EFFECT OF NITROGEN APPLICATION RATE ON TARNISHED PLANT BUG INFESTATION AND YIELD

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Abstract

Tarnished plant bugs have become the key insect pest in Mississippi cotton production, particularly the Mississippi Delta. In 2010, over 416,000 acres were infested with tarnished plant bugs resulting in the loss of 42,907 bales. On average, five insecticide applications for tarnished plant bugs were made in 2010 at a cost of $57.14 per acre. The Mississippi Delta averaged seven applications for tarnished plant bugs in 2010 at a cost of $67.00 per acre. In 2011, 573,000 acres were infested with tarnished plant bugs resulting in the loss of 86,240 bales. The Mississippi Delta averaged seven applications for tarnished plant bugs in 2011 for a cost of $97.02 per acre. Tarnished plant bugs have been documented to be resistant to organophosphate chemistries. Furthermore, this pest has been shown to be 54 – fold more tolerant to permethrin and 35 – fold more tolerant to bifenthrin than in years past. Nitrogen is a key component in maximizing cotton yield. Excessive nitrogen rates can cause an increase in plant height, increased vegetative growth, and delayed maturity. Tarnished plant bugs are drawn to rank, lush cotton; which could be an effect of excessive nitrogen. Previous research has been conducted evaluating planting date and cultivar maturity on tarnished plant bug control. However, little to no data exists on the effect of nitrogen application rate on tarnished plant bug infestation. Therefore, the objective of this study was to determine the effect of nitrogen application rate on tarnished plant bug infestation, cotton growth, and yield.

This experiment was conducted in 2012 at the Mississippi State University Delta Research and Extension Center in Stoneville, Mississippi. Plots contained sixteen – forty inch rows, which were seventy five feet long. All plots were replicated 4 times. Stoneville 5288B2F was planted on 01 May 2012. Nitrogen (32% UAN) was applied at pinhead square at the following rates (lbs N/ac): 0, 40, 80, 120, and 160. A treated (for insects) and non-treated plot was included for all nitrogen application rates. All plots were scouted weekly for tarnished plant bugs and other insect pests using appropriate methodology. Insecticides were applied as needed based upon thresholds developed by Mississippi State University. This experiment was conducted using a factorial arrangement of treatments in a randomized complete block design. Data were subjected to analysis of variance and means were separated using Fisher's protected LSD at $p = 0.05$.

Cotton height and total nodes at bloom were increased following nitrogen application rates ≥ 40 pounds per acre. Nitrogen application rates ≥ 80 pounds per acre resulted in significantly more nodes above white flower when compared to plots receiving no nitrogen. Nitrogen application rates ≥ 40 pounds per acre resulted in significantly taller plants at the end of the season compared to where no nitrogen was applied. Total nodes were maximized in sprayed plots receiving application rates ≥ 80 pounds per acre. Seed cotton yield was significantly higher in plots receiving 80 pounds per acre when compared to nitrogen application rates of 0, 120, and 160 lbs/acre. Increased nitrogen application rates resulted in a prolonged infestation from tarnished plant bugs. Cotton grown with nitrogen application rates of 40 and 80 lbs per acre required one less application for tarnished plant bugs when compared to plots receiving 120 and 160 lbs of nitrogen per acre. Plots receiving no nitrogen required one less insecticide application than those that received 40 and 80 pounds of nitrogen per acre.