

Selected Soils
of
Orange County, Virginia
Their Chemical Properties

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Altavista Loam	91	7
Appling Sandy Loam	20	7
Augusta Silt Loam	64	7
Bucks Silt Loam	71	7
Bowmansville Silt Loam	105	8
Cecil Loam	15	8
Chewacla Silt Loam	2	8
Davidson Clay Loam	31	8
Elbert Silt Loam	52	9
Elloak Loam	12	9
Fauquier Silt Loam	186	9
Fluvanna Silt Loam	150	9
Glenelg Loam	22	10
Grover Sandy Loam	17	10
Hiwassee Loam	94	10
Lignum Silt Loam	63	10
Lloyd Loam	35	11
Madison Sandy Loam	29	11
Manassas Silt Loam	106	11
Masada Loam	93	11
Mayodan Fine Sandy Loam	69	12
Nason Loam	260	12
Nason Silt Loam	60	12

<u>List of Soils</u>	<u>Mapping Unit No.</u>	<u>Chemical Analyses Page</u>
Orange Silt Loam	27	13
Penn Fine Sandy Loam	173	13
Penn Silt Loam	73	13
Roanoke Silt Loam	92	13
State Fine Sandy Loam	87	14
Tatum Loam	254	14
Tatum Silt Loam	54	14
Wadesboro Fine Sandy Loam	82	14
Wehadkee Silt Loam	5	15
Wickham Loam	89	15
Worsham Silt Loam	8	15

SELECTED SOILS OF ORANGE COUNTY, VIRGINIA -
Their Chemical Properties

D. E. Pettry^a and J. B. Carter^b

INTRODUCTION

Bounded on the north by the Rapidan River, on the east by Spotsylvania County, on the west by Greene County, and on the south by Albemarle and Louisa Counties, Orange County comprises 354 square miles of northern Virginia. Orange, the County seat, situated near the center of the county, is about 75 miles southwest of Washington, D.C. and 60 miles northwest of Richmond. Historic Orange County was formed in 1734 from Spotsylvania County. Farming is a primary industry, and the soils and climate are conducive to the growing of a large variety of crops and livestock.

A soil survey of Orange County was completed in 1964 by the Soil Conservation Service in cooperation with the Virginia Agricultural Experiment Station and Orange County. Soils of Orange County, Virginia, a comprehensive report, was published in 1967 and widely distributed in the county. The national Soil Survey of Orange County, Virginia was published in 1971 and widely distributed.

During the soil survey, soil scientists examined the soils and underlying materials in a systematic fashion in order to classify the

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soils and make interpretations for multi-purpose soil usage. The soils were described, and the distinguishing characteristics were recorded in a standard manner. Samples were taken from typical soils in the county to determine characteristic chemical properties by laboratory analyses. Chemical properties of the common soils of Orange County are presented in this report.

Geographical Setting

Orange County lies entirely within the Piedmont physiographic province (3). Elevations range from 200 feet along the Rapidan River to 1,197 feet at the summit of Cowheard Mountain. Much of the county is well dissected and comprised of gently rolling topography. The county is drained by the Rapidan, North Anna, and Rivanna Rivers.

The rocks of Orange County, which serve as parent materials for soil formation, consist of igneous, sedimentary, and metamorphic types (2). The igneous rocks consist of granite, diorite, dacite, and diabase. Greenstone schist, sericite-schist, graphitic schist, phyllite, gneiss, and Everona limestone comprise the metamorphic rocks. The sedimentary rocks are shale, sandstone, and conglomerate. Nine major geologic formations occur in the county (2).

Soil Morphology

Soils make up the surface landscape of the earth's outer crust. These natural bodies result from the weathering actions of climate, organisms, and relief on parent materials over a period of time. Since soils are natural bodies, they may occur as discrete individuals, but they are often mixed and interwoven into complicated patterns.

Adjacent soils are often linked by broad transition zones. The soils of Orange County are complex and occur in intricate patterns in the landscape. About 168 individual soil units were delineated in the Orange County soil survey (1). Each of these soil units differs in some manner from the others. The complex rock parent materials and warm, humid climate have exhibited major influences on soil formation in the county. Soil materials transported and deposited by the forces of water and gravity have also significantly influenced the soil development.

A hypothetical soil profile having all the principal horizons is presented in Figure 1. Few soils contain all the horizons exhibited by the hypothetical profile.

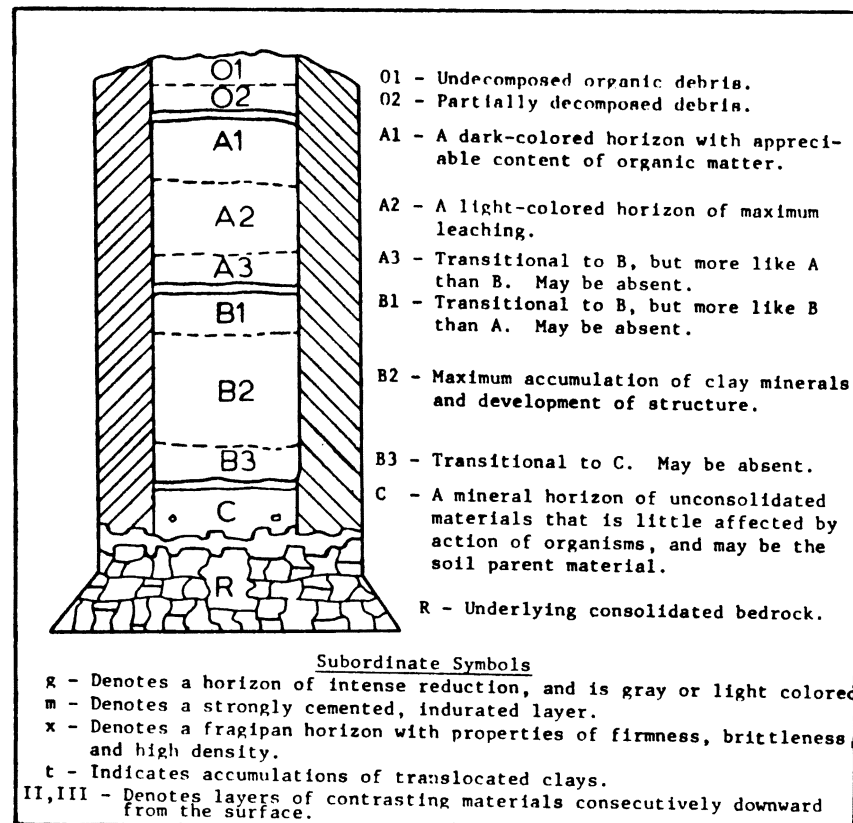


Fig. 1 - Hypothetical Soil Profile with all the Principal Horizons.

The soils of Orange County are essentially a mixture of inorganic particles and relatively small amounts of decaying organic matter. The various particle-size groups (sand, silt, clay) vary widely; proportions of the groups (textural classes) are defined in the glossary. Physical properties of sand, silt, and clay differ considerably from one another. Uncoated sand particles are rather inert, and they exhibit little cohesion or plasticity. In contrast, clay particles are reactive and highly cohesive and plastic. Clays also have high water-holding capacity and retard movement of air and water. Silt particles are intermediate to sands and clays.

Chemical Properties

Soil chemical properties, in combination with other features such as permeability, structure, texture, and consistency, largely determine the limitations and potential of an individual soil. Chemical properties are not evident in visual observations of a soil, and laboratory analyses are necessary to define these characteristics. The amount and type of clay minerals present and the organic matter content largely regulate the chemical nature of soils. These substances have the capacity to attract and hold cations. Many cations are essential plant nutrients.

Calcium, magnesium, and potassium are the major non-acidic exchangeable cations in soils. The cations on the soil-exchange complexes are in dynamic equilibrium with the soil solution. When non-acidic cations are removed by plants or organisms, aluminum and hydrogen ions may replace them on the exchange site. Since aluminum and hydrogen act as acids, the exchangeable hydrogen (reported in Table 1) actually includes both hydrogen and aluminum. The exchangeable aluminum is presented in a separate column in Table 1.

The cations are reported in units of milli-equivalents, which is defined as one milligram of hydrogen, or the amount of any other ion that will combine with or displace it. The unit can be converted to pounds per acre on the basis that an acre of soil (about 6 inches deep) weighs approximately 2,000,000 pounds. One milli-equivalent per 100 grams of soil is equivalent to 942 pounds of potash (K_2O) or 1,000 pounds of limestone ($CaCO_3$) per acre furrow slice. The total exchangeable cations is equal to the cation exchange capacity of the soil.

Soil pH is a measure of the active soil acidity or basicity. It is defined as the logarithm of the reciprocal of the H-ion concentration ($pH = \log 1/[H^+]$). In acid solutions the pH is always less than 7, and in an alkaline solution, it is greater than 7. The following descriptive designations are commonly used to express pH values:

	pH
Extremely acid.	Below 4.5
Very strongly acid.	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1+

Since the pH scale is logarithmic, the extent of acidity or basicity does not occur in equal increments. For example, a soil at pH 5 has 10 times as much acidity as one at pH 6, while a soil at pH 4 has 100 times more acidity than the pH 6 soil. Soil pH levels have an important relationship on the solubility of plant nutrients. Extreme pH levels give rise to severe corrosion of metallic and concrete objects in contact with the soil.

Truog phosphorus, a dilute acid soluble phosphorus, provides an estimate of the amount of phosphorus readily available to plants in acid soils. Generally, 25 parts per million (ppm) is adequate for many common crops and plants. Methods of Analyses - Extractable acidity, bases, and organic matter content were determined using modified procedure of Peech, et al. (4). Available phosphorus was determined via the Truog procedure (5) using a Klett-Summerson Photoelectric Colorimeter. Soil pH was determined in 1:2 soil-water mixture employing a Beckman Zeromatic pH meter. Exchangeable (KCl) aluminum was determined via modified Yuan procedure (7).

Table 1. SOIL CHEMICAL DATA

Hor izon	Depth (in.)	pH	Truog P (ppm.)	Organic Matter (%)	Exchange Cations (me./100g. of soil)						Base Satur- ation (%)
					Ca	Mg	K	Al ¹	H	Total	
<u>ALTAVISTA LOAM (91)*</u>											
Ap	0-9	6.30	47.63	2.04	3.47	1.13	0.08	0.03	4.51	9.19	50.92
B1	9-16	5.38	34.68	0.32	2.06	0.09	0.05	0.22	3.42	5.62	39.15
B21	16-29	5.60	14.53	0.30	4.33	0.47	0.11	0.10	3.71	8.62	56.96
B22	29-35	5.50	6.96	0.30	4.53	0.47	0.12	0.09	4.22	9.34	54.82
B3	35-53	5.50	3.50	0.25	6.35	0.60	0.14	0.04	3.49	10.58	67.01
<u>APPLING SANDY LOAM (20)</u>											
O2	1-0	3.60	22.31	44.78	4.04	2.66	0.60	8.71	63.29	70.59	10.34
A2	0-6	4.48	3.12	2.01	0.13	0.07	0.15	1.70	5.17	5.52	6.34
B1	6-15	4.58	3.02	0.70	0.22	0.15	0.20	2.18	5.67	6.24	9.13
B21	15-24	4.72	2.83	0.66	1.19	1.02	0.33	3.23	9.24	11.78	21.56
B22	24-35	4.70	2.45	0.35	0.47	0.74	0.31	5.71	12.15	13.67	11.12
B3	35-50	5.00	2.06	0.19	0.15	0.46	0.23	6.86	11.71	12.55	6.69
C	50-60	4.58	1.97	0.12	0.00	0.16	0.16	6.55	10.19	10.51	3.04
<u>AUGUSTA SILT LOAM (64)*</u>											
Ap	0-8	6.10	6.86	1.90	3.75	0.41	0.14	0.06	2.76	7.06	60.91
B1	8-11	5.40	3.79	0.58	3.08	0.77	0.11	0.19	4.51	8.47	46.75
B2	11-18	5.00	3.50	0.48	2.77	3.81	0.14	1.31	9.38	16.10	41.74
B2g1	18-35	6.18	5.32	0.37	5.71	7.26	0.20	0.07	6.18	19.35	68.06
B2g2	35-40	6.80	3.50	0.27	7.11	9.11	0.21	0.01	3.93	20.36	80.70
B3	40-44	6.80	3.31	0.17	3.55	4.81	0.09	0.00	2.11	10.56	80.02
C	44-94	7.00	12.52	0.12	2.61	1.50	0.04	0.00	1.89	6.04	68.71
<u>BUCKS SILT LOAM (71)</u>											
Ap	0-9	6.32	20.20	1.78	4.61	0.75	0.11	0.05	3.35	8.82	62.02
B1	9-22	4.62	2.54	0.18	2.90	1.14	0.14	2.28	7.78	11.96	34.95
B2	22-27	4.30	1.58	0.15	0.76	1.03	0.16	5.13	10.11	12.06	16.17
B3	27-36	4.28	1.58	0.11	0.23	0.57	0.16	5.27	9.68	10.64	9.02
C	36-67	4.60	1.01	0.02	0.04	0.29	0.14	3.21	6.11	6.58	7.14

*Pedon has higher base saturation than is typically defined for the series.

¹Exchangeable Aluminum data in this column are included in the exchangeable hydrogen figures in the next column.

SOIL CHEMICAL DATA

Hor izon	Depth (in.)	pH	Truog P (ppm.)	Organic Matter (%)	Exchange Cations (me./100g. of soil)					Total	Base Satur- ation (%)
					Ca	Mg	K	Al ¹	H		
<u>BOWMANVILLE SILT LOAM (105)</u>											
Ag	0-12	5.68	8.20	2.76	5.66	1.20	0.16	0.10	7.71	14.73	47.66
C1g	12-20	5.62	3.60	0.92	2.67	0.79	0.17	0.30	6.98	10.61	34.21
C2g	20-27	5.40	3.41	0.56	1.83	0.94	0.08	0.38	6.61	9.46	30.13
C3g	27-41	5.72	3.21	0.43	2.97	1.56	0.14	0.05	5.67	10.34	45.16
C4g	41-46	6.00	7.15	0.26	3.17	1.67	0.13	0.04	4.66	9.63	51.61
<u>CECIL LOAM (15)</u>											
A1	0-5	4.10	4.80	4.63	0.52	0.19	0.19	2.04	8.69	9.59	9.38
A2	5-7	4.40	3.84	1.73	0.14	0.16	0.14	1.78	5.22	5.66	7.77
B1	7-13	4.20	3.84	1.18	0.26	0.19	0.21	4.54	10.49	11.15	5.92
B2	13-35	4.72	3.84	0.17	0.16	0.66	0.17	4.18	12.24	13.23	7.48
B3	35-49	4.60	2.40	0.10	0.06	0.33	0.17	3.71	7.64	8.20	6.83
C	49-67	4.60	2.40	0.06	0.01	0.10	0.14	4.12	8.13	8.38	2.98
<u>CHEWACLA SILT LOAM (2)</u>											
Layer 1	0-12	4.92	17.41	1.41	2.20	0.41	0.25	0.82	8.29	11.15	25.65
Layer 2	12-19	5.10	10.03	0.56	2.12	0.59	0.13	0.68	6.66	9.50	29.89
Layer 3	19-28	5.10	9.83	0.35	2.07	0.84	0.13	0.55	6.55	9.59	31.70
Layer 4	28-36	5.42	12.62	0.27	1.71	1.40	0.13	0.34	5.27	8.51	38.07
Layer 5	36-63	5.32	18.95	0.22	2.60	1.69	0.13	0.41	6.55	10.97	40.29
<u>DAVIDSON CLAY LOAM (31)</u>											
A1	0-3	6.00	13.58	13.04	11.21	4.14	0.80	0.13	13.97	30.12	53.62
A2	3-7	5.00	3.50	1.87	0.73	0.77	0.44	0.81	10.16	12.10	16.03
B1	7-14	4.72	2.64	1.19	0.49	1.12	0.37	1.51	8.88	10.86	18.23
B21	14-31	4.80	2.54	0.63	1.79	2.62	0.31	0.98	11.23	15.95	29.59
B22	31-76	4.68	2.16	0.14	0.31	0.71	0.16	2.48	12.80	13.98	8.44
B3	76-114	4.60	3.50	0.19	0.85	1.30	0.19	4.70	13.82	16.16	14.48
C	114-133	4.58	5.42	0.00	0.36	0.33	0.18	5.28	15.19	16.06	5.42

¹Exchangeable Aluminum data in this column are included in the exchangeable hydrogen figures in the next column.

SOIL CHEMICAL DATA

SOIL CHEMICAL DATA											
Hor izon	Depth (in.)	pH	Truog P (ppm.)	Organic Matter (%)	Exchange Cations (me./100g. of soil)						Base Satur- ation (%)
					Ca	Mg	K	Al ¹	H	Total	
<u>ELBERT SILT LOAM (52)</u>											
O2	1-0	3.60	34.49	38.78	1.41	3.61	1.10	9.64	48.16	54.28	11.27
A1	0-3	4.10	4.65	3.51	0.01	0.22	0.19	2.39	6.34	6.76	6.21
A2	3-6	4.32	3.98	1.35	0.14	0.13	0.14	1.85	4.69	5.10	8.04
B1	6-11	4.28	2.06	0.57	0.57	2.76	0.17	2.68	6.52	10.02	34.93
B2	11-17	4.40	1.58	0.46	0.19	1.04	0.16	2.76	8.24	9.63	14.43
BgM1	17-37	4.80	2.59	0.19	2.36	12.86	0.18	0.90	6.52	21.92	70.26
BgM2	37-48	5.42	2.21	0.00	1.99	12.86	0.22	0.36	3.84	18.91	79.69
<u>ELIOAK LOAM (12)</u>											
A1	0-2	4.42	4.41	4.94	0.36	0.16	0.33	1.82	7.64	8.49	10.01
A2	2-8	4.50	4.13	2.40	0.28	0.06	0.21	1.49	5.53	6.08	9.05
B1	8-13	4.50	2.69	0.66	0.19	0.63	0.31	2.69	7.86	8.99	12.57
B2	13-29	4.68	2.69	0.32	0.04	1.26	0.50	2.98	11.06	12.86	14.00
B3	29-38	4.90	2.69	0.10	0.00	0.46	0.25	2.86	8.95	9.66	7.35
C	38-62	4.90	2.59	0.04	0.15	0.14	0.17	1.73	3.06	3.52	13.07
<u>FAUQUIER SILT LOAM (186)</u>											
A2	0-5	5.48	6.04	7.77	3.70	1.67	1.00	0.32	13.68	20.05	31.77
B21	5-14	4.80	6.04	1.68	0.64	1.21	0.50	1.35	11.73	14.08	16.69
B22	14-26	4.88	5.47	0.88	1.08	1.39	0.47	1.05	11.35	14.29	20.57
B3	26-38	5.20	5.08	0.45	3.56	1.06	0.49	0.11	8.79	13.90	36.76
C	38-62	5.20	4.32	0.48	2.86	0.99	0.36	0.17	9.40	13.61	30.93
<u>FLUVANNA SILT LOAM (150)</u>											
A2	0-5	4.30	4.13	2.10	0.23	0.18	0.09	2.13	5.67	6.17	8.10
A3	5-8	4.30	3.07	1.02	0.14	0.48	0.08	3.68	7.28	7.98	8.77
B1	8-11	4.30	2.40	1.21	0.16	1.00	0.11	5.20	10.24	11.51	11.03
B21	11-18	4.52	2.40	0.81	0.39	2.33	0.14	5.83	13.53	16.39	17.45
B22	18-29	4.70	2.11	0.43	0.81	3.17	0.12	4.79	12.95	17.05	24.05
B3	29-39	4.80	1.92	0.23	1.15	3.69	0.11	2.97	10.62	15.57	31.79
C	39-62	5.30	1.44	0.23	3.58	9.24	0.09	0.55	5.97	18.88	68.38

¹Exchangeable Aluminum data in this column are included in the exchangeable hydrogen figures in the next column.

SOIL CHEMICAL DATA

Hor izon	Depth (in.)	pH	Truog P (ppm.)	Organic Matter (%)	Exchange Cations (me..100g. of soil)						Base Satur- ation (%)
					Ca	Mg	K	Al ¹	H	Total	
<u>GLENELG LOAM (22)</u>											
A1	0-2	4.30	4.32	3.53	0.34	0.21	0.32	1.92	8.26	9.13	9.53
A2	2-4	4.40	2.88	1.84	0.00	0.08	0.25	1.76	6.23	6.56	5.03
A3	4-7	4.50	2.40	1.06	0.00	0.00	0.25	1.58	5.35	5.60	4.46
B1	7-11	4.72	1.92	0.75	0.71	0.74	0.43	1.58	6.29	8.17	23.01
B21	11-22	5.00	2.40	0.43	0.70	1.16	0.28	1.22	6.69	8.83	24.24
B22	22-30	5.00	2.88	0.32	0.20	1.23	0.24	1.13	6.40	8.07	20.69
B3	30-48	5.10	2.40	0.04	0.00	0.68	0.29	0.80	5.62	6.59	14.72
C	48-62	5.00	3.84	0.04	0.00	0.37	0.33	1.18	4.28	4.98	14.06
<u>GROVER SANDY LOAM (17)</u>											
A1	0-4	5.58	6.24	3.70	1.53	0.38	0.34	0.15	3.40	5.65	39.82
A2	4-9	5.00	2.88	0.75	0.55	0.16	0.22	0.55	2.15	3.08	30.19
B1	9-12	4.72	2.40	0.66	0.65	0.39	0.33	0.89	3.78	5.15	26.60
B21	12-17	4.60	1.92	0.53	0.59	1.10	0.35	1.70	6.05	8.09	25.22
B22	17-27	4.68	1.44	0.25	0.49	0.96	0.48	1.82	6.20	8.13	23.74
B3	27-35	4.60	1.92	0.17	0.14	0.81	0.41	1.99	5.76	7.12	19.10
C	35-75	4.60	1.44	0.13	0.00	0.67	0.31	2.46	4.63	5.61	17.47
<u>HIWASSEE LOAM (94)</u>											
A2	0-4	5.42	42.69	6.32	6.04	1.25	1.28	0.17	9.37	17.94	47.77
A3	4-8	5.20	21.11	3.80	3.44	0.89	0.98	0.24	8.79	14.10	37.66
B1	8-16	5.10	15.83	0.86	2.54	1.19	1.23	0.46	7.89	12.85	38.60
B21	16-36	4.80	13.91	0.29	2.84	1.52	0.79	0.66	9.40	14.55	35.40
B22	36-63	4.10	17.75	0.23	1.05	1.39	0.41	3.29	13.01	15.86	17.97
B3	63-86	4.00	17.75	0.09	0.17	0.98	0.27	4.20	12.86	14.28	9.94
<u>LIGNUM SILT LOAM (63)</u>											
A	0-4	4.18	6.72	3.04	0.08	0.16	0.23	3.35	10.59	11.06	4.25
B1	4-7	4.18	6.72	0.55	0.07	0.17	0.17	4.56	10.42	10.83	3.79
B21	7-14	4.10	4.32	0.63	0.06	0.46	0.21	9.69	17.40	18.13	4.03
B22	14-20	4.00	4.32	0.58	0.07	0.57	0.21	13.96	21.45	22.30	3.81
B23	20-28	4.00	2.40	0.34	0.02	0.51	0.19	11.61	16.53	17.25	4.17
B3	28-37	4.10	3.36	0.06	0.03	0.32	0.10	7.15	9.66	10.11	4.45
C1	37-51	4.42	2.40	0.04	0.01	0.46	0.10	6.90	8.96	9.53	5.98
C2	51-87	4.62	1.92	0.01	0.55	1.52	0.15	9.08	11.38	13.60	16.32

¹Exchangeable Aluminum data in this column are included in the exchangeable hydrogen figures in the next column.

SOIL CHEMICAL DATA

Hor izon	Depth (in.)	pH	Truog P (ppm.)	Organic Matter (%)	Exchange Cations (me. 100g. of soil)					Total	Base Satur- ation (%)
					Ca	Mg	K	Al ¹	H		
<u>LLOYD LOAM (35)</u>											
A1	0-2	4.60	7.68	8.36	0.49	0.42	0.43	2.08	14.64	15.98	8.39
A2	2-6	4.72	3.17	2.82	0.10	0.14	0.21	1.26	7.09	7.54	5.97
B1	6-11	4.50	2.30	0.96	0.10	0.46	0.23	2.08	6.33	7.12	11.10
B21	11-17	4.60	2.49	0.72	0.32	1.47	0.33	2.29	8.10	10.22	20.74
B22	17-32	5.00	1.25	0.30	1.69	3.05	0.55	2.05	10.49	15.78	33.52
B3	32-49	4.66	1.25	0.27	0.50	1.47	0.39	6.60	13.52	15.88	14.86
C	49-62	4.70	1.34	0.15	0.28	1.47	0.36	7.18	13.34	15.45	13.66
<u>MADISON SANDY LOAM (29)</u>											
O2	1-0	4.90	80.40	40.37	21.89	7.52	1.44	1.91	31.79	62.64	49.25
A1	0-3	4.30	2.69	3.28	0.48	0.42	0.35	3.18	11.71	12.96	9.65
A2	3-9	4.58	2.69	1.35	0.19	0.60	0.33	2.70	9.82	10.94	10.24
B1	9-14	4.58	2.21	1.03	0.15	1.47	0.42	3.27	10.55	12.59	16.20
B2	14-26	4.80	1.82	0.68	0.19	1.47	0.45	2.79	9.97	12.08	17.47
B3	26-49	4.92	1.73	0.02	0.24	1.47	0.27	1.83	5.72	7.70	25.71
C	49-97	4.80	1.73	0.01	0.12	1.10	0.30	1.56	4.90	6.42	23.68
<u>MANASSAS SILT LOAM (106)</u>											
A	0-14	5.72	9.50	2.03	5.38	0.39	0.17	0.14	8.57	14.51	40.94
B1	14-20	5.60	3.93	0.92	6.15	1.30	0.21	0.11	8.40	16.06	47.70
B2	20-32	5.42	3.26	0.37	5.89	2.22	0.22	0.17	7.99	16.32	51.04
B3	32-49	4.72	1.73	0.22	4.00	1.78	0.21	0.95	7.49	13.48	44.44
C	49-70	4.70	1.73	0.21	2.54	2.58	0.34	3.01	9.70	15.16	36.02
<u>MASADA LOAM (93)</u>											
O2	1-0	5.00	29.65	30.02	22.17	5.00	0.79	1.40	28.04	56.00	49.93
A1	0-3	4.40	7.10	6.24	0.89	0.13	0.30	1.93	10.81	12.13	10.88
A2	3-10	4.50	2.69	2.93	0.11	0.00	0.20	1.57	7.06	7.37	4.21
B1	10-17	4.52	1.25	0.58	0.19	0.18	0.20	1.47	4.47	5.04	11.31
B21	17-24	4.30	1.25	0.48	0.08	0.46	0.17	2.63	7.09	7.80	9.10
B22	24-38	4.30	0.96	0.26	0.00	0.42	0.15	4.69	10.87	11.44	4.98
B3	38-48	4.28	3.45	0.17	0.08	0.68	0.12	5.76	12.48	13.36	6.59
C1	48-68	4.20	2.88	0.17	0.16	0.42	0.11	6.07	11.64	12.33	5.60
C2	68-90	4.12	2.97	0.13	0.17	0.44	0.09	5.47	9.21	9.91	7.06

¹Exchangeable Aluminum data in this column are included in the exchangeable hydrogen figures in the next column.

SOIL CHEMICAL DATA

Hor izon	Depth (in.)	pH	Truog P (ppm.)	Organic Matter (%)	Exchange Cations (me. 100g. of soil)					Total	Base Satur- ation (%)
					Ca	Mg	K	Al ¹	H		
MAYODAN FINE SANDY LOAM (69)											
A1	0-2	4.30	5.30	6.02	0.57	0.19	0.19	3.37	14.74	15.69	6.05
A2	2-8	4.58	2.41	1.37	0.18	0.08	0.17	1.81	6.10	6.53	6.58
B1	8-12	4.58	1.93	0.57	0.20	0.14	0.23	2.33	5.57	6.14	9.28
B21	12-18	4.50	2.41	0.56	0.25	0.14	0.26	3.03	6.94	7.59	8.56
B22	18-25	4.50	2.41	0.31	0.18	0.72	0.32	4.78	10.66	11.88	10.27
B23	25-32	4.62	2.41	0.11	0.10	1.01	0.33	4.50	10.66	12.10	11.90
B3	32-39	4.70	1.93	0.14	0.08	0.89	0.30	6.30	14.51	15.78	8.05
C	39-62	4.58	1.93	0.00	0.16	0.19	0.19	3.13	5.57	6.11	8.84
NASON LOAM (260)											
A1	0-3	3.98	2.41	5.34	0.35	0.14	0.17	2.64	9.00	9.66	6.83
A2	3-11	4.40	1.45	1.38	0.09	0.03	0.15	1.49	4.40	4.67	5.78
B1	11-14	4.58	1.45	0.55	0.24	0.44	0.24	2.46	7.73	8.65	10.64
B2	14-32	5.00	2.89	0.39	0.12	1.43	0.48	2.66	11.77	13.80	14.71
B3	32-52	4.82	3.86	0.23	0.00	0.54	0.23	3.86	13.53	14.30	5.38
C	52-62	4.78	0.96	0.12	0.00	0.23	0.14	3.84	11.28	11.65	3.18
NASON SILT LOAM (60)											
O2	1-0	3.50	69.44	54.30	4.26	3.40	2.45	12.03	71.39	81.50	12.40
A1	0-9	4.50	1.93	2.00	0.08	0.09	0.34	2.08	6.75	7.26	7.02
B1	9-15	4.48	1.93	0.81	0.08	0.11	0.37	2.46	6.88	7.44	7.53
B21	15-20	4.68	2.41	0.43	0.07	1.05	0.46	2.88	10.11	11.69	13.52
B22	20-28	4.70	2.41	0.27	0.01	0.87	0.35	3.61	12.06	13.39	9.26
B3	28-38	4.76	1.93	0.21	0.00	0.68	0.37	3.94	13.82	14.87	7.06
C	38-48	4.68	2.41	0.26	0.00	0.42	0.28	2.60	8.80	9.50	7.37

¹Exchangeable Aluminum data in this column are included in the exchangeable hydrogen figures in the next column.

SOIL CHEMICAL DATA

Hor izon	Depth (in.)	pH	Truog P (ppm.)	Organic Matter (%)	Exchange Cations (me. 100g. of soil)					Total	Base Satur- ation (%)
					Ca	Mg	K	Al ¹	H		
ORANGE SILT LOAM (27)											
O2	1-0	3.78	14.49	21.18	3.31	1.51	0.35	4.59	23.72	28.89	17.90
A1	0-1	4.00	5.28	4.75	0.32	0.20	0.14	2.44	8.38	9.04	7.30
A2	1-13	4.50	2.40	1.10	0.35	0.15	0.09	1.72	4.54	5.13	11.50
B11	13-17	4.50	6.24	0.51	0.72	1.81	0.12	2.00	6.49	9.14	28.99
B12	17-24	4.98	0.96	0.26	0.94	3.05	0.11	1.05	5.47	9.57	42.84
B21	24-27	5.00	0.96	0.35	2.32	7.36	0.11	0.78	6.05	15.84	61.81
B22	27-36	5.00	2.88	0.41	4.03	9.81	0.17	0.56	5.33	19.34	72.44
C	36-44	5.80	1.92	0.28	4.10	8.31	0.12	0.30	2.50	15.03	83.37
PENN FINE SANDY LOAM (173)											
A1	0-3	4.22	3.55	3.53	0.39	0.30	0.13	1.95	7.07	7.89	10.39
A2	3-8	4.42	2.40	1.10	0.09	0.13	0.13	2.21	4.80	5.15	6.80
B-C	8-18	4.40	2.40	0.55	0.34	0.31	0.18	2.92	6.11	6.94	11.96
C1	18-35	4.60	1.92	0.23	0.32	0.35	0.14	2.66	5.18	5.99	13.52
C2	35-49	4.60	1.15	0.13	0.60	0.34	0.19	4.61	7.57	8.70	12.99
PENN SILT LOAM (73)											
O2	1/2-0	5.40	90.95	39.61	23.62	8.34	2.05	1.04	28.95	62.96	54.02
A1	0-2	4.00	27.63	9.03	1.08	0.47	0.23	3.85	20.02	21.80	8.17
A-C	2-18	4.30	16.60	1.41	0.34	0.22	0.20	3.26	9.46	10.22	7.44
ROANOKE SILT LOAM (92)*											
Ap	0-7	4.50	4.70	3.16	2.87	1.26	0.22	1.64	9.25	13.60	31.99
B1	7-12	4.60	3.17	1.54	3.15	1.72	0.16	2.13	8.53	13.56	37.09
B2g1	12-23	4.50	0.96	0.87	6.56	5.34	0.23	5.67	14.35	26.48	45.81
B2g2	23-51	6.52	9.02	0.32	10.74	11.49	0.27	0.11	3.43	25.93	86.77
B2g3	51-75	7.10	15.83	0.24	9.66	9.79	0.29	0.06	1.89	21.63	91.26
B3	75-81	7.32	22.83	0.21	8.86	8.49	0.30	0.02	1.34	18.99	92.94
C	81-90	7.50	24.66	0.17	9.34	6.99	0.21	0.02	0.96	17.50	94.51

*Pedon has higher base saturation than is typically defined for the series.

¹Exchangeable Aluminum data in this column are included in the exchangeable hydrogen figures in the next column.

SOIL CHEMICAL DATA

Hor izon	Depth (in.)	pH	Truog P (ppm.)	Organic Matter (%)	Ca	Exchange Cations (me. 100g. of soil)				Total	Base Satur- ation (%)
						Mg	K	Al ¹	H		
STATE FINE SANDY LOAM (87)											
A1	0-10	5.00	14.58	1.84	1.81	0.27	0.19	0.51	5.99	8.26	27.48
A2	10-18	5.18	4.70	0.53	1.30	0.20	0.15	0.35	4.21	5.86	28.16
B1	18-21	5.18	3.36	0.43	1.96	0.33	0.13	0.32	4.54	6.96	34.77
B21	21-32	5.10	2.88	0.35	2.93	0.86	0.19	0.40	6.32	10.30	38.64
B22	32-42	4.88	2.78	0.34	2.58	1.47	0.20	0.75	7.94	12.19	34.86
B3	42-62	4.80	11.51	0.30	3.49	1.73	0.23	0.84	10.67	16.12	33.81
C	62-66	5.00	3.45	0.29	3.77	2.98	0.17	0.43	8.40	15.32	45.17
TATUM LOAM (254)											
A	0-9	4.38	2.89	1.50	0.03	0.04	0.20	1.90	5.57	5.84	4.62
B1	9-12	4.32	1.45	1.26	0.11	0.09	0.25	3.37	8.67	9.12	4.93
B2	12-28	4.92	3.86	0.43	0.45	0.88	0.52	3.41	12.42	14.27	12.96
B3	28-39	5.00	2.41	0.23	0.08	0.48	0.42	2.88	10.02	11.00	8.91
C	39-54	4.72	2.89	0.12	0.01	0.07	0.17	3.31	7.42	7.67	3.26
TATUM SILT LOAM (54)											
O2	2-0	3.60	61.73	52.65	6.77	1.95	1.40	11.07	71.31	81.43	12.43
A1	0-6	3.82	3.38	4.93	0.08	0.10	0.10	4.13	11.82	12.10	2.31
A2	6-10	4.50	2.89	1.81	0.14	0.07	0.14	1.94	6.24	6.59	5.31
B1	10-16	4.25	2.89	0.91	0.05	0.05	0.15	3.09	7.55	7.80	3.21
B2	16-36	4.72	3.38	0.23	0.00	0.90	0.28	4.49	14.39	15.57	7.58
B3	36-45	4.68	3.38	0.29	0.09	0.49	0.18	4.58	13.28	14.04	5.41
C	45-94	4.42	2.89	0.05	0.03	0.10	0.12	3.46	6.37	6.62	3.78
WADESBORO FINE SANDY LOAM (82)											
O2	1-0	4.20	38.58	39.81	8.22	1.75	1.10	5.15	44.42	55.49	19.95
A2	0-7	4.50	2.89	1.21	0.04	0.05	0.10	1.68	5.62	5.81	3.27
A3	7-10	4.42	2.89	0.69	0.09	0.07	0.12	2.48	5.82	6.10	4.59
B1	10-14	4.50	2.89	0.52	0.19	0.22	0.18	2.82	6.76	7.35	8.03
B21	14-24	4.82	3.38	0.20	0.27	1.53	0.25	4.28	12.83	14.88	13.78
B22	24-38	4.90	4.34	0.19	0.09	1.10	0.31	4.92	12.11	13.61	11.02
B3	38-49	4.82	4.34	0.10	0.01	0.76	0.20	5.01	10.51	11.48	8.45
C	49-62	4.70	3.89	0.06	0.04	0.74	0.15	7.44	11.36	12.29	7.57

¹Exchangeable Aluminum data in this column are included in the exchangeable hydrogen figures in the next column.

SOIL CHEMICAL DATA

Hor izon	Depth (in.)	pH	Truog P (ppm.)	Organic Matter (%)	Ca	Exchange Cations (me. 100g. of soil)				Total	Base Satur- ation (%)
						Mg	K	Al ¹	H		
WEHADKEE SILT LOAM (5)											
Layer 1	0-10	4.90	19.67	2.38	2.78	0.45	0.21	0.73	9.46	12.90	26.67
Layer 2	10-16	4.90	15.45	1.93	2.63	0.49	0.17	0.87	9.89	13.18	24.96
Layer 3	16-34	4.90	19.86	2.60	4.82	1.02	0.22	0.76	12.66	18.72	32.37
Laver 4	34-66	5.00	37.90	1.40	4.61	2.88	0.24	1.03	11.13	18.86	40.99
Layer 5	66-75	5.80	43.65	1.35	7.82	6.26	0.48	0.11	5.09	19.65	74.10
WICKHAM LOAM (89)											
Ap1	0-2	6.00	15.54	4.14	6.66	0.89	0.46	0.09	5.38	13.39	59.82
Ap2	2-6	5.52	7.68	2.13	3.05	0.37	0.49	0.15	6.04	9.95	39.30
B1	6-10	5.10	14.39	1.01	2.40	0.47	0.50	0.33	6.33	9.70	34.74
B21	10-20	5.32	16.79	0.55	4.71	1.09	0.23	0.22	6.62	12.65	47.67
B22	20-36	5.40	18.80	0.32	4.53	1.00	0.22	0.19	6.47	12.22	47.05
B3	36-42	5.30	14.39	0.19	2.77	1.41	0.29	0.19	7.28	11.75	38.04
C	42-78	4.76	6.62	0.19	1.60	1.32	0.35	0.52	7.28	10.55	31.00
WORSHAM SILT LOAM (8)											
A1	0-1	4.20	3.17	4.28	0.14	0.65	0.22	5.19	14.19	15.20	6.64
A2	1-6	4.30	0.77	2.75	0.29	0.46	0.15	4.11	11.42	12.32	7.31
A3	6-9	4.50	0.77	1.16	0.36	0.29	0.09	1.53	4.37	5.11	14.48
B1	9-16	4.60	0.67	0.58	0.23	0.54	0.10	1.69	5.46	6.33	13.74
B21g	16-29	4.40	0.67	0.43	0.46	2.39	0.16	5.34	10.84	13.85	21.73
B22g	29-42	4.32	0.48	0.24	1.21	6.06	0.15	4.05	8.37	15.79	46.99
B3g	42-52	4.50	0.48	0.19	0.69	5.21	0.14	0.92	2.84	8.88	68.02

¹ Exchangeable Aluminum data in this column are included in the exchangeable hydrogen figures in the next column.

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GLOSSARY

Alluvium - Sediments deposited on existing land surfaces by flowing water.
The materials are usually mixed or stratified.

Arkosic Sandstone - A sandstone containing appreciable amounts of feldspar.

Base Saturation % - The sum or total of the bases on the soil exchange sites
divided by the exchangeable acidity multiplied by 100.

Coarse Fragment - Particles that exceed 2 mm in diameter.

Colluvium - Material which has moved downhill and has accumulated on lower
slopes at the bottom of hills.

Foot Slopes - Sloping areas occurring at the base of higher-lying areas,
often referred to as "toe-slopes" when they occur at the end of a ridge.

Gneiss - A banded metamorphic rock with alternating layers of light-colored
quartz and feldspar and dark-colored materials, including mica and
hornblende.

Granite - Granular rocks composed chiefly of feldspar and quartz, but usually
containing mica and some ferromagnesium mineral.

Granodiorite - A granitic rock in which the feldspar portion is chiefly
plagioclase or soda-line feldspar, usually containing a higher percentage
of dark minerals such as biotite and hornblende.

Greenstone - A basic rock of igneous origin containing considerable epidote,
a hydrous calcium aluminum iron silicate.

Horizons - Soil layers resulting from soil formation processes.

Parent Material - Partially weathered rock materials from which soils developed.

Phyllite - A metamorphic rock with finer banding than schist, intermediate
between slate and schist.

Schist - A metamorphic rock with distinct cleavage.

Soil Separate - A group of soil particles separated on the basis of size.

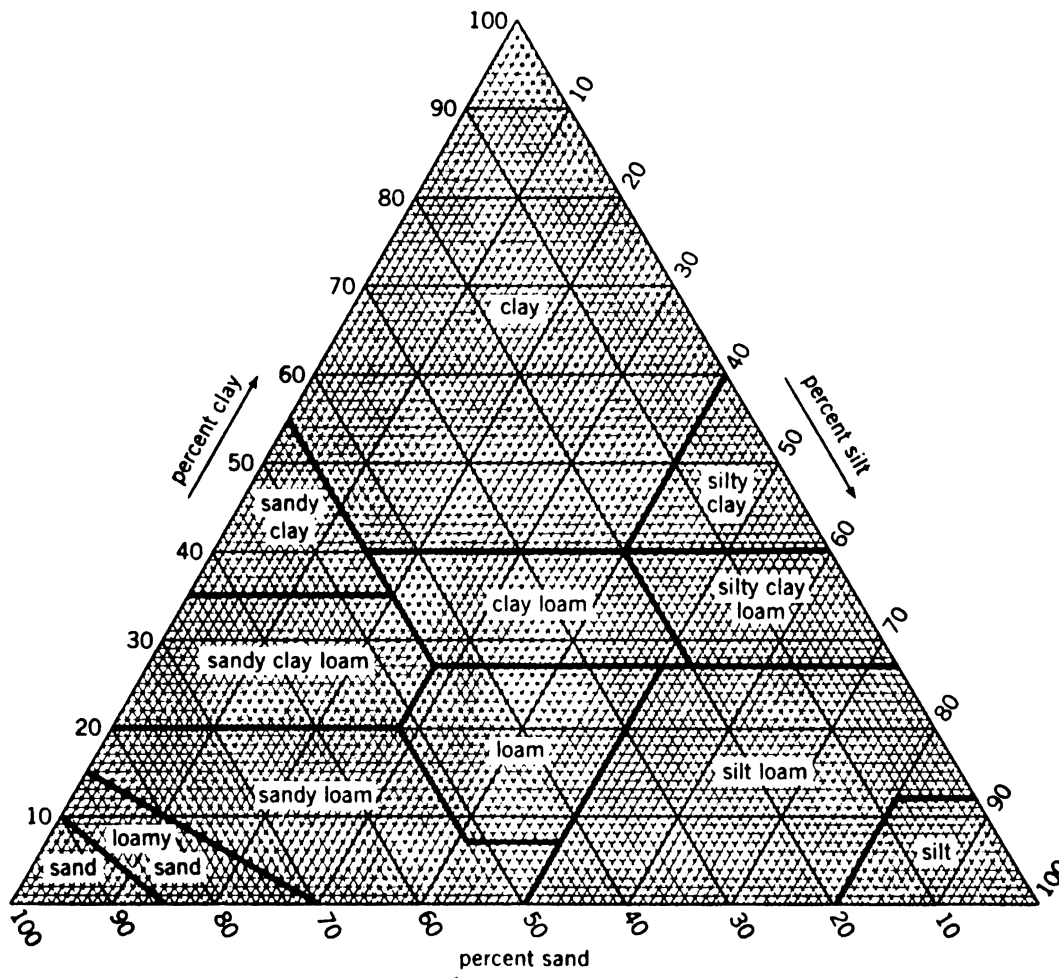
(USDA SYSTEM)

<u>Soil Separate</u>	<u>Particle Diameter mm</u>
Very Coarse sand	2.00-1.00
Coarse Sand	1.00-0.50
Medium Sand	0.50-0.25
Fine Sand	0.25-0.10
Very Fine Sand	0.10-0.05
Coarse Silt	0.05-0.005
Fine Silt	0.005-0.002
Clay	Less than 0.002

Terrace (stream) - An intermediate to high level area of alluvially deposited soil material.

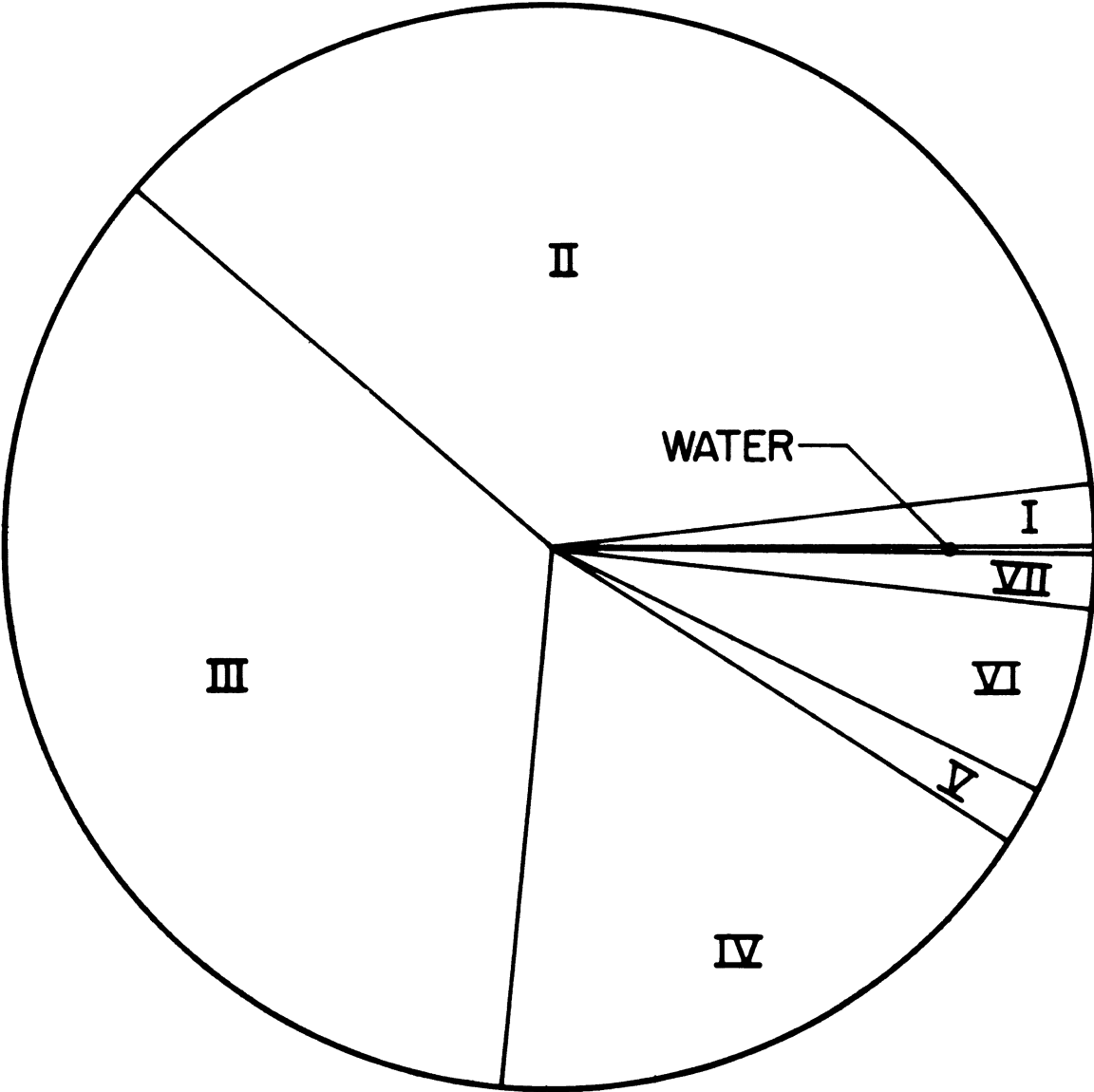
Texture - A soil class based on the relative proportions of sand, silt, and clay size particles.

GUIDE FOR TEXTURAL CLASSIFICATION



Soil Separate	Particle Diameter mm
Very Coarse Sand	.2.00-1.00
Coarse Sand	.1.00-0.50
Medium Sand	.0.50-0.25
Fine Sand	.0.25-0.10
Very Fine Sand	.0.10-0.05
Silt	.0.05-0.002
Clay	.Less Than 0.002

LAND CAPABILITY CLASS DISTRIBUTION OF SOILS IN ORANGE COUNTY



<u>LAND CAPABILITY CLASS</u>	<u>PERCENT OF COUNTY</u>
I	1.8
II	36.8
III	34.8
IV	17.3
V	1.8
VI	5.6
VII	1.8
WATER	0.1