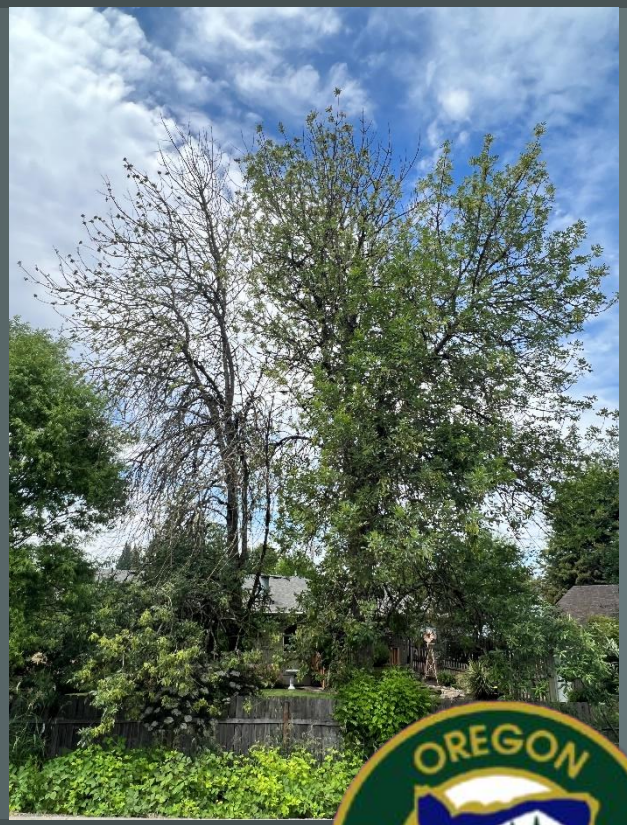
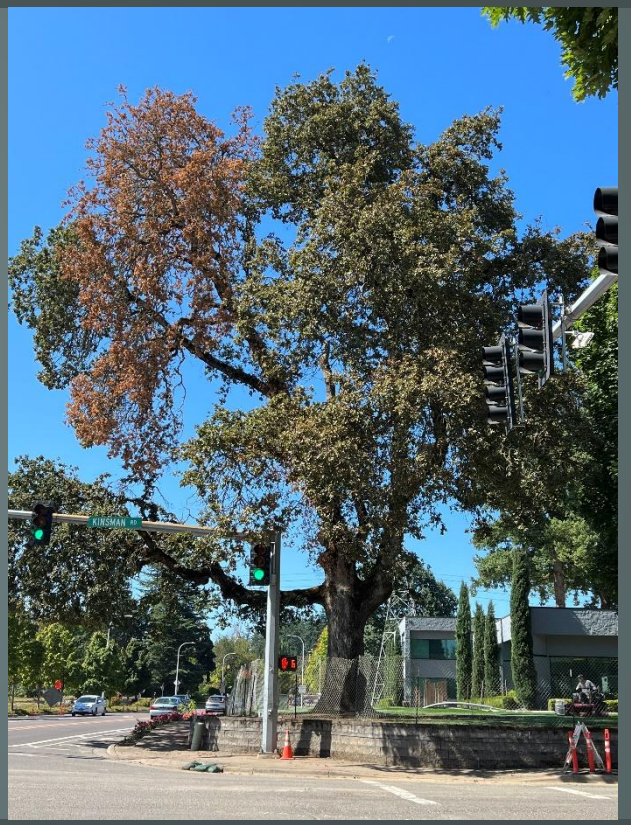
Invasive insects of concern for PNW trees





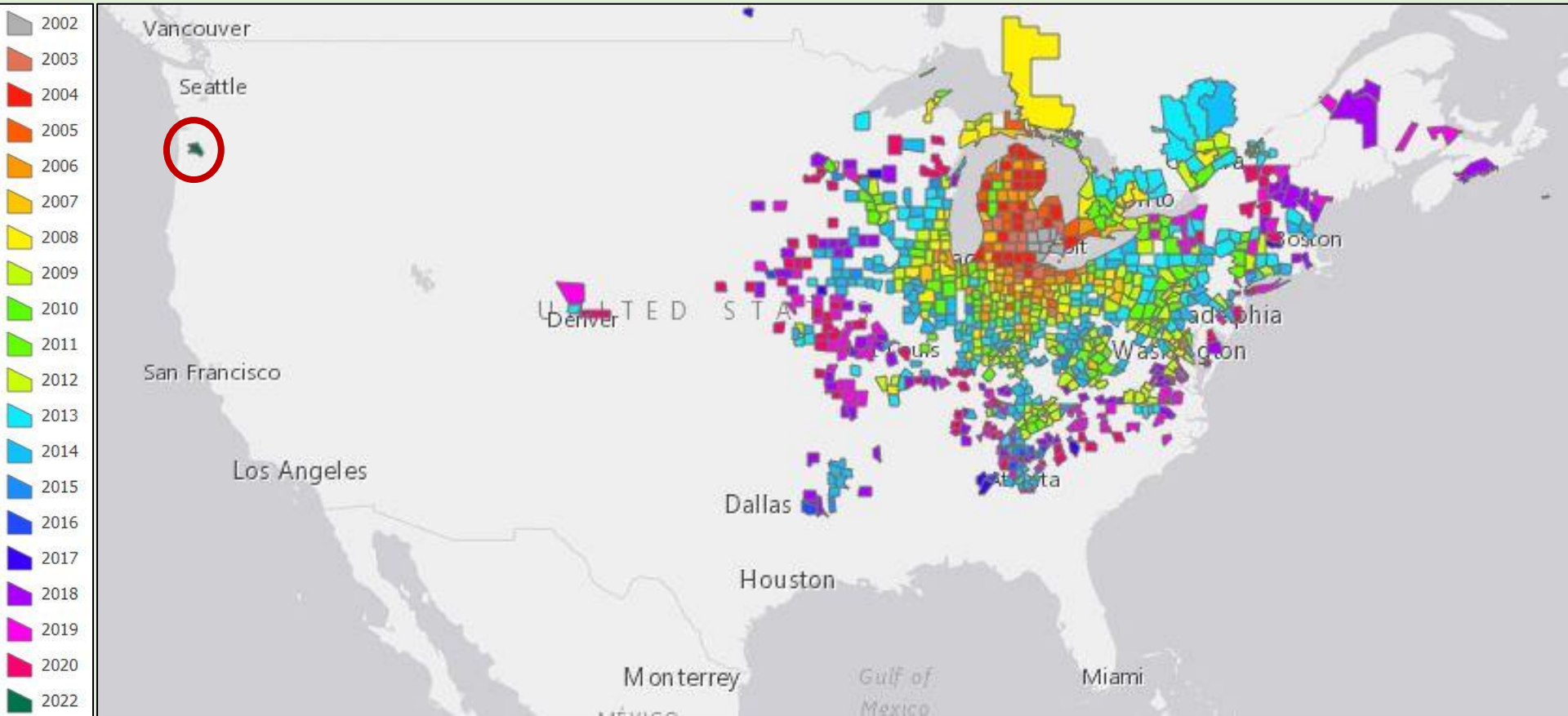
Lilah Gonen
Community Assistance Forester, ODF

Emerald Ash Borer (EAB)

EAB detected in Forest Grove, OR
June 30, 2022

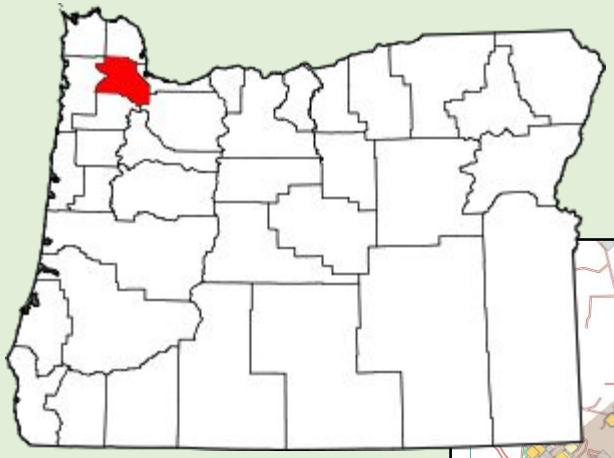
EAB presence in the U.S.

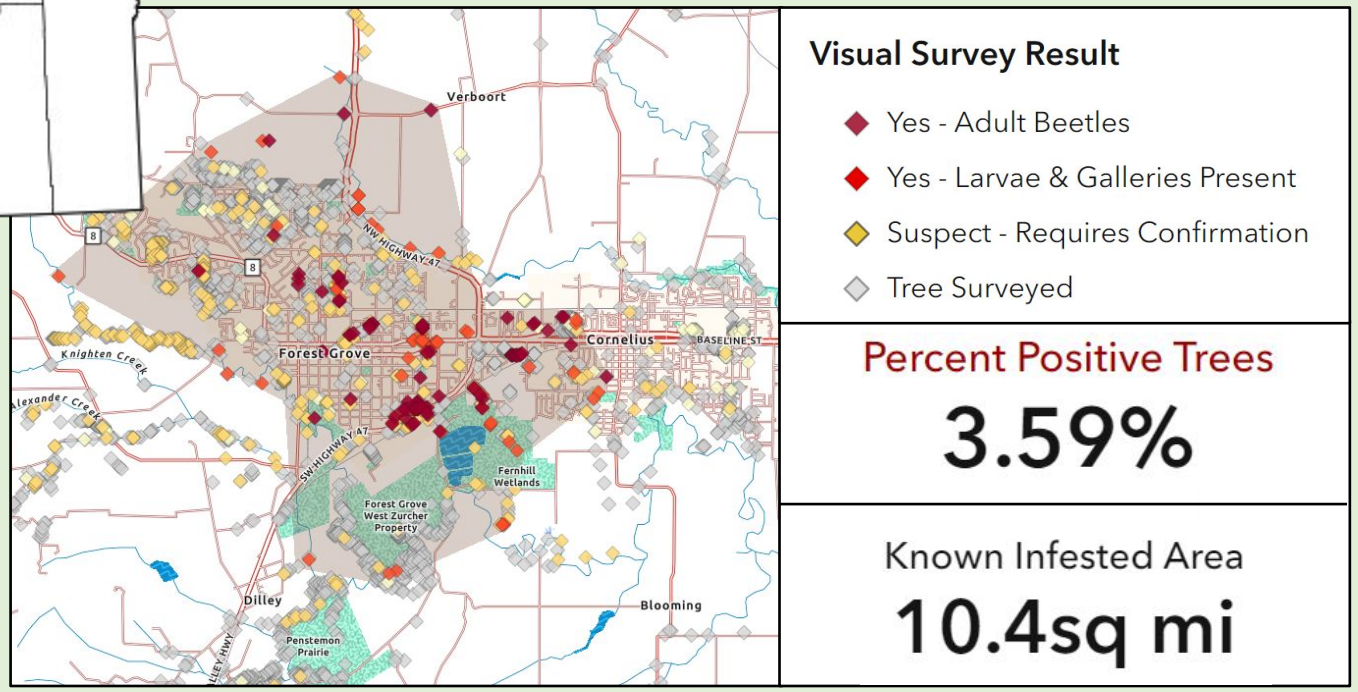
- 2002: Detected in US (Michigan)
- 2013: Jumped quarantine and detected in Colorado
- 2019: Detected in 33 states (as of 2024 in 36 states)
- 2022: Detected in Oregon (first detection on the West Coast)



Current Distribution in Oregon

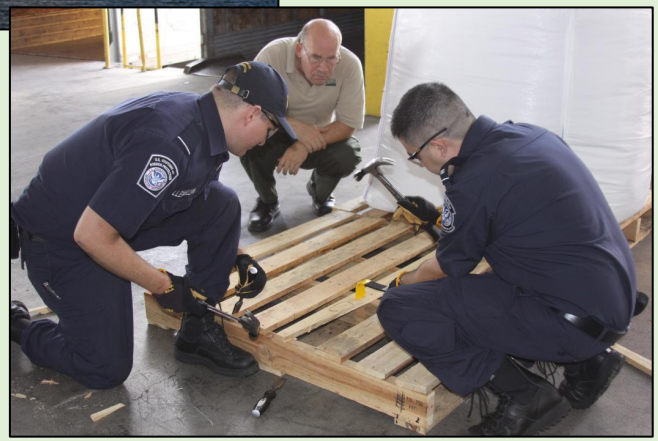
- Location: Forest Grove, Washington County
- Area known to be infested with EAB: 10.4 sq. mi.
- View infestation dashboard





Pathways

- Untreated wood imports
- Firewood (don’t move >10 miles)
- Nurseries



Damage

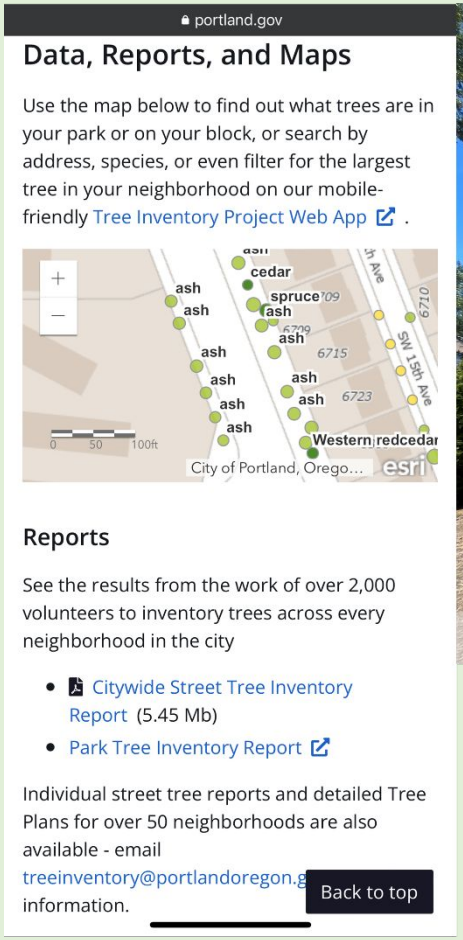
- >95% ash mortality in some counties
- 100+ million trees killed in 30+ states since 1990s
- Never successfully eradicated
- High economic, ecological, and public health costs

TOLEDO STREET BEFORE AND AFTER EMERALD ASH BORER

BEFORE: JUNE 2006 PHOTO COURTESY OF DAN HERMS, OSU **AFTER: AUGUST 2009**

Portland street tree example

- 4.8% (or 72,000) tree trees are ash
- *$49M total cost for removal and replacement*



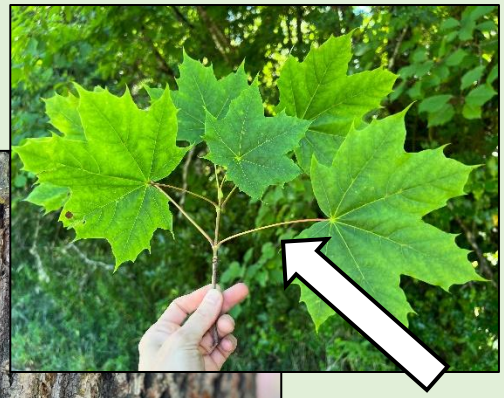
Oregon ash

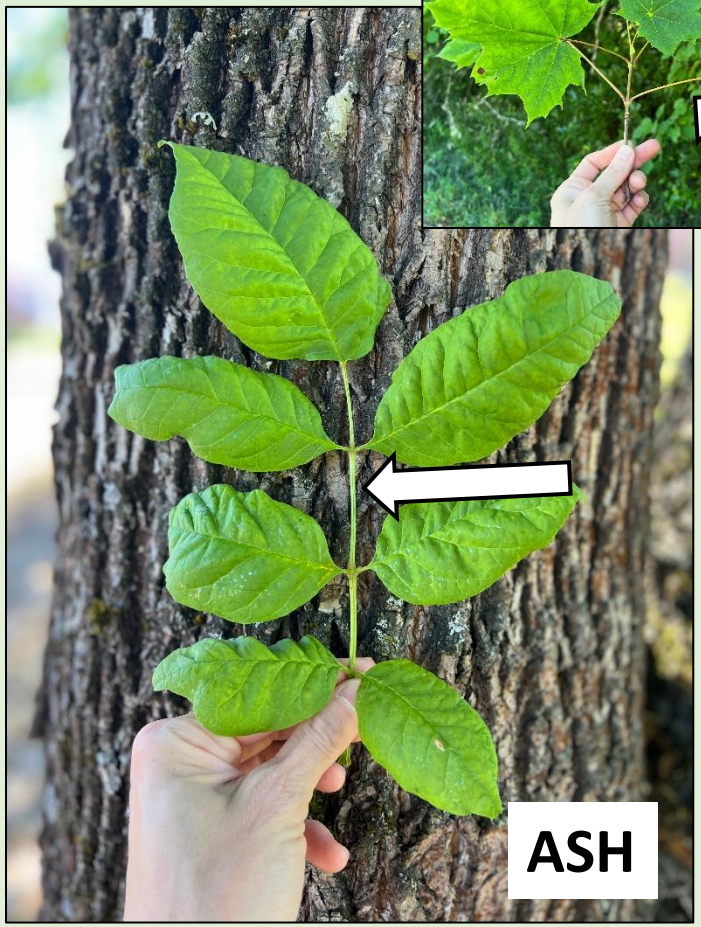
(*Fraxinus latifolia*)

- Oregon's only native ash tree
- Important riparian & wetland tree
- Shading, bank stabilization
- Habitat for T&E species
- Wood products
- Cultural resource

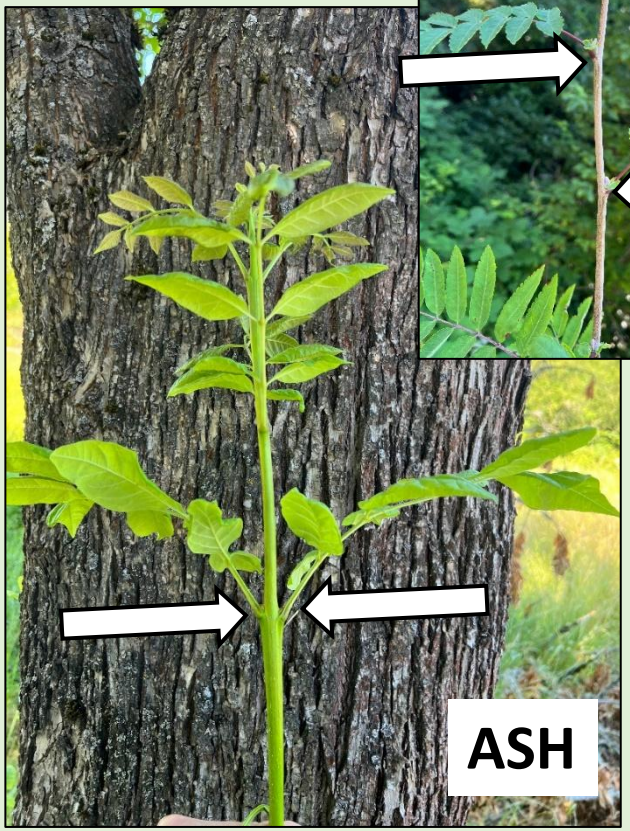
Ash ID

Pinnately compound leaves





Branches opposite instead of alternating



Single-winged seed pod (samara)

Diamond-shaped bark on most older trees

EAB

(*Agrilus planipennis*)

- Native to eastern Asia
- Woodboring type beetle (doesn't go deep)
- Larvae girdle trees
- Prefers ash, can also infest other members of *Oleaceae*

EAB life cycle
1-2 years

Pupae become adults

(May-June)

Adults emerge, mate, lays eggs on outer bark

(May-July)

Eggs hatch, larvae enter tree, and create feeding tunnels as they go through 4 molts

(June-Sept.)

Larvae become pre-pupae and overwinter in sapwood or bark

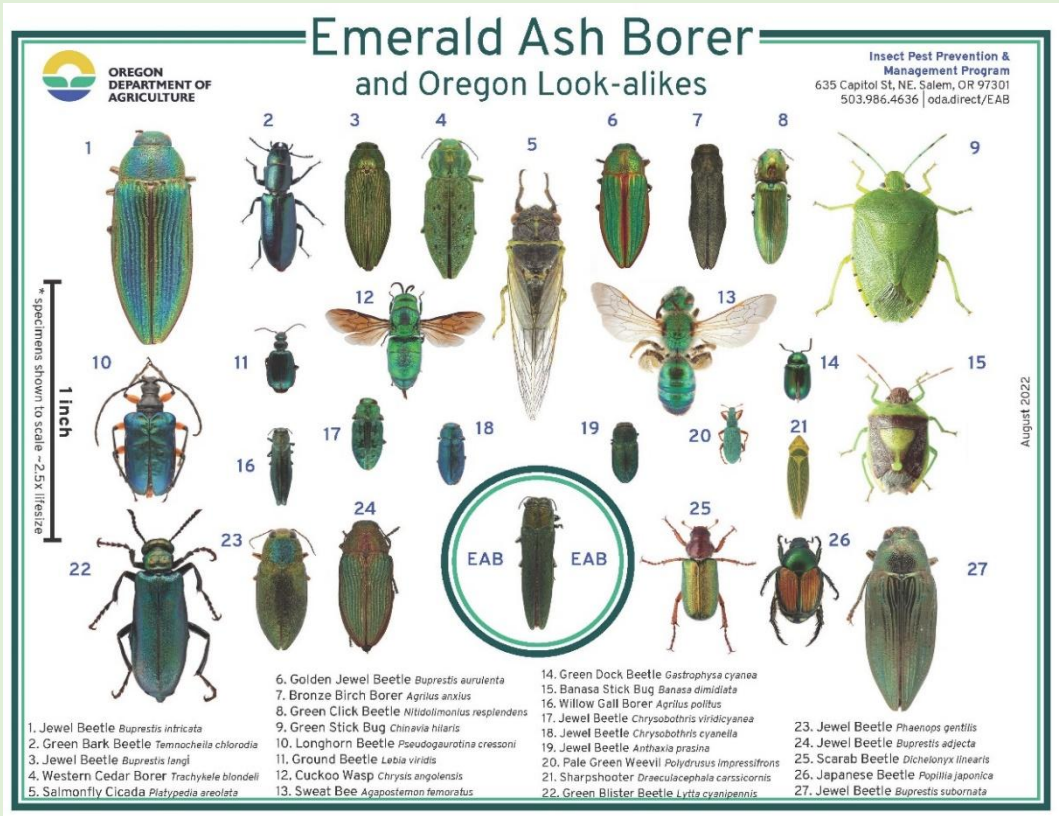
(Oct.-April)

Pre-pupae fold and become pupae

(May)

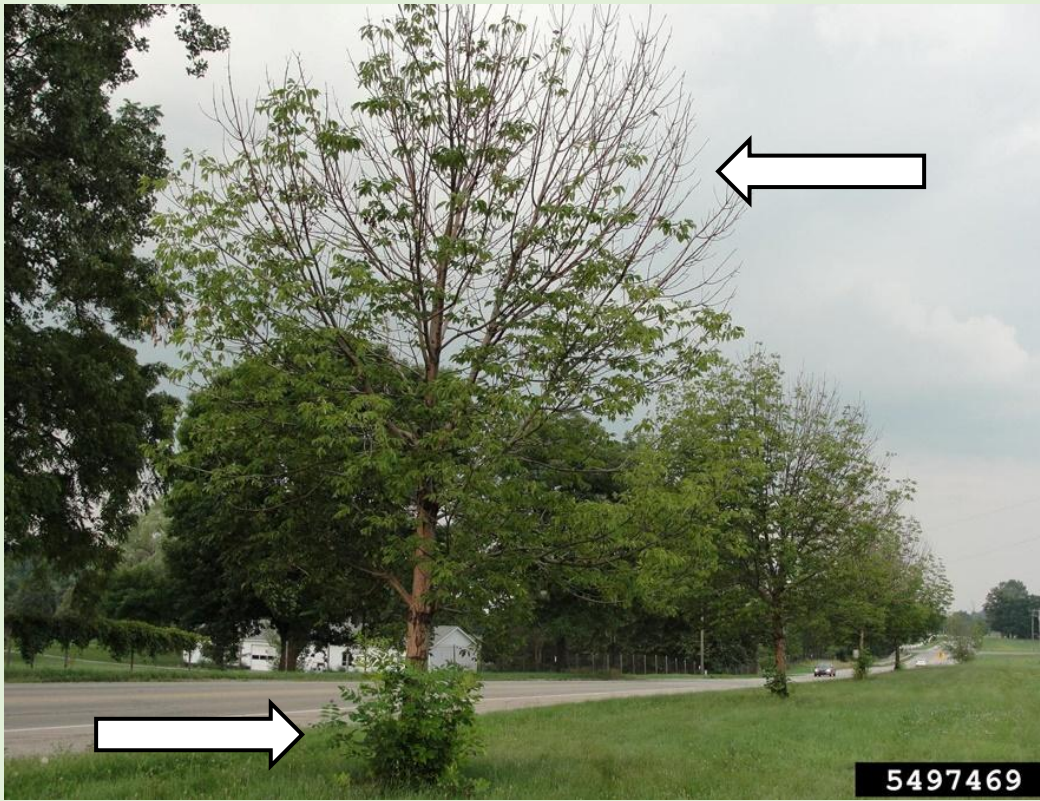
What does EAB look like?

- Slender, approx. ½” long
- <u>All</u> green
- No lines or sculpturing on “back”

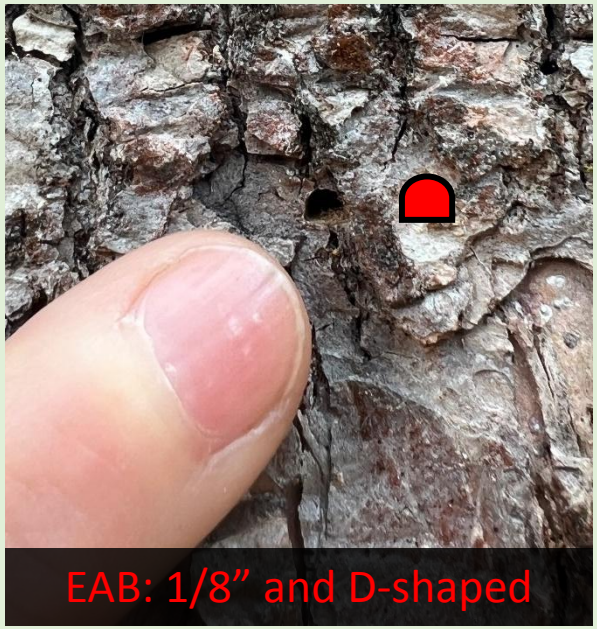


EAB Signs & Symptoms

- Canopy decline
- Epicormic shoots
- Woodpecker flecking ★
- Bark splits
- Larval galleries
- D-shaped exit holes



ID EAB exit holes

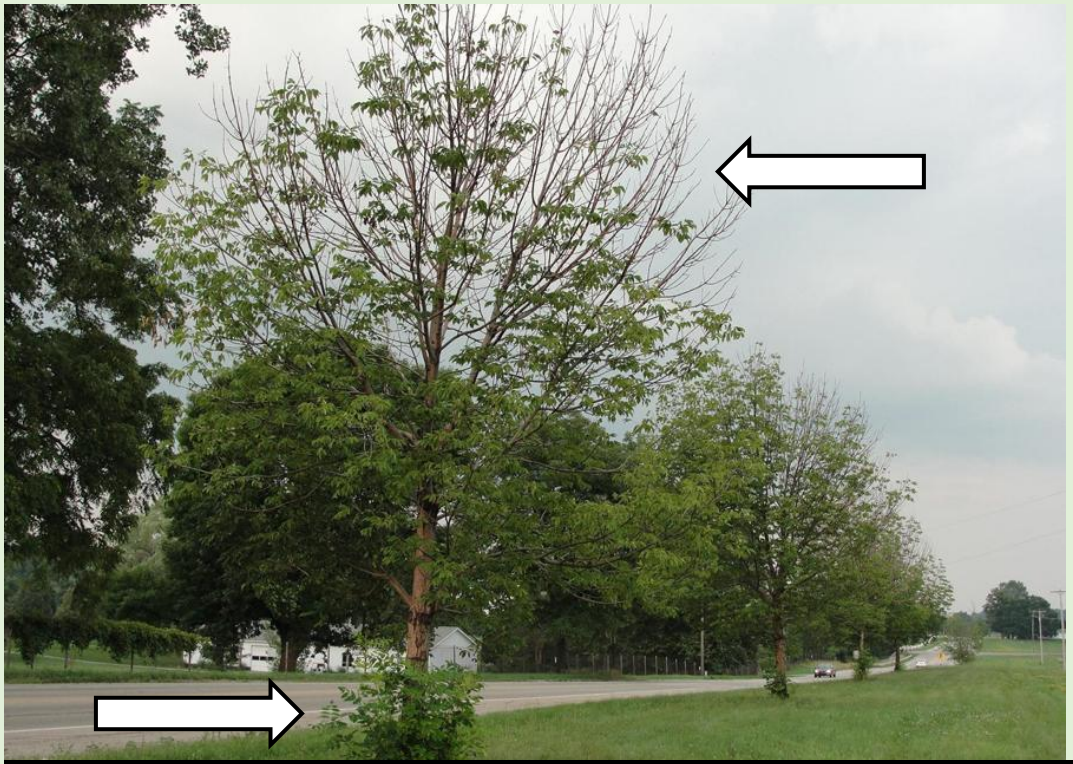


Woodpeckers

Other woodborers

Reporting infestations

- Oregon Invasives Species Hotline
- Washington Invasive Species Council



Look for symptoms of damage + signs of insect

Management Strategies

Be Proactive

- Inventory and monitor ash trees
- Healthy ash trees will die *less quickly*
- Avoid planting ash
- Systemic insecticides
- Don't move wood more than 10 miles

Treatment of Downed Wood

- Chip or masticate < 1"
- Kiln-dry (70 min. at 60°C core temp)
- Incinerate
- Let sit for 2+ years

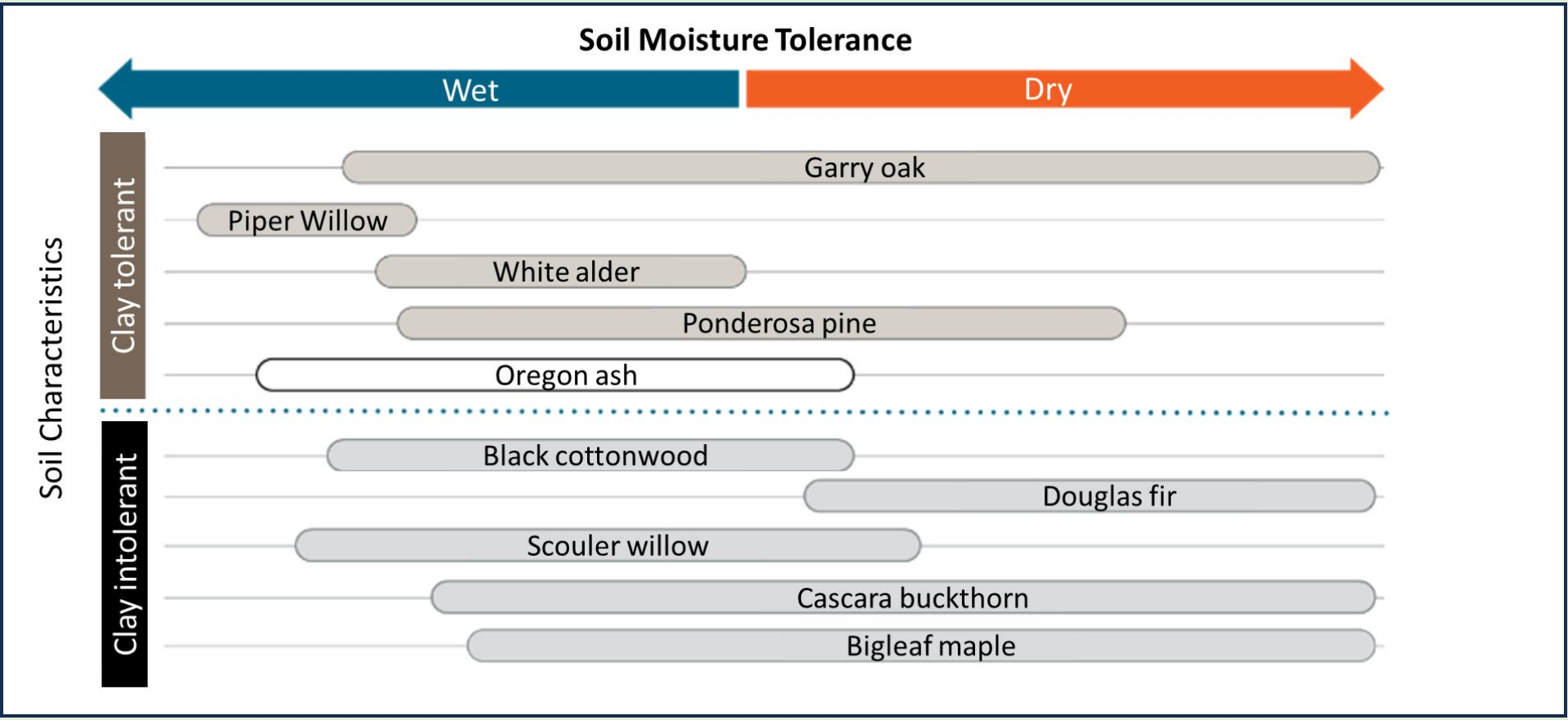
Management recommendations:
https://extension.oregonstate.edu/forests/cutting-selling/what-do-about-emerald-ash-borer-recommendations-tree-protection-eab

Preventative insecticides

- Most effective: Systemic injections of ***emamectin benzoate*** at the lowest dose every 2-3 years
- Advised in large, healthy trees (DBH > 6”, canopy dieback < 30%)
- Pesticide applicator license required in Oregon
- Low off-target risk
- EAB Insecticide Factsheet

(Sadof et al., 2023.)

Native ash alternatives



***Preventative ash removal is not suggested ***

Adapted from Kral & Shaw 2023

Multiagency Efforts

1) 2018 & 2021 EAB Response Plan
2) 2019-2022 Ash seed collection (genetic conservation & resistance)
3) Monitoring (traps, ground observations, remote sensing)
4) Training & outreach (OR Forest Pest Detectors, multimedia press)
5) Permanent quarantine around Washington County
6) SLAM (slow the spread strategies to reduce populations) has been very effective!
7) Biocontrol agents being established

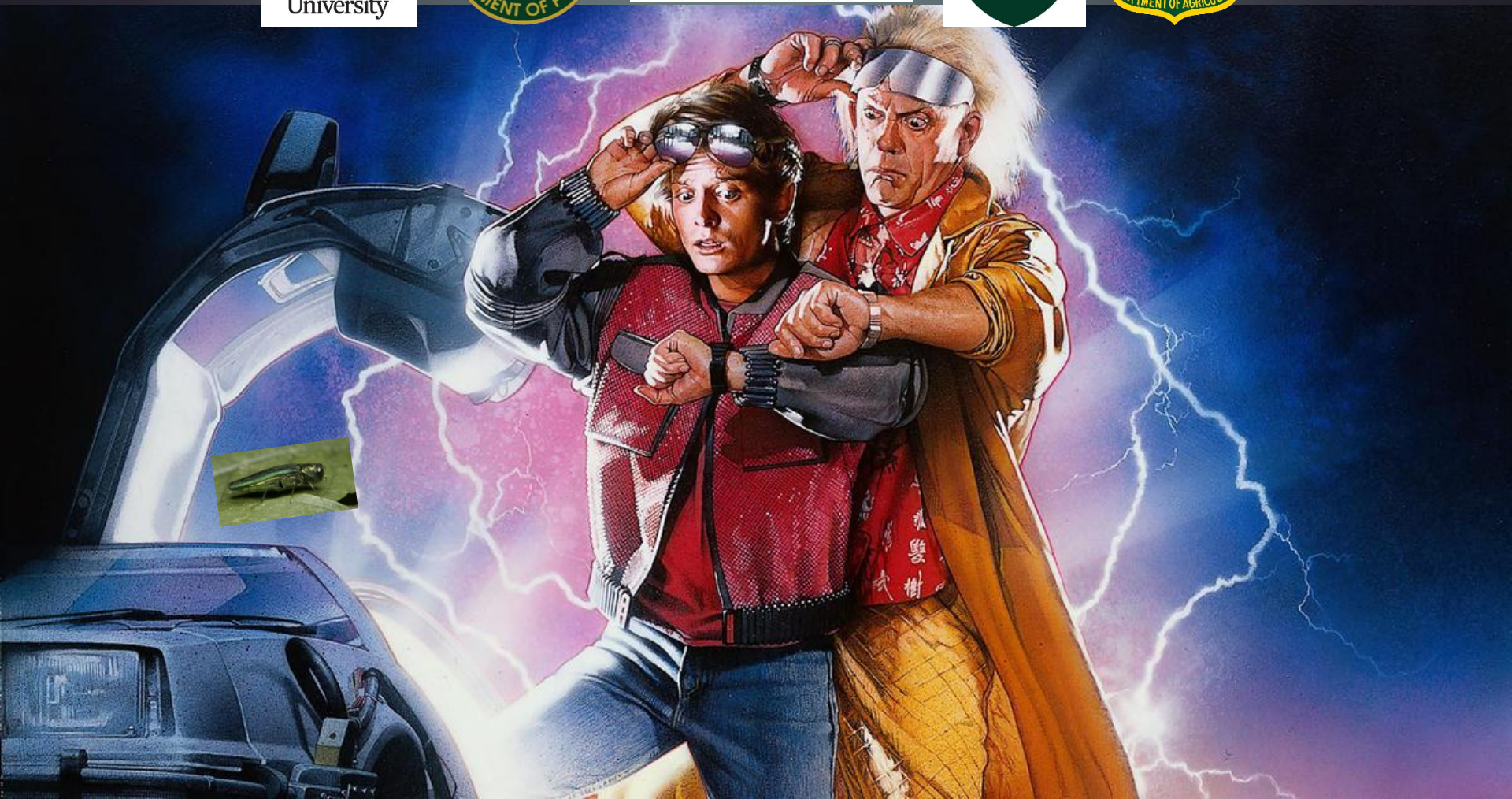



EAB resources

- Report potential EAB insects or infestations (view EAB look-alikes!)
- Washington County EAB quarantine
- EAB Look-alikes
- Take stock of your ash and monitor for damage
- Current infestation in Oregon
- EAB management guidance
- EAB fact sheet
- Alternatives to ash in western Oregon
- EAB Insecticides
- EAB Insecticide Fact Sheet
- Oregon's EAB response plan
- Oregon Forest Pest Detector training

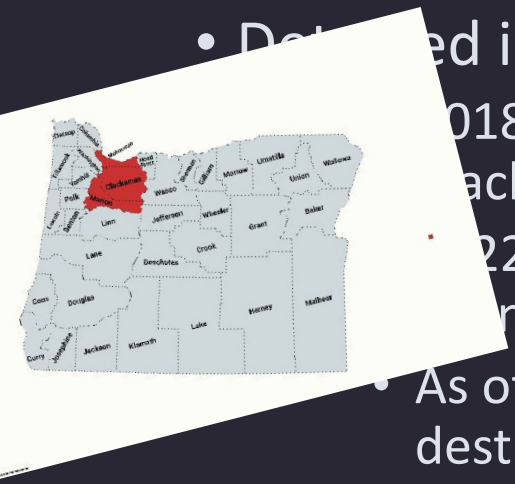
Mediterranean Oak Borer (MOB)

The good news is…we've done this before!



Distribution

- Native to Europe, N. Africa, Middle East
- Detected in Napa, CA 2017 (present since 2010s)
- D[illegible]ed in Oregon,
  - 018-2022: adults found in traps in Multnomah, ackamas, Marion, Washington counties
  - 22: infested trees found in Clackamas and Multnomah nties
  - As of 2024: Multnomah and many Clackamas county trees destroyed, ~30 infested trees present in Wilsonville

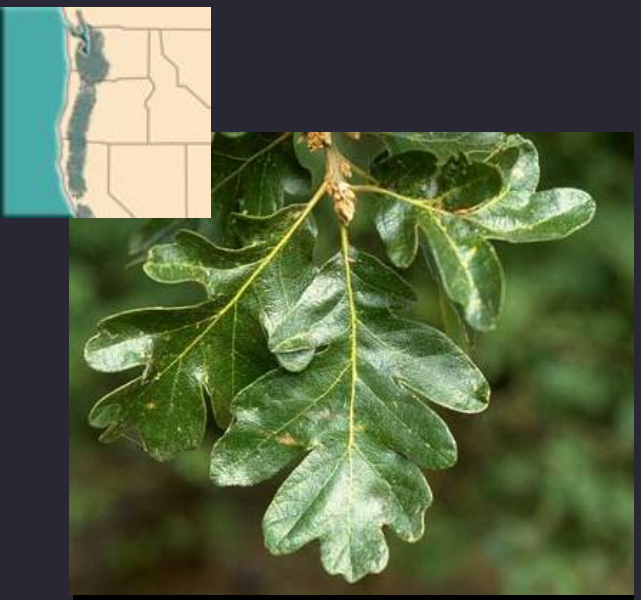


So far, DNA indicates that the OR population of MOB is from German and not of the same origin as the populations in CA

MOB biology
(*Xyleborus monographus*)

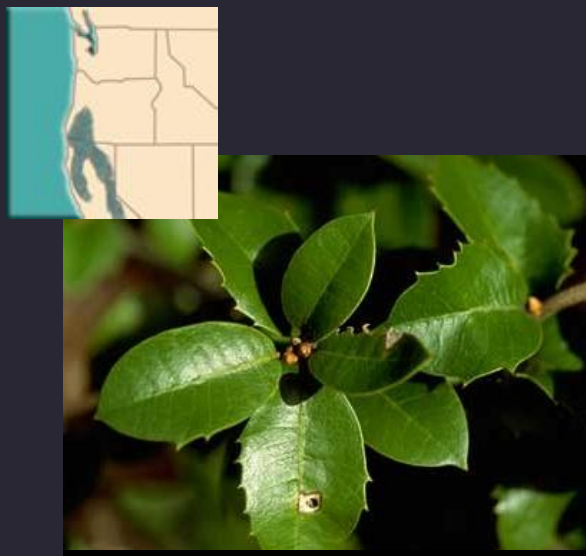
- Attacks oaks (white and red sections of *Quercus*)
- Woodboring ambrosia beetle that feeds on fungus <u>not wood</u>
- Vectors fungi in sapwood that cause vascular wilt in oaks
- Females are active and flying for most of the year
- 2-3 generations estimated for Oregon
- Very cold-tolerant, active for much of the year

Oregon oaks



Oregon white oak
(*Quercus garryana*)
white Quercus section

California black oak
(*Q. kelloggii*)
red Quercus section



Canyon live oak
(*Q. chrysolepis*)
Intermed. Quercus section

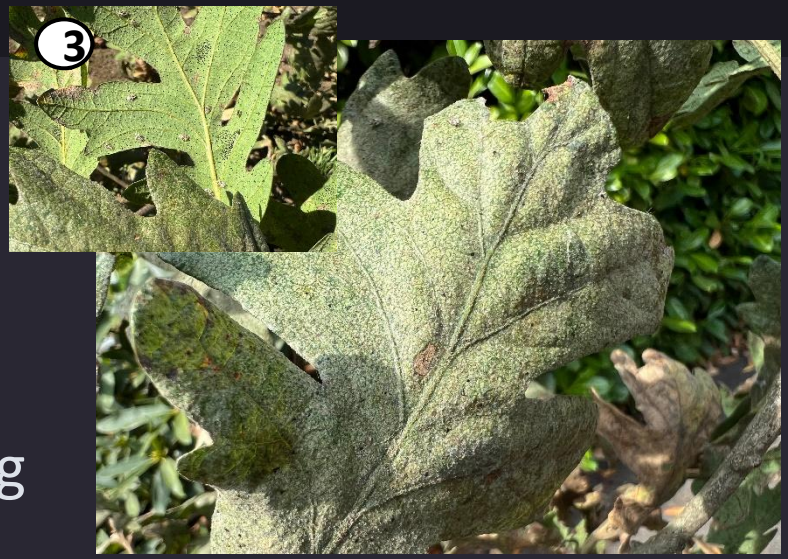
MOB diagnosis

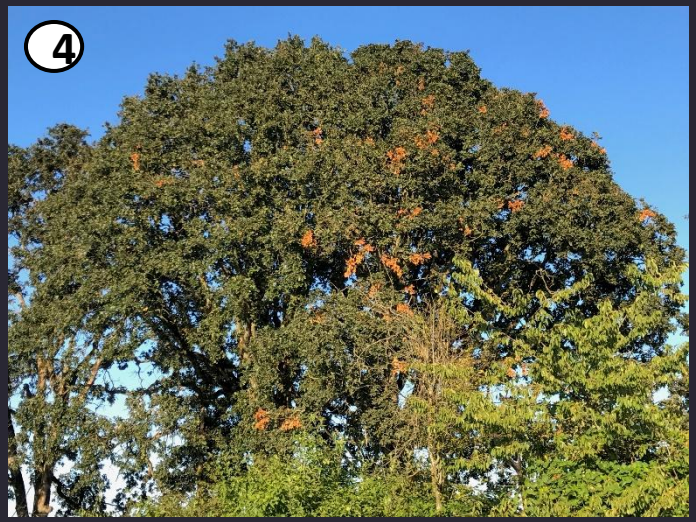
Dieback of a section of crown such as a whole branch

- Pale boring dust (frass)
- (1/16”) tiny round holes
- Black-stained branched galleries cutting across sapwood

Non-MOB issues in oak

1. Storm breakage
2. Fungal conks
3. Oak lacebug
4. Galls + squirrels
5. Other woodboring beetles, including native ambrosias
6. Carpenterworm
7. Woodpeckers





MOB management

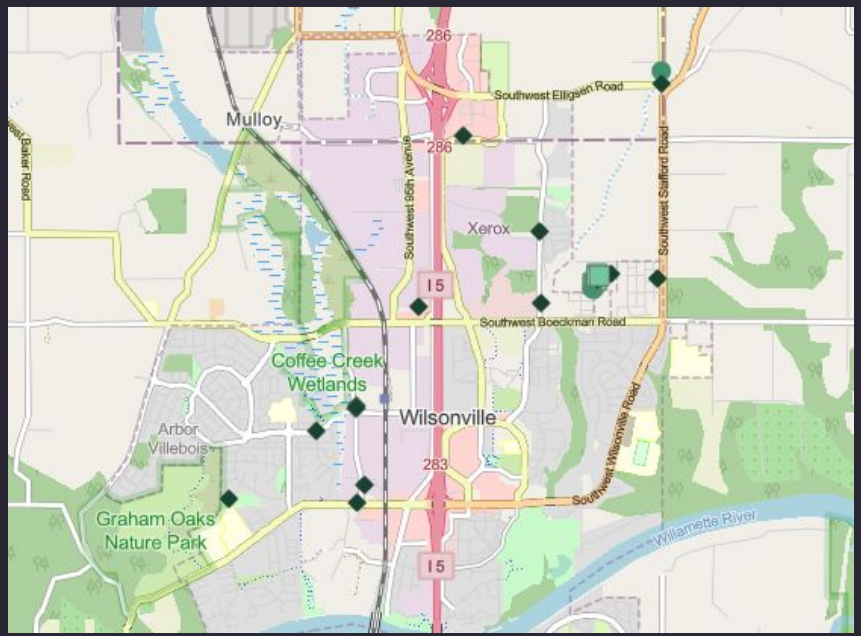
- Promote oak tree health

  Monthly slow, deep watering during hottest summer months:
  https://www.oregon.gov/odf/Documents/forestbenefits/watering-fact-sheet.pdf
- Preventative removal not advised
- Cut infested trees to the ground and chip/burn onsite
- Cover and transport to incinerator
- Sterilize equipment: 70% ETOH, 5% Bleach, Oxidate (hydrogen peroxide), or Lysol
- *Efficacy being tested:*
  - *Insecticide + fungicide*
  - *Volatile repellants*
  - *Attract with baited traps*
  - *Covering fully with thick, clear, plastic tarp (for how long?)*
  - *Pathogen spread via roots or chip?*

…Much to be learned, more guidance to follow

Current infestation

- Infestations detected in Wilsonville only so far
- ~30 trees infested trees have been detected
- In 2024 we will enhance trapping to:
  - Determine spread and introduction pathways
  - Determine emergence timing
  - Find potential parasitoids



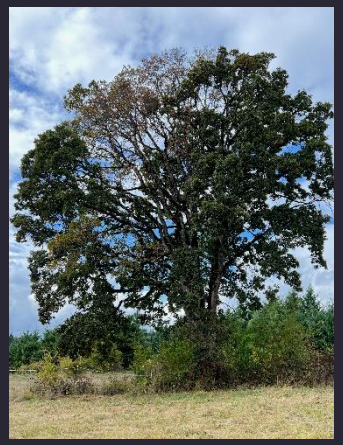
Reporting infestations

Dieback of a section of crown such as a whole branch

- Pale boring dust (frass)
- (1/16”) tiny round holes
- Black-stained branched galleries cutting across sapwood

MOB resources

1. ODF factsheet: https://tinyurl.com/MOB-oregon
2. Other oak pests: https://www.oregon.gov/odf/Documents/forestbenefits/oak-pests.pdf
3. Press release: https://www.oregon.gov/odf/forestbenefits/Documents/news-release-mediterranean-oak-borer.pdf
4. Invasive hotline reporting: https://oregoninvasiveshotline.org/reports/create
5. MOB infestation map: https://oda.fyi/MOBMap



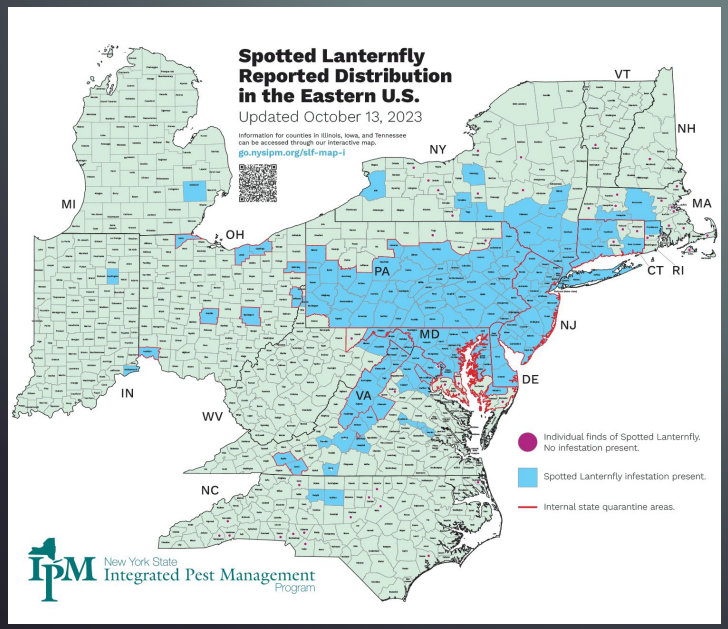


Spongy moth
(prev. gypsy moth)

- Feeds on hundreds of species
- Comes readily to monitoring traps
- Oregon traps for this insect annually
- Each introduction to Oregon has been successfully eradicated

Spotted lanternfly

- Not yet detected in Oregon
- Mainly attacks orchard and other agricultural species
- New evidence indicates they may not be that damaging to hardwoods *(Hoover et al. 2023)*



Thank you!

Lilah Gonen
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