Influence of Soil Nitrogen Level on Seasonal Activity of Cotton Arthropods with Drip Irrigation Systems (Field 6G)

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Objective: The objective was to evaluate the effect of nitrogen fertilizer application rates on the population dynamics of cotton arthropods.

Methodology: Experimental plots of Paymaster 2379RR cotton were planted on May 11, 2004 at the Helms research farm located near Halfway, Texas. The experiment was a randomized block design (RBD) with five treatments and four replications. The five treatments included the application of nitrogen fertilizer at the rate of 0, 50, 100, 150, and 200 lb/acre. Cotton was planted (approximately 56,000 seeds per acre) in 30-inch rows and was irrigated with drip irrigation system. Arthropod predators were sampled at weekly intervals by a beat-bucket sampling method from July 22 to August 28, 2004. White plastic bucket (12" ht x 15" dia) was used to beat four plants per sample and four samples per plot were taken. Cotton aphids (*Aphis gossypii)* were sampled weekly from July 21 to October 1, 2004 by visually inspecting 10 top and 10 bottom leaves from each plot. In addition to arthropod sampling, we collected 10 fifth mainstem node leaves from each plot and estimated leaf moisture for two sample dates in August.

Results: Cotton aphid abundance in 2004 did not surpass the economic threshold of 50 aphids per leaf until September 23, while the seasonal average ranged from 10 to 15 aphids per leaf. Although the aphid abundance was consistently lower at 0-N and 50-N treatments compared with that at higher N rates, the level of nitrogen had no significant effect on aphid abundance (Fig. 1). Arthropod predator activity in 2004 was negligible until late in the season when aphid numbers increased.

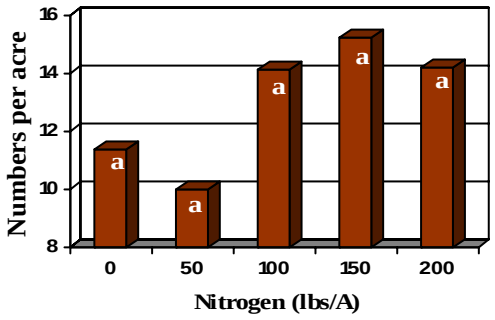

Fig. 1. Effect of nitrogen application rates on cotton aphid abundance.

Lint yield was significantly higher on N-applied plots compared with that in 0-N plots. Nevertheless, the nitrogen levels ≥50 lb per acre had no significant effect on cotton yield; yield was numerically highest in 100 lb N/acre treatment (1408 lb/acre) followed by 50, 150, and 200lb N/acre.

The nitrogen application significantly increased the leaf nitrogen content, but the effect was similar among the three highest nitrogen rates (Fig. 2).

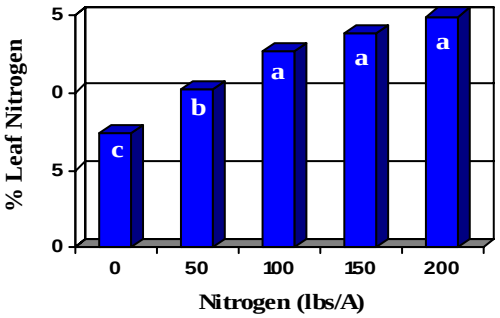

Fig. 2. Effect of nitrogen application rates on leaf nitrogen in cotton.