South Carolina Forestry Commission

Photo by Edward Czerwinski, Ontario Ministry of Natural Resources, Bugwood.org

EMERALD ASH BORER DAMAGE

HOW TO RECOGNIZE AND REPORT IT

What is emerald ash borer (EAB)?

Emerald ash borer (scientific name: *Agrilus planipennis*) is a small, exotic beetle in the jewel beetle family (Buprestidae). The adult is about 0.5 inches long (Fig. 1); the larvae are about an inch long (Fig. 2). The adults nibble on ash foliage but cause little damage. They lay their eggs in the bark of the ash tree, and the eggs hatch into larvae that feed on the inner bark. As the inner bark transports water and nutrients up and down the tree, this damage causes the tree to decline in health.

Why is EAB important? What are the impacts?

This insect was first reported in North America in Michigan in 2002, and as of 2023 it can be found in 35 states (all eastern) and five Canadian provinces. It has killed hundreds of millions of ash trees in North America. As ash trees are removed from the canopy of our forests, they allow space and light for invasive plants, such as privet, Oriental bittersweet and *Elaeagnus* spp., to thrive. This reduces the overall health of our forests, decreasing diversity and providing fewer benefits to native flora and fauna. The death of so many ash trees has been costly to municipalities, homeowners and the forest products industry.

Why do we want to know where it is?

So far, nothing has slowed the spread of EAB in its march through North America's forests. However, knowing where EAB can currently be found is very helpful. Landowners and municipalities that are not currently impacted by EAB, but where infestation is imminent, can prepare and reduce the negative impacts to their forests. It also helps scientists understand changes in the movement of EAB as this organism enters new, warmer territory.

Signs and symptoms of EAB

The first symptoms of an EAB infestation are ash trees with few or no leaves in the crown. As the vascular tissue is destroyed, the tree is less able to transport sugars from the leaves or water from the roots, and branch death is certain.

Fig. 1: Adult emerald ash borer

Fig. 2: Larva

Fig. 3: Epicormic sprouting

Fig. 4: D-shaped exit hole

Fig. 5: Galleries

Some trees may produce epicormic sprouting in response to EAB damage (Fig. 3), that is, a flush of new growth lower on the trunk. Woodpeckers feed on the larvae, so woodpecker damage on the trunk of an ash tree indicates a potential infestation. As the adults emerge, they leave a distinct D-shaped hole in the bark (Fig. 4); a caveat is that other *Agrilus* species leave the same tell-tale D-shaped hole when they exit their hosts. Lastly, peeling back the bark (you may have to use a hatchet or machete) will reveal the distinctive galleries the larvae have made in the inner bark (Fig. 5).

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Recognizing the host: ash

EAB ONLY attacks ash, so recognizing ash is important in diagnosing the presence of EAB. There are at least 50 species of beetles in the same genus as the emerald ash borer native to South Carolina. Many of these leave signs that are identical or very similar to emerald ash borer damage, but if you find the sign in ash, it is very likely you have found emerald ash borer. An important characteristic of ash trees is that they have an opposite branching pattern (Fig. 6), that is, branches come off of branches opposite each other. Other native species with this branching pattern include maples (*Acer* spp.), most dogwoods (*Cornus* spp.) and horsechestnuts (*Aesculus* spp.). Ash has compound leaves (each leaf is made up of five to nine leaflets) (Fig. 7). Ash trees are dioecious, with male trees and female trees. Female trees will produce paddle-shaped samaras that hang down (Fig. 8). The bark of ash trees is furrowed, producing diamond-shaped ridges (Fig. 9).

Fig. 6: Opposite branching of ash trees

Fig. 7: Compound leaves of ash trees

Management options for infested forests

Ash is an important component of our bottomland hardwood species. If infestation is imminent, the health of your bottomland forest can be made more resilient by removing invasive species, particularly shrubby species, such as privet (*Ligustrum* spp.) and *Elaeagnus* spp. You might consider investing in planting some native trees and shrubs that are site-appropriate, trees such as cherry bark oak (*Quercus pagoda*), red maple (*Acer rubrum*), sycamore (*Platanus occidentalis*) or shrubs such as musclewood (*Carpinus caroliniana*) and hophorn-beam (*Ostrya virginiana*). Planting these will help keep invasive plants out while maintaining a diverse array of natives that will enrich the forest with their ecological services.

Contact

If you think you have seen EAB damage, please contact Forestry Commission Forest Health Coordinator David Jenkins at DJenkins@scfc.gov. For more information on EAB, please visit http://www.emeraldashborer.info/.

Fig. 8: Ash samaras

Fig. 9: Ash bark