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no. 5.530

Shade tree borers:

characteristics and control

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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 only successfully attack trees that are injured or stressed.

Shade tree borer development takes from 1 to 3 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.

Shade tree borers are insects that develop underneath the bark of woody plants. Most of these insects are only capable of attacking 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 1 to 2 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 insect eggs are deposited underneath bark.) Eggs typically hatch within 1 to 2 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 in cross section.

Major groups of wood borers include the following:

Longhorned beetles (Cerambycidae)

Longhorned beetles are named for the very long antennae typical of the adult. Some of these insects may reach a maximum of two inches in length. Larvae are known as roundheaded borers and penetrate deeply into the wood while feeding. Completion of the insect life cycle (egg, larval, pupal and adult stages) may take several years. Most longhorned beetles are not able to attack healthy trees and primarily come to attention as a nuisance problem when emerging from firewood (see Service in Action sheet 5.563 *Firewood and house log insects in Colorado*.) However, species are known that can directly damage black locust, poplar and cottonwood.

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Metallic wood 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 a year. Metallic wood borers are only able to develop 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 very similar in appearance to wasps, although they do not sting. The larvae of these insects are some serious insect pests including the ash/lilac borer, peach tree borer (see Service in Action Sheet 5.566, *Peace tree borer*), raspberry crown borer, viburnum borer and currant borer. Development (egg to adult) of these insects typically requires a year to complete.

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. Life cycles of carpenterworms takes 2 to 3 years to complete.

Pinyon borers (Pyralidae, *Dioryctria* spp.)

Larvae of a 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. Life cycles of these insects are not well understood but probably require 1 to 2 years to complete. The Zimmerman pine moth is thought to be established in parts of the Denver metro area and has a 1-year life cycle.

Horntails (Siricidae)

Horntails are a family of non-stinging 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.

Control

Most borers are only capable of attacking 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. 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. (Service in Action sheet 7.211 discusses winter watering.)

A few borers, particularly clearwing borers, are considered to be 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.

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 may also be effective against the newly emerged larvae before they enter the trunk. Canopy spraying also may increase control of longhorned beetles and metallic wood borers since the adult stage of these insects often feed on the twigs and foliage before laying eggs.

Timing trunk sprays varies with different borer species. The general time of adult emergence, which is associated with egg laying, is summarized in Table 1. Insecticide applications typically persist for about 1 to 2 months and may need to be reapplied during a season if egg laying occurs over a long period.

Pheromone traps (Service in Action sheet 5.562) can most accurately determine adult flight periods. Pheromone traps are marketed for most of the clearwing borers and carpenterworms. However, availability often is limited to commercial uses.

In the past, lindane has been the primary insecticide used for borer prevention. However, availability of lindane is becoming increasingly restricted. Chlorpyrifos (Dursban, Lorsban) is currently the most widely labelled insecticide for borer management. Endosulfan (Thiodan) and carbaryl (Sevin, etc.) have some labelled uses for borers. Trunk sprays should thoroughly wet the wood along areas where borers enter. Most borers typically attack lower trunks (e.g., peach tree borer) but others can affect the upper crown areas of the tree (e.g., bronze birch borer).

Since many borers are attracted to recent wounds, try to avoid pruning during periods when the adult insects are laying eggs.

Concentrating insecticide applications around wounds, cankers and callous growth also may be useful in managing borers that use these sites to enter trees.

Systemic insecticides, applied to the root zone

or injected into trunks, generally are not able to control existing borer infestations. These treatments may give some control when applied just as young borers first enter trunks. However, injected treatments also may provide wounding that can allow entry of disease organisms.

Fumigants have been used for some "rescue"

treatments of borers. Paradichlorobenzene (PDB) moth crystals can kill peach tree borer larvae when they are located within the base of trunks. (Service in Action sheet 5.566 discusses this use.) Crystals also may be inserted into the tunnels of borers that leave external openings while feeding, such as carpenterworms.

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

Name	Common hosts	Typical flight periods
• METALLIC WOOD BORERS		
<i>Chrysobothrus femorata</i> Flatheaded apple-tree borer	Apple, maple, <i>Populus</i> , hardwoods	June-August
<i>Atimia huahuachae</i>	Juniper	June-July
<i>Agrilus anxius</i> —Bronze birch borer	Birch	June-July
<i>Agrilus</i> sp.	Honeylocust, aspen	June-July
<i>Chalcophora</i> spp.	Pines	June-August
<i>Dicerca</i> spp.	Aspen	June-August
• LONGHORNED BEETLES		
<i>Plectodera scalator</i> Cottonwood borer	<i>Populus</i> , willow	July-August
<i>Megacyllene robiniae</i> —Locust borer	Black locust	August-September
<i>Saperda calcarata</i> —Poplar borer	<i>Populus</i> , willow	June-August
<i>Saperda candida</i> Roundheaded apple-tree borer	Apple	July-September
<i>Saperda inornata</i> —Poplar gall borer	Poplar, cottonwood	July-September
<i>Parandra brunnea</i> —Pole borer	Maple, other hardwoods	July-September
<i>Neoclytus acuminatus</i> Redheaded ash borer	Ash, other hardwoods	April-June
<i>Monochamus</i> spp.	Pines, spruce, fir	May-September
<i>Callidium</i> spp.	Pines, juniper	May-June
• WEEVILS		
<i>Cryptorhynchus lapathi</i> Poplar and willow borer	Willow, poplar	July, August
<i>Pissodes strobi</i> —White pine weevil	Spruce	March-May
• CLEARWING BORERS		
<i>Podesia syringae</i> —Ash/lilac border	Ash, lilac, privet	April-June
<i>Synanthedon exitiosa</i> Peach tree borer	<i>Prunus</i> spp	late June-September
<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-August
<i>Dioryctria zimmermani</i> Zimmerman pine moth	Austrian, Scotch pine	August-September
• HORNTAILS		
<i>Tremex columba</i> —Pigeon tremex	Maple, other hardwoods	late July-August