



# Common Tree Borers in Tennessee

*Frank A. Hale*  
*Associate Professor*  
*Entomology and Plant Pathology*

*Mark A. Halcomb*  
*Associate Area Specialist*  
*Nursery Production*



Frank A. Hale

Adult southern pine sawyer.



Frank A. Hale

Southern pine sawyer "pencil size diameter" exit holes in pine log.

Many types of insect and mite pests can attack trees in home landscapes. Although feeding damage from most of these pests is aesthetically displeasing, it does not cause severe damage to the tree. Even after total defoliation by caterpillars, most trees will put out a new flush of foliage. Several consecutive years or more of defoliation are needed to cause a serious decline or death

of most trees. Also, defoliation late in the growing season is much less detrimental to tree health than that occurring in spring or early summer.

Conversely, some pests can routinely cause significant damage and even death of the tree. Insect borers are one such group. Some insect borers girdle the trunk by destroying vascular tissue beneath the bark. This



Frank A. Hale

Small tree trunk damaged by flathead borers.



Frank A. Hale

Adult banded ash clearwing borer.

can effectively limit the upward flow of water and nutrients to the canopy and the flow of photosynthesis products to the roots for storage. Other insect borers can riddle the trunk or branches with tunnels, weakening them so that they will snap in a windstorm. Some borers can directly transmit disease. Open wounds in the bark made by borers also can be an entryway for disease. The four common types of tree borers to be discussed are clearwing borers, flatheaded borers, roundheaded borers and the pyralid moth borers.

### **Clearwing Borers**

Sap mixed with fine woody excrement (frass) oozing from small holes in the bark indicates a recent infestation of either the banded ash clearwing, *Podosesia aureocincta* Purrington and Nielsen (Lepidoptera: Sesiidae) or the ash borer, *Podosesia syringe* (Harris), previously known as the lilac borer. Small clumps of coarse frass extruding from pencil-sized tunnels in the trunk and limbs indicate a mature infestation. A major pest of lilac and ash, the ash borer also attacks privet, fringetree, mountain-ash and occasionally other plants in the olive family.

The banded ash clearwing attacks various species of ash. The larvae of both species bore into the trunk and larger branches, causing leaf wilt. Weakened young shoots may break. Older, rough-barked stems are more susceptible to attack, particularly those with wounds or grafting scars.

The ash borer spends the winter as a full-grown larva in a tunnel within the trunk, usually near the surface of the soil. The banded ash clearwing spends the winter as a less mature larva. These cream-colored larvae are 3/4 to 1 inch long with a brown head. In early spring, the ash borers pupate; the winged adults (moths) emerge from mid-April until June, leaving their translucent, amber pupal cases protruding from the emergence holes. The banded ash clearwing moths begin emerging from similar color pupal cases in August and continue through October.

The moths of both species are very similar. They are active, daytime fliers that mimic paper wasps. The fore-wings of the ash borer are dull, black and opaque, while those of the banded ash clearwing are violet brown and opaque except near the base. The hind wings of both species are mostly clear, marked with a dark border. The body of both species is mainly brown and the legs are marked with brown and yellow. They are about 1 inch long with a wing expanse of 1 1/2 inches. The

banded ash clearwing moth has a narrow gold band around the fourth abdominal segment that is not found on the ash borer.

The female moths of both species lay 1 mm or smaller eggs singly or in small clusters on the rough bark. The eggs hatch in about a week. The larvae feed beneath the bark in the phloem tissue before moving into the sapwood. They expel sawdust-like frass out the round exit holes as they feed throughout the summer and fall. In late fall, they bore into the heartwood and plug their tunnels with boring debris to form cells in which they overwinter. There is one generation each year.

Cultural Control: Since the partly-grown insects pass the winter in the stems, the infested branches can be cut out and burned by April 1. These branches are marked by swollen areas with cracked bark that is broken away from the wood. Numerous holes are visible in the bark and wood. Remove larvae from young trees with a sharp knife. A small, copper wire is flexible enough to insert into the hole to kill the larvae.

Chemical Control: A protective spray of insecticide to the bark will kill the newly-hatched borers before they can enter the tree. Spray chlorpyrifos or lindane to the entire trunk and bark of the main scaffold limbs in mid-April and again in mid-June for lilac, privet, fringetree and mountain-ash. Treat ash trees in mid-April and again in mid-July.

Entomopathogenic nematodes, *Steinernema* spp., can be applied to the trunk from May to September to control borers already in a tree or shrub. These nematodes enter the tree through openings in the damaged bark. They move beneath the bark in tunnels made by the borers. Once a borer is encountered, they enter it through naturally occurring body openings. They multiply rapidly within the borer while also infecting it with toxic bacteria. The overwhelmed borer weakens and soon dies. The use of entomopathogenic nematodes will work best on trees that have not been sprayed with lindane or chlorpyrifos since insecticide residue on the bark could kill the nematodes. A protective spray of insecticide can then be applied two weeks after using the nematodes.

The application of these living organisms requires some special care. It is best to use fresh nematodes. Order from a reputable distributor just before you plan to spray. Mix nematodes with warm water that is no higher than 90F. Shake the mixture for one minute or use a sprayer with an agitator that recirculates. Keep the mixture out of direct sunlight. Before spraying, check

nematode viability in the mixture by examining them with a hand lens. They should be wiggling and have a slightly curved body, while dead ones will be straight. Always spray in the early morning or evening or during cooler, overcast weather. Wet the bark before application and concentrate the spray on wounded or cracked bark areas. Injecting the nematode spray solution directly into the borer holes with an eyedropper, baster or syringe should increase the level of control. Try to finish the application within three hours of mixing.

There are many other common clearwing borer pests of ornamentals. The dogwood borer, *Synanthedon scitula* (Harris), is a pest of dogwood, oak, *Prunus* spp., mountain-ash, birch, beech, chestnut, elm, hickory, willow, pecan and apple. Spray the trunk and lower limbs of ornamental trees with chlorpyrifos or lindane in late April and mid-July for full season control.

The peachtree borer, *Synanthedon exitiosa* (Say), originally occurred in North America on wild plum and wild cherry. Its most common host now is peach. It can also attack fruit bearing or ornamental cherry, plum and other trees and shrubs in the genus *Prunus*. Do not overlook the cherry laurel shrub that is in this genus. Treat any exposed roots, the trunk and lower limb scaffold of ornamental trees and shrubs with chlorpyrifos or lindane in late May and in mid-July. The control of peachtree borer in fruit-bearing trees is different from that of ornamentals. Please refer to the Agricultural Extension Service publication PB 1622, **Disease and Insect Control in Home Fruit Plantings**, for control recommendations.

The maple callus borer, *Synanthedon acerni* (Clemens), is a pest of silver maple, red maple, sugar maple and probably other maples. The maple clearwing, *Synanthedon acerrubri* Engelhardt, is primarily a pest of boxelder, red maple and sugar maple. Other maples may also be attacked. Spray trunk and lower limb scaffold with chlorpyrifos or lindane in early May and in late June.

Rhododendron is the preferred host of the rhododendron borer, *Synanthedon rhododendri* (Beutenmuller), while mountain-laurel and deciduous azalea are attacked occasionally. Spray the trunk and branches with chlorpyrifos or lindane in mid-May and late June.

## Flatheaded Borers

Flatheaded borers (Coleoptera: Buprestidae) are considered opportunists because they enter and become established in stressed trees. Newly transplanted trees and older, weakened, or injured trees are particularly susceptible to attack. Drought stress due to lack of irrigation during dry seasons can also predispose trees to borer damage. Excessive pruning can suddenly expose previously shaded parts of a tree to the sun, which can stress trees and make them more susceptible to infestation by borers.

The flatheaded appletree borer (FHAB), *Chrysobothris femorata*, attacks some 30 species of woody plants, but maple, hickory, linden, oak, sycamore, tuliptree, dogwood, and apple are the most commonly infested. The two-lined chestnut borer (TLCB) *Agilus bilineatus* (Weber) is a pest of oaks, chestnut and chinkapin species, and occasionally beech species. The presence of both these borers is indicated by long, shallow, broad oval galleries on the main trunk or large branches, just under the bark or into the sapwood. Above these burrows are dark-colored (wet or greasy appearance) dead areas of bark, often with sap exuding. These burrows are packed tightly with fine sawdust-like frass that looks like cake yeast. They are primarily on the sunny side of the tree, but may extend completely around the tree. Injuries usually result in killing large areas of bark and sometimes in girdling and killing the tree or infested branches.

In late fall, full-grown larvae of both these borers tunnel into the heartwood where they overwinter and pupate the following spring. The larvae are yellowish-white or creamy-white, legless grubs about 1 inch long with a flattened enlargement just behind the head. Their prominent segmented body usually lays curved to one side.

The adult FHAB is broad, flat, dark metallic brown and about 1/2 inch long by 1/5 inch wide; the body is very blunt at the head, and tapers to a rounded point at the posterior end. The adult FHAB emerges by cutting oval-shaped exit holes through the bark. The adults are active from March to November, but especially during May. The TLCB is a slightly flattened bluish black beetle with a faint yellow or white longitudinal stripe on each wing cover. The TLCB is 1/4 to 1/2 inch long

and they produce a D-shaped exit hole beginning in May. They are decidedly sun loving insects and will be found in greatest numbers on the sunny sides of trees or logs. The female beetle (May through August) will lay from 1 to 10 eggs, usually in a cluster in cracks in the bark. Beetles nearly always select a stressed tree, or a spot on a healthy tree where the bark has been injured. When the eggs hatch in 15-20 days, the young larvae bore into the tree. The TLCB usually has one generation per year, although it may take two years when feeding in vigorously growing trees. One generation occurs each year for the FHAB.

The bronze birch borer (BBB), *Agriulus anxius* Gory, is a pest of paper birch and several other species of birch, while the river birch is resistant. The adult olive-black beetle with a faint coppery gleam ranges in length from just over 1/4 inch to just under 1/2 inch. The creamy to yellowish brown larvae range in length from 1/10 inch after hatching to 1 1/2 inches when mature.

**Cultural Control:** Avoid stress: irrigate if possible a few days after transplanting if it does not rain; avoid trunk wounds. Wrapping the trunks immediately after transplanting will protect against mechanical injury to the bark and serve as a barrier to egg laying. Nursery growers should not allow roots of bare-rooted seedlings to dry out from the time they are dug until they are planted; leave as many roots on the plant as possible and avoid severe root pruning.

**Chemical Control:** Spray trees susceptible to FHAB or TLCB with chlorpyrifos or lindane to the entire trunk in mid-May and again in late June. Spray birch trees susceptible to BBB with chlorpyrifos or lindane in late May and early July.

### **Longhorn Beetles (Roundheaded Borers)**

The longhorn beetles (Coleoptera: Cerambycidae) get their name from the long adult antennae which are often longer than the body. The larvae are called roundheaded borers because their tunnels and exit holes are generally round. Some species of roundheaded borers make oval tunnels or exit holes. The larger larvae usually produce frass composed primarily of fibrous shreds of wood often like miniature toothpicks. This fibrous frass can be found emerging from exit holes or covering the ground around the base of infested trees. Some species pack their tunnels with fine, granular frass similar to that

produced by the flatheaded borers. This large group of wood-boring insects, depending on the species, may attack seedling to mature trees with shoots, branches, trunk and roots being susceptible. While some species such as the girdlers and pruners can successfully attack healthy trees, many species are opportunists that attack dying, weakened or dead trees, even cut logs.

Two roundheaded borer pests of oak are the red oak borer (ROB), *Enaphalodes rufulus* (Haldeman) and the white oak borer (WOB), *Goes tigrinus* (De Geer). The ROB attacks both the red and white oak groups, which include northern red, black, scarlet, Nuttall, water and overcup oaks. The WOB prefers white oak and overcup oak. Post oak, swamp chestnut oak and chestnut oak are attacked less frequently. The southern pine sawyer (SPS) is a pest of pine that gets its name from the buzzing sound the larvae make when they feed in the tree. They usually attack stressed trees that are declining in health. They have three generations per year.

Protective sprays of chlorpyrifos or lindane should be made for ROB in early June and mid-July, while WOB sprays should be applied in early May and June. In timber stands, infested "brood" trees should be removed. The SPS should be controlled with chlorpyrifos sprays in late April to early May and mid-July.

### **Pyralid Moth Borers**

The root collar borer (RCB), *Euzophera ostricorella* Hulst (Lepidoptera: Pyralidae) is a pest of yellow-poplar (tuliptree). The adult is a small purplish brown-winged moth with a front wingspan of 1.2 - 1.6 inches. These wood-boring caterpillars are dull white with a dark brown head and several rows of tiny dark bumps called tubercles from which individual hairs arise. They generally attack the base of the trunk. Bark may be loose, cracked and appear fire scorched. Frass and black ooze can often be found at the site of attack. The American plum borer (APB), *Euzophera semifuneralis* (Walker) is closely related to the root collar borer and does similar damage. The hosts of APB include plum, peach, cherry, pear, mountain-ash, persimmon, apple, white mulberry, sycamore, walnut, pecan, basswood, poplar, sweetgum, yellow-poplar, ginkgo, elm, oak and a few others. The mature larva is about an inch long and has a pink body with a dark brown head, thoracic shield, anal plates and tubercles. Apply protective sprays of chlorpyrifos or lindane in early May and again in early September for control of the RCB and APB on ornamental trees.

**Precautionary Statement**

*In order to protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store, or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label. Persons who do not obey the law will be subject to penalties.*

**Disclaimer Statement**

*Pesticides recommended in this publication were registered for the prescribed uses when printed. Pesticides registrations are continuously reviewed. Should registration of a recommended pesticide be canceled, the University of Tennessee would no longer recommend it.*

*Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others, which may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product.*



Frank A. Hale

Peachtree borer larva in cherry laurel.



Frank A. Hale

American plum borer damage on a tulip tree root.



Alan S. Windham

Maple clearwing borer damage and empty pupal cases on red maple.

## References

- Anonymous. 1969. Insects affecting woody ornamental shrubs and trees. Department of Agriculture, Farm Service Series, Extension Bulletin 530. Michigan State University, East Lansing.
- Fenton, F.A. 1942. The flatheaded apple tree borer (*Chrysobothris femorata* (Oliver)). Bull. B-259. Oklahoma Agricultural Experiment Station, Stillwater. 31 p.
- Gill, S. and C. Smith-Fiola. 1966. A living arsenal. *American Nurseryman*, August 1, 1966, pp. 48-53.
- Johnson, W.T., H.H. Lyon, C.S. Koehler and J.A. Weidhaas. 1991. Insects that feed on trees and shrubs. 2nd ed., rev. Comstock Publishing Associates, Cornell University Press, Ithaca, NY.
- Metcalf, C.L., W.P. Flint and R.L. Metcalf. 1962. Destructive and useful insects, their habits and control. 4th ed. McGraw-Hill Book Co., New York.
- Moznette, G.F., T.L. Bissell and H.S. Adair. 1931. Insects of the pecan and how to combat them. Farmers Bull. 1654. U.S. Department of Agriculture, Washington, DC. 60p.
- Pirone, P.P. 1978. Diseases and pests of ornamental plants. 5th ed. John Wiley and Sons, New York.
- Schwartz, P.H. 1972. Insects on deciduous fruits and tree nuts in the home orchard. U.S. Department of Agriculture, Home and Garden Bulletin No. 190. U.S. Government Printing Office, Washington, DC.
- Solomon, J.D. 1995. Guide to insect borers of North American broadleaf trees and shrubs. Agric. Handbk. 706. U.S. Department of Agriculture, Forest Service, Washington, DC. 735 p.



Frank A. Hale

Rhododendron borer damage on a rhododendron stem.

Appreciation is expressed to Sam Jackson for design of this publication.

SP 547 - 15M - 12 - 00

R12 - 4910 - 21 - 001 - 01

The Agricultural Extension Service offers its programs to all eligible persons regardless of race, color, national origin, sex, age, religion, disability, religion or veteran status and is an Equal Opportunity Employer. COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS The University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating in furtherance of Acts of May 8 and June 30, 1914. Agricultural Extension Service, Charles L. Norman, Dean.

Printing for this publication was funded by the USDA Forest Service through a grant with the Tennessee Department of Agriculture, Division of Forestry. The *Trees for Tennessee Landscapes* series is sponsored by the Tennessee Urban Forestry Council.

