



# Polyphagous Shot Hole Borer + Fusarium Dieback Identifying Symptoms and Look-Alike Pests

## BACKGROUND



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

Polyphagous Shot Hole Borer (PSHB), *Euwallacea* sp., is an invasive beetle that attacks dozens of common native and landscape trees. The tiny beetle tunnels into host trees and spreads Fusarium Dieback (FD), a disease known to infect over 110 tree species. FD is caused by *Fusarium euwallaceae*, a fungus that disrupts the transport of water and nutrients in the tree, leading to branch dieback and overall decline.

A closely related beetle called the Kuroshio Shot Hole Borer (KSHB) has been detected in San Diego County. KSHB looks identical to PSHB and also carries disease-causing fungi, but the species are genetically distinct.

## HOSTS

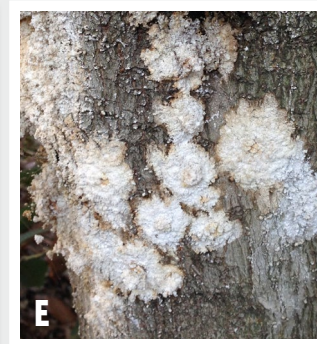
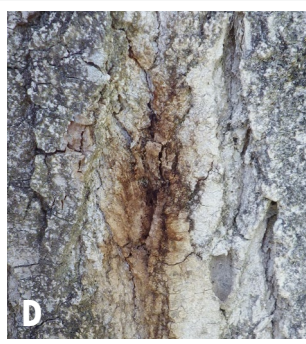
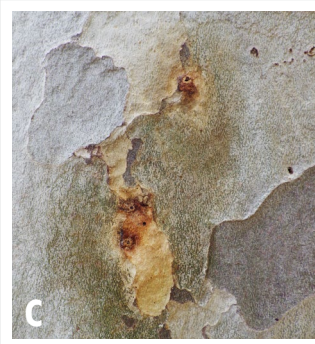
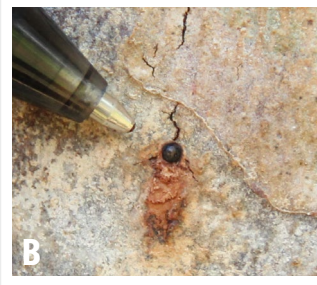
PSHB can reproduce and grow *Fusarium* in at least 38 known species, called reproductive hosts. Relative susceptibility among these species is dynamic and varied. Some of the more susceptible reproductive hosts appear to be box elder, avocado, coral, palo verde, silk tree, white alder, castor bean, and several species of sycamore, cottonwood, and willow.

See the full list of known reproductive hosts at [eskalenlab.ucr.edu](http://eskalenlab.ucr.edu).

## EXTERNAL SIGNS + SYMPTOMS

Attack symptoms, a host tree's visible response to stress, vary by host species. Look for the beetle's entry-holes (B), which are ~0.85 mm in diameter, accompanied by staining (C, D), sugary exudate (E), gumming (F, G), and/or frass (H). The symptoms may be noticeable before the beetles—at 1.8-2.5 mm long, females are smaller than a sesame seed. The abdomen of the female beetle can sometimes be seen sticking out of the hole.

Species below: C. California sycamore, D. Fremont cottonwood, E. Avocado, F. Mimosa/Silk tree, G. Titoki, H. Box elder



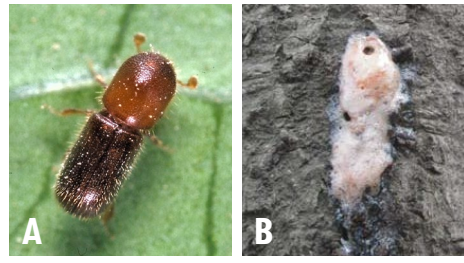
## INTERNAL DAMAGE

*Fusarium* causes dark discoloration of wood beneath the bark (I) and in the beetle's galleries (J). Advanced infections lead to branch dieback (K) and tree mortality.



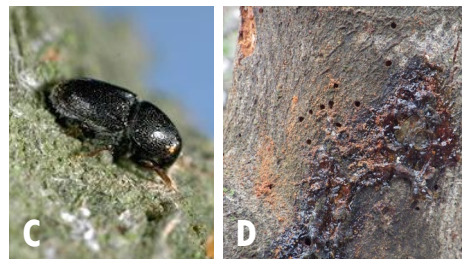
AUTHORS: Monica Dimson (UC Cooperative Extension) ; John Kabashima, Ph.D (UC Cooperative Extension); Akif Eskalen, Ph.D (UC Riverside). Images provided by Monica Dimson and Akif Eskalen unless cited otherwise.

## PSHB/FD LOOK-ALIKES



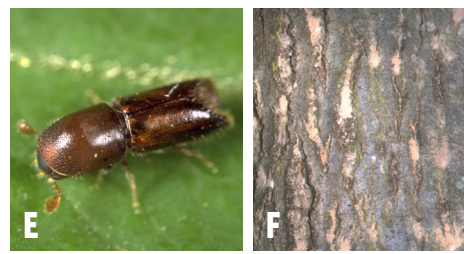
### Western oak bark beetle + Foamy bark canker disease

HOST TREES:	Stressed coast live oak, tanoak, CA buckeye
BEETLE SIZE:	1.7-2.3 mm long
ENTRY-HOLE:	Smaller than PSHB
SYMPTOMS:	Reddish frass/sap; disease causes wet discoloration and/or foamy liquid from entry-hole



### Fruittree bark beetle, *Scolytus rugulosus*

HOST TREES:	Fruit and nut trees (e.g. stone fruits, apples, almonds), English laurel
BEETLE SIZE:	2-2.5 mm long
ENTRY-HOLE:	Larger than PSHB
SYMPTOMS:	Entry-hole oozes sap or frass; exit-holes are sap-free



### Oak ambrosia beetles, common species: *Monarthrum scutellare*

HOST TREES:	Stressed or dying oaks, tanbark oaks, CA buckeye
BEETLE SIZE:	3.5-4.1 mm long
ENTRY-HOLE:	Larger than PSHB
SYMPTOMS:	Bleeding, frothing, white boring dust from entry-hole



### Secondary ambrosia beetle, *Xyleborus saxeseni*

HOST TREES:	Dying or stressed trees
BEETLE SIZE:	2-2.4 mm long
ENTRY-HOLE:	Smaller than PSHB
SYMPTOMS:	Reddish frass and/or sap; wet staining and/or dead tissue around entry-hole



### Bacterial canker, *Xanthomonas campestris*

HOST TREES:	Avocado
BEETLE SIZE:	N/A (Bacteria)
ENTRY-HOLE:	Cavity; no hole
SYMPTOMS:	White, sugary exudate and bleeding from cavity in the bark

Photo credit:

(A) (C) (E) Jack K. Clark/UC IPM <ipm.ucanr.edu>. (F) Pavel Svihra/UC Regents. (G) Christoph Benisch <kerbtier.de>.

## PSHB RESOURCES

Stay up to date on the latest PSHB research and news:

[www.pshb.org](http://www.pshb.org) - Polyphagous Shot Hole Borer, UC Cooperative Extension central website

[www.eskalenlab.ucr.edu](http://www.eskalenlab.ucr.edu) - Eskalen Lab, UC Riverside

[www.cisr.ucr.edu](http://www.cisr.ucr.edu) - UC Riverside Center for Invasive Species Research

## HOW TO REPORT A SUSPECT TREE

Please report suspected infestations to the Eskalen Lab at UC Riverside ([eskalenlab@gmail.com](mailto:eskalenlab@gmail.com)).

Download the reporting form at [eskalenlab.ucr.edu](http://eskalenlab.ucr.edu) and submit the following information:

- Your contact information
- Suspect tree species
- Description of location (and/or GPS coordinates)
- Description of symptoms
- Photos of suspect tree and close-up photos of symptoms (see below)
- If dieback is observed, include a picture of the entire tree.

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)

