



## Emerald Ash Borer

*Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae)

### Introduction:

The Emerald Ash Borer (EAB) is an aggressive exotic wood boring beetle native to East Asia that attacks stressed and healthy ash trees, frequently causing death within three years of infestation. First detected in the U.S. in Michigan in 2002, EAB has spread rapidly, destroying over 25 million ash trees and threatening this important resource of timber, wildlife habitat, and urban landscape trees. The USDA estimates losses could reach billions of dollars if EAB is not controlled.

### U.S. Distribution/Spread:

EAB is thought to have entered North America in infested wood shipping materials. EAB has been confirmed in Michigan, Ohio, Maryland, Indiana, Virginia, Illinois, Pennsylvania, West Virginia, Missouri, Wisconsin, Kentucky, Minnesota, New York, Iowa, Tennessee, and Canada (Ontario, Quebec). EAB is a competent flier, readily traveling ½ to about 1 mile (0.8-1.6 km). In the U.S., EAB is spread long distances primarily by people moving infested ash wood products (e.g., firewood, branches, nursery stock) into uninfested areas, leading to quarantines and fines to control human activities that spread EAB.

### Host Plants:

In North America, only ash trees have been attacked. EAB has killed both stressed and apparently vigorous ash trees in woodlots and urban settings.

### Biology and Damage:

EAB typically completes one generation per year, although when healthy trees are attacked it may take up to 2 years. Mature larvae overwinter in shallow pupal chambers constructed into the outer sapwood or thick bark, and pupate in spring. New adults begin emerging in early to mid-May, peak in June, and may continue into August. Adults mate and lay eggs late-May through mid-August and are most active on sunny, calm days.

Females each lay an average of 77 eggs, laid individually in cracks in the bark. Eggs hatch in about a week and the young larvae bore beneath the bark and feed until fall. As larvae feed they tunnel throughout the sapwood, creating meandering S-shaped galleries that widen as the larvae grow. Larvae are the destructive stage, tunneling in and feeding on tissues beneath the bark, eventually girdling the tree, leading to its decline and death.

### Identification:

- Adults are slender, elongate beetles, ~ ½" long (13 mm), 1/16" wide (1.6 mm), lacking a defined waist, flattened laterally.
- Adults are dark metallic green in color with a coppery green head; the top of the abdomen under the wings is purplish red.
- Adults may be found late spring through summer.



UGA1241011

EAB adult. Howard Russell, Michigan State Univ., Bugwood.org

- Larvae are creamy white flat-headed borers with a small brown head retracted inside an enlarged, distinct, flattened prothorax.
- Larvae have bell-shaped abdominal segments without legs, flattened laterally (top to bottom), with a pair of brown pincers (urogomphi) on the last segment.
- Mature larvae can reach 1-1¼" in length (25-32 mm).
- Larvae are under the bark in shallow S-shaped galleries.



UGA1460071

EAB larva. David Cappaert, Michigan State University, Bugwood.org

### What to Look For:

EAB has infested and killed ash trees in urban and forest settings, and has been found in trees and branches ranging from 1 to 55" (2.5-140 cm) in diameter. EAB are difficult to detect in newly infested trees because eggs are usually laid in bark cracks high on the upper trunk, and larvae are hidden under the bark. Most symptoms do not show up until a year after the initial attack.

### Symptoms of EAB infestation include:

- Woodpecker feeding injury (small bark patches stripped away, jagged holes).
- Foliage wilts and yellows; tree canopy thins; crown die-back occurs (30-50% after 2 years of infestation).
- D-shaped exit holes about 1/8" wide (3-4 mm) left by emerging adults.
- Vertical splits in the bark 2-4" long (5-10 cm) above larval galleries.



EAB D-shaped exit hole (left) and woodpecker damage (right).  
David Cappaert, Michigan State University, Bugwood.org

- Epicormic branches ("sprouts") along the lower trunk and on some major branches.
- Larval galleries beneath the bark: typically S-shaped (serpentine), meandering, frass-packed, increasing in width as larvae grow, 4-20" long (10-50 cm).



EAB galleries. Art Wagner, USDA APHIS PPQ, Bugwood.org

### How to Report a Possible Sighting/Infestation

#### **In Maryland:**

**University of Maryland Cooperative Extension Exotic Pest Threats Website:**

<http://hgic.umd.edu/faq/sendAQuestion.cfm>

**Maryland Department of Agriculture:** call 410-841-5920 to report suspect pests;

visit [http://www.mda.state.md.us/plants-pests/invasive\\_species.php](http://www.mda.state.md.us/plants-pests/invasive_species.php) for information.

**Nationally: USDA-Animal and Plant Health Inspection Service (APHIS)**

[http://www.aphis.usda.gov/services/report\\_pest\\_disease/report\\_pest\\_disease.shtml](http://www.aphis.usda.gov/services/report_pest_disease/report_pest_disease.shtml)



### **Where to Get More Information:**

UMD Cooperative Extension Exotic Pest Threats Website: <http://www.PestThreats.umd.edu/index.cfm>

Look-alikes: MSU Ext. pub. #2939: <http://www.emeraldashborer.info/files/e-2939.pdf>

**Project Participants:** Chris Sargent, Research Assistant; Michael Raupp, Entomologist; Sandra Sardanelli, IPM Coordinator; Paula Shrewsbury, Entomologist; David Clement, Pathologist; Mary Kay Malinoski, Entomologist.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, University of Maryland, College Park, and local governments. Cheng-i Wei, Director of Maryland Cooperative Extension, University of Maryland.

The University of Maryland is equal opportunity. The University's policies, programs, and activities are in conformance with pertinent Federal and State laws and regulations on nondiscrimination regarding race, color, religion, age, national origin, gender, sexual orientation, marital or parental status, or disability. Inquiries regarding compliance with Title VI of the Civil Rights Act of 1964, as amended; Title IX of the Educational Amendments; Section 504 of the Rehabilitation Act of 1973; and the Americans With Disabilities Act of 1990; or related legal requirements should be directed to the Director of Human Resources Management, Office of the Dean, College of Agriculture and Natural Resources, Symons Hall, College Park, MD 20742.