# THE IMPACT OF THRIPS AND TARNISHED PLANT BUG INJURY ON COTTON MATURITY AND YIELD

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# <u>Abstract</u>

A field experiment was conducted in Stoneville, MS in 2016 and in Stoneville, MS and Starkville, MS in 2017 to determine the effects of tobacco thrips, *Frankliniella fusca* (Hinds), and tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois), on the maturity and yield of cotton. Plots were either managed for thrips, managed for tarnished plant bugs, or managed for both, along with an untreated control. Thrips counts, thrips ratings, plant heights, nodes above white flower, and nodes above cracked boll were measured throughout the growing season. At the end of each growing season, plots were harvested and weights were recorded. Maturity of plots with no tarnished plant bug management was delayed two to three days compared to those with tarnished plant bug management. This was likely impacted by warmer than usual air temperatures during September and October that allowed cotton plants to compensate for injury and mature at a normal rate. Plots where insects were managed yielded significantly higher than untreated plots.

# **Introduction**

Tobacco thrips, Frankliniella fusca (Hinds), and tarnished plant bug, Lygus lineolaris (Palisot de Beauvois), are two primary pests of cotton in Mississippi. Tobacco thrips infest nearly every acre of cotton planted in Mississippi. Historically, in-furrow applied granular aldicarb (Temik 15G, Bayer CropScience, Research Triangle Park, NC) was used to manage early season thrips (Cook et al. 2016). Currently, thrips management includes seed treatments followed by foliar treatments if necessary. Differing results have been observed in regards to the effect of thrips on yield and plant maturity. Some researchers have found thrips can delay plant maturity up to two weeks (Gaines 1934; Dunham and Clark 1937; Watts 1937, Carter et al. 1989; Bourland et al. 1992; Parker et al. 1992; Cook et al. 2011), while others have observed no effect on plant maturity (Newsom et al. 1953; Leigh 1963; Harp and Turner 1976; Parker and Huffman 1985; Ratchford et al. 1989; Lentz and Austin 1994; Cook et al. 2011). The tarnished plant bug, Lygus lineolaris (Palisot de Beauvois), is the most important insect pest of cotton in the midsouth region of the United States. Tarnished plant bug feeds on plant fruiting structures including squares and bolls. Feeding can result in direct yield losses and delays in maturity (Tugwell et al. 1976; Hanney et al. 1977; Layton 1995; Russell 1999). While many studies have been conducted to determine the impact that each of these pests have individually, very little information exists about the interaction between the two pests in cotton. The objective of this experiment was to determine the impact thrips and tarnished plant bug, both alone and in combination with one another, have on the maturity and yield of cotton.

#### **Materials and Methods**

To determine the compounding effects of thrips and tarnished plant bug on maturity and yield of cotton, an experiment was conducted at the Delta Research and Extension Center in Stoneville, MS in 2016 and 2017, and at the R.R. Foil Plant Science Research Center in Starkville, MS in 2017. The experiment was a split-split plot within a randomized complete block design with four replications. The main-plot factor was defoliation timing at 3 levels, defoliate thrips protected, defoliate plant bug protected, and defoliate both protected. Plots were defoliated when average nodes above cracked boll reached 4. The sub-plot factor was tarnished plant bug management at 2 levels, plant bug protected and plant bug unprotected. All plots received automatic weekly insecticide applications for tarnished plant bug until first flower, squares were manually removed until square retention reached 50% to simulate damage in plant bug unprotected plots. After square removal, all plots were managed for tarnished plant bug weekly. There were also plots with a treatment combination of thrips and tarnished plant bug protected. The sub-plot factor was thrips management at 2 levels, thrips protected and thrips unprotected. Thrips protected plots had a seed treatment of Avicta

Duo (Syngenta), in-furrow application of AgLogic<sup>™</sup> Aldicarb, (AgLogic Chemical), and automatic weekly sprays of acephate. Thrips counts as well as thrips damage ratings and plant vigor ratings were measured at the beginning of the season. Plant heights, nodes above white flower, and nodes above cracked boll were measured throughout various times of the growing season. Yields were measured and recorded as lint pounds per acre.

### **Results**

Thrips management had a significant effect on mean plant heights across all years and locations. Plants in thrips protected plots were significantly taller than unprotected plots. Thrips had no significant effect on nodes above white flower. However, tarnished plant bug had significant effect on nodes above white flower as plots with tarnished plant bug damage had significantly higher node counts compared to undamaged plots. Thrips had no significant effect on plant maturity. The maturity of unprotected tarnished plant bug plots were delayed two to three days compared to protected plots. This delay was expected as previous research has shown, however, a greater delay was anticipated. The short delay in maturity in this experiment could be due to unusually warmer temperatures in September and October, which allowed plants to mature properly and on time. Plots that were managed for tarnished plant bug yielded significantly higher than the untreated control. The data of this experiment suggests that managing thrips and tarnished plant bug is important in maintaining maximum yield potential of cotton. Growers can protect yield by using proper IPM practices, along with early season insecticide options for thrips management as well as inseason insecticide applications for management of tarnished plant bug.

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