

Invasive Shothole Borers + Fusarium Dieback

Greater shothole borer (*Euwallacea interjectus*): A new introduction in California

BACKGROUND



Fig. 1. Female beetles of *Euwallacea interjectus* (GSHB; left) and *E. fornicatus* (PSHB; right) on a penny. PSHB/KSHB are morphologically nearly indistinguishable, but *E. interjectus* is substantially larger (3.78 mm vs 2.1 mm long).

Fusarium dieback (FD) is an invasive emergent beetle–pathogen complex from Southeast Asia. Until recently, it was caused by two invasive shothole borer beetle species (ISHB) in Southern California: the polyphagous shothole borer (PSHB; *Euwallacea fornicatus*) and the Kuroshio shothole borer (KSHB; *E. kuroshio*). The beetles vector specific symbiotic *Fusarium* pathogen species (*F. euwallaceae* and *F. kuroshium*), which they cultivate within tree hosts for nutrition, killing or causing dieback on over 77 tree species in urban, wildland, and agricultural landscapes. In November 2023, the PSHB beetle–pathogen complex was confirmed killing hundreds of trees in riparian forests in San Jose in Northern California. In October 2024, a separate infestation in Felton, Santa Cruz County, was discovered on box elder (*Acer negundo*). However, the California Department of Food and Agriculture Pest Detection Labs confirmed this infestation was a new introduction of a third shothole borer beetle–pathogen complex: the **greater shothole borer (GSHB; *E. interjectus*)**, which cultivates *Fusarium floridanum* (Figs. 1&3).



Fig. 2. Fusarium dieback damage caused by the greater shothole borer (GSHB; *Euwallacea interjectus*) – *Fusarium floridanum* on box elder (*Acer negundo*) in Felton, California. Symptoms of staining on a heavily infested live tree (a). Cross section of a branch showing beetle gallery formation and advanced colonization by *Fusarium floridanum* (b), and a 60-cm diameter tree killed from beetle-fungal attack (c). GSHB female beetles produce 1.75 mm diameter entry holes (d), whereas PSHB/KSHB entry holes are 0.83 mm in diameter.

HISTORY AND HOST RANGE

- GSHB was introduced from Southeast Asia to the United States on three separate occasions in Hawaii (1976), Louisiana (1984) and Texas (2011). It is most common in Alabama, Louisiana, Texas, Georgia, Florida, Mississippi, and South Carolina.
- A wide variety of host species spanning many families have been noted but not specified in the US¹. Mass attack of box elder trees has been documented in Florida¹. GSHB has been detrimental to *Populus* spp. in Argentina and China and has affected Japanese fig orchards in Japan.
- To date, box elder trees have been predominantly and severely infested at the Felton site, but a few CA sycamore (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), arroyo willow (*Salix lasiolepis*), red willow (*S. laevigata*), and black cottonwood (*Populus trichocarpa*) individuals have also been attacked. Assessment of the full extent of the Felton infestation is ongoing.
- The host range in California is currently being tested.
- Please visit www.ishb.org for updates and current reporting information.



Fig. 3. Colonies of *Fusarium floridanum* recovered from *Euwallacea interjectus*' mycangia (left); *F. floridanum* conidia (right).

References: 1) Cognato, A.I. et al. (2015). History of the Exotic Ambrosia Beetles *Euwallacea interjectus* and *Euwallacea validus* (Coleoptera: Curculionidae: Xyleborini) in the United States. *J. Economic Entomology*, 108 (3): 1129–1135.

