Beetle Borers

Dr. Vera Krischik, Department of Entomology, University of Minnesota

Ambrosia Bark Beetle

Xylosandrus germanus
Family Scolytidae
Introduced Pest

Hosts: Ash, beech, birch, bald cypress, dogwood, elm, holly, honeylocust, linden, maple, pine, willow, red cedar, sycamore.

John Davidson

Ambrosia Bark Beetle

Life History: Adults emerge in spring, look for sites to make tunnels, and lay eggs. They bore into the hardwood and introduce a fungus, which they farm for food. One generation a year.


John Davidson

Overwintering: Adults in tunnels.

Ambrosia Bark Beetle

Damage: The fungus may cause cankers. Dieback in heavy infestations only.

Monitoring: Look for frass emerging from entrance holes near ground. Look for black fungal stains in tunnels.

Physical Control: Cut, remove, and burn dead or infected tree tops and branches.

Chemical Control: Spray for adults when they emerge in spring.

European Elm Bark Beetle

Scolytus multistriatus
Family Scolytidae
Introduced Pest

Hosts: **Elm and Japanese zelkova.**

Life History: **Adults emerge when elm leaves have fully developed and feed in twig crotches on healthy elms. They move to and excavate egg galleries in weak or dead elms, and larvae live in galleries, which they construct under the bark. One generation a year.**

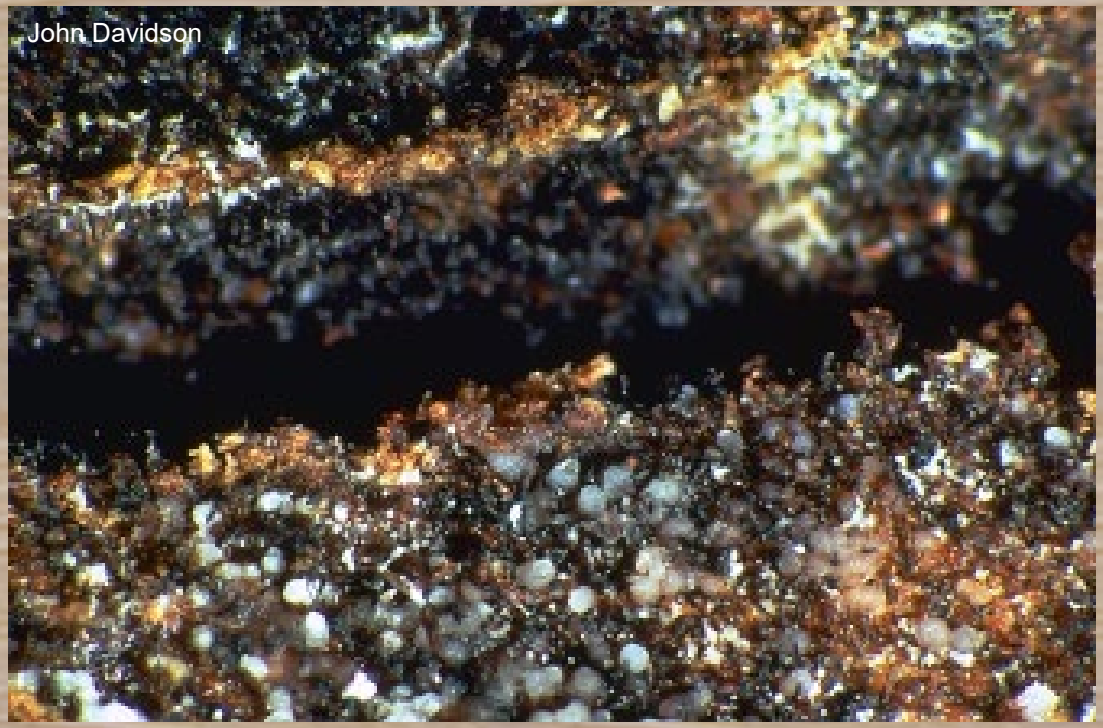
European Elm Bark Beetle

Overwintering: Larvae under bark.

Damage: Adults may transmit Dutch elm disease to trees, which causes wilting and yellow flagging on branches. The infection will spread down the tree and kill it.

European Elm Bark Beetle

Monitoring: Hang pheromone traps in spring to monitor for adults. In summer look for flagging and yellowing in crown terminals.



Ophiostoma ulmi **fungus fruiting bodies inside galleries of European elm bark beetle**

European Elm Bark Beetle

Physical Control: Infected trees, and diseased or damaged branches should be removed and burnt or buried.

Cultural Control: Maintain tree health by watering and fertilizing. Prune only when dormant. Plant resistant varieties of elm.

Chemical Control: Spray residual insecticides on tree tops in spring.

Biological Control: Parasitic wasps, clerid beetles, and the fungus *Beauveria bassiana*.

Native Elm Bark Beetle

Hylurgopinus rufipes
Family Scolytidae
Native Pest

Hosts: Elm species, particularly American, Siberian, and Chinese.

Life History: Adults emerge in April and May, feed in healthy branches, then fly to dying or dead branches. The beetles excavate brood galleries and lay eggs. Larval galleries branch out from brood galleries. New adults move to healthy elms to feed. One generation a year.

Native Elm Bark Beetle

Overwintering: Adults at tree bases.

Damage: Branches with Dutch elm disease wilt, turn yellow, then brown, and die. Beetles leave pin-sized holes in bark and frass at tree bases. Infected sapwood has brown streaks.

John A. Williams
USDA Forest Service
The Bugwood Network
University of Georgia

Monitoring: Monitor for wilt symptoms throughout the summer. Remove suspicious branches and send them to the diagnostic laboratory for analysis. Pheromone traps in spring monitor adult beetles.

Native Elm Bark Beetle

Physical Control: Remove and burn or bury infected trees and branches. Remove root grafts by trenching around infected trees.

Cultural Control: Maintain healthy trees by proper watering and fertilizing. Prune only when dormant. Pruning outside the dormant season should be avoided. Plant resistant elms.

Chemical Control: Apply insecticides in April. Inoculate elms against the Dutch elm disease fungus.

Pine Engraver

Ips pini
Family Scolytidae
Native Pest

Hosts: Most pine and spruce species.

Life History: In spring adult males cut entrance holes through bark which they extend into nuptial chambers. Mated females construct and lay eggs in galleries that lead from nuptial chambers. Larvae feed galleries. Young adults emerge in September or October. Two to three generations a year.

Pine Engraver

Overwintering: Young adults in duff and larvae under bark.

Damage: Sticky white pitch tubes from boring, brown sawdust on trunk or branches, yellowish-red treetops, death.

Pine Engraver

Monitoring: Look in spring for brown sawdust on bark or branches and for white pitch tubes. Check under bark for galleries and larvae. Monitor tree tops for yellowing.

Physical Control: Remove and chip trees that are dead or dying prior to the following spring.

Cultural Control: Minimize tree stress by watering during droughts.

Chemical Control: Spray with residual insecticides when boring appears. Treat nearby trees of the same species.

Pine Shoot Beetle

Tomicus piniperda
Family Scolytidae
Introduced Pest

Hosts: Scots pine and other conifers.

Life History: Adults enter cut pine stumps, logs, or trunks of weakened trees in spring. They lay eggs in vertical egg galleries and then die. Larvae develop in galleries and exit as adults in May or June, then fly to crowns of living trees, where they feed on shoots. One generation a year.

Pine Shoot Beetle

Overwintering: Adults under bark at bases of trees.

Damage: Bent, brown shoots with a 5 mm circular hole at the base of the bend, sawdust emerging from fresh cut logs. Damaged shoots turn yellow to red, droop, and fall.

Monitoring: Look for damaged shoots in summer.

Terminal damage

Pine Shoot Beetle

Physical Control: Place freshly cut pine logs or last year's Christmas trees in pine field. Beetles will fly to freshly killed logs or stumps to breed. In April and May, remove and destroy all infested logs. From June to July, remove and destroy infested tips.

Chemical Control: In February, treat all freshly cut stumps or logs with permethrin or carbaryl. From June to July, treat with permethrin on shoots.

Biological Control: The clerid beetle *Thanasimus formicarius*.

Black Turpentine Beetle

Dendroctonus terebrans
Family Scolytidae
Native Pest

Hosts: Southern, loblolly, slash pines, red spruce.

Life History: Adults bore into cambium and lay eggs in a gallery. Larvae feed in groups and pupate under bark. One generation a year.

Overwintering: Adults.

Damage: Sticky reddish to white pitch tubes, death in severe infestations.

Black Turpentine Beetle

Monitoring: In spring, look for sawdust and white pitch tubes on bark. Check under the bark for galleries and larvae.

Physical Control: Remove and destroy dead or dying trees prior to the following spring.

Cultural Control: Water trees during droughts to prevent stress.

Chemical Control: Spray with residual insecticides when the first signs of boring appear. Treat nearby trees of the same species.

Southern Pine Beetle

Dendroctonus frontalis
Family Scolytidae
Native Pest

Hosts: **Pines, spruces.**

Life History: **Adults emerge in spring and attack trees infested the previous year, beginning at the upper trunk and working downward. One or more generations a year.**

Overwintering: **All life stages in bark.**

Southern Pine Beetle

Ronald F. Billings, Texas Forest Service
www.forestryimages.org

Damage: Pitch tubes, reddish boring dust, emergence holes, yellow and reddish brown needles, crown death. Adults introduce a blue stain fungus into trees.

Monitoring: Look for damage in May through September.

Southern Pine Beetle

Cultural Control: Remove trees that are at risk because of physical damage or prior insect attacks. Avoid drought, flooding, and overcrowding.

Chemical Control: Spray trunks with residual insecticides when pitch tubes are first detected, usually in May.

Asian Longhorned Beetle

Anoplophora glabripennis
Family Cerambycidae
Introduced Pest

Hosts: **Maple, elm, birch, willow, poplar, and horsechestnut.**

Life History: **Adults are present from May to October. Females lay 30 to 70 eggs which hatch in 10 to 15 days. Larvae tunnel under bark and into the wood where they pupate. One generation per year.**

Asian Longhorned Beetle

Overwintering: Prepupae.

Damage: Girdling, dieback, death.

Monitoring: Look round exit holes somewhat larger than the diameter of a pencil. The holes may ooze sap and frass. Look for yellowing or drooping leaves.

James E. Appleby
Dept. of Natural Resources and Environmental Sciences
College of Agricultural, Consumer and Environmental Sciences
University of Illinois at Urbana-Champaign

Asian Longhorned Beetle

Chemical Control: Spray for adults after they have emerged from tree stems and branches.

Robert A. Haack, USDA Forest Service

James E. Appleby
Dept. of Natural Resources and Environmental Sciences
College of Agricultural, Consumer and Environmental Sciences
University of Illinois at Urbana-Champaign

Elm Borer

Saperda tridentata
Family Cerambycidae
Native Pest

Hosts: American elm, slippery elm, others.

Life History: Adults emerge in May and continue into summer. Adults feed on leaves and petioles and lay eggs in cracks in stressed trees. Females live for one month and lay single eggs in bark cracks at night. One generation per year. Larvae may take longer to emerge in recently killed trees.

Elm Borer

Overwintering: Pupal cells in sapwood.

Damage: Leaf damage, flagging at petioles, weakening, death. May vector Dutch elm disease.

James Solomon, USDA Forest Service, The Bugwood Network, University of Georgia

Elm Borer

Monitoring: Monitor for adults from May to August. Notice thin, dying foliage, or flagging and yellowing crown terminals. Look for frass extruding from openings in bark. Hang pheromone traps in spring to monitor adults.

James Solomon, USDA Forest Service, The Bugwood Network, University of Georgia

Physical Control: Remove young larvae mechanically. Remove and destroy heavily infested trees.

Elm Borer

Cultural Control: Follow practices that increase tree vigor, such as mulching, fertilizing, and watering. Elms should be maintained in a healthy and stress-free condition by proper watering and fertilizing. Prune only when dormant and plant resistant elms.

Chemical Control: Spray trunks of residual insecticides. Spray foliage to kill feeding adults.

Elm Borer

Biological Control: Six species of parasitic wasps: *Atanycolus simplex* and *A. ulmicola*, *Cenocoelius saperdae*, *Heterospilus* sp., *Spathius benefactor*, and *Xorides albopictus*.

Roundheaded Appletree Borer

Saperda candida
Family Cerambycidae
Native Pest

Hosts: **Crabapple, apple, mountain ash, hawthorn, serviceberry, and cotoneaster.**

Life History: **Adults are active from June to September, laying eggs in slits cut in the base of trees. Larvae feed on bark for one year and then bore into wood. Two or more years are required to complete the life cycle.**

Roundheaded Appletree Borer

Overwintering: Larvae in galleries.

Damage: Circular exit holes at the base of trees, frass on bark or at tree bases, dieback.

Monitoring: Look for adults on bark from June onward and for bark cracks and frass at bases of trees from June to September.

Roundheaded Appletree Borer

Cultural Control: Water newly planted trees until roots are established. Maintain tree vigor with standard cultural practices.

Chemical Control: Spray residual insecticides on the base of newly planted trees in June if adults are active.

Biological Control: Parasitic wasps and woodpeckers.

Locust Borer

Megacyllene robiniae
Family Cerambycidae
Native Pest

Hosts: **Black locust.**

Life History: **Beetles emerge in summer, feed on goldenrod flowers, and lay eggs in bark cracks and wounds of hosts. Larvae bore into bark and resume activity the following spring, tunneling into heartwood until pupating in July. One generation a year.**

Locust Borer

Damage: Entrance and exit holes, sap stains, oozing sap and frass, and dieback.

Monitoring: Look for damage in spring and early summer, and again in fall.

Cultural Control: Promote tree vigor. Plant trees on good sites, out of full sun, and provide adequate water. Mulch well. Eliminate goldenrod near trees.

Chemical Control: If adults are detected in September, spray the bark with a residual insecticide.

Twig Girdler

Oncideres cingulata
Family Cerambycidae
Native Pest

Hosts: Basswood, dogwood, hackberry, elm, honeylocust, oak, poplar, pecan, persimmon, sourwood, fruit trees.

Twig Girdler

Life History: Eggs are laid in previously girdled twigs or branches, and these parts soon die and fall to the ground. Larvae feed on these fallen limbs. Adults emerge in late summer and feed on twig tips or tender stem bark. One generation a year. Many larvae do not pupate until the second year.

Overwintering:
Larvae in twigs
on the ground.

John Davidson

Twig Girdler

Damage: Girdled branches.

Monitoring: In August and September, look for twigs that have gathered under trees and which display signs of having been cut. Cut open to look for larvae.

Physical Control: Collect and destroy infested branches at the end of the growing season.

Biological Control: Downy woodpecker, blue jay, chickadee.

Twig Pruner

Elaphidionoides villosus
Family Cerambycidae
Native Pest

Hosts: Elm, hackberry, oak, hickory, locust, maple, pecan, sweetgum, walnut.

Life History: Adults emerge in spring and lay eggs in bark slits at twig tips and leaf axils. Larvae feed under bark and then bore down the center of stem. One generation a year.

Twig Pruner

Overwintering: Pupae in twigs on ground.

Damage: Severed twigs and branches.

Monitoring: In August and September cut open fallen twigs and branches to look for larvae.

Twig Pruner

Physical Control: Collect and destroy infested twigs and branches in the spring before adults emerge.

Biological Control: Three hymenopteran parasitoids.

Bronze Birch Borer

Agrilus anxius
Family Buprestidae
Native Pest

Hosts: **Birch species, especially *Betula papyrifera*, *B. pendula*, and *B. populifolia*.**

Life History: **Adults emerge in June, leaving D-shaped exit holes in bark, and feed on leaves for three weeks before laying eggs. Young larvae bore through bark and excavate galleries in cambium. One generation a year.**

Bronze Birch Borer

Overwintering: Larvae in galleries.

Damage: Girdling, dieback, death.

Monitoring: In June look for 3mm long, D-shaped exit holes in bark. Look for dieback.

Physical Control: Remove dead and dying branches before adults emerge in June.

Bronze Birch Borer

Cultural Control: Replace susceptible species with *Betula nigra*, Heritage birch, which is a more resistant riverbirch. Improve tree vigor with fertilizer and watering.

Chemical Control: Spray terminals and bark in June if adults are present.

Biological Control: Various hymenopteran parasitoids.

Twolined Chestnut Borer

Agrilus bilineatus
Family Buprestidae
Native Pest

Hosts: Chestnut and black, bur, red, scarlet, white oaks.

Life History: Adults begin to emerge and lay eggs in June. Larvae bore into phloem in trunk and large branches, beginning in tops of trees. Adults feed gregariously on hardwood foliage. One generation a year. Some larvae require two years to complete their life cycle.

Twolined Chestnut Borer

James Solomon, USDA Forest Service
The Bugwood Network, University of Georgia

Overwintering: Pupal cells in outer sapwood or bark.

Damage: D-shaped exit holes in bark, foliage feeding, discoloration, sparse foliage, dieback.

Monitoring: Look in June for 3 mm long, D-shaped exit holes in bark. Look for damage.

Twolined Chestnut Borer

Cultural Control: Maintain tree vigor with appropriate watering, fertilizing, mulching, and pruning.

Chemical Control: Spray terminals and bark in June if adults are present.

Biological Control: The Chalcid wasp *Phasgonophora sulcata*, the trogsitid borer *Tenebroides corticalis*, and the clerids *Phyllobaenus verticalis*, *Phyllobaenus* sp. and *Cymatodera bicolor*, as well as woodpeckers.

Flatheaded Appletree Borer

Chrysobothris femorata
Family Buprestidae
Native Pest


James Solomon
USDA Forest Service
The Bugwood Network
University of Georgia

Hosts: Apple, beech, cotoneaster, dogwood, elm, linden, maple, oak, sycamore, willow, others.

Life History: Adults emerge throughout summer and lay eggs under bark or in cracks. Larvae bore into bark and feed on phloem. In the following spring, mature larvae bore into heartwood to pupate. One generation a year.

Flatheaded Appletree Borer

Overwintering: Larvae in galleries.

Damage: Girdling, loss of bark, dieback, death.

Monitoring: Look for adults on exposed, sunny bark. Look for dieback and for sap oozing from cracks. Look under bark for larval galleries.

Flatheaded Appletree Borer (bottom) and roundheaded borer (top)

Flatheaded Appletree Borer

Cultural Control: Water and fertilize adequately. Avoid deep planting.

Chemical Control: Spray trunk and limbs three times: the third week of May, the second week of June, and the first week of July.

Biological Control: Parasitic wasps and woodpeckers.

Eggs