

NEBRASKA FOREST SERVICE

Emerald Ash Borer

Treatment Options



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A variety of treatments are available for controlling emerald ash borer (EAB), including trunk injections and implants, soil treatments, and bark and foliage sprays. This publication describes the treatments most commonly used.

All of the trunk injection treatments described here have been shown to be effective against EAB, but actual treatment success can vary depending on initial tree condition. Trees already showing decline from EAB often do not respond well to treatment.

All trunk injections and implants cause damage to trees. Larger hole sizes and larger amounts of product injected cause greater internal damage. Some treatments also pose a greater risk to the applicator and others.



Arborjet QUIK-jet

Three of many treatment methods available for emerald ash borer control



ArborSystems Wedgle Direct-Inject Injection Unit



Mauget Tree Injector










When to begin treatments

Treatments are generally recommended only when EAB is known to be within **15 miles** of your location. Check product labels for additional guidelines.

Trunk injection effectiveness and damage

- **Many factors related to a product's application method** influence the effectiveness of a trunk-injection treatment. Products placed more shallowly in the tree are used more completely, and less product is needed to be effective. Products give more uniform control in the tree when the tree has not been damaged by recent borer tunneling.
- **Sap in the xylem of ash trees** moves almost entirely in the outer three annual rings. As xylem rings become older, they become less able to transport sap. Injection products placed within the outer three rings move more completely to where the products are needed compared to those placed into deeper, older rings.
- **Deep injection holes** and large amounts of product are more likely to cause significant internal damage and contribute to a decline in the health of the tree compared to shallow holes and small amounts of product. The kinds of damage caused by large holes and large amounts of product include the loss of the ability to move water, carbohydrates and other materials through the tree; the loss of stored carbohydrate reserves (the tree's energy reserves); and the loss of the ability to store carbohydrates for future use.
- **When repeating treatments**, previous injection holes should be examined. Any holes that have not closed are signs the tree is not healthy, and a repeated treatment could seriously weaken or kill it.

Trunk-injection treatments for emerald ash borer control*

Product	Imicide	Pointer	TREE-äge	TreeAzin	Xylect Infusible
Manufacturer	J.J. Mauget Co.	ArborSystems, Inc.	Arborjet, Inc.	BioForest Technologies, Inc.	Rainbow Treecare Scientific Advancements
Registered in Nebraska	Yes	Yes	Yes	Not as of December 2014	Not as of December 2014
Product description					
Active ingredient	Imidacloprid	Imidacloprid	Emamectin benzoate	Azadirachtin	Imidacloprid
Pesticide signal words	Caution	Warning	Warning	Warning	Warning
Restricted use pesticide	No	No	Yes	No	No
Number of years a treatment is likely effective	1 year	1 to 2 years	2 to 3 years	1 year	1 year
Equipment for application	Mauget Tree Injector	ArborSystems Wedgle Direct-Inject Injection Unit	Arborjet • QUIK-jet • Tree I.V. • VIPER Hydraulic Device	BioForest Technologies EcoJect System	Rainbow Treecare Scientific Advancement iQ Tree Infuser
Method of application	Product is pressure injected into holes drilled through the bark and into the xylem (wood).	Product is pressure injected with a needle-like device through the bark to the outer surface of the xylem (wood).	Product is pressure injected into holes drilled through the bark and into the xylem (wood).	Product is pressure injected into holes drilled through the bark and into the xylem (wood).	Product is pressure injected into holes drilled through the bark and into the xylem (wood).
Timing of application according to label	No information about timing was found on the label	Early spring through fall	At least 30 days before historical egg hatch or adult flight	May to the end of August	When trees are in full leaf
Label rate	1 capsule (3 or 4 ml) per 2 inches of trunk diameter	1 to 2 ml per 4- to 6-inch spacing around trunk circumference	Varies from 2.2 to 16.5 ml per inch of trunk diameter	12.5 ml per inch of trunk diameter	Varies from 4 to 16 ml per inch of trunk diameter
Amount of product needed for a 25-inch diameter tree	42 ml	24 ml	260 ml	312 ml	225 ml
Damage to trees caused by the injections					
Recommended injection hole diameter and depth into the xylem—in addition to drilling through the bark, phloem and cambium. Sizes are maximum sizes as recommended on the label or in user instructions.	Hole diameter: 11/64"  Hole depth: 1/2" 	Not a drilled hole, but a horizontal cut at the surface of the xylem: Width: 3/32"  Depth: 1/32"	Hole diameter: 3/8"  Hole depth: 1 5/8" 	Hole diameter: 15/64"  Hole depth: 1" 	Hole diameter: 15/64"  Hole depth: 1 3/4" 
Number of injection sites for a 25-inch diameter tree	12	16	11	16	12
Relative degree of damage to the tree based on the total volume of holes and product needed for a 25-inch diameter tree †	Low Holes total: 0.1 cu. in. Product: 2.6 cu. in. (42 ml) Total: 2.7 cu. in.	Low Holes total: 0.003 cu. in. Product: 1.5 cu. in. (24 ml) Total: 1.5 cu. in.	High Holes total: 2.0 cu. in. Product: 15.9 cu. in. (260 ml) Total: 17.9 cu. in.	High Holes total: 0.7 cu. in. Product: 19.0 cu. in. (312 ml) Total: 19.7 cu. in.	High Holes total: 0.9 cu. in. Product: 13.7 cu. in. (225 ml) Total: 14.6 cu. in.
Risk to applicator and others from injections					
Relative degree of risk and main sources of risk of pesticide exposure to the applicator	Moderate Leakage of pesticide around injection sites and removing pressurized capsules before completely empty	Moderate Leakage of pesticide around injection sites	QUIK-jet & Tree I.V.: High — Pouring the pesticide from an open container Viper: Moderate — Pouring from the container (but not needed at every tree)	High Pouring the pesticide from an open container and removing pressurized canisters before completely empty	Moderate Pouring the pesticide from an open container (but not needed at every tree)
Relative degree of risk and main source of risk to others by injection equipment being disturbed if left unattended during slow uptake	High Capsules with pressurized pesticide could be pulled from the tree	Low (No equipment remains outside the tree)	QUIK-jet & Viper: Low — (No equipment remains outside the tree) Tree I.V.: High — Tubes with pressurized pesticide could be pulled from tree	High Canisters with pressurized pesticide could be pulled from the tree	Low (No equipment remains outside the tree)

* Other similar products may be available. No endorsement or discrimination is implied.

† Damage is generally greater as hole size and amount of product increase. The data presented reflect maximum hole size and average amount of product.

Other treatments available for emerald ash borer control*

Method	Active ingredient	Product name
<i>Professional products</i>		
Soil drenches and granules	Imidacloprid	Criterion, Lesco Bandit, Merit, Xytect
Soil drenches and systemic bark sprays	Dinotefuran	Safari, Transtect, Zylam
Residual bark and foliage sprays	Bifenthrin, Cyfluthrin, Permethrin	Onyx, Tempo, Astro † (in order of the active ingredient)
<i>Homeowner products</i>		
Soil drenches and granules	Dinotefuran	Green Light Tree & Shrub Insect Control with Safari, Ortho Tree & Shrub Insect Control Granules
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control, Compare N Save Systemic Tree & Shrub Insect Drench, Merit
Residual bark and foliage sprays	Permethrin	Hi-Yield 38 Plus Turf, Termite and Ornamental Insect Control †
	Spinosad	Ferti-lome Borer, Bagworm, Tent Caterpillar & Leafminer Spray
Trunk implants	Acephate	Acecap

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† This product may be used on ash, but the label does not specifically mention emerald ash borer. No guarantee of effectiveness is implied.

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