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EFFICACY OF SELECTED INSECTICIDES FOR CONTROL OF TARNISHED PLANT BUG, LYGUS LINEOLARIS, IN SOUTHEAST ARKANSAS - 2004

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Abstract

Efficacy trials were conducted in 2004 to determine the effectiveness of new and existing chemistries in controlling the tarnished plant bug (TPB), *Lygus lineolaris.* In early-season trials, industry standards such as acephate (Orthene), dicrotophos (Bidrin), and oxamyl (Vydate), provided adequate control of TPB, as did newer chemistries such as thiamethoxam (Centric) and acetamiprid (Intruder), and newly formulated compounds such as imidacloprid (Trimax). Some numbered compounds and bifenthrin (Capture, Discipline), a pyrethroid, provided control of TPB in these early-season trials as well. In mid-to-late-season trials, tank-mixing pyrethroids with newer chemistries and organophosphates offered some enhanced control of TPB. Newer chemistries along with industry standards mentioned above provided adequate control of TPB in mid-to-late-season trials.

Introduction

Tarnished plant bug (TPB), *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. As the pest spectrum continues to change, TPB continues to be a major pest of cotton in Arkansas. Success of the Boll Weevil Eradication Program (BWEP) and the increased usage of *Bt* cotton have lead to a dramatic decrease in insecticide sprays that often controlled TPB. Removal of that coincidental control has increased the importance of plant bugs in mid-south cotton. As acreage of next-generation *Bt* cotton increases, and insecticide use declines further, TPB will become more important. The TPB 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 (Johnson et al. 1996). 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 expanded prominence of this pest necessitates continued applied research in the form of insecticide efficacy trials concerning its control.

Materials and Methods

Stoneville 4646 B2/R was planted on 26 April (Test I & II), 3 May (Test III & IV) 2004 at the Southeast Branch Experiment Station near Rohwer, AR. Plots measured 8 rows by 40 feet, spaced 38 inches apart, with four replications of each treatment arranged in a RCBD. In Test I & II, mustard was seeded in mid-March 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 12 feet of row per plot with a shake sheet (3 ft^2) and counting adults and nymphs dislodged onto the cloth. Tests I & II were conducted as early-season plant bug trials, with treatments applied soon after pinhead square. Tests III and IV were late-season trials, 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

Four treatments, Exp. 2, Exp. 3, Centric 40 WG at 1.88 oz/acre, and Vydate C-LV at 10.7 oz/acre provided significant control of TPB across all sample dates compared with the untreated check (UTC) (Table 1). All other treatments provided control compared with the UTC on at least four of the six sample dates. Low populations of TPB might explain the lack of significant difference in yields, although some treatments provided a numerical increase in lint yield of as much as 256 lb.

Test II

Only Vydate CLV @ 0.25 lb ai/a plus Intruder 70 WP @ 0.018 lb ai/a and Orthene 97 @ 0.75 lb ai/a provided adequate control of TPB across all sample dates compared with the UTC (Table 2). All other treatments, except Methyl parathion, provided control on at least three sample dates. Numbers of TPB reached threshold on one sample date (2DAT3). Vydate CLV plus Intruder 70WP, Intruder 70 WP, and Orthene 97 provided a significant increase in yields compared with the UTC.

Test III

All treatments, except for Centric @ 0.05, Zephyr plus Karate, Trimax, and Karate alone, provided significant control of TPB across all sample dates (Table 3). All treatments, except Bidrin and Karate Z, provided a significant increase in lint yield. Although numbers of TPB never were detected at or above threshold, differences in yield could be due to an additional treatment applied later in the season, after TPB numbers reached threshold.

Test IV

Compared with the UTC, Orthene, Discipline, Bidrin @ 0.5 lb ai/a, and all Bidrin plus Discipline tank-mixes provided significant control of the TPB across all sample dates (Table 4). Centric and Bidrin @ 0.25 provided significant control on three of the four sample dates. Orthene, Centric, Discipline, and Bidrin plus Discipline @ 0.02 and 0.05 provided significant increases in lint yield compared with the UTC. Although numbers of TPB never were detected at or above threshold, differences in yield could be due to an additional treatment applied later in the season, after TPB numbers reached threshold.

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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.

Johnson, D.R., R.E. Caron, R.B. Head, F.G. Jones, and J.S. Tynes. 1996. Insect and mite pest Management in the mid-south. In Cotton Insects and Mites, E. King, J.R. Phillips and R.J. Coleman, Eds. The Cotton Foundation, Memphis, TN.

Table 1. Average number of adult and immature plant bugs per 12-ft sample (Test I).

Treatment (product rate/acre)	6/14/04 3DAT1	6/16/04 5DAT1	6/18/04 2DAT2	6/21/04 5DAT2	6/24/04 8DAT2	7/9/04 2DAT3	Yield (35% lint)
1) UTC	8.0 a	7.3 a	3.5 a	5.0 a	7.5 a	13.3 a	988 a
2) Trimax 4 @ 1.5 oz/a	4.0 b	3.5 b	1.8 ab	2.0 b	4.0 bcd	10.8 ab	1162 a
3) Exp. 1	4.0 b	4.0 b	1.8 ab	1.0 b	5.8 ab	6.8 bcd	1241 a

4) Exp. 2	3.0 bc	1.8 b	1.3 b	2.0 b	3.0 d	5.3 cde	1223 a
5) Exp. 3	3.5 bc	3.8 b	1.5 b	1.8 b	4.0 bcd	4.3 de	1081 a
6) Exp. 4	2.3 bc	2.8 b	2.3 ab	1.5 b	3.5 cd	9.3 abc	1221 a
7) Intruder 70WP @ 1.07 oz/a	2.8 bc	4.5 ab	2.5 ab	2.5 b	5.3 bc	5.3 cde	1065 a
8) Centric 40WG @ 1.88 oz/a	3.5 bc	3.0 b	1.5 b	1.3 b	3.5 cd	3.3 de	1105 a
9) Bidrin 8 @ 6 oz/a	2.0 c	2.3 b	1.8 ab	1.0 b	3.0 d	2.3 e	1244 a
10) Vydate C-LV @ 10.7 oz/a	4.0 b	3.3 b	1.5 b	2.5 b	4.0 bcd	7.0 bcd	1125 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 12-ft sample (Test II).

Treatment (lb ai/a)	6/14/04 3DAT1	6/16/04 5DAT1	6/18/04 2DAT2	6/21/04 5DAT2	6/24/04 8DAT2	7/9/04 2DAT3	Yield (35% lint)
1) UTC	6.3 a	5.8 a	4.0 a	4.3 a	8.0 a	16.3 a	914 de
2) Vydate C-LV @ 0.31	3.0 bcd	2.3 b	1.3 bc	2.8 ab	4.0 bc	7.8 bc	1051 a-d
3) Vydate C-LV @ 0.25 + Intruder 70 WP @ 0.018	2.5 bcd	2.3 b	1.5 bc	1.5 b	4.0 bc	7.8 bc	1183 ab
4) Intruder 70 WP @ 0.037	2.8 bcd	2.0 b	1.3 bc	2.8 ab	1.5 c	8.3 bc	1135 abc
5) Capture 2 @ 0.0625	2.0 cd	1.8 b	0.8 c	2.0 b	4.0 bc	10.5 abc	1093 a-d
6) Capture 2 @ 0.078	2.3 cd	1.8 b	1.8 bc	1.8 b	5.3 ab	7.3 bc	997 b-e
7) Capture 2 @ 0.1	1.8 cd	2.0 b	1.5 bc	1.5 b	5.3 ab	12.3 ab	1077 a-d
8) Methyl Parathion @ 0.5	3.8 abc	3.8 ab	2.3 abc	3.0 ab	3.8 bc	7.3 bc	952 cde
9) Methyl Parathion @ 0.75	5.0 ab	3.3 ab	3.0 ab	1.5 b	4.3 bc	12.3 ab	822 e
10) Orthene 97 @ 0.75	0.5 d	1.8 b	1.5 bc	1.5 b	5.5 ab	5.3 c	1195 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 12-ft sample (Test III).

Treatment (lb ai/a)	7/14/04 7DAT1	7/19/04 5DAT2	7/23/04 2DAT3	7/28/04 7DAT3	Yield (35% lint)
1)UTC	8.3 a	7.5 a	3.5 a	6.0 ab	1081 d
2)Centric 40 WG @ 0.05	3.0 cd	1.5 b	1.3 abc	2.5 c	1438 a
3)Centric 40 WG @ 0.0625	3.0 cd	0.8 b	0.8 bc	1.8 c	1406 ab
4) Centric 40 WG @ 0.05 + Zephyr @ 0.0059	3.5 cd	1.3 b	0.3 c	1.8 c	1427 a
5) Centric 40 WG @ 0.05 + Karate Z 2.08 @ 0.025	2.5 d	1.0 b	0.8 bc	2.0 c	1326 abc
6) Zephyr @ 0.0059 + Karate Z 2.08 @ 0.025	6.8 abc	2.8 b	1.3 abc	3.0 c	1390 ab
7) Trimax 4 @ 0.047	7.8 ab	6.3 a	3.0 ab	3.5 bc	1411 a
8) Orthene 97 @ 0.5	3.8 bcd	2.3 b	0.5 bc	1.5 c	1322 abc
9) Bidrin 8 @ 0.25	3.5 cd	1.5 b	0.5 bc	1.8 c	1214 cd
10) Karate Z 2.08 @ 0.025	4.8 a-d	1.8 b	2.8 abc	6.5 a	1239 bcd

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

Table 4. Average number of adult and immature plant bugs per 12-ft sample (Test IV).

Treatment (lb ai/a)	7/14/04 7DAT1	7/19/04 5DAT2	7/23/04 2DAT3	7/28/04 7DAT3	Yield (35% lint)
1) UTC	7.0 a	6.0 a	4.3 b	8.0 b	1059 fg
2) Methyl Parathion @ 0.25	6.8 ab	7.3 a	11.8 a	8.8 b	803 h
3) Methyl Parathion @ 0.5	7.0 a	3.3 b	3.5 b	13.8 a	949 gh
4) Malathion @ 0.5	4.3 abc	2.5 bc	3.8 b	2.5 c	1108 efg
5) Orthene 97 @ 0.5	3.3 c	1.5 bc	0.5 cd	1.3 c	1356 abc
6) Bidrin 8 @ 0.25	4.3 abc	0.8 c	0.5 cd	4.0 c	1158 def
7) Bidrin 8 @ 0.5	3.5 bc	0.8 c	0.8 cd	2.0 c	1232 c-f
8) Centric 40 WG @ 0.05	2.3 c	0.8 c	2.5 bc	1.8 c	1257 b-e

9) Bidrin 8 @ 0.25 + Discipline 2 @ 0.05	3.0 c	1.3 c	0.3 d	0.8 c	1432 ab
10) Discipline 2 @ 0.08	3.5 bc	1.8 bc	1.3 cd	0.8 c	1454 a
11) Bidrin 8 @ 0.25 + Discipline 2 @ 0.02	3.3 c	1.3 c	1.3 cd	0.8 c	1311 a-d
12) Bidrin 8 @ 0.25 + Discipline 2 @ 0.03	3.3 c	0.8 c	1.0 cd	1.8 c	1236 c-f
13) Bidrin 8 @ 0.25 + Discipline 2 @ 0.04	2.0 c	1.8 bc	0.8 cd	0.5 c	N/A

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