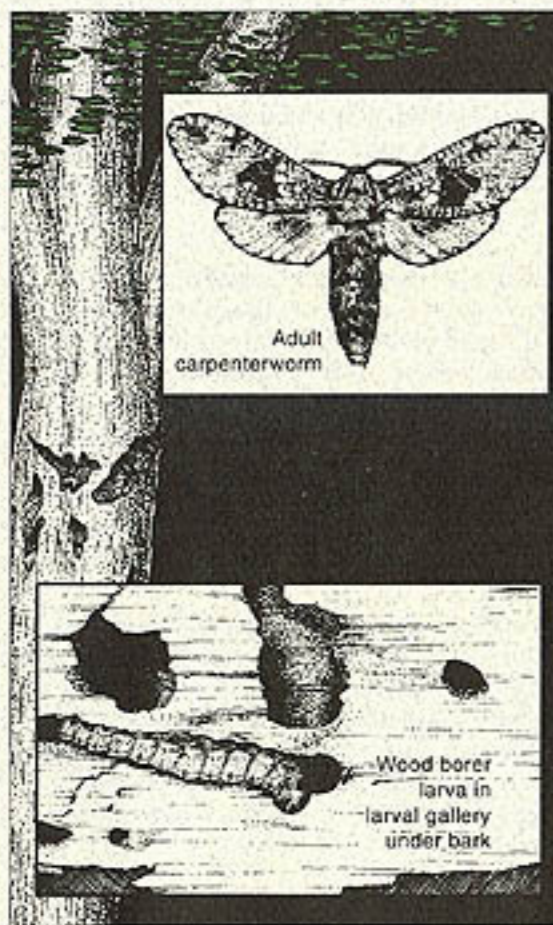




Wood borers in hardwoods



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Distribution and Hosts

There are a number of wood boring insects commonly found in live hardwoods of the prairie provinces. Most notable of these are the carpenterworm (*Prionoxystus robiniae* [Peck]), the poplar carpenterworm (*Acosus centerensis* [Lint.]), the aspen carpenterworm (*A. populi* [Wlk.]), the ash borer (*Podosesia syringae* [Harr.]), the cottonwood crown borer (*Sesia tibialis* [Harr.]), and the poplar-and-willow borer (*Cryptorhynchus lapathi* [L.]). There are many other wood boring insects, most of which are bark beetles (Scolytidae), flatheaded wood borers (Buprestidae), and roundheaded or long-horned beetles (Cerambycidae). Most of the latter borers attack only dead or dying trees and are not usually a problem in living trees that are healthy.

Carpenterworm species are distributed throughout the prairie region, with the exception of the poplar carpenterworm, which is found only in Manitoba and Saskatchewan. The carpenterworm primarily attacks poplar and green ash in the prairie provinces, but it is known to attack a variety of hardwoods elsewhere on the continent. Poplar and aspen carpenterworms attack poplar and aspen, respectively.

The ash borer attacks young ash trees, both green and white, and common lilac, usually in the lower stem. It is found primarily in Alberta, Saskatchewan, and Manitoba. The cottonwood crown borer, is a pest of poplar and willow and commonly feeds in hybrid poplar stool beds in Alberta, Saskatchewan, and Manitoba.

The poplar-and-willow borer was introduced into North America from Europe and is found in Alberta as far north as 54° latitude and in Manitoba wherever willow grows. The borer probably occurs in southern

Saskatchewan, but no specimens have been collected in that province. Hosts include poplar, willow, and occasionally alder and white birch. Most often, the poplar-and-willow borer attacks ornamental plantings of poplar and willow.

Symptoms and Damage

These wood boring insects often go unnoticed in the trees they are attacking until severe damage has resulted. When attacked by one or more of these borer species, trees are usually weakened structurally and are susceptible to wind and snow breakage, especially if they are repeatedly attacked. Severe attack can place trees under stress, making them more susceptible to other damage agents such as drought and disease. If a tree is suspected of being attacked by a wood boring insect, careful examination will reveal small entry holes in the bark (often in and around old wounds) where the larvae of the developing moths or beetles extrude frass or debris. In many cases, small amounts of sap bleed from these entry holes. When a tree is severely attacked, large amounts of frass will accumulate at the base of the tree. Splitting the branches or stem of an attacked tree will reveal wood that is riddled with feeding tunnels. The cottonwood crown borer can be a serious pest of hybrid poplar stool beds, resulting in reduced production of poplar cuttings.

Casual Agents

The carpenterworm's life cycle takes 3-4 years to complete in the prairie provinces. Larvae pupate in feeding tunnels cut when they burrowed into the trees, and adult moths emerge in June. Both male and female moths are mottled gray, but the hind wings of males are orange. Females have a wingspan of 65-75 mm and males of about

50 mm. After mating in June, females fly to host trees where they deposit up to 300 eggs in bark crevices and near wounds. Trees that have been attacked before are often preferred sites for oviposition; these trees are known as brood trees. After the eggs hatch in about 2 weeks, each brood tree may contain several hundred larvae, which burrow into the stem. Larvae are small and green-white, with brown heads and thoracic shields (a hard shield directly behind the head). Once larvae have burrowed into the tree stem, they take up to 4 years to reach their full size of 50-75 mm. Tunnels created by larvae are extensive and often intersect. Larvae keep tunnels clear of frass or debris by pushing it out of the entry holes. Pupation occurs in May of the final year of development when larvae are full-grown.

Little information exists on the life cycles of poplar and aspen carpenterworms, but they are probably similar to each other. The poplar carpenterworm pupates within its host tree, with adult moths emerging in June and July. These adults have wingspans of 40-50 mm, while the wingspans of aspen carpenterworm adult moths are slightly larger at 50-60 mm. Adults of both these species are similar in appearance to the adult carpenterworm, with mottled gray wings and bodies. The larvae of these *Acosus* species have off-white bodies with brown spots and dark brown heads and thoracic shields. Life cycle duration of both species is unknown.

In the southern and midwestern United States, the ash borer has a 1-year life cycle, but in the prairie provinces this species takes up to 3 years to complete development. Larvae pupate in feeding tunnels, just under the bark surface. Adult moth emergence occurs in June and early July. The adult ash borer is known as a clearwing moth because it lacks scales on its wings and therefore appears

wings (elytra), which are initially gray-pink but turn light brown. These borers have functional wings but rarely fly. Adults feed on many young succulent shoots before mating. Oviposition takes place in the summer when females make small punctures in the shoots and deposit a single egg (sometimes as many as three) in each puncture. Once the eggs have hatched, the larvae feed at first by mining the bark and then later move into the wood. Larvae are creamy-white, C-shaped grubs and have a full-grown length of 13 mm.

Prevention and Control

A number of biotic agents act as natural controls for wood borers of hardwoods. Studies have shown that birds, particularly woodpeckers, may feed on up to 75% of a population of wood borers and are probably the most effective natural control agent. Parasitic insects, especially parasitic wasps, also feed on wood borers. In the United States fast-growing wood decay fungi have been documented as trapping pupae within feeding tunnels, thus preventing adult emergence.

Most of the wood borers prefer wounds and scars on trees for oviposition. Care should, therefore, be taken when working on or near ornamental hardwoods, because careless cultivation, pruning, or mowing may cause injury resulting in oviposition sites. Ornamental trees that are healthy and growing well are most resistant to wood borer attacks. During drought, trees should be watered to prevent the drought stress that may predispose trees to wood borer attacks.

If a high-value ornamental tree has been attacked by only a few larvae, these larvae may be killed by inserting a flexible, small-gauge wire into the entry holes. When the wire is fully inserted it may puncture and kill the burrowing larva. Several attempts may be necessary to be successful. When

similar to a hornet or wasp. After mating, each female lays up to 400 light brown, ovate eggs, usually in small clusters in bark crevices. Eggs hatch in 10–14 days. Larvae enter the sapwood and then tunnel upward to feed, forming larval galleries; when larvae are mature, they tunnel back towards the bark. Tunnels can be up to 32 cm long. Ash borer larvae have amber heads and thoracic shields, and white bodies, and are 26–34 mm in length when full-grown. Pupation lasts about 21 days and occurs in May of the final year of development.

The cottonwood crown borer requires 2 years to complete its life cycle. Depending on their location, pupae move to the surface of either soil or bark before emerging as adult moths in late June or early July. These moths look like hornets with black and yellow-striped bodies and transparent wings. It is not known where eggs are laid on the host tree. Cottonwood crown borer larvae feed in tunnels in the cambial area (bark-wood interface) of both the lower stem and roots. Larvae have white bodies with dark red-brown heads and tan thoracic shields; when full-grown they are 40 mm in length. These borers overwinter twice in the larval stage because they require 2 years to complete their development. Pupation occurs in silk-lined, wood chip pupal chambers in the soil if larvae have fed in host tree roots; larvae pupate just below the bark surface if they have fed in the stem. Pupation length is unknown but is probably around 20 days.

The poplar-and-willow borer requires 2 years to complete its life cycle in the prairie provinces, and the adult borer is capable of surviving a third winter. Larvae pupate within wood chip-filled chambers of attacked shoots. Both male and female adults are rough-surfaced, snout-nosed beetles, about 8- to 10-mm long. They are mostly black except for the hind third of their hardened

trees have been severely attacked (i.e., brood trees), they should be removed and destroyed before neighboring trees can be attacked by subsequent generations emerging from the brood trees.

To prevent adult moths from emerging, some infested trees can be tightly wrapped in burlap, which will trap moths in the feeding tunnels. This method is only used on small trees, where all emergence holes can be covered. Wrapping large trees is impractical because some emergence holes may be located on larger, inaccessible branches. Emergence of the poplar-and-willow borer cannot be prevented by wrapping infested trees with burlap.

Pheromones are commercially available for the ash borer and can be used to trap moths around ornamental hardwoods to interrupt mating and prevent oviposition. Research on the carpenterworm and the cottonwood crown borer has isolated the pheromones released by female moths of these species to attract male moths. These pheromones are not commercially available in Canada but may be obtained through suppliers in the United States.

Normal chemical control is not effective against any of the wood borers discussed in this leaflet. Injections of a fumigating insecticide into larval galleries may be useful as treatment against wood borers in high-value trees.

For the most recent information on chemicals available for control of these pests, call Agriculture and Agri-Food Canada's Plant Industry Directorate in Ottawa (toll-free) at 1-800-267-6315.

Chemical pesticides are toxic to humans, animals, birds, fish, and beneficial insects. Follow all instructions and precautions listed by the manufacturer.

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