TILLAGE AND RESIDUE TYPE EFFECT ON COTTON YIELD IN A VARIABLE FIELD

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Abstract

There is considerable variability for crop yield in SE Coastal Plain fields, both within and among soil types. Differences in soil water characteristics appear to be a major cause of the crop yield variation. We conducted this experiment to determine whether using residue management strategies that increase soil water content could reduce variability. The experiment was conducted in 1997, 1998, and 1999 at Clemson University's Pee Dee Research and Education Center near Florence, SC. Treatments in the experiment were winter cover (rye and fallow), tillage (conventional and conservation), and aldicarb (0 and 7 lbs Temik(r) 15G/acre). The field was mapped for soil type on a 100-ft grid by NRCS soil scientists in the early 1990's. Main soil types in the field were Norfolk loamy sand, Eunola loamy sand, and Bonneau sand. Experimental design was split plot with three replicates. The cover x tillage combinations were the main plots and aldicarb levels were the subplots. Subplot size was six 38-inch wide cotton rows that ranged in length from approximately 400 to 700 feet long. These were arranged so that each soil type was present in each subplot. Each subplot was divided into 44-foot sections before harvest, and the soil type of each section was determined from the soil map. Two interior rows of each subplot were harvested with a two-row spindle picker. Seedcotton samples were collected from each section at harvest and these were saw-ginned. Data from sections containing more than one soil type were discarded before the data were analyzed. Data were subjected to analysis of variance with the model including cover, tillage, aldicarb, soil, year, and all interactions. Significant soil x year, aldicarb x year, and cover x tillage x year interactions occurred for lint yield. In 1997 and 1998, cotton grown on the Norfolk soil (875 lb/ac in 1997 and 685 lb/ac in 1998) had higher yield than cotton grown on the other two soil types. In the drier year of 1999, cotton grown on the Norfolk and Eunola soils had the same yield (averaging 380 lb/ac), while cotton grown on the Bonneau sand averaged 265 lb/ac (LSD0.05=70 lbs/ac). Application of aldicarb increased yield only in 1997. With a rye cover crop, there was no difference in yield between cotton grown with conservation and conventional tillage in 1997, but cotton grown with conservation tillage had higher yield than cotton grown with conventional in 1998 and 1999. Following winter fallow, cotton yields were higher with conservation tillage only in 1998. Lack of interactions between soil type, tillage, and winter cover suggests that these residue management techniques may not reduce yield variability of nonirrigated cotton in Coastal Plain fields.

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