Implementation

WENATCHEE VALLEY PEAR IPM PROJECT (WVPP)—YEAR 2

Ted Alway
TC Alway Consulting, Peshastin, WA

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The WVPP seeks to demonstrate the increased use of biological control of key pests in Wenatchee Valley pear orchards to develop pest management programs that are equally or more effective and economical than the chemically intensive programs currently used. This three-year project completed its second year in 2000, working with the same 15 growers on 141 acres throughout the Valley. D'Anjou pear was the cultivar monitored. Each block was monitored weekly from mid-March until pear harvest, with appropriate sampling on each visit for pests and natural enemies. This information was conveyed the same day to the grower and his consultant(s) for use in pest control decisions.

The growers' pest control programs divided into two general categories. "Hard" blocks (seven sites) used broad-spectrum insecticides before and after bloom for pear psylla control. These materials included a pyrethroid (6 growers), Pyramite (6), Agri-Mek (7), and Provado (6). Five growers made two applications of Provado. "Soft" blocks (eight sites) used none of the above materials. For psylla control sprays, these growers mostly relied upon a Surround (pre-bloom only, 6 growers), Esteem (3), and foliar oil (8). Three of the eight growers managed their blocks organically. All of these blocks were under a soft pest management program in 1999 as well. The terms "hard" and "soft" are convenient but can be misleading. Most hard blocks also used codling moth mating disruption, sprayed no or few organophosphates after bloom, and used Surround in the pre-bloom period. Their use of the psyllacides listed above was a significant difference that affected pest and natural enemy populations.

2000 observations

1. **Pear psylla –** Populations were far lower in most soft blocks in 2000 than in 1999 and were similar to hard block populations. Fruit damage was also far lower, with 3% of fruit with marking on average in 2000 vs. 25% in 1999; hard blocks also averaged 3% marking.
2. **Spider mites –** The soft blocks had consistently lower numbers of spider mites (*Tetranychus* spp.) than the hard blocks. Soft blocks applied few or no miticides, other than foliar oil (7 blocks) and Savey (2 blocks); hard blocks applied two to four miticides besides oil, including Pyramite, Agri-Mek, Savey, Vendex and Carzol.
3. **Grape mealybug –** This pest was found in nine WVPP blocks in 2000 (6 soft, 3 hard). Among the soft blocks, two showed large drops in GMB numbers from the previous year and three remained at low, non-economic levels. One block has significant damage, with GMB numbers remaining high in the second year; this block did not develop high numbers of natural enemies in 1999 as did the other soft blocks, probably due to frequent summer Surround applications.

4. **Other pests –** Leafrollers were a problem in several soft blocks in 1999 but fruit damage was reduced in 2000 by *Bt* sprays. They are an increasing problem in several other soft blocks. Codling moth was generally well controlled by mating disruption alone, as only six blocks (3 hard, 3 soft) supplemented pheromones with an insecticide and damage (with one exception) was very low. Stink bug and boxelder bug were a problem for several blocks, both soft and hard, bordering native forest habitat; no sprays were applied for their control. Green fruitworm emerged as a pest in three blocks, all with extensive contact with forest. Pear rust mite was detected in leaf samples from the organic blocks, with no fruit russeting found in any block.
5. **Natural enemies –** Populations of predators and parasites developed in the soft blocks in 1999 and returned in 2000 in higher numbers and much earlier in the season. Most hard blocks had far fewer or no natural enemies throughout the growing season. *Deraeocoris brevis* and *Campylomma verbasci* were the most abundant and widespread predators; other common predators included lacewings (particularly brown), earwigs, coccinellids and spiders. The psylla parasitoid *Trechnites* was found in all eight soft blocks in 2000, often in high numbers.
6. **Costs -** The soft blocks generally had less expensive programs than the hard ones (soft average material cost was $394, hard average was $634). Six of the eight cheapest spray programs were in soft blocks. Six soft blocks reduced spray costs from 1999 levels, as they sprayed less often with less pest pressure in 2000. Soft blocks tended to be treated more often (an average 10 applications/season vs. 7.3 in the hard blocks) due to the use of materials with less toxicity and less residual activity, such as spray oil.

Limitations

- Most soft blocks suffered high psylla damage during the first year of establishing improved biological control, as the psylla populations increased greatly before natural enemies became established.
- Close proximity to native habitat appears to be important, as these lands serve as a reservoir for key natural enemies; a successful soft program may not be possible for blocks in the midst of farmed areas. The WVPP soft blocks tend to have more contact with native habitat.
- Soft pest management programs require more intensive and regular monitoring of pests and natural enemies than growers typically receive. Growers will have to pay extra for this information, and presently there are few people available to provide this degree of service.
- Soft programs are more risky, as they have not yet been shown to provide reliable pest control over many seasons. With lower fruit returns, most growers are less inclined to accept this increased risk.
- Mineral oil is a central part of soft pear pest management programs, particularly applications made after bloom. There remain concerns with oil about both the risks of fruit marking and the long-term effects on tree health.

The WVPP has demonstrated it is possible to develop successful biocontrol of pear psylla and spider mites in the high pest pressure areas of the Wenatchee Valley. The situation with grape mealybug is less clear but developments are promising. It appears that biocontrol in pear orchards can be disrupted not only by the use of organophosphates but also several materials applied for psylla, mite or mealybug control. The third year of the project will further establish the stability and limitations of these biocontrol situations.