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Emerald Ash Borer

The emerald ash borer (EAB) threatens the existence of ash trees throughout North America. While currently limited to potions of the Great Lakes, Ohio Valley, and Mid-Atlantic regions, the insect has the potential to spread wherever ash trees grow.

All native species of ash (green, white, blue, and black), as well as their horticultural cultivars, are susceptible to attack. The emerald ash borer is an exotic insect that was accidentally introduced into North America. As such, our native ash trees have no natural resistance to this pest.

Emerald ash borers were first identified in the Detroit metro area in 2002. Scientists determined that the insect most likely arrived as a hitchhiker in lumber used for crating and packing materials. The insect is native to Southeast Asia and arrived on imported shipments from this area approximately 15-20 years ago. Since its introduction, EAB has spread via infected nursery stock and firewood. As a result, this insect has directly killed millions of ash trees in infested areas.

Description

The emerald ash borer is a beetle. It is a member of the wood boring group of beetles known as metallic wood borers or flatheaded borers. The adult beetle is a bronzy or metallic green and between 1/3 and 1/2 inch long. It is elongate in shape. The adult beetles feed on foliage, but do little, if any, damage to the tree.

The grub-like larva is the stage that causes the damage. They are cream colored and flattened. They reach a little over an inch in length when mature.

Biology

The emerald ash borer is closely related to several native flatheaded borers like the bronze birch borer and two-lined chestnut borer. The biology and life cycle of EAB is very similar to those of our native species. In most cases, it only requires a single year to complete its life cycle.

EAB spends the winter as a mature larva in a small chamber in the outer sapwood of the ash tree. The larvae transform into pupae, still within the chamber, in early spring. In late May or June, the adult beetle will emerge from the pupa and chew its way to the surface. After exiting the tree, the beetle will leave behind a D-shaped emergence hole in the bark. The hole is about 1/8 inch across and is one of the positive indicators that a tree is infested with EAB.

After mating, the female beetles lay their eggs in the bark crevices of ash trees. Ash trees of any species, size or health status will have eggs deposited on their bark. This is a major difference between EAB and our native flatheaded borers. Our native borers focus only on trees that are already in poor health; they usually leave healthy trees alone. EAB will attack healthy as well as stressed trees. Therefore, cultural practices that improve health and

Left: An adult emerald ash borer beetle with its distinctive metallic green coloring; Center: A "D" shaped emergence hole; Right: canopy thinning and branch dieback are symptoms of infestation.

Left photo credit:
Brian Sullivan, USDA APHIS PPQ, Bugwood.org

vitality of trees cannot be relied on by themselves as an effective management strategy.

After the eggs hatch, the small larvae tunnel into the tree to the area just below the bark. There, the larvae create serpentine tunnels that result in the primary damage to the tree. The tunnels disrupt the flow of water and nutrients through the trees vascular system. The characteristic S-shaped larval galleries are also a positive indicator of an EAB infestation.

The larvae feed though the summer and early autumn, growing as they do so. In mid to late autumn, they bore about an inch deep into the sapwood and create their overwintering chamber.

Symptoms

The D-shaped emergence holes and S-shaped larval galleries beneath the bark are the most reliable indicators of EAB presence. Trees under attack by EAB will also show varying degrees of canopy thinning and branch dieback. These symptoms usually are first noticeable in the upper portions of the canopy and progress downward over several years. Trees with moderate to advanced infestations also commonly have trunk sprouts growing from the main trunk and lower scaffold branches. Unfortunately, crown thinning, dieback and trunk sprouts can be present on ash trees with other problems beside EAB. These symptoms should not be relied upon to positively identify EAB infestations.

Another symptom associated with EAB infested trees is large amounts of woodpecker activity. The EAB larvae, just beneath the bark, are a tempting food source for woodpeckers, especially during the winter when other food sources are scarce. EAB infested trees often have numerous holes drilled in their trunks.

Management Options

Regulatory quarantines attempt to restrict the movements of infested nursery stock and firewood from infested areas. Such quarantines rely on cooperation by the public and can be difficult to enforce. They can effectively slow the spread of EAB, but cannot stop it.

Cultural practices that help improve tree health (proper watering, mulching, fertilization), cannot be relied upon alone to protect trees. EAB attacks healthy trees as well as stressed trees. Cultural practices can help trees tolerate and recover from EAB injury when combined with other management practices.

For high value trees in the landscape, insecticidal treatments are available to help protect trees from EAB. Not every tree is a good candidate for treatment, however. Trees with poor form or structure, in poor health, or with EAB damage already present may be best removed rather than treated.

Insecticide treatments that are applied to the soil or trunk, or injected directly into the trunk have been shown by university research to be effective against EAB. The best choice of treatment varies from client to client and situation to situation. No one treatment is suitable for every scenario. If insecticide treatments are to be effective, they should be started before the trees fall under attack whenever possible. It is also important to remember that not every treated tree will survive.

If you have any additional questions or concerns, please do not hesitate to contact your local office for further details.