



Pesticide Options for Control of Emerald Ash Borer

All ash trees throughout Boulder are at risk for emerald ash borer (EAB) infestation and will become infested if not treated with an insecticide. Learn more about EAB and the city's management program at www.EABBoulder.org.

What is emerald ash borer (EAB) and how serious is it?

EAB is a beetle, native to Asia, that attacks and kills ash trees. EAB was accidentally introduced to the U.S. and has no natural enemies or diseases to keep its populations in check. Unlike ash trees in Asia, ash trees in the U.S. have not evolved resistance to EAB and any ash tree that is infested will die. Fatal tree damage is caused by the boring of the immature or larval stage, which tunnels under the bark and feeds on the conductive tissues of the tree. As EAB feeding continues, the tree becomes unable to transport water and nutrients and eventually dies. The most effective method to treat for EAB is with systemic insecticides, which travel throughout the tree's conductive system into all tissues. Once the tree has lost approximately 50% of its canopy, the tree is likely too damaged to transport the insecticide effectively and treatment will not adequately protect the tree.

Should I treat my ash tree?

Before making a decision to treat an ash tree, keep in mind that not every tree can or should be saved. Trees that are in poor condition, have structural defects or previous insect damage, are in undesirable locations (under power lines, causing hardscape damage, etc), or trees that are not located at a site that receives adequate irrigation should not be treated. Once you choose to treat your tree, pesticide treatments must continue indefinitely to save the tree, which is costly and can have environmental impacts. Smaller trees (less than 10 inches in diameter) should be considered for removal and replanting with other tree varieties. If you choose not to treat your ash tree or plan on only treating your tree for the short term, consider planting a new tree **now** to give it time to grow, while your ash tree continues to provide shade and other benefits.

What are the risks when treating my tree?

The insecticides used to treat EAB tend to be potent and extremely low concentrations may have negative impacts to non-target organisms that feed on the tree, including its leaves, pollen, seeds and wood. Insecticides applied as drenches to the soil can harm soil organisms and travel to surface water where they are extremely toxic to aquatic invertebrates. Insecticides also have the potential to be carried off site from fallen leaves. Different compounds and formulations have different levels of toxicity and persistence. Some products can last for years in the tree's tissues or in soils.

A list of common products used to treat EAB

The following products are the most commonly used for EAB. Take your time to gather information to determine if treating your ash trees is the right decision and if you do choose to treat your trees, that you are using the best product for your particular situation. **If you are considering treating a tree in the public right-of-way, per ordinance, property owners must get preapproval from the city.** Information below is compiled from available EAB research and resources.

Active Ingredient	Pros	Cons	Comments
Emamectin Benzoate <u>Brand Names:</u> Tree-äge® Tree-äge G4® ArborMectin® enTREE® others	<ul style="list-style-type: none"> • NOT a neonicotinoid pesticide • Most effective chemical control on the market for EAB control • Most effective control option for larger diameter trees (trees >18" diameter) • Product labels claim at least two years of control (product efficacy may vary) • May provide protection to nearby trees that are not treated • Controls all life stages of EAB 	<ul style="list-style-type: none"> • Highly toxic to bees and other animals • Actual exposure potential for bees and other non-target animals is not understood. Studies are lacking. • Must be injected into trunk of tree; injection process <u>can</u> wound the tree. The city and CSU are conducting trials to determine impacts of trunk injections. Initial findings suggest mostly positive responses from <u>properly</u> injected ash trees. • Most products may only be applied by State of Colorado licensed pesticide applicator. 	The city will continue to search for additional information to better understand the environmental impacts from this product.
Azadirachtin	<ul style="list-style-type: none"> • NOT a neonicotinoid pesticide • OMRI (Organic Materials Research Institute) certified 	<ul style="list-style-type: none"> • Somewhat toxic to bees • Product may only be applied by a professional tree care company. 	The city and CU will be conducting trials to determine the product's effectiveness for two-year control.

<p><u>Brand Names:</u> TreeAzin® AzaSol® others</p>	<ul style="list-style-type: none"> Well-studied, showing minimal environmental impacts Provides good control for first year and reasonably good control for second year. 	<ul style="list-style-type: none"> Injection process wounds the tree. Impacts of wounding of ash via injection in Colorado not documented. The city and CSU will conduct trials to determine impacts. Initial findings suggest mostly positive responses from <u>properly</u> injected ash trees. May be effective for two years under low-level infestations, but will likely need to be applied every year under heavy infestation 	
<p>Dinotefuran</p> <p><u>Brand Names:</u> Safari™ Transect™ Xylam® others</p>	<ul style="list-style-type: none"> Applied as trunk spray to lower 4' of trunk; no wounding of tree in application Effective EAB control, particularly in trees up to 18" diameter. Less expensive than trunk injected products on a per application basis. 	<ul style="list-style-type: none"> Neonicotinoid pesticide Highly toxic to bees and other non-target animals Effective for only one year Highly mobile in water 	<p>It is *crucial* to apply after the tree is leafing out to avoid contamination of pollen. It is *crucial* to avoid applications when other flowering plants that are nearby to avoid contamination of pollen and toxicity to bees. <u>This product is a neonicotinoid and is banned on city properties unless the application has been formally exempted.</u></p>
<p>Imidacloprid*</p> <p><u>Brand Names:</u> Merit® Criterion® Lesco Bandit® Xytect® Ima-Jet® Imicide® Pointer® Others</p>	<ul style="list-style-type: none"> Least expensive option Available as consumer product (see list below) 	<ul style="list-style-type: none"> Neonicotinoid pesticide Inconsistent results with some studies showing poor effectiveness Consumer products ineffective at labeled rates at high EAB populations. Only lasts one year Some products are injected or poured into soil – where it may persist for years Highly toxic to bees and other animals Toxic to earthworms and other soil organisms Resistance problems in other insects Some professional products are applied through tree injection 	<p><u>The city has prohibited the use of imidacloprid for EAB on city properties, including trees in public streets rights-of-way.</u></p> <p>The city of Boulder does not recommend this pesticide for EAB control on private property.</p>

* The City of Boulder Integrated Pest Management Coordinator does not recommend the use of Neonicotinoid pesticides for Emerald Ash Borer controls due to bee/non-target toxicity

Homeowner imidacloprid products (not recommended due to bee/non-target toxicity):

- Bayer Advanced Tree and Shrub Insect Control (imidacloprid)
- Bayer Advanced Tree and Shrub Protect & Feed (imidacloprid)
- Bayer Advanced Tree and Shrub Protect & Feed II (imidacloprid + clothianidin)
- Bonide Annual Tree and Shrub Insect Control (imidacloprid)
- Ferti-lome Tree and Shrub Systemic Drench (imidacloprid)
- Optrol (imidacloprid)
- Ortho- Bug-B-Gon Year-Long Tree & Shrub Insect Control (imidacloprid)
- Others – read the product label to determine if imidacloprid is present.



