Efficacy Trials of Registered and Developmental Insecticides Against Navel Orangeworm

Project No.: **07-ENTO8-Haviland/Holtz**

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Objectives:

1. Develop efficacy data for newly-registered and experimental insecticides against navel orangeworm in almonds

Interpretive Summary:

Navel orangeworm continues to be a major pest of harvestable almond nut meats throughout the San Joaquin and Sacramento Valleys of California. In some cases multiple insecticide sprays are applied in addition to sanitation programs to remove overwintering inoculum sources. New materials are being developed and their efficacy should be examined.

During 2007 a total of three insecticide trials were conducted in Kern and Madera counties to evaluate the effects of 19 registered and non-registered insecticides. The first two trials were conducted in a third-leaf almond block near Blackwell's corner, Kern County, with one trial done in the Nonpareil trees and the second completed later in the year in the Montereys. The third trial was conducted in a mature Fritz orchard in

Madera County. All three trials evaluated the same 19 insecticides, and at the same per-acre rates.

To date we have completed all three 2007 trials and will be spending the winter cracking out the nuts required for efficacy evaluations. Data from these trials will be available during the second half of this 2007-8 research project during the spring of 2008.

2006 Madera trial:
In an almond orchard (20ft*24ft tree spacing) in Madera County, rows of the Carmel variety were divided into five replications of 27 treatments in a randomized complete block design insecticide efficacy trial. The hull split treatments were applied on August 10th with a handgun sprayer delivering 150 gallons of spray solution through a 90 disc tip at 200 psi. The sequential treatments were applied on August 23 with the same spray equipment and methods. Samples were taken from the harvestable treatments on September 7. All samples were oven dried to kill the existing NOW larvae and stop damage. Two hundred nuts were randomly selected from each sample and hulled, shelled, and surveyed for NOW damage. Unfortunately, we did not dry the samples initially at a high enough temperature to immediately kill the NOW within our samples, and as a consequence our samples have higher levels of NOW damage than what the grower observed in the field. For instance the grower had 14 % worm damage while our controls had 20 % worm damage. All the treatment sub-samples experienced the same conditions while in the dryer so we don't think that the improper drying compromised the experiment, only elevated the % damage observed.

Table 1 shows the percent infestation by navel orange worm (NOW). The least infestation was exhibited by Imidan 70WP tank-mixed with GWN-1971 and Latron B1956. This treatment while numerically the best was not significantly different from the following treatments: Imidan 70WP at 5.33 lb mixed with Latron B1956, XDE-175 25WG, Warrior mixed with Induce, GWN-1976 mixed with Latron B1956, Baythroid XL mixed with Induce, XDE-175 followed by Intrepid mixed with Latron B1956, Intrepid mixed with Latron B1956, Proclaim mixed with Warrior and Induce, two applications of Novaluron mixed with Silwet, DPX-E2Y45 at 3 or 4 oz mixed with Induce, Imidan 70WP at 2.07 lb mixed with Latron B1956 or Alverde mixed with Silwet ranging from 10.5 to 16.8 percent NOW infestation. The least control was exhibited by Assail 30SC at 5 oz mixed with Dyne-Amic at 33.5 percent infestation.

No	Table 1: Treatment	Timing	product	% NOW infestation
20	Imidan 70WP + GWN-1971 + 1956	Hull Split	4 lb+ 2 oz +12oz/100	10.50 a
18	Imidan 70WP + 1956	Hull Split	5.33 lb + 12 oz/100	11.25 ab
9	XDE-175 25WG	Hull Split	6.4 oz	11.50 ab
23	Warrior w/Zeon 1CS + Induce	Hull Split	3.2 oz + 16 oz	11.80 ab
19	GWM-1976 + 1956	Hull Split	6.2 lb + 12 oz/100	12.10 ab
3	Baythroid XL + Induce	Hull split	2.4 + 16 oz/100	12.60 abc
11 B	XDE-175 25WG Intrepid 2F + 1956	Hull Split HS + 14D	6.4 oz 16 oz + 12 oz/100	13.10 abcd
10	Intrepid 2F + 1956	Hull Split	16 + 12 oz/100	13.30 abcd
25	Proclaim+Warrior w/Zeon1CS + Induce	Hull Split	3.2 oz+3.2 oz + 16 oz	13.40 abcd
16	DPX-E2Y45 35WG + Induce	Hull Split	4 oz + 16 oz/100	13.70 abcd
13 B	Lorsban 4E+ Intrepid 2F + 1956 Lorsban 4E+ Intrepid 2F + 1956	Hull Split HS + 14D	4 pt + 16 +12 oz/100 4 pt + 16 +12 oz/100	14.40 abcde
22	Proclaim 5SG + Induce	Hull Split	4.8 oz + 16 oz	14.40 abcde
24	Proclaim+Warrior w/Zeon1CS + Induce	Hull Split	2.2 oz + 2.6+16 oz	14.40 abcde
7 B	Novaluron 0.83EC + Silwet Novaluron 0.83EC + Silwet	Hull Split HS + 14D	12 oz +2 oz/100 12 oz +2 oz/100	15.63 abcdef
15	DPX-E2Y45 35WG + Induce	Hull Split	3 oz + 16 oz/100	16.10 abcdefg
17	Imidan 70WP + 1956	Hull Split	2.07 lb + 16 oz/100	16.13 abcdefg
1	Alverde + Silwet	Hull split	16 oz +2 oz/100	16.80 abcdefg
14	DPX-E2Y45 35WG + Induce	Hull Split	2 oz + 16 oz/100	17.70 bcdefgh
2 B	Alverde + Silwet Alverde + Silwet	Hull split HS + 14D	16 oz +2 oz/100 16 oz +2 oz/100	17.75 bcdefgh
12	Imidan 70WP + 1956	Hull Split	4.29 lb +12 oz/100	18.70 cdefgh
6 B	Novaluron 0.83EC + Silwet Novaluron 0.83EC + Silwet	Hull Split HS + 14D	9 oz +2 oz/100 9 oz +2 oz/100	19.40 defgh
27	UTC			20.80 efgh
21	Proclaim 5SG+ Induce	Hull Split	3.2 oz + 16 oz	20.80 efgh
4 B	Assail 30SG +Dyne-Amic Assail 30SG +Dyne-Amic	Hull Split HS + 14D	5 oz + 6oz/100 5 oz + 6oz/100	21.75 fgh
26	Omite 6E + Lorsban 4E	Hull Split	2 qt + 1 qt	22.50 gh
8 B	Dimilin 2L + Silwet Dimilin 2L + Silwet	Hull Split HS + 14D	12 oz +2 oz/100 12 oz +2 oz/100	23.90 h
5 B	Assail 30SG + Dyne-Amic Assail 30SG + Dyne-Amic	Hull Split HS + 14D	8 oz + 6oz/100 8 oz + 6oz/100	33.50 i