



Polyphagous Shot Hole Borer + Fusarium Dieback A New Pest Complex in Southern California

BACKGROUND



The Polyphagous Shot Hole Borer (PSHB), *Euwallacea* sp., is an invasive beetle that carries two fungi: *Fusarium euwallaceae* and *Graphium* sp. The adult female (A) tunnels galleries into a wide variety of host trees, where it lays its eggs and grows the fungi. The fungi cause a disease called Fusarium Dieback (FD), which interrupts the transport of water and nutrients in over 110 tree species. Once the beetle/fungal complex has killed the host tree, pregnant females fly in search of a new host.

Photo credit: (A) Gevork Arakelian/LA County Dept of Agriculture

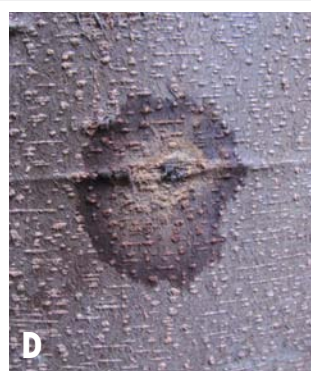
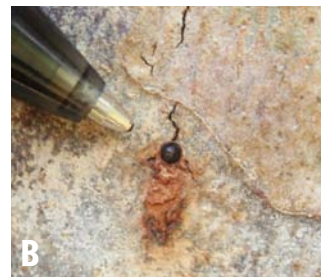
HOSTS

PSHB attacks hundreds of tree species, but it can only successfully lay its eggs and/or grow the fungi in certain hosts. These include: Box elder, California sycamore, London plane, Coast live oak, Avocado, White alder, Japanese maple, Liquidambar, and Red willow. Visit eskalenlab.ucr.edu for the full list.

EXTERNAL SIGNS + SYMPTOMS

Attack symptoms, a host tree's visible response to stress, vary among host species. Staining (C, D), sugary exudate (E), gumming (F, G), and/or frass (H) may be noticeable before the tiny beetles (females are typically 1.8-2.5 mm long). Beneath or near these symptoms, you may also see the beetle's entry/exit holes (B), which are ~0.85 mm in diameter. The abdomen of the female beetle can sometimes be seen sticking out of the hole.

Species pictured: C. California sycamore, D. White alder, E. Avocado, F. Titoki, G. Chinese flame tree, H. Red willow



INTERNAL SYMPTOMS

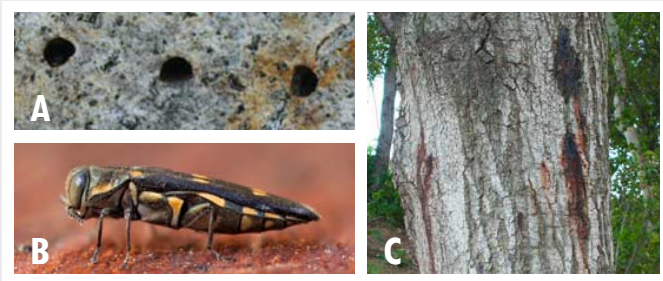
Fusarium euwallaceae causes brown to black discoloration in infected wood. Scraping away bark over the entry/exit hole reveals dark staining around the gallery (I), and cross sections of cut branches (J) show the extent of infection. Advanced infections eventually lead to branch dieback (K).



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PSHB/FD LOOK-ALIKES

Look out for staining or bark damage caused by other wood-boring beetles and/or fungi, which can be mistaken for similar signs and symptoms of PSHB/FD.



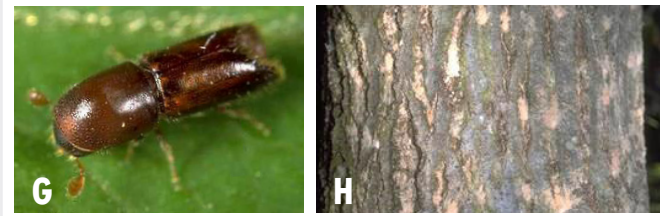
Goldspotted oak borer, *Agrilus auroguttatus*

Hosts: Coast live oak, canyon live oak, CA black oak
Look for: D-shaped exit-holes (A) <4 mm wide but larger than those of PSHB, beetles ~10 mm long (B), bark staining (C), crown thinning, associated woodpecker damage



Western sycamore borer, *Synanthedon respiciens*

Hosts: Species of sycamore, oak, and ceanothus
Look for: whitish/pink larvae 25-38 mm long (D), roughened bark (E), reddish sawdust-like frass and/or pupal cases (F) in bark crevices or on ground, bleeding



Oak ambrosia beetles, *Monarthrum dentiger*, *M. scutellare* (G)

Hosts: Oak species, tanoak, CA buckeye
Look for: slightly larger beetles (*M. scutellare*: 3.5-4.1 mm long, *M. dentiger*: 1.9-2.4 mm) and entry-holes (1-1.5 mm diameter) with bleeding, frothing, bubbling or white boring dust (H) that is tan when oxidized; often attack stressed trees



Foamy bark canker, *Geosmithia pallida* + Western oak bark beetle, *Pseudopityophthorus pubipennis*

Hosts: Coast live oak
Look for: beetles 1.7-2.3 mm long (I); smaller entry-holes than those of PSHB; reddish frass (J), reddish sap, wet discoloration, and/or foamy liquid from entry-hole (K); dead tissue around entry hole, beneath bark (L)

Photo credit: (A), (C) Tom Coleman/USDA. (B) Center for Invasive Species Research <cisr.ucr.edu>. (D), (G), (H), (I), (J) UC IPM <ipm.ucan.edu>.

HOW TO REPORT A SUSPECT TREE

Please report suspected tree infestations in Orange County to pshb.uccce.oc@gmail.com. Report trees outside of Orange County to UC Riverside at eskalenlab@gmail.com. Submit the following information:

- Your contact information (name, city, phone number, email)
- Suspect tree species
- Description of suspect tree's location (and/or GPS coordinates)
- Description of suspect tree's symptoms
- Photos of suspect tree and close-up photos of symptoms (see examples)

Based on the symptom description and photos, UC Riverside or UCCE Orange will decide whether a field assessment is warranted.



Take photos of suspect trees from several distances. Include photos of:

1. the trunk or symptomatic branches
2. the symptoms (close-up)
3. the entry/exit hole, if visible, with a ballpoint pen for scale (remove gumming or exudate if necessary)

If dieback is observed, include a picture of the entire tree.

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