TILLAGE AND IRRIGATION MANAGEMENT OF COTTON IN A CORN/COTTON ROTATION

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Abstract

Cotton cropping systems involving an annual corn-cotton rotation are becoming more common in the southeastern United States. Incorporation of conservation-tillage practices is increasing in order to reduce labor and input costs, and to address environmental concerns. Additionally, the use of irrigation to supplement rainfall is increasing. To address these issues, a five-year research study was undertaken to evaluate the yield of cotton in a corn-cotton rotation under two tillage treatments and two irrigation treatments. The objectives were to examine cotton yield under four tillage/irrigation treatments: 1) irrigated/conventional tillage, 2) irrigated/minimum tillage, 3) non-irrigated/conventional tillage, and 4) non-irrigated/minimum tillage. An eight-acre field at the USDA ARS research station at Stoneville, Mississippi, was subdivided to create one smaller field for each of the four irrigation/tillage treatments. Soil maps were developed using Veris electrical-conductivity equipment, and showed the soils to be highly variable within each treatment and across the four treatments. Yield measurements showed average yields to be slightly higher under conventional-tillage conditions, but differences between the conventional- and minimum-tillage treatments amounted to only 6%. While minimum-tillage production may not have increased yields, the difference in yields was minimal. This could affect profitability by decreasing input labor and cost without a significant decrease in yield. In general, yields were higher under irrigated conditions, but these results varied depending on the season's rainfall conditions. The study also pointed to the importance of taking soil type into account when analyzing treatment results. Yields were highly correlated with Veris measurements, and agronomic differences independent of imposed treatments made interpretation of treatment results difficult. Disregarding soil variability significantly affected the interpretation of treatment outcomes, resulting in misleading interpretations. By taking soil variability into account, interpretation of treatment results led to differing conclusions. Soil variability is an important factor which must be taken into consideration when researchers examine experimental results, and when producers put recommendations into practice.