

FLATHEADED APPLE TREE BORER & PACIFIC FLATHEADED BORER: Live Larvae - Dead Trees

Plant damage caused by flatheaded wood borers, *chrysobothris*:

Flatheaded wood borers attack weakened or stressed plants. A single larva is capable of girdling and killing a young tree.

Adult feeding may cause some defoliation, but the major damage to the plant is caused by larval feeding which creates galleries (mines) between the bark and the wood. The galleries are usually filled with coarse, excelsior-like fibers. The galleries, which nearly always begin on the sunny side of the tree, may extend completely around the tree thus girdling and killing the tree or infested branches. A full-grown larva may bore from 1 to 2 inches deep in the wood of the tree. Bark exterior to the galleries or mines may die and peel off. Sap may exude from these darkcolored dead areas of bark. The darkened areas of bark and fine bits of sawdust protruding through the bark indicate the presence of wood boring larvae.

The borers:

Chrysobothris, a genus of the flatheaded wood borers, contains well over 100 species in North America including *Chrysobothris femorata* Olivier (flatheaded apple tree borer) and *Chrysobothris mali* Horn (Pacific flatheaded borer).

The flatheaded apple tree borer is a common species that feeds on many kinds of deciduous shade trees, fruit trees, and shrubs such as maple, oak, sycamore, tulip poplar, willow, rose and cotoneaster. Although found predominantly in the Eastern and Central United States, it is also found in the Pacific Northwest. However, in the Pacific Northwest, the Pacific flatheaded borer is more common and of greater economic concern (Johnson and Lyon, 1976).

The Pacific flatheaded borer, the predominant species on the west coast, closely resembles the flatheaded apple tree borer and causes the same kind of injury, -usually under similar conditions. The Pacific flatheaded borer is considered one of the worst enemies of newly planted trees and shrubs in the Pacific coast states and in British Columbia, Canada. Seventy or more woody plants are hosts including various fruit, *Acer*, *Alnus*, *Betula*, *Populus*, *Quercus* and *Salix*.

Though the Pacific flatheaded borer resembles the flatheaded apple tree borer in habits and appearance, the two can be distinguished by specialists. Flatheaded apple tree borers in

the Pacific Northwest (usually from *Populus* sp.) are morphologically different from those in the Eastern United States (Personal communication, Stanley G. Wellso, Professor of Entomology, Michigan State University).

Annual life cycle:

1. **Adults:** The adult beetles emerge from infested trees from spring through summer. The flatheaded borer adults are dull bronze in color with metallic copper-colored spots on the wing covers. They are from 1/4 to 1/2 inch long. They fly for about 3-5 weeks and make a buzzing sound when flying. They are active insects, and will quickly conceal themselves or fly away when approached. Being sunlovers, they are inactive and rarely seen on cloudy days. The adults feed on pollen, foliage, or tender bark of trees -they may cause defoliation.

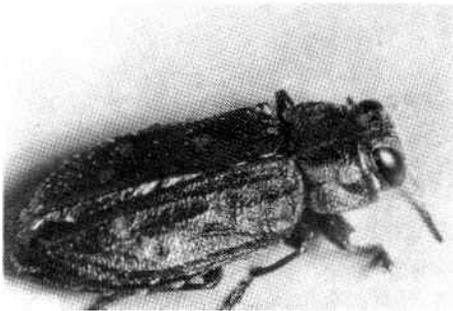


Fig. 1. Pacific flatheaded borer, adult.

2. **Eggs:** The female beetle lays her yellow disk-like wrinkled eggs in cracks in the bark of trees, nearly always selecting a tree that is unhealthy, or a spot on a healthy tree where the bark has been injured, i.e. by sunscald or a bruise. The eggs are laid from May to August.

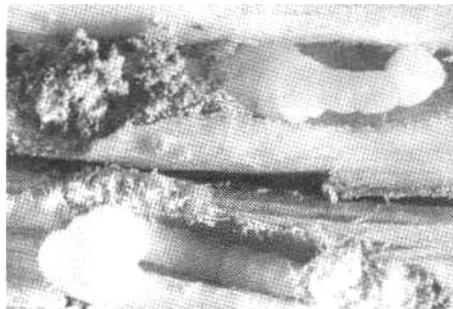


Fig. 2. Within stressed trees the larvae of the Pacific flatheaded borer bore galleries. Note the coarse, excelsior-like fibers filling the galleries. (Figures 1 and 2 are from the OSU Ext. Service, Catalog of Available Insect Slides, Joe Capizzi, Entomology Department: this slide collection contains 3,104 photographic slides of insects - their life stages, habitats, and damage- representing over 980 species in over 200 families).

3. **Larvae:** Eggs hatch in 2 to 3 weeks, the larvae bore directly into the bark underneath the egg. If the tree or shrub is in a weakened condition or the bark has been badly damaged, the larva bores into the inner phloem, making irregular tunnels which become partially filled with powdery frass.

The full-grown larva is about 1/2 inches in length, legless, of a yellow to yellowish-white color with a broad, flat enlargement of the body just back of the head which gives this group of beetles their name, - flatheaded borers.

4. **Pupae:** The pupae overwinter within the galleries where they transform into adults which emerge from late spring through summer.

Protect against infestation: the best control measures are directed at prevention of an infestation.

1. **Plant noninfested stock:** The presence of grubs in a plant is indicated by darkened areas of bark and fine bits of sawdust protruding through the bark. Care should be taken to avoid planting nursery stock that is infested.

2. **Avoid injuries that may induce attack:** Fire, cultivation, and other mechanical injuries, wind breakage, sunscald, weakening due to transplanting, drought, and winter injury induce attacks. Plant stress should be avoided and wounds should be promptly covered with good tree paint.

Prevent Sunscald: Protect planted stock from sunscald by painting with white latex base paint, whitewashing or shading. Sunscald damage may also be limited by wrapping the trunks of the trees the first year after transplanting. Wrappings should be on the tree before the middle of May and should extend from the ground level to the lower branches. Any good grade of paper, even several thicknesses of old newspapers, may be used. The paper should be held in place with twine and should remain on the trees through the second year. **However, it has been shown that tree wrap does not always prevent egg laying or injury.** (Johnson and Lyon, 1976). The larvae are destructive during the first 2 or 3 years after trees are planted, -especially where parts of trees that were previously shaded are exposed to the sun by pruning or reorientation during transplanting (this is a good reason to mark the north side of tree, possibly with a spot of paint, prior to digging and transplanting).

Since the sun-loving adults generally lay eggs on the sunny side of the tree, shading the trunks of young trees by pruning to head the trees low or by wide stakes tends to keep adults away.

3. **Stimulate growth:** Where trees lose vigor for any reason, they are likely to be seriously damaged. Young, recently transplanted trees are particularly subject to attack because during their establishment there is a period in which their condition is somewhat weakened.

A number of tree-care measures should be exercised to prevent stress, or more positively, to keep trees and shrubs in vigorous, healthy condition. **It should be remembered that poor planting sites invite beetle attack.**

Use vigorous plants and maintain their health and vigor by proper planting, watering, pruning, cultivation and avoidance of wounds.

4. **Reduce future infestation potential:** The severity of attack may be associated with the number of beetles present in an area. Prompt removal and destruction of infested trees and shrubs by burning or chopping will protect nearby stock from future infestation.

5. **Enhance biological control:** The borers have a number of natural enemies that might be potential factors in an integrated management program.

Species of *Pyemotes (Pediculoides)* (Cross 1965, Cross and Moser 1975) prey upon broods of wood borers (Furniss and Carolin, 1977). Johnson and Lyon (1976) reported that the most

common predator in Oregon is the mite, *Pediculoides ventricosus* (Newport), which attacks the larva in the galleries.

However, the *Pediculoides ventricosus* (commonly called the harvest mite is also reportedly parasitic on humans producing symptoms much like chiggers: spots produced by these microscopic mites may itch for several days to a week (vomiting, headache, fever may also occur) according to Metcalf and Flint (1939).

A reported group of natural enemies are parasitoid wasps of the Hymenoptera order of insects. Twelve different species of wasps have been reported as being parasitic on the flatheaded apple tree borer (*Chrysobothris femorata*) including *Spathius floridanus*, *Atanycolus charus*, *Atanycolus femoratae*, *Atanycolus rugosiventris*, *Labena grillator*, *Xorides neoclyti*, *Phasgonophora sulcata*, *Trigonura californica*, *Trigonura elegans*, *Metapelma spectabile*, *Tetrastichus holbeini*, *Horismenus carolinensis*. A total of five Hymenoptera are reported as being parasitic on the Pacific flatheaded borer (*Chrysobothris mali*) including *Atanycolus malii*, *Cryptoheleostrizus alamedensis*, *Euchrysis hvalinipennis*, *Trigonura californica*, *Tetrastichus holbeini*.

The biology of these natural enemies requires more study, but they are important in reducing populations of borers which infest woodland and unmanaged areas. If preventative measures are followed, the presence of natural enemies may then help to reduce the beetle population which acts as a source for infesting commercial stock. It is feasible that beetle populations could be further reduced by introducing some of the aforementioned natural enemies into regions where they presently do not occur.

6. Apply preventative insecticides: Chemical treatments are preventative; they protect against infestation rather than eradicate. Lindane is registered for use against flatheaded borer at the rate of 3 pints, 20% EC/100 gals. of water. Follow label directions for use Lindane uses are under critical review by the EPA and the legality of this use should be confirmed before using.

Remember that attack is indicative of injury or poor cultural conditions. A stressed plant is still stressed even if protection is afforded by chemicals.

Literature Cited:

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