MANAGING COTTON IRRIGATION ON VARIABLE WATER HOLDING CAPACITY SOIL IN TENNESSEE

B.G. Leib
A. Duncan
University of Tennessee
Knoxville, TN
D. Verbree
University of Tennessee
Jackson, TN
C.L. Main
Phytogen
Medina, TN
M.S. Wiggins
University of Tennessee
Jackson, TN

Abstract

At the West Tennessee Research and Education Center in Jackson, TN, a field was located that was known to contain variable soil due to the depth of silt loam over course sand. In order to utilize this field for a plot experiment, the soils needed to be differentiated by location. A combination of Ground Penetrating Radar (better for deeper sand layers), Electrical Conductivity (better for shallower sand layers) and verification with soil cores was used to delineate zones. Three soil zones were identified with an average depth to sand of 20, 30 and 50 inches with corresponding average water holding capacity of 0.7, 1.1 and 1.9 in/ft. This field was irrigated at different times and at different amount during the 2010 to 2012 growing seasons.

Irrigated cotton yield was maximized in the deep silt loam by irrigating later with less water than in soil where the sand was closest to the surface. In fact, when more water was added to maximize yield in the sandy soil, yield was reduced in the silt loam. At this point, the sandy soil yield was increasing at 2 twice the rate that the silt loam yield was decreasing as more irrigation was added. Therefore, the point at which yield for the entire field is equal no matter whether you irrigated to maximize yield in the sand or the silt loam was 25% sand and 75% silt loam. So if you had, 35% sand and 65% silt loam you should irrigate to maximize yield in the sand to get the highest yield for the entire field or zone even though it is not the predominant soil type.