Pest e-alerts

Entomology and Plant Pathology, Oklahoma State University
127 Noble Research Center, Stillwater, OK 74078
405.744.5527

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Battling the Enemy Within: Woodborers

Eric J. Rebek, Ornamentals and Turfgrass Extension Entomologist

Wood-boring insects are among the most difficult pests to control in nurseries, forests, and ornamental landscapes. As their name suggests, woodborers live and feed as larvae within trunks and limbs of woody plants, especially trees and shrubs. Their cryptic nature makes them very difficult to detect—woodborers often go unnoticed until infested plants begin showing damage symptoms and decline. At that point, it may be too late to control these pests and restore the health of the plant. Woodborers are also well protected from adverse environmental conditions that would otherwise limit their population growth. These insects typically suffer little mortality from most natural enemies (predators and parasitoids) and insecticide sprays.

Despite their appetite for destruction, woodborers would be a much bigger problem if not for natural defenses exhibited by trees. Many trees have a remarkably complex array of biochemical and physical weapons that they have evolved in response to attack from wood-boring insects. However, these defenses break down when trees are unhealthy and under stress. Trees are especially susceptible to borer attack in the first year of transplanting, or when experiencing stress from drought or nearby construction projects.

Identification and Life Cycle

Two major groups of woodborers are of economic importance: wood-boring beetles (Coleoptera) and several moths (Lepidoptera), especially clearwing borers. Flatheaded borers and roundheaded borers are the primary beetles of concern, although bark beetles and

ambrosia beetles can be problematic in forests and nurseries. Adult flatheaded borers are called metallic wood-boring beetles. These beetles are somewhat bullet-shaped and often colorful or iridescent. Larvae are creamy white and flattened with several bell-shaped body segments. When viewed from above, the head and mouthparts are concealed behind the broad thorax. Adult roundheaded borers are called longhorned beetles due to their long antennae. Larvae are creamy white, but are round and more grub-like in appearance than flatheaded borers.

Some of the more familiar pest species of flatheaded borers are bronze birch borer (*Agrilus anxius*), twolined chestnut borer (*A. bilineatus*), and flatheaded appletree borer (*Chrysobothris femorata*). Emerald ash borer (*A. planipennis*) is an exotic, invasive species that is gaining notoriety as it expands its range in North America, munching through our native ash trees. Upon emerging from their natal tree, metallic wood-boring beetles create distinctly D-shaped holes in the outer bark that measure approximately 1/8 inch wide. Flatheaded borers tend to feed primarily in the phloem layer, cutting off the vital flow of nutrients within the tree. Some species like hickory spiral borer, *A. arcuatus*, feed in a spiral pattern within twigs and small branches, which eventually drop from the tree.

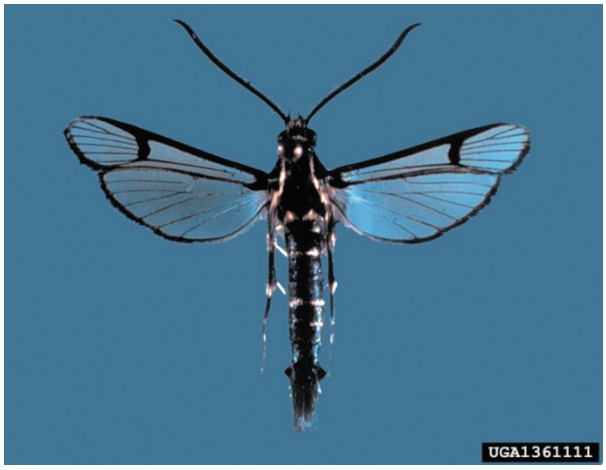
Metallic woodboring beetle, rednecked cane borer, *Agrilus ruficollis*; D-shaped exit hole created by metallic wood-boring beetle; flatheaded borer larva, twolined chestnut borer, *Agrilus bilineatus*; damage to pecan twig from hickory spiral borer, Agrilus arcuatus Photo credits Susan Ellis, www.bugwood.org (l), David Cappaert, Michigan State University, www.bugwood.org (r), Robert A. Haack, U.S. Forest Service, www.bugwood.org (bottom left), Tracey Payton, OCES Cleveland County (bottom right).

Among roundheaded borers, the locust borer (*Megacyllene robiniae*), painted hickory borer (*M. caryae*), redheaded ash borer (*Neoclytus acuminatus*), and pine sawyer beetles (*Monochamus* spp.) are common tree pests. Asian longhorned beetle is another exotic, invasive wood-boring beetle that has wreaked havoc on native hardwoods in major cities like New York and Chicago. Like emerald ash borer, however, this invasive tree pest has not been detected in Oklahoma. Like flatheaded borers, roundheaded borers bore into the phloem upon hatching from eggs. Most roundheaded borers feed for awhile on phloem but gradually move into the xylem where they continue to feed and eventually pupate. Emergence holes formed by longhorned beetles are typically round and measure approximately 1/4 inch wide. As with other tree pests, emergence dates vary with species and geographic location. In Oklahoma, adults of painted hickory borer and cottonwood borer become active in the spring and early summer, respectively.

Longhorned beetle, painted hickory borer, *Megacyllene caryae*; round exit hole created by longhorned beetle; Roundheaded borer; brown spruce longhorned beetle, Tetropium fuscum. Photo credits: Natasha Wright, Florida Department of Agriculture, www.bugwood.org (l), Pennsylvania Dept. of Conservation and Natural Resources, www.bugwood.org (c), Stephanie Sopow, Natural Resources Canada, www.bugwood.org (r).

Clearwing moths can be recognized by their clear wings (hence the common name) and an overall wasp-like appearance. Many species mimic stinging wasps (but they don't sting!) and are variously colored with orange, red, or yellow banding. Peachtree borer (*Synanthedon exitiosa*), dogwood borer (*S. scitula*), lilac or ash borer (*Podosesia syringae*), and banded ash clearwing (*P. aureocincta*) are among the most prevalent clearwing pests of nursery and landscape trees. Most species of clearwing moths are active fliers during the day. Adults emerge from their host trees from early spring through fall, depending on species. As they

emerge, they leave behind their pupal cases, which can be found extruding from the bark. Female moths emit a sex pheromone to attract males; these species-specific pheromones are used in traps to monitor moth populations in production landscapes. Mated females lay eggs on the bark surface of host trees and die soon afterward. Larvae hatch and bore through the outer bark. Clearwing moth larvae tend to tunnel deep into the sapwood and heartwood, though some species prefer to mine closer to the outer bark. Larvae also expel sawdust and frass (excrement) from the entrance to their tunnels, littering the ground nearest the trunk with a mixture of these waste products.



Clearwing moths often mimic stinging wasps; pupal case of a clearwing borer protruding from trunk of host tree. Photo credits: Wendell Snow, USDA-ARS, www.bugwood.org (l), Whitney Cranshaw, Colorado State University, www.bugwood.org (r).

Management

Larvae feeding within the tree can be controlled with systemic insecticides like imidacloprid (e.g., Merit, Bayer Advanced Tree and Shrub Insect Control), which are transported throughout the tree via the phloem tissue. However, the usefulness of these insecticides is limited to controlling flatheaded borers and bark beetles, which feed primarily within these shallow layers. Most roundheaded and clearwing borers tunnel too deeply into the tree to come into contact with these insecticides.

The most successful strategy for managing woodborers is prevention. Healthy trees are more resistant to woodborers, so plant trees properly and provide adequate amounts of water and nutrients. For newly planted trees, we recommend practices that encourage rapid establishment and vigorous growth. These practices include proper site selection and choosing trees that are adapted to the local environment (i.e., right tree, right place). The following are additional practices that promote tree health and woodborer resistance:

1. Protect trunks of young or transplanted trees with nursery wrapping paper, burlap, aluminum foil, or newspaper to prevent egg laying. Spray trunks with a properly labeled

insecticide before wrapping, and then wrap the tree leaves drop during the fall. Wrap should remain on the tree until full leaf expansion in the spring. The tree should be sprayed and rewrapped the following fall. Do not let ties or wraps bind the trunk.

2. Stimulate vigorous growth with proper fertilization and watering (refer to OSU Extension Fact Sheet HLA-6412, Fertilizing Shade and Ornamental Trees and Shrubs).

3. Prune out all dead and dying branches (refer to OSU Extension Fact Sheet HLA-6409, Pruning Ornamental Trees, Shrubs, and Vines).

4. Select trees and shrubs that are locally adapted and preferably are less susceptible to borer attack. Ash, birch, cottonwood, locust, soft maple, flowering stone fruits (e.g., peaches and plums), willow, and poplar are especially susceptible to borers.

References:

Rebek, E.J. Managing Woodborers. American Nurseryman, May 15, 2008.

Royer, T. Oklahoma Cooperative Extension Fact Sheet EPP-7315, Shade Tree Borers.

Wheat Disease Update

Bob Hunger, Extension Wheat Pathologist

Oklahoma: Rain has prevented extensive field scouting, but in examining the variety demonstration strips yesterday here at Stillwater I observed leaf rust moving up the canopy in Jagalene and Jagger. In spots, I found leaf rust at about the 15S level on flag leaves and in the 40-65 MS/S level on leaves below the flag. Plots were still not uniformly infected, but given the temperatures and abundance of free moisture, leaf rust will certainly be increasing. Leaf rust in nearly all other varieties was much less than in Jagalene and Jagger. Dr. Brett Carver (OSU Wheat Breeder) observed similar rust incidence in his breeder plots near Marshall, OK (about 25 miles west of Stillwater), but rain kept him from looking at plots near Lahoma and elsewhere. No stripe rust was observed. Powdery mildew continues to be present on lower leaves. With this wet weather, leaf rust and other foliar diseases should increase dramatically over the next couple of weeks. If a fungicide application is being contemplated, remember the latest at which fungicides can be applied is at full heading before flowering (anthesis) begins.

Jen Olson (Plant Disease Diagnostician) has received about six wheat foliage samples for virus testing over the last week from northwestern OK and the panhandle. Most of these tested

positive for barley yellow dwarf virus although a few were negative for all viruses. One observation I would make here is that although BYDV is common in the state this year, there also is considerable yellowing and discoloration of wheat leaves due to the late freeze. I checked with both Drs. Carver and Edwards, and they confirmed that a freeze such as the one we had on April 7th will cause damaged tillers to abort, and those aborted tillers and leaves will turn yellow as nitrogen is redirected to living, fertile tillers. Hence, to make a long story short, there is a lot of yellow/yellowing wheat that is the result of the freeze rather than BYDV or other viruses. BYDV certainly is prevalent in the state as testing in the Diagnostic Lab demonstrates, but there also is yellowing & discoloration present not from BYDV or other viruses, but likely from the freeze.

Gary Strickland (OSU Extension Educator, Jackson County) reports seeing much of the same regarding BYDV in Jackson County (southwestern OK) as well as some root rot symptoms in fields in southwestern OK.

Updates from other states:
Arkansas: Dr. Gene Milus, Plant Pathology, University of Arkansas (04-May); Dr. Gene Milus, Wheat Pathologist, University of Arkansas. Plots at Lonoke (25 miles east of Little Rock) were mostly just past flowering. No stripe rust. No stem rust on McNair 701. Trace leaf rust on some unadapted lines but none on varieties. Septoria leaf blotch on lower leaves but did not move up much because of previous week's hot dry weather. BYD was the most prevalent disease. Some take-all showing up. Powdery mildew essentially disappeared. Hessian fly damage and pupae were easy to find, and damage likely will be severe in some plots.

Plots at Hamburg (southeast corner) were mostly in soft dough with early varieties approaching maturity. No stripe rust. No stem rust on McNair 701. Up to 15% leaf rust on some unadapted lines and trace on varieties. Septoria leaf blotch on lower leaves but did not move up at all because of previous week's hot dry weather. The only exception was on Roane that had about 50% leaf blotch in non-treated plots. BYD was the most prevalent disease. Bacterial streak and black chaff on a few varieties - likely from seedborne inoculum.

We have been in monsoon season for past week, so disease situation may change.

Dr. Richard Grantham
Director, Plant Disease and Insect Diagnostic Laboratory