EVALUATION OF AUTOMATIC INSECTICIDE APPLICATIONS FOLLOWING PREVENTATIVE INSECTICIDES FOR THRIPS

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Abstract

Small-plot experiments were conducted across the cotton belt in 2009 and 2010 to determine if automatic foliar applications made to cotton that had received a preventative insecticide would be economically viable, and if so, which timing these applications would most contribute to yield. Thrips pressure varied widely between years and among locations. Pressure was not similar between years at the same location, suggesting the need for a preventative, at-plant treatment. There were generally differences attributed to at-plant insecticides at 30-60% of the sites, dependent on plant height, thrips numbers, or yield. Temik and Aeris were not statistically different when averaged across all sites. More importantly, automatic foliar oversprays of acephate (regardless of thrips pressure) generally had little effect across all sites. Certain areas in the cotton belt, however, may benefit from these applications due to less-than-optimal growing conditions coupled with high thrips pressure (e.g., VA, NC).

Introduction

There are several economically important species of thrips in upland cotton across the Mid-south and Southeast (Greene et al. 2003). To minimize losses due to this pest, growers in these regions treat a significant percentage of the cotton acreage with preventative insecticides applied either onto the seed or into the seed furrow at planting. Although these preventative treatments are generally effective, supplemental foliar applications are sometimes required when high populations of thrips are present, or when at-plant treatments are ineffective due to extreme weather conditions (e.g., rainfall). While a certain percentage of foliar applications for thrips are warranted, some cotton acreage receives automatic foliar applications regardless of thrips numbers or associated damage, whereas treatment decisions are often based on plant stage, or even for the sake of convenience when insecticides are tank-mixed with post-emergence herbicide applications (e.g., glyphosate). The value or economic benefit of these applications is not well documented. Experiments were be performed at multiple locations across the Mid-South and Southeast to determine (1) whether these supplemental foliar applications made following preventative treatments for thrips are economically viable, and if so, (2) to determine the most effective number and timing of those applications.

Materials and Methods

Trials were conducted at >18 locations throughout the cotton belt from Texas to Virginia in 2009 and 2010. Plot size was 4 rows x 50 feet and arranged in a randomized complete block design with factorial arrangement of treatments (3 x 4, 4 replications). Treatments consisted of two factors including 'Factor A' (at-plant insecticide) and 'Factor B' (automatic application timing of foliar insecticide). 'Factor A' consisted of no seed preventative insecticide, Aeris® seed treatment, or Temik® 15G (5.0 lbs/A) applied in-furrow. 'Factor B' consisted of no foliar application, an automatic application at 1-2 true leaves, an automatic application at 3-4 true leaves, or automatic applications and 1-2 *and* 3-4 true leaves. Varieties were chosen based on optimal agronomics/insect protection (e.g., Bollgard II or WideStrike) for each location. Seed-cotton yield was recorded from the middle two rows and analyzed with various secondary data such as thrips numbers, weather data, nematode samples, days to emergence, plant stage at each sampling, and a maturity rating of the approximate date when the plots reached NAWF5. Data were analyzed as a split-plot (by year) with location as the main effect. At-plant insecticide and foliar overspray regime were subplot effects. Data were analyzed using PROC GLIMMIX, with interactions further scrutinized using the 'slice' option (SAS 9.2).

Results

Only sites planted before May 15 were chosen for analysis, in order to better evaluate effects due to challenging conditions conducive to thrips injury. In 2009 and 2010, significant differences in adults were attributed to at-plant insecticide at roughly half of the sites at 10-14 days after crop emergence. The same was observed for immatures for both years across all locations. There were significant differences in plant height due to at-plant insecticide in 2009, as plants with Aeris and Temik were taller than those with no at-plant insecticide at 3-5 days after 3-4 leaf foliar application (Figure 1). In 2010, differences in plant height were attributed to at-plant insecticides at 6 of 10 sites (Figure 2).

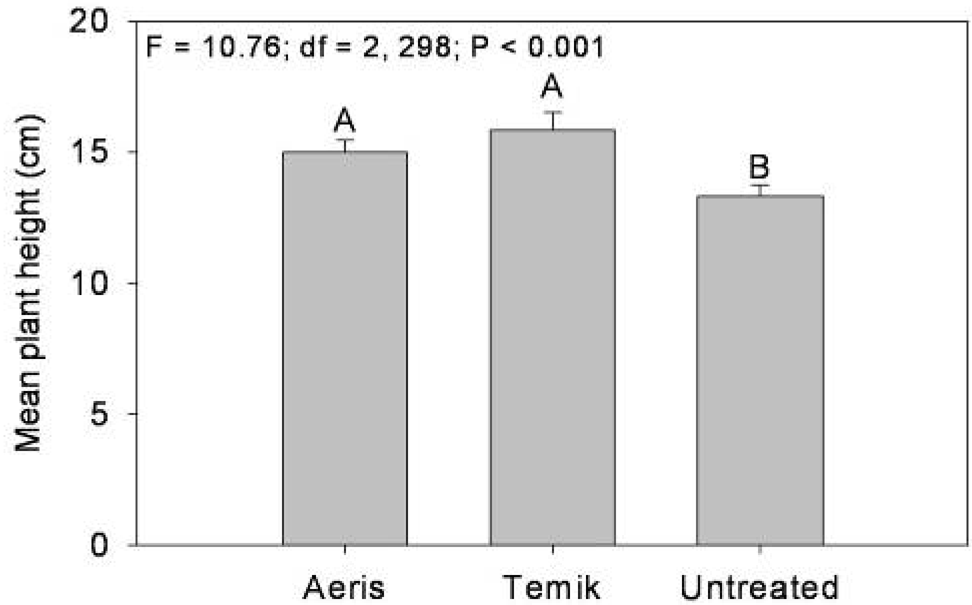

Figure 1. Mean plant height 3-5 days after 3-4 leaf application for at-plant treatments across all foliar regimes, 2009.

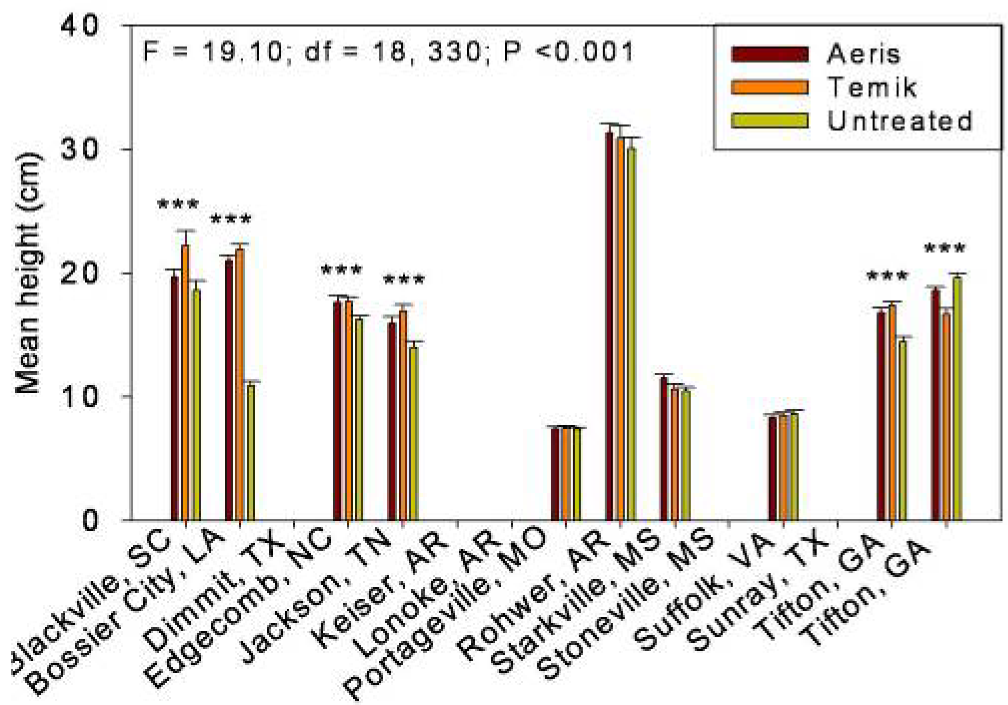

Figure 2. Mean plant height 3-5 days after 3-4 leaf application for at-plant treatments across all foliar regimes, 2010.

When considering foliar regime, there was no significant difference in plant height between unsprayed, 1-2 leaf, 3-4 leaf, and 1-2 + 3-4 leaf in 2009 across all at-plant treatments (Figure 3). In 2010, differences in plant height were attributed to foliar regime at only 2 of 10 sites (Figure 4).

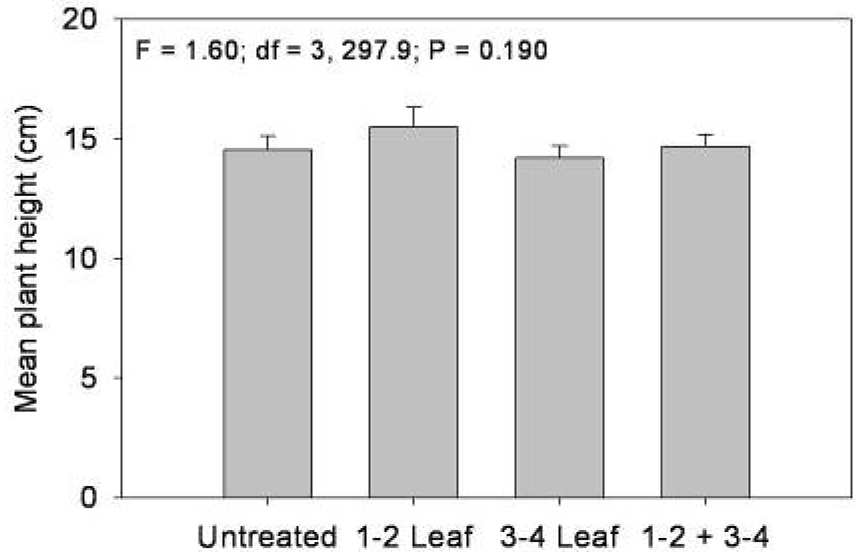

Figure 3. Mean plant height 3-5 days after 3-4 leaf application for foliar regime across all at-plant treatments, 2009.

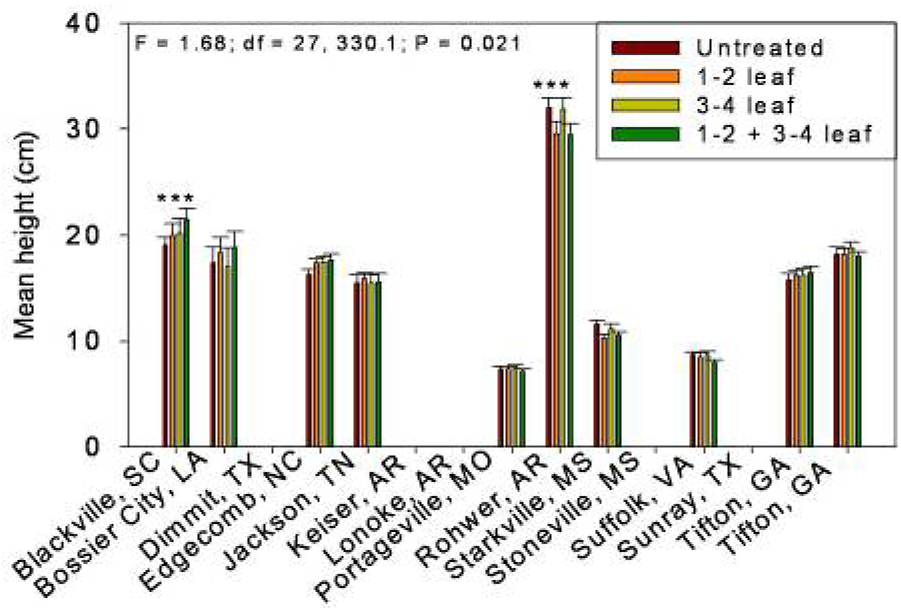

Figure 4. Mean plant height 3-5 days after 3-4 leaf application for foliar regime across all at-plant treatments, 2010.

When considering seedcotton yield, yield differences were attributed to at-plant insecticides at only 4 of 13 sites in 2009 and 2010 (Figures 5 and 6). Foliar regime had no effect on seedcotton yield in either 2009 or 2010 (Figures 7 and 8).

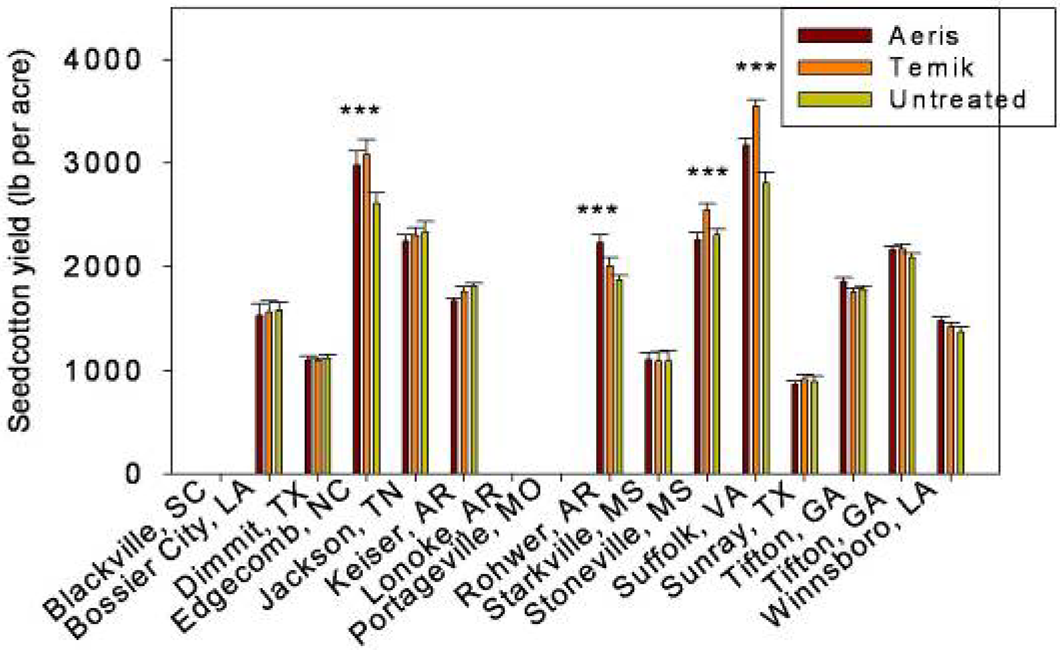

Figure 5. Mean seedcotton yield for at-plant treatments across all foliar regimes, 2009.

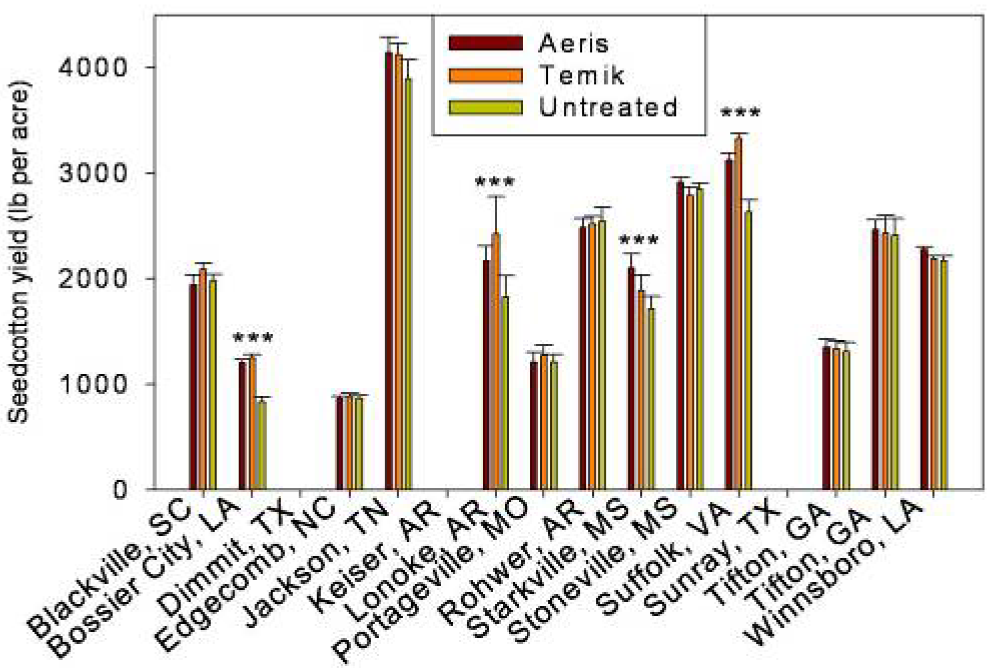

Figure 6. Mean seedcotton yield for at-plant treatments across all foliar regimes, 2010.

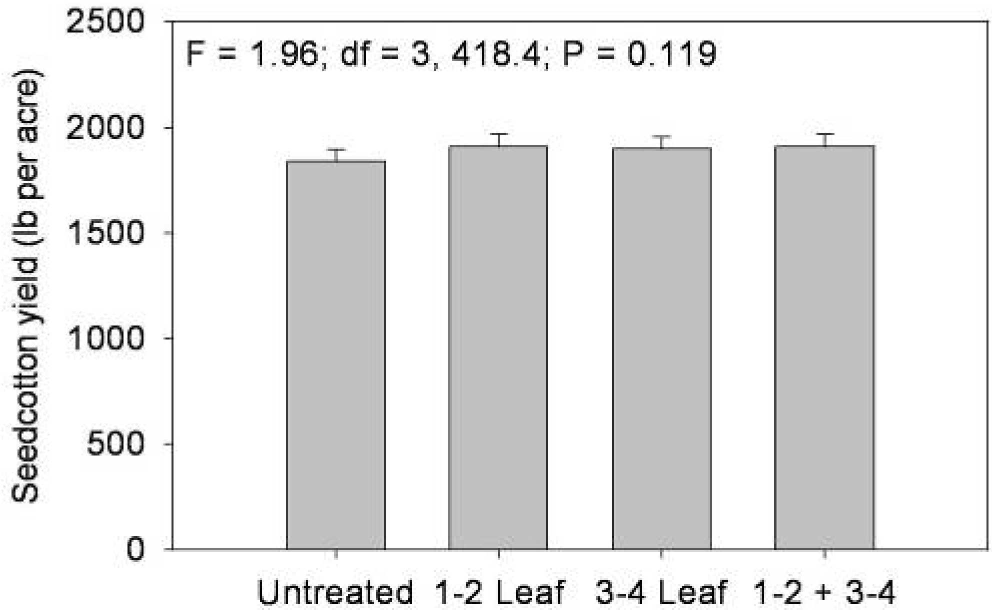

Figure 7. Mean seedcotton yield for foliar regime across all at-plant treatments, 2009.

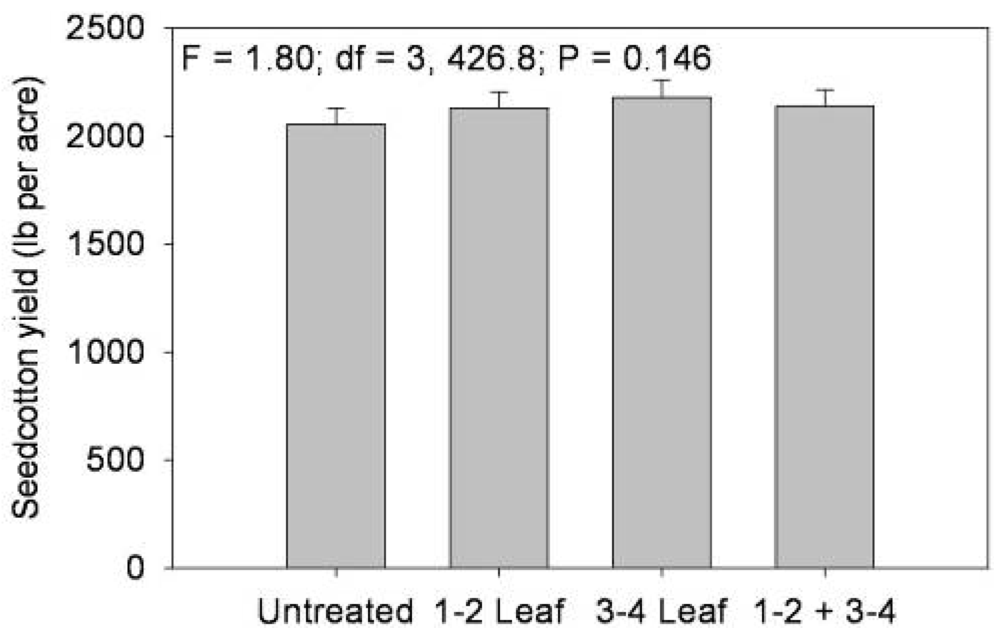

Figure 8. Mean seedcotton yield for foliar regime across all at-plant treatments, 2010.

Summary

Significant variability in thrips pressure was apparent across all locations for both years of the study. While some differences did exist at some sites with regards to at-plant insecticide treatment, there were few differences due to foliar regime when looking at all locations as a whole. This would suggest that automatic applications of a foliar insecticide, based solely on plant stage, would likely have little effect on cotton yield. This would particularly be true in the presence of low thrips numbers. However, the author(s) feels that this is too broad of a statement for developing a recommendation across the entire cotton belt. Therefore, these data will be analyzed further (by site), and determining recommendations, as well as whether a 3rd year of this study is needed, will be addressed by region.

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