

EVALUATION OF SELECTED INSECTICIDES FOR CONTROL OF TARNISHED PLANT BUG IN SOUTHEAST ARKANSAS

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Abstract

Two field experiments were conducted to evaluate the performance of selected insecticides for the control of tarnished plant bug (*Lygus lineolaris*). In trial 1, treatments containing Bidrin, acephate, and Endigo reduced plant bug numbers compared to the check at 7 DAT. In trial 2, most treatments in the trial controlled plant bugs compared to the untreated check at 7 DAT including Bidrin, acephate, Vydate, dimethoate, Carbine, Centric, and Trimax Pro. These data suggest that growers currently have a multitude of insecticide options for control of tarnished plant bug in cotton.

Introduction

Since the success of the Boll Weevil Eradication Program (BWEP) and widespread adoption of Bt cotton for Lepidopteran pests, the resulting low-spray environment has allowed a new insect, the tarnished plant bug (*Lygus lineolaris*) to emerge as a major pest in mid-south cotton. Tarnished plant bugs have historically been troublesome pests in cotton (Hollingsworth et al. 1995, Kharboutli et al. 1998, Robbins et al. 1998), and can cause significant economic injury if left untreated. Tarnished plant bugs cause yield losses by puncturing and feeding on young squares, often resulting in square loss. These pests can also feed on blooms and young bolls, resulting in dirty blooms and damaged seed/lint, respectively. It is because of this detriment to yield loss and lint quality that the tarnished plant bug must be controlled in mid-south cotton from year to year.

From 2004-2006, fields in Southeast Arkansas averaged ca. 3.5 sprays dedicated only to tarnished plant bug per season (Williams 2007). During the 2007 growing season, fields in this region averaged 5 dedicated plant bug sprays per year (Lorenz 2007). Populations of tarnished plant bug were particularly high in areas of Southeast Arkansas, and several fields received justified sprays of 10 or more for this pest.

There are numerous insecticides labeled for control or suppression of tarnished plant bug. Due to this wide selection of insecticides, coupled with the ability of insect pests to develop tolerance/resistance to insecticides, there is a great need to investigate efficacy of labeled insecticides in a given season. The purpose of this study was to evaluate several of the available insecticides labeled for tarnished plant bug control.

Materials and Methods

Both trials were planted using ST4554 (B2RF) at the Rohwer Experiment Station (SEREC) near Rohwer, AR. Plots were treated at first bloom using a MudMaster sprayer equipped with R&D plot boom system. Booms were equipped with TX-6 hollow-cone tips (8 row swath, 20" nozzle spacing). Sprayer was calibrated to 8 gpa at 2.8 mph at 30 psi. Plots were planted as 8 rows (38" spacing) x 50 feet and 4 replications in a randomized complete block design.

Treatments for 'Trial 1' included TriMax Pro (imidacloprid) alone @ 1.8 fl oz/A, the same rate of TriMax Pro tank-mixed with Diamond (novaluron) @ 8 fl oz/A, Baythroid (cyfluthrin) @ 2 fl oz/A, and Bidrin (dicotophos) @ 6 fl oz/A. Treatments in 'Trial 1' also included Endigo (lambda-cyhalothrin + thiamethoxam) @ 4 and 5 fl oz/A, Karate (lambda-cyhalothrin) @ 1.8 fl oz/A + acephate @ 0.5 lb ai/A, Bidrin @ 6 fl oz/A, and acephate @ 0.4 lbs ai/A.

Treatments for 'Trial 2' included Carbine (flonicamid) @ 2.3 oz/A, Cobalt (gamma-cyhalothrin + chlorpyrifos) @ 19 and 29 fl oz/A, Prolex (gamma-cyhalothrin) @ 1.5 fl oz/A, Vydate (oxamyl) @ 17 fl oz/A, Centric (thiamethoxam) @ 1.5 and 2.0 oz/A, acephate @ 0.5 lb ai/A, Bidrin @ 8 fl oz/A, TriMax Pro @ 1.8 oz/A, and Dimethoate (dimethoate) @ 16 fl oz/A.

For both trials, sampling was performed at 4 and 7 days after treatment (DAT) using a 2½-foot black drop cloth in rows 4 and 5 (sampling 5 feet of row per sample, 2 samples per plot) and a 15-inch diameter sweep-net in rows 3 and 6. Due to the low number of adults encountered at the time of trial initiation, and the difficulty of sampling nymphs with a sweep-net, only drop cloth data are presented in this paper.

Results and Discussion

Trial 1. At 4 DAT, TriMax Pro did not reduce plant bug numbers compared to the check, unless tank-mixed with Bidrin or Diamond (Table 1). Acephate and Bidrin, both considered industry standards for tarnished plant bug control, reduced plant bug numbers compared to the check. Both rates of Endigo (i.e., 4 and 5 fl oz/A) also controlled tarnished plant bugs compared to the check. The tank-mix treatment of Karate + acephate, a treatment commonly used for mixed populations of tarnished plant bugs and bollworms in cotton, also reduced plant bug numbers. The same trends were observed at 7 DAT. At both evaluation timings, there was no significant difference between effective treatments. These observations are likely due to the low numbers of tarnished plant bugs at the time of trial initiation.

Trial 2. Trial 2 sustained much higher populations of tarnished plant bug than Trial 1 (Table 2). Also in contrast to Trial 1, TriMax Pro significantly reduced plant bug numbers compared to the check at both 4 and 7 DAT. Prolex (pyrethroid class alone) provided suppression of plant bugs at 4 and 7 DAT. Centric, although labeled and recommended at 2 oz/A, provided significant control of tarnished plant bugs at 1.5 oz/A. Although this was the case with Centric in this trial, more consistent control and sufficient residual control will likely be more achieved with the 2 oz/A rate. Carbine, a relatively new product that has been reported as being a fairly slow product to kill, reduced plant bug numbers as soon as 4 DAT in this trial. Cobalt, a product only labeled for plant bug suppression, provided suppression at 4 DAT. However, the low rate (19 fl oz/A) provided no control at 7 DAT while the high rate (29 fl oz/A) only provided moderate suppression at this time. Vydate controlled plant bugs with the highest labeled rate (nematode suppression rate) at both 4 and 7 DAT. Both industry standards (i.e., acephate and Bidrin)

provided significant control of tarnished plant bug at both 4 and 7 DAT. Dimethoate, applied at the highest rate recommended for plant bugs in Arkansas (Stuebaker et al. 2007) , provided control of plant bugs at both evaluation dates.

These data suggest that several effective insecticide options exist for the control of tarnished plant bugs in Arkansas cotton. However, if populations of this pest continue to build each year, repeated applications of some of the more cost-effective insecticides (e.g., acephate) are likely to increase across Southeast Arkansas. This may, in turn, place greater selection pressure on this pest subsequently resulting in resistance. As a result, insecticide use alone may not be sustainable in the future of plant bug control in cotton production.

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Table 1. Trial 1 -- Number of tarnished plant bug nymphs per 10 row-feet (Rohwer, AR – 2007).

Insecticide	Rate	Number of nymphs (4 DAT)	Number of nymphs (7 DAT)
Untreated	---	8 a	15 a
TriMax Pro	1.8 fl oz/A	6 ab	10 ab
TriMax Pro + Diamond	1.8 fl oz/A 8 fl oz/A	3 b	2 c
TriMax Pro + Baythroid	1.8 fl oz/A 2 fl oz/A	7 a	9 ab
TriMax Pro + Bidrin	1.8 fl oz/A 6 fl oz/A	4 b	5 bc
acephate	0.4 lbs ai/A	4 b	5 bc
Bidrin	6 fl oz	5 b	6 bc
Endigo	4 fl oz/A	5 b	5 bc
Endigo	5 fl oz/A	4 b	5 bc
Karate	1.8 fl oz	3 b	5 bc
+ acephate	0.5 lb ai/A		
LSD (p<0.05)		3.0	5.7

Means in the same column not followed by a common letter are not significantly different.

Table 2. Trial 2 -- Number of tarnished plant bug nymphs per 10 row-feet (Rohwer, AR – 2007).

Insecticide	Rate	Number of nymphs (4 DAT)	Number of nymphs (7 DAT)
Untreated	---	38 a	39 a
Carbine	2.3 oz/A	16 cde	20 bc
Centric	1.5 oz/A	13 cde	16 cd
Centric	2.0 oz/A	16 cde	13 cd
Cobalt	19 fl oz/A	21 bc	37 a
Cobalt	29 fl oz/A	14 cde	26 b
Prolex	1.5 oz/A	27 b	21 bc
Vydate	17 fl oz/A	11 e	11 d
acephate	0.5 lb ai/A	10 e	13 cd
Bidrin	8 fl oz/A	12 de	15 cd
TriMax Pro	1.8 fl oz/A	13 cde	16 cd
Dimethoate	16 fl oz/A	12 de	11 d
LSD (p<0.05)		8.0	9.2

Means in the same column not followed by a common letter are not significantly different.