

**EFFECTS OF ULV MALATHION ON TARNISHED  
PLANT BUG IN ARKANSAS BOLL WEEVIL  
ERADICATION PROGRAM**

**Charles T. Allen and Marwan S. Kharboulfi  
Arkansas Cooperative Extension Service  
Monticello, AR**

**Abstract**

ULV malathion applications appear to cause reductions of about 50 percent in tarnished plant bug populations, but require 2-3 applications to consistently achieve that level of suppression.

**Introduction**

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 co-workers (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 (1999) have shown that Mid-South populations of tarnished plant bugs are resistant to ULV malathion. This study was conducted in order to provide information on the degree of tarnished plant bug reduction which occurs following ULV malathion applications for boll weevil eradication.

**Methods and Materials**

This study was conducted on 2 fields in which other studies on insect control in cotton were being conducted and data on tarnished plant bug population levels was 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 were Stoneville 474 planted on 6-1-99. Mist blower sprays were applied to field borders at a rate of 16 ounces/acre on 8-9, 8-16, 8-23, 8-30, 9-6, 9-13, 9-20, 9-27, 10-4, 10-16 and 10-19-99. Aerial ULV malathion applications were made at a rate of 10 ounces/acre on 8-16, 8-23, 8-30, 9-6, 9-14, and 9-22-99.

Tarnished plant bug counts were taken by counting the number of nymphs and adults per 100 terminals, 100 squares and 100 bolls per treatment (25 of each per plot with plots replicated 4 times per field) on each sampling date. Plots were 4 rows by 40 feet 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 percent as compared with levels present before aerial ULV malathion spraying was begun.

In Field 2, the tarnished plant bug population decline occurred more slowly. Populations declined after the first aerial application by about 14 percent as compared to levels present on the day spraying began. After two aerial applications (on 8-30), populations were five percent 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 percent lower after the third application than when applications began.

**Conclusions**

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 percent would be expected. However, the data indicate that population decreases in some areas may not occur until 2 or 3 aerial ULV malathion applications have been made. Wolfenbarger and coworkers (2000) 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 2 or 3 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.

**Summary**

Aerial ULV malathion applications do appear to reduce tarnished plant bug populations, but more than one application may be required to obtain population reductions. High levels of tarnished plant bug control should not be expected from ULV malathion sprays.

### Acknowledgments

The authors wish to thank Chuck Capps, Larry Earnest, Sheila Willis, Fran Tomerlin, Miranda Greer, Cori Treat, Cari Russell, Amy Gibson, and the Arkansas Boll Weevil Eradication Program for their work and cooperation in conducting this study.

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Table 1. Tarnished plant bug counts during ULV malathion treatments<sup>1</sup> for boll weevil eradication. Rohwer, AR. 1999.

Field 1			
Date	Adults	Nymphs	Total
8-12	14.4	5.2	19.6
8-19	3.2	2.0	5.2
8-28	6.4	5.2	11.6
9-2	1.2	4.0	5.2

  

Field 2			
Date	Adults	Nymphs	Total
8-16	2.4	12.4	14.8
8-20	6.4	6.4	12.8
8-30	7.2	8.4	15.6
9-3	1.4	4.4	5.6

<sup>1</sup>Aerial sprays: 8-16, 8-23, 8-30, 9-6, 9-14 and 9-22-99.

Mist blower applications: 8-9, 8-16, 8-23, 8-30, 9-6, 9-13, 9-20, 9-27, 10-4, 10-16 and 10-19-99.