



TREES & SHRUBS

Shade Tree Borers

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Quick Facts...

Shade tree borers are insects that develop underneath the bark of trees and shrubs. Certain beetles and moths are the most common borers.

Most shade tree borers can successfully attack only trees that are injured or stressed.

Shade tree borer development takes from one to three years to complete. Adult stages of these insects occur outside the tree.

Control of shade tree borers includes maintaining growth and vigor of the tree or shrub.

Insecticides can best control shade tree borers if they are applied when adult insects are laying eggs on tree trunks.

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Shade tree borers are insects that develop underneath the bark of woody plants. Most of these insects can attack only dying trees, felled logs or trees under stress. Stress to woody plants may be the result of mechanical injury, recent transplanting, overwatering or drought. These borers often are incorrectly blamed for damage caused by a pre-existing condition or injury.

Certain borers, in particular the “clear-wing borers,” are capable of damaging apparently healthy trees.

Life History and Habits

A large number of beetles and moths develop as wood borers in their immature (larval) stage. When full-grown, typically in one to two years, the adult stages cut a hole through the bark and emerge.

Many of the adult borers, particularly the longhorned beetles and metallic wood borers, feed on pollen, tender bark or leaves but do not cause any significant injury. The adult stage is mostly spent flying to new host trees, mating and laying eggs.

Eggs of most shade tree borers are laid on the bark, usually within small cracks. Longhorned beetles and horntails deposit their eggs underneath bark.

Eggs typically hatch within one to two weeks, and the newly emerged borers chew through the bark. Subsequent borer development takes place just under the bark and in the wood. As the borers tunnel in the tree, they make meandering tracks that are packed with fibrous boring dust.

When fully developed, the adult insect emerges through a hole chewed in the bark. With the exception of horntails, these exit holes are oval.

Longhorned Beetles/Roundheaded Borers (Cerambycidae)

Longhorned beetles are named for the very long antennae typical of the adult. Some of these insects may reach 2 inches long. Larvae are known as roundheaded borers and penetrate deeply into the wood while feeding. The entire life cycle (egg, larval, pupal and adult stages) may take several years.

Most longhorned beetles cannot attack healthy trees and primarily come to attention as a nuisance problem when emerging from firewood. (See fact sheet 5.563, *Firewood and House Log Insects.*) However, species are known that can directly damage black locust, poplar and cottonwood.



Figure 1: Longhorned beetle adult (above) and larva (below).



Figure 2: Metallic wood borer adult (top left), larva (bottom left), and injury (right).

Metallic Wood Borers/Flatheaded Borers (Buprestidae)

Metallic wood borers are beetles named for their metallic sheen. Most metallic wood borers are green, bronze or blue, but brightly colored species also occur. Larvae are known as flatheaded borers. They feed just under the bark, making meandering mines through the cambium. Complete development usually takes one year.

Metallic wood borers develop only in dead wood or in drought-stressed trees. However, problems with these insects frequently occur in birch and occasionally in juniper and apple.

Weevils (Curculionidae)

Few weevils are wood borers. The best known is the poplar and willow borer. In

Colorado, this insect commonly infests willow, causing gnarled distortions and holes in lower stems and branches. The white pine weevil

also is a problem in some areas, where it kills and curls the top leader of spruce and white pine.

Clearwing Borers (Sesiidae)

Clearwing borers are a group of day-flying moths with relatively scale-free wings. Many of these moths are similar in appearance to wasps, although they do not sting.

The larvae include some serious insect pests, such as the ash/lilac borer, peach tree borer (see 5.566, *Peach Tree Borer*), raspberry crown borer, viburnum borer and currant borer. Development (egg to adult) typically requires a year to complete.



Figure 3: Adult male peach tree borer.

Carpenterworms (Cossidae)

Carpenterworms develop into very large moths, somewhat similar in appearance to the more common sphinx moths. Carpenterworm larvae bore deeply into trunks and branches, producing large amounts of sawdust as they feed.

Shelterbelt plantings in the eastern plains are commonly damaged by carpenterworms. The life cycle takes two to three years to complete.

Pinyon Borers (Pyralidae, *Dioryctria* spp.)

Larvae of this group of moths cause problems to various pines. Most common is the pinyon pitch mass borer that causes large masses of pitch to form around feeding wounds under the bark of trunks and branches.

The Zimmerman pine moth is a more recently established species of borer. It attacks the branch crotches of Austrian pine, causing branches to break easily. Presently outbreaks exist in parts of Denver and Boulder. (See 5.591, *Zimmerman Pine Moth*.)



Figure 4: Typical popcorn-like masses of gum at wound of Zimmerman pine moth larva.

Horntails (Siricidae)

Horntails are a family of nonstinging wasps (sawflies) that develop solely within trunks and branches of killed or damaged trees. Two or more years are required for the horntails to complete their development.

An unusually large ichneumon wasp (*Megarhyssa* sp.) with an extremely long ovipositor is a common natural enemy of horntails.



Figure 5: Pigeon tremex horntail.

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Control

Most borers attack only trees that are stressed due to drought, injury or disease. Consequently, any means of promoting vigorous tree growth should be considered the primary approach for borer management.

Maintaining steady, adequate moisture is most critical to developing tree defenses to borers. This is most important during the period when borer eggs are laid and the newly hatched larvae first attempt to tunnel the tree. In addition to adequate watering, the use of mulches can also assist. For example, birch trees that have a broad area of mulch over the main root zone better resist attacks from bronze birch borer than do trees that have roots which must compete with those of lawn grasses.

Trees that are only marginally adapted to Colorado conditions or those that are shallow rooted and subject to winter drought can have chronic borer problems. (See 7.211, *Fall and Winter Watering*.)

A few borers, particularly clearwing borers and the Zimmerman pine moth, are considered more aggressive and are capable of damaging apparently healthy trees. Infestations of pinyon borers are thought to be related to excessive watering and rainfall that allows increased cracking in stems and trunks.

Spray Timing

Borers within trees cannot be successfully treated with insecticides because the insects are in a protected site. Insecticidal control is best achieved if sprays are made during periods of adult activity and egg laying.

Trunk sprays can kill the adult borers during egg laying and also may be effective against newly emerged larvae before they enter the trunk. Canopy spraying also may increase control of longhorned beetles and metallic wood borers. Adults often feed on twigs and foliage before laying eggs.

Timing of trunk sprays varies with different borer species. The general time of adult emergence, associated with egg laying, is summarized in Table 1. Insecticide applications typically persist for about one to two months and may need to be reapplied if egg laying occurs over a long period.

For a few borers, the larvae remain exposed on the bark for a considerable period. This is particularly true for the Zimmerman pine moth, which hatches in late summer but does not tunnel into the tree until the following spring. For these insects, treatments can be effectively applied from late summer through midspring.

Treatments

Since the removal of chlorpyrifos/Dursban products in 2001 the availability to homeowners of effective insecticides for use as trunk sprays in borer control has been seriously limited. The most common treatment for borers is the insecticide permethrin. Although dozens of permethrin-containing insecticides are marketed at retail outlets very few have labels that allow use against shade tree borers. (A number of borer insecticides are sold for commercial applicators that contain permethrin or bifenthrin as the active ingredients, and these are routinely used.)

The use of systemic insecticides, applied to soil as a drench, has long been an attractive idea. One product, imidacloprid, is currently marketed for borer control but the uses are limited. Soil applied imidacloprid is most reliably used for control of flatheaded borers that feed just under the bark (e.g., bronze birch borer, honeylocust borer). It is not effective against any of the borers that develop into moths (e.g., clearwing borers, carpenterworms, *Dioryctria* spp.) nor against species that tunnel into the heartwood of the tree (e.g., roundheaded borers). Imidacloprid treatments should be made shortly before or at the onset of first egg hatch, which typically occurs in early June for the common *Agrilus* species of flatheaded borers.

Table 1: Flight periods and hosts of common shade tree borers in Colorado.

Name	Common Hosts	Flight periods
METALLIC WOOD BORERS		
<i>Chrysobothrus femorata</i> , Flatheaded apple-tree borer	Apple, maple, <i>Populus</i> , hardwoods	June-Aug.
<i>Agrilus</i> spp.	Honeylocust, birch, currant, oak	June-July
<i>Chalcophora</i> spp.	Pines	June-Aug.
<i>Dicera</i> spp.	Aspen	June-Aug.
LONGHORNED BEETLES		
<i>Atimia huahuachae</i>	Juniper	June-July
<i>Plectodera scalator</i> , Cottonwood borer	<i>Populus</i> , willow	July-Aug.
<i>Megacyllene ribiniae</i> , Locust borer	Black locust	Aug.-Sept.
<i>Saperda calcarata</i> , Poplar borer	Aspen, poplars, willow	June-Aug.
<i>Saperda candida</i> , Roundheaded apple-tree borer	Apple	July-Sept.
<i>Saperda inornata</i> , Poplar gall borer	Poplar, cottonwood	July-Sept.
<i>Parandra brunnea</i> , Pole borer	Maple, other hardwoods	July-Sept.
<i>Neoclytus acuminatus</i> , Redheaded ash borer	Ash, other hardwoods	April-June
<i>Monochamus</i> spp.	Pines, spruce, fir	May-Sept.
<i>Callidium</i> spp.	Pines, juniper	May-June
WEEVILS		
<i>Cryptorhynchus lapathi</i> , Poplar and willow borer	Willow, poplar	July-Aug.
<i>Pissodes strobi</i> , White pine weevil	Spruce	March-May
CLEARWING BORERS		
<i>Podesia syringae</i> , Ash/lilac borer	Ash, lilac, privet	April-June
<i>Sesia tibialis</i> , American hornet moth	Cottonwood	mid-June-July
<i>Synanthedon exitiosa</i> , Peach tree borer	<i>Prunus</i> spp.	late June-Sept.
<i>Synanthedon tipuliformis</i> , Currant borer	Currant, gooseberry	late May-June
<i>Synanthedon viburni</i> , Viburnum borer	Viburnum	June-July
CARPENTERWORMS		
<i>Prionoxystus robiniae</i> , Carpenterworm	Elm, maple, ash	June-July
DIORYCTRIA BORERS		
<i>Dioryctria ponderosae</i> , Pinyon pitch mass borer	Pinyon, ponderosa pine	June-Aug.
<i>Dioryctria zimmermani</i> , Zimmerman pine moth	Austrian, Scotch pine	Aug.-Sept.
HORNTAILS		
<i>Tremex columba</i> , Pigeon tremex	Maple, other hardwoods	late July-Aug.

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