

EFFECTS OF ULV MALATHION USED IN BOLL WEEVIL ERADICATION ON TARNISHED PLANT BUG

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RESEARCH PROBLEM

Growers and consultants in active Boll Weevil Eradication Zones have communicated a desire to know the effects of the ULV malathion sprays used in the program on tarnished plant bugs.

BACKGROUND INFORMATION

Malathion ULV has been used in boll weevil eradication for many years. The primary objective of these sprays is eradication of the boll weevil, but the sprays have impacts on other insects in the cotton field as well. Layton and coworkers (1999) reported on the coincidental control of tarnished plant bug in mid-South eradication programs and the effects of the malathion ULV sprays in reducing plant bug-associated yield losses. They did not, however, quantify the degree of tarnished plant bug control that these sprays might provide. Snodgrass and Elzen (1995) reported tarnished plant bug resistance to organophosphate insecticides and other classes of insecticides. In subsequent studies, Snodgrass and Scott (personal communication) have shown that mid-South populations of tarnished plant bugs are resistant to ULV malathion. This study was conducted to provide information on the degree of tarnished plant bug reduction that occurs following ULV malathion applications for boll weevil eradication.

RESEARCH DESCRIPTION

The study was conducted on two fields in which other studies on insect control in cotton were being conducted, and data on tarnished plant bug population levels were being collected on a regular basis. The untreated control plots in these studies were used for these comparisons, before and after the application of ULV malathion to the whole fields as a part of the fall diapause control phase in the first year of eradication. Experimental fields 1 and 2 consisted of Stoneville 474 planted on 1 June 1999. Mist blower sprays were applied to field borders at a rate of 16 oz/acre on 9 August, 16 August, 23 August, 30 August, 6 September, 13 September, 20 September, 27 September, 4 October, 16 October, and 19 October 1999. Aerial ULV malathion applications were made at a rate of 10 oz/acre on 16 August, 23 August, 30 August, 6 September, 14 September and 22 September 1999. Tarnished plant bug counts were taken by counting

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the number of nymphs and adults per 100 terminals, 100 squares, and 100 bolls per treatment (25 per plot with treatments replicated four times) on each sampling date. Plots were 4 rows by 40 ft long and randomly located within fields.

RESULTS

The results of this study are shown in Table 1. In Field 1, plant bug populations dropped strongly after the initiation of aerial ULV malathion treatments. Populations declined 41 to 73% as compared with levels present before aerial ULV malathion spraying was begun. In Field 2, tarnished plant bug populations declined slowly. Populations declined after the first aerial application by about 14% as compared to levels present on the day spraying began. After two aerial applications (on 30 August), populations were 5% higher than were present before treatment. It was not until after the third aerial ULV malathion treatment that tarnished plant bug populations declined strongly. Populations were 62% lower after the third application than when applications began.

PRACTICAL APPLICATION

The data presented indicate that growers and consultants might expect to see tarnished plant bug populations decrease somewhat after ULV malathion treatments. Population reductions of about 50% would be expected. However, the data indicate that population decreases in some areas may not occur until two or three aerial ULV malathion applications have been made. Wolfenbarger and coworkers (unpublished) have shown that malathion concentration on cotton leaves increases with sequential aerial ULV malathion applications, supporting the observation that tarnished plant bug populations may not reach their lowest levels until two or three applications have been made. As malathion is used repeatedly in boll weevil eradication, increased resistance levels and reduced efficacy against tarnished plant bugs is expected.

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LITERATURE CITED

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Table 1. Tarnished plant bug counts during ULV malathion treatments^{z,y} for boll weevil eradication. Rohwer, AR, 1999.

Date	Adults	Nymphs	Total
Field 1			
12 August	14.4	5.2	19.6
19 August	3.2	2.0	5.2
28 August	6.4	5.2	11.6
2 September	1.2	4.0	5.2
Field 2			
16 August	2.4	12.4	14.8
20 August	6.4	6.4	12.8
30 August	7.2	8.4	15.6
3 September	1.4	4.4	5.6

^z Aerial sprays: 16 August, 23 August, 30 August, 6 September, 14 September, and 22 September 1999.

^y Mist blower applications: 9 August, 16 August, 23 August, 30 August, 6 September, 13 September, 20 September, 24 September, 4 October, 16 October, and 19 October 1999.