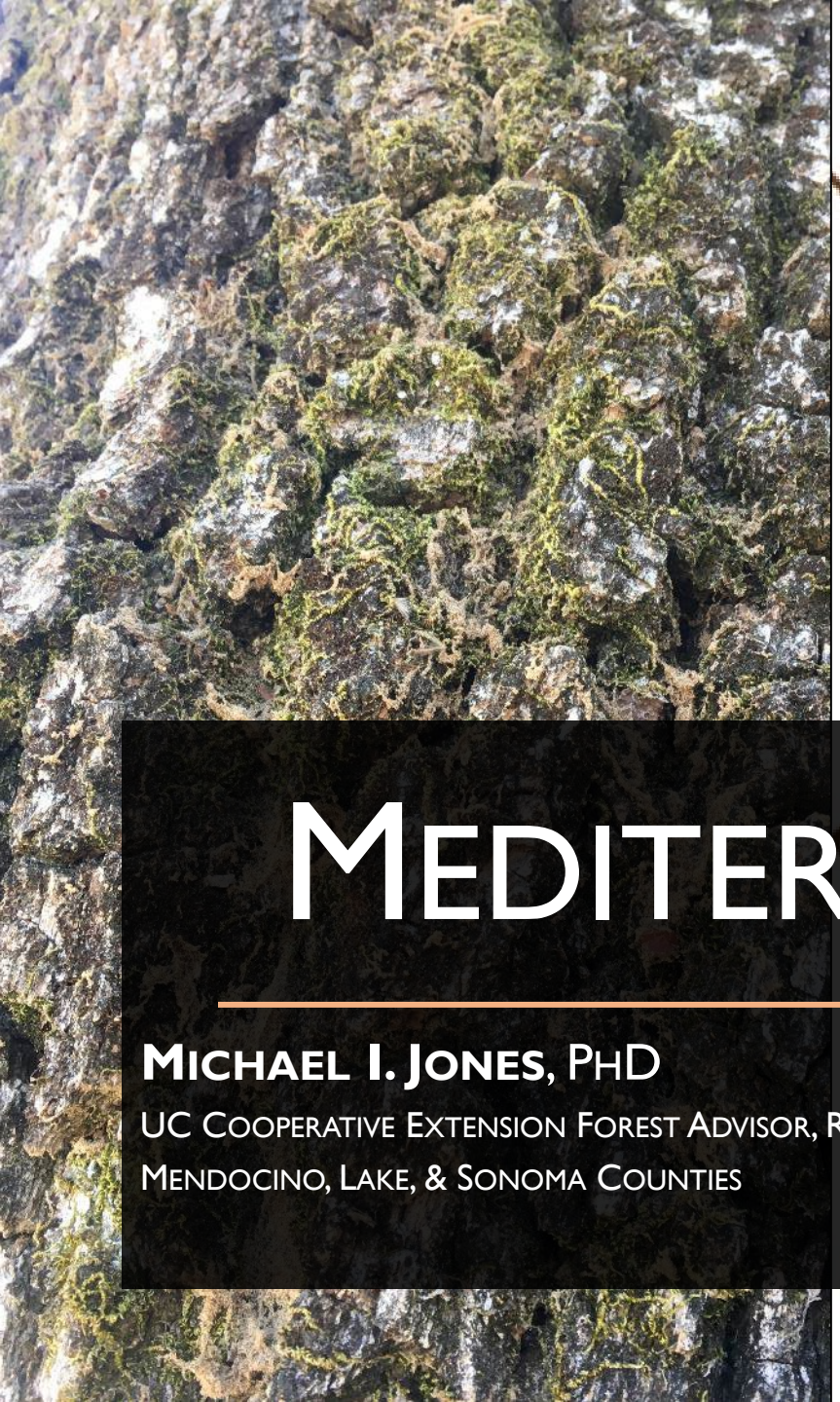
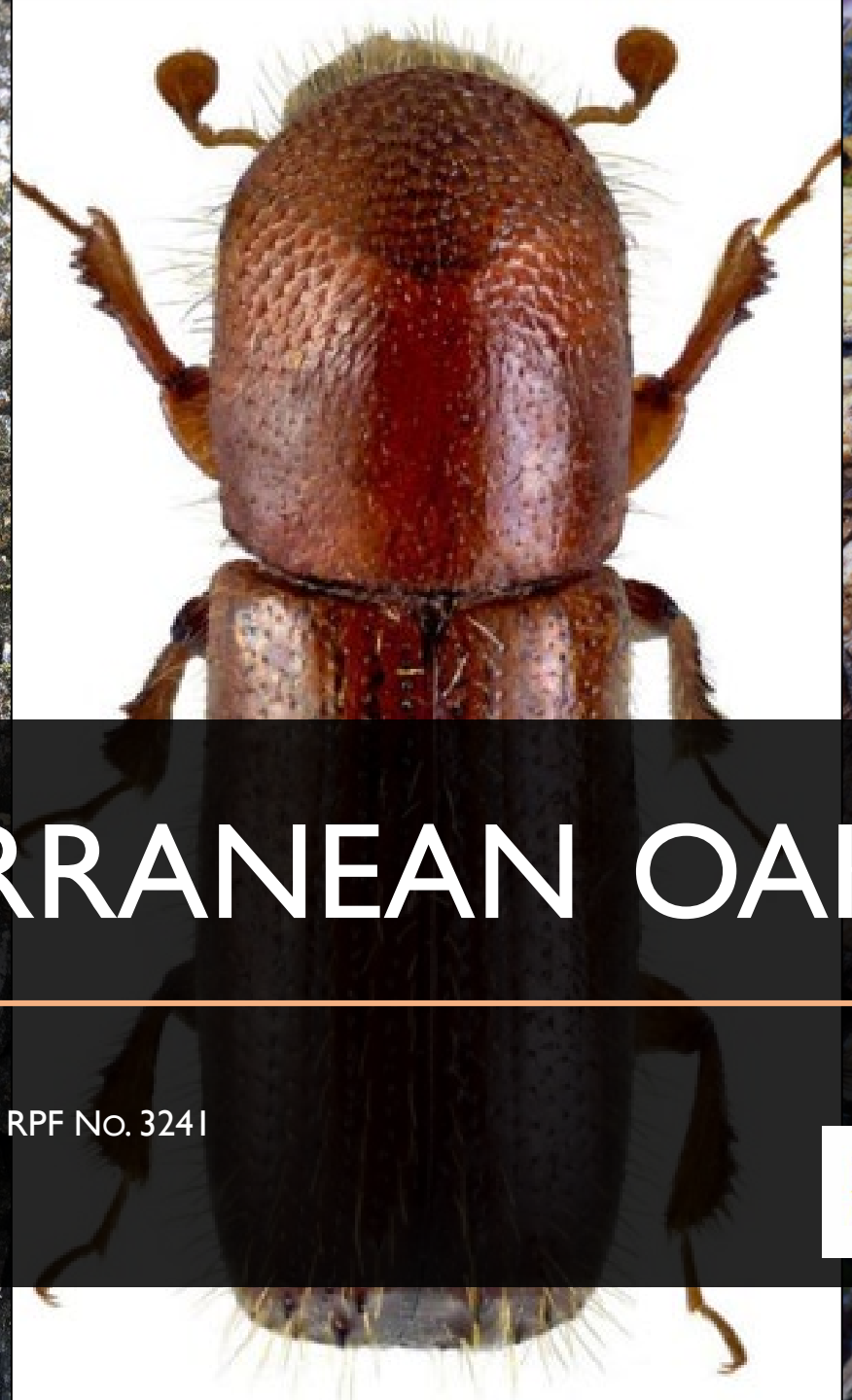


MEDITERRANEAN OAK BORER

MICHAEL I. JONES, PHD
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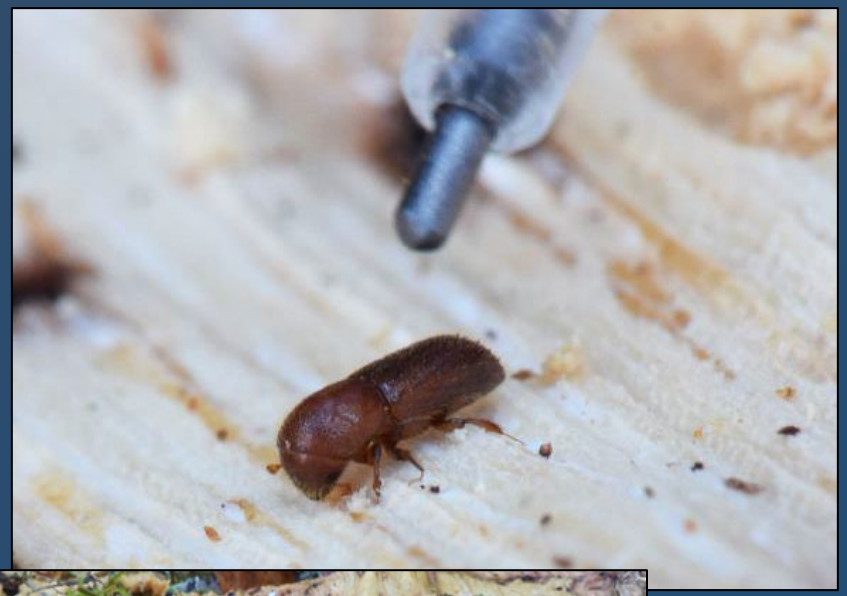
MENDOCINO, LAKE, & SONOMA COUNTIES

UC CE | UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources | Cooperative Extension

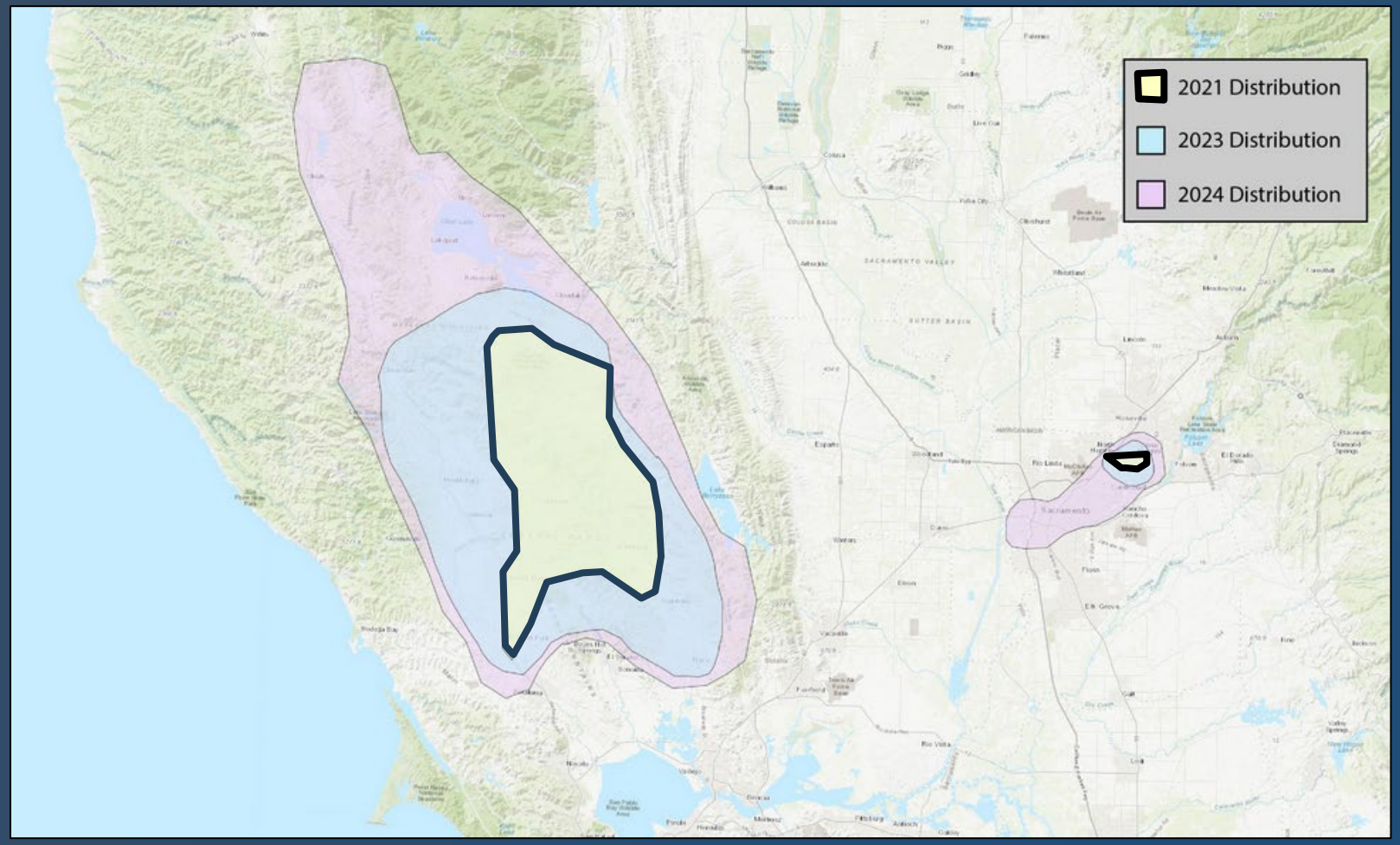
The Insect - "MOB"

- *Xyleborus monographus*
  - Ambrosia beetle native to the Mediterranean region
    - Symbiotic ambrosia fungi (*Raffaelea montetyi*)
      - Plus others (*Fusarium* spp)
    - Farm fungi that break down lignin and cellulose
  - Hosts: White Oaks (*Quercus* spp.)
    - Valley oak (*Q. lobata*)
    - Blue oak (*A. douglasii*)
    - Oregon white oak (*Q. garryanna*)
  - ~ CA black oak (*Q. kelloggii*)



Range of MOB

- First detected in 2019 in northern Napa Valley
  - Likely introduced 5-10 years earlier
- 2021 – Lake, Sonoma, Sacramento



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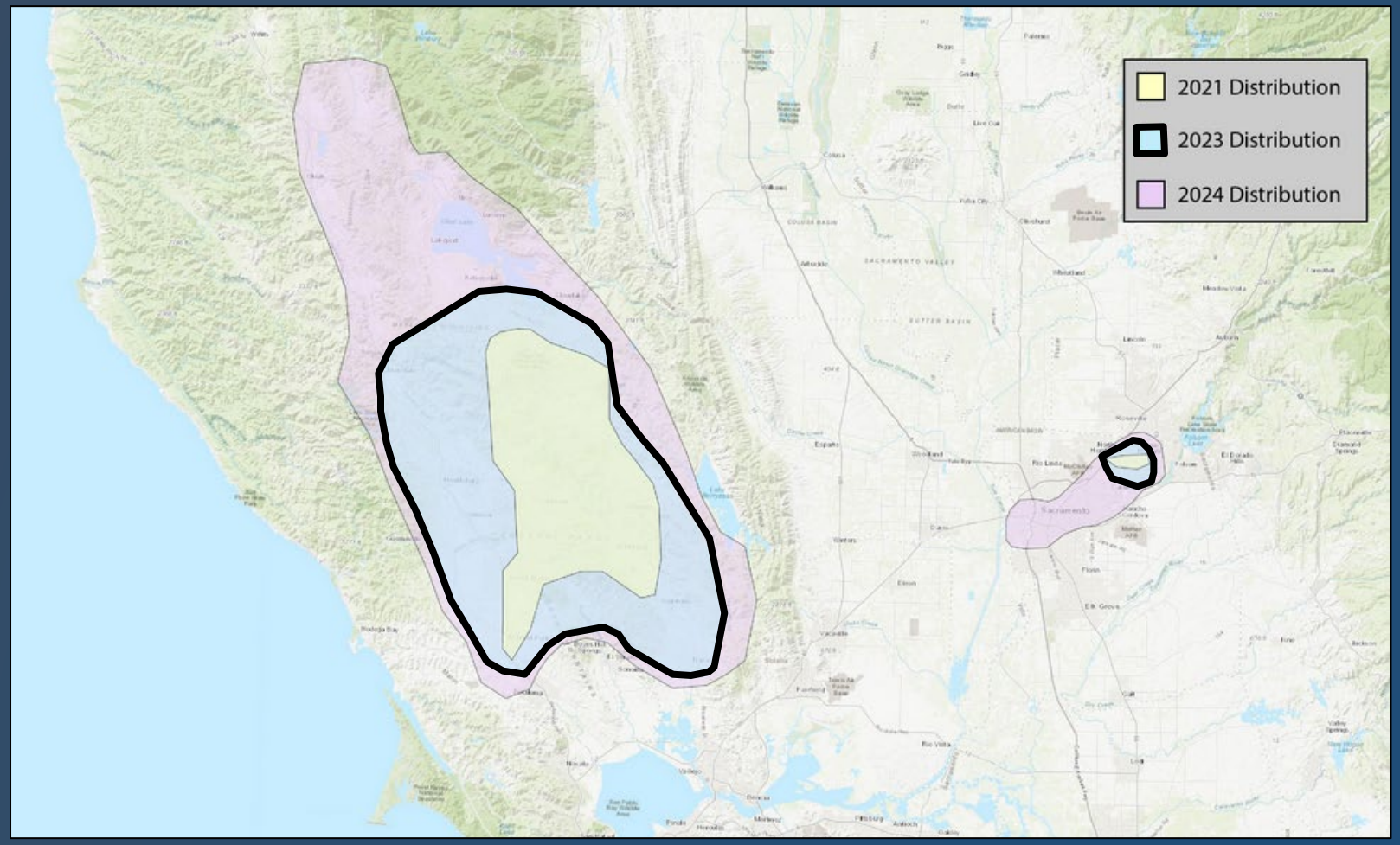
- 2023 – expansion of infestation



Range of MOB

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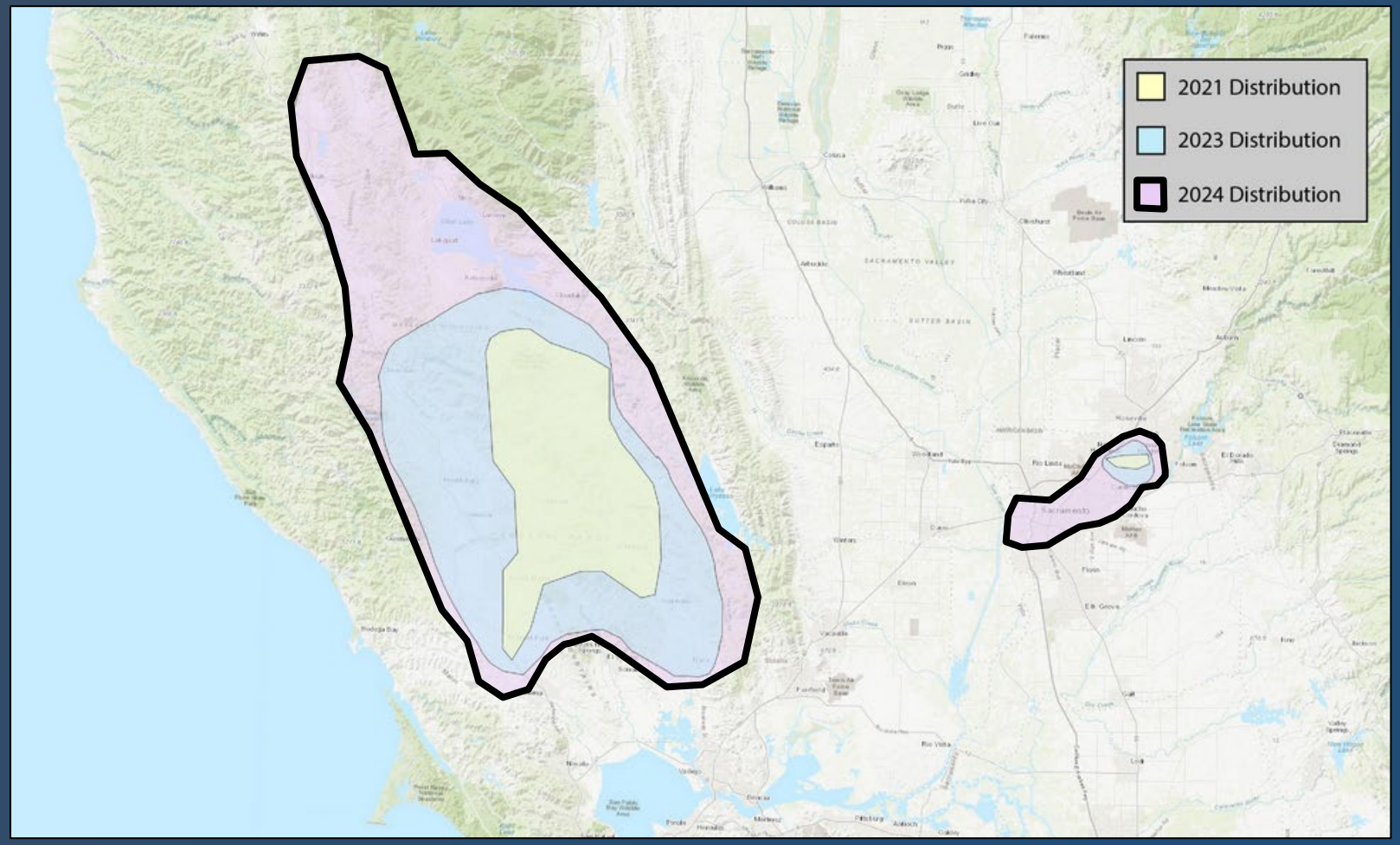
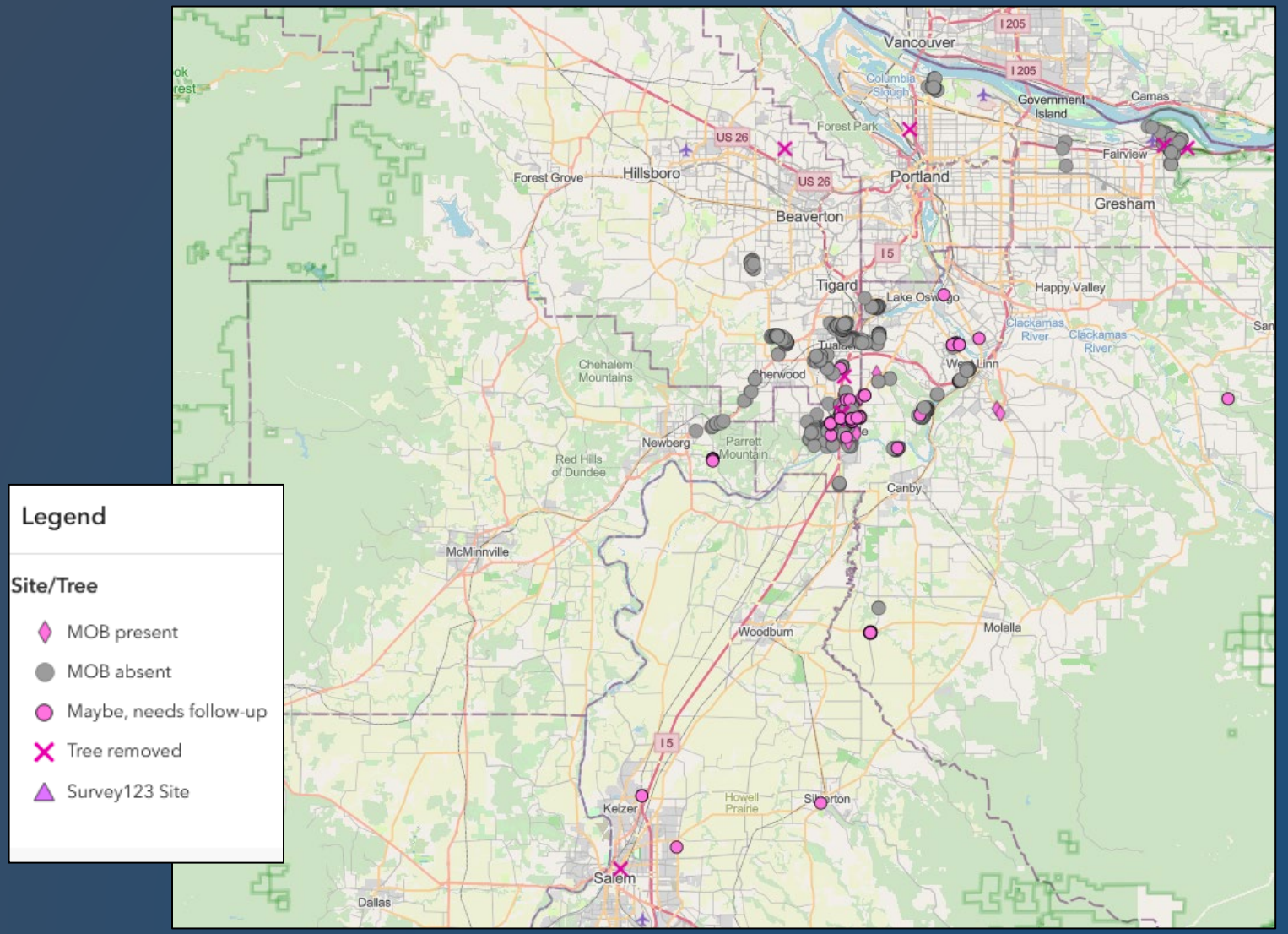
- 2021 – Lake, Sonoma, Sacramento
- 2023 – expansion of infestation
- 2024 – Mendocino, El Dorado, Solano, Yolo



Range of MOB

- 2022 confirmed in Oregon
  - Separate introduction
  - Primarily a pest of OR white oak



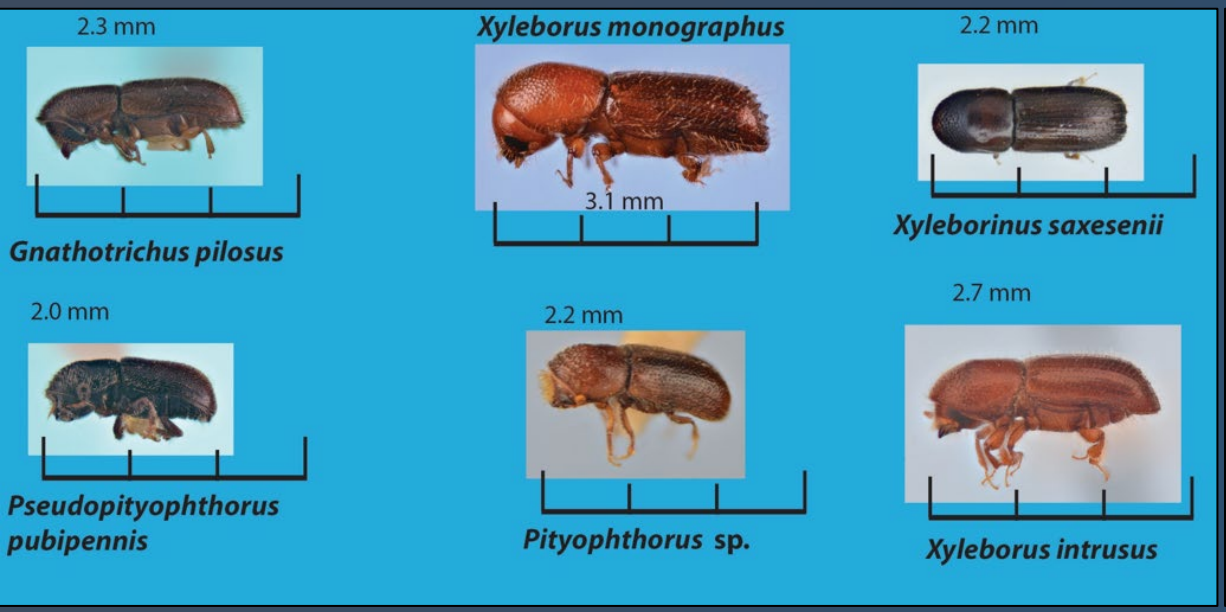
Identification

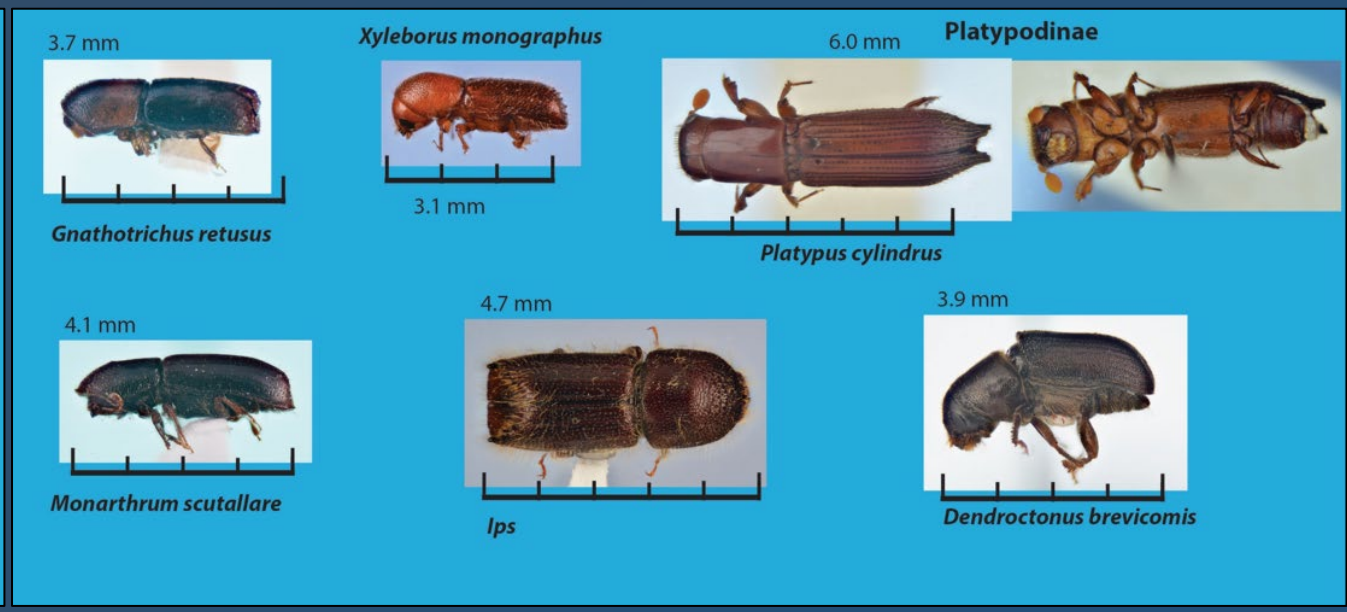
- Females 3.0 mm
- Males 2.25 mm
  - Males do not appear to overwinter
- 10-30:1 (Female:Male)
- Multiple generations
  - Most remain in tree until following year
- Emergence throughout the year


Female


Male

IDENTIFICATION





Identification

- Elongate and parallel sided
- Elytra relatively shiny
- Declivity flattened
  - Paired tubercules, large
  - Stria arced around tubercles

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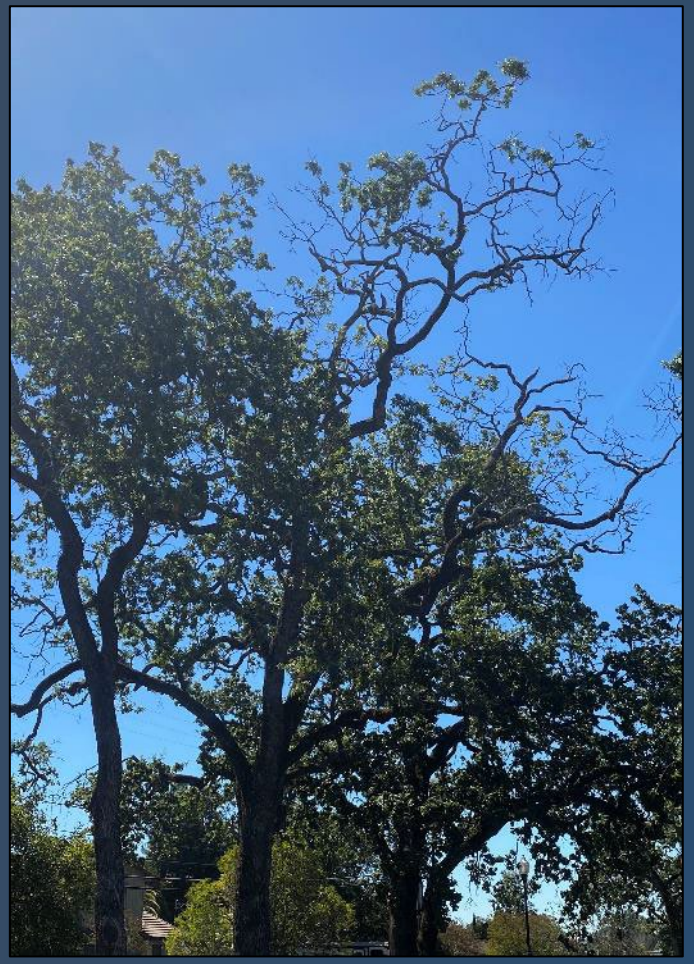
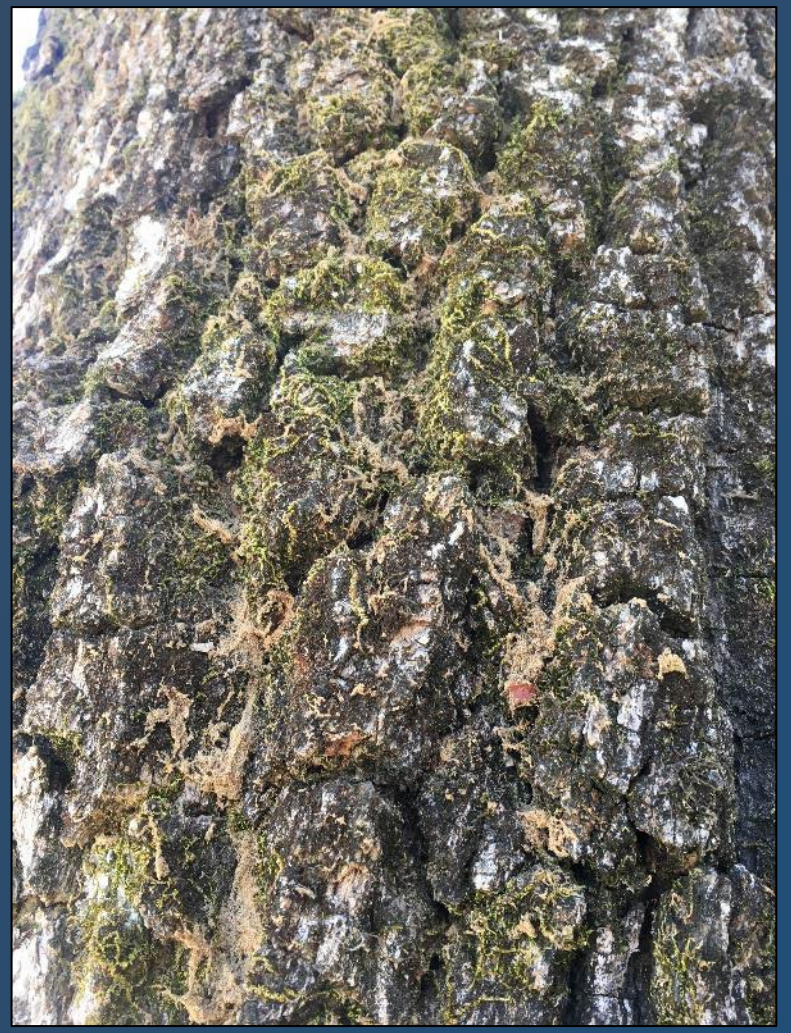
Signs of an Infestation

- Canopy decline
  - Branch dieback
  - Dropped limbs



Signs of an Infestation

- Boring Dust on main stem
- Sometimes staining



Signs of an Infestation

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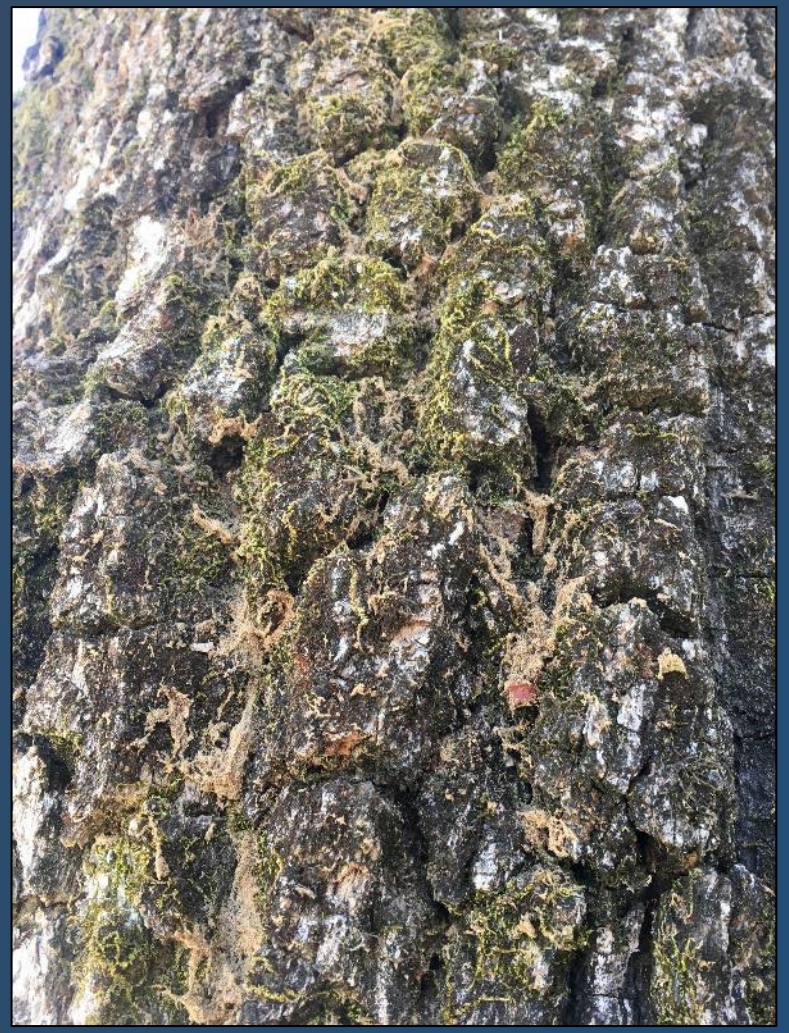
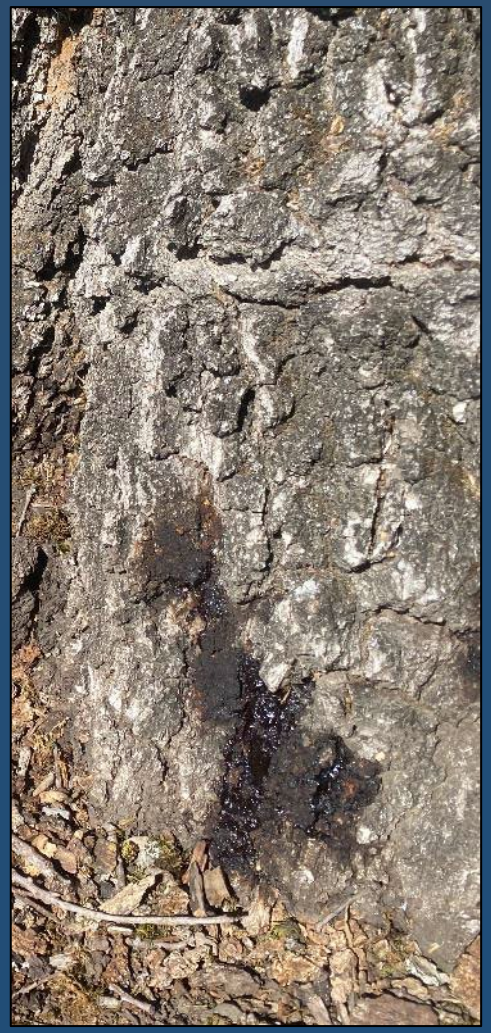
Family	Species	Emergence hole		Injury location
		Shape	Size*	
Beetles (Coleoptera)				
Bostrichidae (false powderpost beetles)	*Scobicia declivis* (lead cable borer)	round	4 d	Common on smaller branches less than 5 inches in diameter.
Buprestidae (flatheaded borers)	*Agrilus auroguttatus* (goldspotted oak borer)	D-shape	4 w	Located primarily on the lower trunk. Can reach high densities.
	Chrysobothris species (appletree and related borers)	oblong/ crescent	5–13 w	Common on the trunk and larger branches.
Cerambycidae (roundheaded borers)	*Xylotrechus nauticus* (oak cordwood borer)	oval	6–10 w	Common on the main trunk, especially around wounds from mechanical damage or fire.
Scolytidae (bark and ambrosia beetles)	*Monarthrum* species, *Gnathotrichus pilosus* and *Xyleborinus saxeseni* (ambrosia beetles)	round	< 2 d (pen-tip sized)	Frequently on the main stem.
	Pseudopityophthorus species (western oak bark beetle)	round	> 1 d (pin sized)	Most common on smaller branches.
Moths (Lepidoptera)				
Sesiidae (clearwing moths)	*Synanthedon resplendens* (western sycamore borer)	round	5–6 d	In bark cracks near deteriorated bark and phloem.

Flint et al., 2013



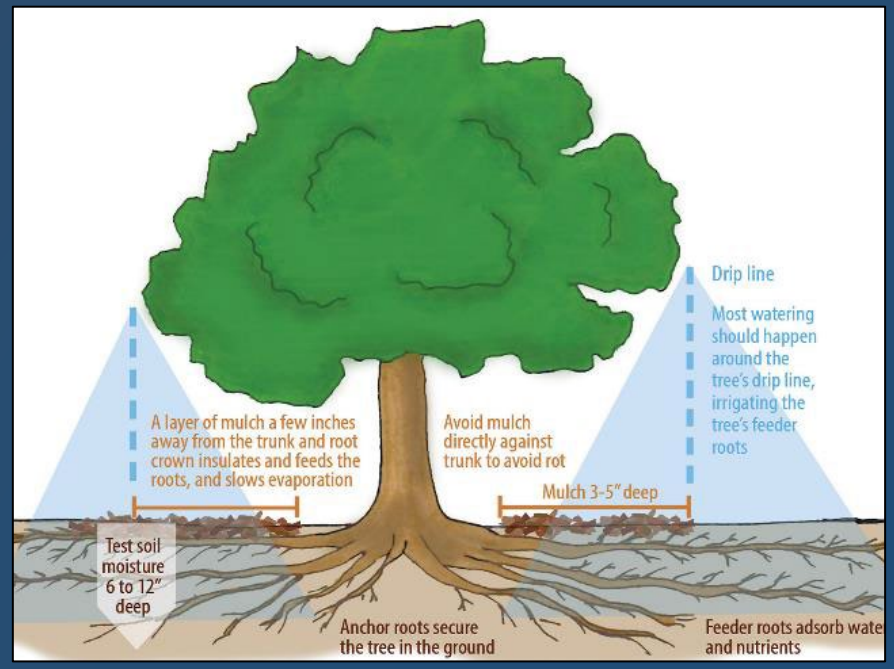


Signs of an Infestation

- Galleries
  - Ambrosia fungi
  - Trellis pattern
  - Cross and join
  - On same plane

MANAGEMENT

- Monitoring
  - Detection/delimitation
  - Remote sensing
- Improve tree vigor
  - Supplemental watering
  - Mulching
  - Thinning stands and pruning trees
- Cultural - Don't move infested material



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MANAGEMENT

- Mechanical
  - Destroy infested material
  - Sanitation pruning when MOB still in the canopy (?)
    - Prune to branch node below decline
  - Solarizing material
- Chemical? (fungicide + insecticide)

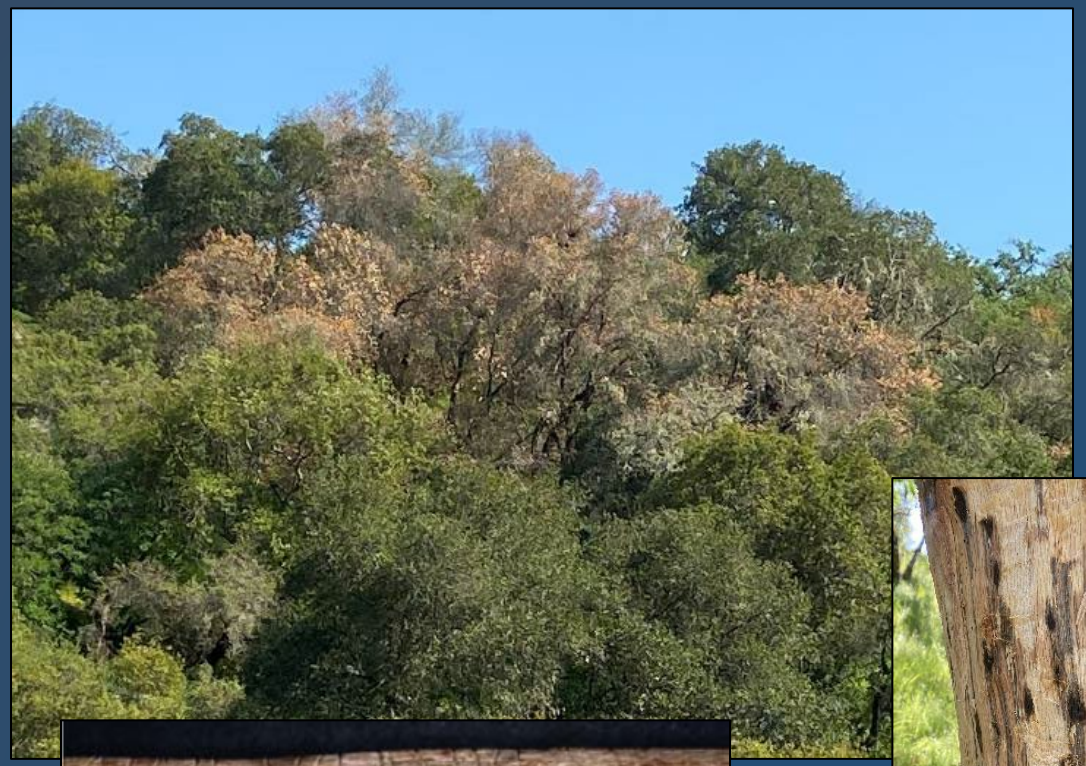

J. Kabashima


C. Dorghalli

Oak Pests Similar to MOB

Western Oak Bark Beetle
(*Pseudopityophthorus pubipennis*)

- Hosts
  - *Quercus* spp.
- Identification
  - Boring dust
  - Galleries across wood grain
- Common in stressed trees
- Vector foamy bark canker (*Geosmithia pallida*)
  - Coast live oak, Ca black oak, & interior live oak
- Management
  - Sanitation – pruning, disposal
  - Improve Vigor



Oak branch dieback
(*Diplodia corticola* and *Diplodia quercina*)

- Hosts
  - California black oak, coast live oak, English oak, and valley oak
- Symptoms
  - Completely dead branches with brown foliage
- Management
  - Usually not serious issue (aesthetic)
  - Supplement irrigation during winter
  - Maintain vigor

Oak twig blight
(*Cryptocline cinerescens* and *Discula quercina*)

- Hosts
  - coast live oak, canyon live oak, and valley oak
- Symptoms
  - Current season twig dieback scatter throughout canopy
  - Apparent summer
  - Late warm spring rains exacerbate
- Management
  - Usually not serious issue (aesthetic)
  - Supplement irrigation during winter
  - Pruning
  - Fungicides

INVASIVE SHOT HOLE BORERS (*EUWALLACEA* SPP.)

- Detected 2003 (2013); 2014
  - Native to Asia, 2 spp. (PSHB/KSHB)
  - Vector pathogenic *Fusarium* fungi
- Hosts
  - Many wildland, urban, landscape, and commercial species (>100 species)
    - Oak, sycamore, alder, willow, maple, box elder, liquidamber, avocado, olive, etc.

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Invasive Shothole Borers + Fusarium Dieback
***Euwallacea interjectus*: A new shothole borer species introduction in California**

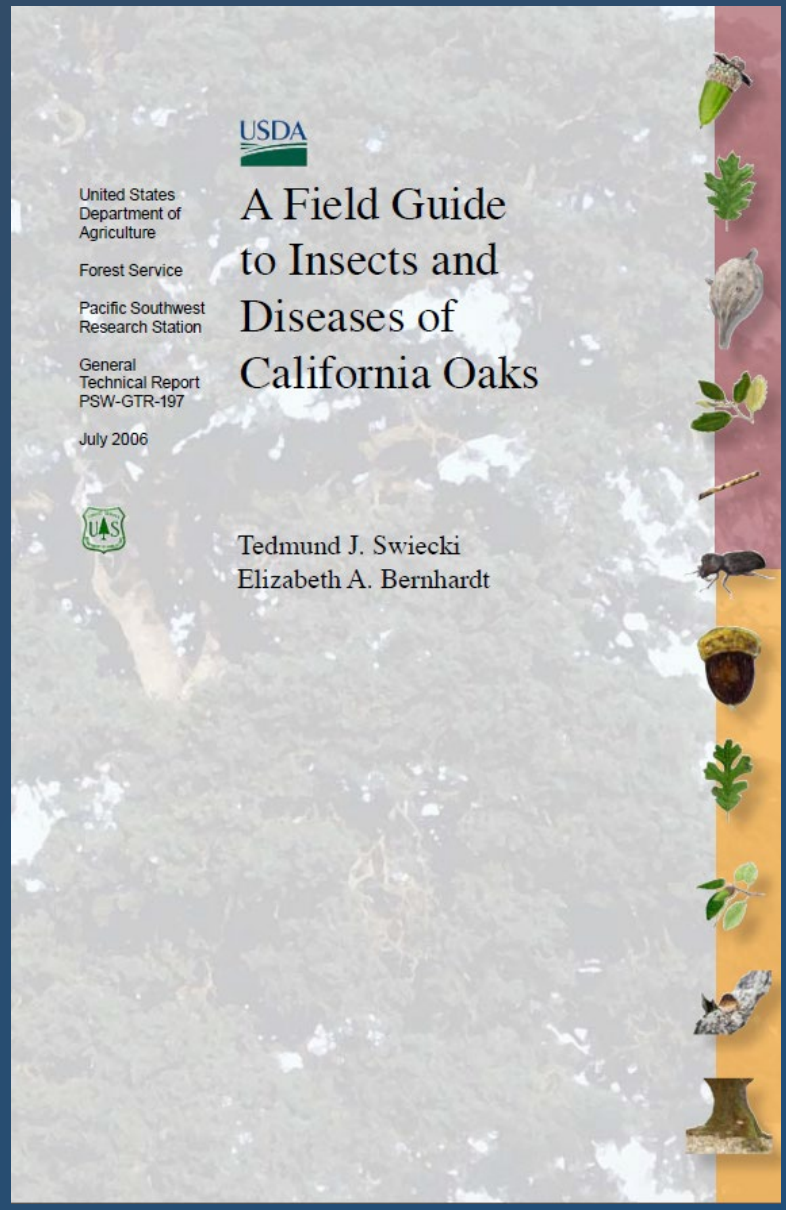
INVASIVE SHOT HOLE BORERS
(*EUWALLACEA* SPP.)

- Identification
  - Canopy wilting, decline
  - Weeping wounds, sugar volcanoes, exudate
  - Entry holes
  - Galleries into wood
- Management
  - Monitoring - no quarantine
  - Mechanical - prune infested branches, destroy material
  - Cultural - Don't move infested material
  - Chemical - (fungicide and insecticide)

Photos: A. Eskalen

Resources

- "A Field Guide to Insects and Diseases of California Oaks"
- California Oak Disease and Arthropod Database (http://coda.phytosphere.com/)
- MOB – mobpc.org
- ISHB – ishb.org
- UC Oaks



Thank You

Questions?

mjones@ucanr.edu

DON'T MOVE FIREWOOD.org

Curtis Ewing, PhD
Entomologist
CAL FIRE Forest Entomology and Pathology Program