EFFECTS OF NITROGEN APPLICATION TIMING ON COTTON UNDER DIFFERENT PLANTING DATES

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Abstract

It is essential to develop innovative approaches that can manage N more efficiently to increase grower profitability due to substantially increased N prices. The objective of this study was to determine the optimal N application timing for high-yielding cotton cropping systems in Tennessee. A field small-plot experiment was conducted at Jackson, TN in 2011 and 2012. Four N application timings (pre planting, at planting, early side dress, and late side dress) were evaluated under three cotton planting dates (early, standard, and late) in a randomized complete block split plot design with four replications. The following data were collected on a split plot basis each year: Soil nitrate and ammonium contents before cotton planting and after cotton harvest; canopy normalized vegetation index readings, leaf chlorophyll meter readings, plant height, number of main-stem nodes, average internode length, and leaf N concentration at early square, early bloom, mid bloom, and peak bloom; number of main stem nodes above the uppermost white flower at fruiting position 1 at early bloom, mid bloom, and peak bloom; boll number per plant and average seed cotton weight per boll at harvest; lint yield at harvest; gin turnout and fuzzy seed index; fiber quality properties including fiber strength, UHM length, uniformity, and micronaire; and nitrogen concentration in cotton seed. Additionally, temperature and rainfall data were recorded during the growing season each year. Our two-year average results showed that lint yield and quality were similar for all four N application timings: pre planting, at planting, early side dress, and late side dress. However, lint yield was significantly reduced by 16.0% to 23.6% with late-planted cotton relative to those of cotton planted earlier. Late-planted cotton had lower micronaire but higher UHM length, uniformity, and strength. Overall, our results suggest that there are no significant benefits in cotton yield or quality with in-season side dress of N compared with pre- and at-planting N applications in west Tennessee.