EVALUATION OF INSECTICIDES FOR WALNUT HUSK FLY MANAGEMENT – 2014

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ABSTRACT

Five insecticides for the management of adult walnut husk fly (WHF) populations were tested in 2014. The test orchard for this trial was a 'Hartley' orchard just south of Hollister, CA. Walnut husk fly adult fly emergence began in late May. Insecticides were applied on June 24, about one week after the beginning of a significant WHF flight. Sprays were repeated at about three week intervals (July 16, August 8) for a total of three sprays. Assail, Danitol + Belay and Leverage 360 provided excellent control of WHF adults. Athena provided moderate control of WHF adults. Malathion provided little or no control of WHF adults. All treatments had the addition of NuLure Insect Bait and Exit adjuvant. The test orchard had a very high WHF population with 47.4% damage to the treated control at harvest.

OBJECTIVES

The objective of this project was to continue testing new products or combinations of older products for WHF management in comparison to existing standard insecticides. This may provide more efficacious products, provide alternatives to existing products if pesticide registrations are lost or products are discontinued and to test new classes of chemicals if resistance to existing pesticides develops.

SIGNIFICANT FINDINGS

1. Assail, Danitol + Belay, and Leverage 360 provided excellent control of WHF.
2. Athena provided moderate control of WHF.
3. Malathion provided little or no control of WHF.
4. Research on Malathion needs to be completed documenting possible WHF resistance.

PROCEDURES

This project was conducted in a 'Hartley' walnut orchard just south of Hollister, CA with a known history of severe WHF damage. The WHF population was monitored from late May until commercial harvest in late September with two Trécé AM/NB traps baited with ammonium carbonate in a UC-supercharged lure. The ammonium carbonate and yellow sticky traps were replaced weekly.

Treatments were first applied on June 24 - one week after the first substantial adult fly captures and at about three week intervals (July 16, August 8) thereafter for a total of three applications. Foliar sprays were applied with a hand-gun orchard sprayer operating at 250 psi with a finished spray volume of approximately 300 gallons per acre. There were four single-tree replicates per treatment in a randomized complete block design.

Materials applied consisted of Malathion, Leverage 360 (imidacloprid + β-cyhalothrin), Athena ((bifenthrin + avermectin B1), Danitol (fenpropathrin) + Belay (clothianidin) and Assail (acetamiprid) (Table 1). All treatments as well as the water-treated check had the addition of NuLure Insect Bait and Exit adjuvant.

WHF damage was evaluated by visual examination of 125 nuts per replicate on the tree on September 2 just prior to commercial harvest but after any appearance of new "stings" or egg-laying punctures. All of the nuts found to be infested were removed from the tree and dissected to determine larval instar.

RESULTS

WHF adult flies were caught in traps throughout the season but were at a very low level prior to June 18 (Figure 1). The population peaked in mid-July but continued at a fairly high level until the end of trapping. Varietal susceptibility varies with the phenology of the nut and few new stings are likely to occur in September on the 'Hartley' variety.

Infestation of walnuts by 1st, 2nd and 3rd instar larvae were very low at the time of visual examination on September 2. There were no significant differences among treatments. Almost all of the damage was rated as exits – that is, the larvae had already infested the hull and exited to the ground for pupation. For exits, all treatments other than Malathion were significantly better than the treated check. For total damage, all treatments except Malathion were better than the treated check. There was no significant difference in total damage between Malathion and Athena. The high percentage of emerged larvae or exits indicates most of the damage occurred mid-season, typical of the 'Hartley' variety.

DISCUSSION

There were no differences in infestation by 1st, 2nd or 3rd instar WHF larvae between all treatments and the treated check. All experimental treatments except Malathion were significantly lower for exits than the treated check. All experimental treatments had significantly lower total infestation than the treated check except for Malathion. Malathion was significantly worse than all treatments for total infestation except Athena.

Malathion is an organophosphate insecticide. Bifenthrin, fenpropathrin and β-cyhalothrin are pyrethroids. Acetamiprid, Clothianidin and Imidacloprid are neonicotinoids. Avermectin B1 is a bacterial fermentation product. For the last three years of tests, Malathion has underperformed including almost no control in 2014. Malathion may be underperforming due to a much shorter residual compared to other insecticides or due to the development of resistance by WHF. Good control with GF-120 (another insecticide with a shorter residual) in nearby organic orchards with similar spray schedules seems to indicate that the resistance issue should be pursued.

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Figure 1. Mean number of WHF captured per day in Hollister, CA-2014.

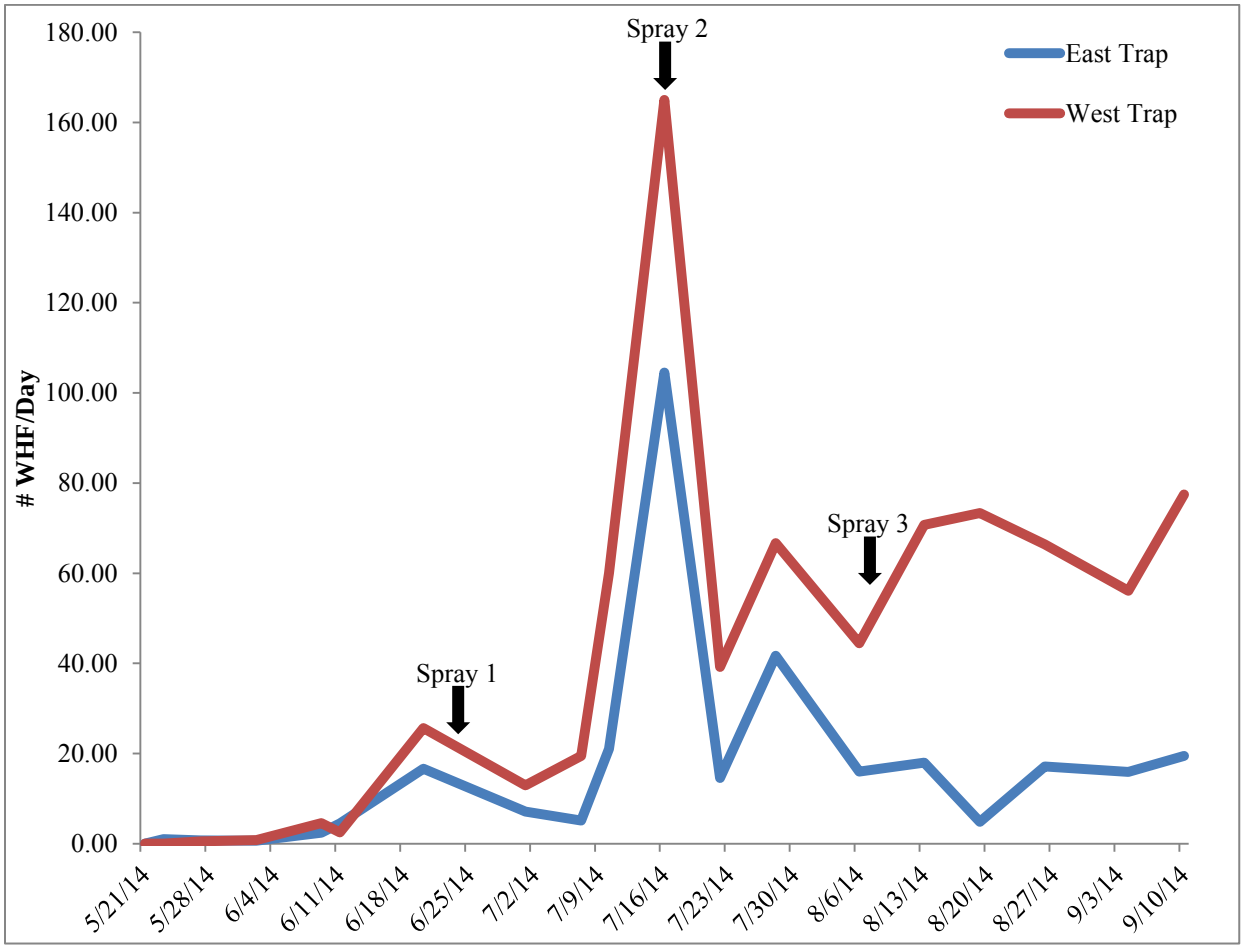

Table 1. Mean percent WHF infested nut by stage in Hollister, CA-2014

Treatment[a]	Rate	Mean[b] percent WHF infested nuts				
		1st Instar	2nd Instar	3rd Instar	Exit	Total
Malathion 57%	64.0 fl. oz	0.0 a	0.0 a	5.2 a	37.2 a	42.4 ab
Leverage 360	2.8 fl. oz	0.0 a	0.2 a	0.7 a	2.9 b	3.2 c
Athena	20.0 fl. oz	0.0 a	0.2 a	1.8 a	13.2 b	15.2 bc
Danitol 2.4 EC + Belay 2.13SC	21.3 fl. oz + 6.0 fl. oz	0.0 a	0.0 a	0.8 a	1.8 b	2.6 c
Grower standard (Assail 30SG)	6.0 fl. oz	0.2 a	0.0 a	0.0 a	2.2 b	2.4 c
Treated check	--	0.2 a	0.4 a	6.2 a	40.6 a	47.4 a

[a] All treatments include NuLure at 48 oz/100 gal and Exit at 0.125% v/v.

[b] Means followed by the same letter in a column were not significantly different (means separated using Fisher's LSD at $P \leq 0.05$).