

APHICIDE APPLICATION TIMING IN LOUISIANA: EFFICACY AND COTTON YIELDS

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Abstract

Field tests were conducted to determine the influence of cotton aphid, *Aphis gossypii* Glover, infestations during the early (vegetative) and mid-season (flowering) periods on cotton yields. Treatments were arranged in a split-plot within a randomized complete block design. Main blocks consisted of irrigation regime (irrigated vs. non-irrigated) and subplots consisted of aphicide treatment (aphid control vs. no control). Aphicides included were pymetrozine (Fulfill 80WP, 0.086 lb AI/acre) in 2000 and thiamethoxam (Centric 25WG, 0.047 lb AI/acre) in 2001. Plants were sampled weekly to determine cotton aphid density and to monitor the occurrence of the entomopathogen, *Neozygites fresenii*. Seedcotton was harvested from sub plots and from one meter micro-plots within each sub plot. Plants within each micro-plot were tagged at the corresponding mainstem node that *N. fresenii* eliminated cotton aphid populations. Seedcotton yields within micro-plots also were partitioned into cotton aphid infested zones, non-infested zones, and vegetative branches on plants.

Cotton aphid densities ranged from 0 to ca. 90 aphids per plant terminal (all apical growth including first fully expanded leaf) in 2000 and 0 to ca. 120 aphids per terminal in 2001. Six applications of pymetrozine provided 29 to 71% control (mean = 50%) of cotton aphids in 2000. Cotton aphid control from seven applications of thiamethoxam ranged from 68 to 94% (mean = 81%) in 2001. Cotton aphid densities peaked the third week of June in 2000 and the fourth week of June in 2001.

For sub plot yields, no irrigation by aphicide interaction [2000, P=0.6684; 2001, P=0.1419] or aphicide treatment effect [2000, P=0.9810; 2001, P=0.3418] was observed. However, seedcotton yields in the irrigated plots were significantly higher than seedcotton yields in non-irrigated pots [2000, P=0.0018; 2001, P=0.0121] in both years.

No irrigation by aphicide interaction [2000, P=0.6521; 2001, P=0.3012] or aphicide treatment effect [2000, P=0.9026; 2001, P=0.5984] was observed during either year of the experiment for micro-plot total yields. However, seedcotton yields in the irrigated regime were significantly higher than that in the non-irrigated regime [2000, P=0.0164; 2001, P=0.0162]. No irrigation by aphicide interaction [2000, P=0.8311; 2001, P=0.1753] or aphicide treatment effect [2000, P=0.5882; 2001, P=0.0601] was observed for seedcotton yields in cotton aphid infested plant zones. In both years, there was a significant irrigation effect [2000, P=0.0453; 2001, P=0.0001] on yields in the infested zone. Yields in the irrigated plots were significantly higher than yields in the non-irrigated plots. No irrigation by aphicide interaction [2000, P=0.6574; 2001, P=0.8136] or aphicide treatment effect [2000, P=0.2143; 2001, P=0.4412] was observed for seedcotton yields in non-infested plant zones. A significant irrigation effect [2000, P=0.0017; 2001, P=0.0001] occurred for yields in the non-infested zones. Yields in the irrigated regime were significantly higher than yields in the non-irrigated regime in both years of the experiment. No irrigation by aphicide interaction [2000, P=0.2655; 2001, P=0.6450] or aphicide treatment effect [2000, P=0.8760; 2001, P=0.4408] was observed for seedcotton yields on vegetative branches. In 2000, seedcotton yields on vegetative branches were significantly higher in the irrigated regime compared to the non-irrigated regime [P=0.0260]. In 2001, no significant irrigation effect on cotton yields harvested from vegetative branches was observed [P=0.2530].

Aphicides used to control cotton aphids significantly reduced cotton aphid densities in both years and *N. fresenii* effectively eliminated cotton aphids once an epizootic was established. Seedcotton yields were significantly influenced by irrigation. Yields were higher in the irrigated regime compared to the non-irrigated regime. Cotton aphids did not significantly affect seedcotton yields in irrigated or non-irrigated regimes. However, significant yield losses may have occurred if higher cotton aphid densities occurred or populations remained for a longer duration.