Current insect problems; some old some new

Laura Jesse
Plant & Insect Diagnostic Clinic
Woodboring beetles

- **Family Buprestidae** (flatheaded borers, metallic woodboring beetles)
  - Two-lined chestnut borer
  - Emerald ash borer
- **Family Cerambycidae** (roundheaded borers, longhorned beetles)
  - Asian longhorned beetle
Two-lined Chestnut Borer

- Attack and kill stressed oaks
- Foliage wilts late in summer
## Late summer symptoms

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upper crown:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper crown:</td>
<td>No foliage</td>
<td>No foliage</td>
</tr>
<tr>
<td>Foliage wilted, brown</td>
<td>No foliage</td>
<td>No foliage</td>
</tr>
<tr>
<td>TLCB larvae common</td>
<td>No TLCB larvae</td>
<td>No TLCB larvae</td>
</tr>
<tr>
<td>TLCB galleries common</td>
<td>TLCB galleries common</td>
<td>TLCB galleries common</td>
</tr>
<tr>
<td>No TLCB exit holes</td>
<td>TLCB exit holes common</td>
<td>TLCB exit holes common</td>
</tr>
<tr>
<td>Other phloem borers rare</td>
<td>Other phloem borers common</td>
<td>Other phloem borers common</td>
</tr>
</tbody>
</table>

| **Lower crown:** | | |
| Foliage healthy, green | Foliage wilted, brown | No foliage |
| TLCB larvae rare | No TLCB larvae | No TLCB larvae |
| TLCB galleries rare | TLCB galleries common | TLCB galleries common |
| No TLCB exit holes | TLCB exit holes rare | TLCB exit holes common |
| No other phloem borers | Other phloem borers rare | Other phloem borers common |

| **Trunk:** | | |
| Foliage, if any, green | Foliage, if any, green | Foliage, if any, brown |
| No TLCB larvae | TLCB larvae rare | TLCB larvae common |
| No TLCB galleries | TLCB galleries rare | TLCB galleries common |
| No TLCB exit holes | No TLCB exit holes | TLCB exit holes rare |
| No other phloem borers | No other phloem borers | Other phloem borers rare |
Prevention & Cultural Controls

- Thin overstocked stands
  - Be careful not to damage remaining trees
- Harvest first overmature oaks and trees in poor health
- Felled oaks dry quickly killing developing larva – best to cut in mid-July
- Prune out branches with symptoms in late summer as soon as observed – burn, chip or bury
Emerald ash borer

- Attacks ash trees (white, black & green)
- Primary invader
- Healthy trees
Woodpecker activity
Epicormic shoots and woodpecker damage

• Are there S-shaped feeding galleries under the bark? Near top of tree.
S-shaped feeding galleries under the bark. Damage starts near top of tree.

Credit: M. H. Shour, ISU Extension
D-shaped exit holes (1/8\textsuperscript{th} inch)
EAB chemical control

- Systemic insecticides require time and active tree growth prior to adult EAB activity:
  - Soil treatments 4-8 weeks
  - Trunk 2-4 weeks
Homeowner EAB control

- Imidacloprid 1.47%
- Up to 25” circumference/8” diameter tree
- Pull back mulch 12” from base of tree
- Soil drench / ‘bucket method’ on tree’s root flare
- Early to mid-April every year
For trees larger than 8” diameter

- Treatment by commercial applicator
- Soil injection w/ imidacloprid
- Trunk spray w/ dinotefuran
- Trunk injection w/ imidacloprid, bidrin, or emamectin benzoate
What is Tree-age?

- Active ingredient emamectin benzoate
- Only EAB treatment effective for more than one year (up to 3 years?)
- Must be injected into tree via $\frac{1}{4}$ inch drilled holes; potential for injury to the tree
Monitoring
What’s the purpose of the Quarantine?

- The intent of the quarantine is to slow the artificial (human-assisted) movement of the EAB.
- Items that may have EAB are listed as “regulated articles” and their movement is restricted by the quarantine.
Regulated Articles

- Emerald Ash Borer in any living stage
- All species of hardwood firewood
- Ash nursery stock
- Green lumber and other material living, dead, cut, or fallen, including logs, stumps, roots, branches, and composted and uncomposted chips of the genus Fraxinus (ASH)
Mitigation

- Debarking + $\frac{1}{2}$" of wood removed
- Heat Treatment
- Kiln Sterilization
- Fumigation
Can Regulated Articles be moved from a quarantined area?

- Yes, with a “Certificate” or a “Limited Permit”
- A Certificate is issued when all of the quarantine conditions have been met, allowing the regulated articles to move freely to any destination.
- A Limited Permit is issued for regulated articles, that permits the movement to a limited or specific destination for specified handling, utilization, processing or treatment.
Compliance Agreements

- Initial visit from state regulatory agency and USDA to determine if a compliance agreement (CA) is appropriate
- Implement operating procedures of facility to accomplish all of the conditions of the CA
- Periodic visits by USDA and IDALS to monitor operations
Asian longhorned beetle

- *Anoplophora glabripennis*
- Native range: China and Korea
- 1-1.5 inches plus long antennae
- 1 year lifecycle
Host Range

- Preferred hosts
  - Maple (Norway, sugar, silver, red)
  - Boxelder
  - Horsechestnut
  - Buckeye
  - Elm
  - London plane
  - Birch
  - Willow
Timeline

1996 – New York – Brooklyn, Queens, Long Island
1998 – Chicago
2002 – New Jersey
2008 – New Jersey and Chicago infestations declared eradicated
2008 – Worcester, Massachusetts
2010 – Boston, Massachusetts
2011 – Bethel, Ohio
74 sq. miles
Worchester, MA

- Over 20,000 infested trees
- Over 30,000 trees removed
Worcester, MA
Found in Ohio June 2011

- Up to 6,740 trees infested and still counting
- Removes 4,684 trees to date
- Found by a citizen
Gypsy Moth

Notorious defoliating pest of the eastern hardwoods
Prefers oak of 300 species reported
Gypsy Moth Monitoring

4,000 to 7,000 traps in Iowa per year
Slow the Spread Program - STS

- Goal: slow the rate of natural spread of the gypsy moth by using IPM strategies.
- As a direct result of this program, spread has been dramatically reduced by more than 70% from the historical level of 13 miles per year to 3 miles per year.
Slow the Spread in Iowa

- Treatments
  - Mating disruption with pheromone flakes
  - Disrupt II™ and SPLAT™
  - $8 to $14 per acre (6 or 15 grams) used for low level outbreaks)
  - Aerial application in early June
  - We will wait and see what is the trap count
Forest Pests

- Quarantines
- Education
- Monitoring
- Nationwide limits of firewood movement are being discussed
- Encourage diversity when planting trees
Japanese beetle
Japanese Beetle Annual Cycle
Adult Japanese Beetle Management

- **Plant resistant hosts**
- **Do nothing**
  - Damage is cosmetic
- **Wait-and-see**
  - Plan on using sprays if necessary
- **Systemic insecticides**
  - Used prior to damage
  - Plants that are favorites
<table>
<thead>
<tr>
<th>Least Favored By Japanese Beetles</th>
<th>Most Favored by Japanese beetles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbovita e</td>
<td>American and English elm</td>
</tr>
<tr>
<td>Boxelder</td>
<td>Birch</td>
</tr>
<tr>
<td>Boxwood</td>
<td>Black walnut</td>
</tr>
<tr>
<td>Dogwood</td>
<td>Elm</td>
</tr>
<tr>
<td>Euonymus sp. (burning bush, etc.)</td>
<td>Grape</td>
</tr>
<tr>
<td>Hemlock</td>
<td>Hawthorn</td>
</tr>
<tr>
<td>Hickory</td>
<td>Hollyhock</td>
</tr>
<tr>
<td>Holly</td>
<td>Horse-chestnut</td>
</tr>
<tr>
<td>Juniper</td>
<td>Japanese and Norway maple</td>
</tr>
<tr>
<td>Lilac</td>
<td>Larch</td>
</tr>
<tr>
<td>Magnolia</td>
<td>Linden</td>
</tr>
<tr>
<td>Mulberry</td>
<td>London planetree</td>
</tr>
<tr>
<td>Northern red oak</td>
<td>Malus spp. (crabapple, apple etc.)</td>
</tr>
<tr>
<td>Pine</td>
<td>Mountain ash</td>
</tr>
<tr>
<td>Red and silver maples</td>
<td>Pin oak</td>
</tr>
<tr>
<td>Redbud</td>
<td>Prunus spp. (flowering cherry, etc.)</td>
</tr>
<tr>
<td>Spruce</td>
<td>Rose</td>
</tr>
<tr>
<td>Spruce (tuliptree)</td>
<td>Raspberry</td>
</tr>
<tr>
<td>Tulip poplar</td>
<td>Virginia creeper</td>
</tr>
<tr>
<td>Yew</td>
<td>Willow</td>
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</tbody>
</table>
Japanese Beetle Controls

- Spray
- Soil-applied systemic
- Non-food plants
Systemic insecticides

- Neonicotinoids
  - Imidacloprid and Dinotefuran
  - Effective when applied early
  - Soil vs trunk applications
    - Soil treatments result in very long residual effects - over a year
    - Annual use may be additive
Systemic insecticides

- Neonictinoids
  - Non-target effects
    - Secondary pest outbreaks especially spider mites
  - Pollinating insects
    - Impacts unclear
  - Recommend using dinotefuran immediately after bloom on trees like linden
Sprays

- Pyrethroids
  - Deltamethrin, cyfluthrin, bifenthrin provide good knockdown and residual activity even without full coverage
- Carbaryl
  - Good knockdown and residual activity
- Antifeedants
  - Azadirachtin
- Bioinsecticides
  - Pyola – short term protection
Japanese beetle traps

- Trapping adult beetles will not prevent damage to ornamentals and will not prevent damage to the turfgrass
**Japanese beetle traps**

- Attract too many beetles!

Collected in 1 hour!
Traps in Illinois

- Single day catch of 73,000 beetles
- One site had 300,000 beetles in a week
Invasive and Newly emerging pests

- Where do we go from here….
  - There will continue to be new introductions or host jumps
  - Climate change will affect disease and insects
  - We try to anticipate and monitor for potentially harmful pests
  - We educate ourselves and the public to watch for and report suspects
  - We increase pesticide use in our landscapes, on our crops, food and our homes
  - We learn to live with them
Thank you! Questions?

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