







# Emerald Ash Borer Management Guide for Missouri Homeowners



The emerald ash borer (EAB) is a serious threat to ash trees in Missouri. This invasive pest will eventually kill unprotected ash trees. Many trees can be saved with the careful use of systemic insecticides. However, not all ash trees should be treated, and for many locations the start of treatments should be delayed. This guide will assist you in making decisions about protecting your trees from this invasive pest. Find more information at [eab.missouri.edu](http://eab.missouri.edu).

## Signs & Symptoms of EAB

 <p>EAB adults are generally seen from mid-May through July.</p> <p>Howard Russell, Bugwood.org</p>	 <p>D-shaped exit holes about 1/8" wide</p> <p>MO Dept. Conservation</p>	 <p>Winding, S-shaped tunnels just under the bark</p> <p>MO Dept. Conservation</p>
 <p>New sprouts on the branches and lower trunk</p> <p>Pennsylvania DCNR, Bugwood.org</p>	 <p>Increased woodpecker activity on the tree</p> <p>Kenneth R. Law, Bugwood.org</p>	 <p>Sparse leaves and/or branches dying in the upper part of the tree</p> <p>David Cappaert, Michigan State University</p>

## Use Care When Applying Insecticides

### Water Quality

When using insecticides applied to the soil or sprayed on bark, take the following precautions:

- Follow all label directions.
- Avoid applications when heavy rainfall is expected within 48 hours.
- Do not apply when soil is frozen or waterlogged.
- Avoid using within 25 feet of bodies of water or conduits to water such as street curbs and storm drains.
- Sweep up granular products off of sidewalks and driveways.

Imidacloprid and Dinotefuran are toxic to some aquatic invertebrates, but have a low probability of impacting aquatic organisms if applied as directed to clay or loam soils. Water quality concerns are less with trunk-injected insecticides compared to products applied to the soil or sprayed on bark.

### Pollinators

Recent evidence shows that some systemic insecticides may be present in pollen, if plants are treated prior to blooming. **Caution is required when applying insecticides to limit possible impacts on pollinators.**



Susan Ellis, Bugwood.org

Ash trees are primarily wind-pollinated, but honey bees occasionally collect ash pollen. Applying insecticides near or after the times indicated in the treatment options tables on page 4 will avoid or limit pollinator exposure to the chemicals.

**Avoid planting flowering plants adjacent to trees where systemic insecticides will be applied to the soil and may be absorbed by flowering plants. If flowering plants are adjacent, do not apply systemic insecticides to the soil before or during blooming.**

**More Information:** See "Frequently Asked Questions Regarding Potential Side Effects of Systemic Insecticides Used to Control Emerald Ash Borer" at [emeraldashborer.info](http://emeraldashborer.info).

## Begin with an inventory of your ash trees.

- How many?
- Where are they?

Do you want to protect your ash trees from EAB?

Yes!

*Remember, using insecticides to protect trees from EAB is a long-term commitment that requires periodic treatments over many years.*

## Are your ash trees worth protecting?

*Healthy trees can be treated!*



### Consider treating with insecticides if ash trees are:

- Healthy and vigorously growing with less than 50% dieback (dead branches and missing leaves)
- Showing few outward signs of EAB or other borer infestations
- Valuable to the owner by providing shade, energy savings or aesthetics
- Historically significant

*Maybe? Contact a certified arborist to evaluate the health of your trees.*

Yes!

How do I identify an ash tree?



*Ash leaves are compound with 5-11 leaflets.*



Visit [eab.missouri.edu](http://eab.missouri.edu) for more information.



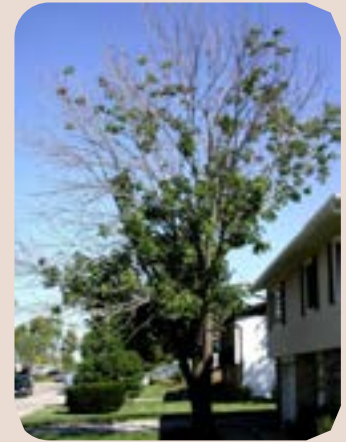
*The buds on ash twigs are opposite one another.*

Unprotected ash trees will die.

No.



*Save money. Have unwanted ash trees removed before they die. For professional removals, ask for references and insurance.*

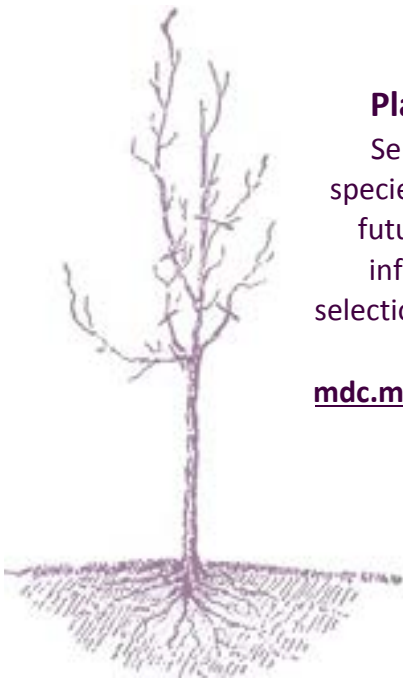


### Remove and replace low-value ash trees.

- Unhealthy trees with more than 50% dieback, severe injuries, or many borer attacks are unlikely to recover—even if treated.
- Small trees or trees located in poor sites (too close to utility lines, buildings, or sidewalks) are often not worth the cost of ongoing treatments.
- If you decide to remove your ash tree, dispose of it locally to prevent the accidental spread of EAB.

Go to "Is EAB nearby?"





### Plant new trees!

Select a diversity of species to reduce risks of future new pests. For information on tree selection, planting and care, visit [mdc.mo.gov/node/10669](http://mdc.mo.gov/node/10669)

### You can treat your trees

yourself using a soil drench containing **imidacloprid** or granules containing **dinotefuran**. **Treat trees in early spring.** Ensure that drenches or granules are applied to bare soil within 18 inches of the trunk. Always follow all insecticide label directions. See page 4 for a list of options.



### Contact a certified arborist!

Find a list of arborists in your area at [treesaregood.com](http://treesaregood.com)

Visit [eab.missouri.edu](http://eab.missouri.edu) for current news on EAB in Missouri.

*Insecticides available to homeowners are **not effective** on trees 20 inches DBH and larger. Call a certified arborist to discuss treatment options.*

No.

Yes!

Is the DBH less than 20 inches?

Insecticide treatments are **not recommended** at this time.

Keep alert for EAB arrival.



No.

### Is EAB nearby?

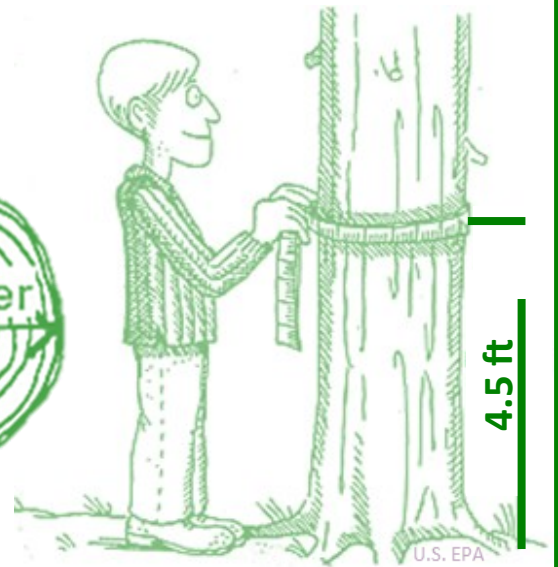
Visit [eab.missouri.edu](http://eab.missouri.edu) for a map of counties with EAB. Insecticide treatment should be considered when EAB has been found **within 15 miles** or **within your county**.

Continue here from page 2.

Yes!

### Measure your trees.

To determine the diameter at breast height (DBH), measure the distance around the trunk at 4.5 feet above the ground. Divide this number by 3.



*Adapted with permission from "Managing Emerald Ash Borer: Decision Guide," Annemarie M. Nagle & Cliff Sadof, Purdue University.*

# Insecticide Treatment Options

Insecticides used for EAB management are systemic products that are applied either to the soil or lower trunk and then transported throughout the tree by its vascular system. Drought conditions limit systemic insecticide uptake into and throughout the tree. Irrigating around the base of the tree before an insecticide application will improve uptake.

For trees near public streets and sidewalks, check with your city to determine what actions are allowed, or if treatment or replacement plans already exist.

Following are some commonly used insecticides listed by active ingredients. Multiple brands are available for some active ingredients. The recommended treatment timing is applicable in Missouri.

## Products Available to Homeowners

For trees less than 20 inches in diameter, but most effective for trees less than 15 inches in diameter.

Active Ingredient	Application Method	Treatment Frequency	Treatment Timing
Imidacloprid	Liquid drench applied onto bare soil within 18 inches of the trunk.	Annually	Apply in early spring near the time of pear and crabapple bloom, or approx. between late March and mid-April.
Dinotefuran	Granules applied onto bare soil within 18 inches of the trunk.	Annually	Apply in early spring near the time of lilac bloom, or approx. between early and late April.

## Products Available to Tree Care Professionals

Be aware of label restrictions on maximum amount of insecticide that can be applied per acre per year.

Active Ingredient	Application Method	Treatment Frequency	Treatment Timing
Emamectin benzoate	Trunk injection	Three-year intervals before EAB population reaches high level. Two-year intervals when EAB population is high.	<u>Optimal:</u> Soon after ash trees have leafed out, or typically late April to mid-May. <u>Alternative:</u> Early summer, due to long effective period of insecticide, especially when making second or subsequent applications to a particular tree.
Azadirachtin	Trunk injection	Two-year intervals before EAB population reaches high level. One or two-year intervals when EAB population is high.	<u>Optimal:</u> Soon after ash trees have leafed out, or typically late April to mid-May. <u>Alternative:</u> Early summer, due to long effective period of insecticide.
Imidacloprid	Trunk injection or soil applications	Annually	<u>Trunk injection:</u> Soon after ash trees have leafed out, or typically late April to mid-May. <u>Soil applications:</u> Near time of pear and crabapple bloom, or approx. between late March and mid-April. Fall applications are possible, but require a higher rate.
Dinotefuran	Bark spray (lower 6 feet of trunk) or soil applications. Trees up to 25" DBH.	Annually	<u>Bark spray:</u> Soon after ash trees have leafed out, or typically late April to mid-May. <u>Soil applications:</u> Near time of lilac bloom, or approx. between early and late April.