

Emerald Ash Borer: Potential Impact on Iowa

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. It was identified as *Agrilus planipennis* or commonly called the "Emerald Ash Borer".

The larvae of 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.

Evidence suggests that EAB has been established in Michigan for at least 6 to 10 years. More than 3000 square miles in SE Michigan around Detroit metro area are infested and more than 6 million ash trees are dead or dying from EAB. New populations of EAB have been found in several counties of the lower peninsula of Michigan, Windsor, Ontario, in scattered locations in Ohio, Indiana, and recently in nursery stock in Maryland and Virginia.

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 (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*) and black ash (*Fraxinus nigra*). These ash species are common in native Iowa forests and are a predominant species in the urban landscape.

This insect is a serious threat to the native forest and urban ash tree population in Iowa.

IDENTIFICATION

EAB adult beetles are generally larger and a brighter green than the native species of *Agrilus*. EAB adults are slender (1/16 inch wide) and are approximately 1/4 to 1/2 inch in length. EAB male beetles are smaller than females. 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.

EMERALD ASH BORER BIOLOGY

EAB is thought to have a one year life cycle with adult beetles beginning emergence in early June and living for about 3 weeks; field records indicate adults are present into mid-August. EAB beetles are active during the day, particularly when conditions are warm and sunny. Most beetles remain in protected locations in bark crevices or on foliage during rain or temperatures above 90 degrees F. Adults feed on ash leaves producing small, irregularly-shaped notches along the leaf 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 for several weeks. The S-shaped feeding galleries wind back



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.

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 go undetected until ash trees show symptoms.

Larval feeding interrupts the transport of nutrients and water within the tree during the growing season. Tree leaves wilt and the canopy thins as branches die. Infested trees lose more than 30% of the canopy after 2 years of infestation and trees often die after 3-4 years of EAB activity.



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 EAB beetles on trees infested for one year.
- ➔ Vertical bark splits above arval 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 has killed ash trees of various sizes and vigor in Michigan. EAB larvae have developed in trees and branches ranging from 1 inch to 55 inches in diameter. Although not proven, it is thought that stress contributes to the vulnerability and rapid decline of infested ash trees. But EAB has killed apparently vigorous trees in woodlot and urban settings.

At the present time, EAB treatment consists of tree removal and chipping. The effort to eliminate EAB from southwestern Ontario involved removing 84,000 ash trees at a cost of

\$12 million. Reforestation efforts and property damage estimates range in the millions of dollars.

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. An estimated 30-40% of Iowa's urban areas are planted to various cultivars of green ash and white ash. All these ash trees are at risk from EAB.

IS THERE EMERALD ASH BORER IN IOWA?

There are no known EAB infestations in Iowa. The Iowa Department of Agriculture and Land Stewardship (IDALS), and the USDA Animal Plant Health Inspection Service (APHIS) are working with infested states to monitor EAB populations.

However, Iowa has and does receive most of its landscape nursery stock from out-of-state wholesale nurseries. Since EAB was only found recently in Michigan, and their wholesale nurseries supply a segment of Iowa's nursery industry, there is a chance that EAB has arrived on infested nursery stock in Iowa.

The USDA Forest Service is providing funding to the Iowa Department of Natural Resources (DNR) Forestry Bureau and Iowa State University Extension Entomology to survey ash trees in 10 cities in Iowa for the presence of EAB. Preliminary information should be available fall of 2004.

WHAT CAN IOWA NURSERIES AND GARDEN CENTERS DO TO HELP WITH EMERALD ASH BORER?

The Iowa Nursery and Landscape Association (INLA) have joined with IDALS and the DNR in recommending that its members participate in a voluntary moratorium on purchasing ash nursery stock east of the Mississippi River.

This "voluntary moratorium" is encouraged because new infestations of EAB are being found regularly in the eastern US. Iowa nurseries and garden centers are urged to ask their suppliers to certify the source of their ash nursery stock.

As ash nursery stock arrives, nurseries and garden centers should examine branches and trunk regions looking for the D-shaped holes or signs of excessive epicormic or root sprouting.

Ash trees can still be used and recommended in the Iowa landscape, but nurseries and garden centers should recommend to clients that they diversify their plantings with as many species of trees as possible. Possible substitutions for ash include:

- ➔ Native oaks such as red, white, bur, chinkapin or swamp white.
- ➔ American and Little leaf Lindens such as Redmond, Legend, Glenleven, Greenspire, and Norlin
- ➔ Maples such as Sugar, Red, Black and hybrid Freeman of Autumn Blaze, Autumn Fantasy, Celebration, and Marmo
- ➔ Hackberry such as Chicagoland, Prairie Pride or Windy City
- ➔ Heritage river birch
- ➔ Ginkgo such as Autumn gold, Princeton Sentry or Emperor
- ➔ Thorn less honeylocust such as Shademaster or Skyline
- ➔ Kentucky Coffeetree
- ➔ Hophornbeam
- ➔ Hornbeam
- ➔ Hybrid elms of Regal, Accolade, Cathedral, Discovery, Frontier, New Harmony, New Horizon, Patriot, Pioneer, Prospector and Triumph

FOR MORE INFORMATION

- ➔ Robin Pruisner, Iowa Department of Agriculture & Land Stewardship, 515/281-6323
robin.pruisner@idals.state.ia.us
- ➔ John Walkowiak, Iowa Department of Natural Resources, (515) 242-5966
john.walkowiak@dnr.state.ia.us
- ➔ Visit the Michigan Multi-Agency Emerald Ash Borer web site at www.emeraldashborer.info or go to the USDA Forest Service site at www.na.fs.fed.us/spfo/eab/.

Emerald Ash Borer in North America, 2004



