

Researchers use a SOFT approach to battle wormy apples

BY RICK HILTON AND ALAN KNIGHT

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While the “apple” in Applegate Valley refers to Jesse Applegate, the trailblazer and early Oregon settler, one might be forgiven for thinking that it referred to the apples that seem to be present in so many homesteads throughout the valley. Apples came to the Applegate Valley with the early settlers and miners. Apples served as a versatile resource—they could be eaten fresh, they stored well during the cold winter months, and they could be processed into sauce and squeezed into cider, including the hard variety. But ever since people began planting apples they have contended with a wide array of pests, from bears to microscopic diseases. One of the most well-known pests of apples is the codling moth. The proverbial worm in the apple is actually the caterpillar of a rather small and nondescript moth.

The codling moth is the key pest in commercial apple and pear orchards in the Pacific Northwest and around the world.

The caterpillar, or larva, bores into the fruit to feed on the seeds causing the fruit to rot or drop off the tree. It is not uncommon to find apple trees where the vast majority of the fruit have been infested with codling moth larvae. Even though there are many natural enemies of the codling moth—birds, bats, insect predators, parasitic wasps and diseases, they generally do not cause enough mortality to prevent the codling moth population from increasing. A codling moth larva spends much of its time inside the fruit, a perfect place to hide from both natural enemies and insecticide sprays. In the early 1900s most of the apple and pear orchards in the Rogue Valley were sprayed with lead arsenate, a stomach poison, for control of codling moth. After World War II, DDT was the pesticide of choice followed by other neurotoxins. These broad spectrum insecticides tended to cause other pest problems to erupt, spider mites being the foremost example. More recently, new behavioral methods for managing codling moths have been adopted. Thanks to a combination of research and entrepreneurship, many orchards now have the option of use mating disruption to control codling moth. By dispensing small amounts of the moth's sex pheromone into the orchard atmosphere, the chemical communication between the sexes can be effectively disrupted, which prevents successful mating from occurring. This non-toxic approach was used on over half the pear acreage in the Rogue Valley last year.

By implementing mating disruption, orchardists can often avoid the use of the more toxic insecticides that kill both pests and beneficial insects. However, by adopting a less toxic method these orchards can become vulnerable to infestation from sources of codling moth outside the orchard. In light of the threat that these sources of codling moth present to commercial orchards, it was necessary to devise a program for controlling codling moths in small orchards and backyards. Unfortunately the mating disruption method used by commercial growers works best on large contiguous acreages and does not work on single trees or small plantings.

Instead, we came up with a multi-tactic approach for managing codling moths using only non-toxic, organically certified methods that are highly selective for codling moth. This Selective Organic Fruit Tree (SOFT) program consists of three components:

1) a suspension of microscopic nematodes that attack soft-bodied insects is applied to the tree trunk and base during the fall or spring to attack the full grown larvae that are overwintering in bark crevices hidden within a silken cocoon;

2) a microbial pesticide, an insect virus that infects only codling moths, is applied to the tree foliage when codling moths eggs are hatching during the summer; and

3) traps specifically designed to attract and capture female codling moths and thereby prevent eggs from being laid are put out in every other tree.

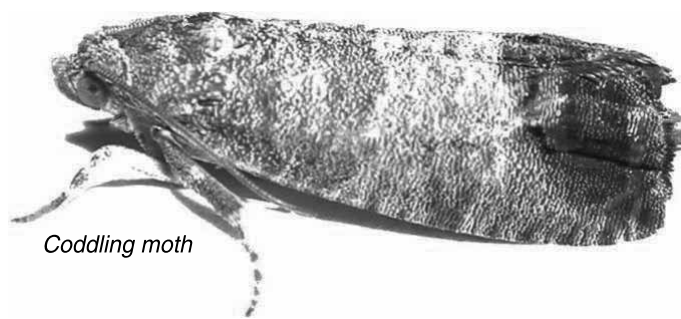
This combination of methods was tested last year in a number of locations throughout the Rogue Valley, including one site on Little Applegate Road. After just one year it is a little early to make any sweeping claims, but the preliminary results indicate that the SOFT program can dramatically reduce codling moth damage to the fruit and, even more importantly, very few codling moths survived, that should make it even easier to control codling moths in these sites in the upcoming year. A couple of factors that seemed to be important in reducing codling moth damage and survival were the degree to which the site was isolated from other sources of codling moths, not surprisingly, and the level of management that the trees received. Generally, it was easier to control codling moth in small trees where the fruit had been thinned. Cultivar was also important. Bartlett's are one of the

most susceptible types of pear to codling moth damage; Golden Delicious apples are much more prone to codling moth attack than other cultivars like Granny Smith or Arkansas Black.

Recently, when we were invited to present our results to the January meeting of the Applegate Valley Garden Club, it was exciting to see a full house of interested homeowners who wanted to improve their management of



Wormy apples



Codling moth




Clear trap

their backyard fruit trees. More testing of the SOFT program is needed to refine and improve this approach. It is hoped that we can develop an optimal combination of methods that is effective without being too costly. If you have a small apple orchard or some backyard trees and are interested in using the SOFT program this coming season please contact Rick Hilton, richard.hilton@oregonstate.edu, at OSU's Southern Oregon Research & Extension Center on Hanley Road for more information.

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