Williamson County
Result Demonstration Report

Texas Cooperative EXTENSION
The Texas A&M University System

EVALUATION OF NEW INSECTICIDES FOR CONTROL OF BOLLWORM IN THE SOUTHERN BLACKLAND OF TEXAS

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SUMMARY:

The bollworm is an occasional pest in the Southern Blacklands of Texas. However, boll weevil eradication has moved this pest to almost key status in 2003. A trial was initiated at first bloom to evaluate different insecticides for their effectiveness on bollworm. Emamectin benzoate (Denim®), lambda-cyhalothrin (Karate®), emamectin benzoate (Denim®) and profenofos (Curacron®) as a combination and zeta-cypermethrin (Mustang® Max) significantly reduced bollworm numbers, all but Mustang Max® below threshold three days after treatment (3 DAT). However, six days after treatment (6 DAT) only the Denim® and Curacron® mixture was significantly different from the untreated control. Final seed cotton yields were not significantly different but all the treated plots yielded higher than the untreated..

OBJECTIVE:

The bollworm, *Helicoverpa zea* (Boddie) is normally an occasional pest in the Southern Blacklands. Most producers in the area will complete their insecticide applications two weeks before bloom and allow natural enemies to build up to control caterpillar pests.

Boll weevil eradication in the Southern Blacklands may disrupt the system, especially in the first and second full years of eradication. During this period, malathion is sprayed over a large area and many fields will receive multiple applications. The late applications can disrupt natural enemy numbers and movement resulting in caterpillar outbreaks.

The objective of this experiment was to evaluate the effectiveness of recently labeled insecticides in controlling bollworm and measure the impact of these treatments on yield.

MATERIALS AND METHODS:

The experiment was conducted in the eastern part of the state in Williamson County, Texas north of Taylor. The cotton was divided into 4 row X 50 ft plots with three replications in a randomized complete block design. Treatments were made during late bloom (July 31). The treatments are listed in Table 1. Applications were made with a self-propelled CO_2 sprayer equipped with three TX-4 hollow cone nozzles per row calibrated to deliver 10 gpa total volume at 80 psi. The insecticide Centric 40WG @ 1.25 oz/ac was added to each treatment to suppress aphids from flaring. In addition, Activator 90® (0.25% v/v) was added to each treatment.

Table 1. List of insecticides used for control of bollworm. Schernik Farm, Williamson Co., TX. 2003.

Treatment	Rate (lb ai/ac)	Rate (oz. formulation/ac)
Karate® Z 2.08 CS	0.03	1.92
Denim® 0.16 EC	0.01	8.0
Denim® 0.16 EC+Curacron® 8 E	0.007+0.5	6.0+8.0
Mustang® Max 0.8	0.023	3.8
Untreated		

Treatments were evaluated by counting the number of bollworms (eggs, small larvae, medium larvae and large larvae) 10 plant terminals on August 3 and 6.

RESULTS AND DISCUSSION:

Bollworm populations were consistently high throughout the trial and egg deposition was consistent in all the plots with no significant differences (Table 2). Three days after treatment, all the treated plots had significantly lower bollworm numbers than the untreated control (Table 3). However, only the Denim® and Curacron® combination lowered populations below published thresholds.

Five days after treatment, only the Denim® and Curacron® combination had significantly lower bollworm numbers than the untreated although a trend existed for lower numbers in all the treated plots except the Mustang® Max (Table 3). None of the treatments were effective at lowering numbers below threshold levels. Treatment efficacy started to decline in all plots.

Damaged square counts reflect larval counts in the different plots (Table 4). No significant differences were found between yields (Table 5). However, when yields are compared to average number of larvae per ten plants and average percent control, the trend definitely favors higher yields with the better treatments (Table 5).

Table 2. Total number of bollworm eggs per 10 plants. Schernik Farm, Williamson Co., TX. 2003.

Treatment	Rate (lb ai/ac)	Average number/10 Plants		
		7/31	8/3	8/6
Untreated		2.3a**	0.7a	0.0a
Karate® Z 2.08 CS	0.03	1.2a	0.7a	0.3a
Denim® 0.16 EC	0.01	1.7a	1.0a	1.0a
Denim® 0.16 EC+Curacron® 8 E	0.007+0.5	1.8a	1.3a	1.0a
Mustang® Max 0.8	0.023	1.0a	0.3a	0.0a
LSD (P=0.05)		NS	NS	NS
P>F		0.5143	0.5512	0.1739

** Means followed by the same letter do not significantly differ. Plots treated on July 31, 2003.

Table 3. Total number of bollworm larvae per 10 plants. Schernik Farm, Williamson Co., TX. 2003.

Treatment	Rate (lb ai/ac)	Average number/10 Plants (Percent Control*)		
		7/31	8/3	8/6
Untreated		4.3a**	6.3a (0)	4.7a (0)
Karate® Z 2.08 CS	0.03	4.0a	2.0c (63)	3.3ab (0)
Denim® 0.16 EC	0.01	5.0a	2.7bc (53)	3.3ab (10)
Denim® 0.16 EC+Curacron® 8 E	0.007+0.5	4.3a	1.0c (76)	2.0b (12)
Mustang® Max 0.8	0.023	4.3a	4.0b (26)	4.7a (0)
LSD (P=0.10)		NS	1.71	1.34
P>F		0.8143	0.0033	0.0291

*Percent control calculated using Henderson's formula.
** Means followed by the same letter do not significantly differ.
Plots treated on July 31, 2003.

Table 4. Total number of damaged fruit per 20 surveyed. Schernik Farm, Williamson Co., TX. 2003.

Treatment	Rate (lb ai/ac)	Average number/10 Plants		
		7/31	8/3	8/6
Untreated		1.3a**	2.3a	3.7a
Karate® Z 2.08 CS	0.03	1.0a	1.3a	1.0a
Denim® 0.16 EC	0.01	1.4a	1.3a	1.0a
Denim® 0.16 EC+Curacron® 8 E	0.007+0.5	0.7a	1.3a	2.7a
Mustang® Max 0.8	0.023	0.8a	3.0a	1.0a
LSD (P=0.10)		NS	NS	NS
P>F		0.7253	0.4483	0.1739

*Percent control calculated using Henderson's formula.
** Means followed by the same letter do not significantly differ.
Plots treated on July 31, 2003.

Table 5. Average percent control, larvae per 10 plants and yield (lbs seed cotton/ac). Schernik Farm, Williamson Co., TX. 2002.

Treatment	Rate (lb ai/ac)	Larvae/10 Plants	Percent Control	Yield
Untreated		5.1	0	857
Karate® Z 2.08 CS	0.03	3.1	31.5	1295
Denim® 0.16 EC	0.01	3.6	31.5	1424
Denim® 0.16 EC+Curacron® 8 E	0.007+0.5	2.4	44.0	897
Mustang® Max 0.8	0.023	4.3	13.0	959
LSD (P=0.10)				NS
P>F				0.2304

** Means followed by the same letter do not significantly differ.
Plots treated on June 28, 2002.

CONCLUSION:

All the products performed below expectations. The pyrethroids (Karate® and Mustang® Max) should have provided well above 80% control. The effectiveness of the Denim® and Denim®

and Curacron® mixture may indicate that tobacco budworms were present but traps did not indicate a significant population at the time.

This trial shows the importance of knowing which caterpillar pests are prevalent in the field. A producer could choose the wrong product or use a rate that is not adequate for the pest population. The trial yields also show the ability of cotton to compensate for larval damage and that control tactics are needed only when numbers are well above threshold levels.

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