

Emerald Ash Borer

Adam Downing
Forestry & Natural Resources Extension Agent, Northern District

Peer reviewed by: Lori Chamberlin, Forest Health Specialist - Va Department of Forestry
Eric Day, Extension Entomologist - Virginia Tech

EAB has become the most destructive and economically costly forest insect to ever invade North America. (Herms, 2014)

Background

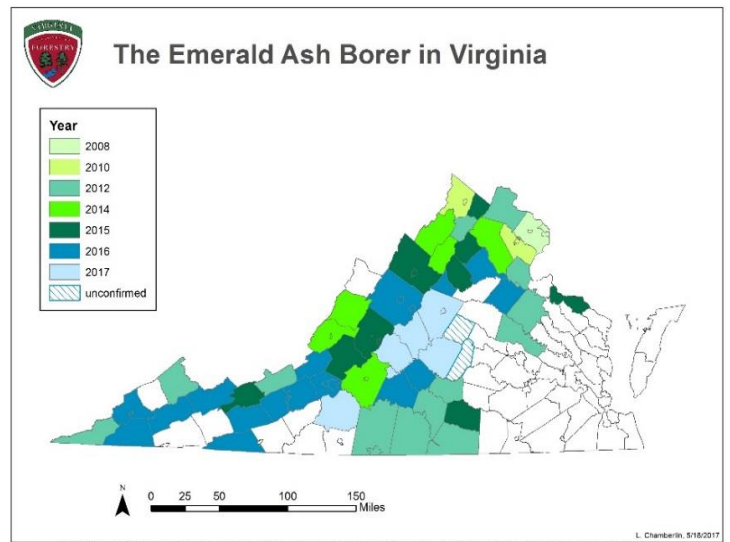
The Emerald Ash Borer (EAB) is a non-native insect. The accidental introduction of EAB to North America is believed to have arrived by way of shipping material, such as pallets, made from infested ash from China. Since its discovery in 2002 in North America, it has been confirmed in parts or all of 29 states and 2 Canadian provinces. EAB was first established in SE Michigan, in the early 1990's. Initial ash damage was mistaken for Ash Yellows for a decade.

North American Ash trees are highly susceptible, unlike the ash of EAB's native China. By 2003, millions of ash trees were dead in a 6 county area of SE Michigan and serious efforts began to better understand the biology of the insect and control its spread.

Initial control efforts included a quarantine restricting the movement of ash nursery trees, logs and related products from infested counties. An "ash-free firebreak" was also tried near Windsor, Ontario by removing all ash trees in a 3-6 mile wide swath around the known infestation. It was unsuccessful.

In Virginia, the Emerald Ash Borer was first detected in Fairfax County in 2003 and eradicated only to show up again in 2008, again in Northern Virginia. As of June 2017, it has been confirmed in over half of Virginia's counties.

Virginia's control efforts initially included quarantines of several counties and adjacent counties of known infestations. In 2012, the whole State was quarantined and added to the federal quarantine boundary thus allowing ash wood and plant material to move freely through Virginia and to/through other states that were also part of the federal quarantine.



Credit: L. Chamberlin, Virginia Department of Forestry.

Identification & Biology

EAB belongs to a group of beetles called “flat-headed borers”. All flat headed borers leave a “D-shaped” exit hole when they emerge from the wood as an adult, because of body shape of the emerging adult. The adult emerald colored beetle does little direct damage to the tree. While it feeds on ash leaves, it is not a significant defoliator.



Credit: Kenneth R. Law, USDA APHIS PPQ, Bugwood.org



Credit: J. Obermeyer, Purdue University

The larval stage of this insect is the killer. It tunnels just underneath the bark creating s-shaped galleries that girdle branches and eventually the trunk of the tree, resulting in death.

Early signs of damage are often unnoticed and not unique to EAB. Branch dieback, epicormic sprouting and thinning foliage can just as likely stem from construction damage as EAB. However, given the wide presence of EAB in Virginia any ash tree exhibiting signs of stress or decline should be suspect of Emerald Ash Borer.

A later sign of damage, however, is unique to EAB. “Blonding” results from Woodpecker activity. These natural predators go after the EAB larvae knocking off outer edges of bark, which changes tree’s the look significantly and can be easily identified



Source: Art Wagner, USDA, www.bugwood.org

Treatment options

Forest settings

At present, there are no economically viable control options for EAB for forested situations. Research continues into biological control options such as parasitic wasps native to China and Russia. While this holds some promise, it is unlikely to “save”

Virginia's ash due to the extent and abundance of EAB relative to the limited trial releases of the non-stinging wasp.

Fortunately, Ash make up only about 2% of the forests in Virginia. However, where ash occurs, it's often a dominant species in the canopy and so mortality can lead to significant local impacts. Where landowners have merchantable ash, a pre-emptive harvest should be considered. Once the trees have been infected with EAB, log value can decrease rapidly.

Landscape settings

For yard, street and park trees, **preventative** treatment is relatively easy and affordable.

Homeowners can purchase and apply imidacloprid or dinotefuran as a soil drench or granule respectively applied in April after bud break. Timing, application method and rate of material applied is critical. Research conducted in the mid-west found mixed results on efficacy of these chemicals in homeowner formulations but suggested the effectiveness variability may have been due to varying application rates. Other research found good control for small to medium healthy trees with annual application at high rates (maximum allowed on the label).

Professional Arborists with an appropriate pesticide applicator license have additional options such as applying the above chemicals at higher rates or applying other products. Some of those other products contain the chemical emamectin benzoate which is typically applied as an injection. Research suggests this is the most effective insecticide both in terms of prevention and, to some extent, treatment of already infested trees. Injected directly into the stem of the tree, this application method results in faster uptake than a soil drench and can therefore "save" lightly infested Ash trees. Trees with more than 30% decline are unlikely to recover. This treatment is more expensive but provides control for 2-3 years.

References

Day, E. and S. Salom. 2016. Emerald Ash Borer. Virginia Cooperative Extension Publication Number 2904-1290.

Herms, DA, DG McCullough. 2014. Emerald Ash Borer Invasion of North America: History, Biology, Ecology, Impacts, and Management. *Annual Review of Entomology*. 59: 13-30

Herms DA, McCullough DG, Smitley DR, Clifford CS, Cranshaw W. 2014. Insecticide options for protecting ash trees from emerald ash borer. North Central IPM Center Bulletin. 2nd Edition. 16 pp.

For more information:

- Insecticide Options for Protecting Ash Trees.
http://www.emeraldashborer.info/documents/Multistate_EAB_Insecticide_Fact_Sheet.pdf
- National status & resources: <http://www.emeraldashborer.info/>
- Emerald Ash Borer Control for Foresters and Landowners.
<https://www.pubs.ext.vt.edu/ENTO/ENTO-76/ENTO-76.html>