pebbles of vein quartz and quartzite on the surface and throughout the profile; these are mostly subrounded. Source of quartz and quartzite not known. A nearby pipeline ditch shows the profile to be variable. In places there is practically no soil over the hard rock; in other spots there may be more than 30 inches of soil overlying cinders and ash. ½ inch wide cracks, spaced 10 to 14 inches apart, run vertically from the surface to depths of 1 to 29 inches, although the soil is not completely dry.
Classification: Typic Chromustert, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561026 | 0-1" -- Brown (7.5YR 4/2) stony silty clay, dark brown (7.5YR 3/2) when moist; moderate medium and thin platy structure; hard, friable, very plastic, very sticky; there is a soft crust ¼ to ½ inch thick at the surface; few fine black spherical concretions ½ to 1 mm diameter; few roots; stones are hard, slightly weathered basalt; noncalcareous; abrupt, smooth lower boundary. |
| A12<br>BSL No.<br>561027 | 1-5" -- Stony silty clay of the same color as above; strong medium and fine subangular blocky structure; hard, firm, very plastic, very sticky; stones are hard, slightly weathered basalt; few fine black spherical concretions ½ to 1 mm diameter; many roots; no clay films; noncalcareous; clear, slightly wavy lower boundary. |
| C1<br>BSL No.<br>561028 | 5-12" -- Silty clay of the same color as above; strong medium angular and subangular blocky structure; extremely hard, very firm, very plastic, very sticky; many medium and fine roots; no clay films; few black spherical concretions ¼ to 1 mm diameter; common slickensides; few hard weathered basalt pebbles and few quartz and quartzite pebbles; noncalcareous; gradual, wavy boundary. |
| C2<br>BSL No.<br>561029 | 12-19" -- Silty clay of the same color as above; thick (½ to 2 inches) crude lozenges or plates break to moderate coarse and medium blocks; extremely hard, very firm, very plastic, very sticky; few black spherical concretions ¼ to 1 mm diameter; common fine roots; no clay films; few hard weathered basalt pebbles; few quartz and quartzite pebbles; crude lozenge-like peds are formed by intersection of many slickensides; noncalcareous; gradual, wavy lower boundary. |
| C3<br>BSL No.<br>561030 | 19-29" -- Silty clay of same color as above; the soil breaks out in crudely lenticular plates from ½ to 2 inches in diameter, and these plates break to weak medium blocks; extremely hard, very firm, very plastic, very sticky; the crude coarse plates are formed by intersection of many slickensides; common fine roots; common fine white mottles ½ to 1 mm diameter; there appear to be a few thin patchy clay films on some vertical surfaces; few black spherical concretions ½ to 1 mm diameter; mildly calcareous, especially the white specks; gradual, wavy lower boundary. |
| C4<br>BSL No.<br>561031 | 29-36" -- Silty clay of the same color as above, with few fine white mottles (segregated calcium carbonate); massive or very weak medium and coarse blocky structure; extremely hard, very firm, very plastic, very sticky; common fine roots; appears to have a few thin patchy clay films on some vertical surfaces; contains a few hard, weathered basalt pebbles and an occasional quartz or quartzite pebble; occasional black spherical concretions, ½ to 1 mm in diameter; mildly calcareous; abrupt, irregular lower boundary. |
| R<br>BSL No.<br>561032 | 36"+ -- Hard, slightly weathered basalt. |

*Identified in original notes as Unnamed Brown Grumusol

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Springerville stony silty clay **LOCATION** Yavapai County, Arizona

SOIL FAMILY: Typic Chromustert, fine, montmorillonitic, mesic

SOIL NOS. S56Ariz-13-6 **LAB. NOS.** 561033-561039

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 3A1 0.2-0.02 | 0.02-0.002 | 2A2 >2 1/ | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | $A_{11}$ | 0.7 | 1.4 | 1.2 | 2.6 | 8.5 | 54.3 | 31.3 | 45.0 | 19.3 | 4 | sicl |
| 1-4 | $A_{12}$ | 1.2 | 1.3 | 1.1 | 2.4 | 8.1 | 50.7 | 35.2 | 40.5 | 19.7 | 9 | sicl |
| 4-10 | AC | 0.7 | 1.2 | 0.9 | 2.1 | 6.8 | 45.5 | 42.8 | 33.1 | 20.3 | 1 | sic |
| 10-17 | $C_1$ | 0.6 | 1.0 | 0.8 | 1.9 | 5.8 | 47.1 | 42.8 | 32.6 | 21.3 | <1 | sic |
| 17-29 | $C_2$ | 0.7 | 1.3 | 0.9 | 1.8 | 5.4 | 46.9 | 43.0 | 31.8 | 21.5 | 0 | sic |
| 29-34 | $C_3$ | 0.6 | 1.1 | 0.8 | 1.7 | 5.2 | 47.2 | 43.4 | 31.6 | 21.8 | 12 | sic |
| 34+ | R | Not analysed | | | | | | | | | | |

| pH 8C1a $H_2O$ 1:1 | 8C1c KCl | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a "Free" $Fe_2O_3$ % | 6E1e $CaCO_3$ equivalent % | 2/ $H_2O$ % | 4A2a Bulk Density g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.0 | | 1.24 | 0.100 | 12.4 | 1.8 | | | -- | | | |
| 5.2 | | 1.22 | 0.094 | 13.0 | 1.8 | | | -- | | | |
| 6.3 | | 0.90 | 0.070 | 12.8 | 1.9 | | 3.5 | 1.82 | | | |
| 7.5 | | 0.56 | 0.048 | 11.6 | 1.8 | 2 | 3.1 | 1.95 | | | |
| 7.7 | | 0.52 | 0.048 | 10.8 | 1.9 | 2 | 3.2 | 1.98 | | | |
| 7.7 | | 0.62 | 0.049 | 12.6 | 1.8 | 2 | 3.0 | 1.92 | | | |

| 5A3a CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6Q2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q2a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE Na | K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | | |
| 31.5 | 16.4 | 8.0 | 5.6 | 0.09 | 1.40 | 82 | | | |
| 36.2 | 18.0 | 8.5 | 8.6 | 0.16 | 0.98 | 76 | | | |
| 42.0 | 26.4 | 9.9 | 4.6 | 0.28 | 0.85 | 89 | | | |
| | 32.1 | 8.2 | -- | 0.74 | 0.67 | 100 | | | |

1/ Percent of <1-inch material

2/ $H_2O$ content at corresponding bulk density

## SPRINGERVILLE STONY SILTY CLAY*
S56Ariz-13-6

Location: Yavapai County, Arizona. 1.95 mile north and 0.3 mile east of Sunset Point Lookout. (Black Canyon area). Date of Sampling: September 15, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: About 30 percent cover of tobosa grass, pricklypear cactus, yucca, mesquite, cholla, whitethorn, rare scrubby juniper. Many barren spots. Climate: Estimated about 12 inches per year precipitation. Nearest weather station (Cordes): Mean annual temperature 60.8° F.; January average 42.8° F.; July average 80.2° F.; mean annual precipitation 12.73 inches. Parent Material: Weathered olivine basalt, cinders and ash. Flow said to be of Tertiary age. Relief: Broadly undulating basalt plateau on 2½ percent plane slope toward the north. No gilgai microrelief. Elevation: About 3,300 feet. Drainage: Well drained. Runoff medium to slow. Permeability slow or very slow.
Remarks: This profile is paired with S56Ariz-13-5-1 through 7. Many boulders, stones, and cobbles are scattered over the surface and through the profile. There are many quartz and quartzite pebbles on the surface and in the soil. Although the soil was not completely air-dry at the time of sampling, there were many cracks 3/8 to 1/2 inch wide extending from the surface to depths of 4 to 18 inches.
Classification: Typic Chromustert, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561033 | 0-1" -- Brown (7.5YR 4.5/2) stony light silty clay, dark brown (9YR 3/2) when moist, with a soft crust ¼ inch thick at the surface; moderate medium platy, breaking to strong fine and very fine granular structure; hard, friable, very plastic, very sticky; very few roots; stones are hard, slightly weathered basalt; noncalcareous; abrupt, smooth lower boundary. |
| A12<br>BSL No.<br>561034 | 1-4" -- Brown (7.5YR 4/2) stony silty clay, dark brown (9YR 3/2) when moist; strong medium and fine subangular blocky structure; extremely hard, firm, very plastic, very sticky; many roots; no clay films; stones are slightly weathered, hard basalt; noncalcareous; clear, wavy boundary. |
| AC<br>BSL No.<br>561035 | 4-10" -- Dark brown (7.5YR 3.5/2) silty clay, slightly darker (3/2) when moist; moderate very coarse prismatic, breaking to moderate coarse and medium subangular blocky structure; extremely hard, very firm, very plastic, very sticky; many roots; no clay films; noncalcareous; gradual, wavy lower boundary. |
| C1<br>BSL No.<br>561036 | 10-17" -- Dark brown (7.5YR 3.5/2) silty clay, darker (2.5/2) when moist; moderate very coarse prismatic, breaking to weak coarse and medium subangular blocky structure; extremely hard, extremely firm, very plastic, very sticky; common roots; common slickensides; no clay films; very slightly calcareous; gradual, wavy lower boundary. |
| C2<br>BSL No.<br>561037 | 17-29" -- Silty clay of the same color as above, with common fine white mottles due to hard, rounded calcium-carbonate concretions 1 to 3 mm in diameter; weak coarse blocky structure; extremely hard, extremely firm, very plastic, very sticky; few fine black spherical concretions; common fine roots; no clay films; many slickensides; mildly calcareous; gradual, wavy lower boundary. |
| C3<br>BSL No.<br>561038 | 29-34" -- Silty clay of the same color as above; weak coarse and medium blocky structure; extremely hard, very firm, very plastic, very sticky; common fine roots; few fine black spherical concretions (less than 1 mm diameter); no clay films; common slickensides; common hard, weathered basalt pebbles and stones; few quartz and quartzite pebbles; very slightly calcareous; abrupt, irregular lower boundary. |
| R<br>BSL No.<br>561039 | 34"+ -- Hard, slightly weathered olivine basalt. |

*Identified in original notes as Unnamed Brown Grumusol

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**OIL TYPE** Springerville stony silty clay **LOCATION** Yavapai County, Arizona

SOIL FAMILY: Typic Chromustert, fine, montmorillonitic, mesic

SOIL NOS. S56Ariz-13-7 **LAB. NOS.** 561040-561047

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | 2A2 > 2 1/ | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | $A_{11}$ | 0.5 | 0.6 | 0.3 | 1.6 | 4.2 | 49.8 | 43.0 | 28.6 | 26.4 | 38 | sic |
| 1-4 | $A_{12}$ | 0.3 | 0.4 | 0.3 | 1.3 | 3.5 | 50.0 | 44.2 | 26.2 | 28.3 | 9 | sic |
| 4-9 | $C_1$ | 0.4 | 0.4 | 0.4 | 1.4 | 3.2 | 46.8 | 47.4 | 25.2 | 25.8 | 0 | sicl |
| 9-15 | $C_2$ | 0.4 | 0.3 | 0.3 | 1.2 | 3.2 | 48.0 | 46.6 | 24.9 | 27.1 | 1 | sic |
| 15-25 | $C_3$ | 0.2 | 0.2 | 0.2 | 1.2 | 3.3 | 47.5 | 47.4 | 24.5 | 27.1 | 0 | sic |
| 25-35 | $C_4$ | 0.2 | 0.2 | 0.2 | 1.0 | 3.1 | 47.2 | 48.1 | 24.0 | 27.0 | 0 | sic |
| 35-39 | C5ca | 0.4 | 0.8 | 0.6 | 1.6 | 2.0 | 42.4 | 52.2 | 17.0 | 28.3 | <1 | sic |
| 39+ | R | Not analysed | | | | | | | | | | |

| 8C1a pH $H_2O$ 1:1 | 8C1c pH KCl | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a Free Iron % $Fe_2O_3$ | 6E1e $CaCO_3$ equivalent % | 2/ $H_2O$ % | 4A2a Bulk Density g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.5 | | 0.89 | 0.060 | 14.8 | 1.5 | | | --- | | | |
| 7.6 | | 0.63 | 0.053 | 11.9 | 1.7 | 2 | 4.0 | 1.78 | | | |
| 7.7 | | 0.61 | 0.046 | 13.3 | 1.4 | 2 | 6.0 | 1.80 | | | |
| 7.7 | | 0.58 | 0.046 | 12.6 | 1.5 | 3 | 3.8 | 1.86 | | | |
| 7.7 | | 0.52 | 0.036 | 14.4 | 1.6 | 3 | 5.6 | 1.86 | | | |
| 7.7 | | 0.50 | 0.048 | 10.4 | 1.6 | 2 | 5.8 | 1.91 | | | |
| 7.8 | | 0.57 | 0.032 | 17.8 | 1.5 | 10 | 5.0 | 1.86 | | | |

| 5A3a CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6Q2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q2a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE Na | K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|
| | milliequivalents per 100g. soil → | | | | | | ← milliequivalents per liter → | | |
| 50.8 | 39.8 | 8.2 | 1.1 | 0.10 | 1.59 | 98 | | | |

1/ Percent of <1-inch material

2/ $H_2O$ content at corresponding bulk density

## SPRINGERVILLE STONY SILTY CLAY*
S56Ariz-13-7

Location: Yavapai County, Arizona. 50 feet west of the center of U. S. Highway 89 at a point 6/10 mile south of Milepost 350 (14.8 mile south of the junction of U. S. Highways 89 and 66). About 16 miles south of Ash Fork. Date of Sampling: September 18, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Juniper-grass cover. Tobosa grass, junipers (J. osteosperma and monosperma), pricklypear and staghorn cacti, ring muhly, a little snakeweed. Dominant juniper trees are 18 to 22 feet high, 12 to 15 inches in diameter b.h. and appear to be 100 to 150 years old.
Climate: Estimated 12 to 15 inches per year rainfall. Nearest weather station (Ash Fork): Mean annual temperature 54.2° F.; January average 36.1° F.; July average 74.4° F.; mean annual precipitation 13.25 inches. Parent Material: Mainly weathered olivine basalt, with little admixture of weathered cinders and ash. Relief: Undulating basalt plateau slope about 2 percent slightly convex, toward the east. Elevation: About 4,700 feet. Drainage: Well drained. Runoff medium or slow; permeability slow or very slow.
Remarks: There are basalt stones and pebbles scattered over the surface and throughout the profile. Depth to hard basalt is quite variable within short distances.
Classification: Typic Chromustert, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561040 | 0-1" -- Brown (7.5YR 4.5/2) very stony silty clay, dark brown (3.5/2) when moist, with a soft crust $\frac{1}{4}$ inch thick at the surface; strong very fine granular structure; hard, friable, very plastic, very sticky; stones are hard basalt fragments; most of the stones are sharply angular; few roots; noncalcareous; abrupt, smooth lower boundary. |
| A12<br>BSL No.<br>561041 | 1-4" -- Dark brown (7.5YR 3.5/2) stony silty clay, slightly darker (3/2) when moist; strong medium and fine subangular blocky structure; extremely hard, very firm, very plastic, very sticky; blocks break to moderate fine granules; many roots; no clay films; noncalcareous; clear, wavy lower boundary. |
| C1<br>BSL No.<br>561042 | 4-9" -- Silty clay of the same color as above, with scattered basalt cobbles and stones; numerous slickensides form lozenge-like peds, 1" x 4", that break to moderate medium and fine subangular blocks; extremely hard, very firm, very plastic, very sticky; many roots; no clay films; mildly calcareous; gradual, wavy lower boundary. |
| C2<br>BSL No.<br>561043 | 9-15" -- Silty clay of the same color as above; very many slickensides form peds in the shape of crude lozenges, 1 $\frac{1}{2}$" x 4", that break to moderate medium and fine blocks; extremely hard, very firm, very plastic, very sticky; many roots; no clay films; common light-gray weathered basalt pebbles 1 to 5 mm in diameter; mildly calcareous, the lime in disseminated form; gradual, wavy lower boundary. |
| C3<br>BSL No.<br>561044 | 15-25" -- Silty clay of the same color as above; very many slickensides form crude, coarse lozenge-like peds that break to moderate medium and fine blocks; few fine white mottles that are hard calcium-carbonate concretions, mostly 1 mm and smaller in diameter; extremely hard, very firm, very plastic, very sticky; very few black spherical concretions less than $\frac{1}{2}$ mm diameter; common roots; no clay films; common light gray and white spots 1 to 5 mm diameter due to weathered basalt grains; gradual, wavy lower boundary. |
| C4<br>BSL No.<br>561045 | 25-35" -- Dark brown (7.5YR 3.5/2) silty clay, slightly darker (3/2.5) when moist, with few fine white or pink mottles due to hard calcium-carbonate concretions about 1 mm. in diameter; weak coarse and medium subangular blocky structure; extremely hard, very firm, very plastic, very sticky; many slickensides; few fine roots; appears to have few thin patchy clay films on some vertical surfaces; contains scattered hard, weathered basalt stones; mildly calcareous; gradual, wavy lower boundary. |
| C5ca<br>BSL No.<br>561046 | 35-39" -- Dark brown (7.5YR 3.5/2) stony silty clay, slightly darker (3/2) when moist, with common fine pink mottles less than 2 mm. diameter, which are mainly hard carbonate concretions; massive, with common slickensides; extremely hard, very firm, very plastic, very sticky; few fine roots; many shiny surfaces that may be clay films but are probably slickensides or pressure surfaces; some carbonate concretions are as large as 5/8 inches, but these are soft and chalky; abrupt, irregular lower boundary. |
| R<br>BSL No.<br>561047 | 39"+ -- Hard, slightly weathered olivine basalt. |

*This profile was identified in original notes as Unnamed Brown Grumusol

**SOIL SURVEY LABORATORY** Beltsville, Maryland

**SOIL TYPE** Springerville very stony silty clay **LOCATION** Yavapai County, Arizona

SOIL FAMILY: Typic Chromustert, fine, montmorillonitic, mesic

SOIL NOS. S56Ariz-13-8 **LAB. NOS.** 561048-561055

| DEPTH INCHES | HORIZON | 1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1 | COARSE SAND 1-0.5 | MEDIUM SAND 0.5-0.25 | FINE SAND 0.25-0.10 | VERY FINE SAND 0.10-0.05 | SILT 0.05-0.002 | CLAY < 0.002 | 0.2-0.02 | 0.02-0.002 | 2A2 > 2 1/ | TEXTURAL CLASS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | $A_{11}$ | 0.2 | 0.4 | 0.2 | 1.7 | 5.6 | 48.1 | 43.8 | 32.6 | 22.4 | 17 | sic |
| 1-5 | $A_{12}$ | 0.2 | 0.3 | 0.2 | 1.1 | 4.1 | 45.2 | 48.9 | 27.6 | 22.5 | <1 | sic |
| 5-10 | $C_1$ | 0.1 | 0.3 | 0.2 | 1.2 | 4.3 | 48.9 | 45.0 | 28.4 | 25.7 | 0 | sic |
| 10-17 | $C_2$ | 0.2 | 0.3 | 0.2 | 1.2 | 3.8 | 49.3 | 45.0 | 28.3 | 25.7 | 3 | sic |
| 17-28 | $C_3$ | 0.2 | 0.2 | 0.2 | 1.1 | 3.8 | 49.0 | 45.5 | 28.0 | 25.5 | 0 | sic |
| 28-35 | $C_4$ | 0.1 | 0.2 | 0.2 | 1.0 | 4.0 | 48.2 | 46.3 | 27.9 | 25.0 | 0 | sic |
| 35-45 | C5ca | 0.1 | 0.2 | 0.2 | 0.9 | 3.7 | 50.8 | 44.1 | 26.9 | 28.2 | 0 | sic |
| 45+ | R | 0.3 | 0.5 | 0.3 | 0.9 | 3.5 | 49.4 | 45.1 | 26.4 | 27.1 | 10 | sic |

| DEPTH INCHES | 8C1a pH $H_2O$ 1:1 | 8C1c pH KCl | ORGANIC MATTER 6A1b ORGANIC CARBON % | 6B2a NITROGEN % | C/N | 6C1a "Free" $Fe_2O_3$ % | 6E1e $CaCO_3$ equivalent % | 2/ $H_2O$ % | 4A2a Bulk Density g/cc | MOISTURE TENSIONS 1/10 ATMOS. % | 1/3 ATMOS. % | 15 ATMOS. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | 7.1 | | 0.90 | 0.058 | 15.5 | 1.3 | | | -- | | | |
| 1-5 | 6.8 | | 0.73 | 0.055 | 13.3 | 1.3 | | 3.9 | 1.76 | | | |
| 5-10 | 7.4 | | 0.62 | 0.048 | 12.9 | 1.4 | | 6.0 | 1.81 | | | |
| 10-17 | 7.7 | | 0.52 | 0.046 | 14.4 | 1.4 | 1 | 4.7 | 1.90 | | | |
| 17-28 | 7.8 | | 0.44 | 0.039 | 11.3 | 1.4 | 2 | 6.3 | 1.82 | | | |
| 28-35 | 7.8 | | 0.46 | 0.038 | 12.1 | 1.4 | 2 | 4.1 | 1.95 | | | |
| 35-45 | 7.9 | | 0.42 | 0.032 | 13.1 | 1.4 | 3 | 4.4 | 1.88 | | | |
| 45+ | 7.8 | | 0.42 | 0.031 | 13.5 | 1.4 | 2 | | | | | |

| DEPTH INCHES | 5A3a CATION EXCHANGE CAPACITY (Sum) | EXTRACTABLE CATIONS 6N2b 5B1a Ca | 6O2b 5B1a Mg | 6H2a H | 6P2a 5B1a Na | 6Q2a 5B1a K | BASE SAT. % 5C3 | SATURATION EXTRACT SOLUBLE Na | K | MOISTURE AT SATURATION % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | milliequivalents per 100g. soil | | | | | | milliequivalents per liter | | |
| 0-1 | 42.2 | 30.0 | 8.8 | 2.2 | 0.10 | 1.08 | 95 | | | |
| 1-5 | 45.2 | 33.6 | 7.6 | 2.8 | 0.27 | 0.94 | 94 | | | |
| 5-10 | 47.6 | 36.9 | 8.1 | 1.2 | 0.45 | 0.90 | 97 | | | |

1/ Percent of <1-inch material

2/ $H_2O$ content at corresponding bulk density

## SPRINGERVILLE VERY STONY SILTY CLAY*
S56Ariz-13-8

Location: Yavapai County, Arizona. 45 feet east of the center of U. S. Highway 89 at a point 1.55 miles north of Milepost 351. About 15 miles south of Ash Fork. Date of Sampling: September 18, 1956.
Collectors: W. M. Johnson, J. G. Cady, M. S. James and Reuben Nelson.
Vegetation: Juniper and grass cover. Junipers (J. monosperma and osteosperma), patches of tobosa grass; sand dropseed; ring muhly; three-awn grass; sideoats grama; blue grama. Much bare gound. Some patches of stone pavement. Junipers average about 18 feet high, about 300 of them per acre. Climate: Estimated 12 to 15 inches rainfall per year. Nearest weather station (Ash Fork): Mean annual temperature 54.2° F.; January average 36.1° F.; July average 74.4° F.; mean annual precipitation 13.25 inches. Parent Material: Weathered olivine basalt, probably with admixture of some weathered cinders and ash. Relief: Gently, broadly rolling basalt plateau, simple slope of 1 percent toward the east. Elevation: About 4,800 feet. Drainage: Well drained (well aerated). Runoff, slow. Permeability, very slow.
Remarks: There are a few basalt pebbles and stones scattered over the surface and throughout the profile. Paired with S56Ariz-13-7.
Classification: Typic Chromustert, fine, montmorillonitic, mesic.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>BSL No.<br>561048 | 0-1" -- Brown (7.5YR 4/2) very stony silty clay, brown (7.5YR 3.5/2) when moist; soft crust $\frac{1}{4}$ inch thick at the surface; strong very fine granular structure; hard, friable, very plastic, very sticky; very few roots; mildly calcareous; abrupt, slightly wavy lower boundary. |
| A12<br>BSL No.<br>561049 | 1-5" -- Dark brown (7.5YR 3/2) very stony silty clay, slightly darker (2.5/2) when moist; moderate coarse prismatic, breaking to moderate coarse subangular blocky structure that in turn breaks to weak very fine granular structure; extremely hard, very firm, very plastic, very sticky; many roots; no clay films; noncalcareous; clear, wavy lower boundary. |
| C1<br>BSL No.<br>561050 | 5-10" -- Dark brown (7.5YR 3.5/2) silty clay, slightly darker (3/2) when moist; many slickensides form thick lozenge-shaped peds that break to coarse subangular blocks; extremely hard, very firm, very plastic, very sticky; many roots; few basalt pebbles and cobbles; no clay films; mildly calcareous; gradual, wavy lower boundary. |
| C2<br>BSL No.<br>561051 | 10-17" -- Silty clay of the same color as above; many slickensides form thick lozenge-shaped peds that break to moderate medium and fine blocks; extremely hard, very firm, very plastic, very sticky; common roots; appear to be a few thin patchy clay films on some vertical surfaces; mildly calcareous; gradual, wavy lower boundary. |
| C3<br>BSL No.<br>561052 | 17-28" -- Silty clay of the same color as above; many slickensides form lozenge-shaped peds $\frac{1}{2}$ to 2 inches thick; these break to moderate fine blocks; extremely hard, very firm, very plastic, very sticky; common roots; there appear to be a few thin patchy clay films on some vertical surfaces; mildly calcareous; gradual, wavy lower boundary. |
| C4<br>BSL No.<br>561053 | 28-35" -- Silty clay of the same color as above; many slickensides form lozenge-shaped peds from $\frac{1}{2}$ to $1\frac{1}{2}$ inches thick; these break to weak coarse and medium blocks; extremely hard, very firm, very plastic, very sticky; contains a few fine white hard carbonate concretions from 1 to 2 mm in diameter; few fine roots; there are a few patches on some vertical surfaces that may be clay films; mildly calcareous; gradual, wavy lower boundary. |
| C5ca<br>BSL No.<br>561054 | 35-45" -- Finely mottled dark brown and light reddish brown (7.5YR 3.5/2 and 6YR 6/3) gritty silty clay, mottled dark brown and reddish brown (7.5YR 3/2 and 6YR 5/3) when moist, with numerous fine white specks (less than 1 mm ) due to hard carbonate concretions; massive, with many slickensides about 1 inch apart, producing thick, crude plates; extremely hard, very firm, very plastic, very sticky; few fine roots; moderately calcareous; abrupt, irregular lower boundary. |
| R<br>BSL No.<br>561055 | 45"+ -- Hard, weathered, olivine basalt. |

*This profile was identified in original notes as Unnamed Brown Grumsol

CONSECUTIVE PEDON NUMBER C 69175 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES BONITA SOIL NO. S69 ARIZ. 5- 1 SAMPLE NO. 9 891-9 898 WILLCOX AREA

SOIL FAMILY: TYPIC CHROMUSTERT,FINE,MONTMORILLONITIC,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2- .05 | SILT .05- .002 | CLAY LT .002 | SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1 | CS 1- .5 | MS .5- .25 | FS .25- .10 | VFS .1- .05 | CSI .05- .02 | FSI .02- .002 | CLAYS CO. 2- .2U | FINE LT .2U | CARBONATE 3A1A.02 | 1A2A INT. II | COARSE FRAGMENTS PCT. OF WHOLE SOIL | I 75- 20 PCT. | II 20-5 PCT. OF LT 75 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | | | | |
| 9 891 | 0- 5 | A11 | 13.7 | 42.6 | 43.7 | 1.8 | 1.9 | 1.3 | 3.6 | 5.1 | 19.5 | 23.1 | | | 26.8 | 7A | 3 | 3 | 1 | |
| 9 892 | 5- 20 | A12 | 11.7 | 42.8 | 45.5 | 1.5 | 1.6 | 1.4 | 3.7 | 3.5 | 20.0 | 22.8 | | | 25.6 | --A | -- | -- | -- | |
| 9 893 | 20- 28 | A13 | 12.5 | 41.4 | 46.1 | 1.5 | 1.4 | 1.5 | 3.5 | 4.6 | 18.7 | 22.7 | | | 25.2 | --A | -- | -- | -- | |
| 9 894 | 28- 48 | C 1 | 10.7 | 42.1 | 47.2 | 1.3 | 1.3 | 1.4 | 3.4 | 3.3 | 19.0 | 23.1 | | | 24.3 | 2A | -- | 1 | 1 | |
| 9 895 | 48- 79 | C 2 | 11.7 | 40.8 | 47.5 | 2.4 | 1.8 | 1.2 | 2.8 | 3.5 | 17.6 | 23.2 | | | 22.7 | 5A | -- | 2 | 3 | |
| 9 896 | 79-102 | 2C 3CA | 42.4 | 31.0 | 26.6 | 12.0 | 11.3 | 6.7 | 8.1 | 4.3 | 10.2 | 20.8 | | 2 | 18.3 | 85A | 79 | 5 | 1 | |
| 9 897 | 102-135 | 2C 4CA | 27.2 | 48.0 | 24.8 | 10.5 | 7.3 | 2.3 | 3.0 | 4.1 | 17.1 | 30.9 | | | 22.8 | 47* | 25 | 7 | 6 | |
| 9 898 | 135-160 | 2C 5CA | 24.9 | 49.1 | 26.0 | 8.8 | 5.5 | 2.2 | 3.4 | 5.0 | 18.8 | 30.3 | | | 25.7 | 43* | 26V | 6 | 3 | |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CAR- BON 6A1A -PERCENT-- | NITRO GEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B -PERCENT- | 19-2 6E1B | EXT. IRON FE 6C2B PCT. | ATTERBERG L I M I T LL 4F1 PCT. | PL 4F2 NO.40 | BULK DENSITY EST 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTENSBLTY LEF 4D1 | LE 4D1 | PH H2O 1/1 8C1A | H2O 1/10 8C1A | CACL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT-- | | | | |
| 9 891 | 0- 5 | 0.86 | 0.081 | | | 0.9 | 52 | 27 | 1.25 | | 0.97 | | | | 18.5 | | | 7.3 | | 7.2 |
| 9 892 | 5- 20 | 0.76 | 0.063 | 1 | | 0.9 | 48 | 27 | | 1.28 | 1.75 | 1.00 | | 32.2 | 21.5 | 11.0 | 11.0 | 7.8 | | 7.6 |
| 9 893 | 20- 28 | 0.72 | | 1 | | 0.9 | | | | 1.30 | 1.68 | 1.00 | | 31.2 | 19.2 | 8.9 | 8.9 | 7.8 | | 7.6 |
| 9 894 | 28- 48 | 0.67 | | 1 | | 1.0 | 59 | 28 | | 1.30 | 1.80 | 0.99 | | 35.0 | 23.7 | 11.5 | 11.3 | 8.0 | | 7.7 |
| 9 895 | 48- 79 | 0.54 | | 3 | | 0.9 | | | | 1.29 | 1.72 | 0.98 | | 35.5 | 22.9 | 10.1 | 9.8 | 8.0 | | 7.7 |
| 9 896 | 79-102 | 0.16 | | 14 | | 0.7 | 44 | 28 | | 1.26 | 1.38 | 0.25 | | 28.3 | 14.9 | 3.1 | 0.7 | 8.0 | 9.1 | 7.7 |
| 9 897 | 102-135 | 0.04 | | 4 | | 0.9 | | | | 1.30 | 1.46 | 0.69 | | 28.5 | 14.5 | 3.9 | 2.7 | 7.8 | 9.2 | 7.5 |
| 9 898 | 135-160 | | | 3 | | 0.9 | | | | 1.47 | 1.66 | 0.70 | | 23.4 | 14.2 | 4.1 | 2.8 | 7.8 | 9.1 | 7.6 |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | BASE SAT. | C E C NA- OAC 5A2A | NH4- OAC 5A6A | EC 8A1A | WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B | MG 6O1B | NA 6P1A | K 6Q1A | CO3 6I1A | HCO3 6J1A | CL 6K1A | SO4 6L1B | B 6T1A | PH SAT. PASTE 8C1B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | PCT. | -MEQ/100G | | MMHO | MEQ/1000 ML | | | | | | | | PPM | |
| 9 891 | 0- 5 | | | 0.3 | 2.0 | 2.3 | | | 39.6 | | | | | | | | | | | |
| 9 892 | 5- 20 | | | 1.0 | 1.2 | 2.2 | | | 39.9 | | | | | | | | | | | |
| 9 893 | 20- 28 | | | 1.5 | 1.3 | 2.8 | | | 38.6 | | | | | | | | | | | |
| 9 894 | 28- 48 | | | 2.9 | 1.2 | 4.1 | | | 39.5 | | | | | | | | | | | |
| 9 895 | 48- 79 | | | 4.2 | 1.1 | 5.3 | | | 38.3 | | | | | | | | | | | |
| 9 896 | 79-102 | | | 5.7 | 1.0 | 6.7 | | | 29.6 | 2.26 | 3.9 | 1.6 | 18.7 | 0.1 | | 3.0 | 11.0 | | | 7.6 |
| 9 897 | 102-135 | | | 5.9 | 1.0 | 6.9 | | | 28.2 | 2.66 | 5.2 | 2.5 | 31.8 | 0.2 | | 2.5 | 15.8 | 15.7 | | 7.6 |
| 9 898 | 135-160 | | | 5.0 | 1.2 | 6.2 | | | 27.0 | 2.31 | 4.1 | 2.3 | 17.2 | 0.3 | | 2.2 | 14.1 | | | 7.7 |

| SAMPLE NO. | DEPTH CM. | WATER AT SAT. 8A PCT. | EXCHANGBLE NA 5B4B MEQ. | NA 5D2 PCT. | SAR 5E | GYPSUM AMT. REQ. 6F1B PCT. | 6P3A MEQ. | CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 PCT. | -L.T. .0002 MM- X RAY 7A2E I | 7A2E II | 7A2E III | MINERAL CODE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 891 | 0- 5 | | 0.3 | 1 | | | | MT 3 | | | | | | | | MT MONTMORT |
| 9 892 | 5- 20 | | 1.0 | 3 | | | | MT 4 | | | | | | | | |
| 9 893 | 20- 28 | | 1.5 | 4 | | | | | | | | | | | | |
| 9 894 | 28- 48 | | 2.9 | 7 | | | | MT 4 | | | | | | | | |
| 9 895 | 48- 79 | | 4.2 | 11 | | | | | | | | | | | | |
| 9 896 | 79-102 | 48.6 | 4.8 | 16 | 11 | | | MT 2 | | | | | | | | |
| 9 897 | 102-135 | 51.0 | 4.3 | 15 | 16 | | | | | | | | | | | |
| 9 898 | 135-160 | 54.3 | 4.1 | 15 | 10 | | | | | | | | | | | |

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.
V=NOT WEIGHED. VALUE CALCULATED FROM A VOLUME ESTIMATE.

## BONITA GRAVELLY CLAY
S69Ariz-5-1

Location: Graham County, Arizona. 2280 feet north and 600 feet west of the SE corner, Section 4, T11S, R22E. About 21 miles northwest of Willcox. Date of sampling: October 13, 1969.
Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Chromustert, fine, montmorillonitic, thermic.
Vegetation: Tobosa grass. Use: Livestock range. Climate: Mean annual precipitation is about 12 to 14 inches. Mean annual air temperature is 61°F., January 45°F., July 79°F. Parent Material: Alluvium from basalt, rhyolite and basaltic andesite. Topography: Slightly convex to smooth, gently sloping fan. Slope, 2-1/2 percent, northeast facing. Elevation: 4580 feet. Drainage: Well drained. Runoff is very slow. Permeability is very slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by thymol blue indicator is 1:5 dilution. Paired with sample S69Ariz-5-2. There are many cracks 1/2 to 2 inches wide that extend from the surface downward to a depth of 24 inches or more. Gilgai relief is evident. The low areas appear to have more gravel on the surface and less vegetation, whereas, the higher areas have less gravel and more vegetation.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL No.<br>69891 | 0 to 5 cm (0 to 2 inches), dark brown (10YR 4/3) clay, dark brown (10YR 3/3) moist; moderate fine granular and weak fine subangular blocky structure; soft, friable, sticky, plastic; many fine and medium roots; many fine interstitial pores; surface has 15 to 25 percent cover of rounded basalt gravel and cobbles; about 25 percent by volume of 1 to 3 inch rounded basalt gravel and about 5 percent of 6 inch rounded basalt cobbles; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| A12<br>RSL No.<br>69892 | 5 to 20 cm (2 to 8 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; moderate medium and coarse subangular blocky structure; hard, firm, sticky, plastic; many fine and medium roots; few fine interstitial pores; about 10 percent by volume of 1 to 6 inch rounded basalt gravel and cobbles; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| A13<br>RSL No.<br>69893 | 20 to 28 cm (8 to 11 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; moderate coarse subangular blocky structure; very hard, firm, sticky, very plastic; common fine and medium roots; few pressure faces and small slickensides; about 3 percent of 1 to 3 inch rounded basalt gravel; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| C1<br>RSL No.<br>69894 | 28 to 48 cm (11 to 19 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; massive; very hard, firm, sticky, very plastic; few fine roots; common pressure faces and slickensides; about 3 percent of 1 to 3 inch rounded basalt gravel; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| C2<br>RSL No.<br>69895 | 48 to 79 cm (19 to 31 inches), dark brown (7.5YR 4/2)clay, dark brown (7.5YR 3/2) moist; massive; very hard, firm, sticky, very plastic; few fine roots; many pressure faces and slickensides; about 3 percent of 1 to 3 inch rounded basalt gravel; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| IIC3ca<br>RSL No.<br>69896 | 79 to 102 cm (31 to 40 inches), mottled reddish brown (5YR 5/4), white (10YR 8/2), and reddish yellow (7.5YR 7/6) gravelly light clay loam, dark reddish brown (5YR 3/4), light reddish brown (5YR 6/4), and strong brown (7.5YR 5/6) moist; weak and moderate fine and medium subangular and angular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine roots; common fine interstitial pores; common moderately thick clay films on ped faces; common thin very dark gray coatings on faces of peds; about 20 percent by volume of 2 to 3 inch rounded basalt gravel and 20 percent by volume of 4 to 8 inch rounded basalt cobbles; many fine and large irregularly shaped soft masses of lime; gravel and cobbles are coated with calcium carbonate; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| IIC4ca<br>RSL No.<br>69897 | 102 to 135 cm (40 to 53 inches), mottled reddish brown (5YR 4/4) and pinkish white (7.5YR 8/2) gravelly clay loam, dark reddish brown (5YR 3/4) and light brown (7.5YR 6/4) moist; weak and moderate fine and medium subangular and angular blocky structure; hard, friable, slightly sticky, plastic; very few fine roots; common fine interstitial pores; common moderately thick clay films on ped faces; about 20 percent by volume of 2 to 3 inch rounded basalt gravel and 20 percent by volume of 4 to 8 inch rounded basalt cobbles; gravel and cobbles coated with lime; common fine and medium old tubular pores filled with white irregularly shaped soft lime masses; common thin black manganese coatings on faces of peds and in veins; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| IIC5ca<br>RSL No.<br>69898 | 135 to 160 cm (53 to 63 inches), mottled reddish brown (5YR 4/4)and pinkish white (7.5YR 8/2) gravelly light clay loam, dark reddish brown (5YR 3/4) and light brown (7.5YR 6/4) moist; weak fine subangular blocky structure; hard, friable, slightly sticky, plastic, very few fine roots; common fine interstitial pores; few thin clay films on ped faces; about 20 percent by volume of 4 to 8 inch rounded basalt cobbles; gravel and cobbles have thin coatings of lime; common fine and medium tubular pores filled with white large, irregularly shaped soft masses of lime, common fine black manganese coatings on faces of peds and in veins; strongly effervescent. |

CONSECUTIVE PEDON NUMBER C 69176 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES BONITA SOIL NO. S69 ARIZ. 5- 2 SAMPLE NO. 9 899-9 905 WILLCOX AREA

SOIL FAMILY: TYPIC CHROMUSTERT,FINE,MONTMORILLONITIC,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

| SAMPLE NO. | DEPTH CM. | HORZ. | TOTAL FRACTION SAND 2-.05 | SILT .05-.002 | CLAY LT .002 | SANDS VCS 2-1 | CS 1-.5 | MS .5-.25 | FS .25-.10 | VFS .1-.05 | SILTS CSI .05-.02 | FSI .02-.002 | CLAYS CO. 2-.2U | FINE LT .2U | CARBONATE 3A1A | 1A2A INT. .2-.02 | COARSE FRAGMENTS PCT. OF WHOLE 20 I 75-20 | II 20-5 | III 5-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PERCENT OF LESS THAN 2MM | | | | | | | | | | | | | | SOIL | PCT. OF LT 75 | |
| 9 899 | 0- 5 | A11 | 13.3 | 36.8 | 49.9 | 0.8 | 2.1 | 2.4 | 4.6 | 3.4 | 12.4 | 24.4 | | | | 18.2 | 61A | 58 | 2 | 1 |
| 9 900 | 5- 15 | A12 | 12.9 | 35.4 | 51.7 | 2.9 | 2.3 | 1.4 | 3.3 | 3.0 | 12.1 | 23.3 | | | | 17.0 | 4A | -- | 3 | 1 |
| 9 901 | 15- 36 | A13 | 11.9 | 35.6 | 52.5 | 2.9 | 2.3 | 1.2 | 2.8 | 2.7 | 11.3 | 24.3 | | | | 15.6 | 2A | — | 1 | 1 |
| 9 902 | 36- 58 | C 1 | 11.5 | 37.3 | 51.2 | 1.7 | 2.1 | 1.5 | 3.1 | 3.1 | 12.5 | 24.8 | | | | 17.3 | --A | -- | -- | -- |
| 9 903 | 58- 79 | C 2 | 10.6 | 37.6 | 51.8 | 1.0 | 2.0 | 1.5 | 3.0 | 3.1 | 11.6 | 26.0 | | | | 16.4 | 9A | 6 | 3 | -- |
| 9 904 | 79- 89 | C 3CA | 15.2 | 36.4 | 48.4 | 3.9 | 3.1 | 1.7 | 3.1 | 3.4 | 11.5 | 24.9 | | | | 16.7 | 19A | 8 | 11 | -- |
| 9 905 | 89-127 | 2C 4CA | 40.0 | 35.2 | 24.8 | 16.2 | 6.4 | 3.5 | 7.7 | 6.2 | 8.4 | 26.8 | | | 3 | 18.9 | 81* | 49 | 20 | 10 |

| SAMPLE NO. | DEPTH CM. | ORG.MATTER CARBON 6A1A | NITROGEN 6B1A | CARBONATE AS CACO3 LT 2 6E1B | 2-20 6E1B | SESQUIOXIDES DI-CIT FE 6C2B | EXT AL 6G7A | PYROP FE 6C5A | EXT AL 6G5A | ATTERBERG LIMIT LL 4F1 | PL 4F2 | BULK DENSITY EST. 1/3 BAR 4A1F | 1/3 BAR 4A1F | DRY 4A1H | CM 3B2 | WATER CONTENT 1/10 BAR 4B1C | 1/3 BAR 4B1C | 15 BAR 4B2 | EXTNSBLTY LEE 4D1 | LE 4D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -PERCENT- | | -PERCENT- | | ------PERCENT------- | | | | PCT.NO.40 | | GRAMS PER CC | | | | ----PERCENT--- | | | -PERCENT- | |
| 9 899 | 0- 5 | 0.83 | 0.073 | | | | | | | | | 1.25 | | | 0.58 | | | 18.4 | | |
| 9 900 | 5- 15 | 0.63 | 0.055 | | | | | | | 54 | 29 | | 1.27 | 1.71 | 0.98 | | 34.5 | | 10.4 | 10.2 |
| 9 901 | 15- 36 | 0.58 | | | | | | | | | | | 1.28 | 1.69 | 0.99 | | 35.6 | 5.4 | 9.7 | 9.6 |
| 9 902 | 36- 58 | 0.58 | | 1 | | | | | | | | 1.25 | | | 1.00 | | | 5.4 | | |
| 9 903 | 58- 79 | 0.52 | | 1 | | | | | | 57 | 26 | | 1.23 | 1.62 | 0.96 | | 35.6 | 6.4 | 9.6 | 9.1 |
| 9 904 | 79- 89 | 0.37 | | 4 | | | | | | | | 1.15 | | | 0.91 | | | | | |
| 9 905 | 89-127 | | | 16 | | | | | | | | | | | 0.30 | | | | | |

| SAMPLE NO. | DEPTH CM. | EXTRACTABLE BASES CA 5B4A 6N2E | MG 5B4A 6O2D | NA 5B4A 6P2A | K 5B4A 6Q2A | SUM | EXT. ACI-DITY 6H2A | KCL EXT. AL 6G1E | CEC SUM 5A3A | NH4-OAC 5A6A | BASE SATURATION SUM+ ACI-DITY | SUM+ AL | NH4-OAC 5C1 | PH NAF 2 MIN 8C1D | H2O 1/1 8C1A | CA-CL2 8C1E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MEQ/100G | | | | | | | | | ----PERCENT---- | | | | | |
| 9 899 | 0- 5 | | | 0.3 | 2.8 | 3.1 | | | 3.1 | 36.1 | | | | | 7.0 | 6.7 |
| 9 900 | 5- 15 | | | 0.7 | 2.2 | 2.9 | | | 2.9 | 38.0 | | | | | | |
| 9 901 | 15- 36 | | | 1.5 | 1.5 | 3.0 | | | 3.0 | 37.5 | | | | | 8.1 | 7.2 |
| 9 902 | 36- 58 | | | 2.8 | 1.4 | 4.2 | | | 4.2 | 38.0 | | | | | 8.2 | 7.4 |
| 9 903 | 58- 79 | | | 3.6 | 1.3 | 4.9 | | | 4.9 | 37.4 | | | | | 8.3 | 7.6 |
| 9 904 | 79- 89 | | | 4.5 | 1.3 | 5.8 | | | 5.8 | 37.9 | | | | | | |
| 9 905 | 89-127 | | | 4.9 | 1.1 | 6.0 | | | 6.0 | 31.2 | | | | | | |

CLAY MINERALOGY

| SAMPLE NO | DEPTH CM. | LESS THAN 0.002 MM X RAY 7A2E I | 7A2E II | 7A2E III | 7A2E IV | DTA 7A3 -PERCENT- | 7A3 | L.T. 0.0002 MM X RAY 7A2E I | 7A2E II | 7A2E III |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 899 | 0- 5 | MT 3 | MI 2 | KK 1 | | | | | | |
| 9 900 | 5- 15 | MT 3 | MI 2 | KK 1 | | | | | | |
| 9 901 | 15- 36 | | | | | | | | | |
| 9 902 | 36- 58 | | | | | | | | | |
| 9 903 | 58- 79 | | | | | | | | | |
| 9 904 | 79- 89 | | | | | | | | | |
| 9 905 | 89-127 | | | | | | | | | |

CODE MINERAL RELATIVE AMOUNT

MT MONTMORT 1 TRACE
MI MICA 2 SMALL
KK KAOLINIT 3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

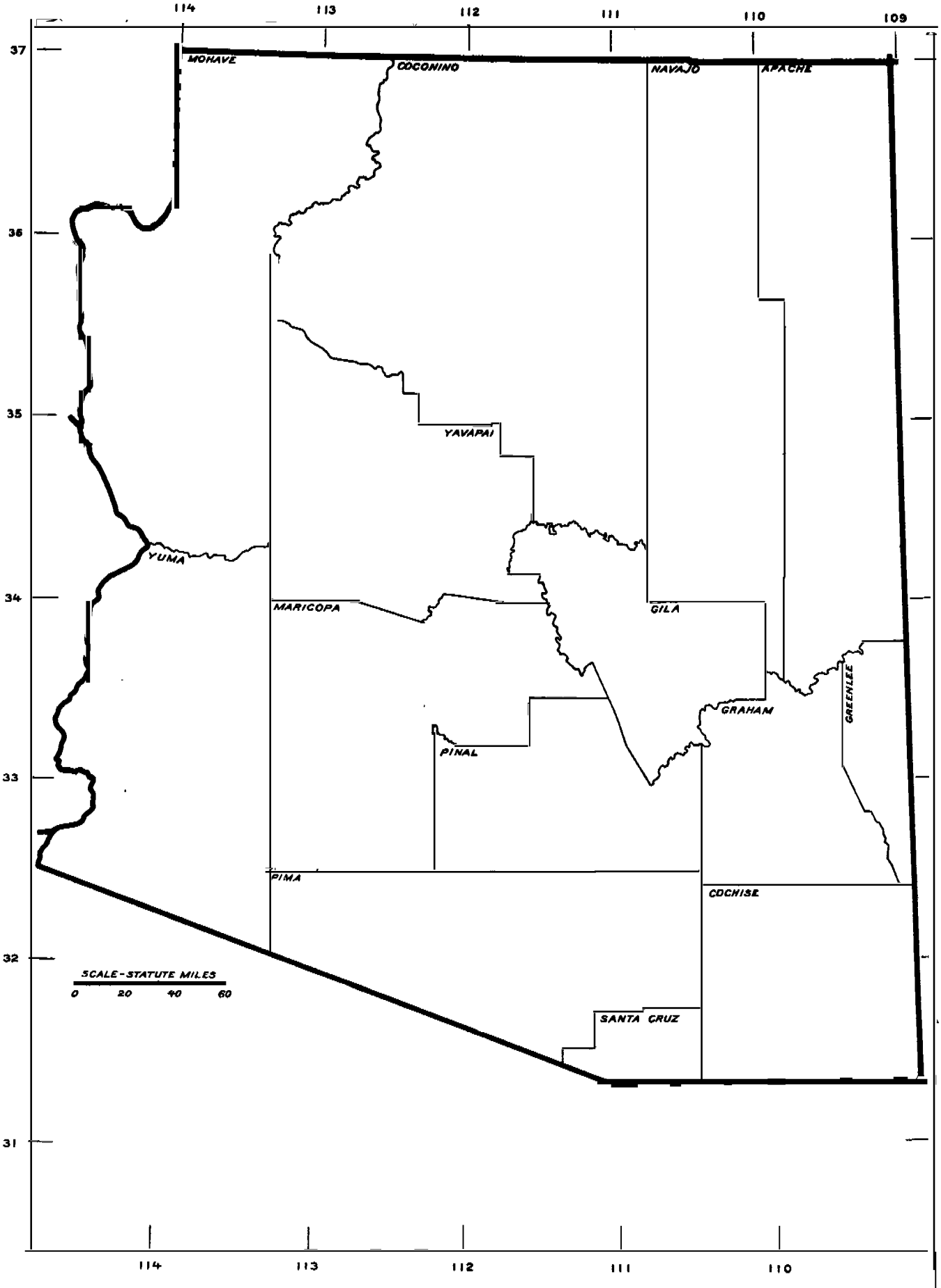
SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.

## BONITA GRAVELLY CLAY
S69Ariz-5-2

Location: Graham County, Arizona. 750 feet south and 100 feet west of the NE corner, Section 24, T11S, R22E. About 21 miles northwest of Willcox. Date of sampling: October 13, 1969. Description by: D. Richmond, H. Havens, K. Dunstan. Collectors: D. Richmond, H. Havens, K. Dunstan.
Classification: Typic Chromustert, fine, montmorillonitic, thermic.
Vegetation: Tobosa grass, annual weeds and few mesquite. Use: Livestock range. Climate: Mean annual precipitation is about 12 to 14 inches. Mean annual air temperature is 61°F., January 45°F., July 79°F. Parent Material: Alluvium from basalt, rhyolite and basaltic andesite. Topography: Slightly convex to smooth, nearly level to gently sloping fan. Slope, 2 percent, northeast facing. Elevation: 4550 feet. Drainage: Well drained. Runoff is very slow. Permeability is very slow. Soil Moisture: Dry when sampled.
Remarks: Field determinations of pH by thymol blue indicator in 1:5 dilution. Paired with sample S69Ariz-5-1. There are many cracks of 1/2 to 2 inches wide that extend from the surface downward to a depth of 20 to 24 inches or more.

| HORIZON | DESCRIPTION |
|---|---|
| A11<br>RSL<br>69899 | 0 to 5 cm (0 to 2 inches), dark brown (7.5 YR 4/2) gravelly clay, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, friable, sticky, plastic; common fine and medium roots; common fine interstitial pores; surface cover about 25 percent of subangular 2 to 3 inch basalt gravel and 10 to 15 percent of 4 to 6 inch cobbles; very slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. |
| A12<br>RSL<br>69900 | 5 to 15 cm (2 to 6 inches ), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; moderate medium and coarse subangular blocky structure; hard, friable, sticky, very plastic; few fine and medium roots; few very fine interstitial and tubular pores; about 5 to 10 percent by volume of 2 to 3 inch rounded basalt gravel; very slightly effervescent; neutral (pH 7.0); clear wavy boundary. |
| A13<br>RSL<br>69901 | 15 to 36 cm (6 to 14 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; weak coarse subangular and angular blocky structure; very hard, friable, sticky, very plastic; few fine and medium roots; few very fine interstitial pores; common pressure faces and small slickensides; about 3 to 5 percent by volume of 2 to 3 inch rounded basalt gravel; very slightly effervescent; neutral (pH 7.2); clear wavy boundary. |
| C1<br>RSL<br>69902 | 36 to 58 cm (14 to 23 inches ), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; weak subangular blocky structure with many slickensides that intersect; very hard, friable, sticky, very plastic; few fine and very fine roots; about 3 to 5 percent by volume of 2 to 3 inch rounded basalt gravel; slightly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. |
| C2<br>RSL<br>69903 | 58 to 79 cm (23 to 31 inches), dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; massive; very hard, friable, sticky, very plastic; few fine and very fine roots; about 3 to 5 percent by volume of 2 to 3 inch rounded basalt gravel; few fine irregularly shaped white soft masses of lime; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. |
| C3ca<br>RSL<br>69904 | 79 to 89 cm (31 to 35 inches), reddish brown (5YR 5/4) gravelly clay loam, reddish brown (5YR 4/4); weak fine and medium subangular blocky structure; hard, friable, sticky, plastic; few fine and very fine roots; few fine tubular pores; common thin clay films on faces of peds; about 35 to 40 percent by volume of 2 to 3 inch rounded basalt gravel; many medium and large pinkish white irregularly shaped soft lime masses; strongly to violently effervescent; moderately alkaline (pH 8.0); abrupt wavy boundary. |
| IIC4 ca<br>RSL<br>69905 | 89 to 127 cm (35 to 50 inches), mottled pinkish gray (5YR 7/2) and reddish brown (5yr 5/4) very gravelly loam, light reddish brown ( 5YR 6/3) and reddish brown (5YR 4/4) moist; mottles are many medium and large and distinct; massive; hard, friable, slightly sticky, slightly plastic; few fine roots; few fine interstitial pores; very few clay films on gravel faces; about 20 percent by volume of 2 to 3 inch rounded basalt gravel and 30 percent of 4 to 10 inch cobbles; gravel and cobbles have a continuous thin coating of soft calcium carbonate; violently effervescent; moderately alkaline (pH 8.0). |

# ARIZONA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