

Ambrosia beetle and Fusarium wilt

Fact Sheet (March 2018)

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Background

Euwallacea nr. fornicatus (polyphagous shot hole borer) is an ambrosia beetle native to Asia that has a symbiotic relationship with *Fusarium* spp. (including the pathogen *Fusarium euwallaceae*). This fungus has emerged as a problem in Israel, California and Florida in the United States and is responsible for Fusarium dieback on avocado ^(1,5). The beetle carries spores within a mandibular mycangium (specialized mouthparts). The adult females burrow into trees to establish brood galleries while depositing the fungi which colonize the gallery walls to provide a food source for the developing larvae and adult beetles ^(1,2). The fungus invades the vascular tissue, causing necrosis of the cambium that results in branch dieback and tree death ⁽³⁾. The host range for the beetle-fungus complex includes >200 trees that are attacked by the beetle, >100 species that support fungal growth and more than > 37 species that the beetle can use as a reproductive host ⁽⁴⁾.

Fusarium Dieback Symptoms (on avocado)

The most conspicuous disease symptoms are branch wilting and dieback (Fig. A) and the presence of a white powdery exudate (sugar volcanoes) (Fig. B) that pin points the single beetle exit hole (0.8 mm) (Fig. C). The hole can be dry or surrounded by wet discoloration of the outer bark. Examination of the cortex and wood underneath the hole reveals brown discolored necrosis caused by the fungus (Fig. D).

The beetle

Euwallacea nr. fornicatus is very small and hard to see. The holes penetrate into the wood (1-4 cm) and there are usually several exit holes (with sugar volcanoes) on infested trees (Fig E). Females are black and approximately 1.8-2.5 mm long (Fig. F), males are brown colored (G) and about 1.5 mm long ⁽⁸⁾. Beetles colonize live and dead wood ⁽⁸⁾.

Known Hosts (selected)

Avocado (*Persea americana*), Box elder (*Acer negundo*), castor bean (*Ricinus communis*), oak (*Quercus* spp.), citrus (*Citrus* spp.), tea (*Camelia sinensis*) and London plane (*Platanus x acerifolia*) ^(6,7). Other hosts can include litchi, mango, cacao and macadamia.

Control⁽⁹⁾

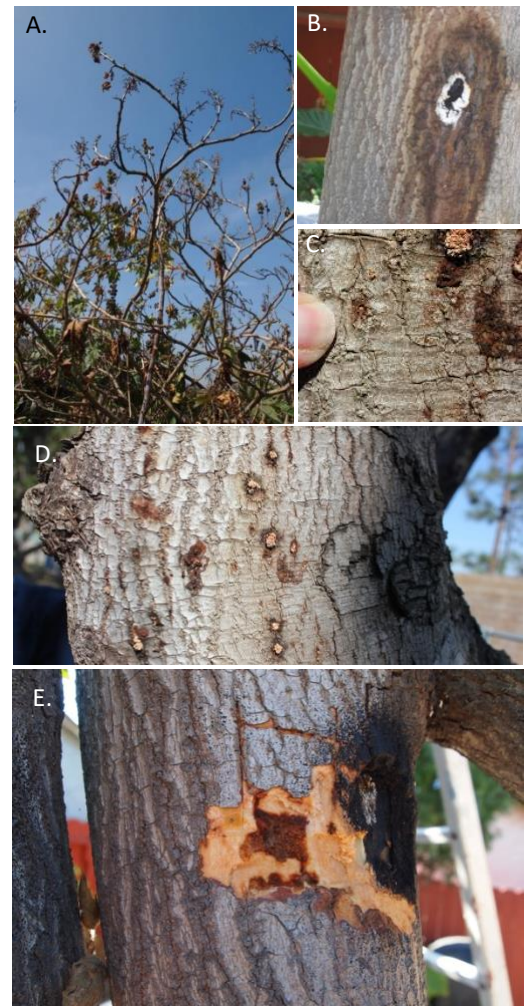
Management options are limited. The main approach for reducing damage is monitoring for the presence of the beetle (visual inspection and trapping if advised to do so) and sanitation. Remove branches, chip and solarize the infested material in the orchard for at least 1 week. Avoid moving infested material between orchards and sterilize tools with household bleach. There are no effective chemicals that are effective in controlling the beetles or the pathogen.

What to do

1. Look for the exit hole surrounded by white exudate
2. Scrape off the bark to see the canker
3. Follow the gallery to look for the beetle (not always present)
4. Look for alternative host plants in the area
5. Chop the infested branch off, place in a plastic cooler box (will be returned to you) and send to the ARP Diagnostic Clinic at FABI, University of Pretoria

Current South African status:

Euwallacea nr. fornicatus and its fungal symbiont *Fusarium euwallaceae* has been confirmed to be present in South Africa on London Plane trees in Kwa Zulu-Natal ⁽⁷⁾. The beetle and the pathogen have to date not been found on avocado or macadamia in South Africa. However, other species of ambrosia beetles have been identified on avocado and could carry fungal symbionts.



Photos by California Avocado Growers and the Eskalen Lab, University of California Riverside.



Photos by Gevork Arakelian, Los Angeles County Department of Agriculture, California and Dr. Jiri Hulcr, University of Florida.

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