



TREEAZIN
Treated

“ There was an average of 10-12 larvae per m² of phloem in the 2012 winter on TreeAzin trees treated only in 2011. That’s pretty low – you would not see the canopies declining on trees with that density of larvae.

Dr. Deb McCullough
Michigan State University (MSU)

EAB Infested
Non Treated

Photo: Town of Oakville, 2013

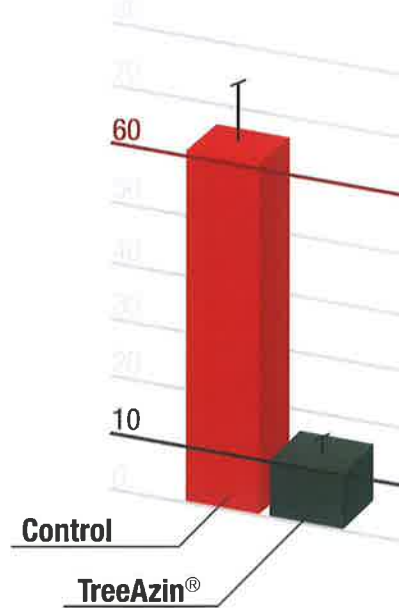
TREEAZIN[®] SYSTEMIC INSECTICIDE[®]



Michigan State University (MSU): Independent Study of 2-year Emerald Ash Borer (EAB) Control with TreeAzin[®] 2011-2012

Dr. Deb McCullough of MSU conducted an independent study on the 2-year efficacy of TreeAzin[®] Systemic Insecticide for EAB control in 2011 and 2012. In the study, conducted near East Lansing, Michigan, Dr. McCullough sampled 24 trees from three forested sites, each with a DBH between five and 13 inches. All trees were felled in winter 2012-2013 and debarked from the base to the upper canopy to determine live larval density per m² of phloem tissue. Trees treated only in 2011 with TreeAzin had an average of just 10-12 larvae per m², which was significantly less than the 60-62 larvae per m² on untreated trees.

Trees Treated 2011 Only
Live Larvae Per m²



Environmental Impacts

Here are some questions to ask before choosing a pesticide:

Is there an effect on bees?

On the relationship between pesticide use and bee colony collapse, TreeAzin has been found to have low toxicity to bees. TreeAzin is not in the neonicotinoid or avermectin classes of insecticides.

Will leaves from a treated tree affect aquatic or terrestrial environments?

According to Dr. David Kreutzweiser et al. (2011)¹, “no significant reductions were detected among earthworm survival, leaf consumption rates, growth rates, or cocoon production, aquatic insect survival and leaf consumption rates, and among terrestrial and aquatic microbial decomposition of leaf material in comparison to controls.”

Don't forget that the leaves from treated trees end up falling into streams and storm water areas. TreeAzin is safe for these environments since it is not a persistent product.

(Continued)

“ When azadirachtin (TreeAzin) is used as a systemic insecticide in trees for control of insect pests such as the invasive wood-boring beetle, emerald ash borer, resultant foliar concentrations in senescent leaf material are likely to pose little risk of harm to decomposer invertebrates.

Dr. David Kreutzweiser
Canadian Forest Service



Long Term Efficacy of TreeAzin

In 2013, a survey was conducted on 727 treated and untreated ash in a Canadian municipality that started using TreeAzin in 2008.

Environmental Impacts

Can a child play in the leaves from a treated tree? Can a homeowner compost leaves from a treated tree and use them in their garden?

Essentially all of the active ingredient in TreeAzin has dissipated from the leaf tissue before senescence in the fall. According to Grimalt et al. (2011)², this indicates an exceedingly low potential for non-target effects. It is safe for a child to play in the leaves, or for leaves to be composted and used in a garden.

Is there a risk of exposure when in proximity to sawdust from a treated tree? How long does the product persist in the tree?

According to Grimalt et al. (2011)², residues from TreeAzin dissipate quickly in the tree after reaching peak levels 48 hours after injection. Within 44 days after treatment, over 90% of the total azadirachtin residues have dissipated. Pruning and removals typically begin several months after treatment; there is no more risk to the worker in cutting a treated tree than an untreated tree.

While tree injections reduce the risk of exposure compared to basal spraying or soil drenching, it's also important to consider how the product persists in the environment and its long-term effects on non-targets and bystanders.



- 1% mortality in treated trees.



- 94% of the **treated trees** were healthy (no sign of EAB), or in good health.

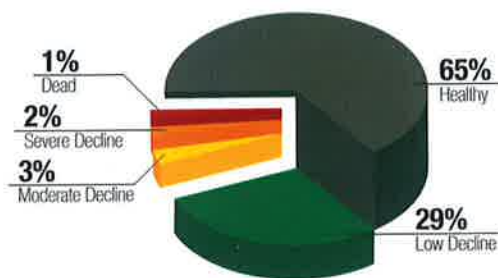


- 47% of the **untreated trees** were dead or in decline.

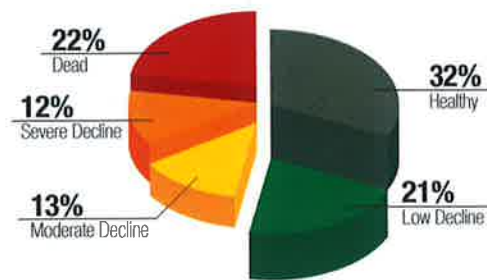
“Waiting several years to commence treatment of a city's EAB infestation with any product will result in moderate to poor efficacy. Treating early is key, and as such, a municipality's decisions at the early stages of an EAB outbreak will determine the program's success. Municipalities will see great results with the appropriately timed usage of TreeAzin.

John McNeil – Manager, Forestry Services, Parks and Open Spaces, Town of Oakville, Canada

Condition of **Treated Trees** | 2013



Condition of **Untreated Trees** | 2013



Affordability of Treatment

TreeAzin treatment almost always costs less than the cost of tree removal, disposal and replanting, and is competitive with other treatment options, without sacrificing environmental safety. Additionally, utilizing BioForest's EcoJect® injection system allows for multiple, simultaneous tree injections, yielding industry leading high volume efficiencies and scalability in larger treatment programs.

Although Emerald Ash Borer is a devastating invasive insect that attacks and kills all species of True Ash, not all ash trees need to be removed. According to the *Society of Municipal Arborists*, an ash conservation strategy is preferred over removal of all trees. Communities who remove all ash trees may take decades to recover financially and ecologically. The synergy created when using TreeAzin in combination with the EcoJect System provides an efficient and affordable means to save trees.

Additional References

¹Kreutzweiser et al. 2011. Environmental safety to decomposer invertebrates of azadirachtin (neem) as a systemic insecticide in trees to control emerald ash borer. *Ecotoxicology and Environmental Safety* 74:1734-1741

²Grimalt et al. 2011. Foliar residue dynamics of azadirachtins following direct stem injection into white and green ash trees for control of emerald ash borer. *Pest Management Science* 67:1277-1284