CONTROL OF TARNISHED PLANT BUG, *LYGUS LINEOLARIS*, IN COTTON WITH TRANSFORM IN ARKANSAS, 2012

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Abstract

The tarnished plant bug has become a more difficult pest to control in the last several years. Multiple applications are needed to achieve control which makes it one of the most expensive pests in Arkansas. Transform (sulfoxafor), a new insecticide, was evaluated across several trials during the 2012 growing season for control of tarnished plant bug in cotton. Trials were located in Lee County, Arkansas. In the first trial, "Efficacy of Transform 1", Transform was evaluated at 1.5 oz/a tank mixed with selected compounds compared to current standards 9 days after treatment 2 (9DAT2). Treatments with Transform reduced tarnished plant bugs (TPB) better than all other treatments. The second trial tested Transform alone at 1.5 oz/a along with other selected compounds. At 7 days after treatment 2 (7DAT2), Transform was the only treatment that controlled TPB at or below economic threshold (6 plant bugs per 10 row ft). In the third trial, "Mayhem-Transform", results indicated that sequential applications of Transform at several rates, as well as tank mixed, provided good initial control and continued to maintain control days after applications of TBP. This new chemistry will provide an excellent control option for TPB when compared to current standards.

Introduction

Tarnished plant bug (TPB), is an important insect pest of mid-South cotton (Layton, 2000). It has potential to cause severe damage that can lead to square shedding and abnormal growth of bolls and terminals. The amount of damage this pest causes varies depending on population intensity from year to year. Growers and consultants have relied on repeated foliar applications to minimize TPB numbers. In 2012, the number of applications per acre of treated fields was 6.5 (Williams, 2012). The reliance of insecticides for control of TPB has led to resistance of some commonly used insecticides, particularly pyrethroids, and new chemistries are needed (Snodgrass, 2000). Transform is the first insecticide from the sulfoximine chemical class. The 2012 growing season was the first year Transform received a section 18 in Arkansas. The purposes of these studies were to compare Transform to current insecticide standards for efficacy against TPB.

Materials and Methods

Trials were conducted in 2012 at the Lon Mann Cotton Branch Experiment Station and producer fields in Lee County, Arkansas. Plot size was 12.5 ft (4 rows) by 50 ft. in a randomized complete block with 4 replications. Insecticide treatments were applied with a Mud Master ground applicator. The spray boom was fitted with TX6 cone jet nozzles at 19-in nozzle spacing. Spray volume was 10 gal/a, at 40 psi. Tarnished plant bug numbers were determined by taking 2 shakes per plot with a 2.5 ft drop cloth, for a total 10 row ft. Data were processed using Agriculture Research Manager Version 8 and Duncan's New Multiple Range Test (P=0.10) to separate means.

Results

In "Efficacy of Transform 1" trial, at 9 days after the second application (9DAT2), no treatments reduced TPB numbers below threshold (6 per 10 row ft). However, all treatments separated from the untreated check (UTC) which was over 22 times threshold (Fig 1). Transform (1.5 oz/a) + Bidrin (8 oz/a) reduced TPB numbers better than all treatments but didn't differ from Transform (1.5 oz/a) + Bidrin (6.4 oz/a) + Discipline (6.4 oz/a), Bidrin (6.4 oz/a) + Discipline (6.4 oz/a) + Diamond (6 oz/a), Bidrin (8 oz/a) + Diamond (6.4 oz/a), Endigo (5 oz/a) and Leverage 360 (3.2 oz/a) + NIS (.25% v/v). All treatments increased yields compared to the UTC (Fig 2). Both

treatments containing Transform had higher yields than the other treatments and showed at least a 27% yield increase over the check.

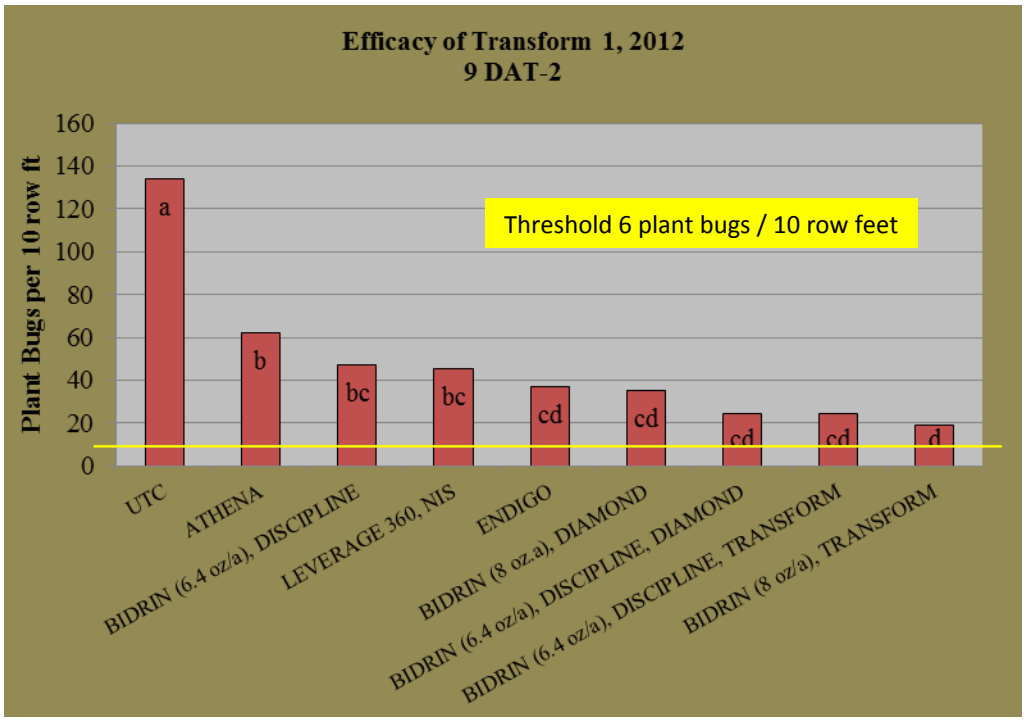

Fig. 1. Efficacy of Transform for control of tarnished plant bug.

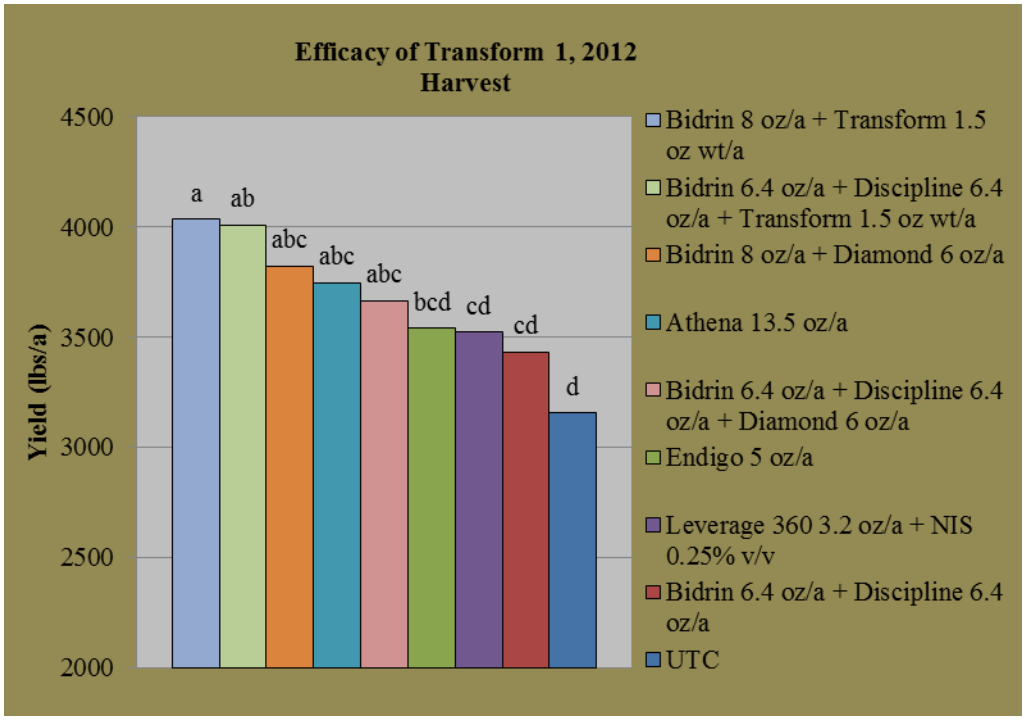

Fig. 2. Efficacy of Transform for control of tarnished plant bug.

In “Efficacy of Transform 2”, at 7 days after the second application (7DAT2), Transform (1.5 oz/a) was the only treatment keeping TPB numbers below threshold (Fig 3), although the treatment did not separate from Bidrin (8

oz/a), novaluron (6 oz/a) + Imidacloprid (2 oz/a), Endigo (4.5 oz/a) and CMT4586 (8 oz/a) + MSO (.25% v/v) + UAN (2.5% v/v). All treatments reduced TPB below the UTC.

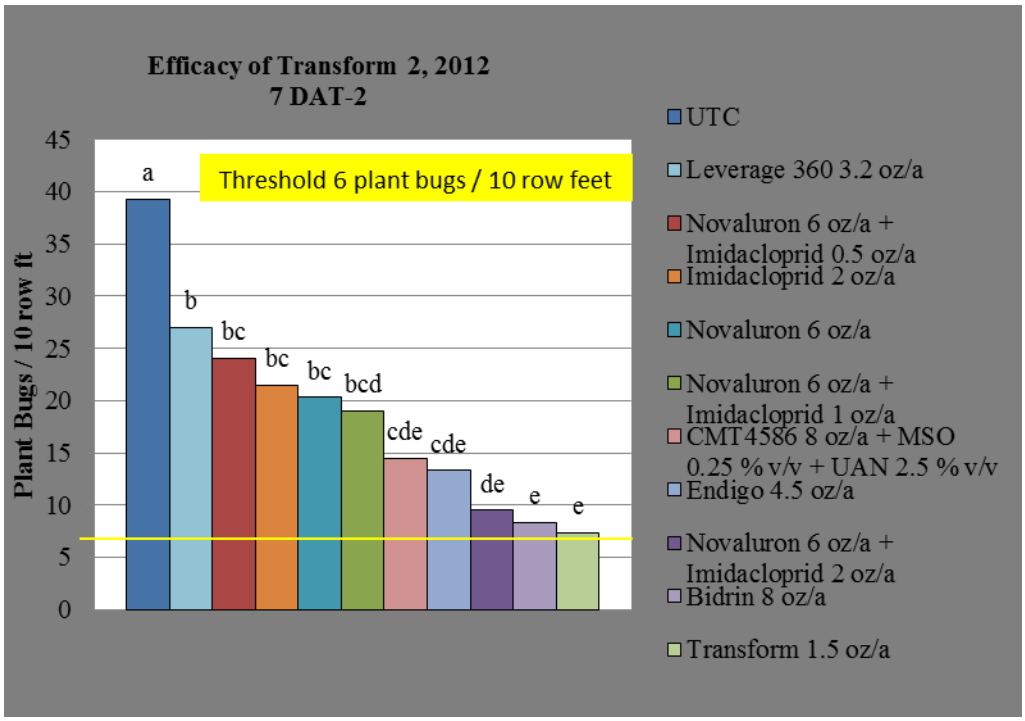

Fig. 3. Efficacy of Transform for control of tarnished plant bug.

In the "Mayhem Transform 2012" trial, at 3 days after the first application (3DAT1), no treatments reduced numbers below threshold, although all treatments separated from the UTC (Table 1). At 6 days after the first application (6DAT1), Mayhem (6 oz/a ABCD) + Transform (1.5 oz/a ABCD), Mayhem (6 oz/a ABCD) + Transform (2.125 oz/a ABCD) and Mayhem (6 oz/a ABCD) + Transform (2.75 oz/a ABCD) were the only treatments that reduced populations below threshold. At 4 days after second application (4 DAT2), all treatments reduced TPB numbers below threshold, and at 7 days (7 DAT2), Transform alone at 2.75 oz/a (ABCD), Mayhem (6 oz/a ABCD) + Transform (1.5 oz/a ABCD) and Mayhem (6 oz/a ABCD) + Transform (2.125 oz/a ABCD) remained below threshold. At 7 days after the third application (7DAT3), the only treatments that were able maintain control of TPB were Transform 2.75 oz/a (ABCD), Mayhem (6 oz/a ABCD) + Transform (1.5 oz/a ABCD), Mayhem (6 oz/a ABCD) + Transform (2.125 oz/a ABCD)and Mayhem (6 oz/a ABCD) + Transform (2.75 oz/a ABCD). At 3 days post application four (3DAT4), Transform (1.75 oz/a ABCD), Mayhem (6 oz/a ABCD) + Transform (1.5 oz/a ABCD), Mayhem (6 oz/a ABCD) + Transform (2.125 oz/a ABCD), Mayhem (6 oz/a ABCD) + Transform (2.75 oz/a ABCD) and Mayhem 6 oz/a (ABCD) + Alias 1.5 oz/a (AC) + Acephate .75lb ai/a (BD) all reduced TPB populations below economic threshold. After 8 days post application (8DAT4), the only treatments that did not provide control were Mayhem (6 oz/a ABCD), Mayhem (6 oz/a AC) + Transform 1.5 oz/a (BD) and Mayhem (6 oz/a AC) + Acephate .75 lb ai/a (AC) + Transform 1.5 oz/a (BD). Harvest totals across all treatments separated from the UTC giving at least a 58 percent yield increase above the UTC (Fig 4).

Table 1. Efficacy of Transform for control of tarnished plant bug.

Mayhem Transform 2012 Average Plant Bugs/10 row feet								
Treatments	**7/20 3DAT1**	**7/23 6DAT1**	**7/27 4DAT2**	**7/30 7DAT2**	**8/6 7DAT3**	**8/9 3DAT4**	**8/14 8DAT4**	**Season Total**
UTC	23 a	26.8 a	32.5 a	59 a	86.5a	93.5a	88.5a	409.8a
Novaluron 6oz/a (ABCD)	10 bc	17.8 b	14.5 b	21 b	14bc	10.3b	6.8bc	95b
Sulfoxaflor 1.5oz/a (ABCD)	8.3 bc	7.8 c	3 c	7.8 c	8.3bcd	5.3b	5.5bc	45.8cde
Sulfoxaflor 2.75oz/a (ABCD)	9 bc	8.5 c	2.5 c	4.3 c	3.5cd	8b	3.5bc	32de
Novaluron 6oz + Sulfoxaflor 1.5 oz/a (ABCD)	8.5 bc	5 c	3.5 c	5.5 c	5.5cd	3.5b	3.8bc	35.3de
Novaluron 6oz + Sulfoxaflor 2.125oz/a (ABCD)	7.8 c	5.8 c	2.5 c	4.8 c	2d	3.3b	1.5c	27.5e
Novaluron 6oz + Sulfoxaflor 2.75oz/a (ABCD)	11.3 bc	5.8 c	3 c	6.5 c	3.5cd	1.8b	2.5c	34.3de
Novaluron 6oz/a (A,C), Sulfoxaflor 1.5oz/a (B,D)	15 b	12.3bc	5.3 c	9.5 c	13.8bc	6.3b	8.8b	70.8bc
Novaluron 6oz (AC), Acephate .75lb ai/a (AC), Sulfoxaflor 1.5oz/a (BD)	9.3 bc	9.5 c	4.8 c	10 c	10bcd	8b	8.3b	59.8cde
Novaluron 6oz/a(ABCD), Alias 1.5oz/a (AC), Acephate .75lb ai/a(BD)	11.3 bc	12 c	3.8 c	8.3 c	18.3b	4b	6bc	63.5bcd

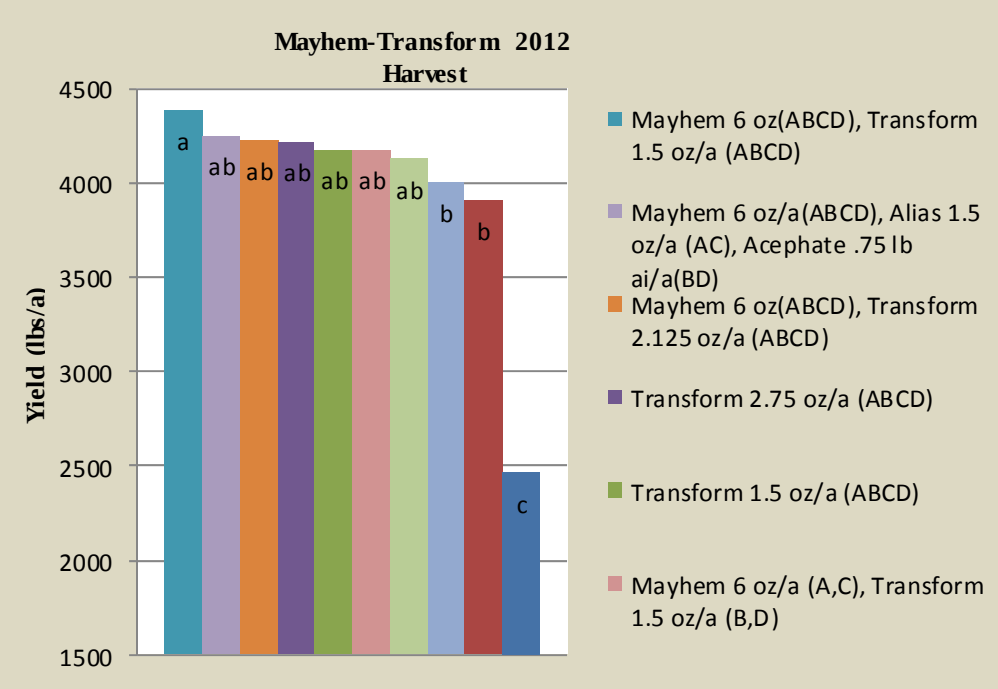

Fig. 4. Efficacy of Transform for control of tarnished plant bug.

Acknowledgements

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References

Layton, M.B. 2000. Biology and damage of the tarnished plant bug, *Lygus lineolaris,* in cotton. Southwestern Entomol. Supp. 23:7-19.

Snodgrass, G.L. and W.P. 2000. Seasonal changes in pyrethroid resistance in tarnished plant bug (Heteroptera: Miridae) populations during a three- year Period in the Delta area of Arkansas, Louisiana, and Mississippi. J. Economic Entomol. 13:441-446

Williams, Michael. Cotton insect losses 2009-2012.Entomology.edu. 2009-2012. <http:www.entomology.msstate.edu/resources/tips/cotton- losses/data>.