

Forest Pest Fact Sheet

November 2017



EMERALD ASH BORER (*Agrilus planipennis*)

BACKGROUND

The emerald ash borer (EAB) is a metallic, flat-headed wood-boring beetle that originates from Asia, but has recently become established in North America. In its native Asia, EAB is a secondary pest that attacks stressed and weakened trees. However, in North America it is an aggressive killer of healthy ash trees.

DISTRIBUTION

EAB's range in Asia includes Taiwan, Japan, Korean Peninsula, northern China, Mongolia and Asiatic Russia. In North America, since it was discovered in the Detroit/Windsor area in 2002, it has spread extensively throughout the Eastern United States where infestations are currently found in 31 states. In Canada, EAB has spread from the Windsor area to London, Toronto, Ottawa and Montreal. By 2014, the Canadian Food Inspection Agency (CFIA) had consolidated Ontario and Quebec as one large regulated area. EAB has continued to spread northwest with infestations found in Sault Ste. Marie and Thunder Bay in 2016. In 2017, EAB was confirmed as far west as Winnipeg.

DESCRIPTION OF LIFE STAGES

Adult EAB are metallic green beetles that have an elongated body. They are 8 mm to 13 mm in length and 3 mm to 3.5 mm in width. The head is flattened and has short antennae. Dark eyes are located on the side of the head. Eggs are flat, oval shaped and approximately 1 mm in length. Initially they are a creamy colour, but turn yellowish-brown prior to hatching. Larvae are a creamy-white colour. They have a flattened body with ten segments and a brown head. Fully grown larvae are 26 mm to 32 mm in length. Pupae are creamy-white, but darken with age. They are 10 mm to 14 mm in length.

Adult beetle



Image: David Cappaert, Michigan State University, Bugwood.org

Larva



Image: David Cappaert, Michigan State University, Bugwood.org

HOST SPECIES

In North America, emerald ash borer is known to infest all 16 species of Ash (*Fraxinus* spp). The mountain ash is *Sorbus* spp and as such is NOT a susceptible host.

LIFE CYCLE

Adults emerge from infested trees in May and early June. Prior to mating, the beetles do maturation feeding on ash foliage. After mating, females lay their eggs in bark cracks or crevices through June and July. Eggs hatch in approximately two weeks. Larvae tunnel through the bark into the cambial region. They feed on phloem and sapwood for several weeks, creating S-shaped galleries. There are four larval instars. Feeding is completed in autumn. Larvae spend the winter in the outer sapwood or the bark. Pupation occurs in spring and the new generation of adults emerges in May and June. The life cycle is generally one year, but could be longer in colder climates

SIGNS, SYMPTOMS AND DAMAGE

EAB is very difficult to detect and trees may be infested anywhere between three to five years before they show symptoms. Infested trees may show signs of woodpecker feeding activity. Irregular notches in leaves may be present from adult maturation feeding. Following adult emergence from infested trees, D-shaped adult exit holes can be seen on larger branches and the main stem. Beneath the bark, S-shaped larval galleries filled with fine brown boring dust are present on the outer sapwood. These galleries are vertically oriented and meander over the surface of the sapwood. The tree may produce callus tissue over the galleries, resulting in vertical bark cracks. As infested trees decline, foliage yellows and/or wilts. Branch dieback occurs giving the crown of the tree a sparse appearance. Epicormic shoots emerge from the main stem of declining trees. Root sprouts occur at the base of dying trees. Bark splitting and sloughing off is often another external symptom.

Larval feeding in the phloem and sapwood interrupts nutrient and water transport within the tree, resulting in girdling of branches and the main stem. Significant crown dieback can occur in the first year of attack. Trees often die in the second or third year of infestation. Because ash is so abundant in Prairie cities and communities, EAB poses a significant risk. If EAB becomes established in Saskatchewan, it will seriously impact urban forests, communities, shelterbelts, river-bottom forests and the tree nursery industry.

D-shaped adult exit holes



Image: David R. McKay, USDA
APHIS PPQ, Bugwood.org

Characteristic larval galleries in the sapwood



Image: Michigan Department of Agriculture,
Bugwood.org

D-shaped adult exit holes



*Image: Joseph O'Brien,
USDA Forest Service,
Bugwood.org*

Epicormic shoots



*Image: Joseph O'Brien,
USDA Forest Service,
Bugwood.org*

Epicormic shoots on dying tree



*Image: Daniel Herms,
The Ohio State University,
Bugwood.org*

MANAGEMENT PRESCRIPTIONS

To date, the transportation of infested wood products has been the most common means by which EAB has spread. Therefore, an integrated approach including prevention, early detection and sanitation can help manage the EAB threat, including:

- taking preventative measures, including legislation, to prevent infested wood or nursery stock from entering uninfested jurisdictions. Natural Resources Canada reports there are currently also some effective biocontrol options that might be considered.
- a tree inventory in urban communities, farm shelterbelts and river bottom forests to provide valuable information on the ash resource at risk and determine where monitoring should be focused;
- a systematic branch sampling and EAB detection survey;
- There are only two direct control options at this time: finding the tree and removing and destroying it, or tree injection with insecticide;
- a communication campaign to educate the public about detection and potential impacts;
- a strategic response plan outlining short-term response and long-term adaptation options;
- Implementing long-term adaptation options now, including replanting with alternate species such as elm, maple, linden and other species to increase family, genus and species diversity.

WHAT THE PUBLIC CAN DO

There are two major ways in which the public can participate in EAB management:

- **Do not transport ash wood or firewood** from infested areas to non-infested areas. **IT IS ILLEGAL**
- **Report any suspect EAB symptoms** to local forestry agencies.

General Enquiries - 1-800-567-4224



REFERENCES FOR ADDITIONAL INFORMATION

Emerald Ash Borer - *Agrilus planipennis*

Canadian Food Inspection Agency

<http://www.inspection.gc.ca/english/plaveg/pestrava/agrpla/agrplae.shtml>

Emerald Ash Borer

Natural Resources Canada

<http://www.nrcan.gc.ca/forests/fire-insects-disturbances/top-insects/13377>

Emerald Ash Borer

United States Department of Agriculture

Animal and Plant Health Inspection Service

https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/emerald-ash-borer/ct_emerald_ash_borer

What you need to know about emerald ash borer

BioForest Technologies Inc.

<http://www.bioforest.ca/index.cfm?fuseaction=content&menuid=20&pageid=1035>