

**PEAR PEST MANAGEMENT ALLIANCE PROJECT
FOR THE SACRAMENTO RIVER DISTRICT
2000 Final Report**

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Cooperating Personnel

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Background

The mating disruption practices used in the Pear Pest Management Alliance (PMA) Project in the Sacramento River District are based on methods developed during the period 1993-98 in the Randall Island Project. The primary strategy in this district is to apply pheromone dispensers at the rate prescribed by the manufacturers shortly after the first codling moth (CM) biofix, in combination with reduced applications of organophosphate (OP) insecticides - usually a single application. The goal of the 1999-2000 Pear PMA project in this district was to aid and educate growers who had not yet used mating disruption (MD) in the transition to this program.

Methods

Implementation of mating disruption. Program implementation is similar to that of the Randall Island Project. A total of 13 growers participated in the program and all these growers used mating disruption; five of these growers began using mating disruption in 1999 and eight began in 2000. Twelve of the growers used BioControl's Isomate C+ dispensers at a rate of 400 per acre and one grower used Consep's Checkmate dispensers at a rate of 200 per acre. All dispensers are placed in top third of the tree. An OP insecticide spray was applied at either the "A" or "B" peak of the first codling moth generation.

In four of the orchards in which mating disruption was used in 1999, we established blocks of about 1 to 2 acres in which the growers did not apply Agri-Mek in 2000. Research and grower experience have shown that after about a year of reduced OP usage, beneficial insects are more effective at controlling mites and psylla. We closely monitored these blocks for pest outbreaks.

In addition to the 13 participating growers noted above, at Ryde Hotel we hung Isomate dispensers (purchased by the hotel) using 400 per acre on the intermittent trees, but no insecticides were applied.

The blocks used in this study ranged in size from about 10 to 30 acres, with most in the 20 to 30 acre range. In all cases dispensers were applied at the prescribed rates throughout the entire orchard.

Monitoring of key insects. Codling moth and obliquebanded leafroller (OBLR) populations were monitored using three clusters of traps in each orchard. Each cluster had four traps: one wing trap for each CM lure type (1, 5, and 10 mg) and one for OBLR. Traps with 10 mg lures were used as the primary means of evaluating the codling moth populations. Traps with 1 mg and 5mg lures were used to help determine if the rate of pheromone release from the ties used in the mating disruption declined during the season, such that moths could identify the lower strength lures. OBLR moths were monitored using wing traps with standard lures. A total of 35 sets of traps were placed in the 14 orchards. All traps were hung in the top 2 ft. of the tree, except 1 mg CM traps, which were placed at eye level. Traps were spaced about 100 ft. apart within each cluster of traps and each trap was placed at least 3 ft. from pheromone ties.

The traps were placed at edge and interior portions of the orchard with consideration given to high-pressure areas as previously noted by the grower or the PCA. Nineteen of the trap sites were considered to be edge sites (traps placed within four rows of the orchard edge) with the remaining twelve sites considered interior sites.

The timing for the placement of the traps in the orchards was:

- 1mg traps were set March 8 - 13 in order to detect emergence of over-wintering adults.
- 5mg and 10 mg traps were set April during the first 2 weeks of April, shortly after pheromone ties were hung.
- OBLR traps were placed in mid April.

The lures were replaced according to the following schedule: 1mg (Long-Life) every 10 weeks; 5mg lures every 2 weeks; and 10mg lures (Megalures) every 12 weeks. CM and OBLR traps were monitored weekly from date of placement to July 31 and then twice more before traps were removed on August 21. Weekly monitoring updates were sent to all participating growers and PCAs.

European red mites and pear psylla were monitored several times during the season. In each orchard, 100 leaves from topshoots were examined every 3 weeks from June through early August. On the same schedule, 50 leaves from topshoots and 50 from eye level were brought back to the lab and brushed with a mite brushing machine and examined under a dissecting scope.

Fruit sampling was done during the first week of June at about 1,000 degree-days. A total of 1,000 fruit per orchard were examined (500 each from upper and lower parts of trees) for

evidence of damage by codling moth, leafrollers and green fruitworm. In addition, a further 1,000 fruit per orchard were examined in bins during each harvest.

Meetings and Updates. Weekly updates of trap counts and visual inspections were faxed or mailed to participating growers and PCAs. We held a meeting in March 2000 to share with growers and PCAs information related to the mating disruption program. Invited speakers were Lucia Varela, North Coast IPM Advisor, who discussed the experiences of Mendocino growers with mating disruption; Dr. Robert Van Steenwyk, UC Berkeley Entomology Specialist, who discussed possible spray programs in mating disrupted orchards; and Chuck Ingels, UC Cooperative Extension Farm Advisor, who discussed economics of mating disruption strategies and methods for hanging pheromone ties.

A meeting of growers and pest control advisers was also held in October 2000 to discuss the results of the 2000 season and plans for 2001.

Results

Pheromone and OP Insecticide Usage. Nearly all growers used Isomate C+ dispensers at 400 per acre (Table 1). One grower used CheckMate dispensers at 200 per acre. All of the growers used only one OP application (Table 1). Three of the growers applied Imidan 70-W at the 1A flight, a further nine growers applied Imidan 70-W at the 1B flight and just one grower used Guthion. Imidan was used mainly because of the 14-day restricted entry interval for Guthion. Applying Guthion would have prevented fire blight cutting during this severe fire blight year; the REI was reduced to 48 hrs. in early summer.

Trap Catches and Fruit Damage. The 10mg trap counts indicated an extremely low population in each of the participating grower's orchards (Fig. 1); the counts were somewhat higher at Ryde Hotel. The 5 mg traps caught more moths than the 10 mg (Megalure) traps. Additional research in 2000 showed that Megalure lures catch less than half the number of moths as standard lures. Regardless, 1 mg traps caught almost no moths the entire season; this is the most important finding because it shows that mating disruption is working.

In our June fruit inspections, we found no codling moth damage and only 3 fruit with old green fruitworm damage. Codling moth damage was zero at both harvests in all orchards (Table 2). Despite a few orchards having high OBLR trap catches, fruit damage was generally low. Only two orchards had fairly substantial OBLR damage. A small amount of codling moth damage was found during the early June fruit examination at the Ryde Hotel. The fruit at the Ryde Hotel was not harvested and was not inspected during the harvest period.

Pear psylla and European red mites were near zero through most of the spring and summer. In mid-August we found only 4 psylla nymphs on one topshoot in one orchard in which Agri-Mek was not applied. At the same time, we found European red mites (0.3/leaf) in only one orchard. However, we found twospotted spider mites in two non-Agri-Mek orchards (0.3 and 0.7/leaf) and two orchards in which Agri-Mek was applied (0.2 and 0.6/leaf). In three of the non-Agri-Mek orchards, we also found about 0.1 to 0.2 predatory mites per leaf but far fewer in other orchards.

Mite buildups late in the season are less of a concern than before harvest because of the pre-harvest interval; also, late season mites can usually be taken care of with the dormant oil and delayed dormant Asana applications. It is also encouraging that predatory mites were found.

Table 1. Pheromone and Insecticide Usage for CM and OBLR

Grower	Mating Disruption			CM/OBLR Insecticide		
	Product	Date of Hanging	Rate (ties/A)	Product	Date of Applic.	Rate (lbs./A)
Peter den Hartog - Thornton	Isomate C+	April 6	400	Imidan	June 5	5
Mark Lubich - Cal Bart Orchards	Isomate C+	March 31	400	Guthion	June 3	3
Mark Mamboise - Reid Ranch	Isomate C+	March 24	400	Imidan	May 31	5
Gary Martinez - Pacific Fruit Farms	Isomate C+	April 7	400	Imidan	May 30	5
Malcolm McCormack - Koket Collins	Isomate C+	March 31	400	Imidan	June 3	5
Ed McDowell - McDowell Farms	Isomate C+	April 14	400	Imidan	May 6	6
Beth Robbins - Brown & Kahrs	Isomate C+	April 15	400	Imidan	May 6	6
Walt Silva - Courtland	Isomate C+	March 31	400	Imidan	June 1	5
Judy Smith - Smith Ranch	Checkmate	April 5	200	Imidan	June 1	4
Jeff Trantum - Runyon Ranch	Isomate C+	April 2	400	Imidan	June 6	5
Topper Van Loben Sels - Poldar ranch	Isomate C+	April 10	400	Imidan	June 7	5
Bruce Wilcox - Shop Ranch	Isomate C+	April 21	400	Imidan	May 5	6
Chris Wilcox - Grand Is. Road	Isomate C+	April 5	400	Imidan	May 28	4

Figure 1. Average Number of Codling Moths per Trap, 2000
(All PMA Growers)

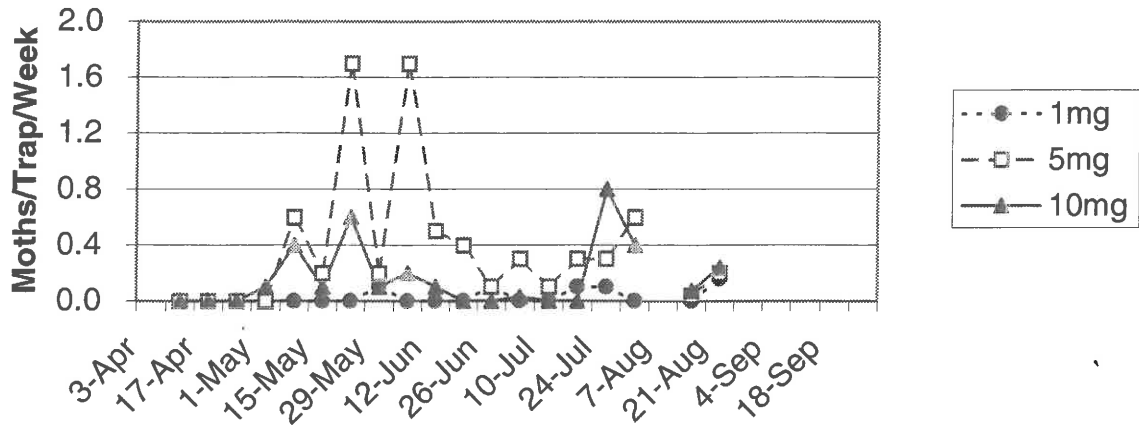


Figure 2. Average Number of OBLR Moths per Trap, 2000
(All PMA Growers)

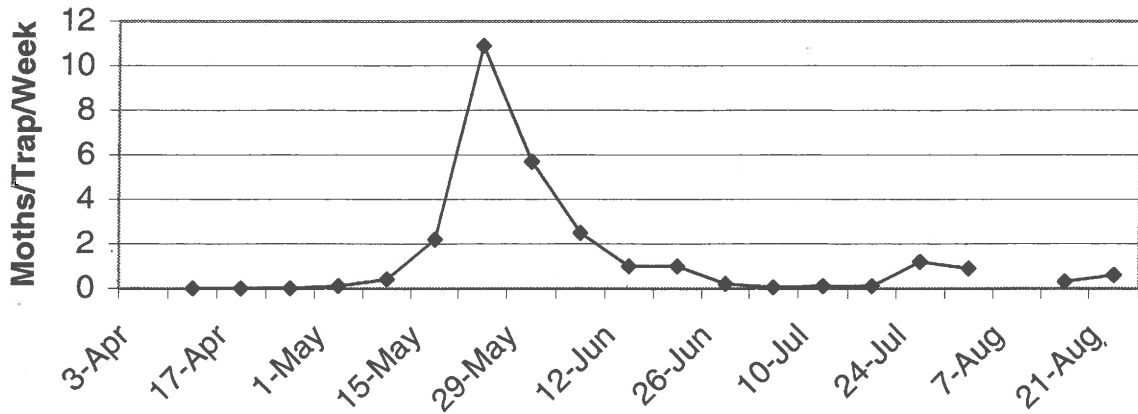


Table 2. Fruit Evaluations at Harvest

		No. of Damaged Fruit/1000					
		First Harvest			Second Harvest		
		CM	GFW	OBLR	CM	GFW	OBLR
Grower	Orchard/Farm	CM	GFW	OBLR	CM	GFW	OBLR
den Hartog	Thornton	0	0	0	0	0	1
Lubich	Cal Bart	1	0	0	3	0	0
Mamboisse	Reid Ranch	One harvest			0	0	0
Martinez	Pacific Fruit Farms	0	0	1	0	0	24
M. McCormack	Koket-Collins	Missed			0	0	0
McDowell	McDowell Farms	0	0	0	0	0	0
Robbins	Brown & Kahrs	One harvest			0	0	0
Silva	Courtland	0	2	2	Field sorted		
Smith	Smith Ranch	0	0	0	Field sorted		
Tranum	Runyon	0	2	1	0	1	0
Van Loben Sels	Poldar	0	4	0	0	3	6
B. Wilcox	WG Shop	0	0	0	0	0	0
C. Wilcox	Grand Island	Missed			0	0	0

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