

**RELATIONSHIP OF COTTON YIELD TO
CHEMICAL AND PHYSICAL PROPERTIES OF
SOILS: VIRGINIA AND NORTH CAROLINA
COASTAL PLAIN REGION**

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Abstract

Yields for cotton (*Gossypium hirsutum*) in the Virginia and North Carolina coastal plain are limited by soil chemical and physical properties. This study was conducted to determine the influence of soil chemical or physical properties on the yield of cotton. An extension survey provided a list of 5 soil series' most frequently used for cotton in the 2 states. Two hundred sites were chosen in the coastal plain region in 4 counties. Within each county, 10 sites for each of the 5 soil series were sampled to a depth of 60 inches. The soils were described and all horizons to a depth of 36 inches were analyzed for pH, ECEC, base saturation, and amount of extractable Al, K, Mg, Ca, and Na in each horizon. Physical properties examined included particle size analysis, water holding capacity, depth to the water table, and depth of the surface horizons (A or A+E). Yield was determined by hand picking 10 feet of row of cotton at each site for 1996 and 1997. In 1996, which was a wet growing season, the physical property of sand content in the Ap horizon and pH in the Ap horizon had a positive effect on yield ($p < 0.1$) and higher potassium levels in the Ap horizon were related to lower yield ($p < 0.1$). For 1997, a dry growing season, the depth to the Bt horizon was the only physical property that had an effect on yield, that is the closer the Bt was to the surface, the higher the yield was ($p < 0.1$). The higher Al content in the Ap horizon and the higher pH in the Bt horizon lowered yield ($p < 0.1$). Higher potassium in the Bt horizon resulted in a higher yield ($p < 0.05$). The physical properties that are related to yield are sand content in the Ap horizon in wet years, such as 1996, and depth to the Bt horizon in drier years as in 1997. Cotton yield increased with higher pH in the surface horizons in 1996, while yields were lower as pH of the subsurface horizons and exchangeable Al content increased in 1997. Potassium content had different effects on cotton yield in each of the two years.