NITROGEN RATE DETERMINATION FOR SOLID AND SKIP-ROW PLANTED 32-IN COTTON IN THE MISSISSIPPI DELTA

M. Wayne Ebelhar and Joe O. Ware
Agronomist and Research Assistant
Mississippi Agricultural and Forestry Experiment Station
Delta Research and Extension Center
Stoneville, MS

Abstract

Cotton pickers are now available to successfully harvest narrow-row cotton (***Gossypium hirsutum* L.**) planted in many different row configurations. Research in Mississippi to determine optimum management techniques for the narrow-cotton production has been underway for several years. Factors investigated have included cultivars, nitrogen (N) rates, N application timing, growth regulators, planting dates, and planting patterns. A 6-year study (1989-1994) at the Delta Research and Extension Center located at Stoneville, Mississippi showed an average lint yield increase for 'DES 119' of 5.3% (56 lb lint/A) with 30-in rows compared to 40-in rows when averaged across N management and growth regulator systems. The response ranged from a decrease of 46 lb lint/A (3.2%) to an increase of 112 lb lint/A (12.5%). Research with different planting patterns at the same time showed good potential for skip-row (2x1) planting with narrow-row systems. The first study with 30-in solid and skip-row planting patterns and increasing N rates showed no significant increase in lint yields above 90 lb N/A. Additional information was needed to better define the interactive role of N rates with respect to lint yield under dryland, rain-fed conditions. A 32-in row system (which allows equal picker efficiency, five 32-in rows vs four 40-in rows) with solid and skip-row (2x1) planting patterns were evaluated with N rates ranging from 60 to 165 lb N/cotton-acre (C-A) in 15-lb /A increments with all N applied prior to planting. The urea-ammonium nitrate (UAN) solution was "knifed" into both sides of the row with a ground-driven squeeze pump system that metered N to each row. For the skip-row areas, the UAN solution was by-passed from the knives back into the tank so that only the planted cotton rows were fertilized. A4-year study was initiated in 1996 on a Bosket very fine sandy loam (Mollic hapludalfs) with 16 treatments (2 planting patterns X 8 N rates) arranged in a randomized complete block design with five replications. Results from the first two years have been included in this report. Yields were reported in cotton-acre units even though these tended to over-emphasize differences when compared to land-acre yields. Lint yield per cotton-acre in 1996 ranged from a low of 665 to a high of 805 lb/C-A for solid planted cotton and 849 to 1052 lb/C-A for the 2x1 skip-row pattern. There were no significant differences with respect to N rate for the solid planted cotton. In the skip-row system, the highest yield was obtained with 120 lb N/C-A. However, lint yields were quite varied among N rates. The lint response to skip-row planting in 1996 ranged from 15 to 58% depending on the N rate with no specific pattern identified. For 1997, lint yield ranged from 977 to 1141 lb/C-A for solid planted 32-in row cotton and 1248 to 1451 lb/C-A for skip-row cotton. The skip-row response ranged from 18 to 36% and again no significant response to N rates. When averaged across the two years, there was no response to increasing N rates and a skip-row response of 167 to 348 lb lint/C-A (19 to 38%). When averaged across all N rates, the skip-row response was 214 lb lint/C-A (28.9%) and 282 lb lint/C-A (26.6%) for 1996 and 1997, respectively. Increasing N rates did delay maturity as determined by the percent first harvest but the differences were small. In summary, the data suggest that, in this non-irrigated environment, N is not a limiting factor with respect to lint yield. In going to a skip-row planting pattern, lint yields were increased by 19 to 38% while utilizing the same N rate per planted cotton acre. Further research is needed to evaluate alternate planting patterns to maintain the same number of row-feet of cotton per acre compared to solid plantings while increasing light in the lower canopy.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 1:659-659 (1998)
National Cotton Council, Memphis TN