CONTROL OF TARNISHED PLANT BUG, *LYGUS LINEOLARIS*, IN COTTON WITH TRANSFORM IN ARKANSAS, 2009-2011

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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 in the past three years for control of tarnished plant bug in cotton. Trials were located in Lee County, Arkansas. In the first trial, Dow Plant Bug 2009, Transform was evaluated at several rates with two applications from three to twenty days after treatment (DAT). Transform at the high rate (0.067 lbs ai/a) was the only treatment to reduce insect populations below threshold after the first treatment. The second trial tested Transform as a tank mix with other selected compounds. At 3 and 9 days after the first application no treatments reduced numbers below threshold, although all treatments separated from the UTC. Control at or below threshold, 6 plant bugs per 10 row ft, was achieved after the second application. In the third trial, Transform-Cobalt, results indicated that selected insecticides provided good initial control but Transform continued to maintain control of TBP. This new chemistry will provide an excellent control option 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 2011 the number of applications per acre of treated fields was 6.4 (Williams, 2011). The reliance of insecticides for control of plant bugs 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 purposes of these studies were to compare Transform to current standards.

Materials and Methods

Trials were conducted from 2009-2011. All trials were conducted at the Lon Mann Cotton Branch Experiment Station in Lee County, Arkansas. Plot size was 12.5 ft (4 rows) by 50 ft, experimental design 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 19in nozzle spacing. Spray volume was 10 gal/a, at 40 psi. Plant bug numbers were determined by taking 2 shakes per plot with a 2.5 ft drop cloth, for a total 10 row ft. The data was processed using Agriculture Research Manager Version 8 and Duncan's New Multiple Range Test (P=0.10) to separate means.

Results

In the Dow Plant Bug 2009 trial at 3 days after the first application (3 DAT-1), all treatments had fewer plant bugs than the untreated check (UTC) (Fig 1). Transform at the highest rate (0.067 lbs ai/a) was the only treatment lowering plant bug numbers below threshold (6 per 10 row ft). At 6 DAT-1, Transform (0.045 lb ai/a) was the only treatment to reduce plant bug numbers compared to the UTC (untreated check) although numbers were not below threshold. At 3 DAT-2 all treatments had lower numbers than the UTC (Fig. 2). However, only Transform (0.034, 0.045, and 0.067 lbs ai/a) reduced plant bug numbers below threshold. Transform (0.067 lbs ai/a) was the only treatment that kept plant bug numbers below threshold at 6 days after treatment. At 14 and 20 DAT-2, all treatments failed to keep plant bug numbers below threshold, although all treatments were lower than the UTC. All treatments increased yields compared to the UTC. Transform (0.067 lb ai/a) had highest yield of all treatments but did not differ from Orthene (1 lb ai/a) or two of the lower rates of Transform (0.034 and 0.045 lb ai/a).

Fig. 1. Efficacy of Transform for control of Tarnished Plant Bugs

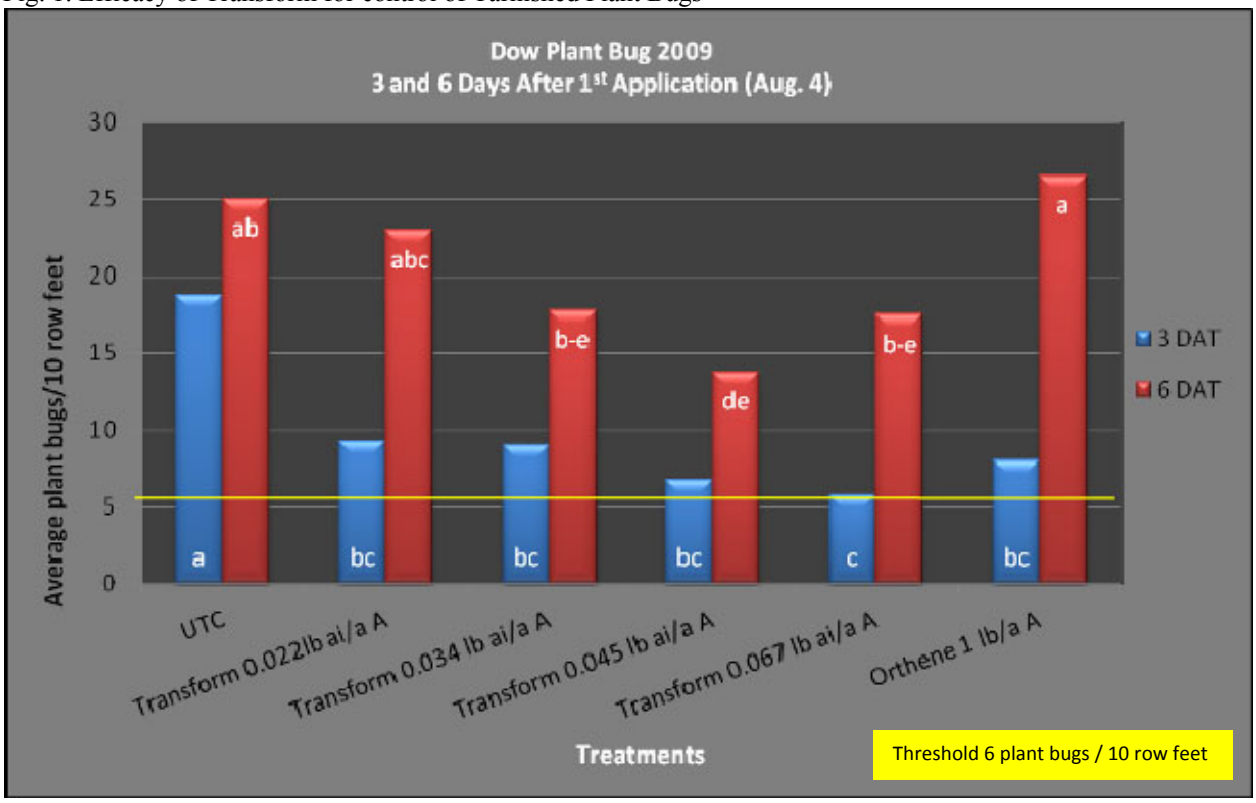
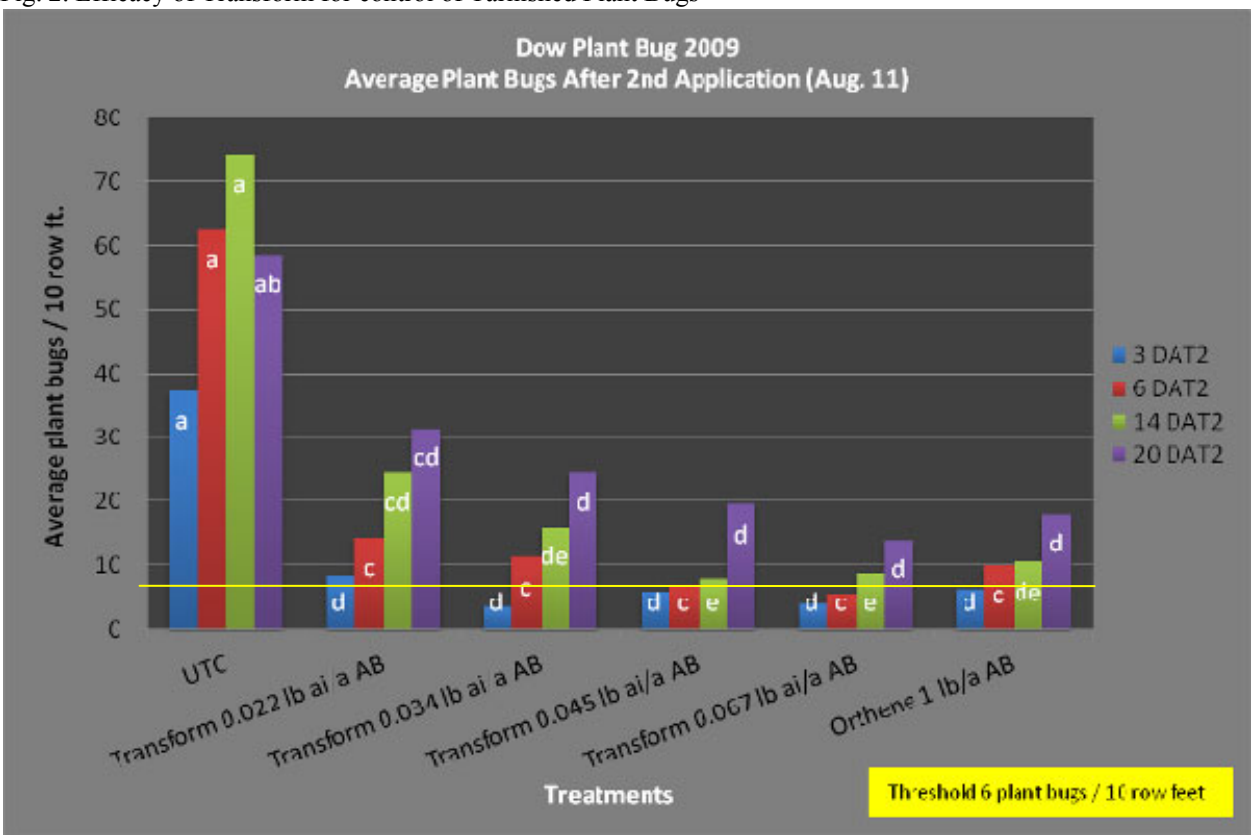


Fig. 2. Efficacy of Transform for control of Tarnished Plant Bugs



In the second trial, Plant bug 4 2010, at 3 and 9 DAT-1 no treatments reduced numbers below threshold, although all treatments separated from the UTC (Fig 4). At 4 days after the second application all treatments reduced plant bug numbers compared to the UTC. Transform (0.066 lb ai/a), Transform (0.022 and 0.045) + Diamond (6 oz/a), Transform (0.022 and 0.045) + Karate Z (0.04 lb ai/a), Transform (0.045 lb ai/a) + Othene (0.5 lb/a) and Orthene (0.5 lb/a) + Diamond (6 oz/a) all provided control below the threshold of 6 per 10 row ft. At 11 DAT-2 all treatments reduced plant bug numbers below the UTC. Transform (0.045 lb ai/a), Transform (0.045 lb ai/a) + Karate Z (0.04 lb ai/a), Transform (0.045 lb ai/a) + Orthene (0.5 lb/a) and Orthene (0.5 lb/a) all remained below threshold. Harvest totals across all treatments separated from the UTC giving at least an 88 percent yield increase above the UTC.

Table. 1. Efficacy of Transform for control of Tarnished Plant Bugs

Plant Bug 4 2010 Average Plant Bugs/10 row feet and Yield						
Treatment Name	7/9/2010 3 DAT-1	7/15/2010 9 DAT-1	7/19/2010 4 DAT-2	7/26/2010 11 DAT-2	Yield lint lbs/a	Yield - % above UTC
UTC	95.3 a	71.8 a	74.3 a	32.5 a	518 c	
Transform 0.022 lb ai/a	30.5 c	22.8 bc	13.5 bc	10.8 bc	1104 ab	113%
Transform 0.045 lb ai/a	22.8 c	12.8 c	7.5 bcd	3.8 c	1098 ab	112%
Transform 0.066 lb ai/a	17.5 c	6.8 c	1.3 d	8.8 bc	1143 ab	121%
Transform 0.022 lb ai/a + Diamond 6 oz/a	21.8 c	18.8 c	3.8 cd	8.5 bc	1176 ab	127%
Transform 0.045 lb ai/a + Diamond 6 oz/a	21.0 c	12.0 c	2.3 cd	6.0 bc	1136 ab	119%
Transform 0.022 lb ai/a + Karate Z 0.04 lb ai/a	17.5 c	21.8 bc	2.8 cd	6.0 bc	1071 ab	107%
Transform 0.045 lb ai/a + Karate Z 0.04 lb ai/a	20.3 c	12.3 c	1.5 d	4.8 c	1022 ab	97%
Transform 0.022 lb ai/a + Orthene 0.5 lb/a	17.3 c	17.5 c	6.0 bcd	14.3 b	1041 ab	101%
Transform 0.045 lb ai/a + Orthene 0.5 lb/a	20.8 c	16.8 c	2.3 cd	3.8 c	1243 a	140%
Orthene 0.5 lb/a	30.8 c	39.5 b	15.3 b	5.8 bc	1058 ab	104%
Diamond 6 oz/a	52.5 b	25.8 bc	8.5 bcd	10.3 bc	1096 ab	112%
Orthene 0.5 lb/a + Diamond 6 oz/a	17.0 c	15.5 c	2.5 cd	7.0 bc	976 b	88%

Results from Transform-Cobalt Plant Bug 2011 trial, indicated at 3 DAT all treatments separated from the UTC (Fig. 5). All treatments reduced plant bug numbers below threshold except Endigo (0.0805 lb ai/a) and Lorsban Advanced (24 and 32 fl oz/a). After 7 days post application Transform (0.047 and 0.0703 lb ai/a), Bidrin 8 (0.5 lb ai/a), Endigo (0.0805 lb ai/a) and Lorsban Advanced (32 fl oz/a) had fewer plant bugs than the UTC. The only treatments that did not provide control below threshold were Lorsban Advanced (24 fl oz/a), and Acephate (1 lb ai/a). At 10 days after the first application Transform (0.047 and 0.0703 lb ai/a), Endigo (0.0805 lb ai/a), and Lorsban Advanced (24 fl oz/a) + Karate (2 fl oz/a) all remained below treatment level. At 5 DAT2 all treatments had fewer plant bugs than the UTC and all but Lorsban Advanced (24 and 32 fl oz/a) were below threshold. At 11 DAT2 Transform (0.047 and 0.0703 lb ai/a) were the only treatments that kept populations below threshold and had fewer plant bugs than all treatments except Bidrin 8 (0.5 lb ai/a), Acephate (1 lb ai/a) and Endigo 0.0805 lb ai/a. Yield figures indicated Transform (0.0703 lb ai/a) and Acephate (1 lb ai/a) were the only treatments to provide higher yields than the UTC.

Table. 2. Efficacy of Transform for control of Tarnished Plant Bugs

Transform-Cobalt Plant Bug 2011 Average Plant Bugs/10 row feet and Yield						
Treatment Name	7/15 3 DAT-1	7/19 7 DAT-1	7/22 10 DAT-1	7/27 5 DAT-2	8/2 11 DAT-2	Yield lint lbs/a
UTC	12.0 a	11.0 a	14.3 a	18.5 a	29.5 b	1247.8 b
Transform 0.047 lb ai/a	3.3 bc	2.8 bc	3.3 de	1.8 e	4.3 d	1288.3 b
Transform 0.0703 lb ai/a	1.8 c	1.5 c	1.5 e	1.3 e	5.3 d	1530.1 a
Bidrin 8 0.5 lb ai/a	1.3 c	3.0 bc	7.3 bcd	3.0 de	15.5 cd	1349.8 ab
Acephate 1 lb ai/a	1.5 c	8.8 ab	8.3 bcd	4.0 de	15.5 cd	1510.5 a
Endigo 0.0805 lb ai/a	6.5 b	2.8 bc	4.8 cde	2.0 de	7.3 d	1413.8 ab
Cobalt Advanced 25 fl oz/a	3.3 bc	5.8 abc	8.8 bcd	5.0 cd	26.3 bc	1339.3 ab
Cobalt Advanced 40 fl oz/a	5.3 bc	5.3 abc	9.3 abc	2.0 de	24.3 bc	1420.3 ab
Lorsban Advanced 24 fl oz/a	6.5 b	8.3 ab	10.8 ab	8.0 b	34.5 b	1364.1 ab
Lorsban Advanced 32 fl oz/a	6.3 b	3.8 bc	7.0 bcd	7.0 bc	51.3 a	1409.9 ab
Lorsban Advanced 24 fl oz/a + Karate 2 fl oz/a	3.8 bc	6.0 abc	4.5 cde	1.3 e	24.3 bc	1372.0 ab

Control of tarnish plant bugs can be achieved with Transform at several different rates and tank mixes. It provided better control and longer residual than many of the standards in use today. Transform has the potential to be a useful tool in combating tarnished plant bug.

Acknowledgements

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