EMERALD ASH BORER
Insecticide Guide

This guide is intended to assist N.C. homeowners & natural resource professionals in selecting and applying a pesticide to treat or protect ash trees from emerald ash borer. Regardless of the content of this publication, applicators must follow all pesticide labels. Remember: the label is the law!

What is the emerald ash borer?

The emerald ash borer, *Agrilus planipennis*, is a non-native invasive insect that was first found in the U.S. near Detroit, MI in 2002. Through both natural dispersal and human-assisted movement in infested materials such as firewood, this beetle has spread to many additional states, including North Carolina where it was first found in 2013. The emerald ash borer has already killed tens of millions of ash trees in the U.S. and has the potential to eliminate the species from the landscape. Pesticides are the most promising option for protecting high-value trees from the pest.

Always read the label!

Pesticide users must comply with all instructions and restrictions on the pesticide label. Always wear appropriate personal protective equipment when handling pesticides.

When to begin treatment

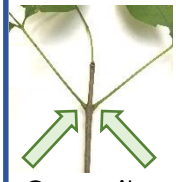
It's best to begin treating ash trees before they become infested. Studies indicate that if more than half the canopy has been thinned or killed by emerald ash borer, then it is too late to save the tree. It may take several years to notice tree health improvement following a treatment. To prevent infestation, it is recommended to begin treatments when the emerald ash borer is known to be within 10-15 miles. The NCFS local range map is continuously updated to show the most recent knowledge regarding its whereabouts. Depending on the pesticide used, retreatment intervals vary. Always follow the label's application instructions.

Insecticide treatment options

The insecticides used against the emerald ash borer can be separated into four categories based on application method:

- Soil injection or drench: Systemic insecticides that are applied via the soil, then taken up by the tree. This method is commonly used, is simple to do, and has shown to be effective.
- Trunk injection: Systemic insecticides injected directly into the tree. Tree uptake is excellent, some application knowledge is required, and it may cause damage to the tree if used year after year.
- Systemic bark spray: Systemic insecticides that are sprayed onto the lower trunk bark, then taken up by the tree.
- Cover spray: Covers bark or foliage; kills the borer as the adult feeds on foliage or the larva bores into the tree and they consume the insecticide. This option is not highly recommended as it will not kill borers already feeding within the tree and you must apply a thorough coat on the entire tree for optimum efficacy.

Is it ash? Ash trees have:



Opposite branching

Compound leaves, 5-7 leaflets

Clustered, oar-shape seeds (Fall)

Is my ash infested with emerald ash borer?

If you see:

- Canopy thinning
- Sprouting from trunk
- Woodpecker activity
- Vertical cracks in bark

LOOK CLOSER FOR

D-shaped exit holes (1/8")

Galleries beneath bark

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For more emerald ash borer information, visit http://www.ncforestservice.gov/forest_health/fh_eabfaq.htm

For more ash tree identification help, visit http://ncforestservice.gov/forest_health/pdf/NC_ash_identification_brochure.pdf

Pesticide options.

Pesticides registered for controlling emerald ash borer in North Carolina that have been tested in multiple field trials. For additional pesticides registered in N.C., visit the NC Pesticide Registration Information. This table is adapted for N.C. from: Herms DA, McCullough DG, Smitley DR, Clifford CS, Cranshaw W. 2014. Insecticide options for protecting ash trees from emerald ash borer. North Central IPM Center Bulletin. 2nd Edition. 16 pp.

Insecticide Formulation	Active Ingredient	Application Method	Recommended Timing	Setting	Restricted Use?
Merit® (75 WP, 75 WSP, 2F)	Imidacloprid	Soil injection or drench (if used during drought, irrigation is needed)	Early to mid-spring	Ornamental	No
Safari™ (20 SG)	Dinotefuran		Mid- to late spring	Ornamental	No
Transtect™ (70 WSP)	Dinotefuran		Mid- to late spring	Ornamental, Forest	No
Xytect™ (2F, 75 WSP)	Imidacloprid		Early to mid-spring	Ornamental	No
Zylam® Liquid Systemic Insecticide	Dinotefuran		Mid- to late spring	Ornamental	No
Bayer Advanced™ Tree & Shrub Insect Control II	Imidacloprid	Soil drench	Early to mid-spring	Ornamental	No
Ortho® Tree and Shrub Insect Control Granules	Dinotefuran	Granules	Mid- to late spring	Ornamental	No
Azasol™	Azadirachtin	Trunk injection	Mid- to late spring after trees have leafed out	Ornamental, Forest	No
Mauget Imicide®	Imidacloprid			Ornamental, Forest	No
TREE-äge™	Emamectin benzoate			Ornamental, Forest	Yes
TreeAzin®	Azadirachtin			Ornamental, Forest	No
Safari™ (20 SG)	Dinotefuran	Systemic bark spray	Mid- to late spring after trees have leafed out	Ornamental	No
Transtect™ (70 WSP)	Dinotefuran			Ornamental	No
Zylam® Liquid Systemic Insecticide	Dinotefuran			Ornamental	No
Astro®	Permethrin	Preventive trunk, branch, and foliage cover sprays	Two applications at 4-week intervals; first spray should occur at 450-550 degree days (50°F, Jan.1); coincides with black locust blooming	Ornamental	No
Onyx	Bifenthrin			Ornamental	No
Tempo® SC Ultra	Cyfluthrin			Ornamental	No
Sevin® SL	Carbaryl			Ornamental, Forest	No

3 steps to treat a tree with an imidacloprid soil drench

Imidacloprid is frequently used to treat ash for emerald ash borer due to its ease of application, overall effectiveness, and relative cost. Imidacloprid can be found at your local farm & garden stores. If the soil is hard/dry, water the soil prior to application.

1) Prep: Rake/remove organic matter within 1-2 feet of tree base (including grass). Calculate the diameter of the tree at breast height (DBH) by measuring around the trunk at 4.5' high and dividing that by 3.14. Put on personal protective equipment required by the label.

2) Dilute: Dilute pesticide in water per label instructions (if using a 75 WSP, try method to the right). Mix until completely dissolved. Calculate amount needed based on tree diameter. If the label directs, a higher dose may be used for ash trees larger than 15" in diameter.

3) Treat: Slowly pour diluted pesticide evenly around the base of the tree. Rinse buckets out 3 times, dump at application site. Once absorbed, rake debris back around the tree, dispose/store unused pesticide according to the label (at an approved waste disposal facility or through the NC Pesticide Disposal Assistance Program), and only use these buckets for future chemical treatments. Retreat annually for maximum control.

75 WSP Dilution

If you choose to use 1.6 oz. packets of imidacloprid 75 WSP/WSB, you could dilute the chemical using a 2 bucket method. For example:

1)In Bucket #1 (5-gal), mix 96 oz. of water and 1 (1.6 oz) water soluble packet of imidacloprid 75 WSP until completely dissolved. ***Put entire packet into water; don't open it.***

2)Fill Bucket #2 (5-gal) about two-thirds full with water. To treat at the normal dose, for every inch of tree diameter, add 4 oz. of solution from Bucket #1 into Bucket #2 & stir. For example, a 12" diameter tree will need 48 oz. of Bucket #1 solution added to Bucket #2. For the high dose, double it.

THE LABEL IS THE LAW! IF LABEL DIRECTIONS DIFFER FROM THE ABOVE RECOMMENDATIONS, ALWAYS FOLLOW THE LABEL.