

# Signs and Symptoms of EAB Infestation

## SIGNS

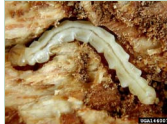
**D-shaped emergence holes:** Adult EAB emerge from infested ash trees, creating D-shaped exit holes that measure about 1/8 inch in diameter.



**S-shaped larval galleries:** EAB larvae wind back and forth as they develop under the bark of an infested tree. This feeding pattern creates distinct serpentine larval galleries that are packed with sawdust.



**Larvae:** EAB larvae are cream colored and somewhat flattened, with pincher-like appendages at the end of their abdomen. Mature larvae reach 1 1/2 inches in length.



**Adults:** Adult EAB beetles are metallic green in color and are 3/8-1/2 inches long. Adults have flat stomachs and round backs.



## SYMPTOMS

**Canopy dieback:** EAB infestations tend to start in the upper portions of the tree. Foliage in the canopy becomes thin and discolored as more larvae feed under the bark. An infestation causes progressive dieback of the upper and outer tree canopy, eventually leading to tree mortality.



**Sprouting:** EAB infestations often cause epicormic sprouting at the base and/or on the main stem of infested ash trees. Infested trees often begin to sprout new shoots just below where the larvae are feeding.



**Bark splits:** Infested ash trees often develop vertical splits or fissures in the outer bark where EAB larvae have tunneled earlier. This is caused by the formation of callus tissue around the EAB gallery. Old larval galleries can often be seen beneath the bark splits.



**Woodpecker feeding:** Woodpeckers frequently feed on EAB larvae located under the bark of infested ash trees. Woodpeckers are typically seen feeding high in the canopy where EAB infestations begin, then later on the main stem.



## What you can do to minimize the devastating effects EAB is having on American Indian traditions and forests:

- ◆ Teach your children and grandchildren about your traditions
- ◆ Learn the signs and symptoms of EAB, and keep a watchful eye on the health of ash trees you encounter
- ◆ Report suspected infestations to tribal, state, or federal natural resource managers and tribal leaders
- ◆ Collect and store ash seeds with your tribe
- ◆ Don't move firewood
- ◆ Work with your tribe to develop an EAB response plan and a comprehensive invasive species management plan

# Identifying Ash Trees

**Ridged Bark:** On mature trees, the bark is tight with diamond-shaped ridges. On young trees, the bark is smooth.



**Compound, Opposite Leaves:** A leaf has 5 to 11 leaflets with either smooth or toothed margins. Leaflets are opposite with one at the top.



**Seeds:** When present, seeds usually hang in clusters and are dry and shaped like oars.



**Opposite Branches:** Branches and buds are directly across from each other rather than staggered.



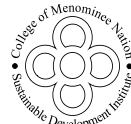
## For more information about emerald ash borer, visit:

- [www.emeraldashborer.info](http://www.emeraldashborer.info)
- [www.na.fs.fed.us/fhp/eab/](http://www.na.fs.fed.us/fhp/eab/)
- [www.sustainabledevelopmentinstitute.org](http://www.sustainabledevelopmentinstitute.org)
- [www.maineindianbaskets.org](http://www.maineindianbaskets.org)
- [www.blackash.org](http://www.blackash.org)

## Photo Credits:

College of Menominee Nation - Baskets, Lacrosse, Carver, Pow Wow  
Joseph O'Brien, USDA Forest Service, [www.bugwood.org](http://www.bugwood.org)  
David Cappaert, Michigan State University, [www.bugwood.org](http://www.bugwood.org)  
Troy Kimoto, Canadian Food Inspection Agency, [www.bugwood.org](http://www.bugwood.org)  
Daniel Herms, The Ohio State University, [www.bugwood.org](http://www.bugwood.org)  
Art Wagner, USDA APHIS PPQ, [www.bugwood.org](http://www.bugwood.org)  
Brochure Designed by: Lenayea Waupoose, Student Intern

College of Menominee Nation  
Sustainable Development Institute  
P.O. Box 1179  
Keshena, Wisconsin 54135  
715-799-5600



U.S. Department of Agriculture  
Forest Service  
Mike Dockry  
Liaison to College of Menominee Nation  
P.O. 1179  
Keshena, Wisconsin 54135  
715-799-6226 ext. 3222  
[mdockry@fs.fed.us](mailto:mdockry@fs.fed.us)  
[mdockry@menominee.edu](mailto:mdockry@menominee.edu)



USDA is an equal opportunity provider and employer.



# Emerald Ash Borer Impacts on American Indian Communities



# Emerald Ash Borer Threatens American Indian Traditions

Emerald ash borer (EAB) infestation is a major concern for American Indian people. Some communities use ash trees for local firewood and manufacturing lumber. Many American Indian cultures and traditions rely on ash trees for the wood needed for making baskets, pipe stems, flutes, medicinal remedies, and lacrosse sticks. The ash tree is a central figure in some traditional and religious stories told by several American Indian tribes.

EAB is an invasive insect that is striking at the core of many American Indian traditions and cultures. Will these traditions be something that American Indian children will only be able to read about in books? Will their knowledge of ash trees and basket making be limited some day to storytelling? Or can something be done to prevent the loss of ash trees to this insect? EAB has already had devastating impacts on ash trees on several American Indian reservations in the Midwest, and it will likely affect all communities, forests, and tribal lands where ash trees are found.



**TRADITIONAL BASKET WEAVING:** Dozens of American Indian tribes and cultural groups, including the Abenaki, Ojibwe, Maliseet, Meskwaki, Micmac, Mohawk, Passamaquoddy, Penobscot, Potawatomi, Menominee, and others, use black ash trees (also known as brown ash) to make baskets. EAB infestations are making it more difficult for basket weavers to find healthy, basket-quality trees. The potential impact of EAB, the scarcity of suitable trees, and the fact that fewer people are making baskets threaten the sustainability of this centuries-old cultural and economic tradition.

**PIPES AND FLUTES:** American Indian pipe stems and flutes are carved from many kinds of trees, including black ash. Pipes are often used for ceremonies and other special cultural events. American Indian pipe stem carvers craft some of their most beautiful pipe stems from black ash trees. EAB threatens this tradition by decreasing the availability of ash trees that can be used for pipe stems.

**MEDICINAL REMEDIES:** American Indian tribes in Eastern North America use different parts of ash trees to make medicinal cures for various maladies. Some tribes use ash sap to treat external skin growths. Other tribes value an extract of ash leaves as an antiseptic for use after childbirth. Some tribes steep a tea from ash bark to treat itching scalp and sores. Ash seeds have been used as an aphrodisiac, a diuretic, an appetite stimulant, and a remedy for fevers. EAB threatens the availability of these traditional medicines and any new medicinal discoveries that may come from ash trees in the future.

**LACROSSE:** Lacrosse games are ceremonial in origin and bring tribes and families together. Today, lacrosse is played by thousands of people around the world. Traditional lacrosse sticks are crafted from ash wood, making ash trees an irreplaceable component of American Indian lacrosse.



## What is Emerald Ash Borer?

Emerald ash borer (EAB), *Agrilus planipennis*, is an exotic beetle that was discovered in southeastern Michigan near Detroit in the summer of 2002. EAB probably arrived in the United States on solid wood packing materials carried in cargo ships or airplanes originating in its native Asia.



As of June 2011, established populations of this insect pest have been detected in 15 States (Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Tennessee, Virginia, Wisconsin, and West Virginia) and 2 Canadian provinces (Ontario and Quebec).

## How Does the Emerald Ash Borer Affect Ash Trees?

EAB larvae are the most damaging life stage. The larvae tunnel under the bark of an ash tree and feed on the inner bark, disrupting the flow of nutrients and water between the tree's canopy and roots. The adult beetles feed on ash foliage but cause little damage.

EAB larval feeding makes the tree's crown thinner and the branches die back, and eventually causes the tree to die. An EAB infestation can kill healthy ash trees within 3 to 5 years, but heavy infestations can kill trees sooner.

EAB is known to infest all species of ash, including black or brown ash (*Fraxinus nigra*), green ash (*F. pennsylvanica*), and white ash (*F. americana*). EAB has killed tens of millions of ash trees throughout North America since its discovery in 2002.



## How does EAB Spread?

EAB moves short distances by flying from tree to tree and longer distances by hitching a ride in infested ash trees or ash wood materials that are moved by people. Adult beetles do not typically fly far from where they emerge if sufficient ash trees are nearby. EAB is most commonly spread long distances by people moving infested firewood, nursery stock, or ash logs.

