EFFICACY OF SELECTED INSECTICIDES FOR CONTROL OF TARNISHED PLANT BUG (*Lygus lineolaris*) IN COTTON BORDERING CORN

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Introduction

Since the widespread adoption of Bt cotton and relative success of boll weevil eradication (BWEP), the tarnished plant bug, *Lygus lineolaris*, has become a major pest of upland cotton in the Mid-southern U.S. Due to the reduction of insecticide applications for boll weevils and heliothines, the average number of sprays targeted specifically for tarnished plant bug has increased in Arkansas since 2000 (Williams 2010). This pest can cause substantial maturity delay or yield loss if numbers are not kept below threshold, particularly during peak bloom.

Corn acreage has increased substantially in Arkansas since 2007 (USDA-NASS 2010). Many growers, consultants, and extension personnel have observed higher numbers of tarnished plant bug in cotton bordering corn relative to the remainder of the field. Acquiring control of this pest next to corn has been difficult in some situations, and has often resulted in double-digit insecticide applications within a single season.

These trials were conducted to evaluate several single-active ingredient insecticides with and without the synergist piperonyl butoxide (Trial 1) and the insect growth regulator novaluron (Diamond®, MANA) (Trial 2) alone and with various tank-mix partners for plant bug control. Although the results from the initial objectives will be discussed briefly, the primary directive of this report is to demonstrate an average scenario of tarnished plant bug pressure in close proximity to corn.

Materials and Methods

Experiments were conducted on Steve Stevens farm (Kelso, AR) on cotton planted adjacent to corn to evaluate several single-active ingredient insecticides with and without the synergist piperonyl butoxide (Trial 1) and the insect growth regulator novaluron (Diamond®, MANA) (Trial 2) alone and with various tank-mix partners for plant bug control.

Plots were 6 rows wide and 70 feet in length, arranged in a RCB design with 4 replications. Insecticide applications were made with a Mudmaster® Sprayer equipped with an R&D® Multi-Boom. TX-6 hollow-cone nozzles were used to spray 10 gpa, 2.7 mph, 45 psi.

Two drop cloth samples were taken in each plot (10 row-ft) and means were separated and analyzed using Duncan's New Multiple-Range Test, Agronomic Research Manager 8 (Gylling Data Mgt, Brookings, SD).

Results and Discussion

Although the results from the initial objectives will be discussed briefly, the primary directive of this report is to demonstrate an average scenario of tarnished plant bug pressure in close proximity to corn. All treatments with and without the tank-mixes showed some control but no treatment was able to reduce the numbers of tarnished plant bug to below the University of Arkansas threshold of 6 per 10 row ft.

The addition of piperonyl butoxide did not appear to enhance control of traditional plant bug insecticides when compared to simply increasing the insecticide rate, particularly with Diamond (Table 1).

Table 1. 1st application, Number TPB Nymphs on two drops (10 row ft)

Treatment/ formulation		Field Rate/acre	5 DAT
Belay 2.13SC		6 fl oz	15.3 bcd
Belay 2.13SC+	PBO	4 fl oz 3 fl oz	15.3 bcd
acephate 97WP		1.0 lb ai	14.3 cd
acephate 97 WP + PBO		0.75 lb ai 3 fl oz	18.3 bcd
Centric 40WG		2.5 oz	14 cd
Centric 40WG+	PBO	2 oz 3 fl oz	18.5 bcd
Diamond .83EC		9 fl oz	11.3 d
Diamond .83EC + PBO		6 fl oz 3 fl oz	23.5 abc
Bidrin 8EC		8 fl oz	26 ab
Bidrin 8EC + PBO		6 fl oz 3 fl oz	23.5 abc
PBO		3 fl oz	38.5 a
UTC			26.3 ab

Means within a column followed by the same letter do not significantly differ (P=0.05).

Also to note in trial 1, three applications were not sufficient in reducing plant bug numbers below threshold for all treatments, with the exception of Centric (2.5 oz/A), which was very close to threshold at 4 days after treatment 3 (Tables 1-3).

Table 2. 2nd application, Number Tarnished plant bug nymphs on two drops (10 row ft.)

Treatment/ formulation	Field Rate/acre	5 DAT	8 DAT
Belay 2.13SC	6 fl oz	22 b	18.8 b
acephate 97WP	1.0 lb ai	25.5 b	17.9 b
Centric 40WG	2.5 oz	27.8 b	24.8 b
Diamond .83EC	9 fl oz	24 b	18.7 b
Bidrin 8EC	8 fl oz	45.8 b	23 b
UTC		86.5 a	68.5 a

Means within a column followed by the same letter do not significantly differ (P=0.05).

Table 3. 3rd application, Number Tarnished plant bug nymphs on two drops (10 row ft.)

Treatment/ formulation	Field Rate/acre	4 DAT
Belay 2.13SC	6 fl oz	11.7 b
acephate 97WP	1.0 lb ai	7.5 b
Centric 40WG	2.5 oz	4.3 b
Diamond .83EC	9 fl oz	6.3 b
Bidrin 8EC	8 fl oz	8.7 b

Means within a column followed by the same letter do not significantly differ (P=0.05).

In trial #2, no treatments reduced tarnished plant bug numbers below threshold with two insecticide applications (Tables 4 and 5). However, several treatments including Diamond at the higher rate, Diamond tank-mixed with another insecticide, or Bidrin (often considered the standard) did reduce tarnished plant bug numbers after a third application (Table 6). It should be noted that Trial 1 was located within the first 8 rows of corn, while Trial 2 was located between rows 12 and 20, potentially resulting in less sustained pressure from tarnished plant bug numbers near the corn.

Table 4. 1st application, Number TPB Nymphs on two drops (10 row ft)

Treatment/ formulation	Field Rate/acre	5 DAT
Centric 40WG	2.5 oz	20.3 b
Diamond .83EC	6 fl oz	19.3 bc
acephate 97WP	0.75 lb ai	18.8 bc
Bidrin 8EC	6 fl oz	17.5 bc
Diamond .83EC	9 fl oz	16.8 bc
Diamond .83EC+ acephate 97WP	6 fl oz 0.75 lb ai	15.5 bc
Diamond .83EC+ Bidrin 8EC	6 fl oz 6 fl oz	13.5 c
UTC		27 a

Means within a column followed by the same letter do not significantly differ (P=0.05).

Table 5. 2nd application, Number TPB Nymphs on two drops (10 row ft)

Treatment/ formulation	Field Rate/acre	5 DAT	8 DAT
Centric 40WG	2.5 oz	25.8 bc	83.3 b
Diamond .83EC	6 fl oz	31.5 b	25.8 b
acephate 97WP	0.75 lb ai	17.5 bc	16.8 b
Bidrin 8EC	6 fl oz	17.3 bc	18.8 b
Diamond .83EC	9 fl oz	25.5 bc	20.5 b
Diamond .83EC+ acephate 97WP	6 fl oz 0.75 lb ai	14.3 c	26.3 b
Diamond .83EC+ Bidrin 8EC	6 fl oz 6 fl oz	12.3 c	29 b
UTC		69.8 a	11.5 a

Means within a column followed by the same letter do not significantly differ (P=0.05).

Table 6. 3rd application, Number TPB Nymphs on two drops (10 row ft)

Treatment/ formulation	Field Rate/acre	5 DAT
Centric 40WG	2.5 oz	11 a
Diamond .83EC	6 fl oz	7.5 a
acephate 97WP	0.75 lb ai	6.5 a
Bidrin 8EC	6 fl oz	5.2 a
Diamond .83EC	9 fl oz	5.5 a
Diamond .83EC+ acephate 97WP	6 fl oz 0.75 lb ai	5.5 a
Diamond .83EC+ Bidrin 8EC	6 fl oz 6 fl oz	5.2 a

Means within a column followed by the same letter do not significantly differ (P=0.05).

It should also be noted that multiple and sequential applications of the same insecticide, as was the case in both of these trials, should not be made under normal grower conditions. Applications were made in this case for testing purposes only. These plots were destroyed prior to harvest due to being over the seasonal limit for many of the insecticides tested.

Summary

When dealing with extremely high and recurring numbers of tarnished plant bug near corn or other field edge/alternate host scenarios, repeated applications consisting of insecticides with different modes of action may be necessary to keep populations below economic threshold. Additionally, populations such as these should be monitored 4-5 days after each application to determine whether another is needed. Data from Mississippi (Gore, unpublished data) has suggested that waiting until 7 days after treatment may result in reduced control from subsequent applications.

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