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Carpenterworm (Prionoxystus robiniae)

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Quick Facts

- The larval stage of the carpenterworm is a wood-boring caterpillar that is known to be hosted by the black locust, cherry, cottonwood, elm, fig, green ash, lilac, maple, oak, pear, poplar, and willow.
- Adult carpenterworms are large, heavy-bodied, mottled gray moths.
- Carpenter worms rarely kill infested trees, but their tunneling can decrease tree vigor and leave it more susceptible to disease.
- Control methods include cultural and chemical treatments.
- Insecticides may be applied as preventative treatments to the trunk and larger branches during active periods.

Fig. 1. *Carpenterworm (Prionoxystus robiniae) Larva*[1]

Fig. 2. *Carpenterworm (Prionoxystus robiniae) Moth*[2]

DESCRIPTION

The larval stage of the carpenterworm, Prionoxystus robiniae is a wood-boring insect that affects various ornamental trees. Unlike most other wood-boring pests of ornamentals, which are mostly beetle larvae, the carpenterworm is a caterpillar belonging to the moth family Cossidae.

Adult carpenterworms are large, heavy-bodied, mottled gray moths. This species is generally distributed in the United States and southern Canada. The females have a wingspread of about 3 inches with light gray hindwings. Males are about 2/3 the size of the females and have yellowish-orange hindwings.

Full grown larvae are 2-3 inches long, fleshy, and greenish-white or pinkish with dark brown heads. Carpenterworm larvae are about the largest wood-boring caterpillars. They can be distinguished from wood-boring beetle larvae by the fact that they have leg-like appendages (prolegs), each provided with bands of hooks (crochets) on their ends.

HOSTS AND LIFE CYCLE

Recorded hosts of the carpenterworm include black locust, cherry, cottonwood, elm, fig, green ash, lilac, maple, oak, pear, poplar, and willow. Based on submitted samples, the primary hosts in Utah are cottonwood and willows.

Adults begin emerging from host trees in late May or early June, are most numerous in mid to late June, and

complete emergence by mid-July. Individual adults live for about one week. Females deposit 200 or more olive green, oblong eggs, singly or in masses, in bark crevices, under lichens or moss, or near wounds.

Egg hatch occurs within 14 days. The 1/4 inch long, reddish-pink larvae penetrate the tree within a few hours, either through the bark or through existing holes. Larvae pupate (form cocoons) in the upper end of their tunnels. When development is completed, the pupae wriggle to the mouth of the burrow and the adults emerge, leaving the empty pupal case protruding from the burrow entrance.

Fig. 3. *Recently Hatched Larva*[2]

Under Utah conditions, three years are required to complete a single generation (four years may be required at higher elevations). Generations overlap and all growth stages occur in any given year.

SYMPTOMS AND DAMAGE

Shortly after entering the tree, the larvae seal the burrow opening with a mixture of silk and chewed wood fiber. Initial feeding activity results in the formation of irregular tunnels in the inner and outer bark. The upward-slanting tunnels extend to the cambium within a month after egg hatch. The sapwood is reached within two months and the heartwood about four months after hatch.

Completed galleries may reach a length of 9 inches and exceed 1/2 inch in diameter. Larvae frequently return to the burrow entrance to feed on the more succulent tissue in that area and to expel a mixture of wood fiber and excrement (frass) they have cleaned out of the tunnels. The burrow entrance is kept sealed with a frass plug when larvae are not expelling waste material. Larvae continue to enlarge the tunnels as they grow.

Initial infestations are difficult to detect until the following spring when larvae begin expelling noticeable quantities of frass from the burrows. Spring feeding activity in the sapwood may also produce discolored, moist areas as sap flows through the injured tissue. Feeding by older larvae produces greater quantities of frass and may kill localized areas of the bark. These dead sections of bark may eventually separate and fall off. The presence of empty pupal cases is a sure sign that the tree has been infested for at least three years.

Scarred and discolored areas caused by larval feeding detract from the appearance of ornamental plantings. While carpenterworms rarely kill infested trees, their tunneling decreases tree vigor, may introduce various disease organisms, and increases the susceptibility of the tree to wind damage.

Females carpenterworms are poor fliers and prefer to crawl. Consequently, the eggs are often deposited in the same tree they emerged from. For this reason the spread of carpenterworms from one tree to the next is often slow. However, once a tree is infested, it will often be reinfested and support several generations.

Fig. 4. *Entry Wounds Typical of Carpenterworm Infestation*[3]

CONTROL

Stressed or low vigor trees are more likely to become infested. Cultural techniques that improve or maintain the vigor of a tree will reduce the potential for damage. Heavily infested, weak, or cull trees are probably best removed. Avoid bark injuries that may invite the entry of carpenterworms or other borers. Larvae produce large, relatively straight tunnels, the entrances of which are marked with expelled frass. As a result, light infestations can be controlled by probing the tunnels with a piece of wire until the larvae are punctured.

Insecticides may be applied as preventative treatments to the trunk and larger limbs of shade trees during the period of adult activity. These applications will kill newly-hatched larvae as they attempt to penetrate the bark. The initial application should be made about the third week of May. Two additional applications should be made at three-week intervals. This preventative treatment may vary by location from year to year.

Carpenterworm larvae are difficult to control once they are within the tree. Injected insecticides may provide some control of larvae. Injections of insect-attacking nematodes (Steinernema carpocapsae) into carpenterworm tunnels have been shown to be somewhat effective in controlling the larvae.

Very few insecticide products are labeled specifically for carpenterworms. Homeowner-type insecticides labeled for borer control (bark treatments) on ornamental trees include some formulations of carbaryl and permethrin. Additional formulations containing bifenthrin, carbaryl, cyhalothrin, cypermethrin, lambda-cyhalothrin, and permethrin are available for professional use.

Insecticide formulations containing abamectin, acephate, cyfluthrin, cyhalothrin, cypermethrin, dicrotophos, fenvalerate, imidacloprid, Metarhizium anisopliae (a fungus), oxydemeton-methyl, and permethrin are labeled for injection treatments on ornamental trees. Most of these are intended for use by professional pest control operators and may require special equipment to be used.

Not all formulations containing the above active ingredients are suitable for use on trees. Before purchasing or applying any insecticide, check the label to be sure the tree you want to treat is listed or that the product is labeled for use on ornamental shade trees in general. Some products may be restricted-use pesticides, which can be purchased and applied only by licensed pesticide applicators.

PRECAUTIONARY STATEMENT

All pesticides have both benefits and risks. Benefits can be maximized and risks minimized by reading and following the labeling. Pay close attention to the directions for use and the precautionary statements. The information on pesticide labels contains both instructions and limitations. Pesticide labels are legal documents, and it is a violation of both federal and state laws to use a pesticide inconsistent with its labeling. The pesticide applicator is legally responsible for proper use. Always read and follow the label.

PHOTO CREDITS

[1]William H. Hoffard, USDA Forest Service, Bugwood.org

[2]James Solomon, USDA Forest Service, Bugwood.org

[3]Bob Hammon, Colorado State University, Bugwood.org