TERMINATING TARNISHED PLANT BUG SPRAYS IN COTTON

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Abstract

Experiments were conducted in 2015 and 2016 throughout the mid-southern U.S. to determine when to terminate insecticide sprays for tarnished plant bug in cotton. All plots except the untreated control were sprayed during the first two weeks of flowering. Treatments included terminating sprays during the second through sixth weeks of flowering as well as a season long control or a threshold treatment. Based on final yields, it appears that cotton is safe from tarnished plant bug injury and yield losses after the fourth week of flowering. The results of this research have the potential to save growers one to two insecticide applications at the end of the season without sacrificing yields.

Introduction

The tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois), is the most important pest of cotton in the Mid-South region of the U.S. Additionally, the pest status of this species has increased in other areas of the eastern U.S. over the last few years. Currently, scouting and applying insecticides based on established thresholds is the primary component of current integrated pest management programs. Considerable research has been conducted throughout the Mid-South to determine appropriate sampling methods and action thresholds to adequately protect cotton yields and maximize the profitability of growers. Currently, the states in the midsouthern U.S. recommend using a black drop cloth and treating when an average of 3 tarnished plant bugs are observed per sample during the flowering period. Additionally, Mississippi has an additional threshold based on damaged square counts of 10%.

Currently, little information exists about when to terminate insecticide sprays for tarnished plant bug in cotton. Previous research has used nodes above white flower counts and heat unit accumulation to determine when to terminate tarnished plant bug sprays. Based on field cage experiments, terminating tarnished plant bug sprays is recommended when cotton reaches nodes above white flower 5 plus 300 heat units (Russell 1999). However, consultants and growers rarely know when cotton reaches this point and sprays are often made well past the point when cotton is safe from yield losses.

Materials and Methods

Multiple experiments were conducted during 2015 and 2016 in Arkansas, Louisiana, Mississippi, Missouri, and Tennessee to determine the optimum time to terminate insecticide sprays for tarnished plant bugs without sacrificing yields. All experiments were in a randomized complete block design with four replications. Plot size was 4-8 rows by 40-50 ft. at each location. The treatments included terminating insecticide applications for tarnished plant bug at specified weeks of flowering. The weeks when insecticides were terminated included weeks 2, 3, 4, 5, and 6 of flowering. For all of the termination treatments, plots were sprayed weekly or twice per week beginning at first flower. In addition to the termination treatments, an untreated control was included at each location in each year. A season long control was included in 2015 and a threshold treatment was included in 2016. For all sprays, insecticides were selected to maximize control and were specific to each location. In all cases, maximum rates of insecticides applied as tank mixes with multiple modes of action were used. Plots designated for termination treatments were sprayed through the designated weeks for termination. After insecticide sprays were terminated for specific plots, those plots were not sprayed with insecticides with tarnished plant bug activity throughout the remainder of the season.

Throughout the season, all plots were sampled weekly by taking two drop cloth samples per plot. The numbers of tarnished plant bug adults and nymphs were recorded. Nodes above white flower counts were also recorded weekly at select locations. At the end of the season, plots were harvested and seedcotton weights were recorded. Data were analyzed with analysis of variance (PROC GLIMMIX).

Results

Overall, tarnished plant bug densities varied significantly among locations and years. In general, tarnished plant bug populations were much higher in 2015 than in 2016. During the 2015 season, termination treatments that provided similar cotton yields to the season long control varied from week 3 to week 5 of flowering (Table 1). Termination treatments that resulted in cotton yields similar to the untreated control ranged from week 2 to week 5 of flowering. During the 2016 season, three locations did not observe significant differences in cotton yields among treatments (Table 2). At the locations where significant differences in cotton yields were observed, termination treatments that provided similar cotton yields to the threshold treatment ranged from week 2 to week 3 of flowering. Similarly, termination treatments that resulted in cotton yields that were not significantly different than the untreated control ranged from week 2 to week 3 of flowering.

Table 1. Week of flowering that termination treatments were statistically similar to the untreated control and season long control at each experimental location in 2015.

	Week of Flowering	
Location	**Same as SLC**	**Same as UTC**
Arkansas 1	4	4
Arkansas 2	3	2
Arkansas 3	3	2
Mississippi 1	5	3
Mississippi 2	5	2
Tennessee	3	--
Louisiana 1	4	5
Louisiana 2	--	--

Table 2. Week of flowering that termination treatments were statistically similar to the untreated control and threshold treatment at each experimental location in 2016.

	Week of Flowering	
Location	**Same as Threshold**	**Same as UTC**
Arkansas 1	NS	NS
Arkansas 2	2	--
Arkansas 3	3	2
Mississippi 1	3	--
Mississippi 2	3	2
Tennessee	2	3
Louisiana 1	NS	NS
Louisiana 2	NS	NS
Missouri	3	2

Averaged across all locations and years, there was a significant difference in cotton yields among treatments (Figure 1). All termination treatments and the season long control/threshold treatment resulted in significantly greater cotton yields than the untreated control. In general, cotton yields increased as week of termination increased until the fourth week of flowering. Where insecticide applications were terminated after the fifth week of flowering, cotton yields were not significantly different than the season long control/threshold treatment. This suggests that insecticide applications targeting tarnished plant bug can be terminated after the fourth week of flowering in most situations. Where tarnished plant bug populations are high, insecticide applications may need to be continued through the fifth week of flowering.

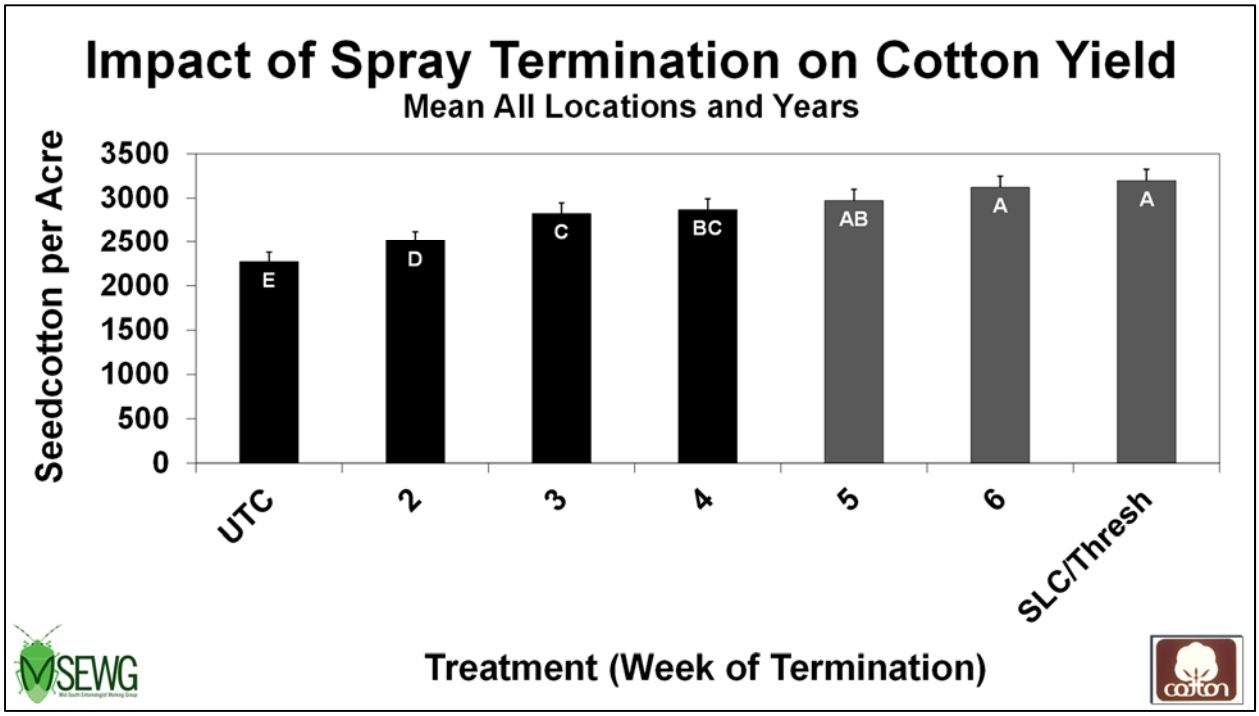

Figure 1. Mean cotton yields from experiments conducted across the midsouthern U.S. in 2015 and 2016 where insecticide applications targeting tarnished plant bug were terminated during different weeks of flowering.

Discussion

Currently, there is little information about when to terminate insecticide applications targeting tarnished plant bug. Previous research used nodes above white flower counts and heat unit accumulation to determine termination timings. In general, most consultants and growers do not track nodes above white flower and heat unit accumulation

during the season. As a result, termination of insecticide applications targeting tarnished plant bug is not consistent and sprays are likely made much later in the flowering period that do not provide an economic return. These results may reduce up to 2 late season insecticide applications in many areas. The average cost of an insecticide application is around $9.20 per acre plus an average application cost of $5.00 per acre for a total of $14.20 per acre per application (Williams 2016). There was nearly 1 million acres planted in the region in 2015 and it increased to over a million acres in 2016. Factoring in a conservative estimate of saving about 1.25 applications per acre, terminating insecticide applications based on these recommendations would save growers in the region a total of just over $1.3 million each year.

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