IMPACT OF LATE SEASON MANAGEMENT APPROACHES FOR TARNISHED PLANT BUG IN MID-SOUTH COTTON

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Abstract

The tarnished plant bug is a major pest of various agronomic crops across the United States; and one of the most yield limiting pests of cotton in mid-south production systems. Insecticides provide the primary form of control for this pest, and numerous applications are required annually. Currently, there is limited research focusing on TPB termination timing impacts in cotton. Growers make the majority of TPB applications later in the growing season to avoid yield losses, however, these applications may only protect a small portion of overall yield or occur after current termination recommendations (Crow et al. 2020). In 2019 and 2020, experiments were conducted in multiple locations across the mid-south to determine when growers may terminate insecticide applications targeting tarnished plant bugs which coincide with week of bloom to minimize uneconomical late season applications.

Introduction

The tarnished plant bug has become the primary target of foliar applied insecticides across the mid-south. The pest prefers to feed on small to medium sized squares, as well as other young fruiting forms, causing abscission or malformation of fruiting structures which result in yield losses. Traditionally, in the state of Mississippi growers make on average five to seven applications per year targeting TPB driving up production costs and increasing insecticide exposure amongst TPB populations. Many of these applications occur in the later portion of the growing season and previous research has shown yield may not negatively be affected when altering thresholds around the third to fourth week of bloom (Wood et al. 2016). This study further evaluates implantation of an established dynamic threshold by altering the current management recommendations in the later weeks of bloom.

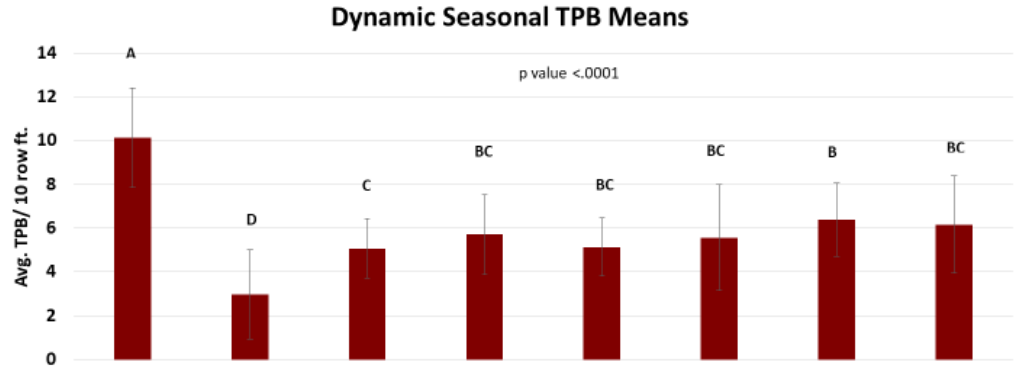
Materials and Methods

Experiments were conducted at four locations in 2019, Glendora, MS, Sidon, MS, and an early and late plant date at the Delta Research and Extension Center (DREC) in Stoneville, MS. In 2020 an additional 4 location were utilized throughout the Mississippi River Delta region in Sidon, MS, Glendora, MS, Stoneville, MS, and St. Joseph, LA to evaluate the potential implementation of a dynamic TPB threshold approach. Treatments included an untreated control, automatic weekly treatments, current threshold, and various dynamic treatments (Figure 1). The Dynamic treatments will consist of plots treated on threshold weeks 1-4 of bloom and not treated weeks 5 and 6 (Dynamic 1), treated on threshold weeks 1-4 of bloom and a 2X threshold weeks 5 and 6 (Dynamic 2), treated on threshold weeks 1-3 of bloom and a 2X threshold weeks 4-6 (Dynamic 3), treated on threshold weeks 1-3 of bloom with a 2X threshold week 4 and 5 and 3X threshold week 6 (Dynamic 4), and treated on threshold weeks 1-3 of bloom with a 2X threshold week 4 and a 3X threshold on weeks 5 and 6 (Dynamic 5). All treatments were arranged in a randomized complete block design and replicated 4 times at each location. Plots were sampled weekly after first bloom using a standard drop cloth making two drops per plot. If a treatment average exceeded the dynamic threshold for the respective week an application was made. All data were analyzed in SAS PROC GLIMX using Fishers LSD.

Results and Discussion

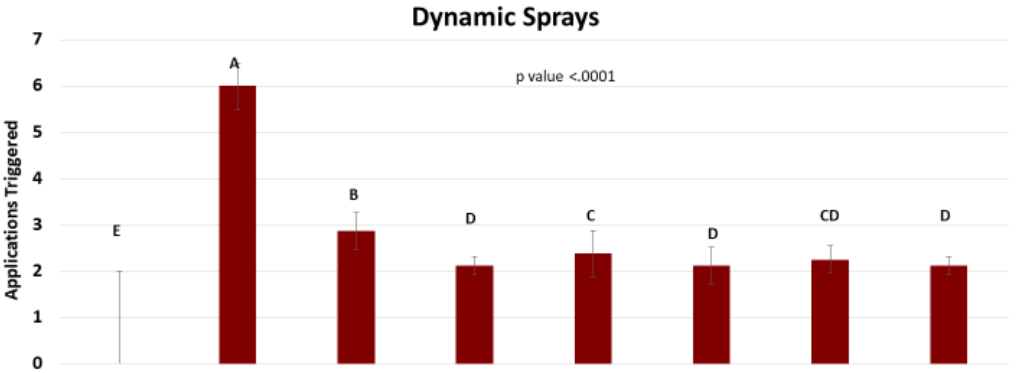
Regarding seasonal averages, except for Dynamic 4, all Dynamic and current treatments held statistically similar numbers of TPB throughout the growing season (Figure 1). However, all dynamic treatments resulted in significantly fewer applications triggered than current recommendations (Figure 2) yet held yield productivity as well as current

recommendations (Figure 3). This shows potential to utilize a dynamic late season approach for managing TPB populations.



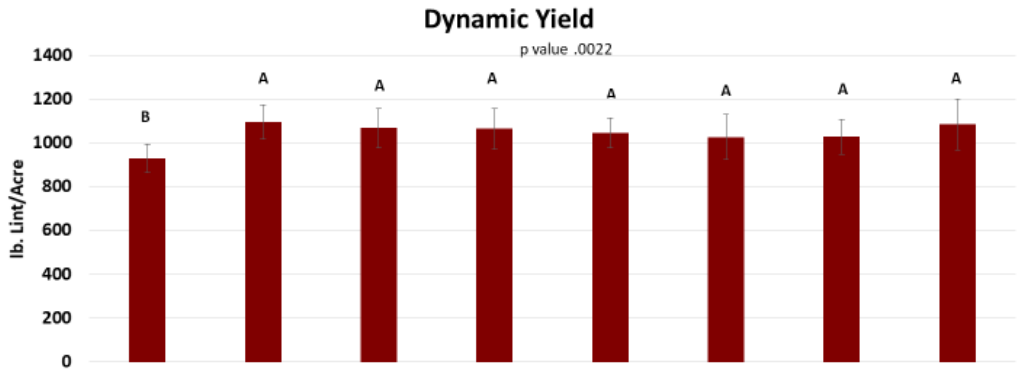
Week of Bloom	Check	Weekly	Current	Dynamic 1	Dynamic 2	Dynamic 3	Dynamic 4	Dynamic 5
1	Untreated	Treated	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
2	Untreated	Treated	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
3	Untreated	Treated	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
4	Untreated	Treated	Threshold	Threshold	Threshold	2X Threshold	2X Threshold	2X Threshold
5	Untreated	Treated	Threshold	Untreated	2X Threshold	2X Threshold	2X Threshold	3X Threshold
6	Untreated	Treated	Threshold	Untreated	2X Threshold	2X Threshold	3X Threshold	3X Threshold

Figure 1



Week of Bloom	Check	Weekly	Current	Dynamic 1	Dynamic 2	Dynamic 3	Dynamic 4	Dynamic 5
1	Untreated	Treated	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
2	Untreated	Treated	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
3	Untreated	Treated	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
4	Untreated	Treated	Threshold	Threshold	Threshold	2X Threshold	2X Threshold	2X Threshold
5	Untreated	Treated	Threshold	Untreated	2X Threshold	2X Threshold	2X Threshold	3X Threshold
6	Untreated	Treated	Threshold	Untreated	2X Threshold	2X Threshold	3X Threshold	3X Threshold

Figure 2



Week of Bloom	Check	Weekly	Current	Dynamic 1	Dynamic 2	Dynamic 3	Dynamic 4	Dynamic 5
1	Untreated	Treated	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
2	Untreated	Treated	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
3	Untreated	Treated	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
4	Untreated	Treated	Threshold	Threshold	Threshold	2X Threshold	2X Threshold	2X Threshold
5	Untreated	Treated	Threshold	Untreated	2X Threshold	2X Threshold	2X Threshold	3X Threshold
6	Untreated	Treated	Threshold	Untreated	2X Threshold	2X Threshold	3X Threshold	3X Threshold

Figure 3

Summary

From this research, there is potential to utilize a dynamic tarnished plant bug threshold approach in the later weeks of bloom. This can minimize expensive late season applications for mid-south producers. Doing so has potential to increase grower profitability as well as decrease insecticide exposure throughout the region in accordance with current integrated pest management (IPM) tactics.

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