

Apple Clearwing Moth (*Synanthedon myopaeformis*)

February, 2016

The apple clearwing moth (known as small red-belted clearwing moth in Europe) was confirmed in Cawston in 2005 on apple as the first record in North America. It has since spread throughout the Similkameen valley and to different areas of the Okanagan valley. It is also present in Coastal B.C. and one orchard in Ontario. Growers should report any suspicious damage to their field service/crop advisor to confirm if this pest is present in their orchard.

****TO STOP THE SPREAD OF THIS PEST, DO NOT MOVE FRUIT TREES, ROOTSTOCKS, AND APPLE WOOD FROM INFESTED AREAS****

Hosts

European hosts include apple, pear, crabapple, quince, plums, apricots, cherries, hawthorn, and mountain ash, but in Canada it has only been found in apple trees.

Identification

Larva: 15 - 20 mm long, dirty white with reddish-brown head and thoracic shield behind head (Figure 1).

Pupa: 15 mm long, pale yellowish-brown (Figure 7).

Adult: 20-25 mm wing-span, slender dark blue-black body with orange-red band across the abdomen. Wings are transparent (lack scales), the front pair narrow, shiny and slightly dark; hind wings are much shorter (Figure 2).



Figure 1. Apple clearwing moth larva with frass.
Courtesy of BC Tree Fruits Cooperative.



Figure 2. Apple clearwing moth adult.
Photo courtesy of Gary Judd, Summerland Research and Development Centre.

Damage

Larvae tunnel under the bark anywhere from below the crown area up to branches. They enter the trunk through burr knots, wounds, grafts, branch collars, pruning cuts, and wire damaged areas (Figures 3 & 4). Infested rootstocks appear swollen (Figure 5). Infestations have been found mainly in M9 and Ottawa 3 rootstocks below the graft union and under burls or around cankers above the graft union, but all apple rootstocks and varieties are attacked. Top-grafted trees are more susceptible to attack and feeding by larvae can kill young trees. Secondary damage in young trees includes weak limbs, poor fruit set and early leaf drop (Dr. Gary Judd, Agriculture and Agri-Food Canada, Summerland). In the drier desert climate of the Southern Interior of B.C., infested trees are prone to drought stress which can contribute to death of trees. In highly infested orchards, damage can spread throughout tree canopies and central leaders of high-density plantings are heavily attacked after being pruned to control growth. In Europe, apple clearwing moths shorten the life of trees and could make the trees susceptible to attack by other insects such as shothole borer and ambrosia beetle. Infestations are often associated with European canker caused by *Nectria galligena*, and with M9 rootstock.



Figure 3. Damage from wires. Photo courtesy of Amanda Brown



Figure 4. Larval damage to crown area of young apple tree.



Figure 5. Swollen infested rootstock. Photo courtesy of Amanda Brown

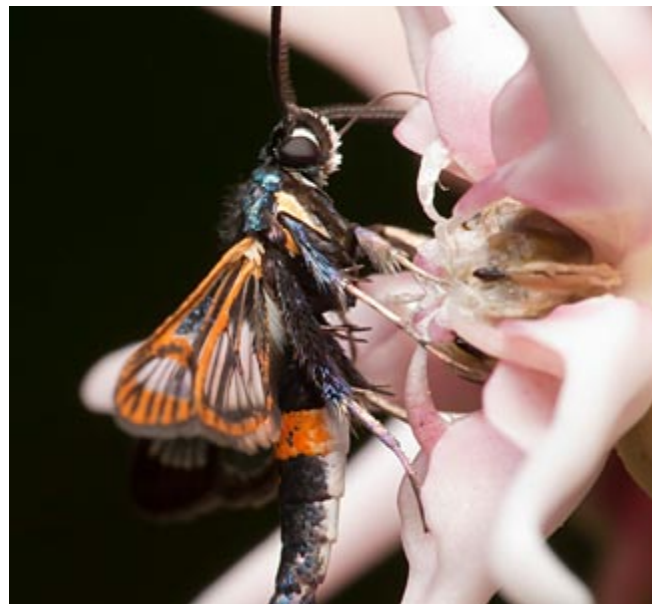


Figure 6. Adult feeding on nectar, Courtesy Gary Judd, Summerland Research and Development Centre

Life History

In the Similkameen and Okanagan Valleys, apple clearwing moth has a 2-year life cycle. Adult flight begins in early June, peaks by mid-July and ends in late August. Females feed on nectar for a few days before laying eggs (Figure 6). Eggs are laid singly in burr knots, pruning cuts and wounded bark on branches and trunks, and likely any other site that allows larvae to get under the bark. Larvae feed on sap between the bark and inner tissue (cambium layer) of trees for almost two years before pupation. Larval feeding leads to the creation of shallow, irregular winding galleries just cutting into the wood, and about 20 – 25 mm long. Frass collects in feeding tunnels but is expelled by larvae in spring just before they pupate. The larvae overwinter in the tunnels and pupate the following spring at the entrance of the tunnels. When the moths are ready to emerge (mostly in the morning), the pupae (Figure 7) wriggle to the tunnel exit hole and extend out to allow the adults to emerge. The appearance of empty pupal cases sticking out of the bark is a useful indication of its presence (Figure 8). Counts of pupal cases can be used to estimate population density. There is one generation per year.



Figure 7. Apple clearwing moth cocoon (left) and pupa (right). Photo courtesy of Hugh Philip, IPM 2 GO Consulting Service



Figure 8. Apple clearwing moth pupal case. Photo courtesy of BC Tree Fruits Cooperative

Monitoring

The moths can be observed resting on leaves during sunny days. To check for larval infestations, examine the bases of trees for 2 to 3 mm-wide holes and tunnels under the bark, especially rootstocks that appear abnormally swollen. Unitraps (Figure 9) or delta or wing traps (Figure 11) baited with peach tree borer pheromone will attract male apple clearwing moths. Yellow pheromone traps are more attractive to moths than other colours.



Figure 9. Unitrap baited with peach tree borer pheromone. Figure 10. Unitrap with male apple clearwing moths.



Figure 11. Delta or wing trap baited with peach tree borer pheromone. Photo courtesy of Gary Judd, Summerland Research and Development Centre

Control

Cultural - Reduce the risk of infestations by minimizing wounds to trees, remove young trees with cankers, and seal wounds with wound-protecting products. Tree guards, trunk wraps, and soil mounding are not effective and probing trees with metal wires to kill larvae will damage trees (Gary Judd, Summerland Research and Development Centre).

Mass trapping - Two litre plastic bottle traps (Figures 12 & 13) baited with grape juice are highly attractive to both male and female clearwing moths (Gary Judd, AAFC, Summerland). Two litre honey buckets can be used instead of plastic bottles. Moths should be cleared out of traps regularly. A bait of 8 L Water + 1 L apple juice + 1 L vinegar + 100 g sugar has been found to be effective at reducing moth populations in Tyrol, Italy. Use an open bucket (such as a 2 liter honey bucket) to allow for easy clearance of trapped moths with a sieve. Clear out moths weekly and top up bait as needed.



Figure 12. Apple clearwing moth bottle trap. Photo courtesy of BC Tree Fruits Cooperative



Figure 13. Grape juice baited bottle trap with moths, Courtesy Gary Judd, Summerland Research and Development Centre

Mating disruption - Mating disruption with Isomate-P dispensers can be used for areas with very low levels of apple clearwing moth (orchards with populations of less than 25 moths/trap the previous season). Mating disruption programs will be more successful if all growers in the area participate. The dispensers should be applied at 100/acre and hung at head height, 5-6 feet. These dispensers are often good for two years of control.

Biological control - Earwigs, ants, spiders and birds will feed on larvae. Birds cause damage to the bark of trees during feeding and this may kill trees.

Chemical control - Spray application technique and coverage are very important. Recommended insecticides should be applied with a hand gun or backpack sprayer at high water volumes to ensure thorough coverage of tree trunks and scaffold limbs. Entrust SC (250 mL/ha), Entrust 80W (75 g/ha), Success 480 SC (125 mL/ha), Delegate (420 g/ha) and Rimon 10EC (1.4 L/1000 L of water/ha) are registered for apple clearwing moth control.

Target larvae before pupation in the spring (April to early May, look for signs of frass). Apply summer sprays at 25% and 75% egg laying; 200 and 375 DD (10°C base temp), respectively, after first male pheromone trap catch (Biofix). In the South Okanagan, first summer sprays are generally applied at peak adult trap captures (July 10-15). Repeat spray applications at 7-14 day intervals depending on the product. Check with your field service person or consultant for timing of spray applications.

Apply Rimon in the spring or fall (September) to control larvae. Summer applications of Rimon are not recommended due to mite flare ups. Altacor used for the control of leafrollers will help reduce apple clearwing moth populations in aerial parts of the tree. Read and follow label directions.