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MANAGEMENT OF TARNISHED PLANT BUG WITH INSECITIDES IN NORTHEAST ARKANSAS

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Abstract

The efficacy of foliar applied insecticides against tarnished plant bug in cotton was evaluated in both small plot field trials and in a caged trial. Insecticides evaluated were Acephate, Bidrin, Dimethoate, Lorsban, Vydate, Trimax, Centric, Intrepid, Steward, Leverage, Asana XL, Capture, Karate Z, Prolex and Mustang Max. In both field studies as well as the caged study, Acephate gave the best level of control. In both field trials, all materials gave some level of control with the exception of Capture. However, in the caged study, Capture did perform somewhat better. In the caged study, all materials tested did give some level of control except for Karate Z and Prolex. There were significant differences among pyrethroids in the caged study with Asana XL being the top performer, followed by Capture and Mustang Max. There was also no apparent benefit from mixing chemistries with no additional control from Leverage, a mixture of Baythroid and Trimax, or by tank-mixing Vydate with Intrepid.

Introduction

The tarnished plant bug has become a major pest of cotton in Arkansas in recent years. Many growers averaged 4 or more insecticide applications in 2004 to control this pest. Treatment level for this pest in Arkansas cotton is dependent on the condition of the field. In fields with normal fruiting activity (small square set of 75-80% or higher), treatment is initiated when plant bug numbers reach 1 per row foot. In problem fields (square set below 75%) treatments are applied when plant bugs reach 1 bug per 3 row feet. The majority of fields were well above treatment level during the 2004 growing season. Efficacy trials were conducted at the Northeast Research and Extension Center in Keiser, AR to determine what insecticides were giving the best control.

Methods

PayMaster 1218BG/RR cotton seed were planted into a Sharky/clay soil on 25 May in plots consisting of 8 rows on 38 inch centers × 35 ft long. Treatments were arranged in a RCB design and replicated 4 times. Insecticides were applied on 5 and 13 August 2004 with a Mud Master hi-clearance sprayer calibrated to deliver 11 gpa through Teejet TX-8 hollow cone nozzles (2 per row) at 50 psi. In the caged study, plots were 4 rows x 35 ft long. Tarnished plant bug densities were determined by sampling 6-row ft of plants per plot with a shake sheet (3 × 3 ft) on 9, 12, and 16 August 2004. In the caged study, tarnished plant bugs collected from cotton were placed in cages on the upper leaves of treated plants ca. 1-hr after insecticide application. Ten bugs were used per rep for a total of 40 per treatment. Mortality was determined 24-hr later. Means were adjusted for natural mortality using Abbot's formula. All data were analyzed with ANOVA, and means were separated according to DMRT ($P \leq 0.05$).

Results

In the first test (Table 1) there were no significant differences among treatments on the first two sampling dates after the first application. On the last sampling date after the second application all treatments with the exception of Capture, had significantly fewer plant bugs than the untreated control. Only Bidrin significantly out yielded the untreated control. In the second test (Table 2) all treatments significantly reduced tarnished plant bug numbers at 4 DAT with the first application, but none were significant by 7 DAT. After the second application only Acephate had significantly lower numbers of tarnished plant bugs. No significant differences in yield were observed. In the caged trial (Table 3), Lorsban had the highest mortality (90%), while Karate Z, Prolex and Steward had the lowest mortality all below 20%. As a group the organophosphates had the highest mortality. There was also wide variation among the synthetic pyrethroids with Karate Z and Prolex having very low mortality (<3%), Mustang Max and Capture begin somewhat intermediate (26% and 45% respectively), and Asana XL having the highest mortality (71%).

Table 1.

Treatment/ Formulation	Rate lb ai/acre	TPB per 6 row ft 4DAT	7DAT	3DAT	Yield lbs lint/acre
Untreated		6.5a	6.0a	11.0a	658b
Bidrin 8EC	0.5	4.5a	3.5a	2.8bc	859a
Orthene 97SP	0.5	5.0a	5.0a	4.2bc	682b
Dimethoate 4EC	0.5	3.8a	4.5a	3.2bc	657ab
Vydate C-LV 3.77EC	0.5	3.5a	7.2a	1.2c	784ab
Lorsban 4EC	0.5	6.2a	9.0a	3.8bc	790ab
Capture 2EC	0.06	3.5a	5.0a	7.5ab	689b
(*P*> *F*)		0.417	0.107	<0.01	0.05

Means within a column followed by the same letter do not significantly differ (P> 0.05; DMRT)

Table 2.

Treatment/ Formulation	Rate lb ai/acre	TPB per 6 row ft 4DAT	7DAT	3DAT	Yield lbs lint/acre
Untreated		16.8a	9.0a	6.0ab	678a
Vydate C-LV 3.77EC	0.31	9.0b	6.8a	4.0bc	863a
Vydate C-LV 3.77EC + Intruder 70WDG	0.25 + 0.018	6.0b	8.8a	3.2bc	824a
Intruder 70WDG	0.037	9.0b	6.2a	3.0bc	768a
Intruder 70WDG	0.047	7.2b	4.2a	4.5ab	830a
Centric 40WDG	0.05	2.8b	7.5a	4.0bc	894a
Centric 40WDG	0.0625	5.0b	4.8a	3.5bc	1051a
Orthene 97SP	0.5	6.5b	8.2a	1.0c	859a
Bidrin 8EC	0.25	4.5b	6.2a	5.0ab	758a
Trimax 4L	0.047	8.2b	8.2a	4.8ab	899a
Trimax 4L	0.031	6.0b	9.5a	7.8a	780a
Leverage 3.6SC	0.105	6.8b	6.0a	5.8ab	861a
(*P*> *F*)		0.011	0.269	0.012	0.205

Means within a column followed by the same letter do not significantly differ (P> 0.05; DMRT)

Table 3.

Treatment/ Formulation	Rate lb ai/acre	Percent Mortality
Mustang Max 0.8EC	0.025	26.4ef
Capture 2EC	0.1	45.6de
Karate Z 2.09SC	0.04	0.0g
Asana XL 0.66EC	0.05	71.9bc
Bidrin 8EC	0.5	76.1abc
Vydate C-LV 3.77EC	0.25	79.4abc
Orthene 97SP	0.5	100.0a
Centric 40WDG	0.05	54.7cd
Lorsban 4EC	0.5	90.0ab
Prolex	0.01	2.8fg
Steward 1.25SC	0.09	16.1fg
(*P*> *F*)		<0.01

Means within a column followed by the same letter do not significantly differ (P> 0.05; DMRT)

Conclusions

All the materials, with the exception of Capture, gave some level of control in both field tests. Overall, Acephate gave the best control in both field trials as well as 100% mortality in the caged trial. There was no apparent benefit from tank-mixing Vydate with Intrepid, or Baythroid with Trimax (the Leverage treatment) (Table 2). In the caged study, the organophosphates, Acephate, Bidrin and Lorsban performed quite well as did the carbamate, Vydate. It is interesting to note that there was some variability in performance among the synthetic pyrethroids. Asana XL was the top performer with 71.9% mortality, Capture next with 45% and Mustang Max on the low side with 26% mortality. Karate Z and Prolex did not do well at all with less than 3% mortality. From this trial it is apparent that not all pyrethroids are equal in their efficacy against tarnished plant bug. We (Studebaker et al. 2004) found more consistent control from the pyrethroids in our trials at the same location in the previous year. The neonicotinoid, Centric, fell out in the middle with 54.7% mortality in the caged trial. However, due to the mode of action of Centric, 24-hr exposure in the caged trial may not have given the material enough time to obtain its highest level of mortality.

Literature Cited

Studebaker, G.E., J. Greene, D. Johnson and G. Lorenz. 2004. Tarnished plant bug control in northeast Arkansas. *In* Proceedings Beltwide Cotton Conferences, Memphis, TN.