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# CONTROL OPTIONS FOR TARNISHED PLANT BUG, *LYGUS LINEOLARIS*

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## Abstract

The tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois), has traditionally been considered an early season pest in Southeast Arkansas but has become more of a mid-to-late season pest as well. The expanded prominence of this pest necessitates continued applied research in the form of insecticide efficacy trials concerning its control. Our tests addressed the effectiveness of several new compounds when compared with existing compounds. Newer formulated compounds such as imidacloprid (Trimax) and thiamethoxam (Centric) provided control of tarnished plant bugs comparable with that provided by older compounds such as acephate (Orthene), dicrotophos (Bidrin), and oxamyl (Vydate) and offer alternatives to aging and increasingly regulated insecticides.

## Introduction

The tarnished plant bug continues to be a major pest in Southeast Arkansas cotton. It can be very damaging during early season, damaging pre-floral buds (squares) and terminal growth that often results in abortion of squares and inhibition of normal plant growth and development. It also can be a pest later in the growing season by feeding on small bolls, causing boll shed or losses in fiber quality and yield. The tarnished plant bug will likely remain a primary pest in Arkansas with the Boll Weevil Eradication Program (BWEP) in place and widespread usage of *Bt* cotton. A successful BWEP has and will continue to reduce the number of insecticide applications used that also help suppress plant bug numbers. Removal of that coincidental control will likely increase the importance of plant bugs in mid-south cotton. Furthermore, the increasing acreage of *Bt* cotton has reduced the number of insecticide applications that also provided suppression of the tarnished plant bug.

## Materials and Methods

Deltapine 451 B/RR was planted on 20 May 2002 at the Southeast Branch Experiment Station near Rohwer, AR. Plots measured 8 rows by 30 feet, spaced 38 inches apart, with four replications of each treatment arranged in a randomized complete block design. Mustard was seeded in early April on two rows between each eight row plot to attract plant bugs. Standard fertilization and herbicide practices were followed according to current University of Arkansas Extension recommendations (Chapman 2000). Insect counts were conducted by sampling 6 meters of row per plot with a shake sheet (1 $m^2$) and counting adults and nymphs dislodged onto the cloth. Tests I, II, and III were conducted as early-season plant bug trials, with treatments applied soon after pinhead square. Test IV was a late-season trial, and applications were made post bloom. Data were processed using Agriculture Research Manager (ARM) (Gylling Data Management, Inc., Brookings, SD), and means were separated using Least Significant Difference (LSD) procedures following significant F tests using Analysis of Variance (ANOVA).

## Results and Discussion

### Test I

While no treatments significantly lowered tarnished plant bug totals across all four post treatment sample dates, all treatments did provide adequate control for some of the sample dates (Table 1). All three insecticide treatments provided adequate control of tarnished plant bug when compared with the untreated control on the fourth sample date, seven days after the second treatment (7DAT2). Trimax at 0.0469 lb ai/a (4DAT1), Orthene at 0.33 lb ai/a (2DAT2), and Trimax at 0.0313 lb ai/a (2DAT3) resulted in numerically reduced populations of tarnished plant bug. There were no statistical differences in yield, but both rates of Trimax yielded the most numerically.

### Test II

No treatments provided significant control across all sample dates, but Trimax at 0.0313 lb ai/a (5DAT1) and Trimax at 0.0313 lb ai/a + Bidrin at 0.33 lb ai/a (2DAT2) provided significant reduction of tarnished plant bug populations when compared with the untreated control (Table 2). Treatments with Bidrin at 0.33 lb ai/a or Trimax at 0.0469 lb ai/a both resulted in significantly increased yields when compared with the untreated control.

### Test III

In this trial, both rates of the experimental compound F1875 were not applied until the last application date, and SC-AU was not applied on the first treatment date. These compounds should not be considered in yield or efficacy evaluations for the

dates prior to their application. All treatments except Novaluron at 0.09 lb ai/a provided significant control on 3 July (2DAT2) (Table 3). All treatments provided significant control on 8 July (7DAT2) and 10 July (2DAT3), except for F1785 at 0.071 lb ai/a. Centric at 0.05 lb ai/a, Trimax at 0.0469 lb ai/a, and Vydate at 0.25 lb ai/a produced significantly higher yields than the untreated control. Similar results with Centric were observed in Arkansas during 2001 (Ngo *et al.*, 2002).

**Test IV**

In this test, initial insecticide applications were not made until 8 August, resulting in difficulty in controlling plant bugs due to dense canopy enclosure. Orthene and Bidrin, both at 0.5 lb ai/a, were the only treatments that provided significant control of tarnished plant bug populations when compared with the untreated control at 4DAT1 (Table 4). No differences were observed following the initial sample date and the second application.

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## Disclaimer

The mention of trade names in this report is for informational purposes only and does not imply an endorsement by the University of Arkansas Cooperative Extension Service.

## References

Chapman, S. L. 2000. Soil Test Recommendations Guide. University of Arkansas Division of Agriculture Pub. No. 39.

Ngo, N.D., V.J. Mascarenhas, S.H. Martin, B.W. Minton, and S.M. White. 2002. Control of tarnished plant bugs and stink bugs with Centric. Proceedings of the Beltwide Cotton Conference. National Cotton Council, Memphis, TN.

Table 1. Average number of adult and immature plant bugs per 6-m sample (Test I).

| Treatment (lb ai/a) | Cost per acre $ | 6/25/02 (4DAT1) | 6/28/02 (7DAT1) | 7/3/02 (2DAT2) | 7/8/02 (7DAT2) | 7/10/02 (2DAT3) | Yield (37% lint) |
|---|---|---|---|---|---|---|---|
| 1) UTC | | 8.0 a | 13.8 a | 4.8 a | 13.5 a | 3.8 a | 492.0 a |
| 2) Trimax (0.0313) | 5.14 | 4.3 a | 18.0 a | 4.0 a | 4.3 b | 0.5 b | 844.0 a |
| 3) Trimax (0.0469) | 7.70 | 7.0 a | 9.8 a | 4.0 a | 5.3 b | 2.3 ab | 810.1 a |
| 4) Bidrin (0.33) | 3.66 | 7.8 a | 11.8 a | 2.5 a | 4.0 b | 1.8 ab | 445.3 a |

Means followed by same letter do not significantly differ (*P*=0.05, LSD).

Table 2. Average number of adult and immature plant bugs per 6-m sample (Test II).

| Treatment (lb ai/a) | Cost per acre $ | 6/25/02 (pretreat) | 7/1/02 (5DAT1) | 7/3/02 (2DAT2) | 7/8/02 (7DAT2) | Yield (37% lint) |
|---|---|---|---|---|---|---|
| 1) UTC | | 8.8 a | 12.5 a | 5.8 a | 10.0 a | 364.8 c |
| 2) Trimax (0.0313) | 5.14 | 8.0 a | 3.8 b | 2.5 ab | 7.3 a | 489.9 bc |
| 3) Trimax (0.0469) | 7.70 | 9.3 a | 8.8 ab | 2.5 ab | 6.0 a | 672.3 ab |
| 4) Trimax (0.0313)+Bidrin (0.25) | 5.14+2.78 | 10.5 a | 7.3 ab | 2.3 ab | 2.3 a | 273.6 c |
| 5) Trimax (0.0313)+Bidrin (0.33) | 5.14+3.66 | 10.3 a | 6.5 ab | 1.8 b | 1.0 a | 504.7 bc |
| 6) Bidrin (0.33) | 3.66 | 12.3 a | 8.5 ab | 2.0 ab | 7.8 a | 882.2 a |

Means followed by same letter do not significantly differ (*P*=0.05, LSD).

Table 3. Average number of adult and immature plant bugs per 6-m sample (Test III).

| Treatment (lb ai/a) | Cost per acre $ | 6/25/02 (pretreat) | 7/1/02 (5DAT1) | 7/3/02 (2DAT2) | 7/8/02 (7DAT2) | 7/10/02 (2DAT3) | Yield (37% lint) |
|---|---|---|---|---|---|---|---|
| 1) UTC | | 10.5 a | 6.3 ab | 8.8 a | 13.5 a | 4.0 a | 485.6 d |
| 2) F1875 (0.071) | | | | | | 2.5 ab | 769.8 a-d |
| 3) F1875 (0.088) | | | | | | 1.0 bc | 763.4 a-d |
| 4) Bidrin (0.33) | 3.66 | 9.5 a | 8.0 ab | 2.0 bc | 3.8 bcd | 0.8 bc | 613.9 cd |
| 5) Orthene (0.33) | 2.96 | 9.5 a | 3.8 b | 2.8 bc | 5.3 bc | 0.3 c | 615.0 cd |
| 6) Novaluron (0.045) | | 9.5 a | 5.8 ab | 3.8 bc | 2.3 bcd | 0.8 bc | 676.5 bcd |
| 7) Novaluron (0.068) | | 9.3 a | 7.0 ab | 3.5 bc | 0.3 d | 1.5 c | 668.0 cd |
| 8) Novaluron (0.09) | | 9.8 a | 8.0 ab | 6.3 ab | 1.3 cd | 1.8 bc | 551.4 cd |
| 9) Centric (0.05) | 6.94 | 8.0 a | 6.0 ab | 1.5 c | 0.8 d | 0.8 c | 1094.3 a |
| 10) Trimax (0.0469) | 7.70 | 8.8 a | 9.8 a | 2.3 bc | 4.3 bcb | 0.5 c | 1015.8 ab |
| 11) Vydate (0.25) | 4.35 | 7.5 a | 7.5 ab | 2.0 bc | 4.0 bcd | 1.0 bc | 880.1 abc |
| 12) SC-AU (1 qt/a) | | | | 1.0 c | 1.8 cd | 0.8 bc | 453.8 d |

Means followed by same letter do not significantly differ (*P*=0.05, LSD).

Table 4. Average number of adult and immature plant bugs per 4-m sample (Test IV).

| Treatment (lb ai/a) | Cost per acre $ | 8/12/02 (4DAT1) | 8/15/02 (7DAT1) | 8/22/02 (2DAT2) |
|---|---|---|---|---|
| 1) UTC | | 28.8 a | 16.8 ab | 5.8 a |
| 2) F1875 (0.071) | | 21.8 ab | 16.8 ab | 5.8 a |
| 3) F1875 (0.088) | | 19.0 abc | 11.5 b | 3.3 a |
| 4) Orthene (0.5 lb) | 4.83 | 9.5 bc | 11.3 b | 4.8 a |
| 5) Trimax (0.0469) | 7.70 | 17.5 abc | 23.5 a | 3.5 a |
| 6) Centric (0.0473) | 6.94 | 21.5 ab | 14.0 b | 2.8 a |
| 7) Intruder (0.05) | 9.18 | 28.0 a | 13.3 b | 5.0 a |
| 8) Vydate (0.25) | 4.35 | 16.0 abc | 13.0 b | 7.3 a |
| 9) Bidrin (0.5) | 5.55 | 8.5 c | 10.5 b | 5.8 a |
| 10) Methyl Parathion (0.5) | 3.68 | 20.8 abc | 15.0 b | 4.3 a |

Means followed by same letter do not significantly differ (*P*=0.05, LSD).