

Parasitoids

Parasitoids are insects that live and feed on or in the tissue of a pest (host), parasitizing and eventually killing the host. Parasitoids are parasitic only in their immature stages; adults are free-living, usually nectar or honeydew feeders.

There are egg, larval, and cocoon parasitoids categorized by the specific host stage that they attack.

Many parasitoids are small and difficult to see. Sometimes the only way to confirm the presence or activity of a parasitoid is to look for signs of parasitism, which include host color change (usually darker), presence of emergence holes in the host, weakened or deformed hosts, and mummified hosts.

About 42 species of parasitoids were recorded from different hosts in a recent survey of the endemic natural enemies in Minnesota apple orchards. Parasitoids are either small wasps (Order: Hymenoptera; Families: Trichogrammatidae, Eulophidae, Braconidae, Ichneumonidae, Aphidiidae, Chalcididae, and Encyrtidae), or flies (Order: Diptera; Family: Tachinidae).



Trichogramma minutum

Wasp parasitoids in the family **Trichogrammatidae** (e.g. *Trichogramma* sp.) are egg parasitoids of many orchard moth pests such as codling moth and leafrollers.

Trichogramma minutum is endemic in Minnesota orchards. *Trichogramma* sp. are very tiny wasps (about 0.3 mm long), and are difficult to see with the naked eyes.



Chrysocharis sp.
(Eulophidae)

Parasitoids in the family **Eulophidae** parasitize eggs and larvae of many insects including spotted tentiform leafminer and leafrollers. *Chrysocharis* sp. is about 2 mm long.

Parasitic wasps in the family **Braconidae** are larval parasitoids of many insect pests, such as codling moth, leafrollers, apple maggot, and plum curculio.

Macrocentrus iridescens is a parasitoid of obliquebanded leafroller larvae. Adult wasps are orange, about 7 mm long.



Macrocentrus iridescens

— 7 mm



Macrocentrus sp. cocoon showing wasp emergence hole (see arrow)



Parasitized obliquebanded leafroller larva



Bracon tachypteri
(a parasitoid of plum curculio larvae)



Diachasma alloeus
(a parasitoid of apple maggot larvae)

Parasitoids in the wasp family **Ichneumonidae** attack larvae and pupae of many insects. They are among the largest of the parasitic wasps encountered in the orchard.



Itopectis conquisitor (a parasitoid of leafroller pupae)



Redbanded leafroller pupa from which Itopectis wasp has emerged



Ascogaster sp. (a parasitoid of codling moth eggs and larvae)



Scambus hispae (a parasitoid of leafroller prepupae, about 10 mm long)

— 10 mm

Mastrus ridibundus, a parasitoid of codling moth (CM) prepupae, was introduced from Eurasia. It was released at four sites in Minnesota in 2000, and was recovered at three of the sites in 2001.

— 7 mm



Mastrus ridibundus (about 7 mm long)



M. ridibundus cocoon (note the head of the parasitized CM larva)

Parasitic wasps may be confused with predatory, or free-living wasps. The look-alike wasps include yellow jackets (Vespidae), spider wasps (Pompilidae), and sphecid wasps (Sphecidae). Parasitoids are non-stinging wasps, while the look-alike wasps do sting. Predatory and free-living wasps are bigger with elbowed and proportionately shorter antennae than parasitoids. Parasitic wasps may also be confused with syrphid or flower flies.



Yellow jacket (about 20 mm long)



Sphecid wasp (about 15 mm long)



Syrphid fly (about 8 mm long)

Tachinid flies are an important group of orchard parasitoids. Adults are hairy and resemble common flies. Female tachinid flies deposit eggs on the host. The larvae hatch, feed and develop in the host. Hosts include various moth and beetle larvae. Tachinid flies can be distinguished from house flies and other common flies by having bristles (long thick hairs) on the tip of their abdomen, which are not present in the other flies.



Lixophaga variabilis (a parasitoid of codling moth larvae)



Phryxe pecosensis (a parasitoid of leafroller larvae)



House fly (note the absence of bristles, but only short hairs on the abdomen)