

Influence of Soil Nitrogen Level on Seasonal Activity of Cotton Arthropods in Drip Irrigation System (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 10, 2005 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. The test was replanted on May 25 due to poor germination and again replanted on June 21 due to hail damage. Therefore, the crop was too late for a meaningful data collection. Nevertheless, we took the soil samples on June 15 for residual nitrogen analysis and monitored crop growth and insect activity throughout the season. Fertility treatments were applied on August 2 with a soil applicator ground rig. When this field was replanted each time, some plants from earlier plantings remained creating a situation where the drip test crop was basically made up of all three plantings.

Results: Cotton aphid populations did not build in 2005. Periodic observations showed only sporadic presence of cotton aphids, but not sufficient in numbers for seasonal monitoring. As a result, no leaf moisture or leaf nitrogen was monitored. Nevertheless, after three years of continuous application of variable rate of nitrogen, residual nitrogen levels varied significantly among the five nitrogen levels. Clearly, no nitrogen application resulted in significantly lower residual nitrogen compared with that in 150 and 200 lbs/acre treatments (Fig. 1). The study planned for 2006 should provide ideal treatment plots for variable nitrogen study as there is significant depletion in zero nitrogen plots in 2005.

Variation in residual nitrogen levels coupled with variable nitrogen application resulted in phenotypic expression of nitrogen deficiency in cotton across treatment plots, especially between zero-N plots and nitrogen-applied plots (Fig. 2). We plan to monitor leaf nitrogen and other plant parameters in 2006.

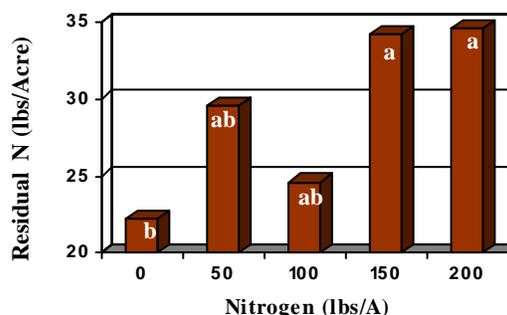


Fig. 1. Effect of nitrogen application rates on residual nitrogen after 3 yrs.



Fig. 2. Visual effect of varying levels of nitrogen application on treatment plots.