EVALUATION OF AUTOMATIC INSECTICIDE APPLICATIONS FOLLOWING PREVENTATIVE INSECTICIDES FOR THRIPS

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Abstract

Research was conducted in 2011 at several sites in the Mid-south as well as one location each in Virginia and Texas to evaluate automatic applications of foliar insecticides for thrips in cotton. Thrips pressure varied in trials at most locations. Most locations did not statistically benefit from automatic applications of foliar insecticides over seed treatments with respect to yield. Some locations, however, did have substantial yield benefit with timed applications based on plant stage. Those locations that did so sustained extremely high numbers of thrips (Stoneville, MS) or less-than-ideal growing conditions (Suffolk, VA). As a result, the overall data set supports the recommendation to scout for thrips numbers and/or associated damage to make treatment decisions in lieu of making automatic insecticide applications based on plant stage or convenience (co-applied with a herbicide).

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 insecticides are sometimes required when high populations of thrips are present, or when at-plant treatments are ineffective due to extreme weather conditions (e.g., excessive 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 sometimes for 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 conducted at multiple locations across the cotton belt 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 in 2011 at 9 locations throughout the mid-south, as well as one location in Texas and one location in Virginia. 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[s] 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 (0.25 lb ai/A acephate) 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 selected based on optimal agronomics/insect protection (e.g., Bollgard II® or WideStrike®) for each location. All plots were treated identically after thrips treatments/counts were made. 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 with Duncan's New Multiple Range Test in ARM 8 ST (α=0.05).

Results

Because a significant treatment by location interaction was apparent (Prob[F]>0.0001), locations were analyzed and evaluated separately. There was no significant difference with respect to yield (including plots with no at-plant or foliar insecticide) at most locations in 2011. This is likely due to the low to moderate numbers of thrips coupled with good to good growing conditions at those sites. Locations that had significant differences in yield are discussed below.

Because trends were difficult to identify across all treatments a t the VA location, analysis was performed within each at plant scenario. There was no significant difference in yield or thrips numbers within the Temik-treated cotton at this location. Within cotton that had no at-plant insecticide, only plots that received both timed applications of foliar insecticide resulted in higher yields compared to the UTC (Figure 1). Within Aeris-treated plots, the 3-4 leaf application resulted in higher yield compared to no insecticide and the 1-2 leaf application. With the exception of cotton that received no insecticide of either type (3 days after 1-2 leaf application), there was no statistical difference in thrips numbers. However, a numerical trend did exist with regards to these data (Figure 1).

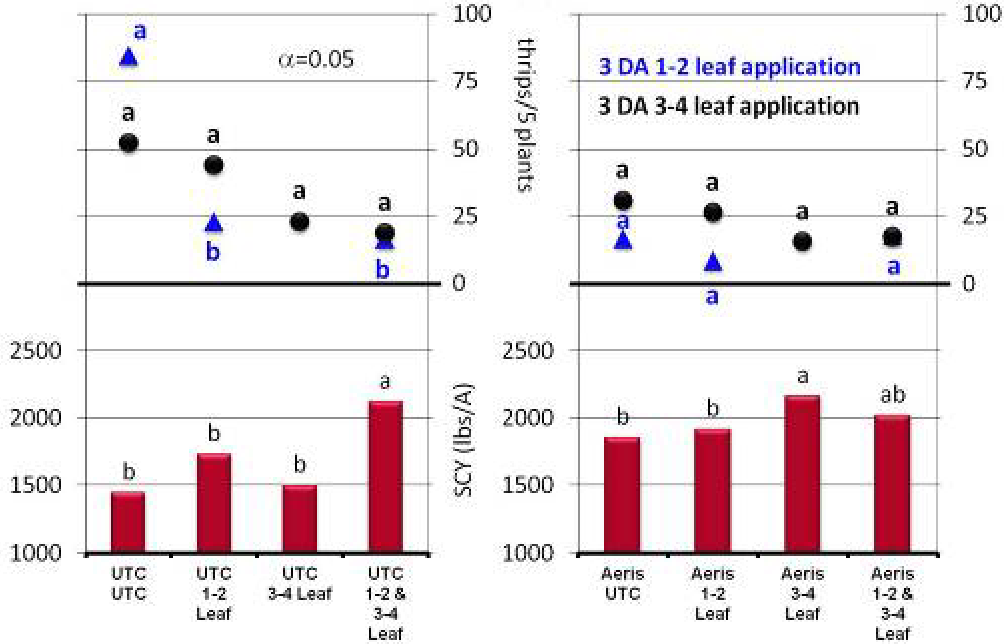

Figure 1. UTC vs. Aeris - Suffolk, VA (Herbert), 2011.

As was the case with thrips numbers at the VA location, there was no statistical difference in thrips numbers with the exception of cotton that received no insecticide of any kind (Figure 2). While a numerical trend was evident across treatments, thrips populations were extremely high (133 thrips/5 plants in plots that received no insecticide). The use of any insecticide, whether at-plant or foliar, reduced thrips numbers by >70% at this location. Significant differences in yield were apparent within plots with no at-plant insecticide as well as Temik-treated plots. Within plots that had no at-plant insecticide, all treatments that received at least one foliar application resulted in higher yield. For plots within Temik-treated cotton, two foliar applications (1-2 leaf and 3-4 leaf) were required for statistically higher yields than Temik alone. However, a numerical trend was evident (Figure 2).

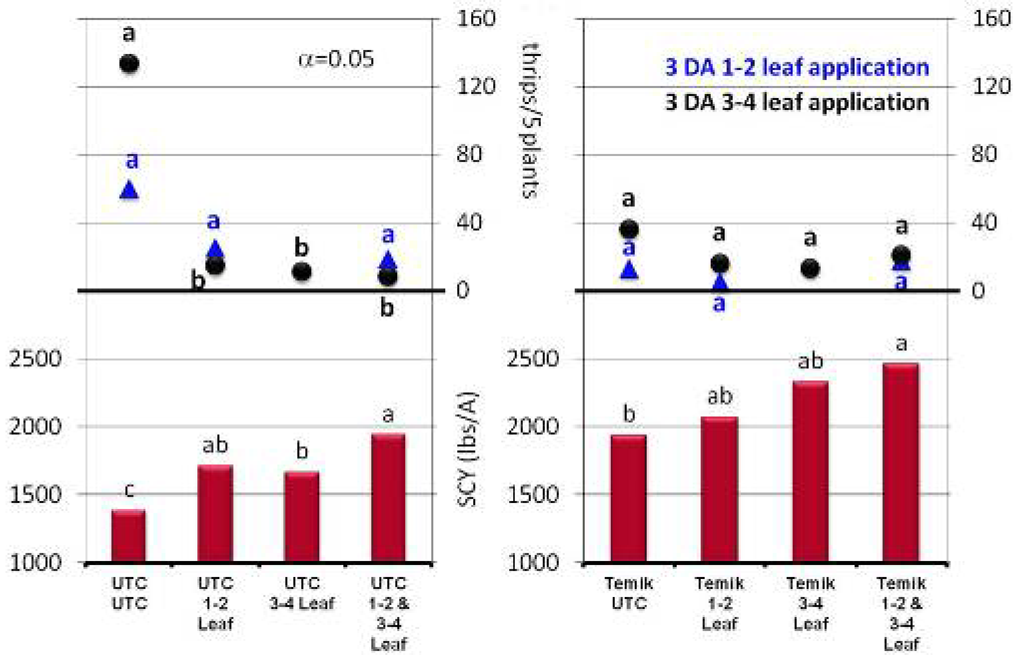

Figure 2. UTC vs. Aeris – Stoneville, MS (Cook/Gore), 2011.

At Jackson, TN, all treatments that contained any type of insecticide resulted in significantly higher yields (Figure 3). However, no significant differences were found within these treatments. The same observation was noted when analyzed within each at-plant treatment. However, in contrast to VA and MS locations, there were substantial differences in thrips numbers across all treatments. Additionally, a trend was evident with respect to insecticide treatments (Figure 3). The lack of correlated yield response was likely due to the yield potential at this location (average 4500 lbs).

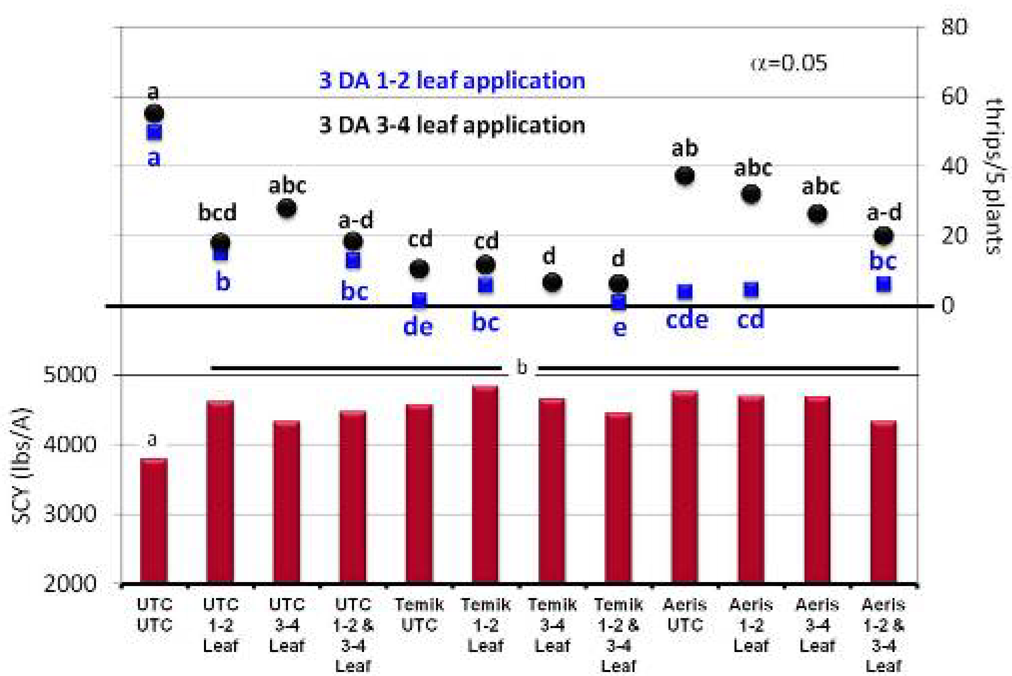

Figure 3. Yield vs. Thrips Pressure – Jackson, TN (Stewart), 2011.

Summary

Automatic applications of foliar insecticide targeted for thrips resulted in increased yields in some trials. However, these trials appeared to have extremely high thrips numbers, challenging growing conditions, or both. The trial with the highest yields (Jackson, TN) exhibited less yield response with respect to foliar insecticide applications, likely due to the compensatory ability of cotton when growing conditions are ideal. Cotton such as in Stoneville, MS, whose location sustained extreme heat/lack of rainfall following emergence (Cook, personal communication), can be more susceptible and thus, more sensitive to thrips numbers and associated injury. Cooler growing conditions, such as those in Virginia, can also result in increased susceptibility to thrips injury, thus resulting in greater yield response to foliar insecticides. Therefore, the overall results from 2011 support the recommendation to scout for thrips or early stages of associated damage in order to make treatment decisions in lieu of making automatic insecticide applications. This also supports the foundation of IPM, where scouting is essential for decision-making, resulting in both short- and long-term economic and environmental benefit. Because it is impossible to know exactly what conditions will be present after cotton emergence, a preventative insecticide (e.g., seed treatment) is recommended across most cotton-growing regions, including the Mid-South.

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References

Greene, J., C. Allen, D. Johnson, G. Lorenz, G. Studebaker, E. Burris, R. Bagwell, D. Cook, B. Freeman, G. Herzog, G. Lentz, R. Leonard, and J. Reed. 2003. Thrips (Thysanoptera: Thripidae) A Multi-State Survey: Summary of Observations for Arkansas, Alabama, Georgia, Louisiana, Mississippi, and Tennessee. University of Arkansas Division of Agriculture Extension Publication AG-754