Emerald Ash Borer and TreeAzin®
Systemic Insecticide

Paul Bolan
BioForest Technologies Inc.
BioForest Office Locations

Head Office - Sault Ste. Marie, ON
Regional Office – Prince Albert, SK
Staff – 11 SSM, 2 PA
Who is BioForest?

• Born in 1995 from Canadian Forest Service downsizing
• BioForest principals (Joe Meating & Paul Bolan) were members of the Forest Insect & Disease Survey Unit – Canadian Forest Service

Expertise:
• Commercial & Urban forest surveys
• Commercial & Urban forest pest management
• Tree care product development & distribution - 2008-14
  TreeAzin®
  Arbotect 20-S
  EcoJect System®
Emerald Ash Borer

Management Options:
1. Treat all ash trees with an insecticide(s)
2. Let EAB kill all the ash trees
3. Treat high value ash trees that provide significant benefit, remove low quality ash trees and replant non-ash species

This is not an option
Emerald Ash Borer

Why Treat?

Benefits of Trees:

– Air quality
– Carbon sinks
– Rainwater interception
– Energy conservation
– Aesthetics
– Property values
– Environmental/ecological benefits
Emerald Ash Borer

Insecticides Registered in Canada

- AceCap® 97 - Acephate
- Confidor® 200SL - Imidacloprid
- TreeAzin® - Azadirachtin
TreeAzin®

- 5% Azadirachtin systemic formulation
- For deciduous and coniferous species
- Intellectual property of Canadian Forest Service
- Developed in collaboration with BioForest (worldwide license holder)
Azadirachtin

- Extract from Neem tree seed kernels
- Toxic to a wide range of insect pests
- Very low mammalian and bird toxicity
Modes of Action

• Immature stages:
  – Interrupts growth and development (IGR)

• Mature stages:
  – Reduced fecundity & egg viability
“Given the inhibition of larval development, reduction of adult emergence, and the occurrence of foliar residues at biologically active concentrations, we conclude that azadirachtin is effective in protecting ash trees from EAB”
• Rapid uptake and translocation within 48 hrs
• Essentially complete dissipation of foliar residues prior to leaf fall
• No quantifiable levels in next year’s foliage

Grimalt et al. 2011. Pest Management Science
• “foliar concentrations in senescent leaf material are likely to pose little risk of harm to decomposer invertebrates”

TreeAzin is NOT persistent in the environment

Leaves from TreeAzin treated trees can be composted and used in gardens

Kreutzweiser et al. 2011. 
Ecotoxicology and Environmental Safety
### TreeAzin® Toxicity

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Skin Sensitization</strong></td>
<td>Not a dermal sensitizer of male Guinea pigs following repeated exposures</td>
</tr>
<tr>
<td><strong>Acute Oral Toxicity</strong></td>
<td>Single oral dose in male and female rats LD50 &gt; 2000 mg/kg</td>
</tr>
<tr>
<td><strong>Acute Nose Inhalation</strong></td>
<td>4-hour acute inhalation in male and female rats LC50 &gt; 2.070 mg/L</td>
</tr>
<tr>
<td><strong>Acute Dermal Irritation</strong></td>
<td>No dermal irritation following a single application in rabbits</td>
</tr>
<tr>
<td><strong>Acute Dermal Toxicity</strong></td>
<td>In male and female rabbits LD50 &gt; 2000 mg/kg</td>
</tr>
</tbody>
</table>
# Labeled Insect Pests

<table>
<thead>
<tr>
<th>Pest</th>
<th>Application Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerald Ash Borer</td>
<td>2-5 mL /cm DBH</td>
</tr>
<tr>
<td>Gypsy Moth</td>
<td>3 mL /cm DBH</td>
</tr>
<tr>
<td>Tent Caterpillars</td>
<td></td>
</tr>
<tr>
<td>Spruce Budworm</td>
<td></td>
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<tr>
<td>Jack Pine Budworm</td>
<td></td>
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<tr>
<td>Cedar Leafminers</td>
<td></td>
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<tr>
<td>Sawfiles: including Birch Leafminer and</td>
<td></td>
</tr>
<tr>
<td>Pine False Webworm</td>
<td></td>
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</tbody>
</table>

US TreeAzin® Research

- Michigan State University – 2011 - EAB – Dr. Deb McCullough
- Ohio State University – 2012 - EAB – Dr. Dan Herms
- University of Minnesota - 2013 – EAB - Dr. Brian Aukema
- University of Massachusetts - 2009 – Hemlock Woolly Adelgid – Dr. David Mausel
- Virginia Technical University – 2010 - Hemlock Woolly Adelgid – Dr. Scott Salom
MSU Study of 2-Year Control 2011-2013

- Trial Location – East Lansing, MI
- 3 forested sites; 8 blocks per site; 5 ash trees per block
- Total of 24 blocks (120 trees), DBH - 5 to 13 inches
- 4 treatments (TreeAzin, Safari, Treeage & Azazol) plus control trees
- All trees treated in 2011 (24 trees per treatment)
- 12 blocks re-treated in 2012 (12 trees per treatment)
- All trees felled in winter 2012-2013 & debarked from the base to the upper canopy to determine larval density
MSU Study of 2-Year Control 2011-2013

Trees Treated in 2011 Only – Live Larva per m²

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

“On TreeAzin trees treated in both 2011 and 2012, there were nearly no live larvae.”

Dr. Deb McCullough – Michigan State University
“TreeAzin reduced production of fertile eggs & egg hatch. Effects most pronounced when trees treated in 2011 & 2012”

Average egg hatch rates in 2012:

- Controls – 67%
- TreeAzin 2011 – 34%
- TreeAzin 2011 + 2012 – 9%
“TreeAzin has been approved by EPA to provide up to 2 years control of EAB”
Emerald Ash Borer

When treating any tree with ≥30% canopy thinning and/or dieback, tree condition may compromise treatment effectiveness.

Photos by: Dave Smithey, Michigan State University
Oakville, ON (suburb of Toronto)

- EAB detected in 2008 (arrived in 03/04)
- In 2013, 727 randomly selected treated and untreated ash trees were surveyed for EAB signs and symptoms
- Average tree diameter – 30 cm Dbh
- TreeAzin treatments commenced in 2008
- Approx. 5700 trees currently under treatment (biennial treatment strategy)
Long Term TreeAzin® EAB Efficacy

Treated ash trees:
- 65% Healthy
- 29% Low Decline
- 3% Moderate Decline
- 2% Severe Decline
- 1% Dead

Untreated ash trees:
- 32% Healthy
- 12% Severe Decline
- 13% Moderate Decline
- 22% Dead
- 21% Low Decline
Emerald Ash Borer

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EcoJect® System Kits

3L Kit
- 3L Pump
- 48 20 mL Canisters
- 18 8 mL Canisters
- 72 Nozzles
- 1 Loading Gun
- Drill bits, DBH tape, PPE, and more...

3XL Kit
- 3L Pump
- 144 20 mL Canisters
- 48 8 mL Canisters
- 204 Nozzles
- 1 Loading Gun
- Drill bits, DBH tape, PPE, and more...

6L Kit
- 6L Pump
- 264 20 mL Canisters
- 96 8 mL Canisters
- 372 Nozzles
- 2 Loading Gun
- Multi-loader attachment
- Drill bits, DBH tape, PPE, and more...
EcoJect® System
Important Questions

• Is the product effective against EAB – “show me the data”
• Multi-year control – “show me the data”
• Be knowledgeable - read the product label
• Adverse impact to the environment - “show me the data”
• Formulation translocation – “show me the data”
• Be knowledgeable - Pesticides Act and Ontario Regulation 63/09-Landscape Licensed Exterminators
• Cost
• Licencing requirements
Thank You

Don't move firewood, it **BUGS** me!

www.emeraldashborer.info