More Northern Aggression: Invasive Species Threats to Florida Forests from Higher Latitudes

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But first...a disclaimer...

YEAH, WELL, THAT’S JUST, LIKE, YOU KNOW...
YOUR OPINION, MAN.
When invasive species come knocking at your door, be an Edna.

Emerald ash borer
(*Agrilus planipennis*)

*Millions of trees. Billions of dollars.*
Emerald ash borer life cycle

As early as late March
Peak in April/May
End in late June

Has preceded leaf-out by 1-2 wks

BUT adults can survive 1-2 wks without food

Eggs hatch in 1-2 weeks

Emerald ash borer life cycle

Larval period = rest of spring/summer/fall/early winter

Frass-packed galleries

Winding galleries

Pupate in Jan-Feb

Pupal chambers
EAB: What to look for

Declining/thinning crown  Epicormic sprouts

**EAB: What to look for**

- Cracking/swollen bark
- D-shaped holes
- Winding galleries under bark

**EAB: What to look for**

- Ash blanding
EAB: What to look for

Woodpecker activity

Good < 10%
Fair > 10% and < 30%
Poor or worse > 30% thinning

Early intervention is critical for saving an ash tree

EAB chemical control

**Systemic**
- Basal drench
- Trunk injections
- Trunk sprays

- Imidacloprid
- Dinotefuran

**Emamectin benzoate**
- Azadirachtin

EAB management in natural stands

**Biocontrol**

**Stand manipulation**
While EAB has been sort of a “slow burn”, ALB was much different...

ALB – found in SC in May 2020
Asian longhorned beetle  
(*Anoplophora glabripennis*)

Native to Asia  
Extremely wide host range (>220 spp.)  
Eradication efforts

Large, bluish feet  
White bands on antennae

ALB: where is it?
Egg niches

Bleeding at egg sites
Sawdust from larval feeding

Larval feeding damage
Adult exit hole

Larval feeding aka “swiss cheesing”

Larva “turned in”

Oviposition site and feeding by young larva in phloem

Pencil test!

Photo by Dr. Eric Benson, Clemson
Broken/falling branches

Egg niche

Exit hole
Adult feeding damage = negligible

Management
Prevent? Yes.
Save? No.

About 45,500 trees surveyed

~41,000 uninfested
~4,500 infested
~98% maple
<table>
<thead>
<tr>
<th>Common name</th>
<th>Latin name</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>American sycamore</td>
<td><em>Platanus occidentalis</em></td>
<td>0.03%</td>
</tr>
<tr>
<td>Willow</td>
<td><em>Salix sp.</em></td>
<td>0.38%</td>
</tr>
<tr>
<td>Black willow</td>
<td><em>Salix nigra</em></td>
<td>0.76%</td>
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<tr>
<td>Weeping willow</td>
<td><em>Salix babylonica</em></td>
<td>0.11%</td>
</tr>
<tr>
<td>Eastern cottonwood</td>
<td><em>Populus deltoides</em></td>
<td>0.14%</td>
</tr>
<tr>
<td>Red maple</td>
<td><em>Acer rubrum</em></td>
<td>97.49%</td>
</tr>
<tr>
<td>Boxelder maple</td>
<td><em>Acer negundo</em></td>
<td>0.03%</td>
</tr>
<tr>
<td>Silver maple</td>
<td><em>Acer saccharinum</em></td>
<td>0.25%</td>
</tr>
<tr>
<td>Sugar maple</td>
<td><em>Acer saccharum</em></td>
<td>0.16%</td>
</tr>
<tr>
<td>Elm</td>
<td><em>Ulmus sp.</em></td>
<td>0.33%</td>
</tr>
<tr>
<td>American elm</td>
<td><em>Ulmus americana</em></td>
<td>0.33%</td>
</tr>
</tbody>
</table>

**ALB: how did it get here?**

Genetics of first beetle matches Ohio population
ALB: how did it get here?

Genetics of first beetle matches Ohio population

(presented without comment)
ALB: how did it get here?

Could be from ALB’s native range

China and the Koreas

ALB: how did it get here?

Could be from Europe

ALB: how did it get here?

Port of Charleston ~20 miles
Port of Savannah ~90 miles

ALB: how did it get here?

RV park
ALB: how did it get here?

Railroad

ALB: how did it get here?

Tourism
Charleston, Hilton Head, Savannah...
Long story short: we don’t know the origin.

Is all hope lost?

Asian longhorned beetle

ALB can be eradicated!!
Eradication efforts are underway!

Spotted lanternfly  
(*Lycorma delicatula*)

Major pest of fruit trees & vines
Native to China, Bangladesh, Vietnam
Pennsylvania, 2014
Potential distribution of spotted lanternfly in the United States

Suitability

- Unsuitable (<0.06)
- Low (0.06 - 0.26)
- Medium (0.26 - 0.51)
- High (0.51 - 0.93)

Datum: North American 1983
Coordinate System: USA Contiguous
Albers Equal Area Conic

Adult forms can be seen as early as July.

The eggs are laid in the fall. Preferred host is the Tree of Heaven, *Ailanthus altissima*, but any smooth bark tree will do.

The nymphs have 4 instars and develop red spots in addition to the white spots exhibited in earlier instars.

Nymphs begin to hatch in late April to early May.
Strong preference for tree-of-heaven

So now what?
Host removal

Prevention, Prevention, Prevention
Questions?

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