

## Implementation Programs

### Codling Moth Mating Disruption in Pear Orchards Using the Shorey 'Puffer' Dispenser

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Two areawide mating disruption projects totaling 860 acres were carried out in 1999. These projects were a continuation of the research initiated by Dr. Harry Shorey in 1996. The first site was an expansion of the original test site in Kelseyville, Lake County, from 160 to 500 acres, under the sponsorship of the USDA Codling Moth Areawide Management Program (CAMP). The second site was 360 acres in Potter Valley, Mendocino County, of which 75 acres was certified organic, under sponsorship of the California Dept. of Pesticide Regulation.

Puffer dispensers (Paramount Farming Co., Bakersfield, CA) were hung every 65' around the perimeter of each 40 acre (or less) block at each site. Adjacent blocks or those larger than 40 acres necessitated fewer units per acre. The rate was 1.3 per acre for Kelseyville and 1.8 for Potter Valley. Codlemone was emitted every 15 minutes from 3:00 p.m. to 3:00 a.m. Emission ceased when the ambient temperature dropped below 50°F. Sites were monitored using 1 mg and 10 mg CM traps and OBLRW traps. Egg and damage sampling was done through the season, at harvest, and post-harvest on fruit remaining in the trees. Codling moth trap catches are shown in Tables 1 and 2.

In the 500 acre Kelseyville site, virtually no codling moth damage was found at harvest, versus 29% in the three untreated controls, despite the fact that nearly 70% of puffer-treated blocks received no organophosphates. In Potter Valley, the only codling moth damage occurred along an upwind riparian corridor harboring feral apple trees, borders of standard blocks across from organic orchards, and in the organic orchards themselves. The organic orchards entered the program with high initial pressure, despite using pheromone ties for the past several years. Early season control was further hindered due to the 1) inability to use oil as an insecticide through almost the entire first flight because it was incompatible with lime sulfur used for pear scab and 2) general ineffectiveness of other organically available materials. Harvest damage in organic blocks ranged from 5-12%. While this is commercially unacceptable, damage in the untreated block of organic Bosc just prior to harvest was 31% (Tables 3 and 4).

1999 was a late, cool year; consequently codling moth pressure was relatively low. However, most standard blocks still received three OP treatments and, as stated above, damage to completely untreated sites was quite high, indicating high potential if left untreated. Low to moderate (0.1-6%) levels of obliquebanded leafrollers (OBLR) were found in over 50% of puffer-treated orchards, which is of future concern.

**Table 1.** Total CM/OBLR trap catches<sup>1</sup> April-September 1999, Kelseyville, Lake County.

Trap type	Treatment		
	Puffer (22 blocks)	Grower (2 blocks)	Untreated (3 plots)
CM 1x Low	0	9	47
CM 1x High	2	3	83
CM 10x High	3	3	-
OBLR W/H	2665	55	179 <sup>2</sup>

<sup>1</sup>One trap of each type per 5 acres.

<sup>2</sup>OBLR traps in 2 untreated blocks.

Puffers hung April 9, 1999.

CM biofix April 18, 1999; OBLR biofix May 25, 1999.

**Table 2.** Total CM/OBLR trap catches<sup>1</sup> April-September 1999, Potter Valley, Mendocino County.

Trap type	Block			
	Standard puffer (10 plots)	Organic puffer (5 plots)	Grower (1 plot)	Control (2 plots)
CM 1x LOW	6	12	2	110
CM 1x HIGH	16	59	7	0
CM 10x HIGH	44	40	3	13
OBLR W/H	2147	835	71	12

<sup>1</sup>One trap of each type per 5 acres.

Puffers hung week of April 5, 1999.

CM biofix April 21, 1999; OBLR biofix May 26, 1999.

**Table 3.** Percent codling moth damage in bins 1996-1999, Kelseyville, Lake County.

Treatment	1996	1997	1998	1999
PUFFER				
upwind	1.0	2.3	0.0	0.03
mid	-	-	-	0.01
downwind	0.0	0.05	0.0	0.0
PUFFER+OP				
upwind	0.0	0.03	0.0	-
downwind	0.0	0.0	0.0	-
GROWER	0.0	0.1	0.0	0.0
UNTREATED	-	7.4*	21.3*	13.4*

\*Average Stage and Quercus Seven Acres; Gold Dust untreated omitted.

**Table 4.** Percent codling moth damage 1999 -Potter Valley, Mendocino County.

Treatment	Sample type	
	Pre-harvest tree	Bin
PUFFER		
standard	0.1	0.3
organic	5.2	5.3
Standard grower control	0.0	0.0
Organic grower control	30.7	-
Untreated control (apples)	20.0	-