



## Emerald Ash Borer

Emerald Ash Borer (EAB) is a destructive, introduced insect of North American ash trees. It has been the cause of widespread ash tree decline and mortality throughout northeastern North America.

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It is believed that it may have been first introduced to those areas in the early 1990s in wood packing material or pallets. Since then, it has spread throughout Michigan and across much of Ohio, eventually finding its way to numerous north central and northeastern states. Heavy infestations can kill trees in as little as three years.

Adult EAB are wood-boring beetles that are bright metallic green. Adults are slender, bullet-shaped and 1/3 of an inch long. Females are slightly larger than males. They have two pair of wings. EAB larvae are white to cream with 10 abdominal segments. The last segment has a pair of brown, pincer-like appendages. Larvae reach a length of 1 to 1¼ inches. EAB utilizes three dominant species of ash, including green, white and black, to complete its lifecycle.

The EAB has a 1-year life cycle. Adult beetles begin emerging in late May and early June through a D-shaped exit hole. Adult activity peaks between mid June and early July. Adults feed on ash foliage for several days and then begin to mate. Males live an average of 13 days; females live 21-22 days. Females lay 60-90 eggs in their lifespan. Eggs hatch in 7 to 10 days. After hatching, first instar larvae tunnel through the bark and into the phloem and cambial region of the ash tree. Larvae feed on phloem for several weeks, creating S-shaped galleries. As larvae grow, galleries become progressively wider. Prepupal larvae overwinter in shallow chambers within the bark. Pupation begins in late April or early May and lasts for 1 to 2 weeks.



EAB is native to Asia, primarily found in China and Korea. In its native environment this insect causes few problems. Since its first detection in Michigan, it has spread to Ohio, Indiana, Illinois, Maryland, Missouri, Virginia, West Virginia and Wisconsin. It was first discovered in western Pennsylvania in June 2007. It is believed that moving infested firewood and nursery stock is the main cause of EAB spread. An adult EAB was collected on a green ash tree in a non-residential landscape in Butler County, Pennsylvania in June 2007 and next in Mercer County, Pennsylvania, in July 2008. In February 2009 the EAB was discovered in Mifflin County.

New infestations are difficult to detect and may not be apparent for up to three years. Jagged holes made by woodpeckers searching for larvae may be one of the first signs of the EAB. Larvae feed on the phloem for several weeks, creating serpentine (S-shaped) galleries packed with sawdust-like frass under the bark of the tree. D-shaped exit holes made by emerging adult beetles will occur on the trunk and branches and the bark may split vertically over the larval galleries. As infestation increases, foliage wilts, branches die back and the tree canopy becomes increasingly thin. Epicormic shoots begin to appear on the trunk of the tree. Trees will die after 3 to 4 years of heavy infestation.

EAB control tactics are extremely limited with tree removal being the principal option. Chemical treatment using insecticides containing the active ingredient imidacloprid can be effective at controlling the EAB. Applications are made as soil drenches, soil injections, or stem injections in May or early June. It is important to begin treating large trees before they become infested. Treatment must continue each year. The Pennsylvania Department of Agriculture has also established a quarantine restricting the movement of ash nursery stock, green lumber and any other ash material. Quarantined counties currently in Pennsylvania include Allegheny, Armstrong, Beaver, Butler, Juniata, Lawrence, Mercer, Mifflin, Washington, and Westmoreland. The movement of firewood of all types and species into the Commonwealth of Pennsylvania is also prohibited.

Prepared by Molly Sturniolo, Master Gardener Coordinator and David R. Jackson, Forest Resources Educator. Reviewed by Greg Hoover, Senior Extension Associate of Ornamental Entomology.

## Emerald Ash Borer Photos



**Certified arborists George Pegher and Bob Crusan survey emerald ash borer infested green ash trees in a non-residential landscape in Butler County, Cranberry Township, Pennsylvania.**



## Emerald Ash Borer Look Alikes

