

# Emerald Ash Borer

Emerald ash borer (EAB), *Agrilus planipennis*, is a highly destructive invasive wood boring beetle that kills trees when the larvae feed in the nutrient conducting vessels of ash trees. First detected in North America in 2002, in Ontario and Michigan, it is thought that EAB was introduced through ash packing material used in shipments from China. Since then it has spread to throughout the Eastern United States, Quebec and New Brunswick. In 2017 EAB was discovered in Winnipeg, Manitoba.

This highly destructive forest pest continues to spread in North America through the movement of nursery stock and raw-untreated ash wood, particularly firewood. Millions of ash trees have been killed in Ontario and the U.S. Native to eastern Asia (China, Korea, Japan, Russia, Mongolia), EAB is well suited to Manitoba's climate and could establish a population here too threatening this province's abundant ash tree populations.



Since EAB is very hard to detect in the early stages, it often goes unnoticed until it is too late. For this reason, EAB has been difficult to control and manage. Prevention measures and early detection are the best defense against this devastating invasive forest pest.

Emerald Ash Borer (David Cappaert, Michigan State University, Bugwood.org)

## Hosts

EAB only attacks ash trees (*Fraxinus* species). Mountain ash is not a true ash tree and is not susceptible to EAB. All North American species of ash are vulnerable to EAB, though blue ash, which does not grow in Manitoba, is somewhat resistant to EAB damage. In Manitoba there are two native species of ash; green and black ash. These native ash trees, including several cultivars of these species, have been planted extensively in Manitoba communities. Non-native Manchurian ash and cultivars of Manchurian ash have also been planted in many Manitoba communities and are less vulnerable to EAB.



Ash trees  
(David Cappaert, Michigan State University,  
Bugwood.org)

## Ash Tree Identification



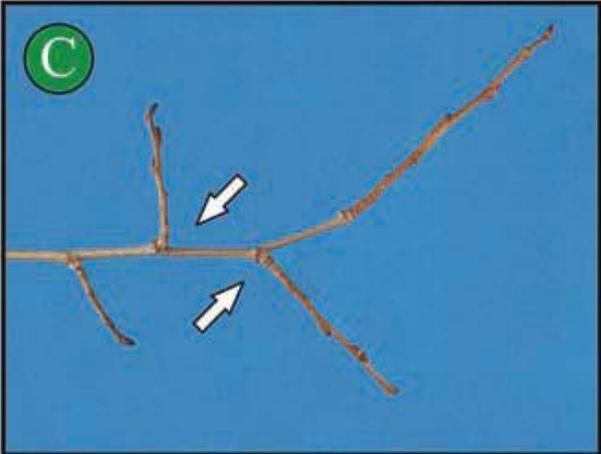
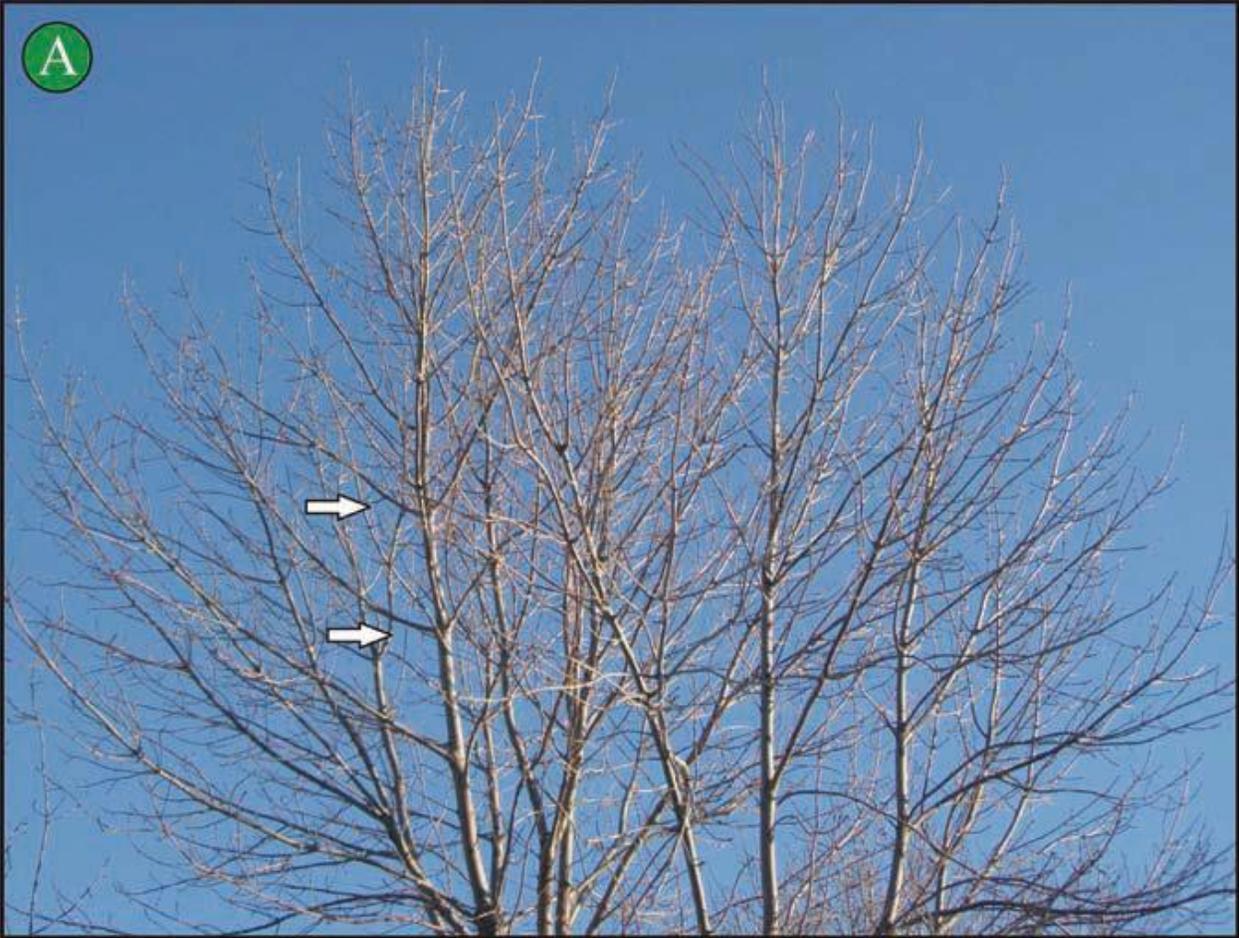
A) Mature green ash tree, and B) green ash seeds



Compound leaves of A) green/red ash, B) white ash, C) black ash, and D) blue ash.



A) Opposite branching on green ash, B) opposite twig structure on green ash and C) alternate twig structure on white elm.



## EAB Life Cycle

EAB has a one to two-year life cycle depending on infestation levels and climate conditions. The larvae overwinter under the bark of ash trees and pupate in early spring (mid-April) with adult emergence in late May to the end of June.

The adults feed on ash foliage for two to four weeks which is characterized by a notched feeding pattern on the leaves. This stage is not damaging to the trees. After this period, from the end of June until the end of August, the adult female lays up to 300 individual eggs (average 75) on the bark of ash trees or in bark crevices.

The larvae bore directly into the bark after hatching and begin feeding just under the bark in the phloem (food conducting tissue) of the tree creating s-shaped galleries. This is the damaging stage of the insect, as the flow of nutrients in the tree is disrupted by the larval feeding.

## Description



Adult emerald ash borer

(Pennsylvania Dept. of Conservation and Natural Resources Forestry Archive Bugwood.org)

The average length for an adult emerald ash borer is 7.5 to 13.5 mm long and 4 mm (1/6 in) wide. The larvae are approximately 1 mm in diameter and 26 to 32 mm long, and are a creamy white color.



Larvae

(Pennsylvania Dept. of Conservation and Natural Resources Forestry Archive Bugwood.org)



Prepupae

(David Cappaert, Michigan State University, Bugwood.org)



Pupae

(David Cappaert, Michigan State University, Bugwood.org)

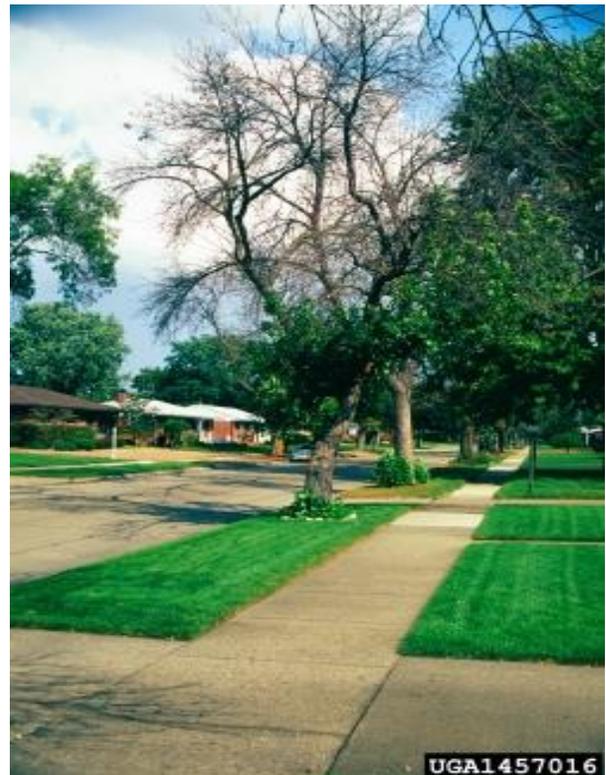
## Damage

EAB larvae feed on the phloem of trees which is just under the bark disrupting the flow of nutrients in the tree. It takes one to six years of infestation to kill the tree.

At low levels the EAB is hard to detect, but after the population builds ash trees start dying. In places like Michigan where the population of EAB went undetected for many years, millions of ash trees have been killed by this pest.

Trees damaged by EAB feeding.

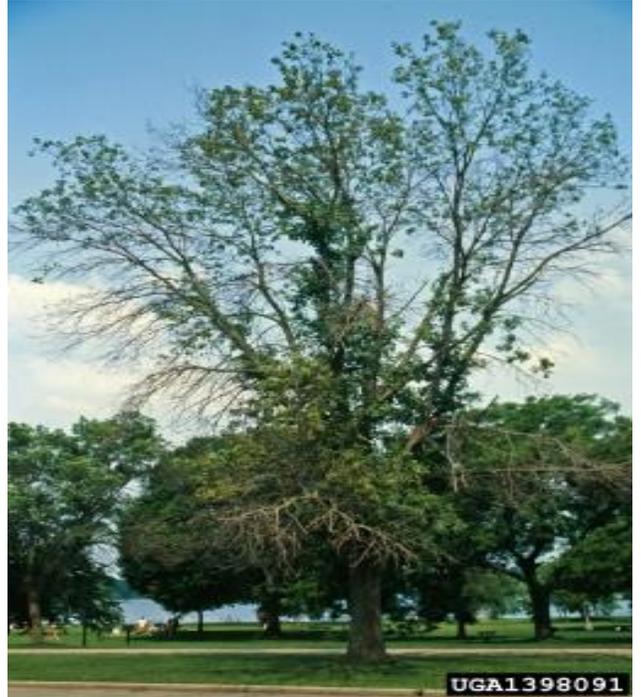
(David Cappaert, Michigan State University, Bugwood.org)



## Symptoms



Vertical cracks, caused by larval activity under the bark.  
(Steven Katovich, USDA Forest Service, Bugwood.org)



Thinning and dieback of crown.  
(David R. McKay, USDA APHIS PPQ, Bugwood.org)



Woodpecker damage, caused by woodpeckers seeking larvae under the bark.  
(Jim Tresouthick, Village of Homewood, Bugwood.org)



Epicormic shoots, shoot development beneath larval activity as tree attempts to survive.  
(Joseph O'Brien, USDA Forest Service, Bugwood.org)



D-shaped exit holes, caused by the emergence of the adult stage of EAB.  
(Daniel Herms, The Ohio State University, Bugwood.org)



Larval galleries under bark.

(James W. Smith, USDA APHIS PPQ, Bugwood.org)

## Control

### Sanitation/Quarantines:

- EAB populations are controlled by removing and destroying infested trees.
- Movement restrictions have been put in place in Ontario and Quebec on ash material by the federal government.
- Quarantines could be established in Manitoba if EAB were detected here by the provincial and federal government.

### Chemical:

- There are insecticides approved for use in Canada for the management of EAB, but it is not recommended that ash trees be chemically treated at this time, since EAB has not yet been found in Manitoba.

### Biological:

- Parasitoids: Non-stinging wasps have been released in Canada and the U.S. that are the natural enemies of EAB in its native habitat.
- Fungus: Research is being conducted on control methods using a fungal pathogen that kills EAB.

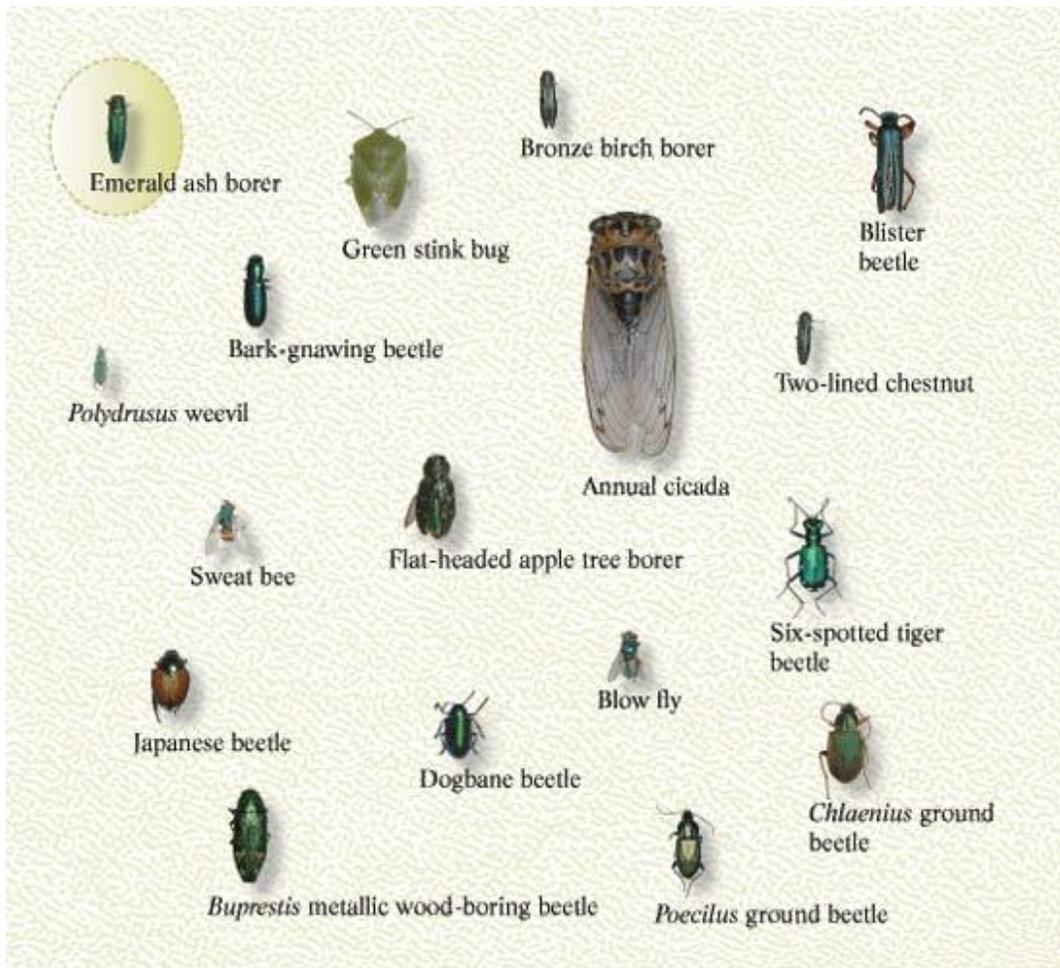
## Where is EAB now?

EAB has been found in Ontario and Quebec and much of the north-eastern U.S., including Minnesota and Wisconsin. The closest infestation to Manitoba is in Thuder Bay Ontario.

Visit these pages for maps of EAB infestations and quarantines:

[Areas Regulated for the Emerald Ash Borer in Canada](#)

## EAB Look-alikes



## Monitoring

The province is monitoring for emerald ash borer in several locations in southern Manitoba using baited sticky green prism shaped traps. Visual surveys are also being conducted at trap sites. No EAB have been found in Manitoba to date.

## You can help

While EAB was likely introduced through packing material from Asia, it continues to be spread in North America through the movement of ash firewood and other ash products.

## DO NOT MOVE FIREWOOD!

Do not move firewood long distances. Buy it locally and leave it where you bought it. Be vigilant. Learn about the signs and symptoms of EAB and report symptomatic ash trees or ash tree products to Sustainable Development's tree care line at 945-7866. Tell others. An informed public is the first line of defense against this destructive pest.

## Links

[Canadian Food Inspection Agency](#)

[Emerald Ash Borer Information Network](#)

[Survey Guide for Detection of Emerald Ash Borer \(PDF\)](#)

[A Visual Guide to Detecting Emerald Ash Borer Damage \(PDF\)](#)

