



Codling Moth and Your Backyard Fruit Tree

WASHINGTON STATE UNIVERSITY EXTENSION FACT SHEET • FS120E

Introduction

If you grow apples, the codling moth will come! This common pest, also known as “the worm in the apple,” directly impacts the eating quality of apples across the state of Washington. When left unmanaged in backyard trees, the codling moth can damage as much as 80 to 95 percent of the fruit—making it “wormy” and unfit to eat. In the apple-producing regions of Washington State, homeowners are legally responsible for controlling this pest in host trees on their properties (Revised Code of Washington, chapter 15.09). The rationale behind this state law is to protect fruit-growers from economic losses caused by invasive pests and the need for additional pest management strategies (pesticide applications) to intercept pests migrating from neglected backyard fruit trees to commercial orchards.

The codling moth is a key pest in apple, pear, crabapple, and Oriental pear trees. The adult codling moth is small, about 1/2 inch long, with brown and gray bands on its body (Figure 1). It is difficult to scout for codling moth because they fly during dawn and dusk hours; however, they can be monitored with bait traps.

After mating, a female moth will lay dozens of flat, circular, 1/12 inch diameter eggs on the fruit or on leaves near the fruit (Figure 2). It is also difficult to scout for the eggs since they are tiny and often match the surface color of the fruit. When the eggs hatch into larvae they search for fruit and begin to bore directly to the fruit’s core and feed around the seeds (Figure 3). Their feeding results in conspicuous piles of brown, granular excrement (frass) plugging the entrance hole on the surface of the fruit (Figure 4). While observing frass on fruit is the easiest sign of codling moth to scout for, once larvae enter fruit they can only be controlled by picking and disposing of the fruit.

Mature larvae (caterpillars) can be up to 3/4 inch long, and often have a pinkish cast. At maturity, the caterpillars exit the fruit and drop to the ground at the base of the tree to pupate in cocoons. Often codling moth will pupate among the cracks and crevices of the tree’s bark, but they also will pupate in any nook or cranny on wooden structures, posts, crates, stacks of firewood, or even outdoor furniture that may be located near the host tree.



Figure 1. A) The adult codling moth is only about 1/2 inch in length. B) It is recognizable by the alternating gray and brown bands and the darker coppery brown patch at the wing tips. Photos: A) M. Bush, WSU Extension, and B) J. Brunner, WSU Wenatchee.

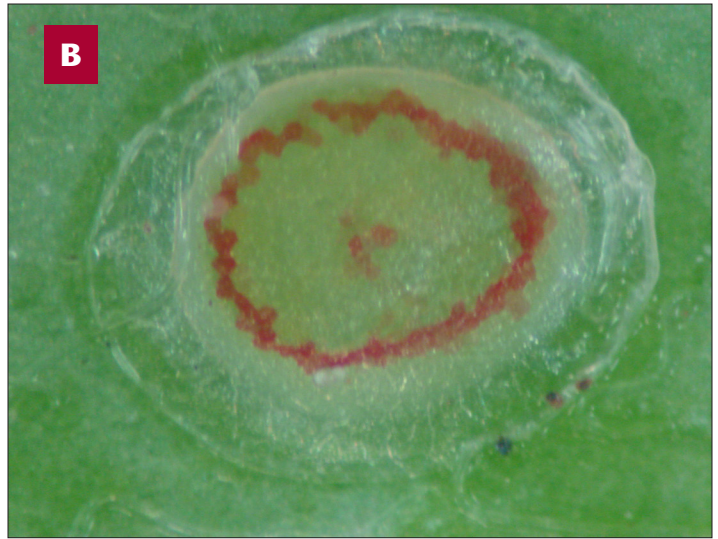
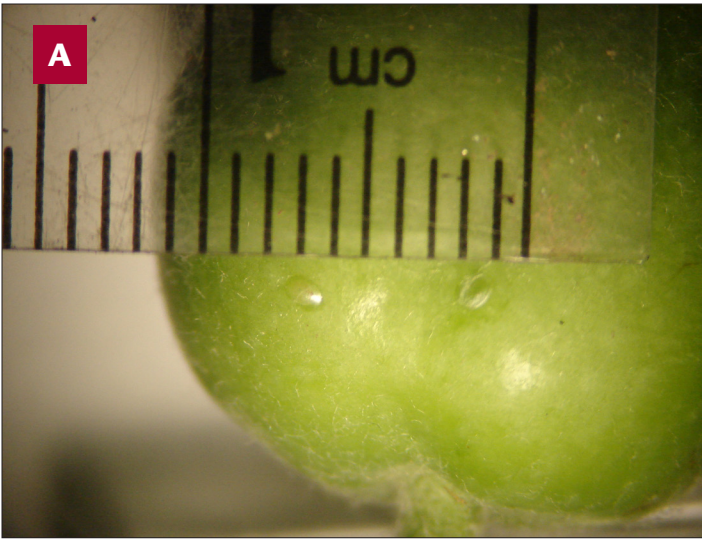


Figure 2. A) Codling moth eggs are laid singly on fruit or on leaves near the fruit. B) As the egg matures (in about a week) it will develop some internal color and the dark head capsule of the larva will be visible. Photos: M. Bush, WSU Extension.

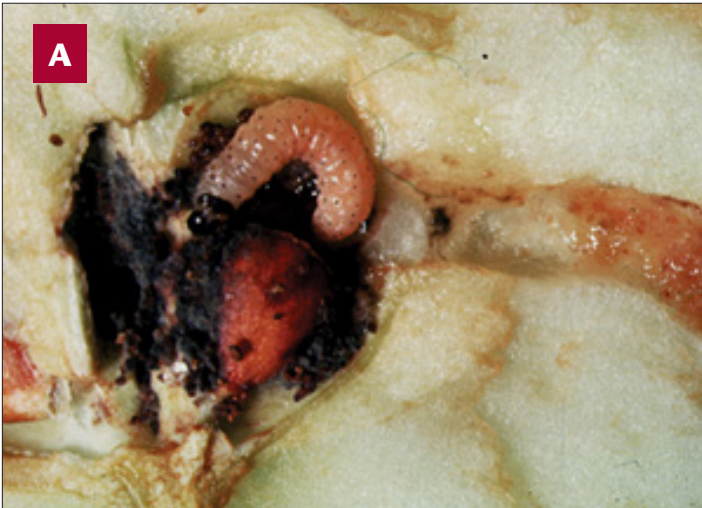


Figure 3. The larvae damage fruit by boring to the core and feeding about the seeds. Photos: A) J. Brunner, WSU Wenatchee, and B) M. Bush, WSU Extension.



Figure 4. Apple fruit with signs of codling moth infestation. Photo: M. Bush, WSU Extension.

Washington homeowners must protect their apple or pear fruit from two, or sometimes three (in the warmer regions of the state) generations of codling moth each year. The adult moths fly during warm evenings, with peak activity in May, July, and late August. The best means of protecting backyard fruit trees from codling moth infestation is an integrated pest management (IPM) program utilizing several control strategies.

Non-Pesticide Management Strategies

The primary strategy for all homeowners to manage this pest in their backyard fruit trees is to purchase and plant fruit trees that are grown on dwarfing or semi-dwarfing rootstock. Dwarfing and semi-dwarfing rootstock help maintain the overall height of the mature tree between 10 and 12 feet tall (Figure 5), keep the fruit-bearing zone low, and reduce the need for ladders. In turn, this makes it easier for the homeowner to scout and manage pests or remove any infested fruit. Regardless of rootstock chosen,



Figure 5. An apple tree grafted on a semi-dwarf rootstock. The tree height is maintained at 10 to 12 feet. Photo: P. Moszeter, WSU Master Gardener Volunteer.

overall tree size is best maintained by proper training and pruning. Even standard-sized trees (30 to 40 feet tall) that have been grafted on seedling rootstock can be maintained to a height of 10 to 12 feet through annual pruning and training (tying down) of upright limbs.

Additional management strategies may include:

- Periodically scouting and removing infested fruit on the tree throughout the growing season. Dispose of any “wormy” fruit and pick up any infested fruit lying on the ground beneath the tree as the caterpillar may continue to feed and develop within the dropped fruit.
- After thinning (late April to early May), when the fruit is less than 1 inch in diameter, individually bag each fruit left on the tree. Standard paper bags or commercially available apple bags can be used. Bagging provides a barrier to keep codling moth adults and larvae off of the fruit (Figure 6). Bags should be removed one to two weeks before fruit harvest to allow for proper color development on the fruit’s surface.
- Placing 2-inch-wide corrugated cardboard bands around the lower trunk of the host tree to attract larvae searching for a place to pupate. Cardboard bands can be placed on the trees in late May, then removed and disposed of before the adult moths begin to emerge in mid-June. Fresh cardboard bands can be placed on the trees in mid-July to attract the next generation of caterpillars, then removed and destroyed a few weeks after harvest.
- Selecting early-maturing varieties of apples to avoid a third-generation of codling moth.
- Looking for other codling moth sources in your home landscape. If possible, remove any infested apple, crabapple, pear, ornamental pear, large-fruited hawthorn, or quince trees.



Figure 6. An apple tree with bags protecting fruit from codling moth. Photo: M. Bush, WSU Extension.

Management Strategies Using Pesticides

Once the codling moth larva is inside the apple it is shielded from the toxic effects of most pesticides. Therefore, pesticides must be applied during adult moth activity so that the pesticide covers the fruit surface before the eggs hatch. Pesticide sprays should start 17 to 21 days after full bloom (about 10 days after most of the flower petals drop from the tree) to target the newly hatched larvae before they bore into the fruit.

The simplest management approach is to continually reapply the pesticide every 10 to 14 days until fruit harvest. Be sure to read the product label and note the preharvest interval (the time between the last pesticide application and fruit harvest) to allow the pesticide residue to dissipate before harvesting fruit. For a list of effective pesticides used to manage codling moth, homeowners can contact their local WSU Extension office or visit the WSU Hortsense website, <http://pep.wsu.edu/hortsense/scripts/query/displayProblem.asp?tableName=plant&problemID=22&categoryID=3>.

A more environmentally safe management approach is to monitor the adult moth activity (by monitoring traps) and apply two applications of pesticide for each generation of adult moths. Codling moth traps come in various designs. Each time the trap starts catching freshly-emerged moths in May, July, and late August, it’s time to apply the first of two pesticide applications. The second application of pesticide should be applied 10 to 14 days later for each generation.

Conclusion

If you plant apples or pears in your backyard, insect pests like the codling moth will come. Codling moth management requires multiple applications of pesticide or labor-intensive IPM strategies; however managing the pest is considerably easier for homeowners who plant fruit trees grafted on dwarfing rootstocks. An alternative for homeowners who wish to avoid the codling moth pest is to plant plum, peach or apricot trees instead of apple or pear

trees. These fruit trees can be grown in some regions of eastern Washington and have fewer fruit-infesting pests.

Further Reading

Beers, E. H., J. F. Brunner, M. J. Willett, and G. M. Warner. 1993. *Orchard Pest Management: A Resource Book for the Pacific Northwest*. <http://jenny.tfrec.wsu.edu/opm/displaySpecies.php?pn=5>.

Foss, C. and A. Antonelli. 2013. *HortSense: Tree Fruits*. Washington State University Puyallup Research and Extension Center. <http://pep.wsu.edu/hortsense/scripts/query/menu.asp?level=2&categoryID=3>.

Stebbins, R. L. 2007. *Training & Pruning Your Home Orchard*. *Oregon State University Extension Publication PNW 400*. <http://extension.oregonstate.edu/catalog/pdf/pnw/pnw400.pdf>.



By **Mike Bush**, Extension Entomologist, WSU Yakima County Extension, Union Gap, WA; and **Marianne Ophardt**, Area Horticulture Specialist, WSU Benton County, Kennewick, WA.

Use pesticides with care. Apply them only to plants, animals, or sites as listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

WSU Extension bulletins contain material written and produced for public distribution. Alternate formats of our educational materials are available upon request for persons with disabilities. Please contact Washington State University Extension for more information.

You may download copies of this and other publications from WSU Extension at <http://pubs.wsu.edu>.

Issued by Washington State University Extension and the U.S. Department of Agriculture in furtherance of the Acts of May 8 and June 30, 1914. Extension programs and policies are consistent with federal and state laws and regulations on nondiscrimination regarding race, sex, religion, age, color, creed, and national or ethnic origin; physical, mental, or sensory disability; marital status or sexual orientation; and status as a Vietnam-era or disabled veteran. Evidence of noncompliance may be reported through your local WSU Extension office. Trade names have been used to simplify information; no endorsement is intended. Published November 2013.