



Photo: B. Ohlendorf, UC Davis



Photos: Seattle Tree Fruit Society

## Biology

The apple maggot (*Rhagoletis pomonella*) is native to the northeastern United States, and has spread across country to become a major pest in the Pacific Northwest. **Transportation of home-grown fruit from infested to non-infested areas is prohibited in Washington.** Fortunately, the apple maggot seems to attack only apple and hawthorn in Oregon and Washington, and so far has not been found on pear (2012). Early cultivars of apples are particularly susceptible to damage.

The adult apple maggot fly is about 1/4-3/8" in length, black with a white mark on the back and black markings on clear wings. Starting in June or July, the female lays eggs on apple fruits by puncturing the skin, and successive flights can continue laying eggs into the fall. The eggs hatch within a few days as cream-colored larvae that feed inside the fruit, leaving brown tunnels that are often infected by rot organisms, ruining the fruit. At maturity, the 3/8"-long maggots drop to the ground where they pupate and overwinter. Adult flies emerge in the summer, and emergence can be monitored with rectangular yellow sticky panels such as Pherocon AM traps (Trece Inc., Adair, OK) placed in the tree canopy. Flies begin to lay eggs within 7-10 days after emergence.

## Management Options

Protecting fruit with nylon "footie" bags is very effective if placed **before the adult flies emerge**; bags should be placed when the fruit is approximately dime-sized and left on for the entire growing season. Kaolin clay (Surround at Home) applied as a spray to leaves, stems, and fruit acts as a repellent but must be re-applied every 1-2 weeks until harvest. If you choose to use a pesticide, some examples of products are listed below. **Always read and follow all label directions.**

- Monterey Bug Buster RTS
- Ortho BugBGon Max Lawn & Garden Insect Killer RTS

More information on apple maggot in Washington from the Seattle Tree Fruit Society (includes illustrated directions on applying apple maggot barriers and link to maggot barrier order form).

<http://www.seattletreefruitsociety.com/maggot-barriers>

See also Pacific Northwest Insect Management Handbook online

(Tree Fruit > Apple) <http://uspest.org/pnw/insects?21TFRT01.dat>

Fact page <http://uspest.org/pdf/reb63.pdf>



Photos: J. Brunner, WSU Tree Fruit Research & Extension Center

### Biology

Codling moth (*Cydia pomonella* L.) has been a principal pest of apple and pear in North America for more than 200 years, and except for Japan and part of Asia, it is found throughout the temperate regions of the world. If uncontrolled, codling moth can destroy most of the crop. The gray wings of adult codling moths are marked with dark brown bands near the wingtips. Wingspan is 1/2" to 3/4". Adult females lay eggs on leaves or fruit. The larvae burrow into fruits, usually through the blossom end, where they eat the core and seeds to acquire nutrients for the next development stage. Mature larvae are about 3/4" long, cream- to pinkish-white with brown heads. The larvae tunnel out of the fruit and make cocoons under bark or in the ground beneath the tree. They overwinter in the cocoons and pupate in the spring. Adults typically emerge around May-June. There can be two generations per year.

### Management Options

Nylon "footie" bags placed over the fruit have only limited effectiveness. Pheromone bait traps can be used to reduce populations of male moths. In the orchard, remove groundfall fruit (especially those that drop early and may contain larvae), and also brush, debris, and loose bark, to eliminate possible hiding places for cocoons. Wrap tree trunks with corrugated cardboard or burlap to trap migrating larvae; check tree wraps periodically and destroy cocoons. Codling moths are often found on or near the tree where they hatched. Kaolin clay (Surround at Home) applied as a spray to leaves, stems, and fruit acts as a repellent but must be re-applied every 1-2 weeks until harvest.

Some examples of pesticide products are listed below. Naturally-occurring parasites may help control codling moth populations, so avoid use of broad-spectrum insecticides which may kill beneficial insects. **Always read and follow all label directions.**

- Bonide Complete Fruit Tree Spray Conc
- Monterey Bug Buster RTS
- Ortho BugBGon Max Lawn & Garden Insect Killer RTS

More information on organic management of codling moth can be seen here:

[http://www.livingwithbugs.com/codling\\_moth.htm](http://www.livingwithbugs.com/codling_moth.htm)

Tree Fruit Research & Extension Center Orchard Pest Management Online (Codling moth) includes links to models for determining spray application timing.

<http://jenny.tfrec.wsu.edu/opm/displaySpecies.php?pn=5>