

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 7, 2003 at the Helms research farm located near Halfway, Texas. The experiment had 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 lbs/acre. Cotton was planted (approximately 56,000 seeds/acre) in 30-inch rows and was irrigated with a drip irrigation system. Arthropod predators were sampled at weekly intervals utilizing a beat bucket sampling method from July 22 to August 28, 2003. A 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 22 to September 4, 2003 by visually inspecting 5 top and 5 bottom leaves from each plot. Cotton aphid data were converted to average numbers per leaf and the predator data were reported as total numbers per 100 plants. Predators sampled included predaceous bugs [minute pirate bug (*Orius* spp), damsel bug (*Nabis* spp.), big-eyed bug (*Geocoris* spp.), wheel bug (*Arilus cristatus*), and assassin bug (*Zelus renardii*)], predaceous beetles [lady beetle (*Hippodamia convergens*), soft-winged flower beetle (*Collops* spp.), scymnus beetle (*Scymnus loewii*), and hooded beetle (*Notoxus* spp.)], green lacewing (*Chrysoperla* spp.), and spiders (predominantly *Misumenops* spp.). 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 was very low in 2003 (seasonal average 0.046/leaf) and the level of nitrogen had no significant effect on aphid abundance (Fig. 1). Predator abundance was significantly higher in plots receiving 200 lbs N/acre (72/100 plants) compared with plots receiving 0 lbs N/acre (55/100 plants) (Fig. 2). The nitrogen level had no significant effect on cotton yield but yield was numerically highest in plots receiving 100 lbs of N/acre (620 lbs lint/acre) followed by 150, 200, 50, and 0 lbs N/acre. Leaf moisture was significantly higher in 0-N plots compared with the plots that received nitrogen, indicating a significant role of nitrogen in modifying the leaf water content.

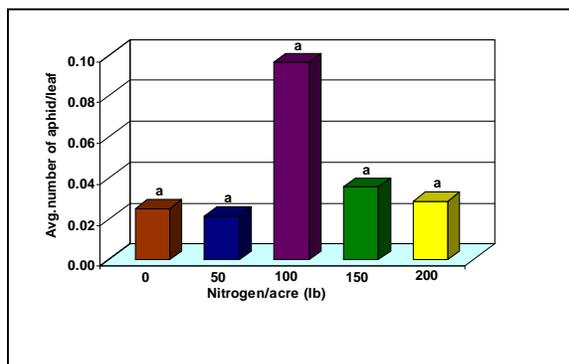


Fig. 1. Effect of nitrogen application rates on cotton aphid abundance.

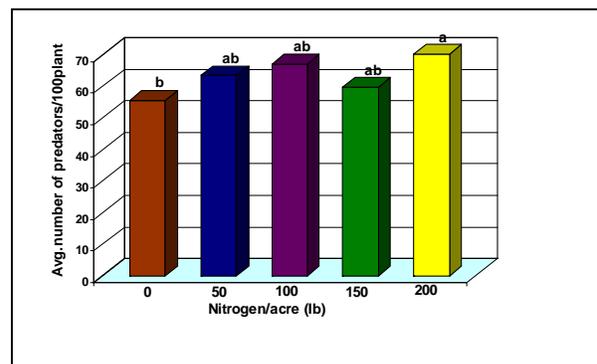


Fig. 2. Effect of nitrogen application rates on predator abundance.