SUMMARY OF INSECTICIDE PERFORMANCE FOR BOLL WEEVIL (*ANTHONOMUS GRANDIS*) CONTROL IN ARKANSAS COTTON

L. M. Page, D. R. Johnson, M. P. Maret and S. R. Amaden
Cooperative Extension Service
University of Arkansas
Little Rock, AR

Abstract

Organophosphates, pyrethroids, tank mixes, and other insecticides were compared for efficacy against the boll weevil in Lonoke county, Arkansas over a nine year period. Results from all of these tests have been compiled and summarized to show each treatment's relative performance. Boll weevil control was calculated from damage levels in the treated plots compared to the untreated. Each insecticidal treatment was grouped into one of six categories based upon its chemical makeup. The best performing groups included: fipronil (Regent), averaging 64 percent control; pyrethroids, averagin 65 percent control; and tank mixes, averaging 66 percent control. Other groups included; organophosphates, averaging 36 percent control; endosulfan (Phaser/Thiodan), averaging 45 percent control; and oxymyl (Vydate) averaging about 48 percent control.

Introduction

Boll weevil control has been a major concern of cotton producers in Arkansas. The use of insecticides is presently the only effective means of control, but insecticidal performance varies among products.

Studebaker and Johnson (1991) reported that the pyrethroid insecticides performed well, usually keeping damage levels below 20 percent, while Guthion or azinphosmethyl gave little control. In general, malathion has performed well as a ULV formulation in the boll weevil eradication (Jones et al. 1996), but performed poorly in a water based spray.

The following data is a summary of insecticide field performance from 1989 through 1997.

Methods and Materials

Insecticidal tests for boll weevil control were conducted from 1989 through 1997 in Lonoke county, Arkansas. Insecticidal treatments were started when 10 to 20 percent of squares were damaged by weevil punctures (usually mid-August) and terminated in September. Cotton plots were 12 rows wide by 50 feet long and on 38 foot row spacing. Treatment plots were replicated four times. One row of cotton between each plot was mowed down to suppress migration from plot to plot.

Insecticides were applied with a John Deere Hi-Cycle 6000 equipped with a CO2 mounted spray system with TSX-6 hollow cone nozzles spaced on 19-inch center. Insecticide treatments were applied at approximately 10 GPA and 50 PSI. Insecticide treatments began when damage to squares reached an average of 12-20 percent. Treatments were applied on a three to five day interval and were evaluated by inspecting twenty-five squares in each plot two to three days after treatments were applied. Boll weevil control was calculated from damage levels in the treated compared to the untreated cotton using the Abbot's formula (Abbott, 1925) .

Results and Discussion

Pyrethroids

The pyrethroids were the best performing class of insecticides for boll weevil control (Table 1), averaging 65 percent control of infestations. Of the pyrethroids, Asana XL, Baythroid, Capture, and the new formulation of Karate, Karate Z 2.09, were the most effective for controlling boll weevils.

Baythroid controlled boll weevils well at the most common field rates (0.028 to 0.040 ai/acre), averaging from 74 to 97 percent control. Baythroid at the 0.22 rate was less effective, averaging only 48 percent control.

Capture (0.050 ai/acre) also performed well on boll weevils, averaging 78 percent control. Increasing the rate did not increase boll weevil control.

Control of boll weevils with Asana XL increased with higher rates. Plots sprayed with Asana XL at 0.030, 0.036 and 0.042 ai/acre gave 65, 72, and 89 percent control, respectively.

A new formulation of Karate (Karate Z, 2.09E) had good boll weevil control, averaging 83 percent control. Karate Z should be available to growers this year. Decis, Fury, Karate, and Scout X-tra gave fair boll weevil control (50-65 percent).

Organophospates

In general, organophosphate insecticide performance was fair for boll weevil control (Table 2), averaging 36 percent control. The best organophosphate treatments were Bidrin (0.5 ai/acre), Guthion (0.5 ai/acre), Penncap M (0.5 ai/acre), and Cythion RTU (0.8 ai/acre), which averaged 62, 52, 50, and 48 percent boll weevil control, respectively.

Oxymyl, Endosulfan, and Fipronil

Regent (a fipronil) provided good boll weevil control (averaged up to 67 percent). Vydate and Phaser/Thiodan

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:1168-1169 (1999)
National Cotton Council, Memphis TN

(Oxymyl and endosulfan) gave fair control with 48 and 45 percent control (Table 3).

Tank Mixes

Combining insecticide products in a tank mix usually provided very good boll weevil control (Table 4). Insecticides applied as tank mixes averaged 66 percent control overall. In general, tank mixes had similar or better control levels than pyrethroids. In particular, tank mixes Scout X-tra with Vydate, Karate with Vydate, Decis with Thiodan, and Asana with Vydate showed improved control (averaging 75 to 93 percent control) than the tank mix partner used by itself.

References

Abbott, W.S. 1925. Method of computing the effectiveness of an insecticide. Journal of Economic Entomology 18:265-267.

Jones, R.G., D.A. Walfenbarger, and O. El-lissy. 1996. Malathion ULV rate studies under boll weevil eradication program field conditions. Procedings Beltwide Cotton Conferences pp. 717-719.

Studebaker, G.E. and D.R. Johnson. 1991. Management of boll weevil using insecticide combinations. Procedings Beltwide Cotton Conferences pp. 774.

Table 1. Pyrethroid insecticide control of the boll weevil. Rate = pounds of active ingredient per acre. Trls = number of trials.

Trade Name	Common Name	Rate	Trls	Percent Control
Asana XL 0.66E	esfenvalerate	0.030	6	**65.0**
		0.036	2	**71.8**
		0.042	1	**79.4**
Baythroid 2E	cyfluthrin	0.022	2	**47.5**
		0.025	1	**74.4**
		0.028	7	**81.4**
		0.030	2	**74.2**
		0.040	1	**86.7**
Capture 2E	bifenthrin	0.050	1	**78.0**
		0.060	1	**74.2**
Decis 1.5 E	deltamethrin	0.020	4	**54.0**
Fury 1.5E	zeta-cypermethrin	0.038	4	**56.9**
Karate 1E	lambda-cyhalothrin	0.025	7	**62.5**
		0.028	2	**63.5**
		0.030	1	**58.4**
		0.033	2	**64.4**
Karate Z 2.09E	lambda- cyhalothrin	0.025	2	**83.0**
Scout X-tra 0.9E	tralomethrin	0.018	3	**50.4**
		0.020	1	**61.0**
		0.024	4	**61.7**
	All pyrethroids			**64.7**

Table 2. Organophosphate insecticide control of the boll weevil. Rate = pounds of active ingredient per acre. Trls = number of trials.

Trade Name	Common Name	Rate	Trls	Percent Control
Cythion RTU	malathion	0.80	1	**47.6**
Guthion 2E	azinphosmethyl	0.25	8	**24.5**
		0.38	1	**41.0**
		0.50	1	**51.6**
Imidan 50WP	phosmet	0.05	1	**25.2**
		0.075	1	**3.3**
		1.00	1	**25.1**
Methyl Parathion 4E	methyl parathion	0.50	2	**34.5**
Penncap M 2E	methyl parathion	0.25	4	**33.7**
		0.35	1	**44.6**
		0.50	2	**50.4**
Bidrin 8E	dicrotophos	0.50	2	**62.4**
	All organophosphates			**36.0**

Table 3. Oxamyl, endosulfan and fipronil control of the boll weevil. Rate = pounds of active ingredient per acre. Trls = number of trials.

Trade Name	Common Name	Rate	Trls	Percent Control
Vydate CLV 3.77	oxamyl	0.25	2	**42.0**
		0.50	2	**53.6**
	All Oxamyls			**47.8**
Phaser/Thiodan 3E	endosulfan	0.2	1	**45.0**
		0.3	1	**39.7**
		0.5	1	**50.7**
	All Endosulfans			**45.2**
Regent 80WG	fipronil	0.0	1	**66.8**
		0.0	1	**62.1**
Regent 2.5E	fipronil	0.0	1	**64.7**
		0.0	1	**60.9**
	All fipronils			**63.6**

Table 4. Tank mix insecticide control of the boll weevil. Rate = pounds of active ingredient per acre. Trls = number of trials.

Trade Name	Common Name	Rate	Trls	Percent Control
Methyl Parathion 2E	methyl-	0.250	2	**49.0**
Thiodan 3E	endosulfan	0.375		
Scout X-tra 0.9E	tralomethrin	0.900	1	**76.5**
Vydate CLV 3.77E	oxamyl	0.250		
Baythroid 2E	cyfluthrin	0.028	1	**83.2**
Guthion 2L	azinphosmet	0.025		
Karate1E	lambda-cyhalothrin	0.025	1	**81.1**
Vydate CLV 3.77E	oxamyl	0.250		
Asana XL .66	esfenvalerate	0.030	1	**74.5**
Vydate CLV 3.77E	oxamyl	0.250		
Decis 1.5E	deltamethrin	0.023	1	**92.2**
Phaser/Thiodan 3E	endosulfan	0.500		
Ammo 2.5E	cypermethri	0.060	1	**69.3**
Methyl Parathion 2E	methyl	0.250		
Thiodan 3E	endosulfan	0.375		
Orthene 90SP	acephate	0.500	2	**47.7**
Vydate CLV 3.77E	oxamyl	0.250		
All combination insecticide treatments				**66.3**