

Pome Fruits—Chemical Control

Codling Moth Mating Disruption and Supplemental Controls

Richard Hilton and Peter Westigard
Oregon State University Southern Oregon Experiment Station

Keywords: codling moth, pear rust mite, twospotted spider mite, Dimilin, Imidan, Guthion, horticultural spray oil, Orthorix, Shin-etsu CM dispenser, pear

This study was carried out to determine if codling moth (CM) mating disruption (MD) supplemented by three applications of horticultural spray oil through the first CM generation could provide control of all the major pear pest species. Alternative tactics to maintain CM control through the second CM generation were then compared. The two study sites consisted of 1) an on-station block of Bartlett and Anjou pear trees and an associated check block of Bartletts; both blocks had experienced high CM pressure in 1992, and 2) a commercial grower's block of Rosired and Sensation Red Bartletts on Tatura trellis with a history of low CM pressure.

Site #1. At the Southern Oregon Experiment Station (SOES) Hanley orchard, a 1.2 acre block of 20-year-old Bartlett and Anjou trees was treated with approximately 450 Shin-etsu CM dispensers per acre on 4/9. The prebloom spray program consisted of a dormant oil application and a delayed dormant application of oil and Orthorix. Since over 40% of the clusters examined at bloom were infested with pear rust mite, an application of sulfur was made on 4/20. Biofix for CM at the Hanley orchard occurred on 4/28 in 1993. Based on earlier work, the oil applications were timed for 450°D, 550°D and 850°D according to the CM phenology model. The actual oil applications went on at 403°D (5/21), 517°D (6/1) and 867°D (6/30).

The block was divided into 9 plots; 3 treatments replicated 3 times. The three treatments made for control of second generation CM were: 1) Dimilin at 1 lb/acre applied on 7/21, 2) Imidan at 5 lb/acre applied 7/29, and 3) Guthion at 3.25 lb/acre applied on 7/29. The levels of immature pear psylla and twospotted spider mites were sampled by leaf-brushing while adult pear psylla and generalist predators were sampled by limb-tapping. CM infestation levels were evaluated by sampling fruit at the end of first generation, 7/21, and at the appropriate harvest date for each of the two varieties in the plot. A nearby Bartlett block, 1.5 acre, was used for both the check and the standard (i.e., 3 applications of Guthion) treatments. Two CM pheromone traps were placed in each block, one with a 1 mg lure and the other with a 10 mg lure. The traps were checked and rotated weekly and the lures were changed every 3 weeks.

Site #2. In the Eden Valley Orchard (EVO) a 10-acre block of Rosired and Sensation Red Bartlett was treated with 450 Shin-etsu dispensers per acre on 4/9?. The dormant spray program was the same as at the SOES site. Three horticultural spray oil applications were made during the first CM generation: 445°D (5/23), 500-575°D (6/4-7) and 760°D (6/23). For control of second generation CM, half the block was treated with Guthion while the other half received a second application of pheromone dispensers on 6/28. Two CM traps were monitored, one baited with a 1 mg lure and the other with a 10 mg lure. As at the SOES site, the traps were rotated weekly and the lures changed every three weeks. CM infestation was evaluated at the end of the first CM

generation and at harvest. Spider mites, pear psylla, and predators were sampled as described above.

Results are presented for both sites in Table 1. The average trap catch (1 mg lures) from the standard, Guthion, treated areas of EVO are included for comparison. The first generation CM catch was generally low at EVO and very low in the MD and oil treated block with no CM damage observed in the first generation sample. At SOES, moth catch in the check was very high. In the MD and oil treatment the trap catch during the first flight in the 1 mg trap was reduced by about 90% as compared to the check. But the catch in the 10 mg trap was reduced by only about 10%. This incomplete trap shutdown indicates a significant lack of mating disruption. Infestation levels in the check and the MD plot were 30% and 12%, respectively, after first generation. The bulk of the reduction in first generation CM infestation is most likely the result of the three oil applications. During second generation, trap catches at SOES were virtually identical in the check and the MD plot signifying that the MD dispensers had run out of pheromone. However, the insecticide sprays held CM damage at the levels seen after first generation, while the damage in the check almost doubled. At EVO, no moths were caught during the second flight and the only damage was on the border of the area which received a second application of pheromone dispensers. The area treated with Guthion had less than 0.3% fruit damage from leafroller whereas the area without Guthion had 2.8% leafroller damaged fruit.

Spider mite levels were low during the first part of the season but after the application of Guthion (and Imidan in the case of Anjous at SOES) mite levels increased. While this increase was not statistically significant in the replicated plots at SOES, the same effect was observed where Guthion was applied at EVO. With regard to psylla eggs and nymphs, the only significant difference observed was in the Bartletts, where on the last leaf sample, 8/25, the psylla levels in the Guthion and Imidan plots were more than double the level observed in the Dimilin plot. This effect on psylla is very evident in the final adult sample, 10/7, where in both varieties significantly more adults are present in the Guthion and Imidan treatments than in the Dimilin treatment. No significant differences were seen in predator levels in any of the treatments.

Table 1. 1993 experimental results—mating disruption and supplemental controls.

| Location | Treatment | Trap catch | | % CM infestation |
|-------------------------------------|-------------------|------------|-------|-------------------------------|
| | | 1 mg | 10 mg | |
| 1st Generation CM | | | | |
| SOES | MD + oil | 16 | 54 | 12.3 |
| | Check | | | 30.0 |
| | Standard | | | 1.2 |
| EVO | MD + oil (3x) | 1 | 2 | 0.0 |
| | Standard | 14.5 | -- | -- |
| 2nd Generation CM | | | | |
| SOES | MD + Dimilin | | | 9.0 |
| | MD + Imidan | 36 | 12 | 10.7 |
| | MD + Guthion | | | 8.3 |
| | Check | 37 | 11 | 55.2 |
| | Standard | | | 1.8 |
| EVO | MD (reapplied) | | | 0.67 (border) 0.0 (middle) |
| | MD + Guthion | | | 0.0 (border) 0.0 (middle) |
| | Standard | 3.1 | -- | negligible |
| | (avg. of 9 traps) | | | |