



D. Cappaert; Bugwood.org

INVASIVE INSECT

# **Emerald ash borer**

*Agrilus planipennis*

JUNE 2024



[BCINVASIVES.CA](http://BCINVASIVES.CA)

## ABOUT

Native to China and eastern Asia, the emerald ash borer is an invasive beetle that has caused extensive damage to ash trees (*Fraxinus* spp.) in North America. Up to 99% of all ash trees are killed within 8-10 years once the beetle establishes in an area. They target all species of ash trees in North America, including healthy ones.

## LEGAL STATUS

Emerald ash borer is a federally regulated pest. In BC it is classified as a 'Prevent' species on the BC Priority Invasive Species list, meaning the beetle is considered a high risk to the province. The objective is to prevent the introduction and establishment.

## DISTRIBUTION

In North America, emerald ash borer was first detected in Detroit, Michigan and Windsor, Ontario in 2002. It has since spread to 30 states and parts of Ontario, Quebec, New Brunswick, Manitoba, and Nova Scotia. Its presence was confirmed in Vancouver, BC for the first time in March 2024.

## IDENTIFICATION

**Adults:** The adult's body is long and narrow, ranging from 8.5 to 14 mm long and 3.1 to 3.5 mm wide. Metallic green back with a bright, emerald green underside. The head is flat with black, kidney-shaped eyes. It has short antennae that do not extend past its head.

**Larvae:** Creamy white with a brown head. The body is flat and 25 to 32 mm long at maturity.



Pennsylvania Department of Conservation and Natural Resources - Forestry; Bugwood.org



**Pupae:** Creamy white with a brown head which shifts to adult colouration with maturity. 10-15 mm long.

## SIMILAR SPECIES



S. Valley, ODA; Bugwood.org

### NATIVE SPECIES

#### Golden buprestid

*Buprestis aurulenta*

Actual size: 20 mm long



W. Cranshaw; Bugwood.org

### NATIVE SPECIES

#### Green blister beetle

*Lytta stygica*

Actual size: 15 mm long



P. Langlois; Bugwood.org

### NATIVE SPECIES

#### Western cedar borer

*Trachykele blondeli*

Actual size: 20 mm long



J. Berger; Bugwood.org

### INVASIVE SPECIES

#### Japanese beetle

*Popillia japonica*

Actual size: 10 mm long

## ECOLOGICAL CHARACTERISTICS

**Habitat:** Emerald ash borer feeds on all species of ash trees in the *Fraxinus* genus. Adult beetles feed on leaves, while larvae feed on the inner bark (i.e. phloem) and outer sapwood. Signs that a tree is infested include S-shaped tunnels or galleries underneath the bark formed by larvae and D-shaped exit holes left behind when the adults emerge. Other symptoms include crown dieback, epicormic shoots, foliage chlorosis and bark cracks.



T. Kimoto, CFIA

*Larvae form galleries under the bark*



T. Kimoto, CFIA

*When adults emerge, D-shaped exit holes are created*

**Reproduction:** Adults emerge in May or June and live for approximately 3 weeks. Females lay 40 to 70 eggs on average (more than 200 for long-lived females) in cracks in the bark, typically between late June and early July. Eggs hatch around two weeks later and then the larvae burrow through the bark and feed within the phloem.

**Dispersal:** Beetles can fly up to 10 km. They can “hitchhike” and travel long distances by hiding in ash materials such as logs, firewood and nursery stock.



D. Herms; Bugwood.org CCBY

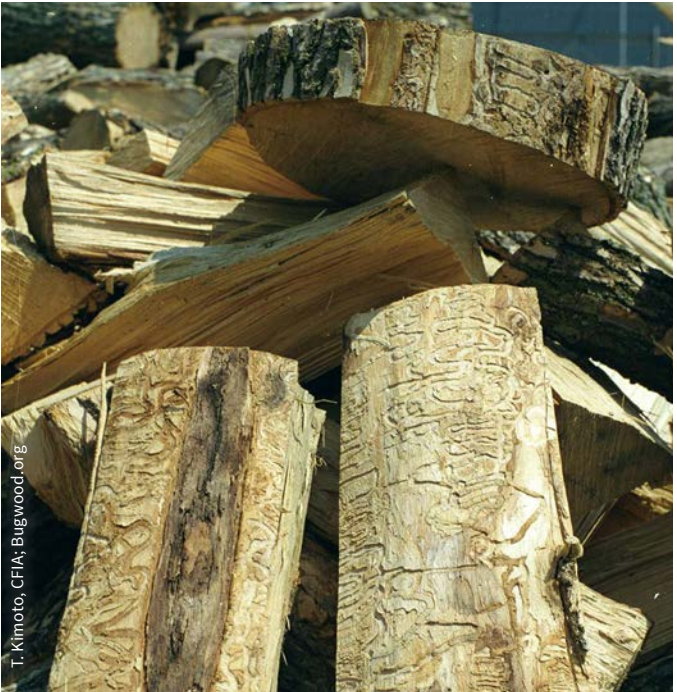
*Crown dieback*

## IMPACTS

**Ecological:** The emerald ash borer has killed millions of ash trees across Canada and the US. Infested ash trees typically die after 2 to 3 years, but heavily infested trees have died after just one year. Crown dieback and death of infested trees in an area can lead to large canopy gaps, altering the forest understory. This can result in changes to forest structure, nutrient cycling, and altered ecological interactions.

**Social:** Ash trees are commonly planted in parks and around cities. With their absence, communities lose the urban greenery appreciated by residents and urban wildlife loses important habitat. Cities also lose critical benefits these trees provide, including temperature regulation, pollution reduction, and erosion prevention.

**Economic:** The cost of treating and removing infested trees, and replanting new ones is very expensive. In 2012, Canadian municipalities spent an estimated \$890 million in connection with damage done to street and backyard trees by emerald ash borer.



T. Kimoto, CFIA; Bugwood.org

*Firewood infested with emerald ash borer*

## INTEGRATED PEST MANAGEMENT

*IPM is a decision-making process that includes identification and inventory of invasive plant populations, assessment of the risks that they pose, development of well-informed control options that may include a number of methods, site treatment, and monitoring.*

### Prevention:

- ▶ Remember to Buy Local Burn Local. Do not move firewood.
- ▶ Do not purchase ash trees from infested areas.
- ▶ Remove ash trees in areas where emerald ash borer is present to slow their spread.
- ▶ Eradication is not an effective strategy for this species so prevention and slowing its spread are the best practices.
- ▶ Report suspicious declining ash or emerald ash borer life stages.
- ▶ Municipalities should maintain a tree inventory to determine how much and where ash is present in the jurisdictions.



**Mechanical Control:** Cut down infested trees and chip down to 2.5 cm or less in any two dimensions. Chipping that produces pieces larger than described above requires specialized disposal.

**Chemical Control:** Insecticide recommendations and use must consider site characteristics and be prescribed based on site goals and objectives. Insecticide labels and other sources of information must be reviewed before selecting and applying an appropriate insecticide.

Insecticides containing imidacloprid, acephate, and azadirachtin can be injected directly into trunks of ash trees. This should be done prior to infestation or soon after, and during adult emergence. It can take several years for a tree to recover and it will need to be monitored and potentially treated again.

Application of pesticides on public land must be carried out following a confirmed Pest Management Plan (*Integrated Pest Management Act*) and under the supervision of a certified pesticide applicator. <https://www2.gov.bc.ca/gov/content/environment/pesticides-pest-management>

**Biological Control:** There are four species of wasps (*Tetrastichus planipennisi*, *Spathius agrili*, *Sapthius galinae*, and *Oobius agrili*) approved as biological control agents against emerald ash borer in Canada. These wasps deposit their eggs within or on the surface of emerald ash borer eggs or larvae, where the wasps' larvae hatch and feed on the eggs or larvae. However, some areas are not suitable for parasitoid release because infested ash need to remain on the landscape to allow introduced parasitoid populations to grow; cities often cannot allow dead ash to remain standing as this is a safety hazard

## DISPOSAL

Trees, whole branches and chipped material larger than 2.5 cm in any two dimensions sourced from within a regulated area must be incinerated or go for deep burial.

## REPORT

Report any detections or evidence of emerald ash borer outside of regulated areas immediately to the [Canadian Food Inspection Agency](#).

You can report by using the mobile Report-Invasives-BC app for Apple and Android platforms, available for [download](#).

You can report any invasive species through the ISCBC [website](#), emailing [info@bcinvasives.ca](mailto:info@bcinvasives.ca) or 1-888-933-3722.

## REFERENCES/LINKS

*Emerald Ash Borer - profile*. Invasive Species Centre. (2024, March 21). <https://www.invasivespeciescentre.ca/invasive-species/meet-the-species/invasive-insects/emerald-ash-borer/>

Government of Canada, C.F.I.A. (2019, May 16). *Agrilus planipennis (Emerald ash borer) - Fact Sheet*. <https://inspection.canada.ca/plant-health/invasive-species/insects/emerald-ash-borer/fact-sheet/eng/1337368130250/1337368224454>

Government of Canada, C.F.I.A. (2018, January 19). *Questions and Answers: Wasps as biological control agents for Emerald Ash Borers*. <https://inspection.canada.ca/plant-health/invasive-species/insects/emerald-ash-borer/wasps/eng/1371137262586/1371137530758>

Government of Canada, C.F.I.A. (2024, February 26). *Emerald ash borer*. <https://inspection.canada.ca/plant-health/invasive-species/insects/emerald-ash-borer/eng/1337273882117/1337273975030>

Government of Canada, C.F.I.A. (2014, April 1). *Emerald Ash Borer - Questions and Answers*. <https://inspection.canada.ca/plant-health/invasive-species/insects/emerald-ash-borer/faq/eng/1337355937903/1337356019017>

Herms, D. A., & McCullough, D. G. (2014). Emerald Ash Borer invasion of North America: History, biology, ecology, impacts, and management. *Annual Review of Entomology*, 59(1), 13–30. <https://doi.org/10.1146/annurev-ento-011613-162051>

McKenney, D.W., Pedlar, J., Yemshanov, D., Lyons, D.B., Campbell, K.L., & Lawrence, K. (2012). Estimates of the potential cost of emerald ash borer (*Agrilus planipennis* Fairmaire) in Canadian municipalities. *Arboriculture & Urban Forestry*, 38(3):81-91.

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ADDITIONAL CONTACT INFO