Does my tree have Emerald Ash Borer (EAB) and what are the treatment options?

First, is it an ash tree?

An ash tree is most easily identified by:

- It has an opposite branching pattern (two branches come off the main stem, one on each side and directly opposite each other).
- It has compound leaves with 5-11 leaflets (depending on the species of ash). Leaflets are moderately toothed and may be stalked or sessile.

- In winter: first look for the opposite branching pattern and stout twigs of ash. Small branches grow off larger branches opposite one another. Likewise, buds and leaf scars are opposite one another on twigs.
- Next, Ash trees have many small dots (vascular bundles) on their leaf scars, forming a semi-circle or crescent pattern.
- And, white and green ashes have thick, diamond-patterned bark, while black ash bark is thin, ashy-gray, and scaly.

Ash species attacked by emerald ash borer include green *(Fraxinus pennsylvanica),* white *(F. americana),* black *(F. nigra),* and blue *(F. quadrangulata),* as well as horticultural cultivars of these species. Green and white ash are the most commonly found ash species in the Midwest with blue ash being rare. Note: blue ash twigs are 4-sided. All other Wisconsin ash trees have round stems.

***While other woody plants, such as mountain ash and prickly ash, have 'ash' in their name, they are not true ash (*Fraxinus* species). Therefore, they are not susceptible to attack by emerald ash borer.**

Related Documents
Ash Tree Identification (This document outlines how to recognize an ash tree. By Michigan State University Extension, in PDF format.)
EABMIextension.pdf

Second, how do you know if the tree is infested?

EAB attacks both healthy and stressed ash trees. When populations are high, it can kill large ash trees in less than 3 years and smaller ash trees within 2 years. However, at low population densities or in a newly infested tree, detecting EAB can be very challenging because the symptoms are often subtle and occur mostly on the top crown region of the tree. As its density builds to moderate or high, external symptoms become more prominent. When checking for EAB presence on an ash tree, it is important to consider at least two or more combinations of signs and symptoms.

Symptoms to watch for:

- **Crown dieback** – Canopy thinning and dieback of branches on the upper and outer region of the crown.
- **Epicormic sprouts** – Excessive shoot growth (suckers) arise from the lower trunk and at the base of the tree.
- **Bark split** – Vertical fissure on the outer bark revealing larval feeding galleries beneath.
- **Woodpecker damage** – Sensing the larval presence underneath the bark, a woodpecker strips pieces of bark (flecking) and excavates holes on the trunk.

Signs of EAB:

- **D-shaped exit hole** – As the adult beetle emerge from underneath the bark in June and July, it creates a D-shaped hole approximately 1/8" in diameter.
- **Serpentine galleries** – When loose bark is peeled, distinct S-shaped feeding galleries packed with frass (waste) can be noticed underneath.
- **Larvae -** Larvae are cream-colored, slightly flattened (dorso-ventrally) and have pincher-like appendages (urogomphi) at the end of their abdomen. By the time larvae are done growing they are 1 1/2 inches long. Larvae are found feeding beneath the bark.
- **Adults -** Adult beetles are metallic green and about the size of one grain of cooked rice (3/8 - 1/2 inch long and 1/16 inch wide). Adults are flat on the back and rounded on their underside.

Signs and symptoms of EAB and EAB look-a-likes can be found at www.emeraldashborer.wi.gov.

One of the more obvious symptoms of EAB is woodpecker damage. Woodpeckers will pick away the bark on infested ash trees, hunting for EAB larvae. Woodpecker activity can be due to other pests as well. However, the closer you are to a known EAB infestation, the more likely it is due to EAB.


Note: Woodpecker damage looks like bark scrapping or flecking.

For any suspicious (woodpeckered) ash trees:

1. Pry off the bark using a chisel or screwdriver and a hammer. Start with an area where the woodpeckers have picked some bark away. Peel away enough bark to expose several galleries as shown in the photos. Galleries of EAB are likely present on the wood surface under the bark. The amount of S-shaped winding will vary from tree to tree.


Note: The inner and outer bark must be peeled back in order to expose galleries on the wood.

2. If possible, collect some life stages of the insects.

Note: EAB larvae have bell-shaped segments.

Adult in wood prior to emergence.

3. Take clear photos of the galleries, any life stages, and any D-shaped exit holes that are seen. With a clear set of photos EAB can be confirmed pretty easily – send any photos to the Winnebago County UW-Extension office, plantadvice@co.winnebago.wi.us. If you have additional questions about how to examine trees and collect life stages, contact the Plant Health Helpline at 232-1986.

Third, should you treat your tree?

Based on current research, EAB treatments are suggested only for ash trees located within 15 miles of a confirmed EAB site, or for trees located within a quarantined area. Insecticide treatments are not necessary for ash trees located outside of these areas. Even within the 15-mile radius, not all trees should be treated. Due to the expense of insecticide treatments for EAB, consider the value of a particular ash tree in relation to insecticide treatment costs before making any treatments. Proper use of EAB insecticides can help maintain the health of high value ash trees over time. Lower value ash trees are not ideal candidates for EAB insecticide treatments.

Ash trees can be a valuable part of the landscape. A properly cared for ash tree can increase property value, provide environmental benefits such as runoff and erosion mitigation, and reduce electricity costs by shading a home. Determining tree value can be subjective. Qualities to consider when assessing value include (but are not limited to) a tree's overall health, shape, location with respect to landscape design, and appearance through the seasons, as well as whether or not a tree provides shade. A healthy ash that is properly located in the landscape, has a nice shape and good fall color, and provides shade has value. An ash tree that is not healthy due to disease or insects, has poor shape or structural damage, is otherwise unattractive, or is in a bad location (e.g., near a power line) is of lower value.

For more information on determining if your ash tree is worth treating, see http://hort.uwex.edu/articles/my-ash-tree-worth-treating-emerald-ash-borer.

Fourth, if you decide to treat what are the options?

Homeowners living in Winnebago County or within a 15 mile radius from the Town of Black Wolf can treat their high value ash trees using a systemic insecticide which is up taken by tree roots. However, several factors influence the effectiveness of the insecticide including the cost of the treatment and the pre-existing health condition of the tree.

In general:

1) Insecticidal treatments are most effective as a preventive strategy on healthy ash trees that have a full crown and intact bark on its branches and trunk.

2) Ash trees that are already infected with EAB and exhibit less than 50% canopy dieback can still opt for insecticide treatment. Any signs of its recovery can be noticed in the second year after treatment. However trees that have lost more than 50% canopy may not recover from its decline. Thus, insecticide treatments are not suggested.
3) Most insecticidal products recommended for homeowners need annual application and are applied as a soil drench. The best timing for soil drench application depends on the size of the tree. To determine the amount of insecticide to apply, simply measure the circumference of the tree using a tape at a chest height at 4.5' above the ground to figure out the size of the tree. Trees less than 47" circumference are best treated in early spring (mid-April to mid-May) and larger trees (greater than 47"circumference) are best treated either in fall (September) or spring (mid-April to mid-May). Research findings suggest that spring insecticide treatments are favored over fall, however fall applications are acceptable.
4) The following systemic insecticides containing imidacloprid as the active ingredient are effective as a soil drench in treating ash trees less than 47" circumference: Bayer Advanced Tree and Shrub Insect Control, Ferti-lome Systemic Tree and Shrub Drench, Optrol, Bonide Tree and Shrub Insect Control, Ortho Max Tree and Shrub Insect Killer, and Gordon's Tree and Shrub Insect Killer.
5) Be sure to read the product label to determine the rate of application and safety protocols. Before drenching, rake up any mulch, leaf litter or landscape cloth around the base of the tree trunk to about 18-24" to facilitate a direct contact of the insecticide with the soil. The soil needs to be in moist condition at the time of application. If the soil is very dry, irrigate around the base of the tree a few hours prior to insecticide application or if the soil is too wet, allow it to dry out for few days. Measure the volume of application needed as directed in the label and slowly pour the solution around the base of the tree trunk. Replace the mulch after the solution is completely absorbed in the soil. Click on the YouTube video link below for a detailed demonstration on soil drench application: http://www.hort.uwex.edu/articles/protecting-your-tree-emerald-ash-borer
6) Trees larger than 47" circumference can still be drenched by the homeowner using Optrol (imidacloprid), or contact professionals for other treatments. You can find the list of certified arborists for hire at http://www.isa-arbor.com/faca/findArborist.aspx
7) Professionals have access to additional products with unique application techniques. A trunk injection technique with Treeäge (emamectin benzoate), a restricted use product (RUP) available only to certified and licensed applicators, has quicker uptake by the tree (irrespective of soil condition) and is effective for at least 2 years. However, trunk injection can create wounds on the tree and repeated applications can cause potential injury. Other products that can be applied via trunk injection method are IMA-jet (Imidacloprid), Imicide (Imidacloprid), Inject-A-Cide B(Bidrin), Pointer (Wedgle). Soil injection is another method of treatment by professionals where the products (Merit, Xytect) are applied within 18" of the trunk and placed between 2" to 4" beneath the soil surface.
8) The treatments are typically cost prohibitive in woodlot areas or for large numbers of ash trees in communities.

Note: University of Wisconsin Extension does not endorse any one specific insecticide listed in this article. Products discussed in the article have been evaluated in a variety of Michigan State University research tests on EAB.

For more information regarding insecticide treatment options for homeowners, see http://hort.uwex.edu/articles/homeowner-guide-emerald-ash-borer-insecticide-treatments.

Sources:
Wisconsin's Emerald Ash Borer Information Source, http://datcpservices.wisconsin.gov/eab/index.jsp.
Wisconsin Department of Natural Resources, Urban Forestry and Forest Health staff members
EAB Treatment Guide for Brown County Residents, Vijai Pandian & Chris Williamson