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Moisture Characteristics of Tennessee Soils

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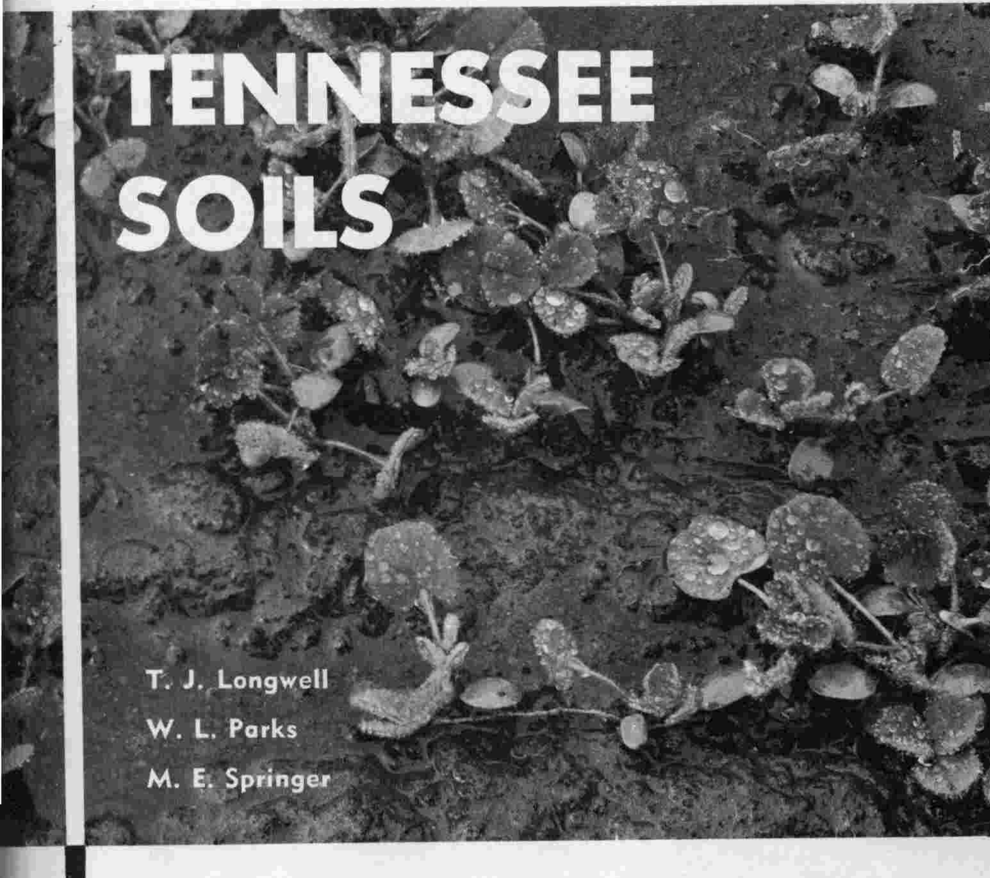

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in cooperation with the
Soil Conservation Service
U. S. Department of Agriculture

CONTENTS

MOISTURE CHARACTERISTICS OF REPRESENTATIVE TENNESSEE SOILS[1]

by

T. J. Longwell,[2] W. L. Parks,[3] and M. E. Springer[3]

INTRODUCTION

STORAGE and release of moisture are important factors affecting the use and conservation of soils. Soils differ greatly in their moisture holding capacities and the relative energies at which the moisture is held. Plants differ greatly in their capacity to utilize soil water. Thus, it is essential that a study of soil moisture properties be based on the adsorption energy of the water by the soil.

The soil moisture-crop relationships that must be considered in arriving at sound decisions about suitable uses of soils for crop production, particularly where irrigation is involved, include:

1. Amount of water held by a soil.
2. Moisture release patterns indicating the amounts of water held at different energy levels.
3. Moisture movement within a soil.
4. Extent of effective soil-plant root contact.

The physical measurements presented here may be useful in management and use of soils. In many cases, the data may be applied to other soils possessing similar properties.

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1. This work was conducted under Regional Research Project S-24 and the National Cooperative Soil Survey Program.

2. Soil Scientist, Soil Conservation Service, U.S. Department of Agriculture.

3. Professor and Associate Professor of Agronomy, University of Tennessee Agricultural Experiment Station, respectively.

Soils

Samples were taken from the main horizons of many of the important agricultural soils of Tennessee to investigate their physical properties. The samples were from soils in all parts of the State, were from many parent materials, and represent soils in several stages of development.

Locations of the general soil areas in Tennessee are shown in Figure 1. In west Tennessee are the Mississippi River bottoms, the loessial plains, and the coastal plains (Areas 13-17 in Fig. 1). Area 17, and the many smaller bottoms throughout the State, are largely Alluvial soils which are among the more productive soils in the State. The upland soils of Areas 16 and 15 were mainly developed in medium to deep loess. Well-drained Gray-Brown Podzolics and soils with fragipans at about 2 feet are quite extensive in this area.

Toward the eastern edge of Area 15, soils developed in Coastal Plain material are common – especially on the steeper slopes. In Areas 14 and 13 are mainly soils developed in Coastal Plain material with smaller acreages of soil from shallow loess over Coastal Plain material, principally on the gently-sloping uplands. Here, as in most of the Areas to the east, the soils are predominantly Red-Yellow-Podzolics with smaller acreages of soils with fragipans.

In Middle Tennessee are the Highland Rim (Areas 4, 7, 11, and 12 in Fig. 1) and the Central Basin (Areas 8, 9, and 10 in Fig. 1). Soils of the Highland Rim, many of which are cherty, were formed mainly from cherty limestone residuum. On the broad, gently-sloping plateaus, where the upper foot or two is derived from loess, the soils are more silty in nature and many, such as the Dickson silt loam, have fragipans. The soils in Area 4 were developed in old alluvium. The soils of the Central Basin were formed mainly from limestone residuum; shallow and rocky soils are commonly intermingled with the more productive soils.

In East Tennessee are the Cumberland Plateau and escarpment, the Great Valley and the Smoky Mountains (Areas 1, 2, 3, 5, and 6 and part of Area 4, the Sequatchie Valley, in Fig. 1). Soils of the escarpment (Area 5) and of the Cumberland Plateau (Area 6) were formed mainly from sandstone and shale. Again shallow and rocky soils are common.

Soils of the Great Valley (Areas 2 and 3) were developed in residuum from limestone, sandstone, and shale and in places from old alluvium. Here, as in Area 4, Reddish-Brown Lateritics are intermingled with the more prevalent Red-Yellow-Podzolic soils. Soils of Area 1, the Smoky Mountains, were not sampled. The Sequatchie Valley portion of Area 4 includes soils mainly from old alluvium.

Sampling sites were selected to represent important soil types of wide distribution and extent which are usually intensively farmed. Detailed

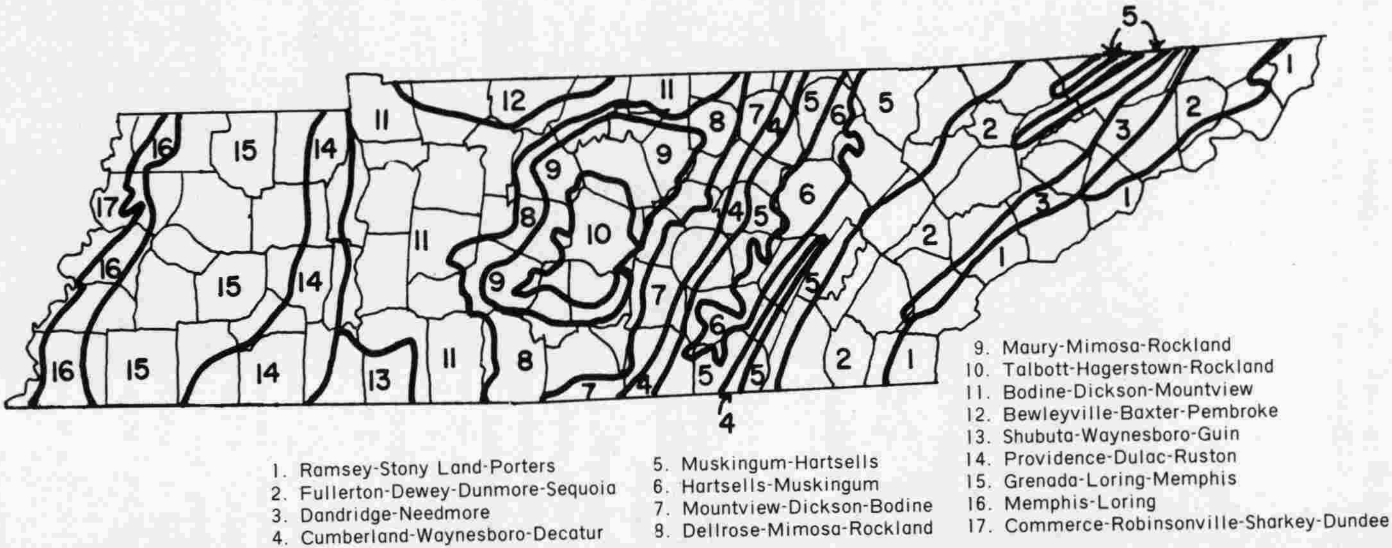


Figure 1. General soil areas of Tennessee.

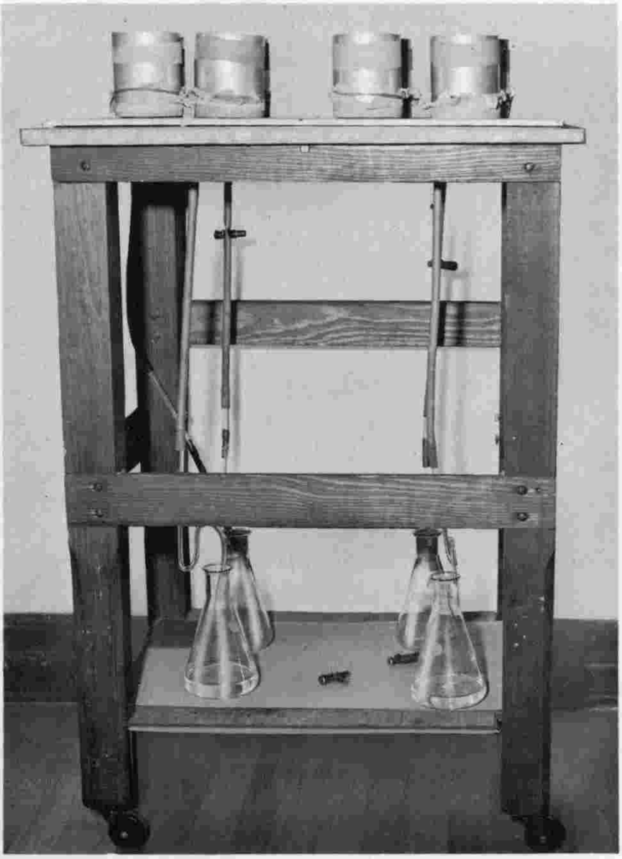
descriptions of each profile were made at the time of sampling but are not included in this report. Nomenclature used in descriptions was in accordance with the Soil Survey Manual (11).

Methods

Sites were selected and sampled by soil scientists of the Soil Conservation Service and the University of Tennessee. At each site two to five 3- x 3-inch core samples were obtained using Uhland's (12) methods. Bulk samples were also taken from each horizon. Capillary porosity and moisture content at 60 centimeters tension were determined from measurements on a tension table (Fig. 2). Saturated permeability, total porosity, and bulk densities were also determined on the cores.

The bulk samples were air-dried, ground, and sieved through a 2 millimeter sieve. Methods described by Richards and his co-workers

Figure 2. A moisture tension table used to determine capillary porosity and moisture content at 60 cm. tension.



(7, 8, 9, 10) were used to determine moisture contents at 1/3 atmosphere tension on the ceramic pressure plate apparatus, Figure 3, and at the 2, 5, 9 and 15 atmospheres tension by pressure membrane apparatus, Figure 4.

Figure 3. Saturated soil samples on a ceramic pressure plate for the 1/3 atmosphere tension determination.

Textures were estimated in the field at the time of sampling. Porosity was calculated from bulk density and 60 centimeters tension measurements. Available water holding capacities in percent by volume were calculated by two methods. Both used 15 atmosphere and bulk density determinations. One used the moisture content of sieved samples equilibrated at 1/3 atmosphere tension and the other used the moisture content of the core samples equilibrated at 60 centimeters tension as upper moisture limits. They are reported by horizon in inches of water per inch of soil depth.

All methods have certain limitations and the results from some samples may not reflect the exact moisture characteristics that exist under field conditions. The moisture held in the soil at low tensions is the moisture that occupies the larger pores. The surface soil generally has a greater percentage of large pores than other horizons. It also experiences the greatest change in pore size distribution over time as it is the cultivated horizon or the one most disturbed by man.

In such a system that is constantly changing, one would not expect a specific moisture content at field capacity as it would also be changing, being a function of the pore size distribution. The moisture content

Figure 4. Saturated soil samples on a pressure membrane for the 2, 5, 9 or 15 atmosphere tension determination.

at 15 atmospheres tension would not be so greatly affected. Consequently, the readings on the sieved samples seem to suffice for the wilting percentage. Field capacity actually is around 1/10 to 1/3 atmosphere tension (2, 3). It is perhaps close to 1/10 atmosphere for the coarser-textured soils but nearer to 1/3 atmosphere for the medium- to fine-textured soils. In these studies slightly over 70% of the surface samples had higher moisture contents at 60 centimeters tension on the core samples than at 1/3 atmosphere tension on sieved samples. However, in the subsoils only about 40% of the samples had higher moisture contents at 60 centimeters tension on core samples than at 1/3 atmosphere tension on sieved samples. This is essentially a reflection of the pore size distribution and bulk densities in the different horizons. Sieving of the subsoil samples changed the amount and size distribution of pores, resulting in an increase in the amount of larger pores generally filled at field capacity. Since the core samples from the A horizons had more pore space in the size range generally filled at field capacity, the net change by sieving was less than for the subsoils.

Since cherty soils were a special problem, samples for bulk density determinations were taken with a 12- x 12- x 6-inch sharpened steel frame. The weights of chert and fine soil were obtained after separation by sieving. Densities of the chert and the soil were determined. Moisture contents at the different moisture tensions were determined on the < 2 mm. soil fraction, and the available water holding capacities for the fine soil fractions were calculated. The volume of soil solids were calculated using a particle density of 2.60 for A horizons and 2.65 for all other horizons. These values represent the average from a large number of particle density measurements. The moisture holding capacity of the cherty soils was calculated from these determinations and it was assumed that the chert would not hold water for plant growth.

Results and Discussion

Data for each individual horizon of the different soils are presented in Tables 1, 2, and 3. Permeability rates in some of the samples were high. Some of these samples were probably obtained when the soil moisture content was below optimum for taking core samples. Sampling soil horizons – particularly fragipans – at lower than optimum moisture content may cause cracks in the cores that result in high permeability. Other samples probably contained earthworm or root channels that permitted rapid water movement through the core. A statistical study conducted by the Soil Conservation Service showed that the variability between cores selected at a site was large and that the variability between sites was equally large (6). The variability reported in this study is of comparable magnitude.

Volume composition at field capacity for profiles of four widely different Tennessee soils is shown in Figure 5. For simplicity, the water held between 1/3 and 15 atmospheres tension is assumed to be the available water holding capacity (A.W.H.C.). Decatur is a well-drained upland soil with a dark red clay B horizon. Falaya is a silty, somewhat poorly-drained first bottom soil. Calloway is a silty, somewhat poorly-drained soil with a fragipan. Crossville is a well-drained loamy soil underlain by sandstone.

In Table 4 are summarized the available water holding capacities of soils by regions and textures excluding the group of cherty soils. The available water holding capacities for the textural classes loam, silty clay loam, and silt loam were high with means ranging from 0.191 to 0.234 inches of available water per inch of soil depth. Silty clays, clay loams, and clays were medium in capacity with means ranging from 0.156 to 0.180 inches per inch. Coarser textures – fine sandy loams, sandy loams and loamy sands – also had lower means covering a wider range from 0.015 to 0.171 inches per inch.

The mean of 414 horizons was 0.203 inches of available water per inch of soil. Standard deviations of the means indicate the variability of the measurements in each textural classification where sample numbers were adequate.

The range in available water holding capacities within a given textural class may appear quite large. However, this may be expected when one considers the variation in the amount of sand, silt, clay, and organic matter within a textural class. Soil structure or arrangement of particles, as well as variations associated with the usual field estimates of textural class, may contribute further to differences in available water holding capacities.

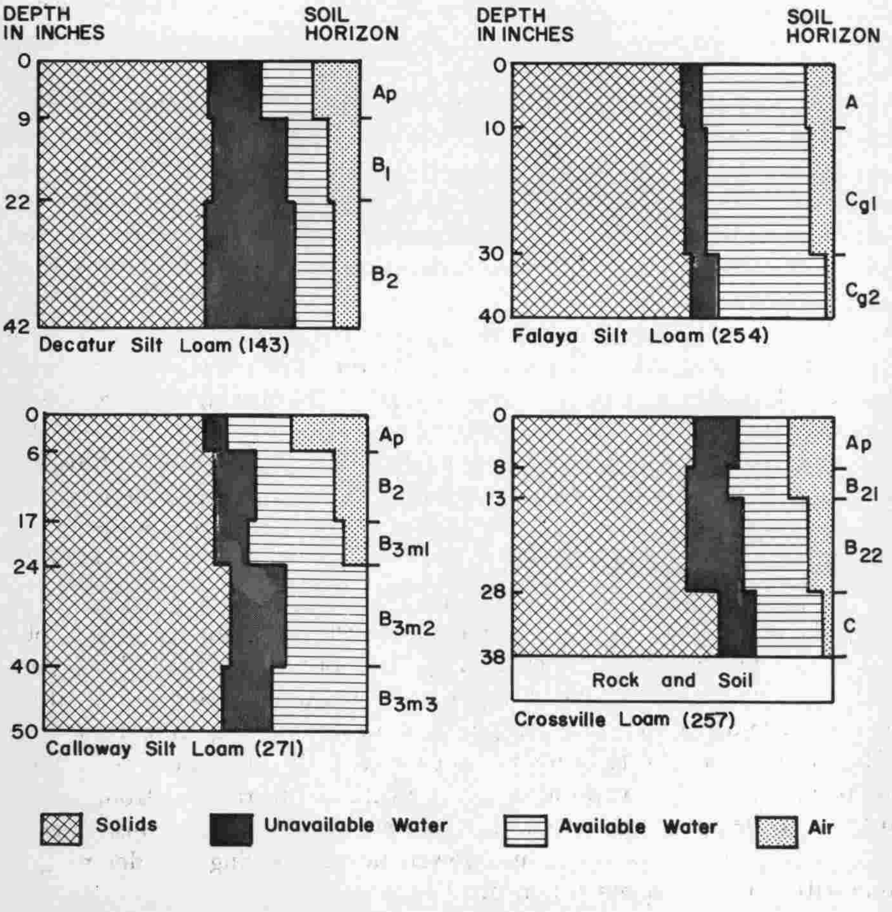


Figure 5. Volume composition of four soil profiles at field capacity.

Table 1. Selected physical properties of major horizons of 78 East Tennessee soils.

Lab. No.	Soil Series	Horizon texture*	Horizon and depth	Saturated permea-bility	Bulk density	Percent porosity: Total	Percent porosity: Aeration (at 60 cm. tension)	Percent moisture by weight at tension of: 60 cm.	1/3 Atm.	2 Atm.	5 Atm.	9 Atm.	15 Atm.	A.W.H.C. inches/inch: 1/3–15 Atm.	60 cm.–15 Atm.
			Inches	In./hr.	g/cc										
187	Chewacla	sil	Ap 0-7	15.17	1.36	47.7	11.7	26.5	27.0	17.9	14.3	11.5	11.3	.213	.207
		sil	Cl 7-20	15.89	1.51	43.0	8.1	23.1	24.6	16.7	13.3	11.2	10.1	.219	.196
		sil	Clg 20+	16.32	1.44	45.7	10.1	24.7	26.9	19.3	15.2	12.1	10.6	.235	.203
249	Colbert	sil	Al&A2 0-6	2.97	1.52	41.5	2.0	26.0	25.4	18.5	13.3	12.6	11.2	.216	.225
		c	B21 6-11	0.08	1.39	47.5	11.8	35.7	37.3	30.7	26.4	25.2	24.3	.181	.158
		c	B22 11-20	0.09	1.38	47.9	0	36.4	——	——	——	——	——	——	——
141	Colbert	sicl	Ap 0-8	——	1.31	49.6	8.2	31.6	26.9	18.8	16.4	13.8	12.2	.193	.254
		cl	C 8-28	——	1.38	47.9	11.7	26.2	35.1	27.5	26.2	23.9	22.2	.178	.055
166	Congaree	fsl	Ap 0-19	2.97	1.21	53.5	3.5	38.2	27.7	19.5	12.1	9.4	7.9	.240	.366
		fsl	C 19+	9.07	1.13	57.4	14.1	38.3	21.5	13.4	9.0	7.4	6.3	.172	.362
177	Congaree	fsl	Ap 0-7	2.24	1.33	48.8	7.6	31.0	18.3	12.7	7.9	5.7	5.0	.177	.346
		sil	C11 7-21	5.65	1.19	55.1	14.0	34.5	21.2	18.0	9.4	7.3	5.7	.184	.343
		sil	C12 21+	4.59	1.28	51.7	13.2	30.1	17.6	10.4	6.7	5.1	4.1	.173	.333
178	Congaree	sil	Ap 0-6	0.42	1.44	44.6	6.7	26.3	18.5	12.4	7.9	6.2	5.3	.190	.302
		sil	C11 9-29	5.01	1.49	43.8	7.1	24.6	22.2	16.5	12.0	9.5	8.4	.206	.241
		sil	C12 29+	4.92	1.52	42.6	7.0	23.4	23.0	17.6	12.7	10.3	9.0	.213	.219
230	Congaree	sl	Ap 0-11	——	1.35	48.1	——	——	10.3	8.0	5.4	3.9	3.2	.096	——
		sl	C 11-28	42.36	1.53	42.3	8.6	22.0	11.9	7.5	6.5	5.2	4.7	.110	.265
241	Congaree	sl	Ap 0-11	5.82	1.48	43.1	11.6	21.3	10.7	6.8	4.6	3.6	3.3	.110	.266
		ls	C 11-20	13.05	1.44	45.7	16.9	20.1	10.3	7.1	4.5	3.7	3.2	.102	.243
257	Crossville	l	Ap 0-8	1.61	1.47	43.5	7.2	24.7	20.2	14.2	11.1	9.7	8.7	.169	.235
		l	(B)21 8-13	4.15	1.44	45.7	10.2	24.6	22.6	16.0	11.8	9.7	9.0	.196	.225
		l	(B)22 13-28	2.89	1.43	46.0	8.4	26.3	26.9	18.3	14.3	12.5	12.8	.202	.193
		l	C 28-38	6.16	1.72	35.1	5.2	17.4	18.4	11.9	8.6	7.0	6.0	.213	.196

* sil = silt loam, c = clay, sicl = silty clay loam, cl = clay loam, fsl = fine sandy loam, sl = sandy loam, ls = loamy sand, l = loam.
**These soil names have been dropped and soils combined in present mapping.

Table 1 (Continued). Selected physical properties of major horizons of 78 East Tennessee soils.

Lab. No.	Soil Series	Horizon texture*	Horizon and depth	Saturated permea-bility	Bulk density	Percent porosity: Total	Percent porosity: Aeration (at 60 cm. tension)	Percent moisture by weight at tension of: 60 cm.	⅓ Atm.	2 Atm.	5 Atm.	9 Atm.	15 Atm.	A.W.H.C. inches/inch: ⅓– 15 Atm.	60 cm.– 15 Atm.
			Inches	In./hr.	g/cc										
266	Crossville	sl	A1 0-7	33.85	1.05	59.6	22.3	35.5	20.7	14.6	9.9	9.3	8.5	.131	.284
		l	(B) 7-17	34.67	1.19	55.1	27.8	22.9	14.9	10.9	8.4	7.2	6.7	.098	.193
273	Crossville	l	A1&A3 0-8	——	1.11	57.3	——	——	32.5	24.5	19.3	16.4	15.3	.191	——
		c	B2 8-14	——	1.17	55.8	——	——	31.4	24.7	18.5	16.9	15.9	.181	——
274	Crossville	l	A1&A3 0-5	——	1.22	53.1	——	——	27.0	15.6	9.9	8.2	7.9	.233	——
		l	(B)21 5-13	——	1.21	54.3	——	——	25.1	14.0	10.1	8.5	7.5	.213	——
		l	(B)22 13-22	——	1.41	46.8	——	——	22.9	13.4	8.6	7.1	6.9	.226	——
233	Cumberland	l	A 0-9	4.70	1.46	43.8	5.4	26.3	23.2	17.1	13.0	11.0	10.1	.191	.237
		cl	B1 9-15	7.63	1.44	45.7	10.3	24.6	22.7	16.8	12.6	11.2	10.2	.188	.207
		c	B21 15-25	24.11	1.31	50.6	18.8	24.3	23.2	16.4	12.5	11.0	9.9	.174	.189
		c	B22 25-39	13.92	1.43	46.0	12.3	23.6	24.0	17.7	14.0	12.5	11.3	.182	.176
		c	B31 39-54	7.48	1.51	43.0	5.9	24.6	24.9	18.6	16.3	15.5	14.0	.165	.160
		c	B32 54+	0.76	1.55	41.5	0	27.7	——	——	——	——	——	——	——
174	Cumberland	sicl	Ap 0-8	7.99	1.40	46.2	13.0	23.7	22.0	16.8	12.7	9.4	9.4	.176	.200
		sicl	A3 8-18	5.88	1.43	46.0	11.0	24.5	23.3	17.9	13.8	10.9	11.2	.173	.190
		cl	B2 18-28	6.78	1.40	47.2	11.8	25.3	23.9	18.6	15.5	12.4	12.6	.158	.178
175	Cumberland	sicl	Ap 0-8	4.84	1.36	47.7	11.8	26.4	22.4	16.4	12.5	9.0	9.2	.180	.234
		sicl	A3 8-18	2.77	1.42	46.4	10.8	25.1	23.0	17.5	13.8	11.0	11.2	.168	.197
		c	B2 18-39	2.16	1.46	44.9	5.5	27.0	24.7	19.2	16.0	12.9	13.2	.168	.201
181	Cumberland	sicl	Ap 0-5	16.42	1.46	43.8	11.2	22.3	21.6	15.1	11.8	10.2	9.6	.175	.185
		sicl	A3 5-14	6.03	1.46	44.9	9.9	24.0	24.9	20.2	15.8	14.6	14.0	.159	.146
		c	B21 14-34	0.79	1.30	50.9	9.7	31.7	32.3	25.4	21.6	20.3	19.8	.163	.155
		c	B22 34+	2.76	1.42	46.4	1.1	31.9	33.5	25.9	22.4	21.0	20.5	.185	.162
179	Cumberland	sil	Ap 0-7	0.82	1.56	40.0	6.3	21.6	21.9	15.6	11.5	10.1	9.4	.195	.190
		sicl	B1 7-14	3.31	1.57	40.8	11.1	18.9	20.4	15.5	12.0	10.7	9.7	.168	.144
		c	B2 14-56	0.26	1.76	33.6	0	24.7	25.5	19.3	15.2	13.9	12.8	.224	.209

180	Cumberland	sil	Ap 0-5	11.48	1.35	48.1	16.0	23.8	21.5	16.2	11.0	9.2	8.2	.180	.211
		cl	B1 5-14	16.76	1.39	47.6	14.1	24.1	25.0	18.9	15.3	13.6	13.0	.167	.154
		c	B2 14-56	3.65	1.23	53.6	18.9	28.2	29.0	22.6	18.8	16.9	17.5	.141	.132
227	Cumberland	sil	Ap 0-7	5.79	1.48	43.1	6.2	24.9	24.5	14.4	15.1	12.9	12.0	.185	.191
		sicl	A3 7-12	26.41	1.34	49.4	15.6	25.2	23.4	17.7	14.8	12.8	12.2	.150	.174
		c	B1 12-17	0.28	1.34	49.4	11.1	28.6	25.0	19.5	16.7	14.9	14.6	.139	.188
		c	B2 17-27	3.53	1.32	50.2	11.1	29.6	27.1	20.3	17.7	16.8	16.0	.146	.180
		c	B3 27+	2.48	1.31	50.6	12.0	29.5	26.6	21.6	19.6	19.0	17.8	.115	.153
143	Decatur	sil	Ap 0-9	9.48	1.39	46.5	11.9	24.9	23.6	19.2	14.9	13.2	11.8	.164	.182
		sicl	B1 9-22	2.49	1.45	45.3	8.6	25.3	24.6	20.2	17.5	16.2	15.3	.135	.145
		c	B2 22-42	0.79	1.39	47.5	4.8	30.7	28.8	25.9	22.6	21.0	20.1	.121	.147
151	Decatur	sil	Ap 0-8	3.72	1.37	47.3	11.3	26.3	21.8	18.0	14.4	12.7	11.4	.142	.204
		cl	B1 8-14	6.66	1.40	47.2	10.1	26.5	24.0	19.7	16.0	15.0	14.0	.140	.175
		c	B2 14-40	5.46	1.45	45.3	5.7	27.3	24.9	20.3	16.9	15.8	14.4	.152	.187
		c	C 40-60	3.68	1.46	44.9	3.7	28.2	26.0	22.7	20.3	20.0	18.1	.115	.147
164	Decatur	sil	Ap 0-8	17.01	1.23	52.7	19.5	27.0	21.8	17.2	12.4	10.3	8.3	.166	.230
		sicl	B1 8-14	20.25	1.30	51.0	17.2	26.0	22.1	17.2	13.0	11.2	9.3	.166	.217
		sicl	B2 14-40	20.38	1.32	50.2	18.9	23.7	22.2	19.0	14.0	12.1	10.6	.154	.173
		c	C 40-60	11.21	1.38	47.9	14.5	24.2	24.9	19.5	16.0	14.5	12.8	.167	.157
240	Decatur	sicl	Ap 0-8	2.84	1.37	47.3	10.3	27.0	26.3	21.4	17.8	16.2	15.4	.149	.159
		c	B1 8-20	10.42	1.22	54.0	15.1	31.9	30.4	26.0	22.6	21.7	20.3	.123	.142
		c	B2 20+	10.36	1.29	51.3	5.2	35.7	38.2	32.8	30.4	29.3	28.1	.130	.098
172	Dewey	sicl	Ap 0-8	14.61	1.39	46.5	13.8	23.5	21.1	16.7	13.3	11.1	11.1	.139	.172
		sicl	B2 8-18	6.60	1.52	42.7	8.2	22.7	23.1	17.9	13.8	12.4	11.6	.175	.169
		cl	B3 18-35	6.34	1.51	43.0	7.1	23.7	24.8	19.5	16.1	14.4	13.3	.174	.157
173	Dewey	sil	Ap 0-8	18.97	1.49	42.7	12.3	20.4	20.6	15.7	12.6	10.3	10.1	.156	.153
		sicl	B2 8-19	7.17	1.52	42.6	8.1	22.7	23.6	19.0	16.2	14.0	13.9	.147	.134
		c	B3 19-35	2.56	1.53	42.3	5.9	23.8	25.7	21.2	18.6	15.9	16.5	.141	.112
209	Dewey	sil	Ap 0-6	3.74	1.44	44.6	11.2	23.2	22.0	13.8	11.1	9.3	8.3	.197	.215
		cl	B1 6-15	11.89	1.46	44.9	13.9	21.2	21.4	14.2	11.6	9.7	8.7	.185	.183
		sicl	B2 15-25	2.90	1.54	41.9	8.0	22.0	22.0	15.9	13.8	12.1	10.4	.179	.179
		c	B3 25+	0.35	1.52	42.7	4.5	25.1	25.1	19.1	17.3	15.9	14.6	.160	.160

* sil = silt loam, c = clay, sicl = silty clay loam, cl = clay loam, fsl = fine sandy loam, sl = sandy loam, ls = loamy sand, l = loam.

**These soil names have been dropped and soils combined in present mapping.

Table 1 (Continued). Selected physical properties of major horizons of 78 East Tennessee soils.

Lab. No.	Soil Series	Horizon texture*	Horizon and depth	Saturated permea-bility	Bulk density	Percent porosity: Total	Percent porosity: Aeration (at 60 cm. tension)	Percent moisture by weight at tension of: 60 cm.	⅓ Atm.	2 Atm.	5 Atm.	9 Atm.	15 Atm.	A.W.H.C. inches/inch: ⅓– 15 Atm.	60 cm.– 15 Atm.
			Inches	In./hr.	g/cc										
149	Dunmore	l	Ap 0-7	12.85	1.33	48.9	17.5	23.6	19.8	14.2	9.1	6.8	6.0	.184	.234
		c	B1 7-13	3.01	1.60	39.6	10.0	18.5	17.8	14.5	11.6	9.9	8.9	.142	.154
		c	B21 13-22	1.58	1.44	45.7	6.8	27.0	26.0	23.2	21.3	20.5	19.9	.088	.102
		c	B22 22-28	0.29	1.26	52.5	8.4	35.0	33.8	31.0	28.7	27.7	27.0	.088	.101
		c	B3 28-45	6.11	1.23	53.6	10.4	35.1	34.4	31.6	29.7	28.9	28.1	.077	.086
152	Dunmore	sicl	B1 2-10	3.02	1.30	50.0	11.6	29.5	24.5	21.4	20.4	17.3	15.9	.112	.177
		c	B2 10-26	0.84	1.34	49.4	4.0	33.9	33.3	30.5	28.1	26.1	24.5	.118	.126
		c	B3 26-42	2.28	1.60	39.6	3.9	22.3	23.6	21.2	18.0	16.0	14.3	.149	.128
		sicl	C 42-58	1.72	1.55	41.5	6.9	22.3	—	—	—	—	—	—	—
169	Dunmore	sil	Ap 0-6	20.07	1.38	46.9	22.3	17.8	17.2	10.4	5.6	4.1	3.6	.188	.196
		cl	A3,B1 6-10	11.15	1.60	39.6	9.4	18.9	20.9	17.5	13.2	10.9	9.3	.186	.154
		sic	B21 10-18	13.09	1.47	44.5	10.1	23.4	27.8	23.4	20.3	19.0	12.2	.229	.165
		c	B22 18-26	3.90	1.45	45.3	7.2	26.3	28.3	25.4	22.6	22.3	20.5	.113	.084
		c	C 26-50	3.54	1.46	44.9	6.4	26.4	27.8	24.9	22.5	22.2	21.4	.093	.073
207	Dunmore	sil	Ap 0-7	1.33	1.57	39.6	3.6	22.9	22.7	14.6	12.1	10.5	9.2	.212	.215
		sicl	B1 7-18	6.92	1.48	44.2	9.0	23.8	23.9	15.6	13.1	11.6	10.4	.200	.198
		c	B21 18-26	1.93	1.48	44.2	6.6	25.4	26.6	19.6	17.8	16.6	15.5	.164	.147
		c	B22 26-40	1.66	1.53	42.3	0	29.2	33.0	24.7	22.7	21.1	19.8	.202	.144
150	Emory	sil	A 0-18	13.68	1.19	54.2	17.5	30.8	27.0	17.5	11.4	9.8	9.3	.211	.256
		cl	C 18-50	26.50	1.09	58.9	25.3	30.8	22.7	18.9	14.3	12.4	11.8	.119	.207
162	Emory	sil	A 0-14	17.68	1.18	54.6	15.2	33.4	29.8	23.4	19.5	16.6	15.0	.175	.217
		sil	C1 14-28	13.37	1.27	52.1	11.5	32.0	29.0	25.6	18.5	16.4	14.1	.189	.227
		sicl	C2 28-50	13.82	1.17	55.9	11.9	37.6	31.1	24.7	16.9	15.8	13.5	.206	.282
228	Emory	sil	Ap 0-11	2.00	1.51	41.9	3.4	25.5	25.0	16.4	12.6	11.0	9.8	.230	.237
		sil	C1 11-19	12.07	1.48	44.2	10.3	22.9	24.3	16.1	12.2	10.4	9.5	.219	.198
		cl	C2 19-31	5.74	1.59	40.0	6.0	21.4	23.9	17.5	14.5	12.8	13.2	.170	.130
		sic	B2b 31+	13.09	1.49	43.8	6.7	24.9	27.9	21.3	19.4	17.6	6.8	.314	.270

144	Fullerton	fsl	Ap 0-4	0.41	1.57	39.6	8.7	19.7	17.8	——	8.3	6.4	5.3	.196	.226
		c	B2 4-30	5.01	1.37	48.3	8.8	28.8	25.8	——	19.4	18.0	16.8	.123	.164
146	Fullerton	l	A1 0-8	19.71	1.47	43.5	13.5	20.4	14.5	9.1	5.2	3.8	3.6	.160	.247
		scl	B1 8-20	0.49	1.73	34.7	5.8	16.7	15.8	12.2	10.1	8.6	8.1	.133	.149
		sc	B2 20-28	3.12	1.44	45.7	7.1	26.8	23.9	17.4	15.7	17.2	18.0	.085	.127
191	Fullerton	l	Ap 0-6	5.62	1.53	41.2	15.5	16.8	12.3	8.4	6.3	5.1	4.6	.118	.187
		sicl	B1 6-13	9.38	1.62	38.8	11.3	17.0	18.2	13.3	11.4	10.6	10.1	.131	.112
		sicl	B21 13-21	20.55	1.41	46.8	14.1	23.2	21.4	16.3	14.2	13.5	12.9	.120	.145
		cl	B22 21+	3.31	1.59	40.0	6.0	21.4	23.5	17.1	15.8	14.6	14.0	.151	.118
206	Fullerton	l	Ap 0-8	2.57	1.52	41.5	12.5	19.1	15.7	9.0	7.3	6.2	5.6	.154	.205
		sicl	A3,B1 8-13	2.91	1.51	43.0	11.0	21.2	18.5	13.4	11.9	11.0	10.0	.128	.169
		sicl	B21 13-22	0.06	1.49	43.8	0	33.7	23.3	16.6	15.3	14.1	13.3	.149	.304
		cl	B22 22+	0.23	1.44	45.7	10.1	24.7	23.2	16.8	15.3	14.5	13.6	.138	.160
226	Fullerton	l	Ap 0-7	13.50	1.48	43.1	11.6	21.3	18.8	10.4	6.6	5.1	4.9	.206	.243
		sicl	B1 12-16	10.08	1.54	41.9	11.4	19.8	18.3	10.6	7.7	6.3	6.0	.189	.213
		c	B2 16-45	4.26	1.52	42.7	9.6	21.8	20.4	13.3	10.6	8.9	8.7	.178	.199
147	Fullerton	sil	A2 0-7	28.58	1.15	55.8	24.1	27.6	20.8	18.4	12.4	9.4	8.8	.138	.216
		sicl	B1 7-19	11.62	1.47	44.5	11.4	22.5	20.4	16.8	13.1	11.5	10.7	.143	.173
		sic	B2 19-35	5.39	1.38	47.9	10.2	27.3	27.2	23.1	20.5	18.4	18.2	.124	.126
197	Fullerton	sil	Ap 0-6	11.31	1.49	42.7	14.2	19.1	17.9	11.2	8.1	6.1	5.1	.191	.209
		sicl	B1 6-13	15.61	1.50	43.4	15.0	18.9	19.9	14.5	10.8	8.8	7.4	.188	.173
		sicl	B2 13-36	8.95	1.64	38.1	7.4	17.8	21.5	14.7	11.9	10.2	9.2	.202	.141
186	Fullerton	sil	Ap 0-7	22.27	1.50	42.3	12.4	19.9	23.9	13.4	7.5	5.8	4.9	.285	.225
		sicl	A3,B1 7-16	3.21	1.64	38.1	6.3	19.4	20.6	13.7	9.3	7.2	6.4	.233	.213
		sic	B2 16-24	6.82	1.61	39.3	7.3	19.9	23.4	16.8	14.0	12.0	11.3	.195	.138
		c	C 24+	4.46	1.56	41.1	5.8	22.6	26.7	19.6	17.4	15.9	14.8	.186	.122
184	Greendale	sil	Ap 0-9	7.96	1.41	45.8	14.4	22.3	25.4	16.2	11.3	9.5	8.0	.245	.202
		sil	C11 9-20	10.06	1.54	41.9	10.8	20.2	21.9	14.8	10.9	8.9	7.7	.219	.193
		sicl	C12 20-30	5.23	1.45	45.3	12.2	22.8	22.8	18.2	8.5	13.1	12.5	.149	.149
		sicl	C13 30+	3.55	1.44	45.7	11.3	23.9	27.1	20.5	18.5	17.0	16.2	.157	.111
153	Groseclose	sil	Ap 0-7	11.86	1.48	43.1	11.4	21.4	21.8	15.4	7.8	5.0	4.4	.258	.252
		sicl	B2 11-24	1.97	1.63	38.5	6.6	19.6	22.3	17.7	12.8	10.8	9.8	.204	.160
		sicl	C 28-60	4.50	1.61	39.3	8.2	19.3	——	——	——	——	——	——	——

* sil = silt loam, c = clay, sicl = silty clay loam, cl = clay loam, fsl = fine sandy loam, sl = sandy loam, ls = loamy sand, l = loam.
**These soil names have been dropped and soils combined in present mapping.

Table 1 (Continued). Selected physical properties of major horizons of 78 East Tennessee soils.

Lab. No.	Soil Series	Horizon texture*	Horizon and depth	Saturated permea-bility	Bulk density	Percent porosity: Total	Percent porosity: Aeration (at 60 cm. tension)	Percent moisture by weight at tension of: 60 cm.	⅓ Atm.	2 Atm.	5 Atm.	9 Atm.	15 Atm.	A.W.H.C. inches/inch: ⅓–15 Atm.	60 cm.–15 Atm.
			Inches	In./hr.	g/cc										
157	Hartsells	fsl	Ap 0-6	6.78	1.31	49.6	13.1	27.9	24.4	16.1	10.1	7.5	6.9	.229	.275
		l	B1 6-15	8.76	1.41	46.8	9.7	26.3	24.5	19.3	13.7	11.4	10.0	.204	.230
217	Hartsells	vfsl	Ap 0-8	10.44	1.36	47.7	11.0	27.0	25.6	11.8	8.5	6.6	5.4	.275	.294
		l	B2 8-15	3.26	1.52	42.6	5.8	24.2	25.7	16.7	12.1	10.4	10.7	.228	.205
		cl	B3 15-24	1.33	1.65	37.7	0.1	22.8	28.4	19.3	16.3	14.7	13.8	.241	.149
202	Hermitage	sil	Ap 0-10	14.28	1.42	45.4	10.6	24.5	26.2	19.5	17.1	15.1	14.0	.173	.149
		sicl	B1 10-16	15.62	1.40	47.2	12.6	24.7	27.3	19.6	17.3	15.5	14.1	.185	.148
		sic	B2 16-30	18.25	1.40	47.2	12.6	24.7	27.2	20.1	18.1	16.1	15.1	.169	.134
205	Hermitage	sil	Ap 0-9	11.11	1.19	54.2	18.1	30.3	26.6	19.1	16.4	13.9	13.2	.159	.203
		sicl	A3 9-14	2.29	1.44	44.6	5.9	26.9	26.9	20.5	18.4	16.5	15.3	.167	.167
		sicl	B1 14-22	1.12	1.45	45.3	6.0	27.1	29.8	22.5	20.6	18.7	17.5	.178	.139
		c	B2 22+	0.30	1.44	45.7	1.3	30.8	32.5	25.9	24.1	21.8	20.6	.171	.147
216	Holston	vfsl	Ap 0-10	12.15	1.44	44.6	13.4	21.7	21.3	10.1	6.1	4.5	3.6	.255	.261
		vfsl	A3 10-19	2.66	1.70	34.6	5.4	17.2	18.5	10.5	6.9	5.1	4.3	.241	.219
		l	B1 19-27	2.79	1.47	44.5	19.3	17.1	20.9	14.0	10.1	8.2	7.2	.201	.146
		cl	B2 27-34	2.99	1.44	45.7	15.7	22.9	27.9	20.4	18.0	16.4	15.2	.183	.111
		sc	C 34+	1.41	1.43	46.0	10.8	24.6	—	—	—	—	—	—	—
182	Huntington	sil	Ap 0-7	3.26	1.54	40.8	7.5	21.6	23.7	17.5	14.0	12.2	12.6	.171	.139
		sil	C11 7-16	4.93	1.65	37.7	5.9	19.3	22.8	17.2	13.2	11.1	10.7	.200	.142
		sicl	C12 16+	0.45	1.74	34.3	1.2	19.0	25.7	20.2	15.3	12.9	11.4	.249	.132
183	Huntington	sil	Ap 0-11	20.52	1.35	48.1	12.9	26.1	27.8	22.8	17.3	15.9	15.6	.165	.142
		sicl	C11 11-16	16.02	1.55	41.5	4.9	23.6	28.1	22.3	18.7	17.0	16.9	.174	.104
		sicl	C12 16-34	5.05	1.60	39.6	4.1	22.2	27.3	22.4	18.2	16.3	16.9	.166	.085
145	Huntington (Emory)	sil	Ap 0-6	5.62	1.39	46.5	8.6	27.3	27.6	22.0	17.2	13.7	13.6	.194	.190
		sicl	C11 6-14	13.97	1.41	46.8	11.4	25.1	26.0	21.2	16.6	14.5	13.6	.175	.162
		sicl	C12 14-40	27.82	1.19	55.1	13.1	35.3	29.8	23.1	17.3	16.9	15.4	.171	.237

208	Huntington	sil	Ap 0-11	14.00	1.27	51.2	15.6	28.0	28.5	20.5	16.2	14.5	13.3	.193	.187
	(Emory)	sicl	C11 11-27	14.63	1.28	51.7	16.9	27.2	26.9	18.7	15.5	13.3	12.0	.191	.195
		sicl	C12 27+	7.46	1.38	47.9	11.4	26.3	26.4	17.8	14.9	13.1	12.0	.199	.197
142	Huntington	sicl	Ap 0-9	25.33	1.32	49.2	9.2	30.3	27.3	——	17.6	16.1	14.6	.168	.207
	(Emory)	sicl	C 9-45	2.58	1.49	43.8	6.0	25.4	25.6	——	15.9	14.5	13.0	.188	.185
139	Lindside	sil	Ap 0-6	17.16	1.32	49.2	14.5	26.2	30.5	——	21.8	18.5	18.2	.162	.106
	(Hamblen)**	sl	C 6-40	8.90	1.54	41.9	8.6	21.6	19.8	——	11.6	10.5	9.4	.160	.188
167	Lindside	sil	Ap 0-10	7.57	1.37	47.3	12.1	25.7	21.2	15.0	10.4	8.5	7.8	.184	.245
	(Hamblen)**	sil	C11 10-22	8.96	1.35	49.1	9.0	29.7	21.4	15.8	10.8	8.6	7.1	.193	.305
		sil	C12 22+	15.15	1.46	44.9	7.4	25.7	22.9	18.4	14.1	11.4	9.4	.197	.238
154	Lindside	sil	Ap 0-6	9.14	1.43	45.0	11.1	23.7	25.7	19.6	14.5	13.2	12.0	.196	.167
		sicl	C 6-15	13.49	1.38	47.9	13.3	25.1	24.6	19.7	14.5	13.0	11.7	.178	.185
242	Litz	sil	Ap 0-5	9.16	1.40	46.2	8.1	27.2	31.8	27.3	20.8	18.5	17.6	.199	.134
		sic	C1 5-11	21.58	1.28	51.7	17.9	36.4	36.3	29.7	24.5	22.3	22.5	.177	.178
243	Litz	sil	Ap 0-6	34.64	1.12	56.9	23.0	30.3	27.0	23.6	19.6	17.5	16.3	.120	.157
		sic	C1 6-14	20.34	1.30	51.0	11.3	30.5	29.0	24.3	20.5	18.4	16.9	.157	.177
		c	C2 14+	26.90	1.28	51.7	11.1	31.7	31.7	26.3	22.9	20.7	18.1	.174	.174
244	Litz	sil	Ap 0-6	2.88	1.35	48.1	9.4	28.7	23.4	18.8	14.8	13.5	12.8	.143	.215
		sicl	C1 6-13	11.65	1.35	49.1	5.9	32.0	27.5	21.9	19.1	17.7	16.7	.159	.207
200	Melvin	sil	Ap 0-6	16.56	1.31	49.6	9.8	30.4	30.3	18.6	14.5	13.1	11.3	.249	.250
		sicl	Cg 6-19	16.26	1.47	44.5	7.3	25.3	25.8	15.4	12.6	10.6	9.5	.240	.232
		sicl	Cgg 19+	14.86	1.45	45.3	10.4	24.1	24.9	13.3	10.5	8.7	7.7	.249	.238
225	Needmore	sil	Ap 0-10	7.56	1.26	51.5	9.9	33.0	27.3	20.4	11.7	8.6	8.2	.241	.312
		sicl	B1 12-20	1.06	1.54	41.9	3.2	25.1	26.7	20.8	16.1	12.6	11.6	.232	.208
		sic	B2 20-28	0.75	1.57	40.8	0.8	25.5	28.3	23.0	19.7	16.3	15.3	.204	.160
		c	B3 28-35	5.79	1.43	46.0	0.7	31.7	34.3	27.6	24.2	23.5	22.2	.173	.136
220	Philo	sil	Ap 0-7	14.13	1.13	56.6	24.6	38.2	36.8	27.5	20.4	18.6	16.5	.229	.245
		sicl	C1 7-12	8.07	1.27	52.1	8.7	34.2	35.8	25.3	19.3	16.8	15.2	.262	.241
		sicl	C2g 12-20	16.03	1.32	50.2	9.9	30.5	34.3	26.9	21.2	18.7	18.7	.206	.156
		sicl	C2gg 20+	6.45	1.45	45.3	2.5	29.5	35.0	27.8	22.6	18.9	19.4	.226	.146

* sil = silt loam, c = clay, sicl = silty clay loam, cl = clay loam, fsl = fine sandy loam, sl = sandy loam, ls = loamy sand, l = loam.

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Table 1 (Continued). Selected physical properties of major horizons of 78 East Tennessee soils.

Lab. No.	Soil Series	Horizon texture*	Horizon and depth	Saturated permea-bility	Bulk density	Percent porosity: Total	Percent porosity: Aeration (at 60 cm. tension)	Percent moisture by weight at tension of: 60 cm.	⅓ Atm.	2 Atm.	5 Atm.	9 Atm.	15 Atm.	A.W.H.C. inches/inch: ⅓– 15 Atm.	60 cm.– 15 Atm.
			Inches	In./hr.	g/cc										
268	Robertsville	sil	Ap 0-6	15.85	1.29	50.4	8.7	32.3	30.2	21.7	17.2	16.0	14.4	.204	.231
		sicl	B3ml 6-16	2.37	1.50	43.4	0	25.3	24.4	16.2	11.3	11.0	8.6	.237	.251
		sic	B3m2 16-28	1.08	1.57	40.8	0	28.0	25.2	19.0	15.6	14.8	13.4	.185	.229
		c	B3m3 28+	1.15	1.48	44.2	2.8	28.0	31.5	24.3	21.6	20.1	18.8	.188	.136
148	Sequoia	sil	A2 0-6	7.72	1.24	52.3	15.8	29.4	23.7	17.1	12.3	9.7	9.1	.181	.252
		sic	B1 6-12	7.78	1.40	47.2	10.0	26.6	25.9	19.8	18.0	16.0	14.9	.154	.164
		sic	B2 12-31	1.65	1.33	49.8	3.5	34.8	31.5	27.3	23.5	20.9	19.5	.160	.203
		—	C 31-35	2.52	1.35	49.0	4.6	32.9	—	—	—	—	—	—	—
165	Sequoia	sil	Ap 0-7	5.34	1.38	46.9	13.0	24.5	22.5	17.3	12.9	11.0	8.7	.190	.218
		sic	B2 7-29	8.00	1.52	42.7	12.3	23.9	27.2	21.0	17.6	15.5	13.7	.205	.154
		sic	C 29-45	3.52	1.52	42.7	2.0	26.8	29.8	23.6	20.3	18.3	15.8	.213	.167
176	Sequoia	sil	Ap 0-7	3.00	1.38	46.9	9.6	27.0	23.0	17.0	12.6	10.1	9.4	.188	.243
		sic	B2 7-15	0.72	1.53	42.3	2.4	26.1	26.7	21.1	18.4	14.5	14.0	.194	.185
		sic	C 15+	3.28	1.49	43.8	3.7	26.9	28.5	23.6	16.5	16.0	16.0	.186	.162
188	Sequoia	sil	Ap 0-7	4.62	1.39	46.5	9.4	26.7	28.1	18.5	13.5	10.2	9.7	.256	.236
		cl	B1 7-16	4.26	1.55	41.5	5.6	23.1	25.6	20.7	16.3	13.6	12.1	.209	.171
		sic	B2 16-25	15.74	1.35	49.1	4.8	32.8	40.0	34.3	28.8	26.7	26.1	.188	.090
190	Sequoia	sil	Ap 0-7	6.74	1.48	43.1	9.2	22.9	23.2	15.4	11.8	9.4	8.5	.218	.213
		sil	A3,B1 7-13	11.86	1.49	43.8	10.6	22.3	24.8	18.3	15.6	13.0	11.6	.197	.159
		sic	B2 13-22	12.61	1.51	43.0	5.6	24.8	29.0	24.4	20.9	18.4	16.6	.187	.124
		c	C 22+	10.84	1.50	43.4	2.1	27.5	36.3	31.2	27.2	24.4	22.8	.203	.071
201	Sequoia	sil	Ap 0-6	25.16	1.40	46.2	12.0	24.4	26.9	18.1	15.2	13.0	12.3	.204	.169
		sicl	B1 6-16	23.36	1.38	47.9	14.5	24.2	24.2	18.5	16.1	14.9	13.7	.145	.145
		sic	B2 16-25	14.43	1.52	42.7	8.8	23.3	29.2	22.7	20.8	19.0	18.4	.164	.074
		sic	C 25+	16.49	1.44	45.7	9.1	25.4	29.9	24.3	22.8	20.2	17.8	.174	.109

229	Staser	fsl	Ap 0-11	0.96	1.61	38.1	5.4	20.3	14.0	9.0	6.0	4.6	3.7	.166	.267
		l	C1 11-20	2.98	1.57	40.8	5.8	22.3	17.9	10.5	7.0	6.7	5.1	.201	.270
		l	A1b 20+	5.79	1.34	49.4	14.6	26.0	24.9	15.6	11.6	9.8	8.1	.227	.240
140	Staser	sil	Ap 0-12	12.93	1.34	48.5	10.8	28.1	27.5	——	12.8	10.8	9.2	.245	.253
		sil	C1 12-50	9.87	1.37	48.3	9.9	28.0	27.9	——	12.4	10.6	9.3	.255	.256
168	Staser	sil	Ap 0-8	1.42	1.43	45.0	8.2	25.7	20.3	15.2	10.7	8.3	7.5	.183	.260
		sil	C11 8-22	16.37	1.55	41.5	10.8	19.8	18.2	13.9	10.2	8.0	7.0	.174	.198
		sil	C12 22-50	20.66	1.36	48.7	9.1	29.1	27.6	24.0	19.3	17.8	17.5	.137	.158
259	Talbott	sil	Ap 0-6	8.00	1.30	50.0	9.0	31.5	28.3	20.8	14.9	14.1	11.7	.216	.257
		sic	B1 10-15	11.52	1.46	44.9	9.0	24.6	25.0	19.7	16.6	14.8	13.4	.169	.164
		c	B2 15-24	18.54	1.33	49.8	3.9	34.5	35.5	29.2	26.8	25.7	24.1	.152	.138
219	Tellico	sicl	Ap 0-9	10.40	1.49	42.7	8.9	22.7	21.5	15.4	12.7	11.5	10.7	.161	.179
		cl	B1 9-19	20.27	1.39	47.6	13.8	24.3	24.2	18.6	15.8	14.7	14.1	.140	.142
		c	B2 19-29	2.30	1.39	47.6	9.1	27.7	27.7	21.2	18.4	17.1	16.5	.156	.156
		c	B3 29-45	1.86	1.38	47.9	7.1	29.6	28.3	22.5	19.9	18.6	18.0	.142	.160
218	Tilsit	fsl	Ap 0-8	11.05	1.29	50.4	18.1	25.0	19.2	10.2	6.5	5.1	4.8	.186	.261
		sicl	B2 8-24	26.82	1.41	46.8	14.1	22.7	20.6	13.3	9.2	7.9	7.2	.189	.223
		scl	B3m 24-32	6.88	1.67	37.0	3.3	20.2	21.6	13.1	9.7	8.5	7.9	.229	.205
185	Waynesboro	l	Ap 0-6	17.25	1.45	44.2	14.5	20.5	21.1	14.1	11.1	9.7	8.9	.178	.168
		l	A3 6-12	14.92	1.55	41.5	13.1	18.3	20.6	15.4	12.7	10.5	10.0	.164	.129
		sicl	B1 12-22	23.31	1.44	45.7	14.9	21.4	22.5	15.9	13.3	11.8	11.1	.164	.148
		cl	B2 22+	6.57	1.45	45.3	10.2	24.2	26.3	18.6	16.5	15.3	14.4	.173	.142
189	Waynesboro (Dunmore)	sil	Ap 0-9	1.22	1.47	43.5	7.2	24.7	20.3	8.6	4.9	3.8	3.3	.250	.315
		sil	A3 9-13	4.48	1.52	41.6	11.2	20.0	19.3	10.0	6.2	4.7	4.1	.231	.242
		c	B1 13-26	9.87	1.44	45.7	15.0	21.3	26.5	18.1	15.9	14.5	13.6	.186	.111
		cl	B2 26+	8.82	1.44	45.7	15.0	21.3	19.7	12.1	8.7	6.8	6.6	.189	.212
212	Wolftever	l	Ap 0-8	8.69	1.42	45.4	8.1	26.3	23.2	14.8	11.3	9.0	7.8	.219	.263
		sicl	B21 14-24	1.63	1.55	41.5	2.7	25.0	28.8	21.0	18.0	17.0	15.4	.208	.149
		sicl	B22 24-32	2.32	1.51	43.0	3.1	26.4	32.0	21.9	18.2	15.8	14.6	.263	.178
		scl	B3 32-48	1.79	1.56	41.1	1.5	25.4	29.4	19.7	16.4	13.9	12.5	.264	.201

*** sil = silt loam, c = clay, sicl = silty clay loam, cl = clay loam, fsl = fine sandy loam, sl = sandy loam, ls = loamy sand, l = loam.**

****These soil names have been dropped and soils combined in present mapping.**

Table 2. Selected physical properties of major horizons of 27 Middle Tennessee soils.

Lab. No.	Soil Series	Horizon texture*	Horizon and depth	Saturated permea-bility	Bulk density	Percent porosity: Total	Percent porosity: Aeration (at 60 cm. tension)	Percent moisture by weight at tension of: 60 cm.	⅓ Atm.	2 Atm.	5 Atm.	9 Atm.	15 Atm.	A.W.H.C. inches/inch: ⅓–15 Atm.	60 cm.–15 Atm.
			Inches	In./hr.	g/cc										
247	Bewleyville	sil	Ap 0-6	1.04	1.57	39.6	3.6	22.9	20.6	10.0	6.6	5.8	4.7	.250	.286
		sil	B1 6-12	12.87	1.56	41.1	5.8	22.6	22.3	14.6	10.7	9.6	8.6	.214	.218
		sicl	B2 12-19	7.11	1.52	42.6	6.4	23.8	24.8	16.1	11.9	11.1	9.9	.226	.211
		sicl	B3 19-29	4.82	1.54	41.9	5.2	23.8	25.0	17.8	15.0	13.9	13.0	.185	.166
		sic	Bb 29+	2.23	1.47	44.5	6.1	26.1	27.6	21.6	19.4	18.6	17.7	.146	.123
160	Dickson	sil	A2 1-6	7.76	1.23	52.7	15.1	30.6	25.8	10.1	5.8	4.5	4.1	.267	.326
		sil	B2 11-23	5.30	1.51	43.0	0	23.6	24.4	15.9	10.1	9.6	8.5	.240	.228
		sil	B3m 27-48	2.08	1.65	37.7	5.5	19.5	23.7	15.1	10.8	9.1	9.1	.241	.172
		sicl	D 48+	0.91	1.53	42.3	4.4	24.8	——	——	——	——	——	——	——
161	Dickson	sil	A2 1-6	2.16	1.32	49.2	9.9	29.8	25.0	12.6	4.9	3.7	3.6	.282	.346
		sil	B1 6-11	9.72	1.31	50.6	17.3	25.4	22.9	14.2	7.9	5.8	5.3	.231	.263
		sil	B2 11-24	6.06	1.43	46.0	11.4	24.2	24.8	15.9	10.4	8.7	7.9	.242	.233
		sil	B3m 28-46	3.55	1.60	39.6	6.8	20.5	23.3	15.7	10.3	8.5	7.9	.246	.202
199	Dickson	sil	Ap 0-12	4.05	1.32	49.2	13.3	27.2	26.2	12.8	9.6	7.6	6.9	.255	.268
		sicl	B2 12-27	18.22	1.39	47.5	11.1	26.2	28.9	16.0	12.2	11.2	10.3	.259	.221
		sil	B3m 27-34	21.54	1.40	47.2	9.7	26.8	28.7	15.1	11.7	10.1	9.4	.270	.244
		sil	C 34+	23.87	1.37	48.3	12.1	26.4	27.3	17.1	14.7	12.6	11.4	.218	.206
211	Dickson	sil	Ap 0-6	1.39	1.42	45.4	6.5	27.4	26.7	10.1	6.0	5.1	4.9	.310	.320
		sicl	B2 6-21	2.81	1.47	44.5	9.5	23.8	22.6	11.0	7.1	5.7	4.8	.262	.279
		sicl	B3m 21-38	0.61	1.65	37.7	5.0	19.8	23.4	12.2	8.6	7.2	6.5	.279	.219

235	Dickson	sil	Ap 0-6	0.86	1.57	39.6	4.3	22.5	21.4	10.0	5.3	4.1	3.7	.278	.295
		sicl	B2 8-24	2.52	1.60	39.6	5.2	21.5	22.6	13.5	8.2	6.8	6.0	.266	.248
		sicl	B3m 24-42	2.20	1.75	34.0	3.4	17.5	24.2	13.5	8.3	7.1	6.1	.299	.200
260	Ennis	sil	Ap 0-11	1.94	1.47	43.5	5.4	25.9	22.0	12.0	8.6	7.5	7.0	.221	.278
		sil	C1 11-20	5.13	1.34	49.4	10.5	29.0	22.0	9.4	6.6	5.8	5.2	.225	.319
156	Ennis	sil	Ap 0-6	2.42	1.25	51.9	14.8	29.7	22.9	12.4	7.2	6.2	5.5	.218	.303
		sil	C 6-15	3.88	1.32	50.2	12.2	28.8	24.0	13.9	7.8	6.7	5.8	.240	.304
221	Etowah	sil	Ap 0-6	1.04	1.46	43.8	6.9	25.3	25.9	12.7	8.7	7.4	6.8	.279	.270
		sil	B1 11-20	6.26	1.52	42.6	9.5	21.8	25.3	15.6	11.2	10.1	9.6	.239	.185
		sicl	B21 20-30	7.55	1.61	39.2	6.7	20.2	27.6	17.5	13.2	12.4	12.1	.250	.130
		sicl	B22 30-60	2.84	1.57	40.8	3.6	23.7	29.1	19.4	16.7	15.3	14.7	.226	.141
234	Guthrie	sil	Ap 0-5	2.19	1.33	48.8	9.4	29.6	30.5	13.0	5.8	4.7	3.7	.356	.344
		sil	Bg 5-24	1.59	1.38	47.9	9.8	27.6	27.4	12.7	5.6	4.3	3.7	.327	.330
163	Guthrie	sil	A2 1-5	1.86	1.43	46.0	9.8	25.3	23.2	16.4	11.8	10.3	9.0	.203	.233
		sicl	Bg 5-28	3.32	1.45	45.3	7.0	26.4	23.3	14.5	8.3	6.6	5.7	.255	.300
224	Lindside	l	Ap 0-8	1.42	1.25	51.9	14.3	30.1	27.0	14.1	11.0	9.2	9.0	.225	.264
		l	C1 8-22	7.37	1.23	53.6	17.7	29.2	22.3	11.7	9.1	8.0	7.8	.178	.263
		fsl	C2g 22-38	3.86	1.50	43.4	8.1	23.5	18.2	9.6	7.6	6.9	6.6	.174	.254
155	Maury	sil	Ap 0-8	12.56	1.38	46.9	10.3	26.5	23.8	16.1	9.7	8.4	7.5	.225	.262
		sicl	B2 8-30	4.12	1.46	44.9	8.5	24.9	25.3	15.8	10.0	9.0	8.2	.250	.244
194	Maury	sil	Ap 0-8	2.31	1.41	45.8	11.5	24.3	29.4	17.5	13.6	10.8	10.3	.269	.197
		sicl	B21 8-19	6.68	1.49	43.8	14.1	19.9	25.6	17.8	14.7	12.4	11.7	.207	.122
		sicl	B22 19-34	8.56	1.59	40.0	12.7	17.2	29.8	20.0	17.2	15.4	14.4	.245	.045
		sic	B3 34+	12.60	1.53	42.3	13.2	19.0	29.7	30.3	17.4	14.8	14.6	.231	.067

* sil = silt loam, sicl = silty clay loam, sic = silty clay, c = clay, l = loam, fsl = fine sandy loam.

** Currently mapped Waynesboro but was originally mapped Cookeville.

Table 2 (Continued). Selected physical properties of major horizons of 27 Middle Tennessee soils.

Lab. No.	Soil Series	Horizon texture*	Horizon and depth	Saturated permea- bility	Bulk density	Percent porosity: Total	Percent porosity: Aeration (at 60 cm. tension)	Percent moisture by weight at tension of: 60 cm.	⅓ Atm.	2 Atm.	5 Atm.	9 Atm.	15 Atm.	A.W.H.C. inches/inch: ⅓– 15 Atm.	60 cm.– 15 Atm.
			Inches	In./hr.	g/cc										
195	Maury	sil	Ap 0-7	5.53	1.44	45.7	13.0	22.7	22.4	11.7	8.9	6.8	6.3	.232	.236
		sicl	B1 7-12	10.06	1.54	41.9	14.0	18.1	23.9	16.3	13.1	10.5	9.8	.217	.128
		sicl	B2 12-32	7.92	1.58	40.4	14.5	16.4	26.3	17.3	15.4	13.6	12.9	.212	.055
		sic	B3 32+	5.08	1.44	45.7	4.9	28.3	30.2	24.1	21.9	20.5	18.7	.166	.138
236	Maury	sil	Ap 0-10	18.93	1.35	48.1	11.6	27.0	26.0	19.6	14.3	13.2	11.6	.194	.208
		sicl	B1 10-17	25.02	1.36	48.7	13.3	26.0	27.9	19.8	15.5	13.8	12.8	.205	.180
		sicl	B21 17-24	23.29	1.37	48.3	12.8	25.9	25.2	19.3	15.6	14.1	13.2	.164	.174
		sicl	B22 24-36	14.51	1.45	45.3	9.3	24.8	24.7	18.9	16.0	14.7	13.9	.157	.158
		c	B3 36+	29.36	1.36	48.7	13.2	26.1	——	——	——	——	——	——	——
237	Maury	sil	Ap 0-10	2.41	1.54	40.8	4.9	23.3	21.7	12.8	8.9	7.7	6.9	.228	.253
		sil	B1 10-14	28.31	1.32	50.2	17.1	25.1	23.9	16.1	10.7	8.9	7.7	.214	.230
		sicl	B21 14-24	35.41	1.35	49.1	17.6	23.3	23.3	15.9	10.9	9.1	7.8	.209	.209
		sicl	B22 24-37	25.74	1.43	46.0	13.4	22.8	22.1	16.5	11.6	10.1	8.9	.189	.199
223	Melvin	sil	Ap 0-8	4.94	1.35	48.1	11.2	27.3	26.9	12.9	8.3	7.6	7.6	.261	.266
		sicl	C1gg 8-15	8.48	1.56	41.1	8.0	21.2	23.8	14.3	10.6	9.4	9.1	.229	.189
		sicl	C2gg 15-24	5.43	1.61	39.2	7.0	20.0	25.5	16.8	13.5	12.3	10.5	.242	.153
		sicl	C3gg 24-32	5.83	1.63	38.5	6.9	19.4	24.5	14.7	11.5	10.0	9.4	.246	.163
222	Mimosa	sicl	Ap 0-6	4.78	1.33	48.8	6.5	31.8	36.5	29.9	25.4	24.2	23.1	.178	.116
		c	B2 6-19	1.31	1.27	52.1	0.8	40.4	44.5	36.3	31.9	30.6	28.6	.202	.150
		c	B3 19-32	1.14	1.47	44.5	5.9	33.9	41.4	34.1	29.3	28.2	26.9	.213	.103

250	Mimosa	sil	Ap 0-7	1.50	1.41	45.8	5.8	28.4	27.8	19.0	14.8	13.5	12.3	.219	.227
		c	B2 14-32	0.09	1.28	51.7	3.6	37.6	36.5	30.0	27.7	25.6	24.2	.157	.172
170	Mountview	sil	A2 1-8	16.31	1.11	57.3	24.4	29.6	28.9	15.2	8.0	6.7	6.1	.253	.261
		sil	B1 8-11	20.51	1.21	54.3	22.0	26.7	24.5	16.5	10.3	8.4	7.4	.207	.234
		sicl	B2 11-29	20.64	1.24	53.2	20.2	26.6	25.6	18.8	14.1	12.7	11.1	.180	.192
171	Mountview	sil	A2 1-8	4.57	1.25	51.9	12.8	31.3	27.2	10.4	4.8	4.0	4.4	.285	.336
		sil	B1 8-11	15.17	1.25	52.8	21.2	25.3	22.2	12.4	6.6	5.5	4.9	.216	.255
		sicl	B2 11-28	15.39	1.39	47.5	14.0	24.1	24.2	14.6	8.7	7.6	7.3	.235	.234
198	Mountview	sil	Ap 0-8	3.01	1.24	52.3	14.2	30.7	26.4	11.0	8.1	6.9	5.9	.254	.308
		sicl	B1 8-20	13.49	1.35	49.1	14.0	26.0	26.5	15.7	13.0	11.3	10.1	.221	.215
		sicl	B2 20-34	11.75	1.52	42.6	8.1	22.7	28.0	16.4	13.1	12.0	11.0	.258	.178
210	Mountview	sil	Ap 0-7	1.48	1.45	44.2	10.7	23.1	20.6	7.3	4.6	3.9	3.6	.247	.283
		sicl	B1 7-16	2.57	1.48	44.2	10.9	22.5	21.4	9.5	5.5	4.3	3.9	.259	.272
		sicl	B2 16-25	0.83	1.55	41.5	7.1	22.2	23.6	14.6	10.3	9.9	8.5	.234	.212
		sil	B3m 25-33	0.22	1.69	36.2	2.1	20.2	22.7	12.8	8.8	7.6	7.2	.262	.220
		sicl	C 33+	2.83	1.54	41.9	8.0	22.0	27.6	15.5	12.2	11.1	11.0	.256	.169
261	Pembroke	sil	A12 2-12	9.83	1.28	50.8	11.8	30.4	23.5	11.6	7.8	7.0	6.2	.221	.310
		sicl	B1 12-17	11.98	1.43	46.0	14.3	22.1	26.0	17.2	13.0	11.9	10.9	.216	.160
		sicl	B21 17-24	5.92	1.48	44.2	10.2	23.0	28.5	18.8	15.6	13.9	12.7	.234	.152
		sicl	B22 24-35	3.00	1.49	43.8	5.7	25.6	28.0	18.8	15.1	14.0	12.8	.226	.191
158	Waynesboro** (Cookeville)	sil	A2 2-8	1.78	1.36	47.7	8.4	28.9	25.1	14.8	7.6	5.6	4.7	.277	.329
		sicl	B1 8-13	12.67	1.39	47.5	14.8	23.5	23.3	17.0	10.8	9.4	8.2	.210	.213
		sicl	B2 13-32	4.09	1.51	43.0	5.4	24.9	27.6	22.9	17.7	15.7	14.5	.198	.157
159	Waynesboro** (Cookeville)	sil	A2 2-8	3.72	1.36	47.7	9.6	28.0	19.6	8.4	4.9	3.8	3.4	.220	.335
		sicl	B1 8-13	19.21	1.28	51.7	20.9	24.1	22.2	16.6	12.6	10.8	9.8	.159	.183
		sicl	B2 13-32	6.61	1.47	44.5	6.1	26.1	26.9	21.9	18.1	16.9	15.3	.163	.159
		sicl	C 32+	1.42	1.38	47.9	6.9	29.7	29.3	25.9	23.9	22.1	21.1	.113	.119

* sil = silt loam, sicl = silty clay loam, sic = silty clay, c = clay, l = loam, fsl = fine sandy loam.

** Currently mapped Waynesboro but was originally mapped Cookeville.

Table 3. Selected physical properties of major horizons of 24 West Tennessee soils.

Lab. No.	Soil Series	Horizon texture*	Horizon and depth	Saturated permeability	Bulk density	Percent porosity: Total	Percent porosity: Aeration (at 60 cm. tension)	Percent moisture by weight at tension of: 60 cm.	⅓ Atm.	2 Atm.	5 Atm.	9 Atm.	15 Atm.	A.W.H.C. inches/inch: ⅓– 15 Atm.	60 cm.– 15 Atm.
		·	Inches	In./hr.	g/cc										
67	Alder	si	Ap 0-8	0.43	1.37	47.3	1.8	33.2	25.6	7.8	6.2	5.2	4.8	.285	.389
	(Rodney)	si	C1 8-50	0.70	1.38	47.9	1.4	33.7	20.3	6.4	5.4	4.4	3.9	.226	.411
271	Calloway	sil	Ap 0-6	3.80	1.32	49.2	7.9	31.3	20.2	9.5	6.5	5.8	4.9	.202	.348
		sil	B2 6-17	5.57	1.38	47.9	7.9	29.0	27 2	16.1	11.9	11.1	10.4	.232	.257
		sil	B3m1 17-24	12.25	1.40	47.2	8.1	27.9	28.3	15.5	10.8	9.4	7.6	.290	.284
		sicl	B3m2 24-40	0.73	1.52	42.6	2.2	26.6	30.9	19.2	14.3	12.8	11.4	.296	.231
		sil	B3m3 40-50	0.36	1.47	44.5	2.6	28.5	30.0	17.3	11.9	10.9	9.3	.304	.282
103	Collins	sil	Ap 0-7	1.19	1.27	51.2	8.3	31.0	27.5	11.5	7.2	6.1	5.4	.281	.325
	(Hymon)	sil	C1 7-22	2.68	1.53	42.3	4.2	24.9	27.4	10.9	7.0	5.7	5.1	.341	.303
		sil	Cg 22-40	6.19	1.42	46.4	5.9	28.5	18.8	6.6	4.3	3.5	3.1	.223	.361
265	Collins	sil	A1 0-15	7.50	1.42	45.4	10.5	24.6	14.2	5.8	3.9	3.4	3.0	.159	.307
	(Hymon)	sil	C1g 15-30	3.67	1.46	44.9	7.4	25.7	13.7	7.8	5.4	4.8	4.3	.137	.312
		sil	A1b 30+	11.39	1.27	52.1	9.4	33.6	30.5	11.1	7.2	6.1	5.5	.318	.357
107	Collins	sil	Ap 0-6	0.24	1.39	46.5	5.6	29.4	20.5	6.8	4.7	4.2	3.8	.232	.356
		sil	C1 6-19	1.49	1.43	46.0	0.4	30.6	27.3	7.9	5.5	6.4	4.3	.329	.376
		sil	C2 19-40	7.73	1.29	51.2	9.3	32.5	—	—	—	—	—	—	—
245	Eustis	ls	Ap 0-6	10.93	1.47	43.5	17.2	17.8	11.2	7.7	5.2	4.3	4.0	.091	.203
	(Independ-	ls	(B) 2 6-24	43.84	1.49	43.8	25.2	12.5	7.0	4.3	3.4	2.8	2.7	.064	.146
	ence)**	ls	(B)3 24-40	61.00	1.47	44.5	32.6	8.1	5.5	2.3	1.8	1.5	1.4	.060	.098
		sicl	B2b 40-50	6.22	1.73	34.7	8.4	15.2	22.8	13.5	9.1	8.3	8.0	.256	.125

246	Eustis	ls	Ap 0-12	32.37	1.43	45.0	29.4	10.9	6.2	4.4	2.9	2.7	2.5	.053	.120
	(Huckabee)**	s	C1 12-33	35.36	1.47	44.5	39.2	3.6	1.8	0.9	0.8	0.9	0.8	.015	.041
60	Falaya	sil	Ap 0-6	5.32	1.22	53.1	10.9	34.6	29.6	11.4	7.5	6.5	6.2	.285	.346
		sil	Cg 6-24	8.61	1.33	49.8	5.6	33.2	30.3	13.6	8.4	7.0	6.7	.314	.352
		sil	Cgg 24-40	5.43	1.40	47.2	12.2	25.0	32.4	14.5	8.9	7.5	6.9	.357	.253
254	Falaya	sil	Ap 0-10	0.18	1.36	47.7	7.6	29.5	28.2	8.5	5.5	4.6	4.3	.325	.343
		sil	Cg1 10-30	0.42	1.41	46.8	4.8	29.8	27.5	10.4	6.2	5.4	4.9	.319	.351
		sil	Cg2 30+	0.54	1.48	44.2	1.3	29.0	30.6	13.2	8.3	7.0	6.4	.358	.334
73	Falaya	sil	Ap 0-9	15.34	1.25	51.9	15.8	28.9	29.8	18.5	13.1	10.5	10.7	.239	.228
	(Ina)**	sil	Cg 9-18	9.44	1.23	53.6	13.5	32.6	31.7	21.4	15.4	12.7	13.4	.225	.236
		sil	Cgg 18-40	12.36	1.32	50.2	12.7	28.4	25.6	14.9	9.9	8.0	7.1	.244	.281
193	Grenada	sil	Ap 0-7	5.04	1.14	56.2	18.4	33.2	24.8	11.1	8.1	6.1	6.1	.213	.309
		sil	B2 7-18	11.98	1.39	47.5	10.7	26.5	30.7	17.4	12.9	11.0	11.6	.265	.207
		sil	B3 18-23	8.28	1.36	48.7	10.9	27.8	33.4	18.1	13.1	11.1	11.6	.296	.220
		sil	B3m 23-35	11.30	1.39	47.5	11.9	25.6	31.6	16.5	12.3	9.7	10.0	.300	.217
		sil	C 35+	6.06	1.54	41.9	5.9	23.4	29.9	14.0	10.5	8.3	8.5	.330	.229
271	Grenada	sil	Ap 0-6	1.04	1.32	49.2	6.3	32.5	22.0	7.7	5.0	4.3	3.5	.244	.383
		sil	B21 6-15	17.43	1.34	49.4	4.9	28.2	25.2	13.3	8.5	7.4	6.2	.255	.295
		sil	B22 15-24	4.98	1.43	46.0	4.7	28.9	30.2	19.4	13.1	12.6	11.5	.267	.249
		sil	B3m2 29-42	15.06	1.41	46.8	8.6	27.1	27.0	14.0	9.6	8.8	7.6	.273	.275
		sil	B3m3 42+	4.68	1.50	43.4	3.6	26.5	29.7	15.2	11.0	10.0	9.0	.311	.263
253	Henry	sil	Ap2 2-9	2.67	1.37	47.3	4.0	31.6	30.1	9.9	5.2	4.5	4.6	.349	.370
		sil	B3m2 13-34	0.30	1.40	47.2	4.8	30.3	29.5	10.3	6.9	5.7	5.3	.339	.350
		sil	B3m3 34+	0.08	1.59	40.0	0	26.8	28.7	16.5	11.8	10.9	10.3	.293	.262
110	Henry	sil	Ap 0-8	0.29	1.44	44.6	5.9	26.9	21.5	6.1	4.8	3.6	2.8	.269	.347
	(Calhoun)**	sicl	Bg 8-30	5.95	1.46	44.9	6.5	26.3	28.5	18.3	13.8	12.6	12.7	.231	.199

* sil = silt loam, sicl = silty clay loam, ls = loamy sand, s = sand, fsl = fine sandy loam, si = silt, c = clay.

** These soil names have been dropped and soils combined in present mapping.

Table 3 (Continued). Selected physical properties of major horizons of 24 West Tennessee Soils

Lab. No.	Soil Series	Horizon texture*	Horizon and depth	Saturated permeability	Bulk density	Percent porosity: Total	Percent porosity: Aeration (at 60 cm. tension)	Percent moisture by weight at tension of: 60 cm.	1/3 Atm.	2 Atm.	5 Atm.	9 Atm.	15 Atm.	A.W.H.C. inches/inch: 1/3– 15 Atm.	60 cm.– 15 Atm.
			Inches	In./hr.	g/cc										
231	Lexington	sil	Ap 0-6	1.64	1.51	41.9	2.8	25.9	24.2	13.5	8.4	7.1	6.3	.270	.296
		sicl	B21 11-17	17.97	1.38	47.9	10.9	26.8	29.4	19.7	14.1	12.3	13.0	.226	.190
		sicl	B22 17-30	8.70	1.47	44.5	4.8	27.0	31.8	20.2	13.9	13.3	11.9	.293	.222
		sicl	B3 30-38	5.70	1.47	44.5	5.7	26.4	29.9	17.8	11.2	9.5	9.2	.304	.253
232	Lexington	sil	Ap 0-10	5.54	1.43	45.0	5.4	27.7	26.8	12.5	7.7	5.4	5.2	.295	.322
		sicl	B2 19-29	35.04	1.31	50.6	15.0	27.2	28.8	15.4	11.2	9.5	9.3	.255	.234
		sicl	B3 29-40	13.60	1.37	48.3	11.3	27.0	27.8	17.4	14.1	13.1	13.9	.190	.179
112	Memphis (Lintonia)**	sil	Ap 0-10	0.58	1.51	41.9	6.0	23.8	20.8	8.1	5.7	4.7	4.8	.242	.287
		sicl	B1 10-27	12.64	1.41	46.8	8.2	27.4	28.7	19.5	15.8	15.1	14.3	.203	.185
		sicl	B2 27-50	7.15	1.34	49.4	11.5	28.3	28.6	16.8	12.6	11.5	11.4	.230	.226
192	Memphis	sil	Ap 0-6	2.67	1.30	50.0	10.0	30.8	19.7	9.9	7.6	6.3	6.0	.178	.322
		sicl	B21 6-18	10.56	1.38	47.9	13.3	25.1	26.8	17.3	14.9	12.6	12.9	.192	.168
		sicl	B22 18-24	11.28	1.43	46.0	11.8	23.9	30.7	18.9	14.0	12.3	11.4	.276	.179
		sil	B3 24-36	12.71	1.41	46.8	12.3	24.5	33.8	16.4	12.1	10.2	9.6	.341	.210
		sil	C or D 36+	12.40	1.43	46.0	10.0	25.2	33.5	15.2	11.7	10.5	9.9	.337	.220
267	Memphis	sil	Ap2 1-7	1.83	1.49	42.7	0	28.9	23.8	9.4	6.1	5.4	4.6	.286	.362
		sicl	B2 11-25	10.04	1.44	45.7	6.4	27.3	28.0	17.8	14.0	13.5	12.1	.229	.219
		sil	C 40+	6.81	1.37	48.3	9.1	28.6	29.3	16.3	11.2	10.6	9.5	.271	.262
239	Robinsonville	fsl	Ap 0-9	0.87	1.54	40.8	1.8	25.3	10.8	7.1	5.0	4.6	3.7	.109	.333
		fsl	C11 9-14	1.75	1.43	46.0	5.5	28.3	14.0	8.9	6.1	5.6	4.9	.130	.335
		fsl	C12 14+	6.80	1.42	46.4	13.3	23.3	11.4	4.9	4.7	4.2	4.1	.104	.273

119	Roellen	sil	Ap 0-8	0.43	1.45	44.2	5.0	27.0	29.8	17.9	12.4	10.9	12.6	.249	.209
		sicl	A1b 8-14	0.85	1.44	45.7	4.1	28.9	32.7	20.0	17.6	15.8	12.3	.294	.239
		sicl	Cg 14-48	8.92	1.35	49.1	9.5	29.3	31.9	20.8	15.4	14.4	13.2	.252	.217
238	Sharkey	sic	Ap 0-4	5.68	1.16	55.4	0	40.9	38.5	33.0	26.4	25.1	25.3	.153	.181
		c	Cg1 4-13	0.03	1.32	50.2	0.7	37.5	39.1	33.7	26.7	27.3	26.3	.169	.148
		c	Cg2 13+	0.13	1.25	52.8	0	41.8	41.8	35.6	29.6	28.1	27.8	.175	.175
118	Silerton	sil	Ap 0-9	2.73	1.45	44.2	6.8	25.8	25.3	10.8	7.3	6.1	5.7	.284	.291
		sil	B2 9-22	7.79	1.31	50.6	10.5	30.6	25.4	13.6	9.4	8.0	7.6	.233	.301
		sicl	B3m 22-35	4.58	1.49	43.8	8.0	24.0	29.2	18.8	13.4	12.7	11.8	.258	.182
264	Waverly	sil	Ap 0-8	0.64	1.40	46.2	3.6	30.4	29.8	17.8	11.5	10.9	9.7	.281	.290
	(Beechy)**	sil	Cg 8-30	10.23	1.23	53.6	10.5	35.0	34.1	21.0	13.7	11.6	10.7	.288	.299
		sil	Cgg 30+	3.88	1.30	50.9	8.4	32.7	32.9	22.4	13.0	10.9	10.0	.298	.295

* sil = silt loam, sicl = silty clay loam, ls = loamy sand, s = sand, fsl = fine sandy loam, si = silt, c = clay.

** These soil names have been dropped and soils combined in present mapping.

Table 4. Average available water holding capacities* of soil textural groups expressed as inches per inch of soil depth.

Textural classes	No. samples	Mean	Standard deviation	Range Low	Range High
		In./in.		In./in.	In./in.
		Horizons from all Tennessee soils studied			
Very fine sandy loams	3	.257	——	.241	.275
Silts	2	.256	——	.226	.285
Silt loams	154	.234	.051	.120	.358
Sandy clay loams	3	.209	——	.133	.264
Silty clay loams	115	.204	.040	.112	.304
Loams	25	.191	.033	.098	.233
Silty clays	25	.180	.038	.124	.314
Fine sandy loams	11	.171	.041	.104	.240
Clay loams	17	.172	.028	.119	.241
Sandy clay	1	.085	——	——	——
Clays	47	.156	.034	.077	.224
Sandy loams	5	.121	——	.096	.160
Loamy sands	5	.074	——	.053	.102
Sand	1	.015	——	——	——
Total or average	414	.203			
		Horizons from East Tennessee soils			
Very fine sandy loams	3	.257	——	.241	.275
Sandy clay loams	3	.209	——	.133	.264
Silt loams	64	.198	.032	.120	.285
Fine sandy loams	7	.195	——	.166	.240
Loams	23	.190	.034	.098	.233
Silty clay loams	60	.180	.035	.112	.263
Silty clays	21	.188	.044	.124	.314
Clay loams	17	.172	.028	.119	.241
Sandy clay	1	.085	——	——	——
Clays	42	.152	.032	.077	.224
Sandy loams	5	.121	——	.096	.160
Loamy sand	1	.102	——	——	——
Total or average	247	.181			
		Horizons from Middle Tennessee soils			
Silt loams	41	.244	.026	.194	.327
Silty clay loams	39	.221	.041	.113	.299
Loams	2	.202	——	.178	.225
Clays	3	.191	——	.157	.213
Silty clays	3	.181	——	.146	.231
Fine sandy loam	1	.174	——	——	——
Total or average	89	.228			

*Based on 1/3 and 15 atmosphere measurements on sieved samples.

Table 4 (Continued). Average available water holding capacities* of soil textural groups expressed as inches per inch of soil depth

Textural classes	No. samples	Mean	Standard deviation	Range Low	Range High
		In./in.		In./in.	In./in.
	Horizons from West Tennessee soils				
Silt loams	49	.274	.052	.137	.358
Silts	2	.255	——	.226	.285
Silty clay loams	16	.249	.036	.190	.304
Clays	2	.172	——	.169	.175
Silty clays	1	.153	——	——	——
Fine sandy loams	3	.114	——	.104	.130
Loamy sands	4	.067	——	.053	.091
Sand	1	.015	——	——	——
Total or average	78	.244			

*Based on 1/3 and 15 atmosphere measurements on sieved samples.

Figure 6 shows graphically the relationship between the mean available water holding capacities of the different textural classes. Increasing clay content lowers available water holding capacity but the relationship is not linear. Likewise, as sand replaces silt the available water holding capacity is lowered. Thus, high available moisture retention values seem to be closely related to amount of silt and very fine sand. These results agree with those of other workers (1, 4, 5).

In general, the available water holding capacities of the soils were highest in West Tennessee, intermediate in Middle Tennessee, and lowest in East Tennessee. Bottom soils had higher available water holding capacities than upland soils. Soils containing a large amount of silt or very fine sand had higher values than those with appreciable quantities of clay or medium and coarse sand.

In Table 5 are given groupings of soils with similar profile characteristics; members of each group may be expected to have similar available water holding properties. In each group are Tennessee soils for which moisture data are presented along with certain selected similar soils to which the data may be applied. This grouping is designed to aid in soil management predictions.

Table 6 shows the correlation coefficients between permeability and aeration porosity for the A and B horizons. The significant "r" values of 0.69 for A horizons and the 0.74 for B horizons indicate that permeability depended considerably on aeration porosity.

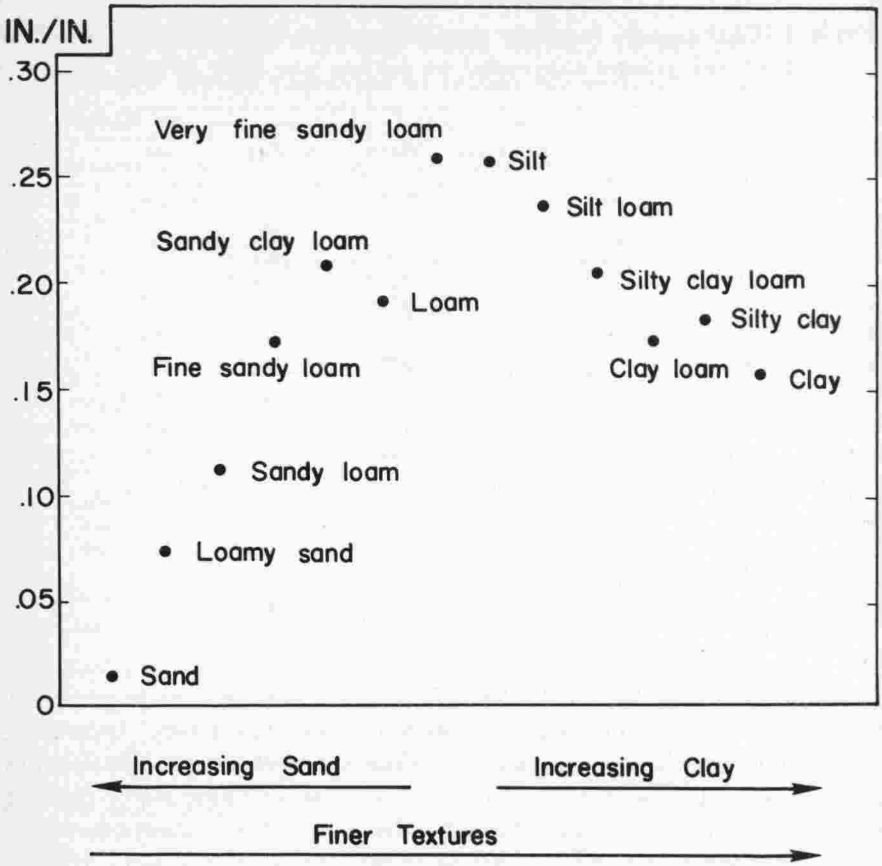

Figure 6. Mean available water holding capacities of Tennessee soil samples having different textures.

Data on eight cherty soils are given in Tables 7 and 8. Available water holding capacities of the cherty silt loams ranged from 0.07 inches per inch of soil for a horizon containing 32.6% chert by volume to 0.25 inches per inch for a soil having 20.2% chert by volume. Mean available water holding capacity of the 12 cherty silt loams was 0.143 inches per inch. This is much lower than the mean value of 0.198 inches per inch for silt loams from East Tennessee. There were great variations in the bulk densities, amounts of chert, bulk densities of the chert, and available water holding capacities of these soils.

Available water holding capacity and water held at the various tensions are useful in determining irrigation needs and moisture management of soils. When moisture in two different soils is at the same tension, then the next increment of moisture in both soils is equally available to

Table 5. A grouping of soils according to similarity in profile characteristics

Position	Soil drainage[1]	Subsoil	Parent material or parent rock	Soil Series
			EAST TENNESSEE SOILS	
			Well to excessively drained cherty soils	
Upland	4	cherty, clayey	cherty dolomitic limestone	*Fullerton
Upland	4-6	cherty, clayey	cherty dolomitic limestone	Clarksville
			Well to excessively drained shallow soils	
Upland	4-6	shaly	shale	*Litz
Upland	4-6	shaly	acid shale	Montevallo
Upland	4-6	shaly	limey shale	Dandridge
			Moderately deep well drained soils with firm clayey subsoils	
Upland	4	clayey	shale	*Sequoia
Upland	4	clayey	limey shale	*Needmore
Upland	4	clayey	clayey limestone	Talbott
			Well drained soils with firm clayey subsoils	
Terrace	4	clayey	alluvium (limestone)	*Cumberland
Upland	4	clayey	limestone	*Decatur
Upland	4	clayey	limestone	*Dewey
Upland	4	clayey	limestone	*Dunmore
Upland	4	clayey	limestone	*Fullerton
Upland	4	clayey	limestone and shale	*Groseclose

* Soil moisture data for these series are included in this report.

[1] Soil drainage: 1 = poorly drained; 2 = somewhat poorly drained; 3 = moderately well drained; 4 = well drained; 5 = somewhat excessively drained; 6 = excessively drained.

[2] Soil Series in parenthesis have been dropped in favor of the preceding soil series name, e.g. Hamblen has been dropped in favor of Lindside.

Table 5 (Continued). A grouping of soils according to similarity in profile characteristics

Position	Soil drainage[1]	Subsoil	Parent material or parent rock	Soil Series
Upland	4	clayey	shale and limestone	Farragut
Upland	4	clayey	limey sandstone	*Tellico
		Deep well drained soils with friable loamy subsoils		
Terrace	4	loamy	alluvium (mainly limestone)	Etowah
Footslopes	4	loamy	local alluvium (mainly limestone)	*Etowah (*Hermitage)[2]
Footslopes	4	loamy	local alluvium (limey sandstone)	Alcoa
		Well drained soils with friable loamy subsoils		
Upland	4	loamy	sandstone	*Hartsells
Upland	4	loamy	sandstone	*Crossville
Upland	4	loamy	sandstone	Linker
Upland	4	loamy	shale and sandstone	Wellston
Terrace	4	loamy	alluvium (sandstone, limestone, shale)	*Waynesboro
Terrace	4	loamy	alluvium (sandstone, limestone, shale)	Nolichucky
Terrace	4	loamy	alluvium (sandstone and shale)	*Holston
Footslopes	4	loamy	local alluvium (sandstone and shale)	Jefferson
		Moderately well drained soils with fragipan or compacted subsoil		
Upland	3	friable, loamy with fragipan	sandstone and shale	*Tilsit
Terrace	3-4	compacted	alluvium (limestone)	*Wolftever
		Moderately well drained soils with firm, clayey subsoils		
Upland	3-2	firm, clayey	clayey limestone	*Colbert
		Somewhat poorly drained soils with fragipans		
Upland	2	loamy with fragipan	sandstone and shale	Johnsburg
Terrace	2	loamy with fragipan	alluvium (sandstone and shale)	Tyler

		Poorly drained soils with fragipans		
Terrace	1	loamy with fragipan	alluvium (mainly limestone)	*Robertsville
Terrace	1	loamy with fragipan	alluvium (sandstone and shale)	Purdy
Upland	1	loamy with fragipan	sandstone and shale	Mullins
		Well drained soils on bottomlands		
Bottom	4	loamy	alluvium (micaceous rocks)	*Congaree
Bottom	4	loamy	alluvium (mainly limestone)	*Huntington
Bottom	4	loamy	alluvium (sandstone, limestone and shale)	*Staser
Bottom	4	loamy	alluvium (sandstone and shale)	Pope
Footslopes	4	loamy	local alluvium (limestone)	*Emory
Footslopes	4	loamy	local alluvium (limestone)	*Greendale
Footslopes	4	loamy	local alluvium (sandstone and shale)	Barbourville
		Moderately well drained soils on bottom lands		
Bottom	3-2	loamy	alluvium (micaceous rocks)	*Chewacla
Bottom	3-2	loamy	alluvium (mainly limestone)	*Lindside (*Hamblen)[2]
Bottom	3-2	loamy	alluvium (sandstone and shale)	*Philo
		Poorly drained soils on bottomlands		
Bottom	1	loamy	alluvium (mainly limestone)	*Melvin (Prader)[2]
		MIDDLE TENNESSEE SOILS		
		Well to excessively drained cherty soils		
Upland	4	cherty, clayey	cherty limestone	*Baxter
Upland	4-6	very cherty	cherty limestone	Bodine

* Soil moisture data for these series are included in this report.

[1] Soil drainage: 1 = poorly drained; 2 = somewhat poorly drained; 3 = moderately well drained; 4 = well drained; 5 = somewhat excessively drained; 6 = excessively drained.

[2] Soil Series in parenthesis have been dropped in favor of the preceding soil series name, e.g. Hamblen has been dropped in favor of Lindside.

Table 5 (Continued). A grouping of soils according to similarity in profile characteristics

Position	Soil drainage[1]	Subsoil	Parent material or parent rock	Soil Series
			Moderately deep well drained soils with firm, clayey subsoils	
Upland	4	clayey	clayey limestone	*Mimosa
Upland	4	clayey	limestone	Talbott
			Deep, well drained soils with firm, clayey subsoils	
Upland	4	clayey	limestone	*Cookeville
Upland	4	clayey	siltstone and limestone	Christian
Upland	4	clayey	phosphatic limestone	*Maury
Upland	4	clayey	limestone	Hagerstown
Upland	4	clayey	limestone	Hampshire
			Deep, well drained soils with friable, loamy subsoils	
Upland	4	loamy	thin loess over limestone	*Bewleyville
Upland	4	loamy	thin loess over limestone	*Mountview
Upland	4	loamy	thin loess over limestone	Pembroke
Terrace	4	loamy	alluvium (mainly limestone)	*Etowah
Terrace & footslopes	4	loamy	alluvium (phosphatic limestone)	Armour
Terrace & footslopes	4	loamy	alluvium (limestone)	Humphreys
			Deep well drained cherty colluvial soils	
Middle & lower slopes	4	cherty, loamy	colluvium and local alluvium (limestone)	*Dellrose
			Moderately well drained soils with fragipan	
Upland	3-4	loamy with fragipan	thin loess over limestone	*Dickson
Terrace	3	loamy with fragipan	alluvium (mainly limestone)	Captina
Upland	3-2	loamy with fragipan	thin loess over limestone	Sango

			Poorly drained soils with fragipans	
Upland	1	loamy with fragipan	thin loess over limestone	*Guthrie
Terrace	1	loamy with fragipan	alluvium (loess over limestone)	Robertsville
			Well drained and moderately well drained soils on bottomlands	
Bottom	4	loamy	alluvium (limestone and loess)	*Ennis
Bottom	4	loamy	alluvium (mainly limestone)	*Huntington
Footslopes	4	loamy	local alluvium (limestone)	Greendale
Footslopes	4	loamy	local alluvium (limestone)	Emory
Bottom	3-2	loamy	alluvium (limestone)	Lindside
			Poorly drained soils on bottomlands	
Bottom	1	loamy	alluvium (mainly limestone)	*Melvin
			WEST TENNESSEE SOILS	
			Deep, excessively drained sandy soils	
Terrace	5-6		alluvium (sandy Coastal Plain material)	Lakeland (*Huckabee)[2]
Terrace	5-6		alluvium (sandy Coastal Plain material)	Eustis (*Independence)[2]
			Deep well drained soils	
Upland (terrace)	4		thick loess	*Memphis (*Lintonia)[2]
Upland	4		loess (over sandy Coastal Plain material)	Lexington
Terrace	4		alluvium (loess and sandy Coastal Plain)	Dexter
Upland	4-3		thick loess	Loring

* Soil moisture data for these series are included in this report.

[1] Soil drainage: 1 = poorly drained; 2 = somewhat poorly drained; 3 = moderately well drained; 4 = well drained; 5 = somewhat excessively drained; 6 = excessively drained.

[2] Soil Series in parenthesis have been dropped in favor of the preceding soil series name, e.g. Hamblen has been dropped in favor of Lindside.

Table 5 (Continued). A grouping of soils according to similarity in profile characteristics

Position	Soil drainage[1]	Subsoil	Parent material or parent rock	Soil Series
		Moderately well drained soils with fragipans		
Upland (terrace)	3		thick loess	*Grenada (*Richland)[2]
Terrace	3		alluvium (loess and sandy Coastal Plain)	Freeland
Upland	3		sandy Coastal Plain material	*Savannah
Upland	3		thin loess over Coastal Plain sandy clay	Dulac
Upland	3		thin loess over sandy Coastal Plain material	Providence
		Moderately deep, well drained soils		
Upland	4-5		thin loess over Coastal Plain gravel	Brandon
Upland	4-3		thin loess over Coastal Plain sandy clay	Silerton
		Dark soils with fine textured subsoils		
Terrace	2		alluvium (loess)	*Roellen
		Somewhat poorly drained soils with fragipans		
Upland (terrace)	2		thick loess	*Calloway (Olivier)[2]
Terrace	2		alluvium (loess and sandy Coastal Plain material)	Hatchie
		Poorly drained soils with fragipans		
Upland (terrace)	1		thick loess	*Henry (*Calhoun)[2]
Terrace	1		alluvium (loess and sandy Coastal Plain material)	Almo

Well drained and moderately well drained soils on bottomlands			
Bottom	4	alluvium (mainly loess)	Vicksburg (Shannon)[2]
Bottom	4	alluvium (loess)	Morganfield
Bottom	4	alluvium (Coastal Plain material)	Ochlocknee
Bottom	3	alluvium (mainly loess)	*Collins (*Hymon)[2]
Bottom	3	alluvium (loess)	Adler (*Rodney)[2]
Bottom	3	alluvium (Coastal Plain material)	Iuka
Somewhat poorly drained soils on bottomlands			
Bottom	2	alluvium (mainly loess)	*Falaya (*Ina)[2]
Bottom	2	alluvium (loess)	Wakeland
Bottom	2	alluvium (Coastal Plain material)	Mantachie
Poorly drained soils on bottomlands			
Bottom	1	alluvium (mainly loess)	Waverly (*Beechy)[2]
Bottom	1	alluvium (loess)	Birds
Bottom	1	alluvium (Coastal Plain material)	Bibb
Well and moderately well drained soils on Mississippi bottom			
Natural levee	4	alluvium (Mississippi)	*Robinsonville
Natural levee	3	alluvium (Mississippi)	Commerce
Somewhat poorly and poorly drained clayey soils on Mississippi Bottom			
Slack water areas	2	alluvium (Mississippi)	Tunica
Slack water areas	1	alluvium (Mississippi)	*Sharkey

* Soil moisture data for these series are included in this report.

[1] Soil drainage: 1 = poorly drained; 2 = somewhat poorly drained; 3 = moderately well drained; 4 = well drained; 5 = somewhat excessively drained; 6 = excessively drained.

[2] Soil Series in parenthesis have been dropped in favor of the preceding soil series name, e.g. Hamblen has been dropped in favor of Lindside.

Table 6. Correlation coefficients between soil horizon permeability in inches per hour and soil horizon aeration porosity in percent

	No. of samples	"r" value
A Horizons	128	.693**
B Horizons	162	.743**

** Significant at the .01 level of probability.

(Continued from page 30)

plants. The main difference is the amount of moisture held at the tension in question.

For example, assume that the soil moisture tension should not exceed 2 atmospheres for the best production of a particular crop and the same crop is located on a Congaree fine sandy loam and a Crossville loam. Data in Table 1 indicate that the Congaree (Lab. No. 166) should be irrigated when the surface soil moisture content decreases to 19.5% while the Crossville (Lab. No. 257) should be irrigated when the soil moisture decreases to 14.2%.

Water held at any tension may be converted from weight percent to volume percent by multiplying by the bulk density. Available water holding capacities based on results from sieved samples equilibrated at 1/3 and 15 atmospheres tension of each soil for 1-, 2-, and 3-foot depths are shown in Tables 9, 10, and 11.

Variations in the moisture characteristics within a soil series may seem large. However, since land use and cultural treatment of the soils of a particular series may have varied, differences in moisture characteristics are to be expected. Each profile is an individual, similar in many respects to other profiles of the same series but differing somewhat in properties.

Table 7. Selected physical properties of eight cherty soil samples

Lab. No.	Soil Series	Horizon texture*	Horizon	Depth	Bulk density**	Bulk density of chert	2 mm. Fine soil	Chert	Percent moisture of fine soil (2 mm.) at tension of: F.C. ⅓ Atm.	2 Atm.	5 Atm.	9 Atm.	W.P. 15 Atm.	A.W.H.C. ⅓-15 Atm.
				Inches	g/cc	g/cc	Vol. %	Vol. %	Wt. %	Wt. %	Wt. %	Wt. %	Wt. %	In./in.
281	Baxter	ch sil	A2	2-10	1.04	1.96	80.9	19.1	28.4	14.0	9.0	6.9	6.7	.14
		ch sil	B1	10-16	1.07	1.91	82.6	17.4	23.9	15.3	10.2	8.3	7.3	.12
287	Bodine	ch sil	Ap	0-6	0.96	1.86	82.0	18.0	31.7	16.2	11.5	9.2	8.7	.15
		ch sil	C1	6-10	1.26	1.69	80.0	20.0	26.4	15.8	9.8	7.0	6.0	.19
285	Dellrose	ch sil	Ap & A1	0-24	1.45	1.91	78.1	21.9	25.3	18.6	14.3	11.0	9.5	.16
283	Ennis	ch sil	Ap	0-8	1.78	2.22	88.7	11.3	19.9	14.0	9.0	7.4	6.8	.20
		ch sil	C	8-20	1.42	1.93	65.8	34.2	20.4	17.7	13.5	11.6	10.3	.08
282	Fullerton	ch sil	Ap	0-7	1.31	2.20	67.4	32.6	28.2	22.6	18.7	16.7	15.3	.07
		c	B2	14+	1.25	——	100.0	0.0	35.7	30.2	26.7	25.1	24.6	.14
286	Groseclose	ch sil	Ap	0-5	1.64	2.23	79.8	20.2	28.8	16.8	11.5	10.1	8.2	.25
		c	B2	8-16	1.43	——	100.0	0.0	33.6	27.6	25.4	23.4	22.2	.16
284	Huntington	ch sil	Ap	0-10	1.30	2.12	87.7	12.3	20.1	15.9	12.8	10.8	9.4	.11
		ch sil	C	10-20	1.54	2.02	81.1	18.9	23.3	18.1	15.2	12.9	12.0	.15
256	Mimosa	ch sil	Ap	0-8	1.11	1.88	81.0	19.0	25.7	19.5	16.2	14.4	13.2	.10
		c	B2	13-30	1.53	——	100.0	0.0	30.4	24.4	——	20.0	19.0	.17
Average for 12 cherty horizons														.14

* ch = cherty; sil = silt loam; c = clay.

** Determined from a 12" x 12" x 6" sample containing soil and chert.

Table 8. Location, land use, erosion, slope and available water holding capacity of eight cherty soil samples

Lab. No.	Soil type	County	Land use	Erosion	Slope	Available water holding capacity (inches) 1-foot depth	2-foot depth
281	Baxter cherty silt loam	Putnam	Forest	Slight	Sloping	1.64	3.08
287	Bodine cherty silt loam	Putnam	Idle	None	Sloping	2.04	——
285	Dellrose cherty silt loam	Putnam	Pasture	None	Steep	1.92	3.84
283	Ennis cherty silt loam	Putnam	Pasture	None	Level	1.92	2.88
282	Fullerton cherty silt loam	Union	Idle	Moderate	Sloping	1.19	2.87
286	Groseclose cherty silt loam	Washington	Pasture	Moderate	Steep	2.37	4.29
284	Huntington cherty silt loam	Putnam	Cont. cult.	None	Level	1.40	3.20
256	Mimosa cherty silt loam	Williamson	Pasture	Moderate	Sloping	1.48	3.52

Table 9. Location, land use, erosion, slope and available water holding capacity[1] of 78 East Tennessee soils

Lab No.	Soil type	County	Land use	Erosion	Slope	A.W.H.C. in inches to: 1' Depth	2' Depth	3' Depth
187	Chewacla silt loam	Knox	Rotation	None	Gently sloping	2.59	5.28	8.10
249	Colbert silt loam	Meigs	Forest	None	Gently sloping	2.38	4.55	—
141	Colbert silty clay loam	Knox	Rotation	Moderate	Sloping	2.26	4.39	—
166	Congaree fine sandy loam	Blount	Rotation	None	Level	2.88	5.42	7.48
177	Congaree fine sandy loam	Blount	Cont. cult.	None	Level	2.16	4.33	6.41
178	Congaree silt loam	Knox	Cont. cult.	None	Gently sloping	2.38	4.85	7.37
230	Congaree sandy loam	Cocke	Cont. cult.	None	Level	1.17	2.47	—
241	Congaree sandy loam	Sevier	Cont. cult.	None	Gently sloping	1.31	2.54	—
257	Crossville loam	Cumberland	Rotation	Moderate	Gently sloping	2.14	4.55	7.07
266	Crossville sandy loam	Cumberland	Forest	None	Gently sloping	1.41	2.58	—
273	Crossville loam	Bledsoe	Forest	None	Gently sloping	2.25	4.42	—
274	Crossville loam	Bledsoe	Forest	None	Gently sloping	2.66	5.36	—
233	Cumberland loam	Blount	Pasture	Slight	Sloping	2.26	4.38	6.56
174	Cumberland silty clay loam	Blount	Rotation	Moderate	Gently sloping	2.10	4.09	5.98
175	Cumberland silty clay loam	Blount	Rotation	Moderate	Gently sloping	2.11	4.13	6.14
181	Cumberland silty clay loam	Blount	Rotation	Moderate	Sloping	1.99	3.94	5.94
179	Cumberland silt loam	Blount	Rotation	Moderate	Sloping	2.21	4.78	7.47
180	Cumberland silt loam	Blount	Idle	Moderate	Sloping	2.07	3.81	5.51
227	Cumberland silt loam	Sevier	Pasture	Slight	Gently sloping	2.05	3.76	5.24
143	Decatur silt loam	Jefferson	Rotation	Slight	Sloping	1.88	3.47	4.93
151	Decatur silt loam	Blount	Cont. cult.	Slight	Gently sloping	1.70	3.44	5.26
164	Decatur silt loam	Blount	Grass	Moderate	Gently sloping	1.99	3.86	5.71
240	Decatur silty clay loam	Knox	Pasture	Moderate	Gently sloping	1.68	3.19	4.75
172	Dewey silty clay loam	Blount	Rotation	Moderate	Sloping	1.81	3.91	5.99
173	Dewey silt loam	Blount	Rotation	Moderate	Sloping	1.94	4.02	6.07
209	Dewey silt loam	Knox	Rotation	Moderate	Sloping	2.29	4.46	6.40

[1] Calculations based on ⅓ and 15 atmosphere measurements on sieved samples.

Table 9 (Continued). Location, land use, erosion, slope and available water holding capacity[1] of 78 East Tennessee soils

Lab No.	Soil type	County	Land use	Erosion	Slope	A.W.H.C. in inches to: 1′ Depth	2′ Depth	3′ Depth
149	Dunmore loam	Blount	Rotation	Moderate	Sloping	2.00	3.11	4.08
152	Dunmore silty clay loam	Greene	Pasture	Severe	Steep	1.36	2.77	4.50
169	Dunmore silt loam	Blount	Idle	Moderate	Gently sloping	2.33	4.38	5.54
189	Dunmore silt loam	Blount	Rotation	Slight	Gently sloping	2.56	4.83	7.10
207	Dunmore silt loam	Sevier	Pasture	Moderate	Sloping	2.48	4.67	7.02
150	Emory silt loam	Blount	Forest	None	Gently sloping	2.53	4.51	5.94
162	Emory silt loam	Blount	Cont. cult.	None	Gently sloping	2.10	4.34	6.74
228	Emory silt loam	Knox	Rotation	None	Gently sloping	2.75	5.13	7.89
144	Fullerton fine sandy loam	Jefferson	Idle	Severe	Steep	1.77	3.24	4.72
146	Fullerton loam	Jefferson	Forest	Light	Sloping	1.81	3.22	4.24
191	Fullerton loam	Jefferson	Rotation	Moderate	Gently sloping	1.49	3.04	4.85
206	Fullerton loam	Jefferson	Rotation	Moderate	Gently sloping	1.74	3.49	5.15
226	Fullerton loam	Knox	Rotation	Moderate	Gently sloping	2.47	4.65	6.79
147	Fullerton silt loam	Knox	Forest	None	Sloping	1.68	3.30	4.79
197	Fullerton silt loam	Jefferson	Rotation	Moderate	Sloping	2.27	4.68	7.11
186	Fullerton silt loam	Knox	Rotation	Slight	Gently sloping	3.16	5.65	7.88
184	Greendale silt loam	Knox	Cont. cult.	None	Gently sloping	2.86	5.21	7.05
153	Groseclose silt loam	Greene	Pasture	Moderate	Sloping	3.04	5.49	7.94
157	Hartsells fine sandy loam	Cumberland	Rotation	Slight	Gently sloping	2.60	5.05	——
217	Hartsells very fine sandy loam	Morgan	Rotation	Moderate	Gently sloping	3.19	6.05	——
202	Hermitage silt loam	Blount	Pasture	Slight	Gently sloping	2.10	4.19	6.22
205	Hermitage silt loam	Blount	Rotation	Slight	Gently sloping	1.93	4.03	6.08
216	Holston very fine sandy loam	Jefferson	Rotation	Slight	Gently sloping	3.03	5.72	7.97
182	Huntington silt loam	Knox	Rotation	None	Gently sloping	2.20	4.99	7.98

183	Huntington silt loam	Knox	Rotation	None	Gently sloping	1.99	4.01	6.01
145	Huntington silt loam	Blount	Cont. cult.	None	Level	2.21	4.27	6.33
208	Huntington silt loam	Knox	Grass	None	Gently sloping	2.31	4.61	6.97
142	Huntington silty clay loam	Jefferson	Pasture	None	Level	2.08	4.33	6.59
139	Lindside silt loam	Knox	Pasture	None	Level	1.93	3.85	5.77
167	Lindside silt loam	Blount	Cont. cult.	None	Level	2.23	4.55	6.91
154	Lindside silt loam	Greene	Rotation	None	Level	2.24	4.38	——
242	Litz silt loam	Hawkins	Pasture	Moderate	Steep	2.23	——	——
243	Litz silt loam	Hawkins	Cont. cult.	Moderate	Sloping	1.66	3.72	——
244	Litz silt loam	Hawkins	Rotation	Slight	Gently sloping	1.81	——	——
200	Melvin silt loam	Blount	Pasture	None	Level	2.93	5.86	8.85
225	Needmore silt loam	Knox	Pasture	Slight	Gently sloping	2.89	5.56	7.76
220	Philo silt loam	Morgan	Cont. cult.	None	Level	2.91	5.47	8.18
268	Robertsville silt loam	Bledsoe	Pasture	None	Level	2.65	5.07	7.32
148	Sequoia silt loam	Blount	Idle	Moderate	Sloping	2.01	3.93	6.33
165	Sequoia silt loam	Blount	Idle	Moderate	Gently sloping	2.36	4.82	7.33
176	Sequoia silt loam	Blount	Idle	Moderate	Gently sloping	2.29	4.54	6.77
188	Sequoia silt loam	Knox	Rotation	Moderate	Gently sloping	2.84	5.37	7.43
190	Sequoia silt loam	Knox	Rotation	Moderate	Gently sloping	2.51	5.14	7.58
201	Sequoia silt loam	Knox	Rotation	Moderate	Gently sloping	2.09	3.99	6.06
229	Staser fine sandy loam	Sevier	Cont. cult.	None	Level	2.02	4.54	7.27
140	Staser silt loam	Knox	Rotation	None	Level	2.94	6.00	9.06
168	Staser silt loam	Blount	Cont. cult.	None	Level	2.16	4.17	5.82
259	Talbott silt loam	Loudon	Forest	Moderate	Gently sloping	2.50	4.37	——
219	Tellico silty clay loam	Knox	Pasture	Moderate	Sloping	1.87	3.63	5.40
218	Tilsit fine sandy loam	Morgan	Rotation	Moderate	Sloping	2.24	4.51	7.26
185	Waynesboro loam	Knox	Rotation	Slight	Sloping	2.05	4.04	6.11
212	Wolftever loam	Knox	Rotation	Slight	Gently sloping	2.62	5.15	8.30

[1] Calculations based on ⅓ and 15 atmosphere measurements on sieved samples.

Table 10. Location, land use, erosion, slope, and available water holding capacity[1] of 27 Middle Tennessee soils

Lab No.	Soil type	County	Land use	Erosion	Slope	A.W.H.C. in inches to: 1′ Depth	2′ Depth	3′ Depth
247	Bewleyville silt loam	Putnam	Pasture	Moderate	Gently sloping	2.78	5.29	7.24
160	Dickson silt loam	Coffee	Forest	None	Gently sloping	3.18	6.06	8.95
161	Dickson silt loam	Coffee	Forest	None	Gently sloping	3.09	5.99	8.95
199	Dickson silt loam	Giles	Rotation	Moderate	Level	3.06	6.17	9.27
211	Dickson silt loam	Putnam	Rotation	Moderate	Gently sloping	3.43	6.63	9.98
235	Dickson silt loam	Putnam	Pasture	Moderate	Sloping	3.29	6.48	10.07
260	Ennis silt loam	Robertson	Pasture	None	Level	2.65	5.29	——
156	Ennis silt loam	Robertson	Cont. cult.	None	Level	2.75	5.63	——
221	Etowah silt loam	Williamson	Rotation	Moderate	Gently sloping	3.31	6.22	9.08
234	Guthrie silt loam	Putnam	Rotation	None	Level	4.07	7.99	——
163	Guthrie silt loam	Coffee	Forest	None	Level	2.80	——	——
224	Lindside loam	Williamson	Cont. cult.	None	Level	2.51	4.64	6.73
155	Maury silt loam	Maury	Rotation	Slight	Gently sloping	3.04	6.04	9.04
194	Maury silt loam	Maury	Rotation	Moderate	Gently sloping	2.98	5.65	8.57
195	Maury silt loam	Giles	Rotation	Moderate	Gently sloping	2.71	5.25	7.61
236	Maury silt loam	Williamson	Pasture	Moderate	Gently sloping	2.35	4.52	6.41
237	Maury silt loam	Williamson	Pasture	Moderate	Sloping	2.71	5.23	7.49
223	Melvin silt loam	Williamson	Cont. cult.	None	Level	3.00	5.87	8.82
222	Mimosa silty clay loam	Williamson	Rotation	Severe	Gently sloping	2.28	4.76	7.32
250	Mimosa silt loam	Williamson	Pasture	Moderate	Sloping	2.63	4.64	6.52
170	Mountview silt loam	Coffee	Forest	None	Gently sloping	2.83	4.98	7.15
171	Mountview silt loam	Coffee	Forest	None	Gently sloping	3.16	5.98	8.80
198	Mountview silt loam	Giles	Rotation	Moderate	Gently sloping	2.92	5.72	8.81
210	Mountview silt loam	Putnam	Rotation	Moderate	Gently sloping	3.02	5.93	9.05
261	Pembroke silt loam	Robertson	Idle	Slight	Gently sloping	2.65	5.37	8.08
158	Waynesboro silt loam	Coffee	Forest	None	Gently sloping	3.06	5.44	7.82
159	Waynesboro silt loam	Coffee	Forest	None	Gently sloping	2.30	4.25	6.01

[1] Calculations based on ⅓ and 15 atmosphere measurements on sieved samples.

Table 11. Location, land use, erosion, slope, and available water holding capacity[1] of 24 West Tennessee soils

Lab No.	Soil type	County	Land use	Erosion	Slope	A.W.H.C. in inches to: 1′ Depth	2′ Depth	3′ Depth
67	Adler silt	Dyer	Cont. cult.	None	Level	3.18	5.90	8.61
271	Calloway silt loam	Fayette	Cont. cult.	Slight	Very gently sloping	2.60	5.79	9.35
103	Collins silt loam	Madison	Cont. cult.	None	Level	3.67	7.73	11.60
265	Collins silt loam	Fayette	Rotation	None	Gently sloping	1.91	3.62	6.35
107	Collins silt loam	Gibson	Cont. cult.	None	Level	3.37	7.31	11.26
245	Eustis loamy sand	Chester	Cont. cult.	Moderate	Gently sloping	0.93	1.70	2.41
246	Eustis loamy sand	Chester	Idle	None	Steep	0.64	0.82	1.00
60	Falaya silt loam	Crockett	Cont. cult.	None	Level	3.59	7.36	11.65
264	Falaya silt loam	Fayette	Cont. cult.	None	Level	3.89	7.72	11.78
73	Falaya silt loam	Madison	Cont. cult.	None	Level	2.83	5.64	8.57
193	Grenada silt loam	Fayette	Rotation	Moderate	Gently sloping	2.82	6.19	9.82
272	Grenada silt loam	Fayette	Cont. cult.	Moderate	Gently sloping	2.99	6.16	9.44
253	Henry silt loam	Fayette	Pasture	Slight	Very gently sloping	4.16	8.23	12.20
110	Henry silt loam	Madison	Cont. cult.	Slight	Level	3.08	5.85	——
231	Lexington silt loam	Chester	Pasture	Moderate	Gently sloping	2.98	6.17	9.74
232	Lexington silt loam	Chester	Rotation	None	Level	3.46	6.52	9.13
112	Memphis silt loam	Madison	Cont. cult.	Slight	Gently sloping	2.83	5.26	8.06
192	Memphis silt loam	Fayette	Rotation	Moderate	Gently sloping	2.22	5.03	9.12
267	Memphis silt loam	Fayette	Pasture	Moderate	Gently sloping	2.16	4.91	8.12
239	Robinsonville fine sandy loam	Dyer	Cont. cult.	None	Level	1.37	2.67	3.92
119	Roellen silt loam	Obion	Cont. cult.	None	Level	3.17	6.27	9.30
238	Sharkey silty clay	Dyer	Cont. cult.	None	Level	1.96	4.06	6.16
118	Silerton silt loam	Chester	Rotation	Slight	Gently sloping	3.26	6.10	9.20
264	Waverly silt loam	Fayette	Cont. cult.	None	Level	3.40	6.86	10.37

[1] Calculations based on ⅓ and 15 atmosphere measurements on sieved samples.

SUMMARY

SOME physical properties of many Tennessee soils are presented. Relationships between water storage and texture are pointed out.

As clay content increased, the available water holding capacity decreased but the decrease was not proportionate to the amount of clay. As sand increased, the moisture storage capacity decreased.

The available water holding capacity increases with silt and very fine sand content, and soils high in silt and very fine sand have the highest available water holding capacity.

Available water holding capacities of cherty soils are inclined to be low.

A relationship between permeability and aeration porosity is indicated.

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(4M/1-64)