



Honey bee on ash pollen

Emerald Ash Borer Control Best Practices

Pollinator Considerations for Minnesota Residential Communities

Introduction. This fact sheet emphasizes best practices for emerald ash borer treatments to ash trees with consideration for pollinators and the environment.

Because Minnesota native ash trees lack natural resistance to some invasive pests and we do not have the right species of predators and parasitoids to keep them under control due to insect decline and nature imbalance, good cultural practices may not be enough to save the trees they attack. This holds true for emerald ash borer (EAB) infestation of Minnesota ash trees.

It's imperative to consider environmental costs and impacts before using toxic chemical treatments for EAB. The benefits of retaining a tree compared to environmental costs need always be considered. Our world is experiencing an insect decline crisis. We lost over 50% of wildlife including insects in the last 40 years. Systemic insecticides kill target and non-target insects on the tree including pollinators and beneficial insects. Pollinators can visit ash tree flowers in the spring and carry the contaminated pollen back to their colony.

We must minimize pesticide use by utilizing all the tools in the toolkit through an integrated pest management (IPM) scheme: 1) educating the public; 2) resistance breeding of trees 3) quarantine of firewood and infected trees, and 4) bio controls including releasing parasitoids which prey on EAB such as *Spathius galinae*. Many municipalities and counties employ a replacement program to replace ash trees over time with a native resistant tree species. Removal of ash trees is the most effective control method to stop the spread of EAB pest to other areas. Once infected, an ash tree ultimately will die even when treated. Insecticide applicators will not guarantee tree recovery even with treatments.

Best Practices

- **Foster natural resilience and biodiversity:** Start an ash tree replacement program to plant new resilient diverse tree species over time.
- **Weigh the environmental impacts and long-range costs of treatments** versus benefits of retaining the tree. The larger the trunk, the more treatments cost. The cost of repeated treatments every 2-3 years over the life of the tree can cost more than planting a replacement tree.
- **Do not move firewood.** Larvae can hide in the bark. Buy and burn local wood.
- Remove potential EAB habitat and debris from around trees.
- **Awareness:** Local municipalities, counties and state agencies need to provide the public with balanced and complete information to encourage good stewardship including best practices, monitoring tips, environmental and species impacts.
- **Best Practices:** When a community contracts with or recommends a pesticide service, best practices and thresholds for treatment need to be defined by the community and provided

to the contractor as part of the community's [Integrated Pest Management Program. IPM responds to pest problems with an effective and least-toxic option.](#)

- **Minimize pesticide use through an integrated pest management** scheme employing all the tools in the toolkit: 1) educating the public; 2) resistance breeding of trees 3) quarantine of firewood and infected trees, and 4) bio controls such as releasing [parasitoids \(*Spathius galinae*\)](#) which prey on EAB.

EAB and Ash Tree Treatments.

Minnesota ash trees are prone to emerald ash borer infestation. Ash trees with low population densities of EAB often have few or no external symptoms of infestation. Symptoms of an infestation may include any or all the following: dead branches near the top of a tree, leafy shoots sprouting from the trunk, bark splits exposing larval galleries, extensive woodpecker activity, and D-shaped exit holes. By the time most people notice canopy thinning or dieback, EAB has already caused considerable injury to the vascular system of the tree. An effective insecticide may stop additional damage, but it cannot reverse damage that has already occurred, and it takes time for trees to recover. Any pesticide use, either least toxic or synthetic, is simply a delaying tactic. Even with treatment, EAB is likely to irreparably damage ash trees within 5 years and kill them within 10. Trees in poor health to begin with are not likely to respond well to treatments.

Biological controls are an important tool in the toolbox. The State of Minnesota has been introducing parasitoids since 2010. The University of Minnesota, USDA and MDA continue research on four parasitoids that prey on EAB. [Municipalities can reach out to MDA Plant Protection to see whether their area can become part of the release program.](#) The University of Minnesota is currently researching [entomopathogenic fungi](#) as a bio control.

[Azadirachtin](#), which is derived from neem, has a relatively short half-life and is less toxic to bees than the synthetic, systemic chemicals often used to treat EAB. [Neem oil is part of organic and sustainable practices.](#) Yet, there is some evidence of reproductive toxicity associated with exposure to bumblebees, and indications that they can be negatively affected by the chemical even at levels significantly lower than recommended levels. However, if it is applied after ash trees spring bloom, the likelihood of affecting pollinators would be reduced. Read more on [TreeAzin](#),

Systemic Insecticides used for EAB control include: Emamectin benzoate (avermectin), [dinotfuran \(neonicotinoid\)](#) and [imidacloprid \(neonicotinoid\)](#). Systemic insecticides move through the vascular system of the tree permeating all parts including leaves, flowers and pollen and stays in the tree for at least 2 years. Systemic tree injections are more concentrated than most insecticide treatments and persist longer (4-5 years) especially with cumulative repeat treatments. Ash is wind-pollinated and does not produce nectar, but bees do collect ash pollen, and some native bees will fill larval chambers with up to 25% ash pollen during late April and early May when ash flowers. [Learn more about neonicotinoid effects here.](#)

[Emamectin benzoate](#) is the most common chemical used for EAB and is highly toxic to all insects including pollinators, aquatic and terrestrial wildlife, and can contaminate drinking water.

Emamectin benzoate is a 'RESTRICTED USE' pesticide. Emamectin benzoate can remain in the tree's vascular system from two to five years. Any person using this product is required to be a licensed pesticide applicator with a "E: turf and ornaments" commercial pesticide applicator license.

Proper application and handling are extremely important and needs to be carried out by a “certified applicator”. Each individual applicator needs to be trained and certified – not just the company in general. Properly applied trunk Injections may result in less non-target species mortality than sprayed chemicals do however, repeated injections accumulate in the tree tissue over time.

Chemicals to Avoid. Look at your product labels and try to avoid products containing those chemicals listed below:

(A = acute health effects, C = chronic health effects, SW = surface water contaminant, GW = ground water contaminant, W = wildlife poison, B = bee poison, LT = long-range transport)

[Dinofuran \(C, B\)](#)

[Emamectin Benzoate \(A,C,W,B\)](#)

[Etofenprox \(C,W,B\)](#)

[Imidacloprid \(A,C,SW,W,B\)](#)

Additional Resources:

[What is Integrated Pest Management, University of Minnesota, Dr. Vera Krischik](#)

[Biological Control of Emerald Ash Borer, Release Request, State of Minnesota Dept of Agriculture](#)

[Fungi as a Bio Control for Emerald Ash Borer, ScienceDirector, Dr. Benjamin Held](#)

[Neem Oil for Emerald Ash Borer Control, The Ash Grove Seed Project](#)

[What are Systemic Insecticides, Beyond Pesticides](#)

[Neonicotinoid Effects to Native Insects on Ash Trees, Minnehaha Falls Landscaping](#)

[What is Emamectin Benzoate, Beyond Pesticides](#)

Sources:

[Beyond Pesticides](#)

University of Minnesota Forest Resources & Entomology

[Minnesota Department of Agriculture, Plant Protection](#)

[Michigan State University, Entomology](#)

[Pesticide Action Network](#)

Washington County Parks

Minnehaha Falls Landscaping

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