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EVALUATION OF NEW AND EXISTING HELIOTHINE INSECTICIDES IN SOUTHEAST ARKANSAS

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Abstract

The Heliothine complex, comprised of the cotton bollworm, *Helicoverpa zea* (Boddie), and the tobacco budworm, *Heliothis virecens* (F.), was a major pest of cotton in Southeast Arkansas during 2002. The impact of the Heliothine complex as been lessened by the widespread usage of *Bt* cotton and the development of new chemistries of insecticides. Our trials addressed the effectiveness of new insecticide chemistries when compared with existing compounds. When applied alone, newer products such as Tracer, Denim, Steward, and S-1812 provided acceptable control of mixed populations of tobacco budworms and bollworms, and performance was enhanced with the addition of a pyrethroid insecticide.

Introduction

Adoption of new pest control measures is necessary for successful cotton production in Southeast Arkansas. In recent years, the rapidly changing cotton industry has resulted in dramatically different strategies for managing insect pests in cotton. Transgenic *Bt* cottons and new classes of insecticides have been and continue to be developed, addressing tolerance of the Heliothine pest complex to aging classes of insecticides. Recent research has addressed some of these new classes of insecticides (Greene and Capps 2002, Kharboutli 2001, Reaper et al. 2001, Leonard et al. 2001), but additional research is needed to evaluate their effectiveness over time. In our trials, we compared the effectiveness of these new chemistries to that of existing standards.

Materials and Methods

Plots of cotton (Phytogen 355) planted on 10 July 2002 in a loam soil at the Southeast Branch Experiment Station near Rohwer, AR, were four rows (38 in) by forty feet. Treatments were randomly assigned to plots and were replicated four times. Standard field preparation and fertilization practices were followed using current University of Arkansas Cooperative Extension Service recommendations (Chapman 2000). Irrigations were applied as needed according to the irrigation scheduler model. Insecticides were applied on 28 August and 4 and 11 September for Tests I and II. Insecticides were applied using a 4-row CO2-powered plot boom attached to a hi-cycle sprayer calibrated to apply 10 GPA at 42 psi. Insect data were collected by examining 25 terminals, 25 squares (below the terminal), and 25 bolls in each plot. 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

On the second sample date, two days after the first application (2DAT1), Larvin plus Curacron was the only treatment that significantly reduced larval densities (Table 1). All treatments except F0570 at 0.018 lb ai/a and Baythroid XL at 0.018 lb ai/a per acre resulted in significantly lower larval counts than the untreated control for the third sample date (6DAT1). No treatments significantly differed from the untreated control on the fourth and fifth sample dates (2DAT2 and 2DAT3).

Test II

On the second sample date (2DAT1), there were no statistical differences among treatments (Table 2). On the third sample date (6DAT1), only S-1812 at 0.1 lb ai/a plus Asana at 0.02 lb ai/a provided significant control when compared with untreated plots. On the fourth sample date (2DAT2), S-1812 at 0.1 lb ai/a plus Orthene at 0.63 lb ai/a, S-1812 at 0.1 lb ai/a plus Asana at 0.02 lb ai/a, Denim at 0.0075 lb ai/a plus Baythroid at 0.025 lb ai/a, and Steward at 0.09 lb ai/a plus Baythroid 0.025 lb ai/a all provided significant control of larvae when compared with the untreated control. All treatments except S-1812 at 0.1 lb ai/a and S-1812 at 0.1 lb ai/a plus Orthene at 0.63 lb ai/a, which were not applied on the last treatment date, provided significant control of larvae when compared with the untreated control (2DAT3).

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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.

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Table 1. Average number of larvae per 25 plants (Test I).

Treatment (lb ai/a)	Cost per acre $	8/26/02 (pretreat)	8/30/02 (2DAT1)	9/3/02 (6DAT1)	9/6/02 (2DAT2)	9/13/02 (2DAT3)
1) UTC		6.8 abc	6.5 ab	11.5 a	4.0 b	3.3 abc
2) Tracer (0.067)	12.18	5.5 cd	6.0 abc	4.0 e	3.0 b	2.8 bc
3) Capture (0.05)	9.42	4.3 d	4.0 abc	7.0 b-e	6.5 ab	6.0 a
4) Capture (0.05) + Tracer (0.044)	9.42+12.18	6.8 abc	3.0 bc	7.3 b-e	3.0 b	3.8 abc
5) F0570 0.018		5.5 cd	3.5 bc	8.8 abc	8.8 a	5.5 ab
6) F0570 (0.018) + Tracer (0.044)		6.3 a-d	4.8 abc	6.3 cde	4.0 b	3.3 abc
7) Steward (0.104)	13.90	6.5 abc	4.3 abc	7.8 bcd	5.5 ab	2.5 bc
8) Denim (0.015)	17.50	7.8 ab	4.0 abc	5.0 de	4.5 b	2.0 c
9) S-1812 (0.15)*		8.0 a	5.0 abc	7.5 bcd	3.0 b	
10) Baythroid XL (0.018)		6.8 abc	3.0 bc	9.8 ab	6.5 ab	3.8 abc
11) Larvin (0.6)	10.88	6.3 a-d	4.0 abc	7.0 be	5.5 ab	2.3 c
12) Larvin (0.9)	16.32	6.5 abc	4.0 abc	6.3 cde	4.0 b	2.8 bc
13) Larvin (0.3) + Curacron (0.8)	5.44+9.41	5.8 bcd	2.5 c	5.0 de	4.5 b	2.8 bc
14) Decis (0.03)	6.60	4.8 cd	7.3 a	6.5 be	4.3 b	4.5 abc

*Not applied on the last treatment date.
Means followed by the same letter do not significantly differ (*P*=0.05, LSD).

Table 2. Average number of larvae per 25 plants (Test II).

Treatment (all treatment rates listed as lb ai/a)	8/26/02 (pretreat)	8/30/02 (2DAT1)	9/3/02 (6DAT1)	9/6/02 (2DAT2)	9/13/02 (2DAT3)
1) UTC	6.3 a	5.3 a	7.5 a	7.8 a	4.8 a
2) S-1812 (0.1)*	4.3 a	3.5 a	6.3 ab	6.3 ab	
3) S-1812 (0.1) + Orthene (0.63)*	5.3 a	2.8 a	6.5 ab	4.0 b	
4) S-1812 (0.1) + Asana (0.02)	4.3 a	3.3 a	4.3 b	3.5 b	1.8 b
5) Denim (0.0075) + Baythroid (0.025)	5.3 a	3.0 a	5.5 ab	3.5 b	1.3 b
6) Steward (0.09) + Baythroid (0.025)	5.0 a	3.8 a	6.8 ab	3.8 b	0.8 b
7) Curacron (0.75) + Baythroid (0.025)	5.0 a	3.3 a	5.8 ab	5.5 ab	1.5 b
8) Bidrin (0.25) + Baythroid (0.025)	4.5 a	4.8 a	4.5 ab	6.0 ab	1.0 b

*Not applied on the last treatment date.
Means followed by the same letter do not significantly differ (*P*=0.05, LSD).