EMERALD ASH BORER

Emerald Ash Borer Homeowner Guide to Insecticide Selection, Use, and Environmental Protection

MINNESOTA

Department of Agriculture
Department of Natural Resources

What is the Risk to Your Tree(s)?

Trees need to be protected with insecticides when emerald ash borer (EAB) populations are abundant enough in an area to cause significant injury in the next year or two. Deciding when to use insecticides to protect trees from EAB depends on the EAB abundance in the area and how much risk you are willing to tolerate regarding the tree or trees in question. To learn about EAB abundance in your area:

- Check the Minnesota Department of Agriculture's (MDA) Interactive EAB Survey Map for the locations of known infestations in Minnesota at: **www.mda.state.mn.us/eab**
- Check with your local government or the MDA about monitoring efforts in your area.
- Learn how to recognize symptoms of EAB infestation and keep an eye on the trees in your neighborhood.

Treatment Will Need to be Repeated

Insecticides only work while they are present in the tree, and products are generally labeled for one to two years of effectiveness. Treatment will need to be repeated to protect trees if EAB are still abundant enough in an area to cause significant injury when the effective period ends. EAB could remain at damaging levels in an area for several treatment cycles or return to damaging levels in the future.

Remove and Replace Ash Trees on Your Property

It may be more cost effective to replace a small or struggling ash tree than to pay the cost of ongoing treatments. In addition, trees in poor health are not likely to respond well to treatments. Do not treat trees showing more than 50 percent canopy decline; these ash trees are unlikely to recover even if treated. Check with a certified arborist or licensed professional pesticide applicator to compare costs and benefits of treatment versus removal.

Check Your Calendar – *Timing is Everything*

As most EAB females lay their eggs on nearby trees within two to three miles of the tree from which they emerge, preemptive insecticide treatments can help curb population spread and establishment. Most insecticides used for EAB control act systemically so application of treatments should allow for uptake and distribution of the insecticide within the tree.

To ensure the insecticide is distributed throughout the tree to control EAB, soil-applied insecticides available to homeowners are most effective when applied mid-to late spring or in mid-fall. Several university studies have also confirmed that spring insecticide treatments are more effective than the same treatments applied in fall. Do not apply products when the soil is frozen. Refer to the table inside for more information on the timing of different insecticide options. Weather conditions or other factors may alter these recommendations. Read pesticide labels carefully. The label is the law.

Contact a Certified Arborist or City Forester to Evaluate Treatment Options

When contacting a professional, consider the following:

- Your city or township may have requirements or restrictions related to the treatment of EAB, especially for ash trees located on city property, which may include trees planted on or near boulevards or sidewalks. Check with your city.
- If hiring a professional, ask to see their licensure as a Commercial Pesticide Applicator for category "E: Turf and Ornamentals."

Treatment of Large Ash Trees

Treatment options available to homeowners for treating large ash trees require carefully following application instructions to avoid unintended environmental impacts. In general, consider having large ash trees (those greater than 48 inches in circumference, as measured 4½ feet above ground level) treated by a professional. Check specific pesticide product labels for tree size requirements.

Insecticide Treatment Options

Always read and follow the label directions for the specific pesticide product being used.

Pesticide products sold and distributed for use in Minnesota must be registered with the MDA annually. Make sure that the product you are using is registered for sale and use in Minnesota. Products registered for sale and use in Minnesota can be found at **www2.mda.state.mn.us/webapp/lis/productsdefault.jsp** or **www.kellysolutions.com/MN**

This document does not endorse the listed insecticide products over other options, and includes only the most common treatments. For product efficacy questions, consult your local Extension specialist.

Insecticide Products Available to Professionals and Homeowners for EAB Control

Insecticide Active Ingredient	Examples of Products Available to Professionals Only	Examples of Products Available to Homeowners **	Treatment Frequency and Optimal Timing1	Application Methods Available to Professionals	Application Methods Available to Homeowners
Emamectin benzoate (Avermectin)	TREE-äge* Tree-age R10*	Arbormectin Tree-äge G4	• Every 2 years or longer depending on insect pressure • May through September while full canopy is in place and tree is not under heat/drought stress • For best results, apply at least 30 days before historical egg hatch or adult flight. Visit **www.mda.state.mn.us/eab** to learn about EAB biology.	Trunk injection	Trunk injection (requires specialized equipment)
Dinotefuran (Neonicotinoids)	Dinotefuran tree care 70 WSP	Zylam liquid systemic insecticide	Once per year or longer depending on insect pressure Mid to late spring	Bark spray; soil injection; soil- applied drench	Soil-applied drench; bark band spray (up to 4-5 ft above the soil surface)
Imidacloprid (Neonicotinoids)	Merit products Ima-jet	• Xytect/Optrol products • Bayer Advanced Tree and Shrub Insect Control • Bonide Tree and Shrub Insect Control • Ferti-lome Tree and Shrub Drench	Once per year or longer depending on insect pressure2 Early to mid-spring and/ or mid-fall (before ground freezes)	Trunk injection; soil injection; soil-applied drench	Soil-applied drench
Imidacloprid + Clothianidin (Neonicotinoids)		Bayer Advanced 12 Month Tree & Shrub Protect & Feed Concentrate II	Once per year or longer depending on insect pressure Early to mid-spring and/or mid-fall (before ground freezes)		Soil-applied drench
Bifenthrin (Synthetic pyrethroids)	• Batallion products* • GCS Bifenthrin 2 EC* • Wisdom 2 EC* • Liberty bifen FC*		Early spring or prior to adult beetle flight and tree infestations	Preventive trunk, branch, and foliage cover spray	
Cyfluthrin (Synthetic pyrethroids)	Tempo products		A minimum of two applications/season, first in late May/ early June or when adult beetles begin flying. Subsequent applications are one month after the previous application	Preventive trunk, branch, and foliage cover spray	
Pyrethrin (Pyrethroids)		Pyrocide home and garden spray 74403	Use at first signs of insect infestation, preferably before damage and feeding occurs For trees taller than 10 feet, consider hiring a licensed professional		Preventive trunk, branch, and foliage spray
Azadirachtin (Botanical)	TreeAzin systemic insecticide Azasol Azaguard	Azasol	Every year (heavy pressure). Every other year (low pressure) Mid to late spring	Trunk injection	Preventive trunk, branch, and foliage spray
Beauveria bassiana (Biological)		BotaniGard 22 WP	Begin treatment at the first appearance of the insect pest, preferably before high populations develop		Preventive trunk, branch, and foliage spray

[1] Application timing will vary in Minnesota, depending on location and seasonal temperature fluctuations.
[2] Recommended only for trees less than 48 inches in circumference (as measured 4½ feet above ground level); for exceptions, check specific pesticide product labels.
* Restricted Use Pesticide. Any person using this product is required to be a licensed or certified pesticide applicator.
** Products available to homeowners are also available to professionals.

Follow These Recommendations to Protect Water Quality

The MDA conducted a special registration review of EAB insecticides in 2011. The review concluded that insecticides commonly used to control EAB are not likely to result in unreasonable risks to human health or the environment when used according to label directions.

In some cases, the following recommendations may refer to mandatory label use requirements:

Generally, professionally applied trunk injections have fewer concerns for water quality. For soil-applied products and bark sprays, the following considerations are important:

- Properly prepare application site and apply product according to label instructions. Consider avoiding use within 25 feet of water bodies. This includes streams, lakes, ponds, wetlands, or conduits to surface water or groundwater such as street curbs, storm drains, sumps, or well heads.
- Do not apply when heavy rainfall is expected within 24 hours of the planned treatment.

Situations that could cause soil-applied insecticides to wash away or leach, potentially contaminating water resources

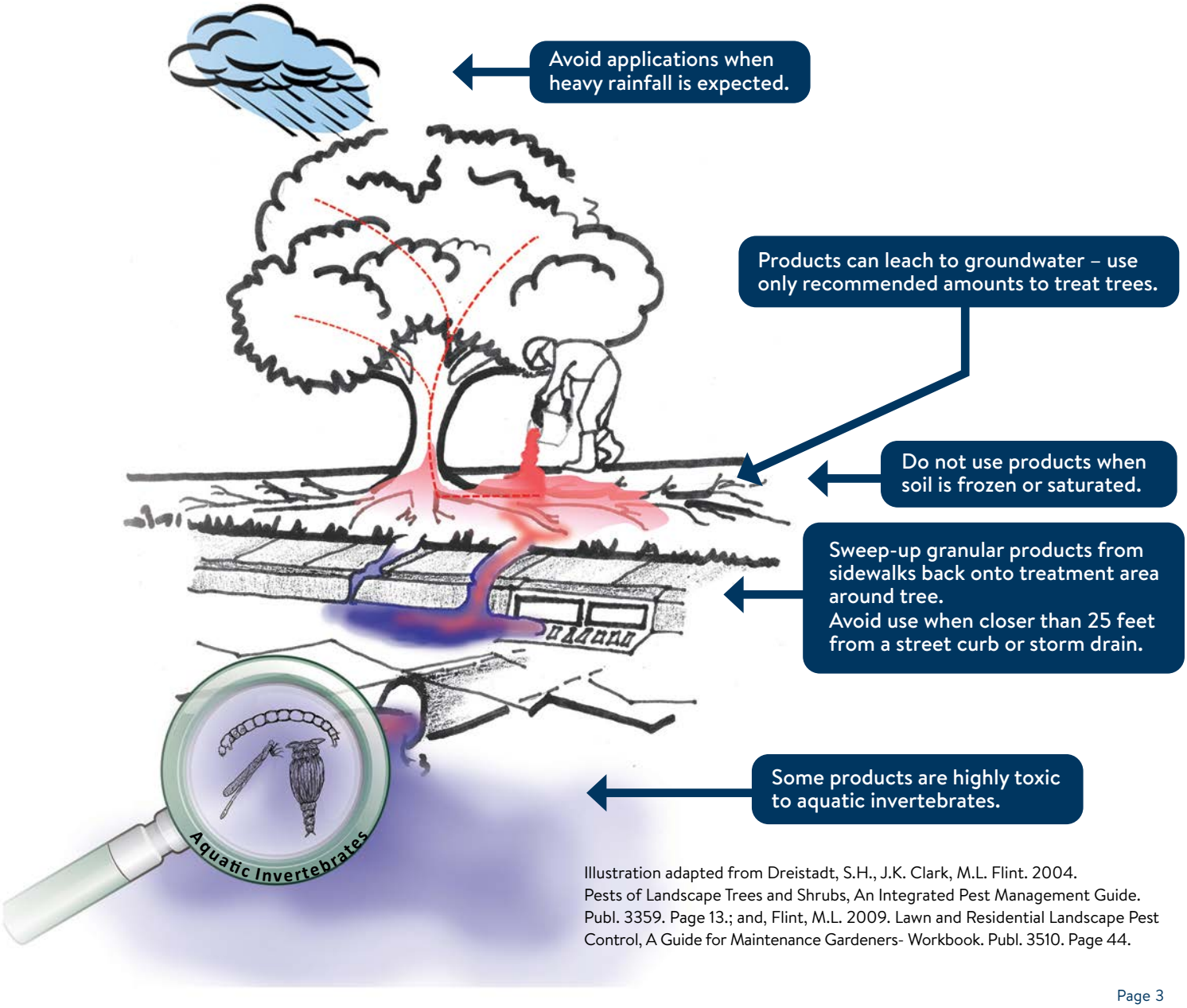
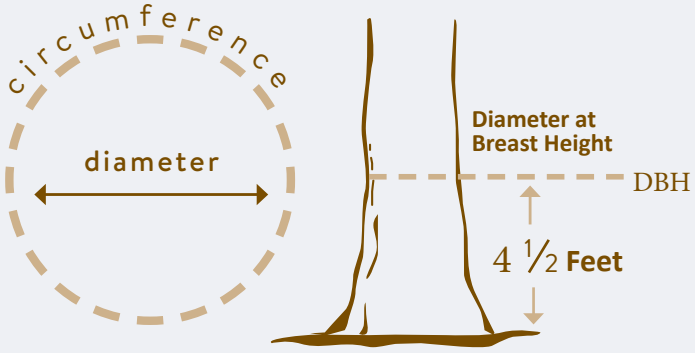


Illustration adapted from Dreistadt, S.H., J.K. Clark, M.L. Flint. 2004. Pests of Landscape Trees and Shrubs, An Integrated Pest Management Guide. Publ. 3359. Page 13.; and, Flint, M.L. 2009. Lawn and Residential Landscape Pest Control, A Guide for Maintenance Gardeners- Workbook. Publ. 3510. Page 44.

Measure Your Ash Trees

It is important to measure your ash tree to determine the appropriate treatment and to accurately follow the use instructions on insecticide labels.



trunk diameter = trunk circumference X 0.32

Conversion Table

Tree measurements at 4-1/2 feet above ground level

Circumference – Inches	Diameter at Breast Height (DBH) – Inches
15	5
20	6
25	8
30	9.5
35	11
40	13
45	14
> 48 inches	> 15 inches

Large trees are best treated by a professional. Check specific pesticide product labels for exceptions.

Water Quality and Pollinator Considerations

When using pesticides, read and carefully follow all label directions. Use in accordance with all precautionary statements, label directions, and applicable state and federal regulations.

Aquatic Considerations

- To protect the environment, do not apply these pesticides directly to water or where surface water is present; prevent pesticide entry or runoff into storm drains, drainage ditches, gutters, or surface water; consider the risks of groundwater contamination.
- Trunk injections have fewer concerns for water quality, unless accidentally spilled.
- Emamectin benzoate is highly toxic to mammals, fish, and aquatic invertebrates.
- Neonicotinoids are highly toxic to aquatic invertebrates and have the potential to leach into the groundwater. Imidacloprid and Clothianidin are surface water pesticides of concern in Minnesota.

Pollinator Considerations

- When using pesticides, take steps to prevent exposure to bees and other insect pollinators. Look for the bee hazard icon on the label, and in Directions for Use section of the pesticide label, check instructions for each application site for any additional specific use restrictions and instructions to protect bees and other insect pollinators.
- To protect pollinators, prevent pesticide drift from foliar applications onto beehives or to off-site, pollinator-attractive habitat areas; prevent drift of insecticides to blooming, pollen-shedding, or nectar-producing plants.
- Ash trees are wind-pollinated and does not produce nectar. However, insect pollinators may collect pollen from them.
- Systemic insecticides can move into plant pollen and nectar resulting in exposure to pollinators. For soil injection and drenching applications to trees, protect pollinators by not planting pollinator-attractive habitat within the area of treatment.

The MDA's Insect Pollinator Best Management Practices for Minnesota Yards and Gardens are available at: **www.mda.state.mn.us/png/bmps/pollinators.aspx**

Making Sense of EAB Insecticide Labels

THE LABEL IS THE LAW!

Always read, understand, and follow the label directions for the specific insecticide product being used.

SELECTING AND USING AN INSECTICIDE

- Look for products marketed to control emerald ash borer (see Products Table on page 2).
- Read the Environmental Hazard Statements on the insecticide label.
- To facilitate uptake, soil-applied insecticides should be applied when the soil is moist but not saturated or excessively dry.
- For soil drenches, remove or rake any mulch or dead leaves, then pour the insecticide solution directly onto soil.
- Do not allow children and pets to re-enter treatment area until sprays or drenches have dried.
- Store insecticides where children cannot reach them.
- Many homeowner products only allow one soil drench application per year.
- Some products have maximum per acre use limits. Do not apply more than the approved labeled rate.

DISPOSING OF AN INSECTICIDE

- When using the last of a liquid insecticide, triple-rinse the container before disposal, then apply the rinse water as you would apply the insecticide.
- Unusable and unwanted insecticides must be disposed of according to the label directions, or at a county household hazardous waste disposal event.
- It is illegal to bury or burn an insecticide.

Additional Resources

EMERALD ASH BORER RESOURCES

Minnesota Department of Agriculture
www.mda.state.mn.us/eab

University of Minnesota Extension
extension.umn.edu/tree-and-shrub-insects/emerald-ash-borers

USDA-APHIS
www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/emerald-ash-borer

Minnesota Department of Natural Resources
www.mndnr.gov/eab

Hiring a Tree Care Company
extension.umn.edu/planting-and-growing-guides/how-hire-tree-care-professional

PESTICIDE DISPOSAL

For more information about disposing of unusable or unwanted pesticides, visit **www.mda.state.mn.us/chemicals/spills/wastepesticides/schedule.aspx** or call 651-201-6562.

REPORTING AND INVESTIGATING PESTICIDE SPILLS AND MISUSE

Complaints can be reported to the Minnesota Duty Officer at 800-422-0798.

The MDA will evaluate the information provided and if a pesticide misuse is suspected, and an MDA inspector will be assigned. More information is available at **www.mda.state.mn.us/chemicals/pesticides/complaints.aspx**