

Apple Maggot (*Rhagoletis pomonella*)

Note: This fact sheet is not intended for commercial fruit growers.

Host/Site

Apples are the main host of the apple maggot, and early cultivars are particularly susceptible to damage. Apple maggots are frequently found in hawthorn and crab apple, particularly in neglected trees, and have also been identified in pear, plum, cherry, apricot, wild rose, pyracantha, and cotoneaster.

In 1979, the apple maggot was first discovered in the Pacific Northwest. Apple maggot flies have now been found in most western Washington counties and several eastern Washington counties. To date, neither apple maggot flies, maggots, nor fruit damaged by them have been detected in commercial orchards in Washington state.

A strict quarantine exists on transporting home-grown fruit. Highway signs posted in western Washington remind drivers not to take fruit out of western Washington or across county lines.

Identification/Appearance

Damage is done by the larval stage (maggots), which are cream-colored and about 3/8 inches long. Maggots live inside the fruit for a period of 20 to 30 days before reaching maturity. Adult flies are about 1/4 to 3/8 inches long, with a black abdomen and three (males) or four (females) white bands. The wings are clear but have black bands. (Positive identification requires dissection, since the apple maggot closely resembles snowberry fly and a number of other flies.)

Infested apples have larva tunnels where the insect moved. These rot, eventually rendering the entire fruit pulpy and useless. Note that apple maggot damage differs from that of codling moth, which feeds in the core of the fruit and only tunnels through the flesh to enter and exit.

Life Cycle

The female apple maggot fly deposits eggs just under the skin of host fruit, leaving a small but visible puncture that dimples the surface

after pollination as fruit begin to form. The tiny, white eggs are rarely seen. Depending upon temperatures, the eggs hatch after 3–7 days. Maggots feed in the fruit for 20–30 days (typically mid-July to about November) before maturity. They exit the fruit and drop to the ground, burying themselves in the soil, where they form pupal cases.



Top: adult flies; Bottom: apple maggot damage. Photos courtesy of WSU Cooperative Extension.

Adult flies emerge from early June through September, depending on temperature. Seven to ten days after emergence, they are attracted to fruit, where they mate and the females lay eggs. There is only one generation per year.

Natural Enemies

Several parasitic wasps are the principal natural controls in the western United States: *Biosteres melleus*, *Opius downesi*, and a species of *Pteromalus*.

Monitoring

Monitoring using sticky traps to catch adult flies should begin in early June and extend through early October. Either bright-yellow panels or red balls can be used. Both are available commercially, but if desired can be made from 5 1/2 x 9 inch panels painted with exterior white primer followed by lemon yellow fluorescent paint or from croquet balls painted red. The sticky material

is a mixture of 1/4 teaspoon ammonium acetate crystals (available at some pharmacies and chemical suppliers) and 3 tablespoons “brush-on” formula TangleTrap™. Coat all surfaces and hang traps by wire on the south side of the tree canopy up among the apples. Flat panels should be wired to prevent swinging in the wind. Remove leaves in the vicinity to prevent contact with traps. Renew sticky bait every two weeks. Scrape off old material before recoating. (Panels can be slipped inside clear plastic envelopes or bags to facilitate recoating; apply sticky material to outside of plastic and replace plastic when needed.)

If apple maggot has been a problem the previous season, check fruit early and often.

(continued/over)



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Action Threshold

If chemical controls will not be used, cultural/physical controls, especially setting traps, should begin before emergence of adult flies. This is especially important where apple maggot has been a problem. Include non-apple host trees in the vicinity.

If chemical control is used, WSU recommends the first application within seven days of first adult fly capture in a trap. Growers on the east coast have used a threshold of five captures on a trap to indicate the need for repeat sprays.

Cultural/Physical Controls

Remove all fallen fruit daily. If not visibly affected, these can be used for cider or cooking but should not be stored. Boil fruit to kill any larvae inside before burying or composting. Alternatively, place fruit in lock-tight bags and dispose in garbage. Fall cleanup should be thorough.

Sticky traps also provide a little control of apple maggot. Follow directions on previous page under “Monitoring.”

Remove unneeded host trees such as unmaintained apples or hawthorns located near orchards.

Bagging fruit. One of the most effective controls is to place paper bags over fruit on the tree so that they are not accessible to apple maggot larvae. Bagging can be done on fruit over the entire tree, or on as many fruit as desired. Before bagging, thin fruit to one per cluster, preferably when fruit is from 1/2 to 1 inch in diameter. Use No. 2 paper bags (standard lunch bag size measuring 7-1/4 inches by 4 inches). Cut a 2-inch slit in the bottom of the bag and slip this opening over the fruit to form a seal around the stem. Staple the open end shut.

Biological Controls

Although there are natural enemies of the apple maggot, they do not provide significant control.

Chemical Controls

Chemical controls are less important if fruit will not be eaten, but careful attention to cultural/physical controls will help reduce apple maggot populations.

Chemicals registered for apple maggot include some of the more toxic, broad-spectrum insecticides. Diazinon will no longer be registered for non-agricultural use after the end of 2002. Timing based on trapping rather than a calendar schedule can reduce the amount of insecticide used and increase its effectiveness. Organic growers use the botanical insecticides pyrethrum and rotenone in conjunction with trapping. A formulation of kaolin clay, Surround WP, (not yet registered for home use for apple maggot control) is undergoing trials to determine its usefulness in IPM programs. Because sprays are directed against the adult fly — larvae are hidden inside the apple and thus relatively protected — growers must remove untended host trees and fallen fruit near the orchard.

References

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