

Chemical Control/New Products

Evaluation of Insect Growth Regulators for Codling Moth Control in Walnuts

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The trial was conducted in a commercial 'Payne' walnut orchard near Tracy, CA. The orchard was selected because of high codling moth (CM) pressure the previous season. Twelve treatments were replicated four times in a RCB design. Each replicate consisted of an individual tree. Treatments were applied with a hand-held orchard sprayer operating at 300 psi and delivering 400 gal/acre of finished spray (5.7 gal/tree). Application timings were based on degree days (DD). DD were calculated with a 2 Apr biofix for the first generation and 25 Jun biofix for the second generation using a single sine horizontal cutoff model with a lower threshold of 50°F and an upper threshold of 88°F and with air temperature from the San Joaquin County weather station in Tracy. Target application timings were Confirm and Neemix—250 DD from 1st and 2nd biofix and 1250 DD from 2nd biofix; Dimilin—300 DD (combined with Lorsban), 900 and 1900 DD from 1st biofix; Comply and Pyriproxyfen—300 DD (combined with Lorsban or Lorsban alone) from 1st biofix, 100 and 1100 DD from 2nd biofix; and grower standard—300 DD from 1st biofix, 250 and 1250 DD from 2nd biofix.

Control of the overwintering CM generation (first application) was evaluated by inspecting all dropped nuts weekly from 31 May through 7 Jul for CM infestation. Control of the summer generations was evaluated by inspecting 100 nuts/tree at commercial harvest on 18 Sep for CM and navel orangeworm (NOW) infestation.

The trial was conducted in an orchard which had experienced more than 10% CM damage the previous year and the trial should be considered a very rigorous test of the experimental materials. Pheromone trap counts indicated a high CM population during this trial. All insect growth regulators except Lorsban followed by the low rate Comply and both rates of Neemix provided CM control. However, since 4.9% or less total infestation is required for Class 1 walnuts, only Confirm, Comply + Lorsban combination followed by high rate of Comply, Pyriproxyfen + Lorsban combination or Lorsban alone followed by the high rate of Pyriproxyfen gave commercially acceptable control. No walnut aphid or twospotted spider mite flare-ups were observed with any treatment.

**Table 1.**

Treatment	lb (AI)/acre	Mean* no. CM-infested dropped nuts/tree	Mean* percent CM and NOW infested nuts
Confirm 2F + CS-7 (by vol.)	0.25 0.06%	3.3a	0.8a
Dimilin 25WP + Lorsban 4E	0.25 1.0		
Dimilin 25WP	0.25	10.0a	7.0bc
Comply 40WP + Lorsban 4E	0.125 1.0		
Comply 40WP	0.125	10.3a	2.5ab
Lorsban 4E Comply 40WP	2.0 0.094	8.3a	13.8cd
Lorsban 4E Comply 40WP	2.0 0.125	4.8a	6.0bc
Pyriproxyfen 0.83EC + Lorsban 4E	0.066 1.0		
Pyriproxyfen 0.83EC	0.088	6.0a	4.5ab
Lorsban 4E Pyriproxyfen 0.83EC	2.0 0.066	6.5a	7.3bc
Lorsban 4E Pyriproxyfen 0.83EC	2.0 0.088	4.3a	3.5ab
Neemix 0.25%	0.01	25.8b	17.0d
Neemix 0.25%	0.02	30.8b	14.0cd
Lorsban 4E Guthion 50W	2.0 1.5	9.3a	4.8ab
Untreated	--	40.3c	17.0d

\*Means followed by the same letter within a column were not significantly different (Fisher's Protected LSD,  $P \leq 0.05$ ).