Nuts—Chemical Control

Codling Moth in Walnut

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The first flight codling moth (CM), *Cydia pomonella*, is frequently observed to exhibit a bimodal pattern in California. Control of the second peak of the first flight with Diazinon or Lorsban may be justified if the second peak is of sufficient magnitude.

The study was conducted in a mature Serr orchard in Arbuckle, CA. The trees were approximately 30 ft tall and were planted on a 30 ft by 30 ft square (48 trees/acre). Five treatments were replicated 3 times in a randomized complete block design. Each replicate was 8 rows by 8 trees (1.3 acres). The 5 treatments were: Lorsban 4EC at 2.0 lb (AI)/acre applied on April 27, Guthion 50WP at 1.5 lb (AI)/acre applied on April 27, Lorsban 4EC at 2.0 lb (Al)/acre applied on April 27 and May 19, Lorsban 4EC at 2.0 lb (AI)/acre applied on April 27 plus Diazinon 50WP at 3.0 lb (AI)/acre applied on May 19, and an untreated control. The timing of the applications was based on tree and CM phenology. The April 27 application was made at 1/2 inch nut size, or 368 DD, and the May 19 application was made shortly after the second peak of the first flight, or 817 DD. The insecticides were applied with an air blast sprayer operating at 1.7 mph and delivering 50 gal/acre of finished spray.

Adult CM were monitored by four pheromone traps placed in and around the plot. The traps were monitored once a week from March 17 through May 26 for the first CM flight. Control of the first peak was evaluated by counting all CM-infested dropped nuts around the center 4 trees in each plot weekly from May 19 through June 16. Control of the second peak was evaluated by determining the percent CM infestation from 200 nut pairs from the bottom one-third of the 4 center trees in each plot on June 16. Walnut aphids, *Chromaphis juglandicola*, were monitored by inspecting 10 leaflets/tree from the 4 center trees in each plot weekly from June 2 through June 16.

Control of the first peak, as measured by mean number of CM-infested dropped nuts, showed a significant difference between the untreated control and the various insecticide treatments. However, there was no significant difference among the insecticide treatments. The second application on May 19 had some influence on the number of CM-infested dropped nuts. For example, the two applications of Lorsban had 0.9 CM-infested dropped nuts, while a single application of Lorsban had 4.3 CM-infested dropped nuts.

Control of the second peak, as measured by mean percent CM-infested nut pairs, showed a significant difference between the untreated control and the insecticide treatments. In the various insecticide treatments, a single application of Guthion and two applications of Lorsban had significantly lower percent infested nut pairs than did a single application of Lorsban. However, an application of Lorsban followed by a Diazinon treatment did not differ significantly

from the other insecticide treatments. The single application of Guthion, which was successful in controlling CM over the extended bimodal flight period, caused a significant increase in the walnut aphid population.

Table 1. Control of the second peak of the overwintering flight of codling moth, Arbuckle, CA.

1st application	2nd application	Mean no. CM-infested dropped nut/tree	Mean % CM-infested nut pairs	Mean no. aphids/leaflet
Lorsban	Lorsban	0.9a	0.3a	0.9b
Guthion	--	1.8a	0.3a	10.8a
Lorsban	Diazinon	2.9a	1.7ab	0.7b
Lorsban	--	4.3a	5.5b	1.0b
Untreated	--	32.8b	12.5c	1.5b

Means followed by the same letter in a column were not significantly different (P<0.1, Fisher's LSD).

Fig. 1. Pheromone Trap Capture and Application Timing for Control of First Flight Codling Moth in Walnuts, Arbuckle CA, 1992.