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WALKER BRANCH WATERSHED PROJECT: CHEMICAL, PHYSICAL AND MORPHOLOGICAL PROPERTIES OF THE SOILS OF WALKER BRANCH WATERSHED

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INTRODUCTION

Walker Branch Watershed is located on the AEC Oak Ridge Reservation in Anderson County, Tennessee, latitude 35° 58' N, longitude 84° 17' W. The 97 ha watershed lies within the Ridge and Valley Physiographic Province at elevations between 250 m and 345 m above mean sea level. The climate of the Oak Ridge area is typical of the humid southern Appalachian region. Mean annual rainfall is approximately 139 cm and mean median temperature is 14.5° C. The area is underlayed by Knox Dolomite, a siliceous, medium to light gray, dense to coarsely crystalline dolomite rock of the late Cambrian to early Ordovician age. Jasper chert is found in abundance in the upper 122 m. The bedrock dips to the southeast at a 35° angle and outcrops occasionally on the steeper northwest slopes of the Watershed (Curlin and Nelson 1968).

The overstory vegetation is predominantly an oak-hickory association with lesser amounts of pine-oak-hickory and pure stands of pine. Small areas of mixed mesophytic vegetation are found in sheltered coves and stream valleys. Prior to 1942, 44% of the area within the West Subwatershed was cleared for agriculture, while 13% of the area was cleared on the East Subwatershed.

The soils formed over the dolomitic substrate are primarily Ultisols, formerly called Red-Yellow Podzolics. These soils develop in humid climates of the temperate to tropical zones on old or highly weathered parent material under forest or savannah vegetation. Small

areas of Inceptisols are found in alluvial areas adjacent to the streams. The soils are generally well-drained and have a high infiltration capacity. The predominant clay mineral found in these soils is kaolinite with lesser amounts of vermiculite, hydrous micas and quartz forming the complement.

An intensive soil survey was conducted by personnel of the United States Soil Conservation Service in 1967 (Fig. 1). The survey indicated that the indigenous soils are predominantly Typic Paleudults (Table 1). Fullerton soils occupy the ridge tops and upper slope positions while the Bodine Series is found on intermediate and lower slopes. Areas of Claiborne soil are located on lower slopes and benches on the downstream portion of each subwatershed just above the weirs. Tarklin and Linside soils occupy minor areas in the major stream bottom of the East fork on alluvial or colluvial deposits washed from the uplands. Stonyland and Rockland occur on lower slopes near the weirs where the dolomite substrate tends to outcrop or lie near the soil surface.

Table 2 summarizes the results of the soil survey. Fullerton soils occupy approximately one-half of the acreage of each watershed while members of the Bodine Soil Series cover approximately 47% of the East Subwatershed and 37% of the West Subwatershed. Together, the Fullerton and Bodine soils comprise 90% to 96% of the total area. The remainder of the watershed is occupied by minor soil series, rock outcrops, and deep chert beds.

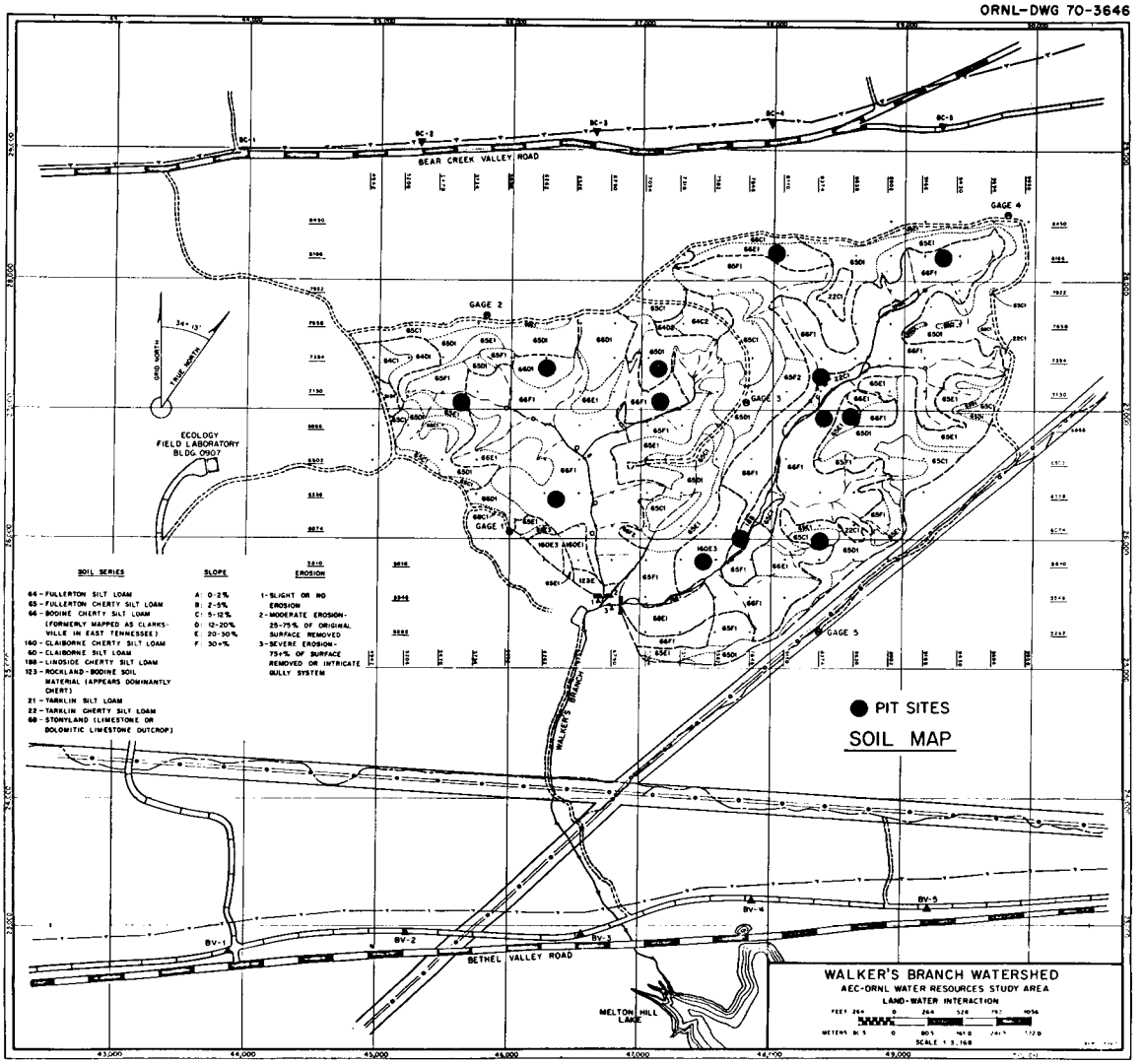

Figure 1. Soils map showing locations of sample pits.

Table 1. Soil Series and Mapping Units Observed on Walker Branch Watershed

Soil Series	Texture	Slope Range (percent)	Degree Erosion	Comprehensive Classification (7th approximation)
Tarklin	sil to cherty sil	2-12	slight	Typic Fragiudults fine-loamy, siliceous, thermic
Fullerton	sil, cherty sil to cherty sicl	5-30+	slight to severe	Typic Paleudults clayey, kaolinitic, thermic
Bodine	cherty sil	5-30+	slight	Typic Paleudults loamy-skeletal, siliceous, thermic
Claiborne	cherty sil to cherty sicl	12-30+	slight to severe	Not classified
Linside	sil	0-5	slight	Aquic Fluventic Eutrochrepts fine, silty, mixed, mesic
Stonyland (Fullerton soil material)	dolomite outcrop	20+	--	Not classified
Rockland (dominantly chert)	chert fragments	20+	--	Not classified

Table 2. Acreage Summary of Soil Survey on Walker Branch Watershed

Map Symbol	Texture	Slope Class %	Erosion Class	Acres		Percent Area	
				West	East	West	East
			Fullerton Series				
64C1	Sil	5–12	Slight	1.5		1.6	
64C2	Sil	5–12	Moderate	1.4	1	1.5	0.4
64D1	Sil	12–20	Slight	2.0		2.1	
64D2	Sil	12–20	Moderate	0.5		0.5	
65C1	Cherty Sil	5–12	Slight	7.3	10.8	7.7	7.4
65D1	Cherty Sil	12–20	Slight	17.0	28.5	17.9	19.5
65E1	Cherty Sil	20–30	Slight	7.7	14.6	8.1	10.0
65E3	Cherty Sil	20–30	Severe	0.2		0.2	
65F1	Cherty Sil	30+	Slight	8.0	16.9	8.4	11.6
65F2	Cherty Sil	30+	Moderate	0.6	5.1	0.6	3.5
			Bodine Series				
66D1	Cherty Sil	12–20	Slight	7.8		8.2	
66E1	Cherty Sil	20–30	Slight	5.3	6.1	5.6	4.2
66F1	Cherty Sil	30+	Slight	31.7	47.8	33.3	32.7
66C1	Cherty Sil	5–12	Slight		0.7		0.5
			Claiborne Series				
160D1	Cherty Sil	12–20	Slight		0.4		0.3
160E1	Cherty Sil	20–30	Slight	1.2		1.3	
160E3	Cherty Sil	20–30	Severe	1.1		1.2	
160F3	Cherty Sil	30+	Severe		4.7		3.2
			Tarklin Series				
21B1	Sil	2–5	Slight	0.6		0.6	
22C1	Cherty Sil	5–12	Slight		3.4		2.3
			Linside Series				
188B1	Cherty Sil	2–5	Slight		2.2		1.5
			Rockland				
123E1	Chert	20–30	Slight	1.1		1.2	
			Stonyland				
68E1	Limestone	30+	Slight		4.2		2.9

Thirteen soil pits were excavated at selected locations within each of the major soil series. Profile descriptions were made and each horizon was sampled for subsequent physical and chemical analysis. This report summarizes the morphological, physical, and chemical characteristics of the soils of Walker Branch Watershed.

METHODS AND PROCEDURES

Sampling Procedures

Large chert fractions in the soils made intensive sampling difficult at many of the sites. However, where feasible, undisturbed soil cores were taken from each soil horizon. Two different size cores were taken: duplicate cores 6.4 cm OD by 3 cm were used for moisture retention analysis and two larger cores (8 cm OD by 9 cm) were used for hydraulic conductivity and bulk density determinations. A bulk sample was also taken from each horizon for use in chemical analyses and for determination of particle size distribution. The bulk samples were air-dried, ground, and passed through a 2-mm sieve.

Physical Analyses

Bulk Density

Bulk density was determined from the large, oven-dried soil cores. The small cores were used only for horizons that were difficult to sample. Bulk density was computed from net oven-dry weight and core volume.

Particle-Size Distribution

Particle-size distribution of the soil samples was determined by wet-sieving that fraction of soil material > 2 mm in diameter, and by using a slight modification of the hydrometer method (Day 1965) for that fraction < 2 mm in diameter.

The entire soil sample was dried, ground, and dry-sieved through a 2-mm sieve. A 40-g sample of material smaller than 2 mm was digested with 30% H_2O_2 to remove the organic matter. The sample was dispersed in a 5% Calgon solution and the suspension was mixed with a rotary mixer for five minutes; the suspension was then transferred to a 1000-ml sedimentation cylinder and made to volume. The cylinder was placed in a constant temperature bath maintained at 35° C. After stirring thoroughly, two readings of the suspension were taken with a standard hydrometer (ASTM No. 152H), one at 6 1/2 hrs and another at 8 hrs.

Using the formula X (microns) = $\theta/t^{1/2}$ (Day 1965) and tabular values for θ at 35° C, the amount of material $\leq 2\mu$ in the suspension was interpolated from the 6 1/2 and 8 hr readings. The suspension was then wet-sieved through 53μ and 105μ sieves. The total oven-dry weight of the material on the two sieves was used to determine the percent sand, and the material between 53 and 105μ was used to determine the percent of very fine sand in the sample. The amount of silt in the sample was determined by difference from the clay and sand percentages. These results are all reported as percent of material less than 2 mm in diameter.

That portion of material greater than 2 mm diameter (almost exclusively chert) was wet-sieved through a nest of sieves including No. 4 (4.76 mm), 9.52 mm, 19.00 mm, and 25.40 mm. The material on the sieves was oven-dried and weighed. Total weight of this material was used to determine the percent chert in the total sample. The size fractions of chert are reported as percentages of total chert weight.

Moisture Retention

The small undisturbed soil cores were placed in Tempe[1] pressure cells and saturated with water. The cells were placed under successive pressures of 5, 25, 100, 333, and 667 millibars. After the moisture content reached equilibrium at each pressure, the soil cores were weighed. Porous monel plates were used at pressures of 5, 25, and 100 millibars, while ceramic plates were used at pressures of 333 and 667 millibars. Moisture retention at 1, 5 and 15 atmospheres tension was determined on a pressure membrane apparatus.[2] After completion of the 15 atmospheres tension level, the soil cores were oven dried and weighed.

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[1]Soil Moisture Equipment Company, Santa Barbara, California, Cat. No. 1400

[2]Soil Moisture Equipment Company, Santa Barbara, California, Cat. No. 1000

Hydraulic Conductivity

The method used for determining hydraulic conductivity was one described by Shaw (1952). The 8 cm OD undisturbed soil cores were used. A double thickness of gauze was attached around one end of the core and empty cylinder was attached to the other end of the core with water-resistant tape. The cores were placed in a pan and filled with water to a depth of ca. 1 cm from the top of the empty cylinder. Water was allowed to percolate from the bottom of the soil core to the top of the second cylinder, thereby assuring saturation of all pore space in the soil. After several centimeters of water had percolated through the soil, the excess was removed by suction. The quantity of water percolated through the soil in a given time was recorded.

The above method is not wholly satisfactory for porous, cherty soils such as those found on the watershed, therefore the hydraulic conductivity values reported herein should be applied with discretion.

Chemical Analyses

Total Analysis

After grinding in a ball mill, a 0.1 g sample of soil was digested with hydrofluoric and perchloric acids (Pratt 1965). Organic samples were pretreated with H_2O_2 to oxidize the bulk of the organic matter present. The samples were then digested in teflon beakers on a sand-bath heated to 225° C. Five milliliters of HF and 0.5 ml of $HClO_4$ were used in the digestion. After evaporating to dryness, the residue was dissolved in 6N HCl and water (1:1) and made to 50 ml volume.

The four cations; Ca, Mg, K, and Fe; were determined with a Perkin-Elmer Model 303 atomic absorption spectrophotometer. One percent La solution was added to the samples to control chemical interference in the Ca determination.

Phosphorus was determined by the sulfuro-molybdate method on a Technicon Autoanalyzer (Lundgren 1960), using an excess of H_2SO_4 to eliminate Si interference.

Organic Matter

Soil organic matter was determined using the Walkley-Black method suggested by Allison (1965). In this method the active forms of soil organic-C are oxidized by $Cr_2O_7^{--}$. The reaction is facilitated by the heat generated from the addition of concentrated H_2SO_4 to the sample solution. A standard $FeSO_4$ solution is used to determine the amount of unreduced $Cr_2O_7^{--}$, and the organic-C is calculated from the amount of $Cr_2O_7^{--}$ consumed in the reaction.

One-half gram of soil was used for surface samples; 1.0 g soil for subsurface samples; and 2.0 g soil for deep subsurface samples. Ten milliliters of 1N $K_2Cr_2O_7$ was used as the oxidant. After the soil was wetted with this solution, 20 ml of concentrated H_2SO_4 were rapidly added. Titration with 0.5N $FeSO_4$ solution was used to determine excess $Cr_2O_7^{--}$. The titrant was standardized daily. The indicator used in the titrations was O - phenanthroline-ferrous complex ("Ferroin") which gives a red endpoint. A correction factor of 1.33 was used to convert the results of the titration to C, and an additional factor of 1.724 was used to convert that value to organic matter.

Total Nitrogen

Total nitrogen in the soil samples was determined using the semimicro-Kjeldahl method (Bremner 1965). A 1 g soil sample was used for each determination. The digestion was carried out in a 100-ml micro-Kjeldahl flask. The sample was mixed with 5 ml of water and the suspension allowed to stand for 30 min. A salt catalyst mixture containing K_2SO_4, $CuSO_4 \cdot 5H_2O$, and Se (100:10:0.7) was used in the digestion. Three grams of this mixture and 4 ml of concentrated H_2SO_4 were added to the flask and the flask was heated on the digestion stand for 2 hrs after clearing. The flask was cooled, and 20 ml of water added.

The NH_3 in the digestate was collected by steam distillation into 4% H_3BO_3 (adjusted to pH 5.0). Forty percent NaOH was used to liberate the NH_3 from the digestate. Bromocresol green-methyl red indicator was used in the H_3BO_3 solution to aid in assessing the progress of the distillation. The distillate was titrated potentiometrically to an endpoint of pH 5.0 using 0.02 N HCl as the titrant.

Cation Exchange Capacity

Cation exchange capacity (CEC) was determined by replacement of the exchangeable cations with an unbuffered solution of 1N $SrCl_2$, tagged with ^{85}Sr and the determination of the adsorbed ^{85}Sr radiometrically. The determinations were carried out entirely in standard 25- x 150-mm test tubes without the need for quantitative transfer. If the soil contained $< 40\%$ clay, a 4-g sample was used; and if $> 40\%$ clay, a 2-g sample was used.

The soil was was washed three times with 1N $^{85}SrCl_2$ solution to replace the exchangeable cations. Twenty-five milliliters of solution were used for each washing. A vortex mixer was used to agitate the suspension during the first and third washing, and the suspension was shaken overnight in a reciprocating shaker during the second washing. After each washing the soil was centrifuged at 1300 rpm for 5 minutes and the supernatant liquid was decanted. Finally soil was washed twice with distilled water and once with methanol. Strontium-85 activity in the sample was determined by counting the samples in a gamma spectrometer using a well-type NaI crystal. Cation exchange capacity was calculated from the ratio of the activity in the unknowns to that in standards prepared from soil and the stock 1N $^{85}SrCl_2$ solution. Activity arising from a standard using 0.5 ml of stock solution in 4 g of soil is equivalent to that generated by a soil sample of 12.5 meq/100 g.

pH

The pH of the soil samples were determined using the method outlined by Peech (1965). In this method, the pH of a suspension of 0.01 M $CaCl_2$ solution and soil (2:1 ratio) is measured. Ten milliliters of solution were mixed with 5 g of soil, and the pH was read after one hour. The pH meter was read with the glass electrode immersed in the settled soil suspension and the calomel electrode in the clear supernatant solution.

Exchangeable Cations

The soil samples were leached with neutral 1N NH_4OAc to extract the exchangeable cations, and the resulting solutions were analyzed for Ca, Mg, and K. A 10-g sample of soil was extracted by percolation with 100 ml of 1N NH_4OAc using a filter tube packed with glass wool (Jackson 1958). The soil sample was placed in a cup formed with two layers of Whatman No. 42 filter paper and the NH_4OAc was delivered by an inverted 100-ml volumetric flask. Filter paper slowed down the rate of leaching so that 100 ml of solution passed through the soil in 3-4 hrs. The leachate was brought to 100 ml volume. Three cations, Ca, Mg, and K were determined with a Perkin-Elmer Model 303 atomic absorption spectrophotometer. In the Ca determinations, 1500 ppm Sr was added to the samples to control chemical interference.

PROFILE DESCRIPTION

Fullerton cherty silt loam

Coordinates: N6413-E6441

O1,O2	1-0"	Hardwood litter; the lower part partially decomposed.
A1	0-3"	Grayish brown (2.5Y 5/2) cherty silt loam with weak fine granular structure; friable; clear smooth boundary.
A2	3-10"	Light yellowish brown (10YR 6/4) cherty silt loam with weak fine granular structure; friable; gradual wavy boundary.
A3	10-18"	Light yellowish brown (10YR 6/4) cherty silt loam; the lower part is streaked with very pale brown (10YR 8/4); weak medium granular structure; friable; clear irregular boundary.
B1t	18-22"	Reddish yellow (7.5YR 6/6) cherty silt loam with weak fine angular blocky structure; firm to friable; few thin patchy clay films; clear irregular boundary.
B21t	22-26"	Yellowish red (5YR 5/8) cherty silty clay loam with moderate medium angular and subangular blocky structure; firm; continuous clay films; clear irregular boundary.
B22t	26-46"+	Red (2.5YR 5/8) cherty clay with strong medium angular blocky structure; very firm; continuous clay films.

The depth to the B1t horizon within the pit ranges between 8 and 35 inches.

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Table 3. Soil Moisture Properties. Fullerton cherty silt loam. N6413-E6441. Pit 1

Horizon	Depth	Bulk Dens.	Moisture Retained (atm)								Hydr. Cond.
			.005	.025	.100	.333	.667	1	5	15	
	in	g/cc	percent								cm/hr
A1	0-3	1.14	33.2	31.7	28.3	24.4	22.3	21.4	20.8	18.8	75.7
A2	3-10	1.51	22.4	20.3	18.5	17.4	16.0	14.9	13.9	12.3	38.2
A3	10-18	1.49	17.6	16.3	15.3	14.4	13.2	12.5	12.0	8.4	>140
B1t	18-22	1.41	20.0	18.1	16.8	14.4	12.3	12.0	11.6	9.7	>140
B21t	22-26	1.40	16.9	16.5	15.5	14.6	14.0	13.4	12.6	10.2	28.6
B22t	26-42+	1.12	17.3	17.1	16.6	14.5	13.7	13.2	12.0	10.7	29.6

Table 4. Particle Size Distribution. Fullerton cherty silt loam. N6364-E6392. Pit 1

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm)					
						Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	sil	36	2	62	3	24	32	34	29	4	
A2	sil	25	9	66	4	39	27	30	21	16	6
A3	sil	32	7	62	5	40	26	31	22	9	13
B1t	sil	31	9	60	4	47	22	24	23	8	23
B21t	sicl	18	33	50	3	17	30	32	26	13	
B22t	c	12	39	49	4	2	35	65			

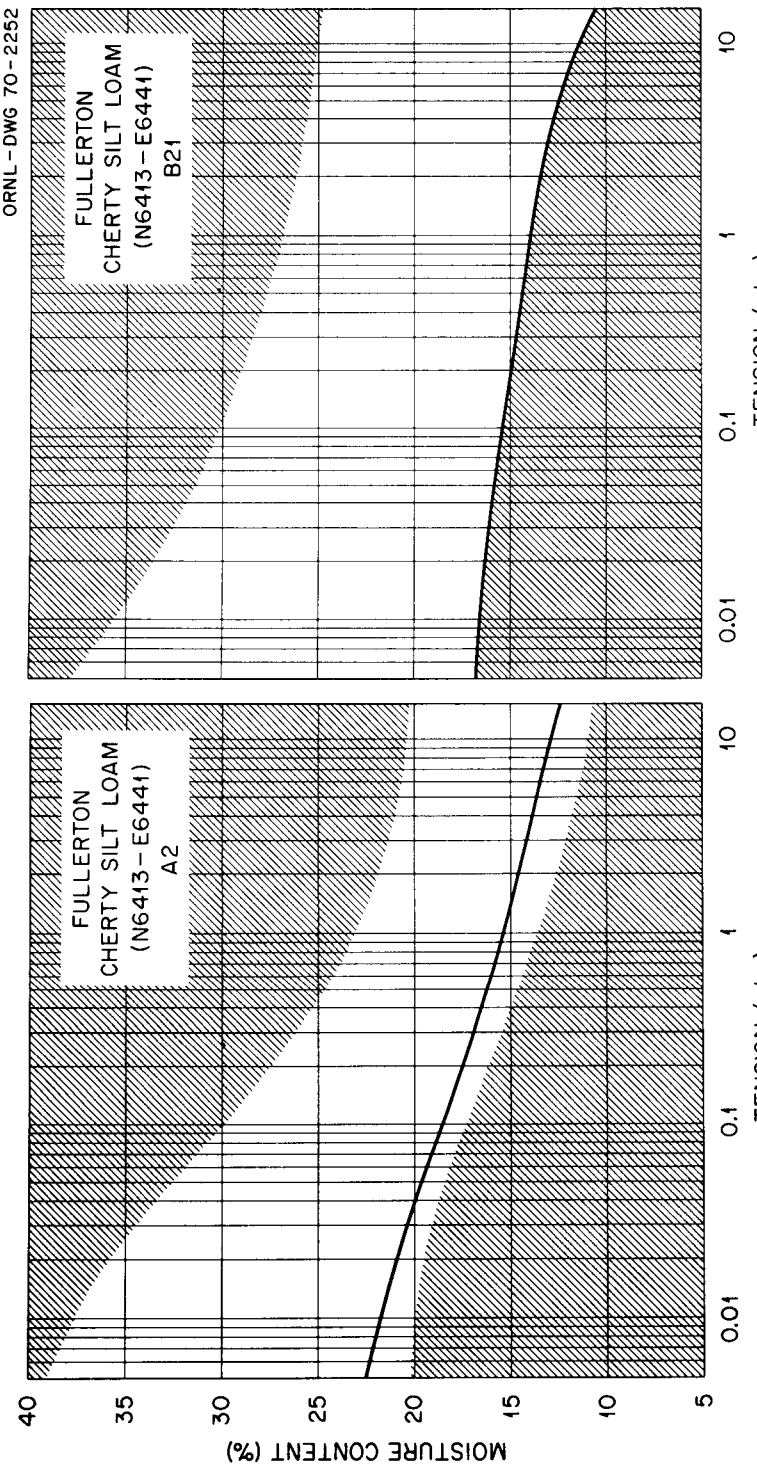


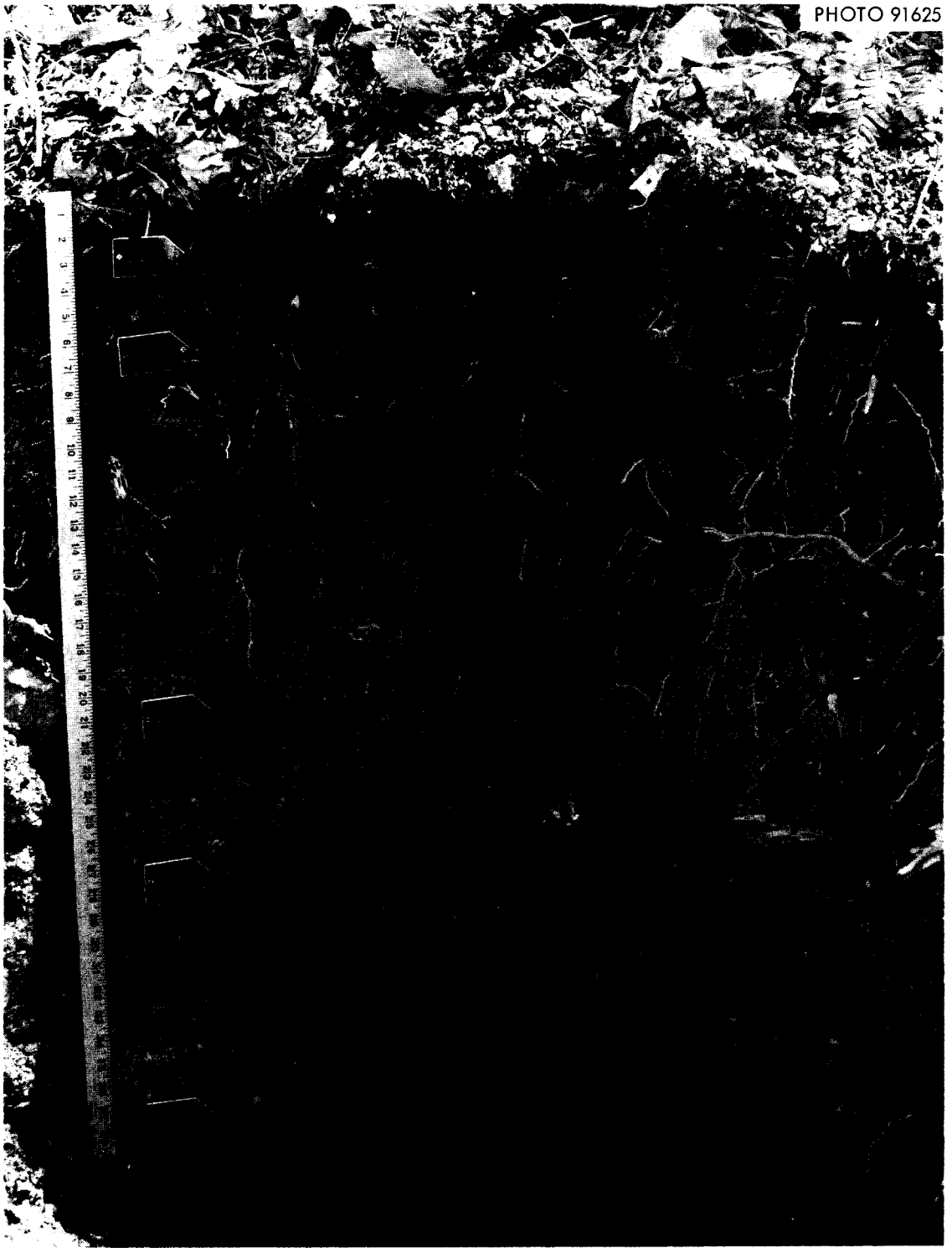
Figure 2. Moisture retention curves for Fullerton cherty silt loams (Pit 1). Shaded areas represent limits of retention for indicated horizon for all soils sample.

Table 5. Exchangeable Cations. Fullerton cherty silt loam. N6413-E6441. Pit 1

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-3	5.0	3.30	0.34	0.11	0.09	16
A2	3-10	4.7	2.18	0.11	0.05	0.04	9
A3	10-18	4.7	1.45	0.16	0.07	0.05	19
B1t	18-22	4.2	1.68	0.11	0.05	0.03	11
B21t	22-26	4.4	4.45	0.16	0.23	0.05	10
B22t	26-42+	3.9	10.89	0.16	0.45	0.09	6

Table 6. Total Analyses. Fullerton cherty silt loam. N6413-E6441. Pit 1

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.03	0.08	0.36	1.26	0.128	0.03	4.11
A2	0.03	0.10	0.48	2.40	0.038	0.02	1.38
A3	0.05	0.10	0.45	1.36	0.018	0.01	0.68
B1t	0.05	0.14	0.52	1.38	0.025	0.02	0.52
B21t	0.04	0.20	0.58	2.00	0.048	0.01	0.52
B22t	0.04	0.30	0.68	2.66	0.022	0.01	0.27



Bodine cherty silt loam
N7060-E5550

PROFILE DESCRIPTION

Bodine cherty silt loam (TYPICAL)

Coordinates: N7060-E5550

O1,O2	1/2-0"	Hardwood litter, the lower part partially decomposed.
A1	0-2"	Very dark grayish brown (10YR 3/2) cherty silt loam with weak medium granular structure; friable; abrupt smooth boundary.
A21	2-6"	Pale brown (10YR 6/3) cherty silt loam with weak medium granular and weak fine subangular blocky structure; friable, clear smooth boundary.
A22	6-20"	Light yellowish brown (10YR 6/4) cherty loam or silt loam; weak medium granular and weak fine subangular blocky structure; friable; clear smooth boundary.
B1t	20-27"	Reddish yellow (7.5YR 6/6) cherty silt loam or silt loam; moderate medium subangular blocky structure; few patchy clay films; friable; gradual smooth boundary.
B2t	27-36"	Reddish yellow (7.5YR 6/6) cherty silt loam or silt loam with patches of reddish yellow (5YR 6/8); moderate medium subangular blocky structure; few thin patchy clay films; gradual wavy boundary.

Table 7. Soil Moisture Properties. Bodine cherty silt loam. N7060-E5550. Pit 2

			Moisture Retained (atm)								
Horizon	Depth	Bulk Dens.	.005	.025	.100	.333	.667	1	5	15	Hydr. Cond.
	in	g/cc	percent								cm/hr
A1	0-2	0.90	43.4	37.6	32.6	27.2	24.8	23.6	22.9	21.2	
A21	2-6	1.20	23.1	21.6	18.9	15.1	13.8	13.1	11.9	11.3	37.9
A22	6-20	1.24	24.8	20.1	16.9	13.8	11.9	11.2	10.8	8.6	4.3
B1t	20-27										
B2t	27-36+										

Table 8. Particle Size Distribution. Bodine cherty silt loam. N7060-E5550. Pit 2

						Chert Fraction (mm)					
Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	sil	36	2	62	7	19	38	35	27		
A21	sil	24	14	61	5	27	19	20	24	3	34
A22	sil	11	4	84	2	25	20	25	30	6	19
B1t	sil	37	7	56	5	51	16	22	19	8	34
B2t	sil	13	13	75	4	47	12	15	17	18	38

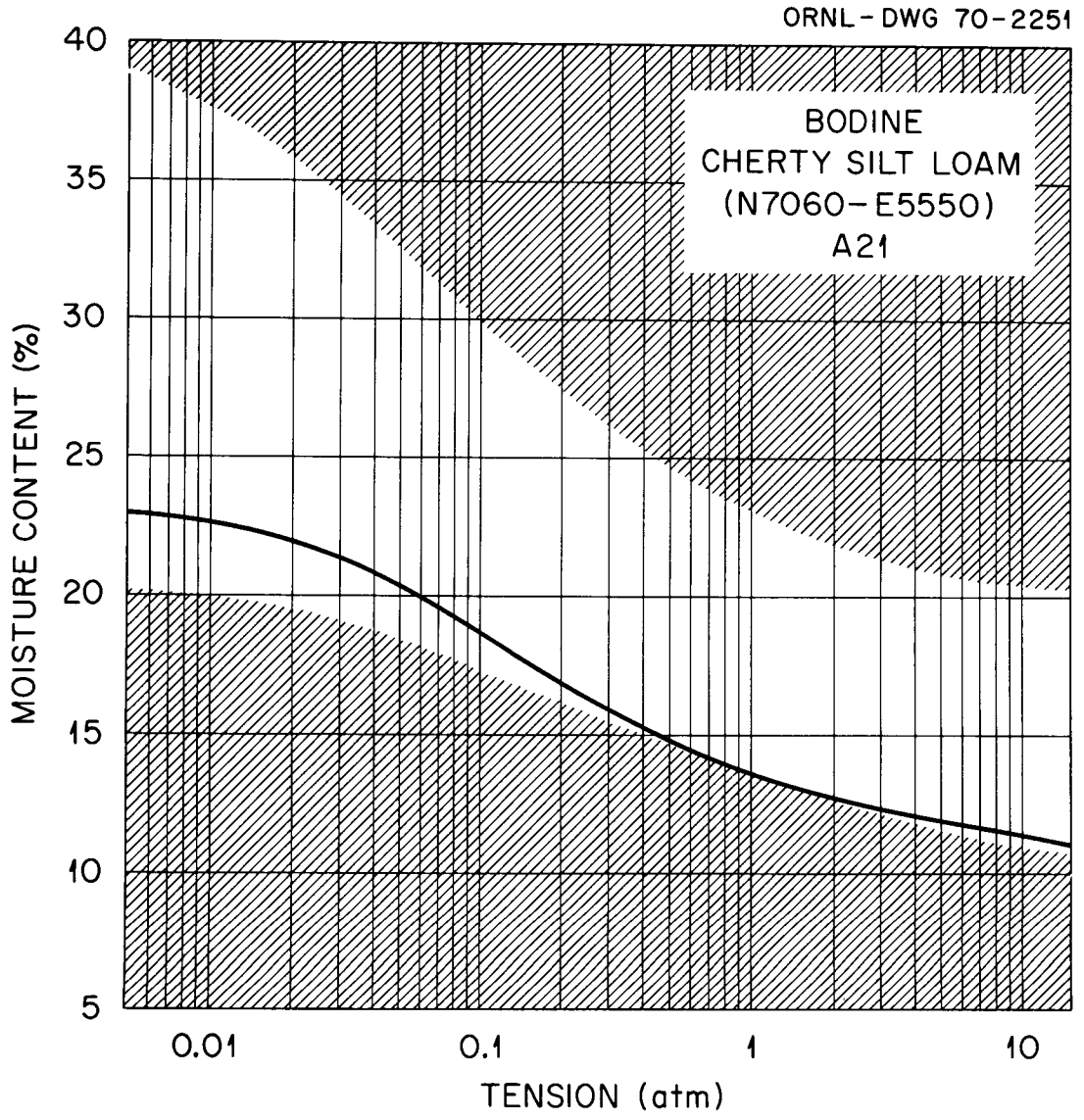


Figure 3. Moisture retention curve for Bodine cherty silt loam (Pit 2).

Table 9. Exchangeable Cations. Bodine cherty silt loam. N7060-E5550. Pit 2

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-2	5.0	9.58	2.41	0.54	0.19	33
A21	2-6	4.5	1.98	0.10	0.05	0.05	10
A22	6-20	4.7	1.94	0.23	0.06	0.05	17
B1t	20-27	4.8	1.42	0.14	0.04	0.03	15
B2t	27-36+	4.4	2.58	0.26	0.11	0.03	16

Table 10. Total Analyses. Bodine cherty silt loam. N7060-E5550. Pit 2

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.11	0.09	0.43	1.02	0.210	0.05	5.84
A21	0.05	0.07	0.34	0.71	0.050	0.01	2.07
A22	0.06	0.17	0.51	1.22	0.073	0.01	1.18
B1t	0.04	0.10	0.64	1.34	0.007	0.01	0.84
B2t	0.04	0.16	0.79	1.22	0.026	0.01	0.34

PROFILE DESCRIPTION

Fullerton cherty silt loam (TRANSITION)

Coordinates: N7335-E6262

O1,O2	1-0"	Hardwood litter, the lower part partially decomposed.
A1	0-2"	Grayish brown (10YR 5/2) cherty silt loam with weak fine granular structure; friable; gradual smooth boundary.
A2	2-15"	Pale brown (10YR 6/3) cherty loam with weak fine granular structure; friable; clear wavy boundary.
A3	15-19"	Light yellowish brown (10YR 6/4) cherty loam with weak fine granular and weak medium subangular blocky structure; friable; gradual wavy boundary.
B1	19-22"	Yellowish red (5YR 5/6) cherty loam with weak medium subangular blocky structure; firm to friable; gradual wavy boundary.
B21t	22-26"	Yellowish red (5YR 5/8) cherty silt loam or clay loam with moderate medium angular blocky structure; firm; few patchy clay films; clear wavy boundary.
B22t	26-42"+	Red (2.5YR 4/8) cherty clay loam with strong medium angular blocky structure; very firm; continuous clay films.

Table 11. Soil Moisture Properties. Fullerton cherty silt loam. N7335-E6262. Pit 3

Horizon	Depth	Bulk Dens.	Moisture Retained (atm)								Hydr. Cond.
			.005	.025	.100	.333	.667	1	5	15	
	in	g/cc	percent								cm/hr
A1	0-2	1.15	36.6	33.5	30.2	26.4	24.1	23.0	20.6	19.3	14.6
A2	2-15	1.46	20.3	19.2	17.7	15.4	14.2	13.7	11.6	10.9	2.8
A3	15-19	1.51	19.2	18.9	17.5	16.4	14.0	13.3	11.0	10.6	0.3
B1	19-22	1.57	19.0	18.6	17.0	16.0	15.0	14.2	12.3	11.7	1.9
B21t	22-26	1.46	18.6	18.0	16.8	15.7	15.3	14.5	13.1	12.8	2.4
B22t	26-42+	1.44	21.3	20.2	19.3	18.5	18.0	17.2	14.6	14.2	1.2

Table 12. Particle Size Distribution. Fullerton cherty silt loam. N7335-E6262. Pit 3

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm)					
						Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	sil	41	2	57	7	17	23	29	38	11	
A2	l	46	7	47	5	29	43	33	15	9	
A3	l	32	4	64	5	29	30	37	28	4	8
B1	l	33	7	50	3	27	23	20	20	12	26
B21t	sil	33	9	58	6	32	24	20	23	6	27
B22t	cl	24	27	49	4	14	22	26	28	12	12

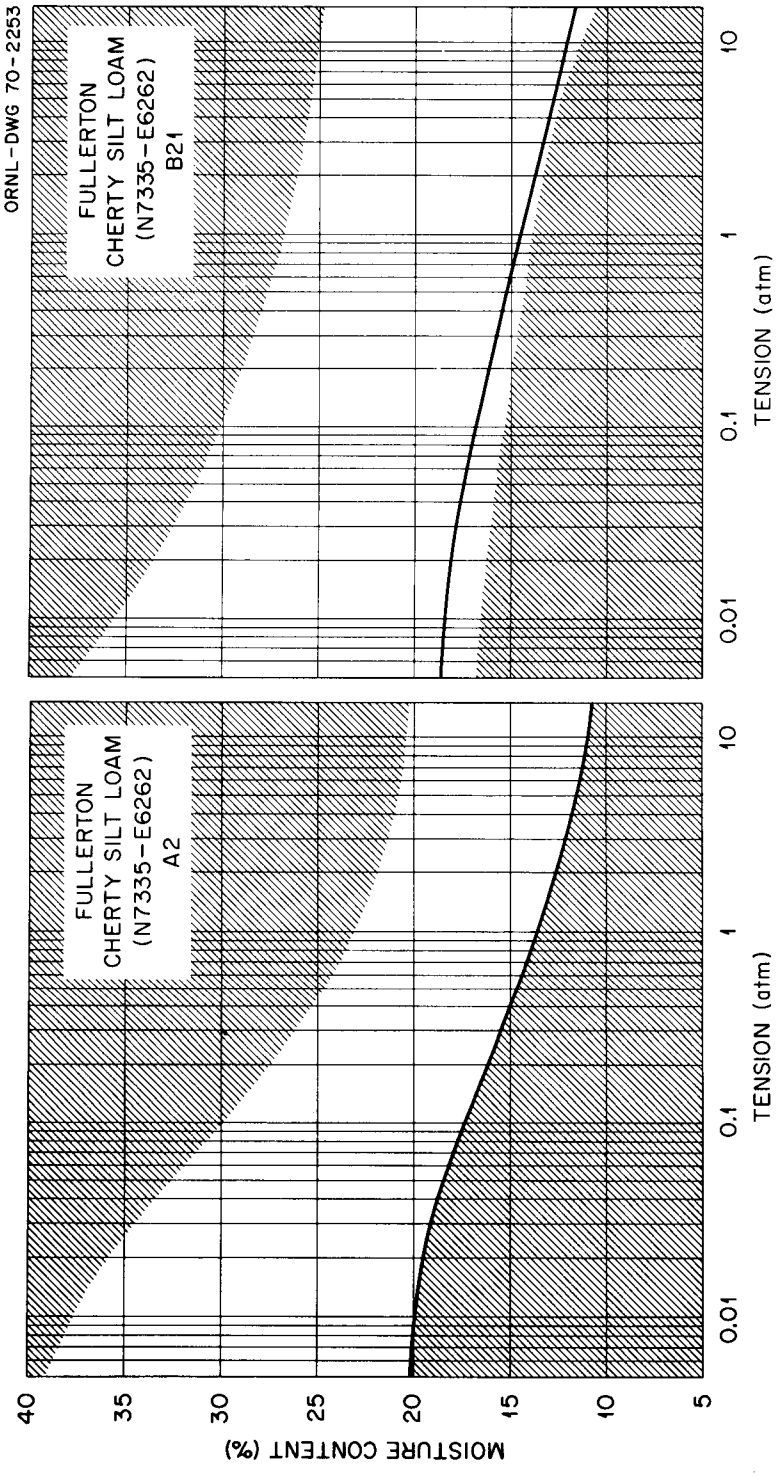


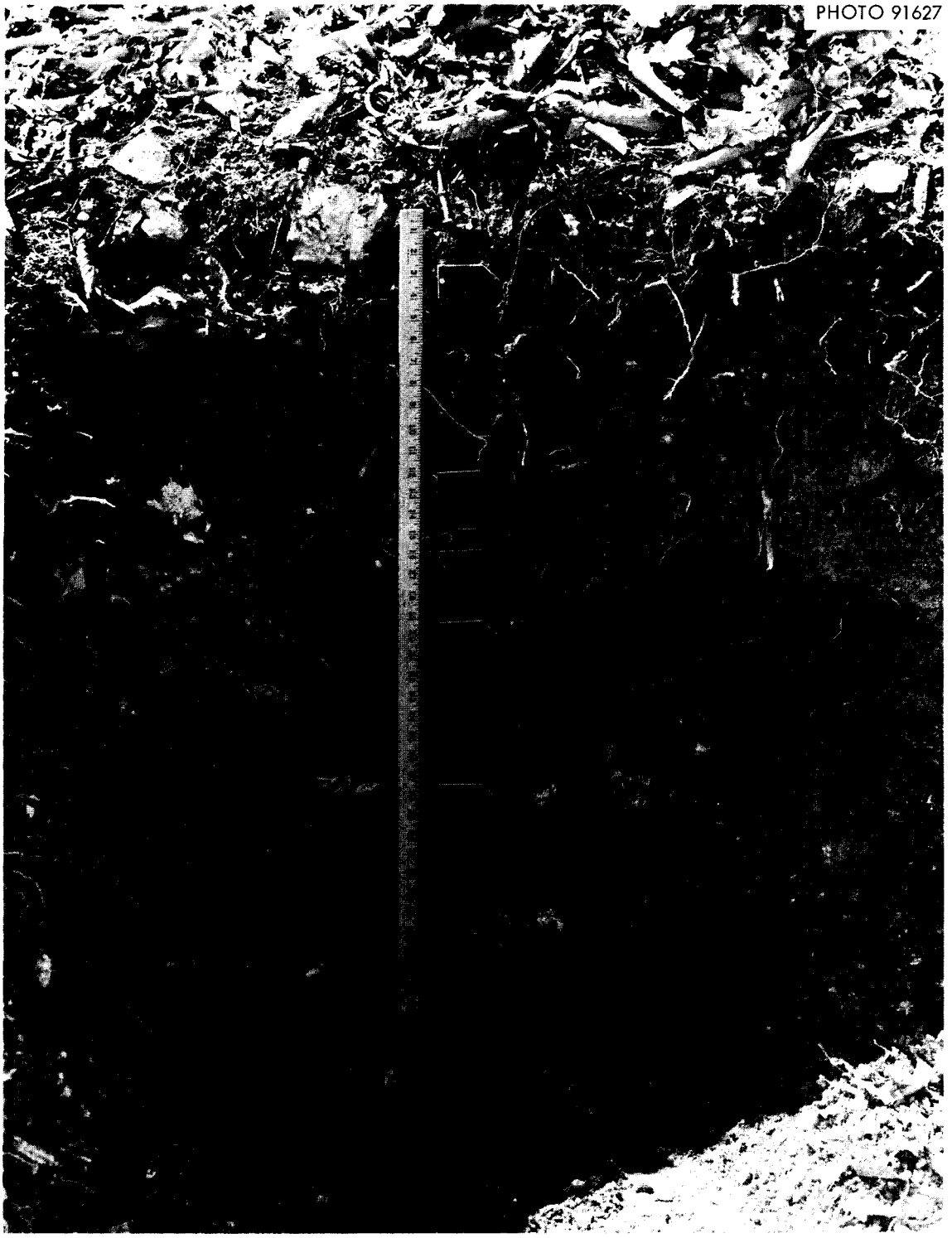
Figure 4. Moisture retention curves for Fullerton cherty silt loam (Pit 2).

Table 13. Exchangeable Cations. Fullerton cherty silt loam. N7335-E6262. Pit 3

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-2	4.8	2.81	0.32	0.12	0.12	20
A2	2-15	4.2	1.15	0.11	0.04	0.02	15
A3	15-19	4.1	1.12	0.18	0.05	0.03	23
B1	19-22	4.5	2.31	0.12	0.06	0.03	9
B21t	22-26	4.9	1.80	0.11	0.06	0.03	11
B22t	26-42+	4.8	3.98	0.33	0.05	0.04	11

Table 14. Total Analyses. Fullerton cherty silt loam. N7335-E6262. Pit 3

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.04	0.07	0.32	1.30	0.118	0.02	4.14
A2	0.04	0.06	0.32	0.92	0.038	0.01	1.06
A3	0.04	0.06	0.56	1.40	0.044	0.01	0.59
B1	0.06	0.08	0.30	0.99	0.020	0.03	0.55
B21t	0.03	0.08	0.29	1.12	0.017	0.01	0.33
B22t	0.09	0.19	0.52	2.18	0.029	0.01	0.31



Fullerton cherty silt loam
N7300-E7148

PROFILE DESCRIPTION

Fullerton cherty silt loam (TYPICAL)

Coordinates: N7300-E7148

O1,O2	1/2-0"	Hardwood litter, the lower part partially decomposed.
A1	0-3"	Grayish brown to dark grayish brown (10YR 5/2-4/2) cherty loam with weak fine granular structure; friable; clear smooth boundary.
A2	3-13"	Pale brown (10YR 6/3) cherty silt loam with weak medium granular structure; friable; clear smooth boundary.
A3	13-17"	Light yellowish brown (10YR 6/4) cherty silt loam with weak medium granular and weak medium subangular blocky structure; friable; abrupt smooth boundary.
B1	17-20"	Strong brown (7.5YR 5/6) cherty silt loam with weak fine subangular blocky structure; friable; clear smooth boundary.
B21t	20-28"	Yellowish red (5YR 5/6) cherty silt clay with weak medium subangular blocky structure; firm; patchy clay films; gradual smooth boundary.
B22t	28-36"+	Red (2.5YR 5/8) cherty clay variegated with reddish yellow (7.5YR 6/8); strong medium angular and subangular blocky structure; firm; continuous clay films (this layer contains more chert than the B21t).

Table 15. Soil Moisture Properties. Fullerton cherty silt loam. N7300-E7148. Pit 4

Horizon	Depth	Bulk Dens.	Moisture Retained (atm) .005	.025	.100	.333	.667	1	5	15	Hydr. Cond.
	in	g/cc	percent								cm/hr
A1	0-3	1.08	39.5	35.4	27.9	24.4	21.8	20.4	19.8	19.6	64.9
A2	3-13	1.18	28.3	24.8	20.6	19.0	17.2	15.5	12.8	12.2	22.8
A3	13-17	1.28	20.9	17.7	14.5	12.2	11.1	10.4	10.0	9.4	>140
B1	17-20	1.32	21.9	17.9	15.4	12.7	11.8	11.3	10.5	7.9	7.0
B21t	20-28	1.20	24.8	22.9	20.8	20.6	19.9	18.8	18.2	17.9	>140
B22t	28-36+	1.19	41.0	36.9	30.8	21.0	20.3	19.6	18.8	18.3	80.7

Table 16. Particle Size Distribution. Fullerton cherty silt loam. N7300-E7148. Pit 4

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm) Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	sil	47	4	49	12	44	17	29	29	3	23
A2	sil	34	12	54	6	44	16	20	15	9	39
A3	sil	31	9	60	4	40	22	31	11	14	22
B1	sil	28	9	63	4	53	15	17	20	7	41
B21t	sic	19	40	40	4	27	13	19	30	19	20
B22t	c	19	49	33	3	65	4	7	10	34	76

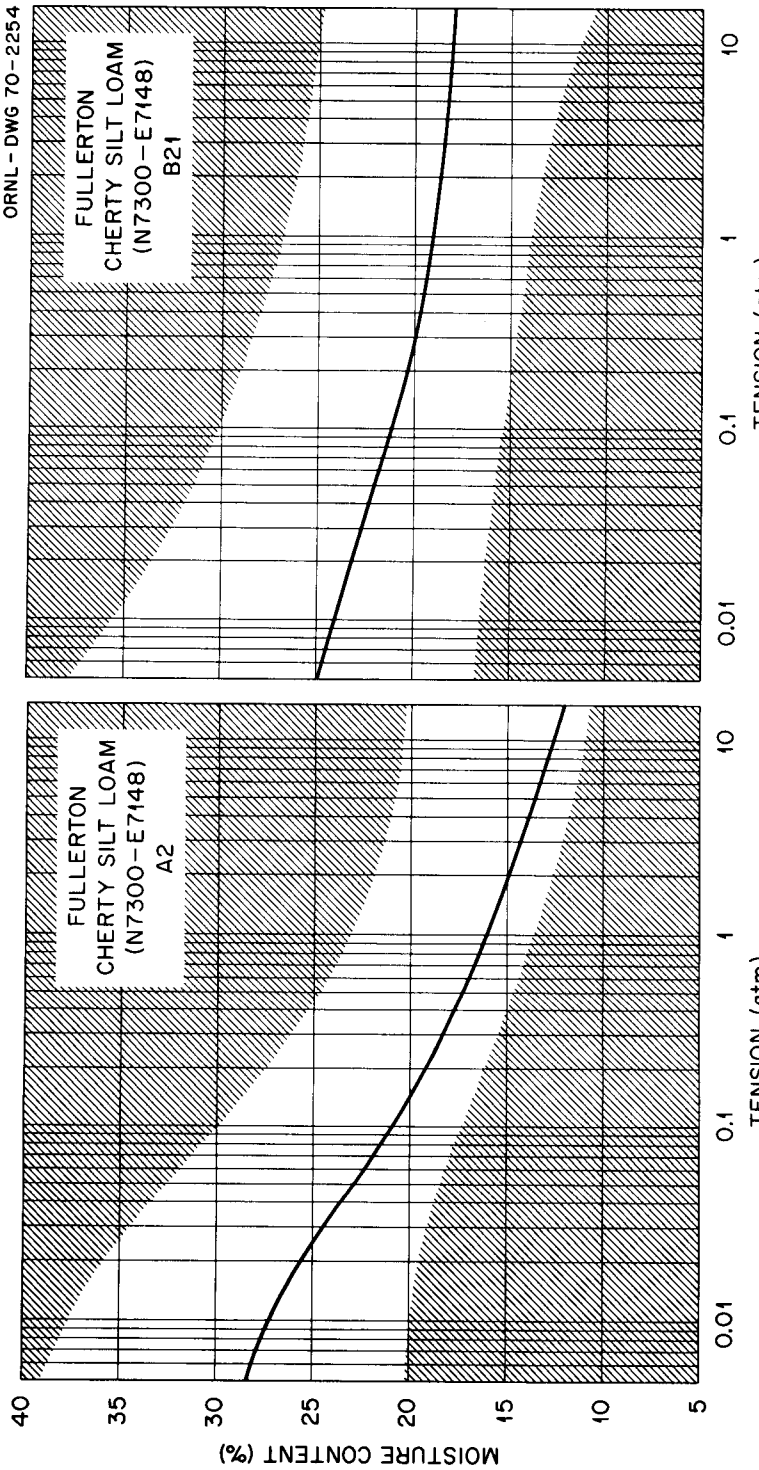


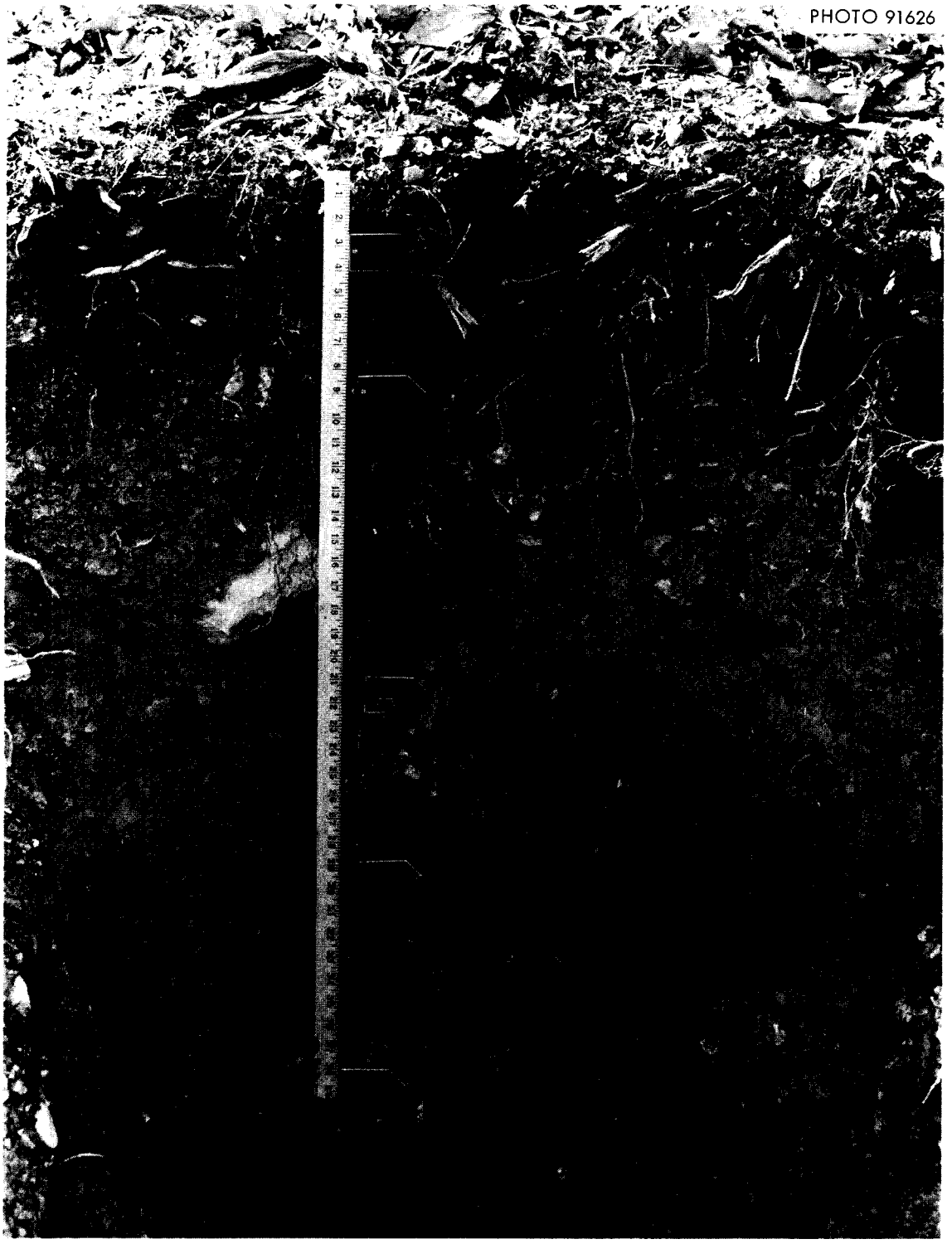
Figure 5. Moisture retention curves for Fullerton cherty silt loam (Pit 4).

Table 17 Exchangeable Cations. Fullerton cherty silt loam. N7300-E7148. Pit 4

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-3	5.8	6.00	1.88	0.36	0.15	40
A2	3-13	4.2	2.21	0.08	0.02	0.03	6
A3	13-17	4.6	1.45	0.09	0.03	0.04	11
B1	17-20	4.1	1.85	0.04	0.03	0.03	5
B21t	20-28	4.4	4.92	0.09	0.21	0.03	7
B22t	28-36+	4.3	5.98	0.08	0.35	0.04	8

Table 18. Total Analyses. Fullerton cherty silt loam. N7300-E7148. Pit 4

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.08	0.06	0.40	0.83	0.161	0.03	5.52
A2	0.03	0.11	0.33	1.06	0.039	0.01	0.31
A3	0.03	0.09	0.34	1.46	0.035	0.01	0.37
B1	0.04	0.14	0.34	1.24	0.029	0.01	0.48
B21t	0.05	0.11	0.75	2.38	0.035	0.01	0.15
B22t	0.04	0.11	1.07	2.74	0.031	0.03	0.33



Bodine cherty loam
N7034-E7131

PROFILE DESCRIPTION

Bodine cherty loam

Coordinates: N7034-E7131

O1,O2	1-0"	Hardwood litter, the lower part partially decomposed.
A1	0-3"	Very dark grayish brown (10YR 4/2) cherty loam with moderate fine granular structure; friable; clear smooth boundary.
A21	3-9"	Brown (10YR 5/3) cherty loam or silt loam with weak fine and medium granular structure; friable; clear smooth boundary.
A22	9-24"	Light yellowish brown (10YR 6/4) cherty loam with weak fine and medium granular structure; friable; this layer is very cherty; clear smooth boundary.
B1	24-29"	Reddish yellow (5YR 6/8) cherty loam; friable; clear wavy boundary.
B2t	29-41"+	Yellowish red (5YR 5/8) cherty clay loam with strong medium angular blocky structure; very firm; continuous clay films.

Table 19. Soil Moisture Properties. Bodine cherty silt loam. N7034-E7131. Pit 5

Horizon	Depth	Bulk Dens.	Moisture Retained (atm)								Hydr. Cond.
			.005	.025	.100	.333	.667	1	5	15	
	in	g/cc	percent								cm/hr
A1	0-3	1.10	61.7	49.5	38.7	35.0	31.7	29.4	28.2	27.5	>140
A21	3-9	1.26	32.9	30.0	25.2	22.9	21.3	19.7	17.2	17.0	>140
A22	9-24	1.42	24.6	22.0	19.7	16.8	16.2	15.8	15.2	14.9	>140
B1	24-29	1.27	19.4	18.9	17.1	15.8	14.4	13.9	13.0	12.0	>140
B2t	29-41+	1.28	21.7	19.5	17.5	16.4	15.9	15.4	15.0	14.7	>140

Table 20. Particle Size Distribution. Bodine cherty silt loam. N7034-E7131. Pit 5

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm)					
						Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	l	47	4	49	12	27	31	29	24	7	9
A21	l	47	12	41	10	34	18	21	31	10	19
A22	l	49	9	41	9	40	25	27	32	7	8
B1	l	38	20	43	7	65	7	11	12	14	56
B2t	cl	25	38	37	3	57	7	10	12	7	64

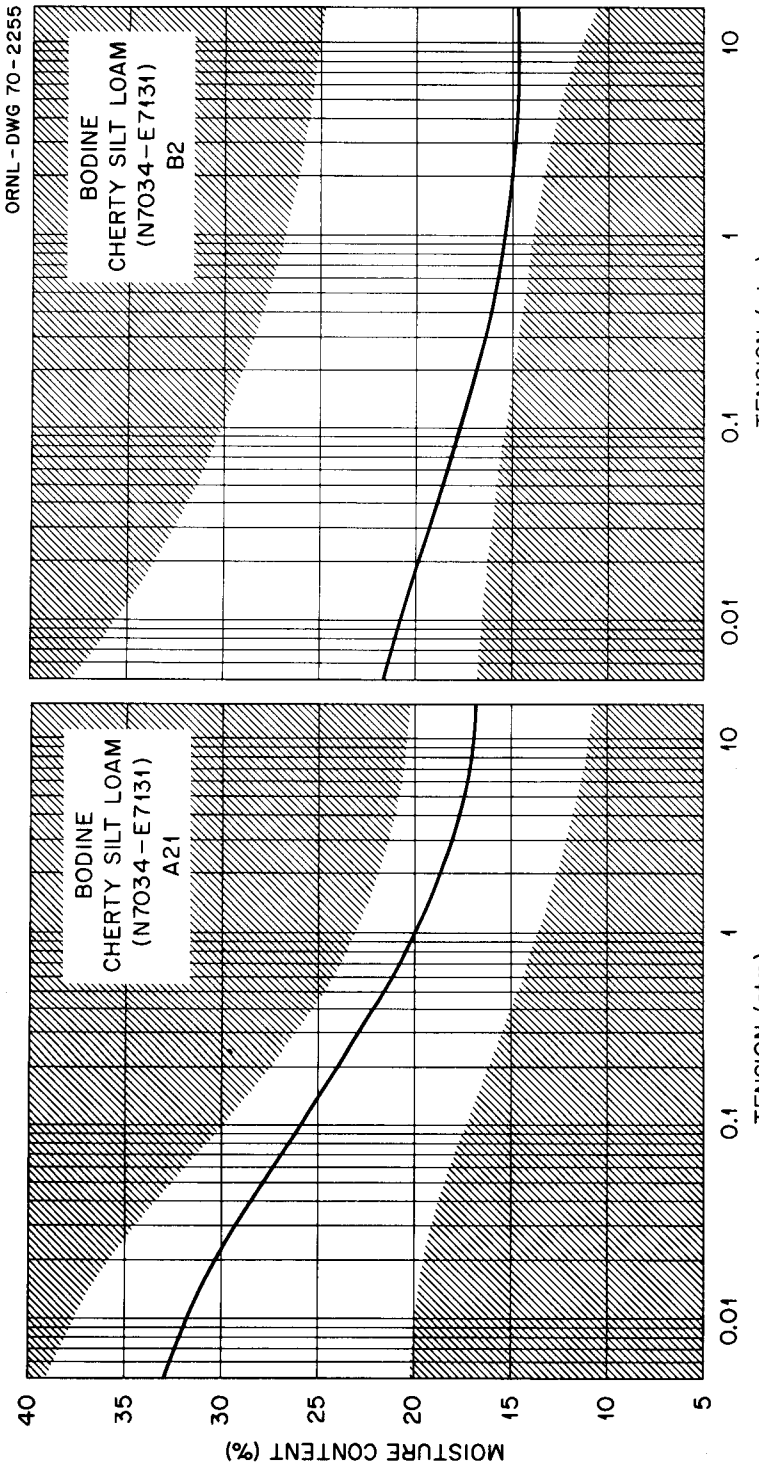


Figure 6. Moisture retention curves for Bodine cherty silt loam (Pit 5).

Table 21. Exchangeable Cations. Bodine cherty loam. N7034-E7131. Pit 5

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-3	4.5	5.42	1.43	0.28	0.16	34
A21	3-9	4.8	1.80	0.18	0.04	0.06	16
A22	9-24	3.8	1.46	0.13	0.05	0.06	16
B1	24-29	3.9	2.84	0.13	0.10	0.06	10
B2t	29-41+	3.9	6.00	0.16	0.27	0.07	8

Table 22. Total Analyses. Bodine cherty loam. N7034-E7131. Pit 5

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.07	0.09	0.33	0.86	0.137	0.03	3.43
A21	0.08	0.11	0.34	1.56	0.057	0.01	0.60
A22	0.05	0.10	0.40	0.89	0.047	0.01	0.79
B1	0.05	0.16	0.55	1.47	0.020	0.02	0.29
B2t	0.05	0.23	0.80	2.04	0.029	0.03	0.36

PROFILE DESCRIPTION

Bodine cherty silt loam

Coordinates: N8173-E8083

O1,O2	1-0"	Hardwood litter, the lower part partially decomposed.
A1	0-3"	Very dark grayish brown (10YR 3/2) cherty silt loam with weak fine granular structure; friable; abrupt smooth boundary.
A2	3-12"	Pale brown (10YR 6/3) cherty silt loam with weak fine and medium granular structure; friable; clear smooth boundary.
A3	12-18"	Light yellowish brown (10YR 6/4) cherty silt loam with weak fine granular and weak fine subangular blocky structure; clear smooth boundary.
B1t	18-26"	Strong brown (7.5YR 5/6) cherty silt loam with pockets of pale brown (10YR 6/3) around rocks and roots; weak fine and medium subangular blocky structure; friable; patchy clay films; clear smooth boundary.
B21t	26-34"	Yellowish red (5YR 5/8) cherty silt loam with weak medium angular blocky structure; firm to friable; common clay films; clear smooth boundary.
B22t	34-42"+	Red (2.5YR 4/8) cherty silt loam with strong medium angular blocky structure; firm; continuous clay films.

This soil does not contain as much chert as most Bodine soils.

Table 23. Soil Moisture Properties. Bodine cherty silt loam. N8173-E8083. Pit 6

Horizon	Depth	Bulk Dens.	Moisture Retained (atm) .005	.025	.100	.333	.667	1	5	15	Hydr. Cond.
	in	g/cc	percent								cm/hr
A1	0-3	0.98	64.0	53.8	41.0	35.0	30.4	30.1	29.6	29.1	84.6
A2	3-12	1.20	33.5	29.3	24.6	21.4	18.1	17.7	16.7	15.7	14.0
A3	12-18	1.22	26.0	22.2	20.3	20.0	17.2	16.8	15.5	14.5	3.3
B1t	18-26	1.23	33.5	31.8	28.3	25.8	22.6	22.5	21.8	20.9	7.8
B21t	26-34	1.22	24.8	21.8	18.9	16.7	15.4	15.1	14.4	13.7	
B22t	34-42+	1.12	25.0	23.1	20.9	19.9	18.9	18.7	18.1	17.4	

Table 24. Particle Size Distribution. Bodine cherty silt loam. N8173-E8083. Pit 6

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm) Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
					percent						
A1	sil	20	2	78	5	33	16	26	30	25	3
A2	sil	19	7	75	4	24	14	23	36		28
A3	sil	19	7	75	4	29	26	29	27	13	6
B1t	sil	21	12	68	5	25	25	28	34	8	5
B21t	sil	16	17	66	4	41	19	17	17	5	41
B22t	sil	14	25	61	4	41	11	11	14	7	57

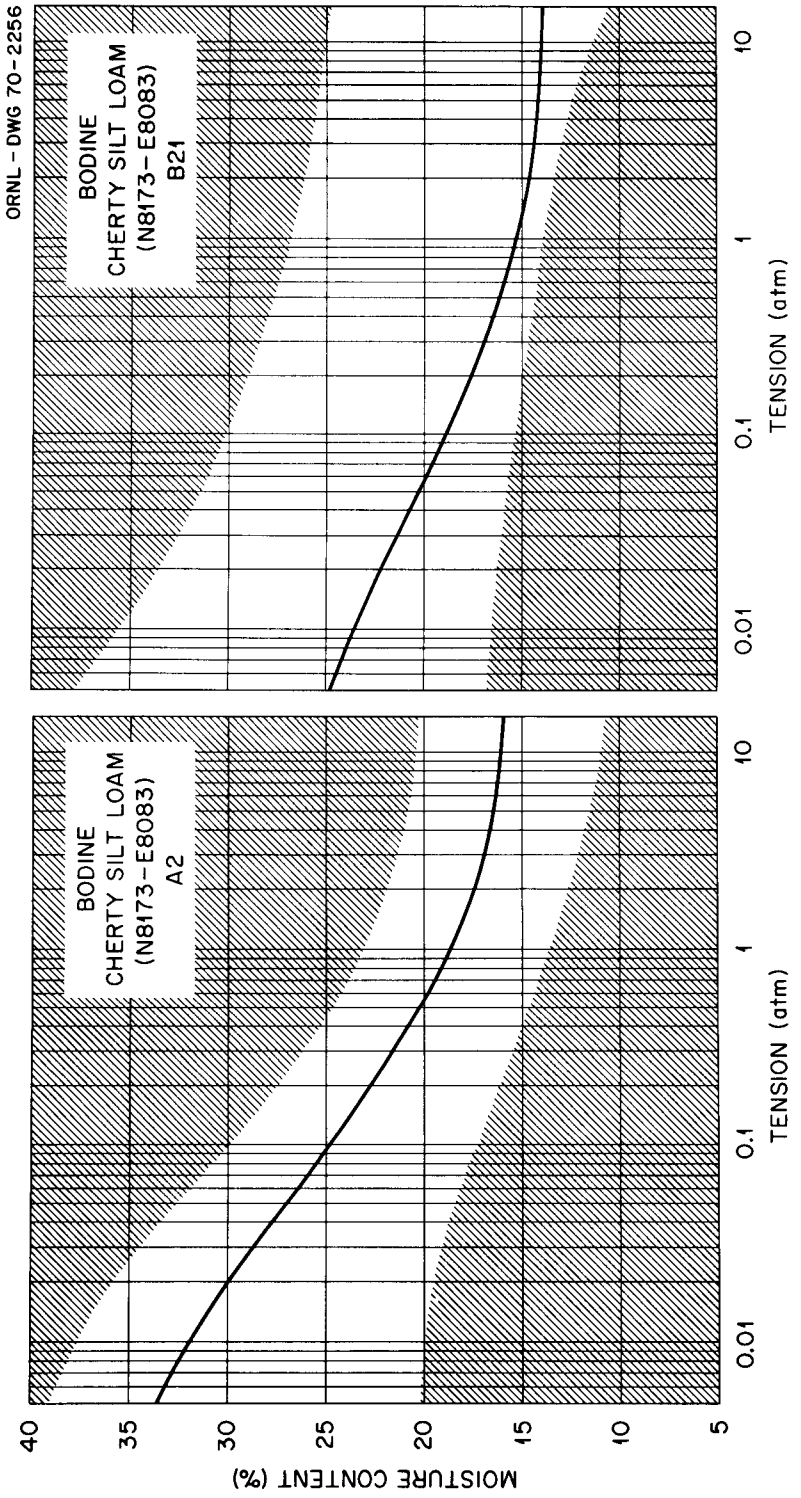


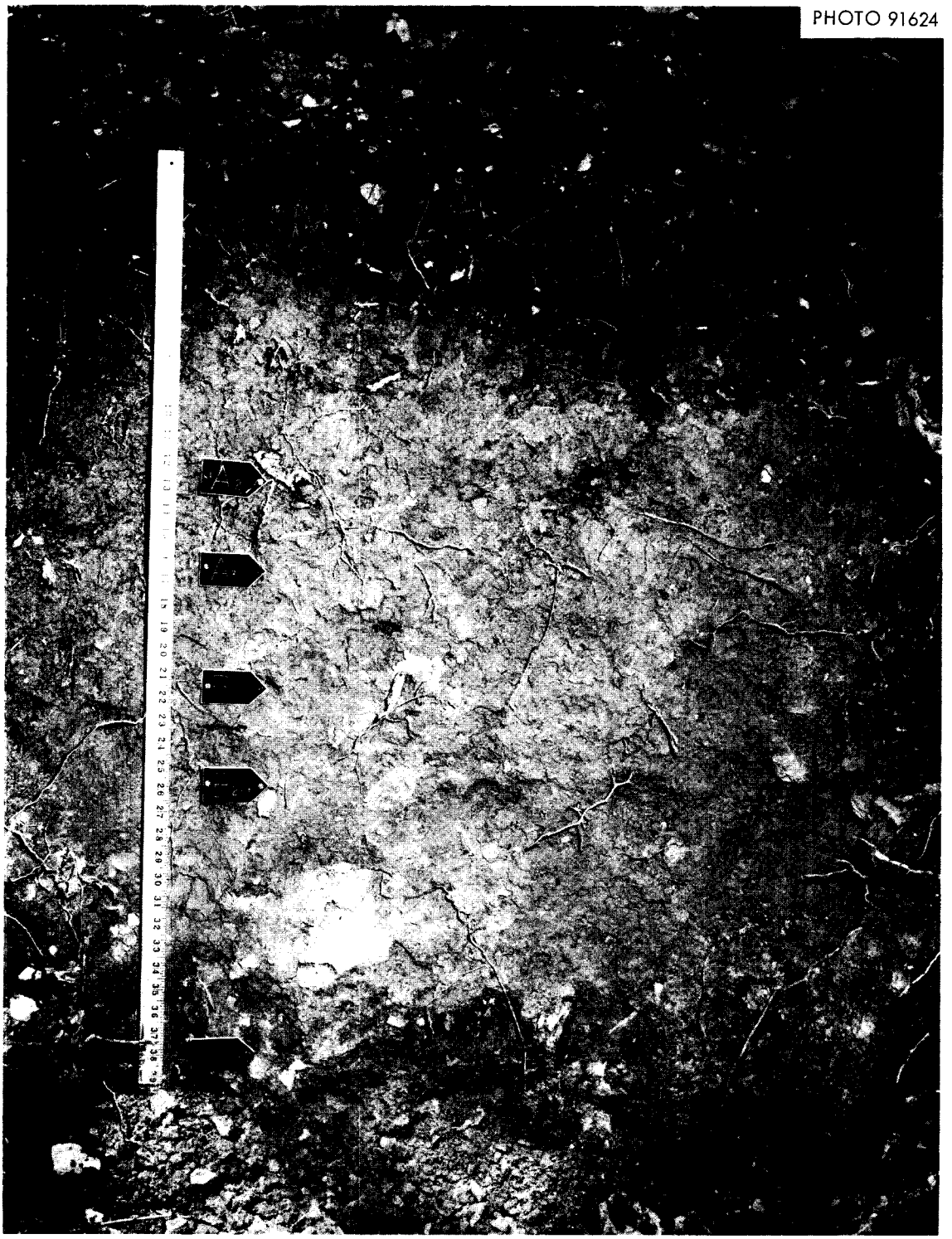
Figure 7. Moisture retention curves for Bodine cherty silt loam (Pit 6).

Table 25. Exchangeable Cations. Bodine cherty silt loam. N8173-E8083. Pit 6

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-3	4.6	6.08	0.89	0.14	0.11	19
A2	3-12	4.3	1.98	0.08	0.02	0.02	6
A3	12-18	5.2	1.82	0.20	0.05	0.03	15
B1t	18-26	4.7	4.77	0.33	0.09	0.05	10
B21t	26-34	4.3	3.92	0.26	0.20	0.03	7
B22t	34-42+	4.4	4.88	0.14	0.13	0.02	6

Table 26. Total Analyses. Bodine cherty silt loam. N8173-E8083. Pit 6

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.09	0.10	0.36	1.01	0.180	0.06	5.37
A2	0.06	0.08	0.54	0.95	0.050	0.01	1.14
A3	0.05	0.07	0.45	1.09	0.023	0.01	1.38
B1t	0.04	0.11	0.42	1.42	0.029	0.01	0.48
B21t	0.05	0.08	0.21	1.30	0.024	0.01	0.48
B22t	0.05	0.15	0.36	1.81	0.026	0.01	0.27



Bodine cherty silt loam
N8153-E9253

PROFILE DESCRIPTION

Bodine cherty silt loam (TRANSITION TO FULLERTON)

Coordinates: N8153-E9253

	1/2-0"	The O1, O2, and A1 have been burned.
A2	0-13"	Light brownish gray (10YR 6/2) cherty silt loam with weak fine granular structure; friable; clear smooth boundary.
A3	13-17"	Brown (10YR 5/3) cherty silt loam with a few pockets of strong brown (7.5YR 5/6) and pale brown (10YR 6.3); weak medium granular structure; friable; clear smooth boundary.
B1	17-22"	Yellowish red (5YR 5/6) cherty silt loam with weak medium subangular blocky structure; friable; patchy clay films; clear smooth boundary.
B21t	22-26"	Yellowish red (5YR 5/8) cherty silt loam with weak medium subangular and weak fine angular blocky structure; firm to friable; continuous clay films; clear smooth boundary.
B22t	26-49"+	Red (2.5YR 4/8) cherty silty clay loam with strong medium angular blocky structure; firm; continuous clay films.

Table 27. Soil Moisture Properties. Bodine cherty silt loam. N8153-E9253. Pit 7

Horizon	Depth	Bulk Dens.	Moisture Retained (atm) .005	.025	.100	.333	.667	1	5	15	Hydr. Cond.
	in	g/cc	percent								cm/hr
A2	0-13	0.85	72.7	65.5	48.0	39.6	34.9	33.6	32.5	30.6	
A3	13-17	1.18	27.1	24.8	20.9	17.6	16.5	15.9	14.5	13.5	
B1	17-22	1.15	30.5	25.6	21.5	18.2	16.5	15.5	14.4	12.9	
B21t	22-26	1.14	37.7	28.3	22.5	19.9	18.4	17.4	16.2	15.2	
B22t	26-42+	1.15	28.0	21.7	21.4	20.0	19.1	18.2	17.3	16.4	

Table 28. Particle Size Distribution. Bodine cherty silt loam. N8153-E9253. Pit 7

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm) Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
					percent						
A2	sil	24	4	71	5	43	16	29	45	2	8
A3	sil	16	20	64	4	29	16	16	11	1	56
B1	sil	19	9	72	4	26	10	30	29	17	15
B21t	sil	13	9	77	3	32	19	32	29	2	18
B22t	sicl	13	35	51	3	23	13	18	19	12	38

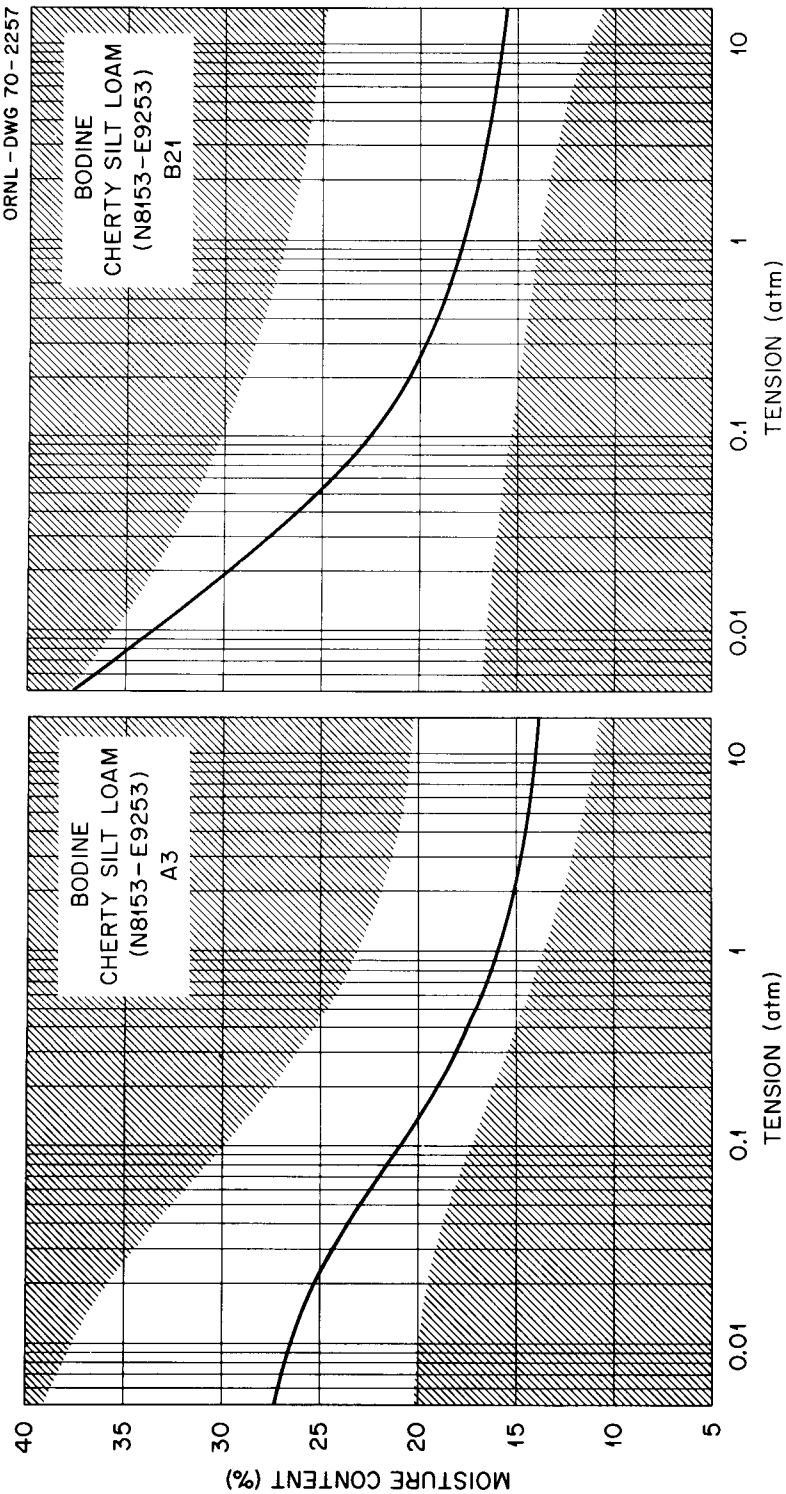


Figure 8. Moisture retention curves for Bodine cherty silt loam (Pit 7).

Table 29. Exchangeable Cations. Bodine cherty silt loam, N8153-E9253. Pit 7

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A2	0-13	4.7	15.18	3.95	0.52	0.15	30
A3	13-17	5.1	4.45	0.52	0.10	0.02	14
B1	17-22	4.8	4.21	0.48	0.10	0.04	15
B21t	22-26	4.7	3.32	0.72	0.11	0.07	27
B22t	26-42+	5.1	8.46	1.95	0.31	0.07	27

Table 30. Total Analyses. Bodine cherty silt loam. N8153-E9253. Pit 7

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A2	0.17	0.09	0.42	0.85	0.416	0.03	7.51
A3	0.06	0.11	0.42	1.86	0.419	0.02	0.46
B1	0.07	0.09	0.38	1.24	0.384	0.01	0.20
B21t	0.06	0.08	0.40	1.01	0.396	0.01	0.84
B22t	0.08	0.13	0.48	2.50	0.478	0.02	0.46

Fullerton cherty silt loam
N6952-E8612

PROFILE DESCRIPTION

Fullerton cherty silt loam (TYPICAL)

Coordinates: N6952-E8612

01,02	1-0"	Hardwood litter, the lower 1/2 inch partially decomposed.
A2	1-10"	Pale yellow (2.5Y 7/4) cherty silt loam with weak fine granular structure; friable; clear smooth boundary.
A3	10-14"	Pale yellow (2.5Y 7/4) cherty silt loam with weak medium subangular and weak fine granular structure; friable; abrupt smooth boundary.
B1t	14-16"	Strong brown (7.5YR 5/6) silty clay loam with weak medium subangular blocky structure; friable to firm; few clay films; clear smooth boundary.
B21t	16-20"	Yellowish red (5YR 5/8) clay or silty clay with moderate medium subangular and angular blocky structure; firm; common clay films; clear smooth boundary.
B22t	20-40"+	Yellowish red (5YR 5/8) clay with strong medium and coarse angular blocky structure; firm to very firm; continuous clay films.

Table 31. Soil Moisture Properties. Fullerton cherty silt loam. N6952-E8612. Pit 8

Horizon	Depth	Bulk Dens.	Moisture Retained (atm)								Hydr. Cond.
			.005	.025	.100	.333	.667	1	5	15	
	in	g/cc	percent								cm/hr
A2	1-10	1.03	38.5	35.7	29.9	25.2	22.4	22.1	21.0	20.2	139.7
A3	10-14	1.10	33.6	31.9	28.3	22.5	20.2	19.0	17.7	15.9	>140
B1t	14-16	1.20	31.0	29.2	26.1	19.8	17.5	17.3	15.6	14.6	>140
B21t	16-20	1.18	32.3	31.3	30.0	28.4	27.1	26.9	25.3	24.3	34.7
B22t	20-40+	1.06	36.6	35.8	34.1	32.8	31.8	31.4	29.8	28.9	20.4

Table 32. Particle Size Distribution. Fullerton cherty silt loam. N6952-E8612. Pit 8

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm)					
						Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A2	sil	22	7	72	5	27	17	23	24	14	22
A3	sil	14	30	56	4	11	40	29	26	4	
B1t	sicl	15	28	58	3	8	47	31	20	4	
B21t	c	8	64	28	3	4	55	35	10		
B22t	c	4	75	22	2	2	52	42	6		

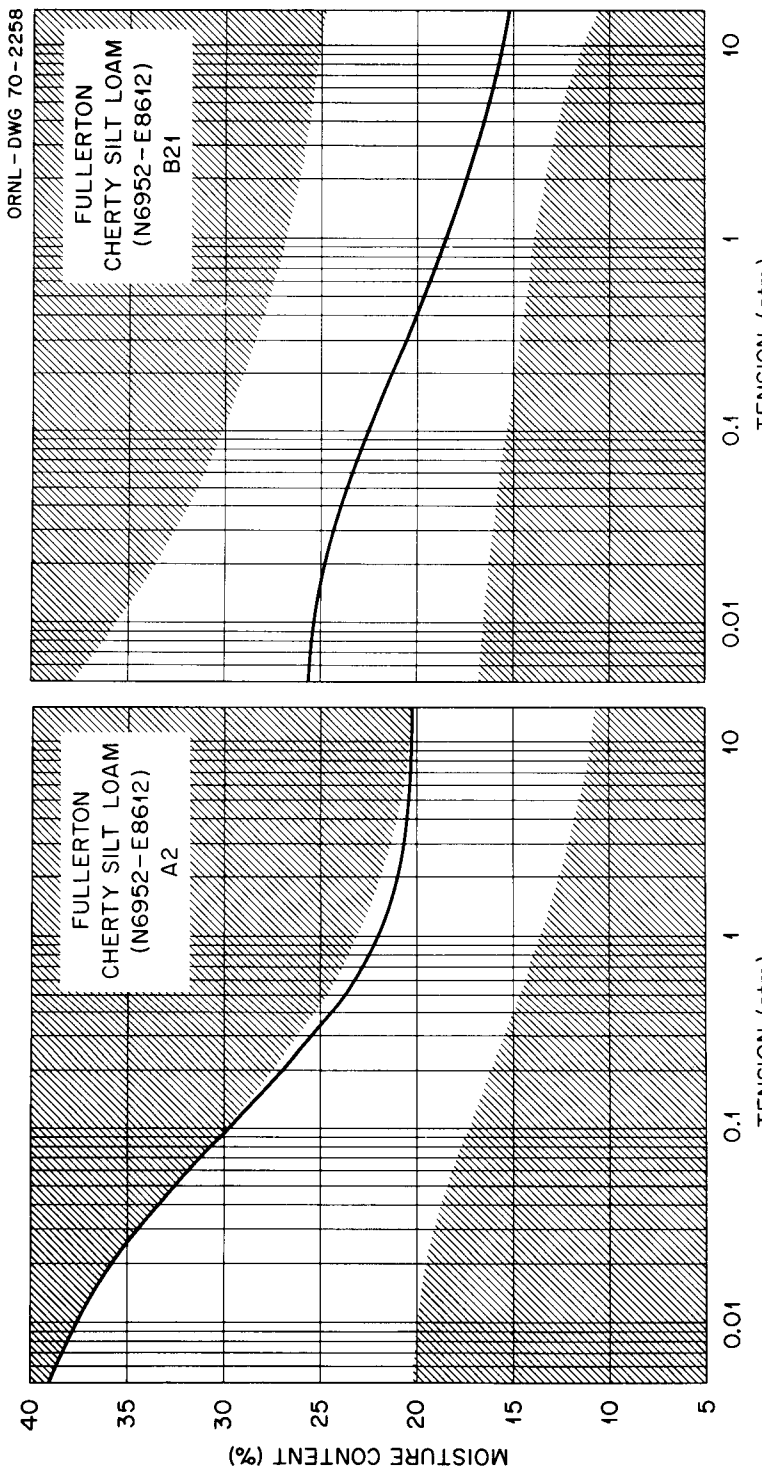


Figure 9. Moisture retention curves for Fullerton cherty silt loam (Pit 8).

Table 33. Exchangeable Cations. Fullerton cherty silt loam. N6952-E8612. Pit 8

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A2	1-10	4.0	1.99	0.07	0.04	0.02	6
A3	10-14	4.1	4.32	0.05	0.01	0.02	2
B1t	14-16	4.4	3.95	0.08	0.04	0.03	4
B21t	16-20	3.7	4.78	0.07	0.02	0.03	3
B22t	20-40+	4.2	9.75	0.06	0.04	0.03	1

Table 34. Total Analyses. Fullerton cherty silt loam. N6952-E8612. Pit 8

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A2	0.03	0.06	0.36	0.60	0.052	0.01	2.03
A3	0.01	0.13	0.27	1.50	0.031	0.01	0.96
B1t	0.05	0.10	0.46	1.31	0.034	0.01	0.93
B21t	0.02	0.33	0.62	2.67	0.042	0.01	0.84
B22t	0.02	0.40	0.74	3.09	0.028	0.01	0.96

PROFILE DESCRIPTION

Bodine cherty silt loam (TRANSITION)

Coordinates: N6895-E8374

01,02	1-0"	Hardwood litter, with very thin 02.
A1	1-3"	Very dark gray (10YR 3/1) very cherty silt loam; this layer consists mostly of chert fragments.
A2	3-20"	Pale yellow (2.5Y 7/4) cherty silt loam with weak medium granular structure; friable; clear smooth boundary.
B1t	20-29"	Yellow (10YR 7/6) cherty silt loam with weak medium to fine subangular blocky structure; friable; few patchy clay films; clear wavy boundary.
B21t	29-32"	Yellowish red (5YR 5/6) silty clay with moderate medium subangular blocky structure; firm; continuous clay films; clear smooth boundary.
B22t	32-41"+	Yellowish red (5YR 4/8) cherty clay with strong medium angular blocky structure; very firm.

Table 35. Soil Moisture Properties. Bodine cherty silt loam. N6895-E8374. Pit 9

Horizon	Depth	Bulk Dens.	Moisture Retained (atm)								Hydr. Cond.
			.005	.025	.100	.333	.667	1	5	15	
	in	g/cc	percent								cm/hr
A1	1-3	1.16	68.3	55.2	43.9	36.9	32.7	31.4	30.6	27.5	
A2	3-20	1.26	25.9	24.5	22.2	20.4	19.1	18.8	16.3	15.2	
B1t	20-29	1.34	30.6	29.2	26.8	24.5	23.4	23.0	22.1	21.2	
B21t	29-32	1.28	21.1	19.8	18.0	16.7	16.2	15.8	14.4	13.5	
B22t	32-42+	1.11	38.2	37.7	34.6	32.8	31.8	31.2	28.9	27.7	

Table 36. Particle Size Distribution. Bodine cherty silt loam. N6895-E8374. Pit 9

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm)					
						Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	sil	35	4	61	2	84	10	20	54	8	8
A2	sil	31	14	55	6	41	26	23	22	11	19
B1t	sil	25	17	58	7	51	9	9	10	2	70
B21t	sic	11	43	46	4	6	30	15	36	19	
B22t	c	4	72	24	2	3	24	29	47		

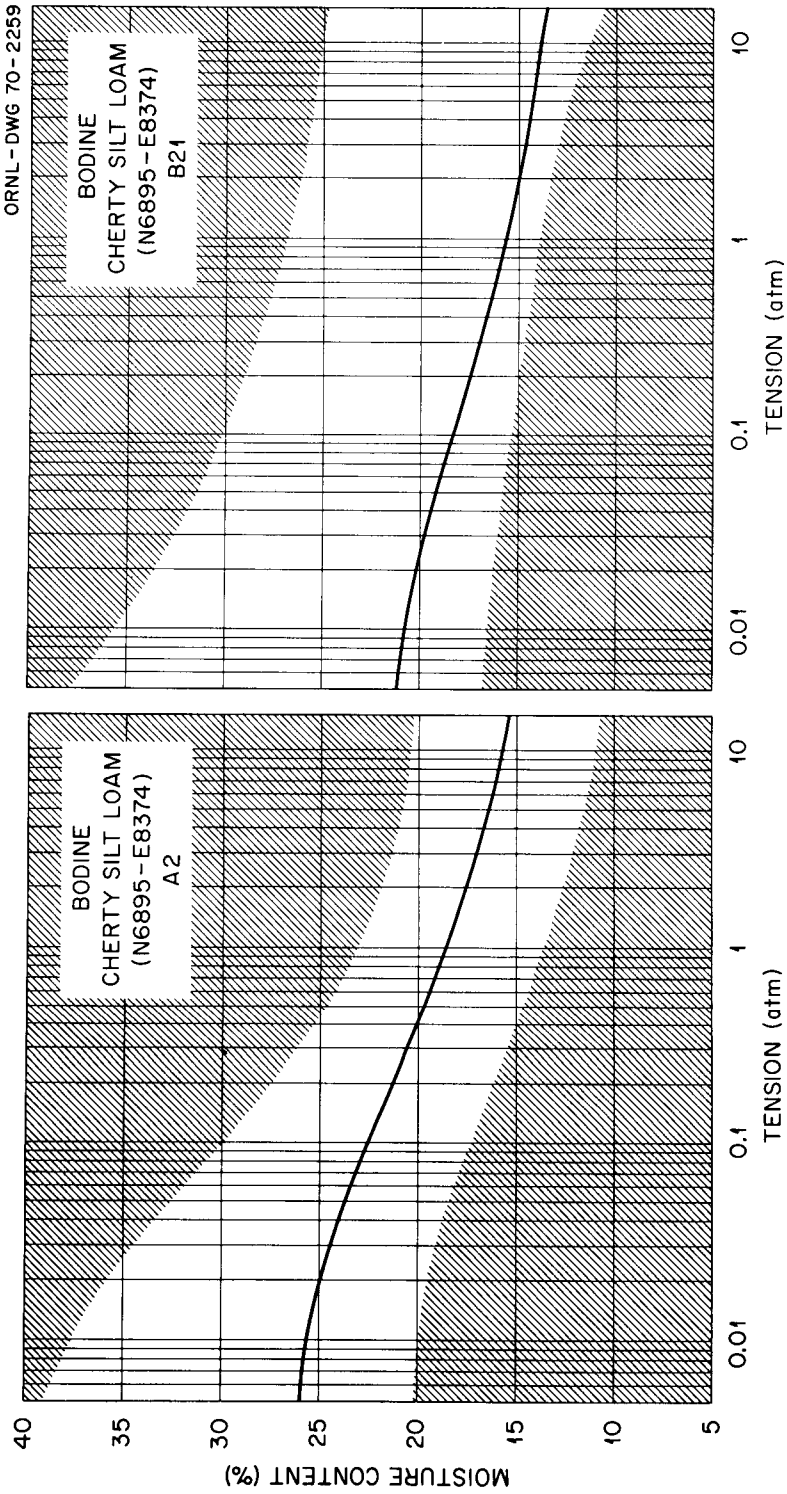


Figure 10. Moisture retention curves for Bodine cherty silt loam (Pit 9).

Table 37. Exchangeable Cations. Bodine cherty loam. N6895-E8374. Pit 9

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	1-3	3.9	4.88	0.10	0.06	0.07	4
A2	3-20	4.3	1.81	0.08	0.03	0.04	8
B1t	20-29	4.3	2.94	0.05	0.01	0.02	3
B21t	29-32	4.3	7.39	0.08	0.04	0.03	2
B22t	32-42+	4.2	15.98	0.22	0.28	0.06	3

Table 38. Total Analyses. Bodine cherty loam. N6895-E8374. Pit 9

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.11	0.07	0.31	0.62	0.125	0.01	8.34
A2	0.03	0.09	0.49	0.95	0.057	0.01	2.28
B1t	0.03	0.14	0.34	2.08	0.027	0.01	0.53
B21t	0.03	0.32	0.63	2.53	0.028	0.01	0.53
B22t	0.03	0.48	0.87	3.03	0.042	0.02	0.29

PROFILE DESCRIPTION

Fullerton cherty silt loam

Coordinates: N6004-E8374

O1,O2, A1	0-2"	These layers have been almost completely destroyed by fire.
A2	2-9"	Light yellowish brown (10YR 6/4) cherty silt loam with weak fine and medium granular structure; friable; abrupt smooth boundary.
B1	9-11"	Yellowish red (5YR 5/6) to strong brown (7.5YR 5/6) cherty silt loam with pockets of light yellowish brown; weak medium granular and weak medium subangular blocky structure; friable; clear smooth boundary.
B21t	11-14"	Yellowish red (5YR 4/6) cherty silty clay or clay with weak medium angular and subangular blocky structure; firm; patchy clay films; clear smooth boundary.
B22t	14-20"	Red (2.4YR 4/8) cherty clay with strong course angular blocky structure; firm or very firm; continuous clay films; gradual smooth boundary.
B23t	20-29"	Red (2.5YR 4/8) cherty clay variegated with yellow (10YR 7/8); strong course and medium angular blocky structure; very firm; continuous clay films; gradual smooth boundary.
B24t	29-42"+	Red (2.5YR 4/8) cherty silty clay; about one-half of mass is yellow (10YR 7/8); course angular blocky structure; very firm; continuous clay films

Table 39. Soil Moisture Properties. Fullerton cherty silt loam. N6004-E8374. Pit 10

Horizon	Depth	Bulk Dens.	Moisture Retained (atm)								Hydr. Cond.
			.005	.025	.100	.333	.667	1	5	15	
	in	g/cc	percent								cm/hr
A1	0-2	0.89	36.9	33.4	28.5	25.6	24.6	23.9	22.1	21.0	
A2	2-9	1.11	27.1	23.9	21.6	19.0	17.2	16.3	15.5	12.3	110.2
B1	9-11	1.05	29.0	24.3	21.0	19.0	17.7	17.0	16.6	15.2	56.0
B21t	11-14	1.19	25.4	23.6	22.2	21.0	20.3	19.8	19.1	17.7	34.3
B22t	14-20	1.21	32.9	28.9	27.5	26.3	25.4	24.3	23.7	19.8	22.9
B23t	20-29	1.27	40.1	36.7	35.1	34.0	32.6	32.0	31.2	29.5	11.6
B24t	29-42+	1.00	43.7	39.2	35.4	33.4	32.3	31.2	30.5	28.5	17.0

Table 40. Particle Size Distribution. Fullerton cherty silt loam. N6004-E8374. Pit 10

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm)					
						Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	sil	23	2	76	2	38	13	8	9	7	64
A2	sil	21	4	74	2	21	21	38	28	13	
B1	sil	17	14	68	4	34	21	16	9	8	46
B21t	sic	12	46	42	3	18	40	32	28		
B22t	c	8	55	37	1	10	60	18	22		
B23t	c	5	67	29	1	3	69	16	16		
B24t	sic	6	48	46	1	11	45	34	15	6	

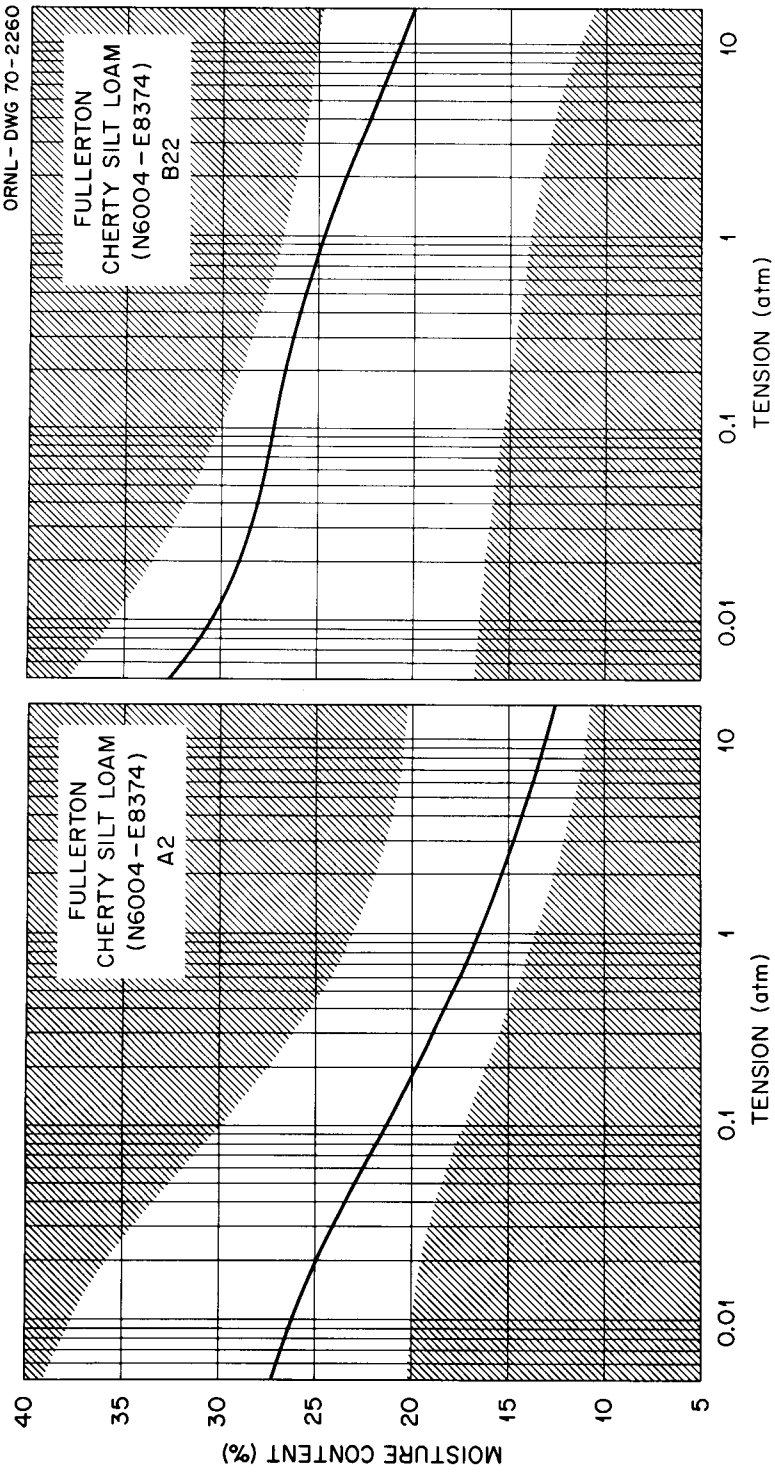


Figure 11. Moisture retention curves for Fullerton cherty silt loam (Pit 10).

Table 41. Exchangeable Cations. Fullerton cherty silt loam. N6004-E8374. Pit 10

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-2	3.8	10.46	0.18	0.12	0.08	4
A2	2-9	3.8	2.19	0.07	0.05	0.04	7
B1	9-11	3.9	3.85	0.07	0.03	0.04	4
B21t	11-14	3.8	11.17	0.06	0.02	0.02	1
B22t	14-20	3.9	14.00	0.11	0.12	0.07	2
B23t	20-29	3.9	13.70	0.10	0.08	0.05	2
B24t	29-42+	3.8	12.84	0.07	0.04	0.02	1

Table 42. Total Analyses. Fullerton cherty silt loam. N6004-E8374. Pit 10

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.09	0.10	0.41	1.56	0.224	0.02	12.38
A2	0.06	0.06	0.31	0.89	0.051	0.01	2.24
B1	0.09	0.15	0.62	1.82	0.034	0.02	0.62
B21t	0.06	0.38	0.63	2.80	0.044	0.01	1.31
B22t	0.06	0.13	0.57	1.73	0.042	0.02	1.21
B23t	0.04	0.12	0.42	1.62	0.055	0.01	1.66
B24t	0.04	0.32	0.57	2.17	0.041	0.01	0.76

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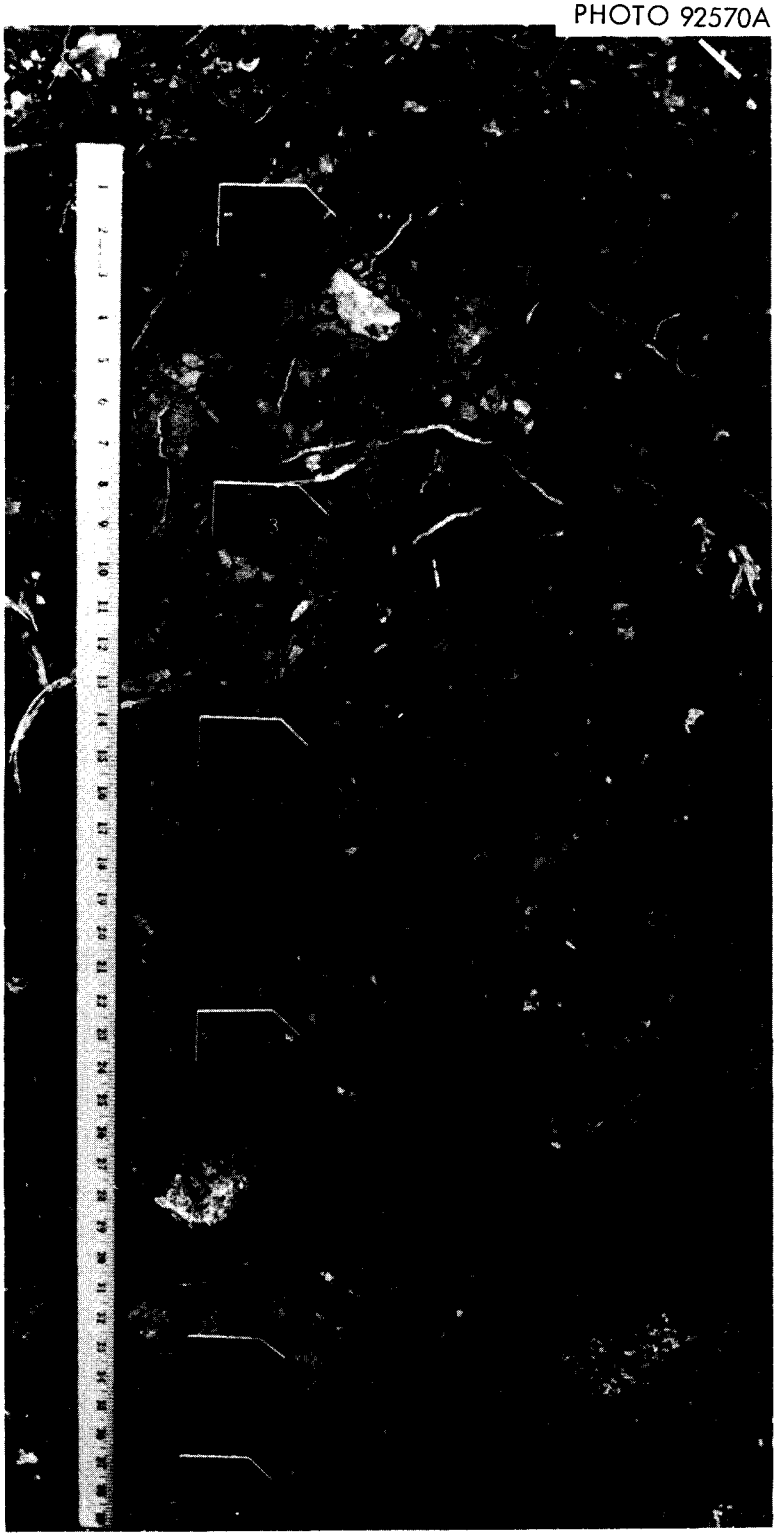

Claiborne cherty silt loam
N5810-E7451

PROFILE DESCRIPTION

Claiborne cherty silt loam

Coordinates: N5810-E7451

01,02	1-0"	Hardwood litter, the lower part partially decomposed.
A1	0-2"	Dark brown (7.5YR 3/2) cherty silt loam; medium granular structure; friable; abrupt smooth boundary.
A3	2-9"	Dark brown (7.5YR 4/2) cherty silt loam; weak granular structure; friable; clear smooth boundary.
B1	9-15"	Yellowish brown (7.5YR 5/6) cherty silt loam with weak subangular blocky structure; friable; patchy clay films; clear smooth boundary.
B21t	15-24"	Yellowish brown (7.5YR 5/6) cherty silty clay loam; fine and medium subangular blocky structure; friable; clear smooth boundary; common clay films.
B22t	24-36	Yellowish red (5YR 4/8) cherty silt loam with medium subangular blocky structure; firm; gradual smooth boundary; patchy clay films.
B23t	36-44"+	Yellowish red (5YR 5/8) cherty silt loam; strong medium subangular blocky structure; firm; patchy clay films.

Table 43. Soil Moisture Properties. Claiborne cherty silt loam. N5810-E7451. Pit 11

			Moisture Retained (atm)								
Horizon	Depth	Bulk Dens.	.005	.025	.100	.333	.667	1	5	15	Hydr. Cond.
	in	g/cc	percent								cm/hr
A1	0-2	0.84	38.5	32.7	25.1	22.4	21.6	20.3	19.4	18.5	
A3	2-9	1.09	38.3	29.6	25.9	21.5	20.3	19.6	19.0	17.9	15.7
B1	9-15	1.17	34.2	25.0	21.0	18.0	17.0	16.4	15.8	15.2	19.4
B21t	15-24	1.19	31.6	23.6	20.0	17.9	16.3	15.5	14.5	13.4	3.8
B22t	24-36	1.26	21.8	18.7	16.5	16.0	14.1	13.2	12.5	11.6	
B23t	36-44+	1.31	23.2	18.6	16.6	15.4	14.1	13.5	12.9	12.8	

Table 44. Particle Size Distribution. Claiborne cherty silt loam. N5810-E7451. Pit 11

						Chert Fraction (mm)					
Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	sil	27	7	66	4	19	35	39	20	6	
A3	sil	26	7	67	4	20	28	29	25	6	16
B1	sil	22	12	66	4	17	13	15	10	5	4
B21t	sicl	18	20	63	3	23	31	32	15	12	10
B22t	sil	18	17	65	3	22	31	40	29		
B23t	sil	19	20	61	3	34	18	22	23	16	22

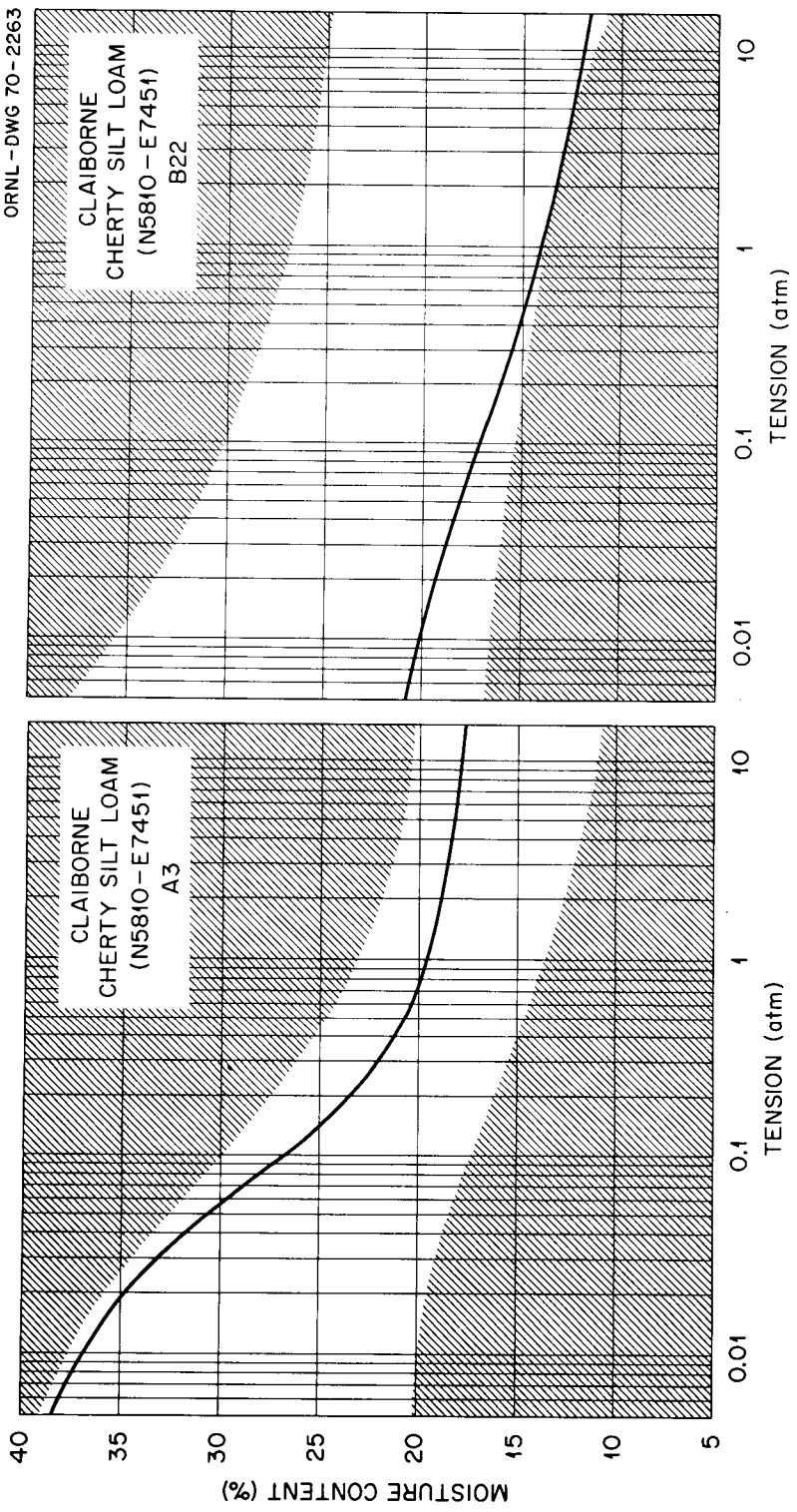

Figure 12. Moisture retention curves for Claiborne cherty silt loam (Pit 11).

Table 45. Exchangeable Cations. Claiborne cherty silt loam. N5810-E7451. Pit 11

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-2	4.2	11.29	3.01	0.66	0.23	34
A3	2-9	4.3	5.19	2.29	0.37	0.24	55
B1	9-15	4.8	3.69	0.74	0.26	0.07	29
B21t	15-24	4.7	4.00	2.50	0.24	0.11	71
B22t	24-36	4.9	4.56	2.16	0.36	0.12	58
B23t	36-44+	5.0	4.58	1.13	0.10	0.04	27

Table 46. Total Analyses. Claiborne cherty silt loam. N5810-E7451. Pit 11

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.15	0.12	0.44	1.57	0.217	0.04	6.31
A3	0.10	0.16	0.72	1.78	0.139	0.01	3.31
B1	0.07	0.12	0.48	1.65	0.099	0.03	1.96
B21t	0.08	0.13	0.53	1.92	0.034	0.01	0.28
B22t	0.08	0.25	0.51	1.88	0.051	0.01	0.79
B23t	0.07	0.12	0.45	1.83	0.031	0.03	0.55

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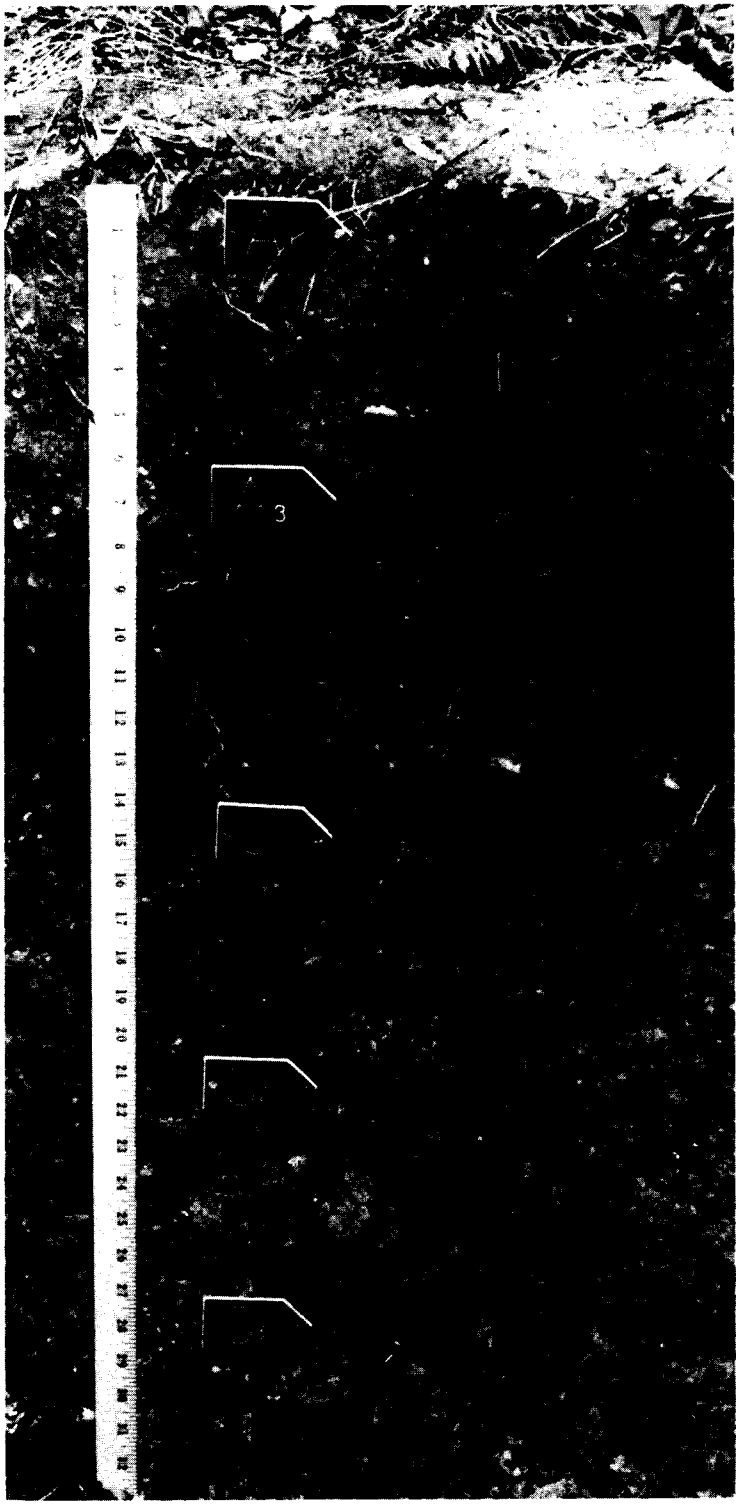

Linside cherty silt loam
N5968-E7767

PROFILE DESCRIPTION

Linside cherty silt loam

Coordinates: N5968-E7767

A1	0-2"	Very dark grayish brown (10YR 3/2) cherty silt loam; medium granular structure; very friable; abrupt smooth boundary.
A3	2-7"	Dark brown (10YR 4/3) cherty silt loam; weak fine granular structure; friable; clear smooth boundary.
C1	7-15"	Dark grayish brown (10YR 4/2) cherty silt loam with granular to weak subangular blocky structure; firm to friable; clear smooth boundary.
C2	15-22"	Yellowish brown (10YR 5/4) cherty loam; granular to weak subangular blocky structure; friable; gradual boundary.
C3	22-35"+	Yellowish brown (10YR 5/8) cherty sandy loam; weak fine subangular blocky structure; friable.

Table 47. Soil Moisture Properties. Linside cherty silt loam. N5968-E7767. Pit 12

Horizon	Depth	Bulk Dens.	Moisture Retained (atm)								Hydr. Cond.
			.005	.025	.100	.333	.667	1	5	15	
	in	g/cc	percent								cm/hr
A1	0-2	1.02	40.5	38.1	31.1	27.2	26.0	25.1	22.3	21.5	
A3	2-7	1.20	34.7	32.5	27.9	25.1	24.0	22.8	20.0	18.5	14.7
C1	7-15	1.22	31.4	27.8	22.9	20.0	18.3	17.7	15.6	15.0	>140
C2	15-22	1.23	24.6	21.7	18.0	16.5	15.4	14.7	13.5	12.9	109.9
C3	22-35+	1.23	18.7	17.1	14.5	13.4	12.8	12.2	11.0	10.6	130.8

Table 48. Particle Size Distribution. Linside cherty silt loam. N5968-E7767. Pit 12

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm)					
						Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	sil	24	14	61	5	27	20	35	17		28
A3	sil	40	9	51	6	35	17	20	22	3	38
C1	sil	29	12	59	3	38	15	23	28	18	16
C2	l	50	14	36	3	64	18	25	29	13	16
C3	sl	64	17	19	3	64	12	23	28	9	27

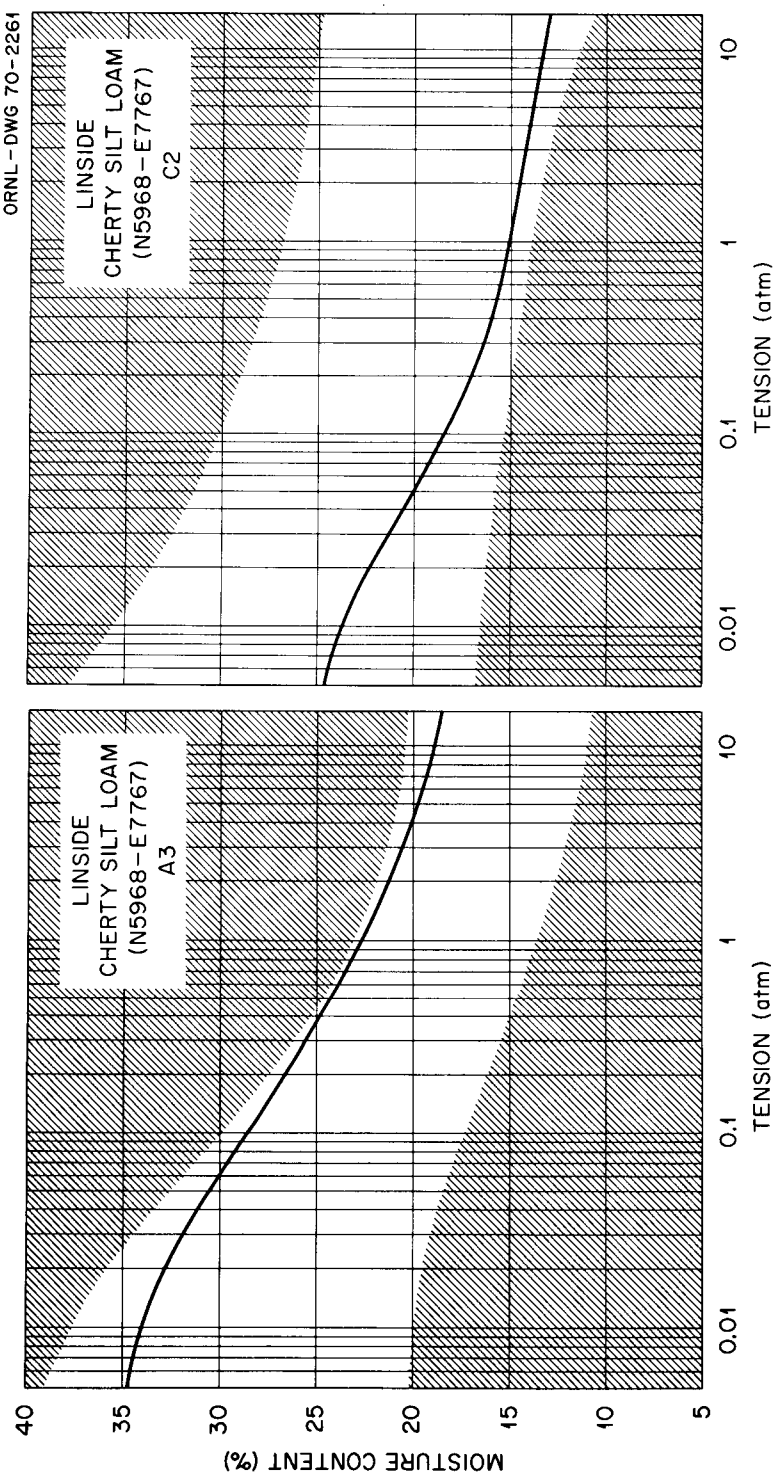

Figure 13. Moisture retention curves for Linside cherty silt loam (Pit 12).

Table 49. Exchangeable Cations. Linside cherty silt loam. N5968-E7767. Pit 12

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-2	5.5	10.04	3.55	1.94	0.13	56
A3	2-7	5.6	8.14	2.56	1.86	0.12	55
C1	7-15	5.4	7.84	1.72	1.87	0.11	47
C2	15-22	5.2	7.00	2.59	1.49	0.08	59
C3	22-35+	5.3	5.90	2.31	0.30	0.12	46

Table 50. Total Analyses. Linside cherty silt loam. N5968-E7767. Pit 12

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.05	0.44	0.61	3.27	0.124	0.01	3.52
A3	0.11	0.13	0.41	0.99	0.111	0.02	2.88
C1	0.09	0.14	0.50	1.32	0.109	0.03	2.36
C2	0.07	0.15	0.45	2.13	0.097	0.03	1.66
C3	0.06	0.13	0.45	1.75	0.052	0.02	0.79

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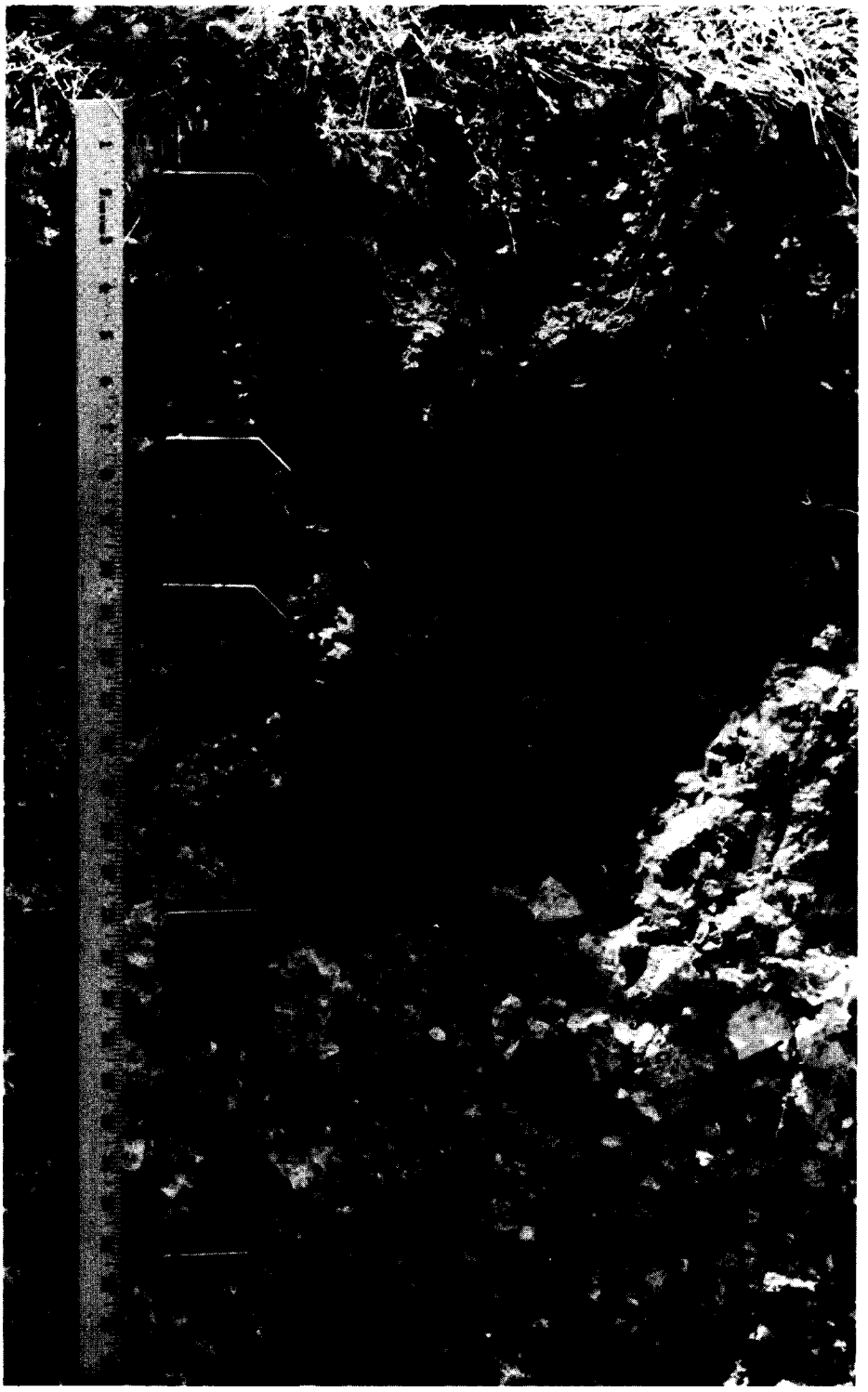

Tarklin cherty silt loam
N7236-E8374

PROFILE DESCRIPTION

Tarklin cherty silt loam

Coordinates: N7236-E8374

A1	0-2"	Grayish brown (10YR 5/2) cherty silt loam with weak granular structure; very friable; abrupt smooth boundary.
A3	2-9"	Grayish brown (10YR 5/2) cherty silt loam; weak fine granular structure; friable; clear smooth boundary.
B1	9-12"	Light yellowish brown (10YR 6/4) cherty silt loam with medium subangular blocky structure; friable; gradual wavy boundary.
B2	12-20"	Brownish yellow (10YR 6/8) cherty silt loam; moderate fine and medium subangular blocky structure; friable to firm; clear smooth boundary.
B3	20-27"	Brownish yellow (10YR 6/8) cherty silt loam, mottles common, moderate angular blocky structure; very firm, compact; brittle; chert very abundant; gradual wavy boundary.

Table 51. Soil Moisture Properties. Tarklin cherty silt loam. N7236-E8374. Pit 13

Horizon	Depth	Bulk Dens.	Moisture Retained (atm)								Hydr. Cond.
			.005	.025	.100	.333	.667	1	5	15	
	in	g/cc	percent								cm/hr
A1	0-2	1.12	30.3	27.9	27.1	26.1	21.2	20.0	17.7	17.3	
A3	2-9	1.17	29.0	29.1	24.5	23.1	19.8	19.0	17.1	16.9	>140
B1	9-12	1.28	27.7	25.0	22.2	19.5	17.2	16.7	14.7	14.3	>140
B2	12-20	1.42	23.7	21.9	18.9	17.2	15.1	14.4	12.6	12.2	>140
B3m	20-27+	1.44	25.0	22.6	19.3	17.4	16.2	15.3	14.2	13.9	>140

Table 52. Particle Size Distribution. Tarklin cherty silt loam. N7236-E8374. Pit 13

Horizon	Texture	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm)					
						Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	>25.4
		percent									
A1	sil	24	7	69	4	11	20	24	37	13	6
A3	sil	25	4	71	5	17	22	25	34	4	14
B1	sil	25	9	65	5	12	25	35	31	9	
B2	sil	24	12	63	5	13	33	45	22		
B3m	sil	22	17	60	4	7	55	29	16		

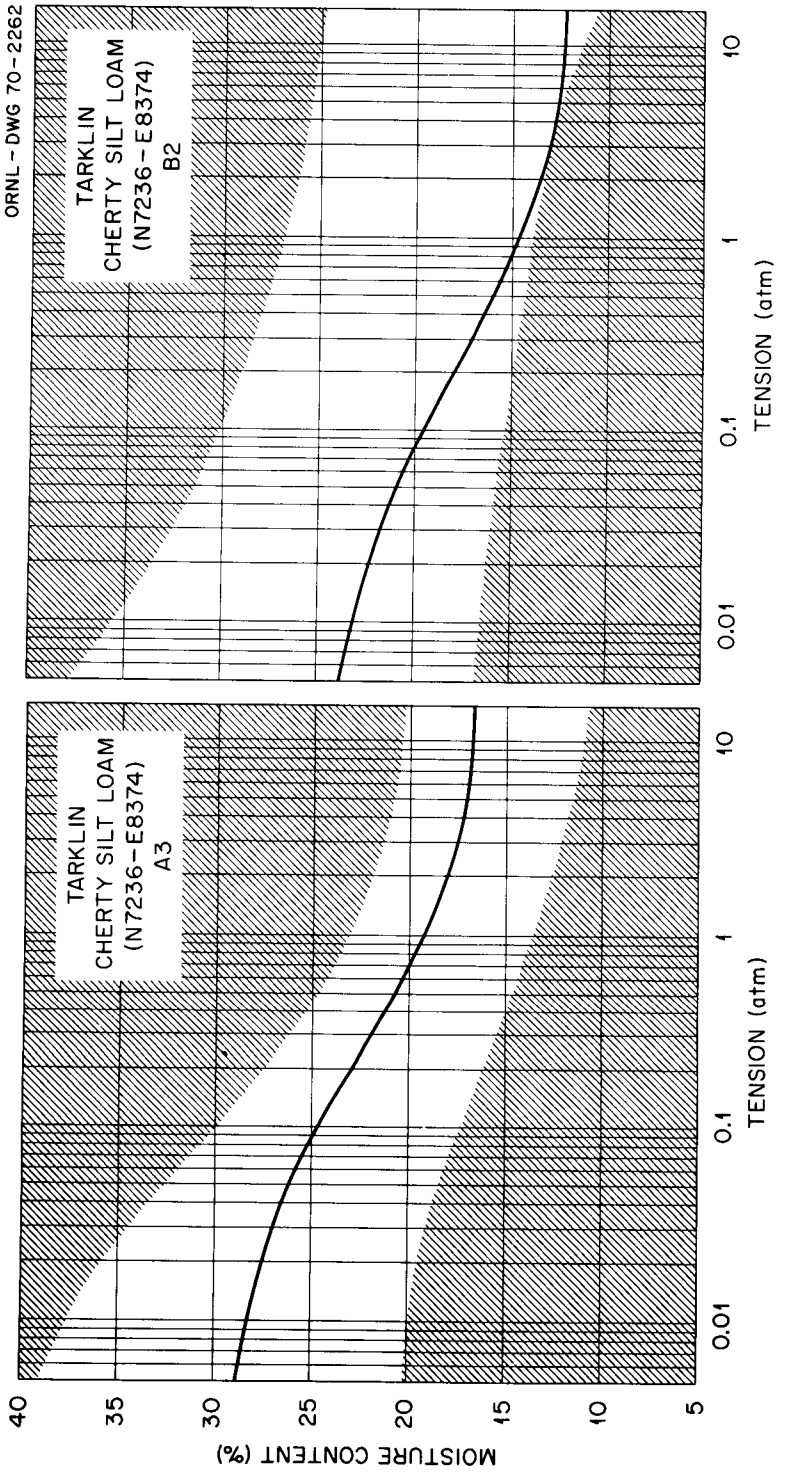

Figure 14. Moisture retention curves for Tarklin cherty silt loam (Pit 3).

Table 53. Exchangeable Cations. Tarklin cherty silt loam. N7236-E8374. Pit 13

Horizon	Depth	pH	CEC	Ca	Mg	K	Base Sat.
	in				meq/100g		%
A1	0-2	5.5	7.00	2.56	0.35	0.16	43
A3	2-9	5.4	6.71	3.28	0.36	0.20	57
B1	9-12	5.6	4.08	0.53	0.14	0.03	17
B2	12-20	5.6	3.51	2.02	0.24	0.06	66
B3	20-27+	4.5	5.14	2.17	0.24	0.06	48

Table 54. Total Analyses. Tarklin cherty silt loam. N7236-E8374. Pit 13

Horizon	Ca	Mg	K	Fe	N	P	O.M.
			percent				
A1	0.09	0.08	0.38	0.84	0.104	0.05	3.52
A3	0.09	0.08	0.35	0.98	0.124	0.05	4.48
B1	0.07	0.08	0.35	0.89	0.048	0.03	1.05
B2	0.06	0.08	0.39	0.73	0.025	0.01	2.27
B3	0.09	0.10	0.46	0.97	0.020	<0.01	0.55

SUMMARY

Chemical and physical properties of typical soils of Walker Branch Watershed are summarized in Tables 55 through 58. Five Bodine and five Fullerton soil profiles were sampled; the tabular values represent the mean of those samples. Only one Claiborne, one Linside, and one Tarklin soil profile was sampled.

Bodine and Fullerton soils occupy most of the area of the watershed. As indicated by the summary tables, both these soils are very cherty, infertile and permeable. Fullerton has about twice as much clay in the B horizon as does Bodine (51% versus 28%), and thus slightly higher cation exchange capacity (Table 57). The chert content in the lower horizons is higher in Bodine (ca. 45%) than Fullerton (20%). The similarities of these soils, however, override the small differences noted.

Both the Bodine and Fullerton soils are acidic (pH 4.2-4.6) and low in exchangeable bases, N and P. Thus relatively thin A1 horizons have moderate base saturation (25%) whereas the lower A and B horizons are approximately 10 and 7% respectively. Because of the high chert content of all the soils on the watershed, the hydraulic conductivity determinations are susceptible to significant errors. The Bodine and Fullerton soils are very permeable and are very well drained.

The minor soil series on the watershed show widely different characteristics compared with the Bodine and Fullerton soils. The colluvial origin of the Linside soil is apparent in the relatively

Table 55. Average Particle Size Distribution - Summary

	Sand	Clay	Silt	Very Fine Sand	Chert Fraction (mm)					
					Total	2-4.8	4.8-9.5	9.5-19.0	19.0-25.4	> 25.4
	percent									
Fullerton										
A1	34	3	63	6	30	20	25	26	8	36
A2	28	12	59	4	29	29	30	21	10	22
A3	28	8	64	4	36	25	29	18	9	22
B1t	24	20	55	3	31	29	25	22	8	30
B21t	17	40	43	3	18	36	25	22	13	24
B22t	13	51	36	3	17	36	31	15	23	44
Bodine										
A1	34	3	62	6	41	24	28	34	13	7
A21	30	12	58	6	32	19	22	28	8	25
A22	26	7	67	5	31	24	27	30	9	11
B1t	30	14	56	6	48	14	18	19	8	41
B2t	16	28	56	4	38	17	14	20	12	48
Claiborne										
A1	27	7	66	4	19	35	39	20	6	
A3	26	7	67	4	20	28	29	25	6	16
B1	22	12	66	4	17	13	15	10	5	4
B21t	18	20	63	3	23	31	32	15	12	10
B22t	18	17	65	3	22	31	40	29		
B23t	19	20	61	3	34	18	22	23	16	22
Linside										
A1	24	14	61	5	27	20	35	17		28
A3	40	9	51	6	35	17	20	22	3	38
C1	29	12	59	3	38	15	23	28	18	16
C2	50	14	36	3	64	18	25	29	13	16
C3	64	17	19	3	64	12	23	28	9	27
Tarklin										
A1	24	7	69	4	11	20	24	37	13	6
A3	25	4	71	5	17	22	25	34	4	14
B1	25	9	65	5	12	25	35	31	9	
B2	24	12	63	5	13	33	45	22		
B3x	22	17	60	4	7	55	29	16		

Table 56. Average Soil Moisture Properties - Summary

	B.D.	Moisture Retained (atm)							
		.005	.025	.100	.333	.667	1	5	15
	g/c.c.	percent							
Fullerton									
A1	1.06	36.9	33.9	29.0	25.2	23.0	22.1	20.9	19.8
A2	1.27	26.3	24.0	21.0	18.7	17.0	15.9	14.3	12.5
A3	1.43	19.2	17.6	15.8	14.3	12.8	12.1	11.0	9.5
B1t	1.31	24.2	21.6	19.3	16.4	14.9	14.4	13.3	11.8
B21t	1.29	23.6	22.5	21.1	20.1	19.3	18.7	17.7	16.6
B22t	1.20	29.8	27.8	25.7	22.6	21.8	21.1	19.8	18.4
Bodine									
A1	1.04	59.4	49.0	39.0	33.2	29.9	28.6	27.6	26.5
A21	1.22	29.8	27.0	22.9	19.8	17.7	16.8	15.3	14.7
A22	1.28	25.3	22.2	19.8	17.8	16.1	15.6	14.4	13.3
B1t	1.28	27.8	26.6	24.1	22.0	20.1	19.8	19.0	18.0
B2t	1.26	22.5	20.4	18.1	16.6	15.8	15.4	14.6	14.0
Claiborne									
A1	0.84	38.5	32.7	25.1	22.4	21.6	20.3	19.4	18.5
A3	1.09	38.3	29.6	25.9	21.5	20.3	19.6	19.0	17.9
B1	1.17	34.2	25.0	21.0	18.0	17.0	16.4	15.8	15.2
B1t	1.19	31.6	23.6	20.0	17.9	16.3	15.5	14.5	13.4
B22t	1.26	21.8	18.7	16.5	16.0	14.1	13.2	12.5	11.6
B23t	1.31	23.2	18.6	16.6	15.4	14.1	13.5	12.9	12.8
Linside									
A1	1.02	40.5	38.1	31.1	27.2	26.0	25.1	22.3	21.5
A3	1.20	34.7	32.5	27.9	25.1	24.0	22.8	20.0	18.5
C1	1.22	31.4	27.8	22.9	20.0	18.3	17.7	15.6	15.0
C2	1.23	24.6	21.7	18.0	16.5	15.4	14.7	13.5	12.9
C3	1.23	18.7	17.1	14.5	13.4	12.8	12.2	11.0	10.6
Tarklin									
A1	1.12	30.3	27.9	27.1	26.1	21.2	20.0	17.7	17.3
A3	1.17	29.0	29.1	24.5	23.1	18.8	19.0	17.1	16.9
B1	1.28	27.7	25.0	22.2	19.5	17.2	16.7	14.7	14.3
B2	1.42	23.7	21.9	18.9	17.2	15.1	14.4	12.6	12.2
B3x	1.44	25.0	22.6	19.3	17.4	16.2	15.3	14.2	13.9

Table 57. Average Exchangeable Cations - Summary

	pH	CEC	Ca	Mg	K	Base Sat.
			meq/100g			%
Fullerton						
A1	4.5	5.64	0.68	0.17	0.11	29
A2	4.2	1.94	0.09	0.04	0.03	9
A3	4.4	2.08	0.12	0.04	0.04	14
B1t	4.2	2.73	0.08	0.04	0.03	7
B2t	4.2	5.42	0.10	0.11	0.03	6
B22t	4.2	8.92	0.15	0.20	0.05	6
Bodine						
A1	4.5	6.49	1.21	0.26	0.13	22
A21	4.5	1.89	0.11	0.04	0.04	10
A22	4.6	1.74	0.14	0.05	0.05	16
B1t	4.4	2.99	0.16	0.06	0.04	10
B2t	4.2	5.21	0.16	0.13	0.04	8
Claiborne						
A1	4.2	11.29	3.01	0.66	0.23	34
A3	4.3	5.29	2.29	0.37	0.24	55
B1	4.8	3.69	0.74	0.26	0.07	29
B21t	4.7	4.00	2.50	0.24	0.11	71
B22t	4.9	4.56	2.16	1.36	0.12	80
Linside						
A1	5.5	10.04	3.55	1.94	0.13	56
A3	5.6	8.14	2.56	1.86	0.12	55
C1	5.4	7.84	1.72	1.87	0.11	47
C2	5.2	7.00	2.59	1.49	0.08	59
C3	5.3	5.90	2.31	0.03	0.12	46
Tarklin						
A1	5.5	7.00	2.56	0.35	0.16	43
A3	5.4	6.71	3.28	0.36	0.20	57
B1	5.6	4.08	0.53	0.14	0.03	17
B2	5.6	3.51	2.02	0.24	0.06	66
B3x	4.5	5.14	2.17	0.24	0.06	48

Table 58. Average Total Analyses - Summary

	Ca	Mg	K	Fe	N	P	O.M
				percent			
Fullerton							
A1	0.06	0.08	0.37	0.96	0.158	0.02	6.54
A2	0.05	0.10	0.45	1.47	0.050	0.02	1.75
A3	0.03	0.10	0.40	1.43	0.031	0.01	0.65
B1t	0.06	0.12	0.56	1.68	0.031	0.02	0.62
B21t	0.04	0.22	0.57	2.19	0.041	0.01	0.63
B22t	0.05	0.23	0.72	2.48	0.039	0.02	0.62
Bodine							
A1	0.10	0.09	0.36	0.88	0.131	0.04	5.74
A21	0.06	0.09	0.43	1.04	0.049	0.01	1.52
A22	0.05	0.11	0.45	1.07	0.051	0.01	1.12
B1t	0.04	0.13	0.48	1.58	0.024	0.01	0.54
B2t	0.04	0.20	0.61	1.77	0.028	0.02	0.43
Claiborne							
A1	0.15	0.12	0.44	1.57	0.217	0.04	6.31
A3	0.10	0.16	0.72	1.78	0.139	0.01	3.31
B1	0.07	0.12	0.48	1.65	0.099	0.03	1.96
B21t	0.08	0.13	0.53	1.92	0.034	0.01	0.28
B22t	0.08	0.25	0.51	1.88	0.051	0.01	0.79
B23t	0.07	0.12	0.45	1.83	0.031	0.03	0.55
Linside							
A1	0.05	0.44	0.61	3.27	0.124	0.01	3.52
A3	0.11	0.13	0.41	0.99	0.111	0.02	2.88
C1	0.09	0.14	0.50	1.32	0.109	0.03	2.36
C2	0.07	0.15	0.45	2.13	0.097	0.03	1.66
C3	0.06	0.13	0.45	1.75	0.052	0.02	0.79
Tarklin							
A1	0.09	0.08	0.38	0.84	0.104	0.05	3.52
A3	0.09	0.08	0.35	0.98	0.124	0.04	4.48
B1	0.07	0.08	0.35	0.89	0.048	0.03	1.05
B2	0.06	0.08	0.39	0.73	0.025	0.01	2.27
B3x	0.09	0.10	0.46	0.97	0.020	0.01	0.55

high sand and chert contents in the lower horizons. The fragipan indicated in the profile description of the Tarklin soil is also indicated by the higher bulk density in the lower horizon of that soil. Claiborne, though morphologically similar to the Bodine and Fullerton soils, is more similar chemically to the Linside and Tarklin soils. It is more acid than the latter two soils, but has a moderate base saturation. The three soils are cherty, moderately fertile, and permeable. Though minor in extent, this proximity to the stream makes them extremely important both in terms of their ability to supply moisture to mesophytic and raparian vegetation, and their possible influence on the quality of water flowing in the stream.

In summary, the soils of Walker Branch Watershed can be described as very cherty, infertile, and very permeable. They are ill suited to agriculture, and as such, are characteristic of many forested soils through the Ridge and Valley Physiographic Province.

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