



**Figure 1—The adult emerald ash borer, an exotic wood-boring beetle, attacks ash trees exclusively.**

The emerald ash borer (EAB) is a very small but very destructive beetle. Metallic green in color, its slender body measures 1/2 inch in length and 1/8 inch wide. The average adult beetle can easily fit on a penny.

Native to China and eastern Asia, the EAB probably landed in North America hidden in wood packing materials commonly used to ship consumer goods, auto parts, and the like. Although no one can say for sure when EAB arrived in southeastern Michigan, the scientific community now believes the beetle went undetected for up to 12 years, based on its widespread distribution and destruction. EAB was officially identified in the summer of 2002.

This beetle is currently known to be responsible for the death or decline of more than 15 million ash trees in a 20-county area around Detroit. EAB has also impacted various communities in Ontario, Canada. Essex County, across the river from Detroit, was declared infested with EAB in 2002. Canadian officials estimate that between 100,000 and 200,000 ash

trees are infested and will die in Essex. The neighboring county, Chatham–Kent, has recently been declared to be infested with EAB.

Although large EAB infestations are concentrated in Michigan and parts of Canada, the States of Ohio, Maryland, Indiana, and Virginia have also found EAB in smaller, somewhat contained areas.

In terms of the range and extent of the EAB infestation in North America, the human element is of particular significance. Unknowingly, people's behaviors associated with everyday living and commerce have greatly contributed to the spread of the EAB. The movement of any ash tree products (e.g., branches, logs, woodchips, nursery stock, and firewood) advances the spread of EAB. Consider this: current research suggests that the natural spread or movement of the EAB is about 1/2 mile each year. If that estimate is accurate and the length of time EAB has been present is 12 years, at press time (April 2005) the generally infested area in Michigan\* should cover about 113 square miles. But as of 2005, Michigan's generally infested area covers almost 13,000 square miles! Human behavior is a defining factor in the spread of EAB.

### Scientifically Speaking

Entomologists from the United States and Canada have been studying the EAB to learn more about its biology and behavior. Because this pest has never been found anywhere in North America prior to the current infestation, this information is being continually updated.

Scientists have discovered that, in a temperate climate, the beetle can develop from egg to adult in as little as 1 year. From May to August, adults emerge from overwintering sites under bark and mate. Females lay eggs in bark crevices, and the eggs hatch in about 10 days. The eggs develop into wormlike larvae, which tunnel under the bark to feed and grow

\* These calculations are based on the beetle's having appeared at only one point of introduction.

throughout the fall. This activity eventually kills the tree. Larvae lay dormant during the winter and emerge from trees in May as adults, leaving a unique D-shaped exit hole.

Here are some key discoveries about the EAB.

- On this continent, EAB attacks only ash trees (*Fraxinus* spp.), and all the ashes—green, white, and black, etc.—are at risk except the mountain ashes (*Sorbus* spp.), which are not a true ash.
- EAB is a good flyer but tends to fly only relatively short distances (about 1/2 mile).
- We cannot count on natural predation to control EAB: the beetle has no known predators in North America, although woodpeckers will eat them.
- EAB infestation is always fatal to ash trees. Infested trees will decline from the top down and will be dead in 1 to 3 years, even if the trees were healthy before being attacked by EAB.
- EAB is under a great deal of scientific scrutiny now. New information and discoveries will improve managers' ability to detect, control, and eradicate the beetle.

### Signs and Symptoms

It is extremely difficult to determine whether an ash tree is infested or not infested with EAB because tree decline is usually gradual. Early symptoms of an infestation might include dead branches near the top of a tree or perhaps wild, leafy shoots growing out from its lower trunk. D-shaped exit holes and bark splits exposing S-shaped tunnels are significant signs of EAB.

If a tree is infested with the EAB, tree removal is recommended as the most effective way to eliminate these exotic pests and prevent the species' further spread. Considering the most current science, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service recommends felling infested trees, chipping them, and burning the chips.

Treatment options may eventually be approved for some homeowners living in a generally infested area where suppression efforts are being used, with the understanding that treatments are not a cure. At best, a homeowner might only prolong a tree's decline. Every EAB-infested tree will die.

Because new treatment options and methods are expected to become available in the future, we encourage homeowners to talk to their local Extension Office or State department of agriculture for the most up-to-date information.



**Figure 2—S-shaped tunnels, made by EAB larvae, riddle infested ash trees.**



**Figure 3—The D-shaped exit hole is a unique signature of the EAB.**



**Figure 4—Epicormic shoots are a telltale sign of a tree under stress.**

## The Cooperative Mix

Detection, control, and eradication of EAB is a huge undertaking. Cooperation between Federal and State government agencies, municipalities, universities, the greening industry, and the public at large is essential to eliminate this pest.

Here are some things you can do *now* to lessen the likelihood of EAB's becoming established in the United States.

- **Don't move firewood.** Humans unknowingly contribute to the spread of EAB when they move firewood. EAB larvae can survive hidden under the bark of firewood. Play it safe: don't move *any* firewood and you won't move *any* beetles.
- **Visually inspect your trees.** Early detection is a key factor. If trees display any sign or symptom of EAB infestation, contact your State agriculture agency.
- **Spread the word.** Talk to your neighbors, friends, and coworkers and get them onboard. Public awareness and education is an ongoing process; support the effort.
- **Know State and Federal regulations.** Make sure you understand the regulations that govern your own State and those States and Provinces you may visit.
- **Ask questions.** If you receive ash nursery stock, know its point of origin and your supplier. EAB larvae may be hiding under the tree bark.



Figure 6—The female beetle lays eggs in bark crevices of ash trees.

These Web sites offer more-detailed information about the EAB.

<http://www.aphis.usda.gov>

<http://www.na.fs.fed.us/spfo/eab>

<http://www.emeraldashborer.info>

Toll-free information line: 1-866-322-4512



Figure 5—EAB larvae can be transported to new locations while hidden under the bark of firewood.

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*Cover photo:* Bark's-eye view of the emerald ash borer, a foreign insect that attacks all species of ash trees except the mountain ash, which is not a true ash.

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Web sites: <http://www.aphis.usda.gov>  
<http://www.na.fs.fed.us/spfo/eab>  
<http://www.emeraldashborer.info>

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## The Green Menace

