Implementation of Emerald Ash Borer Biological Control in Minnesota

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Classical Biological Control

The goal of biological control is to reduce the pest population to an acceptable level, not to eradicate the pest.

![Graph showing the population density over time with bioagent release and pest and bioagent lines.

M. Chandler, Minn Dept. of Ag]
EAB Biological Control Agents

larval parasitoid, *Tetrastichus planipennisi*

larval parasitoid, *Spathius galinae*

egg parasitoid, *Oobius agrili*
How Implementation Works

Step 1 – Identify a suitable location

Step 2 – Perform 2 yrs. of releases at site

Step 3 – Begin parasitoid recovery work 1 yr. after releases completed

Great River Bluffs State Park (Winona County, MN)

Lake Winona Releases (Winona County, MN)

Bark, Branch & YPT Sampling for EAB Parasitoids
Implementation of EAB Biological Control in MN

- **USDA APHIS & FS** Begin releases at sites in Michigan
- Minnesota begins releases (Houston County)
- Minnesota adds 10 new release sites
- **2011**
- MN adds 7 new sites. 1st Recovery of *T. planipennisi*
- 2013
- MN adds 2 new release sites. Increase in *T. planipennisi* recoveries
- 2014
- MN adds 8 new sites. 1st Recovery of *O. agrili* at sites in Twin Cities & SE MN
- 2015
- MN adds 2 new release sites. Increase in *T. planipennisi* recoveries
- 2016
- MN adds 3 new sites. 1st Releases done in Duluth, MN
- MN adds 5 new release sites. 1st *T. planipennisi* recovery in Twin Cities
- MN adds 2 new release sites
- 2017
- *38 Release sites in total from 2010 - Present.*
EAB Biological Control in Twin Cities Metro Area

EAB Biocontrol Release Site

☐ Active
☒ Monitoring

Map created by: Jonathan Osthus. 7/13/2017

Area of detail highlighted in red

Sources: Esri, HERE, DeLorme, TomTom, Intermap, iCorporated, GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Elizon China (Hong Kong), swisstopo,
MapmyIndia, © OpenStreetMap contributors, and the GIS User Community.
## MN Parasitoid Release Totals

<table>
<thead>
<tr>
<th>Biocontrol Agent</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017 (as of July 8th)</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Tetrastichus planipennisi</em></td>
<td>2,154</td>
<td>19,480</td>
<td>19,822</td>
<td>42,579</td>
<td>34,434</td>
<td>151,022</td>
<td>45,288</td>
<td>17,661</td>
<td>332,440</td>
</tr>
<tr>
<td><em>Oobius agrili</em></td>
<td>0</td>
<td>3,641</td>
<td>10,241</td>
<td>8,597</td>
<td>12,062</td>
<td>31,490</td>
<td>42,600</td>
<td>6,800</td>
<td>115,431</td>
</tr>
<tr>
<td><em>Spathius agrili</em></td>
<td>1,172</td>
<td>7,596</td>
<td>15,258</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>24,026</td>
</tr>
<tr>
<td><em>Spathius galinae</em></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,613</td>
<td>1,299</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>3,326</td>
<td>30,717</td>
<td>45,321</td>
<td>51,176</td>
<td>46,496</td>
<td>182,512</td>
<td>89,501</td>
<td>25,760</td>
<td>474,809</td>
</tr>
</tbody>
</table>
Research Partnership with University of Minnesota

Cold Tolerance of parasitoids:

- All species are sufficiently cold tolerant for southern but not necessarily northern MN
- Some winter mortality expected most years

Flight Dispersal Capacity of *T. planipennisi*:

- Can fly up to 4.5 miles in 24 hours
- Females fly farther than males
- A pre-flight snack (nectar) is critical to dispersal success
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Questions?

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