

# **CHEMICAL CONTROL OF WALNUT HUSK FLY - 2008**

W.W. Coates, R.A. Van Steenwyk, and C.A. Evers

## **ABSTRACT**

Excellent seasonal walnut husk fly (WHF) control was achieved with three applications of Assail + Dyne-Amic, Delegate + NuLure, Provado + Dyne-Amic, Baythroid + NuLure, Leverage + Dyne-Amic + NuLure, Provado + Delegate + NuLure + Dyne-Amic, and Assail + Delegate + NuLure + Dyne-Amic. The Delegate + NuLure treatment had numerically higher but statistically insignificant damage when compared to the other effective treatments possibly due to slower insecticidal activity. All treatments were adulticides. No treatments exhibited larvacidal control of WHF. Altacor + NuLure was ineffective for the control of WHF.

## **OBJECTIVES**

The objectives of this research project were:

1. To test new, reduced risk chemical treatments for WHF control.
2. Repeat previous research that indicated Provado might have systemic efficacy for the control of second and third instar WHF larvae.

## **PROCEDURES**

This project was located in a conventional, commercial 'Hartley' walnut orchard near Hollister, CA. A yellow Trece AM (unbaited) trap with an ammonium carbonate "supercharger" was placed in the orchard for monitoring purposes on April 8. It was checked for WHF adults and maintained at approximately one week intervals through September 29.

Treatments were replicated four times in a randomized, complete block design with single tree replicates. Foliar sprays were applied with a handgun orchard sprayer operating at 300 psi with a finished spray volume of approximately 250 gallons/acre. Treatments were applied at trap capture increase (July 2) and repeated twice at three week intervals (July 22, August 12). The treatments are shown in Table 1.

Twenty-five nuts per replicate were examined on September 2, September 18 and September 27 on the tree for external signs of WHF larval infestation. All nuts with external signs of WHF infestation were removed from the tree and dissected in the laboratory. The number of nuts with larvae and the larval instar were recorded. WHF damaged nuts in which larvae had already exited were also recorded. These results are shown in Table 1.

## **RESULTS**

Trap catches are shown in Figure 1. The first WHF adult flies were caught in the monitoring trap on June 23 and began to rise by July 2 (the first spray timing) at which time the trap catches were 4 flies/trap/day (F/T/D). The adult WHF population then decreased slightly but began increasing

again by the timing of the second spray on July 22. The population then increased to a peak trap count of 51 F/T/D on August 14 coinciding with the third spray (August 12). The fly population then dropped to 10 F/T/D on August 26 before reaching a peak trap count of 74 F/T/D on August 29. Trap counts on August 7, 14 and 29 were near trap saturation. Drops in trap counts following spraying were probably due to the suppressive effects of the experimental materials despite the trap being placed in an untreated tree. Adult suppression was ephemeral as flies redistributed themselves among the trees rapidly.

At the time of the first evaluation on September 2, WHF larval infestation was significantly reduced in all treatments when compared to the untreated control except Altacor + NuLure (Table 1). Altacor + NuLure was numerically higher than the untreated control, but it was not significantly different from the untreated control. Provado + Dyne-Amic had significantly higher infestation when compared to the Assail + Dyne-Amic, Baythroid + NuLure, Leverage + Dyne-Amic + NuLure and Assail + Delegate + NuLure + Dyne-Amic treatments. At the September 2 evaluation, most larvae were 2<sup>nd</sup> or 3<sup>rd</sup> instar with a few 1<sup>st</sup> instar larvae and some nuts where the larvae had exited. There were few ovipositional punctures or eggs among the treatments and there was no significant difference among treatments. This data is not included.

At the second evaluation on September 18, WHF larval infestation was again significantly reduced in all treatments when compared to the untreated control except for the Altacor + NuLure treatment. The Delegate + NuLure treatment had significantly higher infestation when compared to Assail + Delegate + NuLure + Dyne-Amic but was not significantly different than other treatment materials at this evaluation except for Altacor + NuLure. The infestation at the second evaluation was mostly 2<sup>nd</sup> and 3<sup>rd</sup> instar larvae as well as nuts where the larvae had exited with a few 1<sup>st</sup> instar larvae.

At the third larval evaluation on September 27, WHF larval infestation was significantly higher for Altacor + NuLure compared to all other treatments including the untreated control. Larval infestation was significantly reduced in all other experimental treatments when compared to the untreated control. There was no significant difference in larval infestation among the experimental treatments except Altacor + NuLure. Delegate + NuLure had a numerically higher larval infestation compared to other experimental treatments, but not significantly higher. At the third evaluation, the infestation was mostly 3<sup>rd</sup> instar larvae and nuts where the larvae had exited with a few 1<sup>st</sup> or 2<sup>nd</sup> instar larvae.

## **DISCUSSION**

Excellent WHF control was achieved by all experimental materials except Altacor + NuLure. NuLure is a feeding stimulant. Flies probably congregated on the Altacor treatment because of the NuLure but were not killed by the Altacor. It is speculated that that if an untreated control had been sprayed with NuLure alone then the infestation in the untreated control would have been higher and not significantly different than Altacor + NuLure.

The elevated infestation in the Delegate + NuLure treatment may be the result of the slow insecticidal activity of the product. The flies must feed on the material and once ingested, a longer period is required before fly mortality as compared to the Assail, Baythroid or Provado.

This would allow some WHF adults to oviposit before intoxication and death. Laboratory studies have shown that Delegate is highly toxic to WHF at a very low concentration once the adults feed on the material.

This study did not show larvacidal activity by Provado or Assail as had been shown in a previous project<sup>1</sup>. Altacor is not registered on walnut at this time but registration is expected within one or two years. All other insecticides used in this study are registered for use on walnuts. Leverage is a combination of Baythroid and Provado.

## **REFERENCES**

1. Coates, William W. and Robert A. Van Steenwyk. 1998. Evaluation of selected insecticides for walnut husk fly control - 1997. Walnut Research Reports 1997: 191-195. Walnut Marketing Board, Sacramento. CA.

**TABLE 1: WALNUT HUSK FLY CHEMICAL CONTROL, 2008, HOLLISTER, CA  
TREATMENTS, RATES AND MEAN<sup>a</sup> PERCENT WHF-INFESTED NUTS BY LARVAL INSTAR**

Treatment	Rate form/ac	Mean <sup>a</sup> Percent Infested nuts				
		1 <sup>st</sup>	2nd	3rd	Exit	Total
<b>September 2</b>						
1)Assail 30SG Dyne-Amic	8.0 oz 0.25% V/V	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
2)Delegate 25WG NuLure	3.2 oz 3 pt	0.0 a	1.0 a	7.0 bc	0.0 a	8.0 ab
3)Provado 1.6F Dyne-Amic	7.0 oz 0.25% V/V	1.0 a	7.0 bc	4.0 ab	0.0 a	12.0 b
4)Baythroid XL NuLure	2.8 oz 3 pt	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
5)Altacor 35WDG NuLure	4.0 oz 3 pt	5.0 b	12.0 cd	10.0 c	2.0 b	29.0 c
6)Leverage Dyne-Amic NuLure	5.1 oz 0.25% V/V 3 pt	0.0 a	1.0 a	0.0 a	0.0 a	1.0 a
7)Provado 1.6F Delegate 25WG NuLure Dyne-Amic	7.0 oz 3.2 oz 3 pt	1.0 a	2.0 a	1.0 a	0.0 a	4.0 ab
8)Assail 30SG Delegate 25WG NuLure Dyne-Amic	8.0 oz 3.2 oz 3 pt 0.25% V/V	0.0 a	1.0 a	1.0 a	0.0 a	2.0 a
9)Untreated		1.0 a	15.0 d	7.0 bc	1.0 ab	24.0 c
<b>September 18</b>						
1)Assail 30SG Dyne-Amic	8.0 oz 0.25% V/V	3.0 b	1.0 a	1.0 a	0.0 a	5.0 ab
2)Delegate 25WG NuLure	3.2 oz 3 pt	1.0 ab	1.0 a	10.0 b	5.0 ab	17.0 b
3)Provado 1.6F Dyne-Amic	7.0 oz 0.25% V/V	1.0 ab	0.0 a	2.0 a	3.0 a	6.0 ab
4)Baythroid XL NuLure	2.8 oz 3 pt	0.0 a	1.0 a	1.0 a	6.0 ab	8.0 ab

5)Altacor 35WDG NuLure	4.0 oz 3 pt	0.0 a	4.0 a	24.0 c	14.0 c	42.0 c
6)Leverage Dyne-Amic NuLure	5.1 oz 0.25% V/V 3 pt	1.0 a	0.0 a	2.0 ab	2.0 a	5.0 ab
7)Provado 1.6F Delegate 25WG NuLure Dyne-Amic	7.0 oz 3.2 oz 3 pt 0.25% V/V	2.0 ab	0.0 a	1.0 a	4.0 a	7.0 ab
8)Assail 30SG Delegate 25WG NuLure Dyne-Amic	8.0 oz 3.2 oz 3 pt 0.25% V/V	0.0 a	0.0 a	0.0 a	1.0 a	1.0 a
9)Untreated		2.0 a	4.0 d	13.0 b	11.0 bc	30.0 c

**September 27**

1)Assail 30SG Dyne-Amic	8.0 oz 0.25% V/V	0.0 a	0.0 a	1.0 a	3.0 a	4.0 a
2)Delegate 25WG NuLure	3.2 oz 3 pt	0.0 a	1.0 a	6.0 ab	10.0 a	17.0 a
3)Provado 1.6F Dyne-Amic	7.0 oz 0.25% V/V	0.0 a	0.0 a	0.0 a	4.0 a	4.0 a
4)Baythroid XL NuLure	2.8 oz 3 pt	0.0 a	0.0 a	1.0 a	2.0 a	3.0 a
5)Altacor 35WDG NuLure	4.0 oz 3 pt	0.0 a	2.0 a	18.0 c	35.0 b	55.0 c
6)Leverage Dyne-Amic NuLure	5.1 oz 0.25% V/V 3 pt	1.0 ab	1.0 a	1.0 a	2.0 a	5.0 a
7)Provado 1.6F Delegate 25WG NuLure Dyne-Amic	7.0 oz 3.2 oz 3 pt	0.0 a	1.0 a	3.0 ab	9.0 a	13.0 ab
8)Assail 30SG Delegate 25WG NuLure Dyne-Amic	8.0 oz 3.2 oz 3 pt 0.25% V/V	1.0 ab	0.0 a	0.0 a	1.0 a	2.0 a
9)Untreated		2.0 b	2.0 a	9.0 b	24.0 bc	37.0 b

<sup>a</sup> Means followed by the same letter within a column within a specific date are not significantly different (Fisher's protected LSD,  $P \leq 0.05$ )

**Fig. 1 Seasonal Flight Activity of Walnut Husk Fly  
in Walnuts, Hollister, CA 2008**

