

## Implementation Programs

### Howard Flat CAMP Site Update—1997

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*Keywords:* codling moth, *Cydia pomonella*, pandemis leafroller, obliquebanded leafroller, CAMP, apple

### **Project Area Description and Participation**

Howard Flat is one of five original Codling Moth Areawide Management Project (CAMP) sites in the western United States. In 1995, 34 of the 36 growers on Howard Flat participated in the CAMP, representing 1,035 acres. In 1996, 35 of 36 growers opted to participate in the CAMP, representing 1,092 acres; and in 1997 there was 100% grower cooperation with the project totaling 1,100 acres. Also in 1997, a new area was added to the original CAMP site, referred to as the Chelan River CAMP site. This new area totaled 650 acres and involved 27 growers.

### **Codling Moth**

Codling moth, *Cydia pomonella* L., activity was monitored using pheromone traps baited with 10 mg lures placed at an average density of one trap for every 2.5 acres. In 1997, 483 traps were placed at Howard Flat and 260 at Chelan River. Traps were placed in the upper part of the tree canopy and monitored weekly. Lures were changed every third week in the first generation and every other week in the second generation.

Table 1 compares data from Howard Flat over the last four years, 1994-1997, and gives data for Chelan River for 1997. The areas in which codling moth populations were detectable with traps have dramatically declined each year of the project, from 82% in 1995 to 42% in 1996 and finally to 16% in 1997. The average number of moths captured per trap declined by only 50% in 1997, whereas the average from 1995 to 1996 had declined by 82%. Both indices confirm that codling moth populations have been dramatically reduced by the areawide use of mating disruption. In the first year of the Chelan River CAMP site 73.6% of the traps captured one or more codling moths, about the same proportion as the first project year for the Howard Flat CAMP site. The average capture of moths per trap, 6.9, also was similar to that reported for Howard Flat in the first year of the project.

Reductions in codling moth captures at the Howard Flat CAMP site are reflected in the pattern of capture. From Table 1 it is clear that the percent of area (traps) with NO catch for the entire year was 18.5, 58.4, and 84.0% for 1995, 1996 and 1997, respectively. The only "hot spot" at Howard Flat in 1997 was near the airport, a traditional problem area.

Fruit injury by codling moth was determined by sampling as many blocks as possible at harvest for fruit injury by codling moth, leafroller and any other arthropods that might be

reflected in a fruit damage inspection. One hundred fruits from at least 25 bins were sampled per block. A total of 3,334 bins was sampled from 82 blocks. Table 2 shows the historical level of injury caused by codling moth, leafrollers and other pests at Howard Flat and Chelan River from 1994-1997. Fruit injury estimates were again complicated by hail damage to fruit in 1997. Hail fell on the entire project area in June and resulted in speeding up of harvest in many small blocks where samples could not be made. Even with this complication, the same number of blocks was sampled at Howard Flat as in 1996 although the total number of fruits sampled was slightly less. The level of fruit damage by codling moth at Howard Flat was dramatically lower than in 1996. Only 41 fruits injured by codling moth were found in 1997, and these were found in only three blocks. Leafroller injury at Howard Flat was essentially the same as in 1996, and injury from bugs and cutworms (other) was significant.

### Leafrollers

One hundred nine traps were used to monitor each leafroller species at Howard Flat in 1997, and 55 traps were used for each species at the Chelan River site. They were scattered uniformly throughout both projects at a density of approximately one trap every 10 acres. The average capture of pandemis and obliquebanded leafroller moths per trap was about the same in 1997 as the previous year at Howard Flat and the distribution of catch was also similar, concentrated in the northern half of the project area. The obliquebanded leafroller was by far the dominant leafroller species captured in the Chelan River project (Table 3).

**Table 1.** Historical capture of codling moth in 10 mg lure-baited pheromone traps at the Howard Flat and Chelan River CAMP sites, 1994-1997.

Year	Total codling moth captured			% traps with moths	No. traps	Avg. moths per trap
	First gen.	Second gen.	Season total			
<b>Howard Flat</b>						
1994	NA	NA	NA	NA	NA	32.3
1995	610	3929	3319	81.5	448	8.8
1996	114	594	708	41.6	450	1.6
1997	68	274	342	16.0	450	0.8
<b>Chelan River</b>						
1997	1429	304	1733	73.6	250	6.9

**Table 2.** Historical data on harvest fruit injury at the Howard Flat and Chelan River CAMP sites, 1994-1997.

Year	Percent fruit injury				No. fruits
	Codling moth	Leafroller	Bugs	Other	
<b>Howard Flat</b>					
1994	0.80	NA	NA	NA	Packout data
1995	0.55	NA	NA	NA	172,600
1996	0.20	0.21	NA	NA	338,600
1997	0.01	0.14	0.1	0.09	334,000
<b>Chelan River</b>					
1997	0.11	0.01	1.1	0.02	81,700

**Table 3.** Historical data on leafroller moth capture at the Howard Flat, 1995-1997, and Chelan River, 1997, CAMP sites.

	No. traps	Total moths	% Catching	Avg. moths/trap
<b>Howard Flat</b>				
Pandemis				
1995	57	1899	98	33.32
1996	108	1400	77	12.96
1997	109	1189	92	11.11
Obliquebanded				
1995	57	889	98	15.60
1996	108	2218	94	20.54
1997	109	2529	99	23.64
<b>Chelan River</b>				
Pandemis				
1997	55	86	67	1.56
Obliquebanded				
1997	55	1474	100	26.80