Detection & mitigation of new exotic insect species in Oregon’s forests

Wyatt Williams, Invasive Species Specialist

February 26, 2020
Exotic insects are still arriving in the U.S.

In U.S. forests:
- 2.5 exotic insect spp. arrive per year
- 1 new invasive species every 2 years

Blue = All exotic forest insects
Red = Invasive forest insects and disease

Aukema et al. 2010.
Multiple ways to detect insect species:

Plus... landowner & public reports
Spruce Aphid

- Introduced to OR in early 1900s
- 1950s: 20,000 acres damage in Coast Range
- 2019: Detected by aerial survey
Aerial survey of spruce aphid damage in NW OR, June 2019
Gypsy moth (GM)

- European & Asian subspecies
- 500+ host species, including DF
- Great tools for detection, eradication
2019 GM eradication - Corvallis

ODA is lead agency
- 4 GM detected in 2017
- 27 GM detected in 2018
- 2019 46-acre treatment area
- May, 2019, two treatments
- 3 GM detected in 2019

Oregon has 100% success rate eradicating GM since 1979
Emerald Ash Borer (EAB)

- First detected in U.S., 2002
- 100+ million trees killed in 30 states since 1990s
- Costs of $1.7 billion in U.S.
Emerald ash borer (EAB)

2002: one county in Michigan → 2020: >30 states
>95% mortality of ash in some counties
Oregon Ash – a widespread and common tree in Oregon, California, and Washington.
Oregon ash in riparian area
Ash seed for conservation & research

1. USFS Dorena Genetic Resource Center, Cottage Grove, OR
2. National Center for Genetic Resource Preservation, Fort Collins, CO
3. USDA-ARS National Plant Germplasm System, Ames, IA
Collecting ash seed for long-term storage

2019 Oregon ash seed sites

Legend
- red = complete
- green = partial
- circle = mother tree

1. Sauvie Island – Columbia River
2. JE Schroeder Seed Orchard
3. Baskett Slough Wildlife Refuge
4. OSU Soap Cr. – EE Wilson WA
5. Albany – interstate sloughs
6. North Santiam River
7. Siuslaw River – Mapleton
8. Fern Ridge Lake
9. Cow Creek – Riddle
10. South Cow Creek
11. Applegate River
12. Rogue River – JH Stone Nursery

2019 collection summary:
343,000 seeds from 103 mother trees across 12 populations

2019-2020 project goal:
1 million seeds from 300 mother trees across 30 populations
2016-2018 early detection survey

4 new exotic species detected

Clifton, OR
Longview, WA
Prescott
Scappoose
Sauvie Island
Railroad Bridge
Chinook Landing
Cascade Locks
Hood River
Rowena Ridge
Dallesport, WA

8 trap types per site
12 sites
8 sample periods, Apr-Sept
=768 samples per year
New exotic species #1

Longview, WA; June 15, 2017 (one specimen)
Native to eastern North America
First record on west Coast
Hosts: Oak, chestnut

Chrysobothris rugosiceps
(Cerambycidae)
New exotic species #2

Rooster Rock; 2017 and 2018 (over 50 individuals)
Native to Asia
First record in western North America
Hosts: Alder, maple, oak, chinkapin

*Cyclorhipidion pelliculosum*
(Curculionidae: Scolytinae)
New exotic species #2
Rooster Rock site

Cyclorhipidion pelliculosum (Curculionidae: Scolytinae)

Moving in firewood in NE U.S. since 1987. Pest status unknown
New exotic species #3

Chinook Landing; June 6, 2018 (1 specimen)
Native to Europe
First record in North America
Hosts: oak (and other hardwoods?)

*Xyleborus monographus*
(Curculionidae: Scolytinae)
New exotic species #3
New exotic species #3

Chinook Landing site
New exotic species #3

**Xyleborus monographus** (Fabr.)

- Recently established, Napa Co.
- Associated with oak damage
- Vectors *Raffaela montetyi*
- =Oak pinhole borer, *Platypus cylindrus*

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*Mycological Progress*

--- May 2004, Volume 3, Issue 2, pp 95–102 | [Cite as]

Identification of the ambrosia fungus of *Xyleborus monographus* and *X. dryographus* (Coleoptera: Curculionidae, Scolytinae)

Authors

Heiko Gebhardt, Dominik Begerow, Franz Oberwinkler

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Oregon Department of Agriculture
New exotic species #3

2019 delimitation trapping (ODA) → None were detected in 2019
Xyleborus monographus causing problems in CA
Xyleborus monographus causing problems in CA
Research underway to (1) identify fungal associates, (2) pathogenicity on white oak species, and (3) distribution of “California oak wilt” – Eskalen & Rizzo (UC-Davis)
New exotic species #4

Scappoose Airport; May 16, 2018 (1 specimen)
Native to Eurasia
First record in Oregon
Hosts: several hardwood genera

Trypodendron domesticum (Curculionidae: Scolytinae)

Oregon Department of Agriculture
Goal: Train professionals who work around trees how to identify key invasive forest pests

Early detection = better chance of eradication or containment
OFPD leadership

Amy Grotta, 1970-2019
OFPD Project Leader

Brandy Saffell
Former OFPD Coordinator

http://blogs.oregonstate.edu/treetopics/2020/02/07/remembering-amy/
OFPD online course

1 hour total:
1. Invasive species overview (13 min)
2. Emerald Ash borer (22 min)
3. Asian Longhorn beetle (15 min)
4. How to report (8 min)

For more information or to take the free class, http://pestdetector.forestry.oregonstate.edu/
Stats on the OFPD since 2015

<table>
<thead>
<tr>
<th>Oregon Forest Pest Detectors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># of students</td>
<td>552</td>
</tr>
<tr>
<td># of workshops</td>
<td>35</td>
</tr>
<tr>
<td># field courses installed</td>
<td>13</td>
</tr>
<tr>
<td># counties impacted</td>
<td>20</td>
</tr>
<tr>
<td># hotline reports</td>
<td>27</td>
</tr>
</tbody>
</table>
Oregon Forest Pest Detectors and the **Oregon Invasive Species Council** Hotline:

Have you seen something suspicious in your backyard or neighborhood? Are you having trouble identifying something you've found? Report potential invasive species you've found to the Online Hotline. Your submission will provide vital early detection information to the experts working to stop the next invasion before it starts!

- [Report Now](#)
- [Search Reports](#)
- [About the Hotline](#)

Help stop the spread of invasive species in Oregon
In 2019, Oregon Forest Pest Detectors report new exotic species! *Agrilus cyanescens*

Twinberry (*Lonicera involucrata*) with dieback
Prevention & early detection are key
Thank you for listening!

Wyatt Williams
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503-945-7472
Detection/mitigation is part of a sound IPM strategy

- Preventative Quarantines
- Weed laws
- Education
- Cultural Seed banking
- Planting timing
- Mixed stands
- Mechanical Cutting
- Fire
- Flooding
- Biological Insects
- Disease
- Grazing
- Chemical Pesticides
- Other Do nothing

IPM
Extra slides
Forestry: $5.2 billion GDP in Oregon
Let’s be ready for next invasive species
Chapter 634 Pesticide Control

634.650 (1) Definition of IPM:

“Integrated pest management” means a science-based decision-making process that (a) identifies and reduces risk from pests…(b) prevents unacceptable levels of pest damage…and poses the least possible risk to people, property, resources and the environment; and (c) focuses on the prevention of pests through a combination of techniques…

634.650 (2) Definition of Pest:

“Pest” means any animal, pathogen, plant, or similar organism which can cause disease or damage to crops, trees, shrubs, grasses, humans, animals or property.
Notorious invaders to Oregon’s forests

White pine blister rust
• Introduced 1910 in Oregon

Balsam woolly adelgid
• Introduced 1930 in Oregon

Port-Orford-cedar root disease
• Introduced 1952 in Oregon

Sudden oak death
• Detected 2001 in Oregon
## West side PNW exotic insect pests

<table>
<thead>
<tr>
<th>Insect</th>
<th>Guild</th>
<th>Status</th>
<th>Hosts</th>
</tr>
</thead>
<tbody>
<tr>
<td>BWA</td>
<td>Terminal</td>
<td>Established in PNW</td>
<td>True fir</td>
</tr>
<tr>
<td>Spruce aphid</td>
<td>Foliage</td>
<td>Established in PNW</td>
<td>Spruce</td>
</tr>
<tr>
<td>Gypsy moth</td>
<td>Foliage</td>
<td>Detected &amp; eradicated in PNW</td>
<td>Oak, conifers</td>
</tr>
<tr>
<td>EAB</td>
<td>Wood borer</td>
<td>Rapidly spreading across U.S.; not in PNW</td>
<td>True ash</td>
</tr>
<tr>
<td>ALB</td>
<td>Wood borer</td>
<td>Isolated populations in eastern U.S.</td>
<td>Maple, others</td>
</tr>
<tr>
<td>GSOF</td>
<td>Wood borer</td>
<td>In California</td>
<td>Oak</td>
</tr>
<tr>
<td>PSHB</td>
<td>Ambrosia</td>
<td>In California</td>
<td>Hardwoods</td>
</tr>
<tr>
<td>Ambrosia beetles</td>
<td>Ambrosia</td>
<td>Rapidly spreading across U.S.</td>
<td>Wood, all types</td>
</tr>
</tbody>
</table>
Planning for the inevitable

Oregon’s Plan for EAB, released May 2018:
http://www.OregonEAB.info/
Balsam Woolly Adelgid (BWA)

- Introduced in OR in 1930
- Hosts in PNW: True firs
  - Subalpine fir
  - Pacific Silver fir
  - Grand fir
- Attacks buds, terminal branches
- Causes gouting, mortality

Ladd Livingston, Idaho Dept of Lands, Bugwood.org
Invasive woodborer survey

STDP project:
“Improving Early Detection of Exotic Invasive Wood Boring Insects at High Risk Areas in Oregon and Washington”

Proposal submitted:
FY2015

Total amount awarded:
$90,000

Field work:
2016-2018
Traps/lures

1. UHR alpha-pinene, UHR ethanol (Scolytinae: bark beetles)
2. UHR ethanol (Scolytinae: ambrosia beetles)
3. Monochamus lure set (Cerambycidae: Monochamus spp.)
   (alpha-pinene, Ipsenol, Ipsdienol, Monochamol, Ethanol)
4. Exotic Ips lure set (Scolytinae: Ips typographus)
   (2-methy-3-buten-2-ol, cis-verbenol, Ipsdienol)
5. Oak pinhole lure set (Curculionidae: Platypodinae: Platypus cylindrus) (leaf alchol, ethyl alcohol, sulcatol, sulcatone)
6. Pine shoot beetle lure set (Scolytinae: Tomicus piniperda)
   ((-) alpha-pinene, trans-verbenol, myrtenol)
7. Control (no lure)
8. Green leaf volatiles (Buprestidae) (Z-3-hexenol, Manuka oil)

Traps 1-7: black funnel; Trap 8: green funnel
# 2016-2017 Results – species richness

<table>
<thead>
<tr>
<th>Family</th>
<th>Native</th>
<th>Exotic</th>
<th>Total</th>
<th>% total</th>
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<tbody>
<tr>
<td>Buprestidae</td>
<td>26</td>
<td>3</td>
<td>29</td>
<td>14.9</td>
</tr>
<tr>
<td>Cerambycidae</td>
<td>83</td>
<td>4</td>
<td>87</td>
<td>44.8</td>
</tr>
<tr>
<td>Platypodinae</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Scolytinae</td>
<td>55</td>
<td>15</td>
<td>70</td>
<td>36.1</td>
</tr>
<tr>
<td>Siricidae</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>3.1</td>
</tr>
<tr>
<td>Xiphydriidae</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>170</td>
<td>24</td>
<td>194</td>
<td>--</td>
</tr>
<tr>
<td><strong>% total</strong></td>
<td>87.6</td>
<td>12.4</td>
<td>--</td>
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</tr>
</tbody>
</table>

4 new exotic species detected 2016-2018
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Authors: Heiko Gebhardt, Dominik Begerow, Franz Oberwinkler

Integrated Oak Timber Protection from Ambrosia Bark Beetles: Economic and Ecological Importance in Harvesting Operations

Milivoj Franjević, Tomislav Poršinsky, Andreja Duka

“*Xyleborus dispar, Xyleborus monographus, Xyleborus saxesenii*...cause damage to oak roundwood” in Croatia.

*Xyleborus monographus*: Potential hardwood pest?
Laurel Wilt (*Raffaela lauricola*)

- Another exotic *Raffaela*...
- Vectored by ambrosia beetle...
- First detected, 2002, GA
Ambrosia beetles

Fungus farmers

Sometimes the fungus is pathogenic