



SOIL SAMPLING SMALL WETLAND FOREST PLOTS IN THE COASTAL PLAIN

The variability of soil properties has always created problems in soil sampling, identification, and classification. The difficulty is particularly acute in the lower coastal plain of South Carolina, where little information is available on wetland soil variability to guide study designs which involve soil sampling. Questions of particular concern involve: (1) selection of a sampling depth or depths in the A horizon representative of the mean of particular soil physical properties, and (2) determination of the number of sampling locations necessary per plot to estimate those means with prescribed precision. An exploratory investigation was conducted near Charleston, S. C., to provide answers to these key problems for an earlier soil-site study. In this situation the results indicated just a few samples could provide reasonable estimates of some soil properties.

The study area was located in Dorchester County, S. C., on wet forest land altered by drainage. Fifty-two small plots from the soil-site study were distributed through the range of soil and drainage conditions available in the area but were generally grouped into two soil drainage classes: poorly and very poorly drained. One plot from each drainage class was randomly picked for the exploratory soil sampling.

One test plot was situated on Coxville fine sandy loam and the other on Bayboro clay loam. Both soils cover extensive acreage in the Charleston area and are generally distributed in the southeastern coastal plain from Virginia to Mississippi, with the largest concentration of Coxville situated in North and South Carolina. The soils were formed from unconsolidated marine sediment of fine texture laid down in the Pleistocene era. Bayboro soil normally has an A horizon depth of 8 to 18 inches and the Coxville approximately 10 inches. Test soils had A horizon depths of 10 and 8 inches for the Bayboro and Coxville series, respectively.

At 2-inch increments beginning with the top layer of mineral soil and continuing through the A horizon, soil samples were collected at 11 locations on the Coxville plot and 10 locations on the Bayboro plot in metal cylinders measuring 2 x 3 inches. Laboratory analyses were made to determine bulk density, total porosity, capillary porosity, percent sand, and percent clay. Standard statistical procedures were used to analyze the data to determine sampling depths and number of sampling locations.

Results of the statistical analyses indicated Coxville was the more variable of the two soils. All the soil properties except percent clay differed significantly with depth on the Coxville plot, while only percent sand differed significantly with depth on the Bayboro plot. Comparison of the means for varying depths indicated that the 2 to 4 and 4 to 6 inch depths were most representative of the A horizon for the Coxville plot and the 2 to 4 inch depth most representative for the Bayboro plot. Therefore, it appears that sampling at approximately the midpoint in the A horizon may define the soil properties of this layer.

The number of sampling locations on each of the test plots needed to estimate the mean of a physical property within 5 percent are given for two probability levels ($P = .95$ and $P = .90$) as follows:

<u>Soil property</u>	<u>Coxville fine sandy loam plot</u>		<u>Bayboro clay loam plot</u>	
	($P = .95$)	($P = .90$)	($P = .95$)	($P = .90$)
Capillary porosity	7	5	4	3
Total porosity	5	4	4	2
Bulk density	4	3	6	5
Percent sand	4	2	5	4
Percent clay	12	9	6	6

Results from this study have only limited application to other areas. Since only one plot was sampled per soil type, the results cannot be expected to represent what might exist on the same soil type in another area. However, the results do indicate the magnitude of sampling needed for the area studied and may provide a starting point for others faced with soil sampling problems on similar wetland soils.

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