

Emerald Ash Borer: Update on the potential impact on Iowa

Emerald Ash Borer *Agrilus planipennis*, a new pest of trees from Asia was discovered in July 2002 feeding on ash trees (*Fraxinus* spp.) around the Detroit area of SE Michigan. Evidence suggests that this insect arrived 15+ years prior to detection.

The larvae of the emerald ash borer, or EAB, feed in the cambium between the bark and wood, producing galleries that eventually girdle and kill branches and entire ash trees.

In Michigan alone, more than 25 million ash trees are dead or dying from EAB. Windsor, Ontario, Indiana, Ohio, Illinois, and Maryland are also fighting the insect. As of December 1, 2006, all of Ohio, Indiana, Illinois and Michigan (except the Upper Peninsula) are under federal EAB quarantine. Despite federal and state quarantines prohibiting movement of ash firewood, new populations of EAB are being found. The July 2006 EAB find in Illinois puts this exotic pest within striking distance of the Iowa border.

Emerald ash borer is native to Asia and is known to occur in China, Korea, Japan and Mongolia, eastern Russian, and Taiwan. In North America, EAB has been found feeding only on green ash, white ash and black ash. These ash species are common in native Iowa forests and green ash is a predominant species in our communities.



EAB has not been detected in Iowa to date. However, EAB should be considered the most serious threat to Iowa's native forest and urban ash tree population in Iowa since Dutch elm disease 30+ years ago.

IDENTIFICATION

EAB adult beetles are generally larger and a brighter green than the native species of *Agrilus* or ash borers in Iowa. EAB adults are slender (1/16 inch wide) and are approximately 1/4 to 1/2 inch in length. Color varies but beetles are a unique bronze to golden green overall, with darker, metallic emerald green wing covers.



Emerald ash borer adult. Note the bronze head and thoracic area and the emerald green wing covers.



Emerald Ash Borer larvae are a white to cream colored 10 segmented flat worm that reach 2/3 to 1 1/4 inch in length.



Characteristic S-shaped galleries made by larvae are apparent when the bark of a host tree is removed.



D-shaped emergence holes on the trunk of host trees. Native borers infesting ash produce round-shaped emergence holes.

EMERALD ASH BORER BIOLOGY

EAB has a one year life cycle. Adult beetles begin emerging in late May and live for about 3 weeks. Field data indicate adults emerge throughout the summer and are present into mid-August. Beetles are active during the day, particularly when conditions are warm and sunny. Adults feed on ash leaflets producing small irregularly-shaped notches along the margins.

EAB females can mate several times. Approximately 60-80 eggs are deposited individually in bark crevices on the trunk and branches. After 7 to 10 days, EAB larvae chew through the bark and into the cambial region. Larvae feed on phloem and the outer sapwood throughout their growth. The S-shaped feeding galleries wind back and forth, becoming progressively wider as the larva grows. Galleries are packed with fine, sawdust-like frass.

Feeding is completed in the fall and the larvae overwinter in shallow chambers in the outer sapwood. Pupation begins in late April into May. Adult EAB beetles emerge head first through a D-shaped exit hole that is 1/8 inch in diameter.

EMERALD ASH BORER DAMAGE

Damage by EAB populations typically goes undetected until ash trees show characteristic symptoms. Larval feeding interrupts the transport of nutrients and water within the tree during the growing season. Leaves wilt and the canopy thins as branches die. EAB-infested trees lose more than 30% of the canopy after 2 years and trees often die after 3-4 years of EAB activity.



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Thinning and branch dieback in an ash tree infested with emerald ash borer.

Symptoms to look for in EAB infested trees:

- ➔ Jagged holes excavated by woodpeckers.
- ➔ D-shaped exit holes left by the emerging adult beetles.
- ➔ Vertical bark splits above larval feeding galleries.
- ➔ S-shaped, frass-filled larval tunnels etching the sapwood when bark is removed from an infested tree,
- ➔ Epicormic sprouts along the tree's trunk below larval feeding.
- ➔ Dense root sprouting can occur after trees die.



Epicormic sprouts below EAB larval feeding tunnels on an infested ash tree.

WHAT'S AT RISK IN IOWA

EAB kills ash trees of various sizes and vigor. EAB larvae have developed in trees and branches ranging from 1 inch to 55 inches in diameter. Stressed trees are most vulnerable and die very fast.

At the present time, control of EAB consists of complete tree removal and chipping. The effort to contain EAB in the state of Michigan alone has cost more than \$550 million (early 2006 estimate) and could exceed \$20 billion. Iowa has 2.7 million acres of forests, with green ash being a regular component of floodplain areas, and white ash being found in our upland forests. A recent inventory indicates there are 50 million

ash in Iowa's forests, plus an additional 12-20 million in urban settings. One of our every 5 urban trees is an ash tree. Initial estimates indicate that the cost of EAB killed ash tree removal could cost Iowa's local government \$7.5 billion.

IS THERE EMERALD ASH BORER IN IOWA?

There are no known EAB infestations in Iowa. The Iowa Department of Agriculture and Land Stewardship (IDALS), Iowa Department of Natural Resources (IDNR), Iowa State University (ISU), and the USDA Animal Plant Health Inspection Service (APHIS) are working to survey and detect EAB populations in Iowa. For three years, trap trees (girdled or potted ash) have been used to survey high-risk areas, such as campgrounds and parks. Although research is ongoing, no traps or lures have been successful to date.

Iowa receives most of its landscape nursery stock from out-of-state wholesale nurseries. Since EAB was only found in recent years in states that supply a large segment of Iowa's wholesale nursery industry, there is a chance that EAB has arrived undetected on infested nursery stock in Iowa.



Most importantly, continued movement of out-of-state firewood to, and through, Iowa poses the greatest threat to spread EAB to Iowa's ash trees.

WHAT ARE IOWA CITIZENS AND INDUSTRY DONE TO KEEP IOWA FREE OF EMERALD ASH BORER?

In 2004, the Iowa Nursery and Landscape Association (INLA) joined with IDALS and the DNR to participate in a voluntary moratorium on not buying ash nursery stock east of the Mississippi River.

Additionally, 2007 is the last year the DNR State Forest Nursery will sell ash trees for conservation plantings.

IDALS, DNR and ISU are launching educational programs for EAB awareness, preparation, and early detection of small populations.

PLANT SUBSTITUTIONS FOR ASH

- ➔ Native oaks such as red, white, bur, chinkapin, shingle or swamp white.
- ➔ American and Little leaf lindens or Basswood.
- ➔ Native maples such as Sugar, Red, Black,
- ➔ Norway, silver and hybrid Freeman maples such as Autumn Blaze, Autumn Flame, and others.
- ➔ Hackberry
- ➔ River birch
- ➔ Ginkgo
- ➔ Thornless and podless Honeylocust
- ➔ Kentucky Coffeetree
- ➔ Black Walnut
- ➔ London Planetree
- ➔ Hickories and Northern Pecan
- ➔ Katsura tree
- ➔ Hophornbeam
- ➔ Hornbeam
- ➔ Pagoda dogwood
- ➔ Japanese tree lilac
- ➔ Black Cherry
- ➔ Serviceberry
- ➔ Flowering Crabapple
- ➔ Hybrid elms.

WHAT RESOURCES IOWA NEEDS TO PROACTIVELY MINIMIZE EAB IMPACT

- Expanded general and focused public outreach efforts - \$75,000
- Expanded detection using visual, trap trees and experimental traps in areas of high ash concentrations - \$50,000.
- Implement a City Forestry Cost-Share Program to assist local governments in high risk areas to ID high stress ash trees, contract removal and replacement - \$500,000.
- Emergency funds to deal with infestation - \$250,000.

FOR MORE INFORMATION

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- Visit the following web sites for more information:
 - www.emeraldashborer.info
 - www.extension.iastate.edu/pme/
 - www.iowadnr.gov/forestry/
 - www.na.fs.fed.us/spfo/eab/