

III. Stone Fruits

c. Biological control

1. Oriental Fruit Moth - peaches and nectarines

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Mating disruption trials for OFM were conducted using Shin-Etsu three-month pheromone dispensers at an application rate of 400 dispensers per acre. Pheromone traps were used to monitor the response of male moths to pheromone point sources. Terpinyl acetate bait traps collected female moths for dissection and determination of mating success in the female population. At fruit maturity in each of the trials, a minimum of 2,000 fruit were inspected for infestation by oriental fruit moth. Infestation data was also collected on secondary pests such as peach twig borer and omnivorous leafroller.

OFM mating disruption was continued in two trials at the Kearney Agricultural Center (KAC) at Parlier and three trials at Kingsburg. Results of these five field trials (Table 1) show that the mating disruption treatments were equivalent or better in control of oriental fruit moth compared to untreated checks. None of the five check blocks in the OFM trials in 1987 used insecticides during the season. In the three trials at Kingsburg, the 1987 check blocks had all been treated with pheromones in 1986. Consequently, resident populations in the three check blocks were relatively low compared to surrounding untreated orchards, due to the carry-over influence of the 1986 treatments.

These results confirm the efficacy of mating disruption for control of oriental fruit moth with synthetic pheromones and it is anticipated that use of this technique for OFM control will increase in future years. Infestations of peach twig borer in harvest samples at Kearney (Table 1) showed high levels of twig borer damage in both check blocks, neither of which received dormant sprays. Both of the pheromone treatment blocks at Parlier, however, did receive standard dormant treatments and twig borer damage was held to negligible levels. These data confirm the value of dormant sprays for control of peach twig borer, particularly in orchards that are being treated with pheromones and do not receive in-season sprays for oriental fruit moth. Although higher in several of the pheromone treated blocks, infestations of omnivorous leafroller were not significantly different in check and pheromone treatment blocks in any of the five locations in 1987. OLR populations were not nearly as severe in 1987 in pheromone treatments as they had been observed in previous years. The commercial formulation of oriental fruit moth pheromone (Isomate-M) was approved and registered by EPA and CDFA in February, 1987, for commercial use by growers in California.

Dissections of oriental fruit moth females collected in bait traps at Parlier again showed that mating success in each of the five OFM generations exceeded 90% in check blocks throughout the year with increasing population levels as the season progressed. In the pheromone treated blocks at Parlier (Fields 21 and 72) mating success was less than 50% in the first generation and then began to increase in the second or third generations and approached a high percentage at the end of the season. In each generation, however, mating success in the pheromone treatments was always less than in the

codling moth population to develop to levels too high for the pheromone to control later in the season.

A study was conducted in walnuts in Tulare County to determine at which levels or areas within a tree codling moth is most active. Results of this study confirmed that codling moth, as with other species such as oriental fruit moth, are most prevalent in the upper portions of the tree canopy. This reaffirms the recommendation that pheromone dispensers for mating disruption need to be placed in the upper 1/3 of the canopy in trees of whatever height, if mating disruption is to reach optimum levels.

Table 1. Codling moth mating disruption trials - 1987^{1/}

PLOT	VARIETY	TREATMENT	% Infested Fruit		
			CM	PTB	OLR
Kingsburg	Red Beaut	Check	0.1	0	0.2
		Isomate	0.3	0	0.4
Kingsburg	Santa Rosa	Check	0.2	0	0
		Isomate	0.2	0.1	0
Parlier KAC 52	Friar	Check (1) ^{2/}	0.2	0.5	0
		Isomate	0.6	0.4	0.8
KAC 32 KAC 21	Casselman	Check	27.8	0.2	0
		Isomate	4.4	0	0.4
KAC 32 KAC 21	Casselman	Check	4.4	2.8	0.4
		Isomate	0.6	0.4	0.3
Exeter	Casselman	Check	0.3	0	0.9
		Isomate	0	0	0.2
KAC 22	Apples	Isomate	1.1	-	-
		Isomate (1)	0.2	-	-
Arvin	Apples	Check (5)	0.9	-	-
		Isomate (3)	36.3	-	-

^{1/} BioControl pheromone dispensers; 1 application @ 100/ac, 3/18-23/87.

^{2/} Number of insecticide treatments during season.