

Walnut Twig Beetle And Thousand Canker Disease As An Emerging Problem Of Black Walnut In The Western US

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Background

Since 2001, a suspicious die-off of black walnut (*Juglans nigra*) began to be noted by arborists and city foresters along Front Range Colorado. The affected trees would show a progression of symptoms; yellowing of the crown, followed by flagging branches, then crown dieback and death. Vascular staining was noted in limbs and large cankers in trunks.

Originally the walnut declines were assumed to be associated with drought, which was severe in the region prior to 2003. Three aspects of the situation suggested another cause. These included:

- 1) The occurrence of dieback and death of trees regardless of irrigation;
- 2) The observation of walnut twig beetle and an associated *Geosmithia* sp. fungal pathogen in all affected trees;
- 3) The concurrent appearance of the black walnut declines over several western states.



Flagging black walnut infested with walnut twig beetles

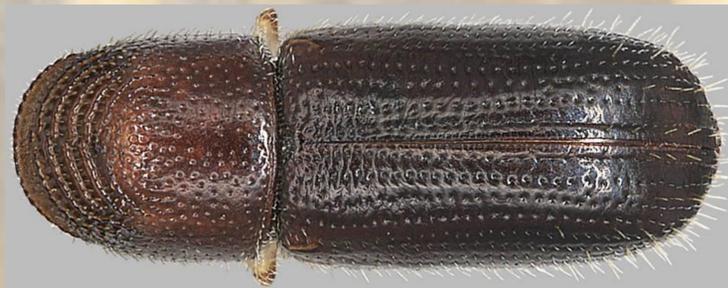


Typical trunk cankers found in infested black walnuts

The Twig Beetle



Photographs of twig beetle courtesy Jim LaBonte, Oregon Department of Agriculture



Pityophthorus juglandis is a minute (1.5-1.9 mm) yellowish-brown bark beetle. It is one of only a few species in the genus *Pityophthorus* that is associated with hardwoods and the only one associated with *Juglans*. It can be readily distinguished from other members of the genus by several physical features. Among these are 4 to 6 concentric rows of asperities on the prothorax, usually broken and overlapping at the median line.



New nuptial chamber construction in May



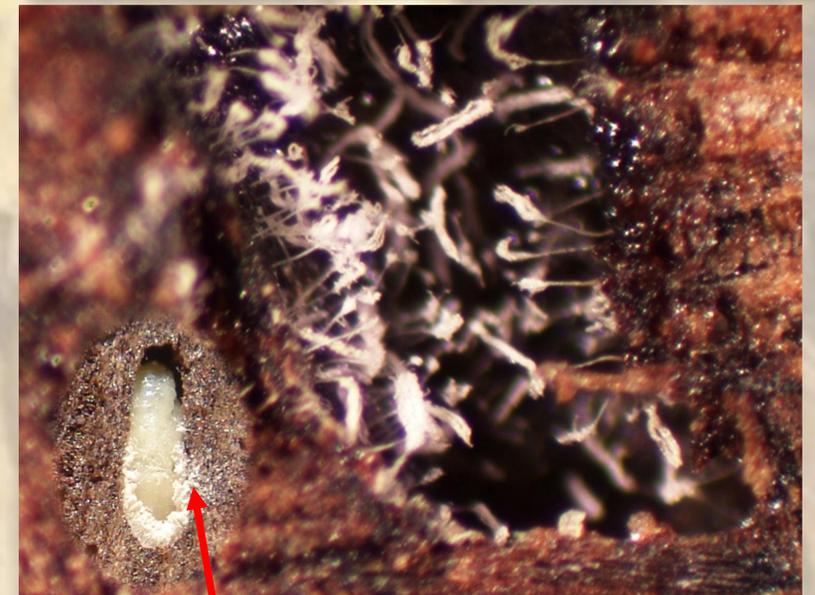
Cross section of damage to living bark

The Fungus

A *Geosmithia* sp. was consistently isolated from canker margins surrounding beetle galleries, from the surface of the beetle galleries, and from beetles removed from galleries. *Geosmithia* sporulated profusely in culture and in galleries producing dry conidia on multi-branched conidiophores



Geosmithia infection within beetle galleries



Geosmithia conidiophore production in beetle tunnel
Inset: Conidiophores surrounding pupa

Abstract. Within the past decade an unusual decline of black walnut (*Juglans nigra*) has been observed in several western states. Initial symptoms involve a yellowing and thinning of the upper crown, which progresses to include death of progressively larger branches. During the final stages large areas of foliage may rapidly wilt. Trees often are killed within three years after initial symptoms are noted. Tree mortality is the result of attack by the walnut twig beetle (*Pityophthorus juglandis*) and subsequent canker development around beetle galleries caused by a fungal associate (*Geosmithia* sp.) of the beetle. A second fungus (*Fusarium solani*) is also associated with canker formation on the trunk and scaffold branches. The proposed name for this insect-pathogen complex is *thousand cankers disease*.