EFFICACY OF ASANA XL TANK MIXED WITH NEW CHEMISTRY FOR HELIOTHINE CONTROL IN COTTON

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RESEARCH PROBLEM

As Heliothine resistance to pyrethroid insecticides becomes more common, cotton producers are constantly searching for economic pest-management options while utilizing the latest technology. This experiment was conducted to evaluate the efficacy of Asana XL, a pyrethroid, when tank mixed with newer, non-pyrethroid insecticides for Heliothine control in cotton.

BACKGROUND INFORMATION

Resistance of the Heliothis complex to several pyrethroid insecticides has been evident over the past several years. Many states throughout the mid-South have documented tobacco budworm (*Heliothis virescens*) and cotton bollworm (*Heliocoverpa zea*) resistance to this class of insecticides (Payne et al., 2001; Williams, 1999; Brown et al., 1998; Bagwell et al., 1996; Wall, 1994; Abd-Elghafar et al., 1993; Ernst and Dittrich, 1992). In Arkansas, critical levels of tobacco budworm resistance to certain pyrethroid and organophosphate compounds have been observed over the past few years while signs of cotton bollworm resistance are becoming apparent (Williams, 1999; Wall, 1994).

A direct result of pyrethroid resistance has been the development of several effective non-pyrethroid insecticides including Tracer, Steward, Denim, and Intrepid; however, these products may be more costly when compared to some traditional pyrethroids. In addition to these options, other pyrethroid insecticides, specifically Asana XL, have maintained acceptable control levels in areas with little or no resistance due to insecticide management recommendations. Previous research has indicated reduced

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rates of S-1812 and Steward tank mixed with Asana XL has provided equal Heliothine control when compared to labeled rates of the products (Hopkins et al., 2001; Reaper et al., 2001).

The objective of this experiment was to observe the tank-mix efficacy of Asana XL with reduced rates of newer insecticides in addition to comparing the results with control of the recommended labeled rates.

RESEARCH DESCRIPTION

This trial was conducted on the Chuck Hooker Farm in Jefferson County Arkansas, in 2001. The treatments observed are listed in Table 1. Delta Pine 425R was sown on 30 April in small plots (eight 38-inch rows x 50 ft) arranged in a randomized complete block design with 4 replications. Insecticide treatments were initiated based on state recommendations of one Heliothine damaged square per row foot with eggs and small larvae present. Applications were made with a John Deere 6000 hi-cycle sprayer equipped with a compressed air delivery system. The boom was equipped with conejet TXVS 6 nozzles on 19-inch spacings. Operating pressure was 45 psi with a final spray volume of 8.6 GPA. Treatments were applied as foliar sprays on 11 July, 18 July, and 3 August. Insect counts and damage ratings were made on 16 July (5DAT#1), 23 July (5DAT#2), and 7 August (4DAT#3). Data were collected by randomly examining 50 squares and 50 terminals from the center of each plot for the presence of live larvae and damage. Seasonal averages of percentage square damage and total number of live larvae were calculated from the rating dates. The center two rows of each plot were machine harvested on 25 October (178DAP) and lint yields were determined based on a 36% gin turnout. Data were processed using Agriculture Research Manager Ver. 6.0.1. Analysis of variance was conducted and Duncan's New Multiple Range Test (P=0.05) was used to separate means only when AOV Treatment P(F) was significant at P=0.05.

RESULTS AND DISCUSSION

Populations of tobacco budworm and cotton bollworm were lower than those observed in 2000. Normally, tobacco budworm populations are greater in late July through early August. While this trend held true in 2001 (Table 1), overall pressure was lower than normal.

All treatments observed in this study resulted in fewer damaged squares, total live larvae, and greater lint yield when compared to the untreated control (Table 2). However, no differences in these parameters were observed between Steward, Tracer, Denim, and S-1812 when used alone or in combination with Asana XL. The addition of Asana XL (0.04 lb ai/acre) mixed with a reduced rate of Intrepid (0.10 lb ai/acre) did significantly reduce square damage below that observed for the labeled rate of Intrepid (0.15 lb ai/acre). Although square damage was suppressed with the tank mix, no difference in live larvae or lint yield was observed.

While no differences in total live larvae were observed, Intrepid did produce a lower yield than those observed with the Asana XL, Tracer, Denim, S-1812,and Asana + Tracer tank mix. The higher percentage square damage recorded for the Intrepid treatment more than likely caused this yield decrease.

Lack of significance among treatments indicates satisfactory performance of Asana XL used in combination with reduced rates of newer insecticides. It is important to note that equal levels of Heliothine control were achieved using labeled rates of all insecticides, including Asana XL, with the exception of Intrepid. Heliothine insect populations, particularly for tobacco budworm, were lower in 2001 than those observed in recent years. This fact may have contributed to the performance of the Asana XL treatment.

Many Heliothine control options currently exist for cotton producers in Arkansas. However, strict insecticide management is vital for preventing resistance in all production areas. Combining new compounds with traditional chemistry has, in this study and others, been an effective method of controlling the Heliothine complex. More importantly, a greater number of options are introduced to the producer while helping to manage insect resistance.

PRACTICAL APPLICATION

The increased expense involved with using the newer insecticides is a drawback for growers. Heliothine efficacy with lower rates of the new insecticides tank mixed with a standard pyrethroid may be a more economical approach to Heliothine control in cotton. Low populations of tobacco budworm caused few significant differences among treatments. No differences in square damage, live larvae, or lint yield were observed between Steward, Tracer, Denim, or S-1812 when used alone or at lower rates in combination with Asana XL. Equal levels of Heliothine control where achieved using labeled rates of all insecticides, including Asana XL, with the exception of Intrepid. Lack of significance among treatments indicates satisfactory performance of Asana XL tank mixed with reduced rates of newer insecticides. However, results may vary in years with greater tobacco budworm pressure, a species known to be resistant to pyrethroid insecticides.

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Table 1. Heliothine composition of Jefferson and Lincoln Counties, AR, 2001.

Observation date	Cotton bollworm[z]	Tobacco budworm[z]
6 July	88.90	11.10
13 July	96.87	3.13
20 July	91.74	8.26
27 July	44.33	55.67
3 August	55.88	44.12
10 August	78.66	21.34
17 August	58.42	41.58

[z] Numbers based upon 7-day averages of pheromone traps throughout the counties.

Table 2. Seasonal Heliothine control in cotton with reduced rates of new insecticides tankmixed with a Pyrethroid insecticide.

Treatment	Damaged squares[z]	Total live larvae[z]	Lint yield
(lb ai/acre)	(%)		(lb/acre)
Untreated check	19.14 a[y]	1.70 a	656 c
Asana XL 0.66EC (0.04)	6.00 c	0.43 b	1067 a
Asana XL 0.66EC (0.04) + Steward 1.25SC (0.09)	5.30 c	0.52 b	989 ab
Asana XL 0.66EC (0.04) + Tracer 4SC (0.047)	5.30 c	0.17 b	1069 a
Asana XL 0.66EC (0.04) + Denim 0.16EC (0.0075)	6.16 c	0.25 b	976 ab
Asana XL 0.66EC (0.04) + Intrepid 2F (0.1)	4.20 c	0.60 b	991ab
Asana XL 0.66EC (0.04) + S-1812 35WP (0.1)	4.60 c	0.17 b	1036 ab
Steward 1.25SC (0.104)	4.30 c	0.32 b	921 ab
Tracer 4SC (0.067)	5.40 c	0.43 b	1052 a
Denim 0.16EC (0.015)	6.24 c	0.23 b	1106 a
Intrepid 2F (0.15)	12.26 b	0.40 b	857 b
S-1812 35WP (0.15)	6.84 c	0.17 b	1078 a

[z] Damage based upon samples of 50 squares and 50 terminals per plot.
[y] Means followed by same letter do not significantly differ (P=0.05, Duncan's New MRT).