

TREE FRUIT

Cherry Fruit Flies

Cherry Fruit Fly *Rhagoletis cingulata* (Loew), Black Cherry Fruit Fly *Rhagoletis fausta* (Osten Sacken), European Cherry Fruit Fly *Rhagoletis cerasi* (L.)

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Introduction

The tephritid fruit flies that feed on cultivated cherries in New York and surrounding areas include two native species, the cherry fruit fly, *Rhagoletis cingulata*, and the black cherry fruit fly, *R. fausta*, as well as the invasive European cherry fruit fly, *R. cerasi*. The range of the cherry fruit fly (CFF) includes most of eastern North America. The black cherry fruit fly (BCFF) has a more northern distribution than the CFF, reaching only as far south as Pennsylvania, and exists in eastern as well as western North America. The European cherry fruit fly (ECFF) is native to Europe and parts of Asia, and was found in southern Ontario, Canada in 2016, as well as in western New York in 2017.

The CFF is usually a more abundant and more severe pest than the BCFF. The principal wild host of the CFF is the black cherry, *Prunus serotina*. The BCFF infests almost exclusively the smaller-fruited, native “bird cherry” or “fire cherry,” *P. pennsylvanica*. However, sweet as well as sour cherries are readily attacked by both species. Conversely, the native choke cherry (*P. virginiana*), plums, and other stone fruits are reportedly not suitable hosts for either fly species. The ECFF can infest *Prunus spp.* such as sweet cherry, tart cherry, all saints cherry, mahaleb cherry, and black cherry. This insect can also infest fruit of honeysuckle (*Lonicera spp.*), including those of invasive honeysuckles (*L. tartarica* and *L. morrowii*).



Figure 1. Cherry fruit fly adult male on a cherry fruit. Photo: J. Ogradnick, NYSAES.



Figure 2. Wing of the cherry fruit fly (*Rhagoletis cingulata*). Photo: A. Agnello.



Figure 3. Black cherry fruit fly adult (*Rhagoletis fausta*). Photo: J. Ogradnick, NYSAES.

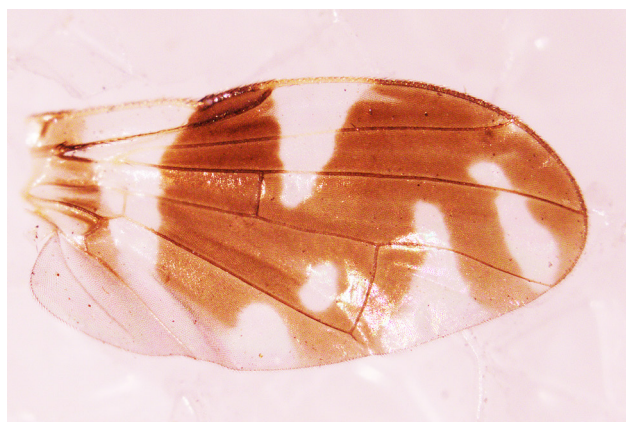


Figure 4. Wing of the black cherry fruit fly, note the doughnut hole marking. Photo: A. Agnello.

All the cherry fruit flies have a similar seasonal biology: only one generation per year throughout their geographic ranges. Except for the adults, the eggs, larvae, and puparia of the three species look alike.

Adults

The adults of the CFF are somewhat smaller than the common house fly. The head and legs are yellowish-brown. The male has three white crossbands on the abdomen (fig. 1); the female has four crossbands. The wings are clear with dark bands and a characteristic dark spot at the tip (fig. 2). The adult BCFF is slightly larger than the CFF, and its abdomen is entirely black (fig. 3); the bands on the wings are darker and wider than those of the CFF, with a characteristic “doughnut-hole” marking near the posterior (back) edge of the wing (fig. 4). The adult ECFF is similar in appearance to the CFF (fig. 5), ranging in size from 3-4 mm (0.13 inch) for the male, to 5 mm (0.19 inch) for the female. The ECFF wings have four distinct large bands and one characteristic small band.



Figure 5. European cherry fruit fly adult (*Rhagoletis cerasi*) Photo: R. Coutin/Office Pour les Insectes et leur Environnement (OPIE).

Emergence of CFF and BCFF begins in late May or early June when early sour cherry varieties begin to turn red or when 950 degree-days above 4.4° C (40°F) have accumulated after March 1. The ECFF may emerge 1-2 weeks earlier than the native species. As a rule of thumb, the BCFF emerges at McIntosh apple petal fall and the CFF emerges seven days later. Flies continue to emerge for about one month, into early July. Peak emergence occurs in mid- (BCFF) to late (CFF) June.

Freshly emerged flies move actively about the foliage and feed on honeydew produced by aphids or other insects. Adult European cherry fruit flies are often observed on sunlit portions of cherry trees or honeysuckle bushes because females prefer to lay eggs in fruit bathed in sunlight. After about one week, flies are sexually mature. Mating takes place on the fruit and egg-laying begins.

Eggs

The female fly pierces the fruit with her sharp ovipositor and inserts a single egg just below the skin, leaving a small scar on the surface (fig. 6). The eggs of all three species are creamy white, about 0.6 mm (0.02 in.) long, and slightly curved. Hatch occurs after five or more days, depending on the temperature.

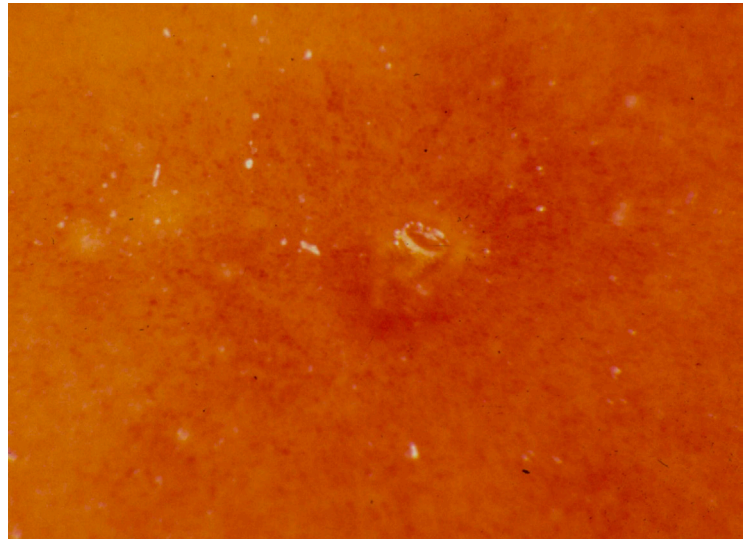


Figure 6. Small oviposition scar caused by a cherry fruit fly. Photo: J. Ogrodnick, NYSAES.

Larvae

The larvae (maggots) of all the cherry fruit fly species look very similar. Mature larvae are 5 to 6 mm (about 0.2 in.) long, cream-colored, and have no legs or visible head (fig. 7). The posterior end is blunt; the anterior or “front” end tapers to a point with two dark mouth hooks. The young larva feeds next to the pit and matures in two to three weeks. When the fruit is ripe or overripe, the full-grown larva bores through the skin (fig. 8) and drops to the ground to pupate.

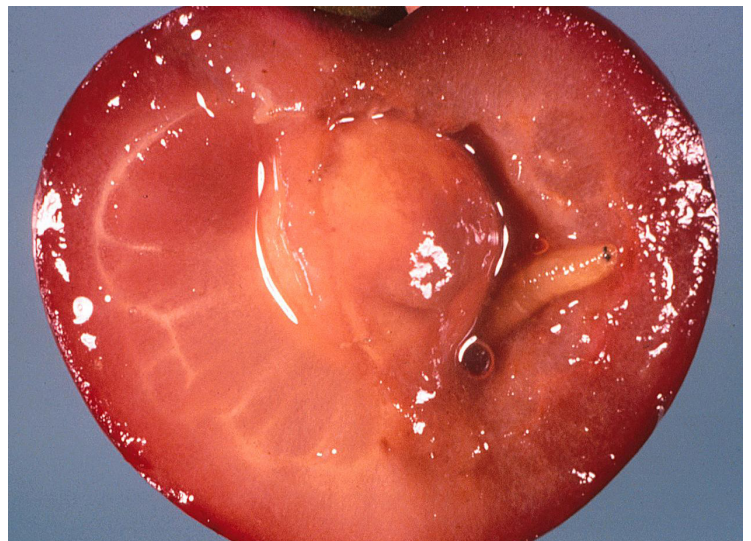


Figure 7. Cherry fruit fly larva and feeding damage near the fruit pit. Photo: J. Ogrodnick, NYSAES.



Figure 8. Exit hole in cherry fruit caused by a cherry fruit fly larva. Photo: J. Ogradnick, NYSAES.

Pupae

After the larva drops to the ground, it bores into the soil, where it forms a puparium. Although most larvae pupate in the top 5 cm (2 in.) of soil, some puparia, particularly the native species, can be found up to 12 cm (4.8 in.) deep. The straw-colored puparium is 4 mm (0.16 in.) long, and resembles a grain of wheat (fig. 9). All three species overwinter in this stage and spend about ten months in the soil. Some individuals may stay in the ground for two or more years before they emerge.

Damage

All three species attack cherry, piercing fruit with the ovipositor to insert eggs singly just below the skin. Little damage results from the egg puncture itself, and the egg-laying scar can be inconspicuous (fig. 6). If the fruit is stung while still green – such as with late varieties – and before it has fully sized, a small dimple will form around the egg puncture (fig. 10). There is typically only 1 egg laid per fruit, although it is possible to find more.

Infested fruit may initially appear sound and will not drop prematurely. Larval feeding in the fruit will separate the pit from the pulp and cause the pulp to turn brown (fig. 7). Sometimes the skin shrivels over the injured area. Brown rot (*Monilinia* spp.) can start in wormy fruit (fig. 8) and spread to other cherries. Late cherry varieties are usually more heavily infested than early varieties.



Figure 9. Cherry fruit fly puparium. Photo: J. Ogradnick, NYSAES.



Figure 10. Close-up of cherry fruit with a small dimple around the egg puncture. Photo: J. Ogradnick, NYSAES.

Monitoring

The date of first emergence in an area can be determined by collecting infested cherries, caging them on the ground under several trees (preferably in the south quadrant), and observing fly emergence in the cages the following spring.

A more convenient method for monitoring cherry fruit fly activity is the use of baited fluorescent-yellow sticky board or vane traps. These traps attract the CFF, the BCFF, the ECFF, the apple maggot, and many other flies. The three cherry fruit fly species can then be identified by their characteristic wing patterns (figs. 2, 4 and 5). Consult local recommendations for the use of these traps.

Management

All species of cherry fruit flies build up in unsprayed, abandoned cherry trees or in wild *Prunus* trees (or, in the case of ECFF, *Lonicera* hosts), and migrate from there to commercial orchards. ECFF adults exhibit limited dispersal, usually less than 100 m, except when hosts are scarce. The removal of sources of infestation will considerably reduce the cherry fruit fly threat in an area.

The CFF is attacked by several natural predators, of which a braconid wasp is the most important. The BCFF is parasitized by an ichneumonid wasp. Neither wasp provides acceptable control in commercial orchards.

Cherries that are to be used commercially must be free of maggots. To achieve such quality, insecticides must be applied to prevent female flies from laying eggs. The first spray should go on seven days after first fruit fly emergence, or when early varieties are beginning to show a tinge of color. The second is applied ten days later, or when the Montmorency variety begins to color. Late varieties may require a third spray. Consult local Cooperative Extension educators for advice on the most effective insecticides for CFF, BCFF, and ECFF control.

