



INT-DM-09-01: Distribution of thousand cankers disease and the walnut twig beetle associated with *Juglans* spp. mortality in the western U.S.

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INTRODUCTION

Recently, widespread tree mortality has been observed in the western U.S. in adventive plantings of black walnut, *Juglans nigra*, as well as in native stands of western black walnuts (e.g., *J. californica* and *J. hindsii*). Symptoms involve an initial yellowing and thinning of the upper crown. Eventually, large areas of foliage rapidly wilt and the tree dies within several years of initial symptoms. This mortality has been attributed to attacks from the walnut twig beetle (WTB), *Pityophthorus juglandis* Blackman, and subsequent canker formation caused by an unnamed *Geosmithia* sp. fungus. *Geosmithia* spp. are associates of bark beetles of hardwood and conifer trees, but have not previously been reported as pathogens of *Juglans* or as fungal associates of *P. juglandis*.

Potential planting range of eastern black walnut

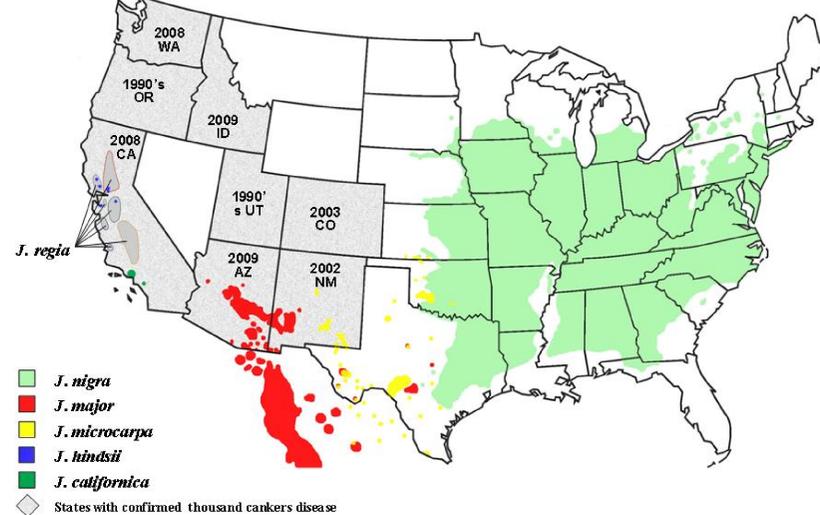


Adventive plantings of *J. nigra* likely facilitated the invasion of thousand cankers disease in CO, ID, NM, OR, and WA.



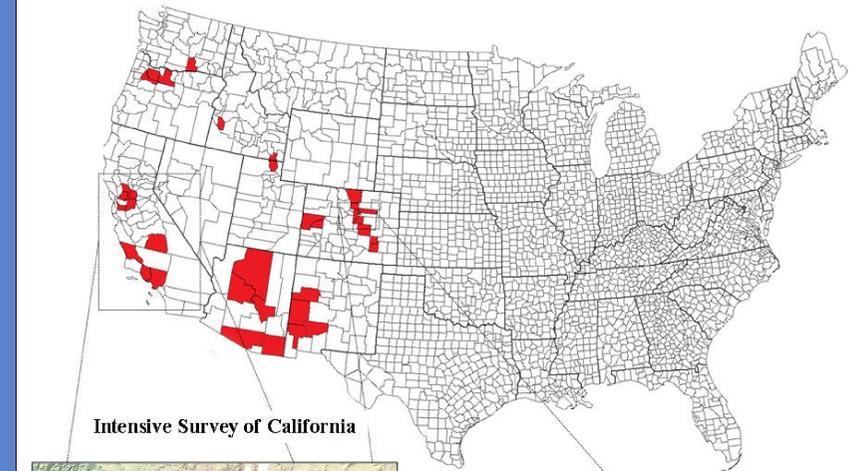
Male and female walnut twig beetle (WTB), *Pityophthorus juglandis*.

Distribution of *Juglans* spp. and thousand cankers disease

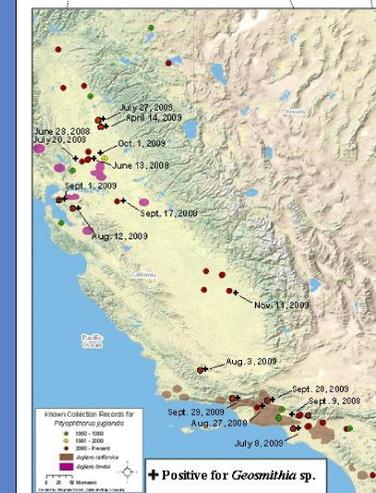


Geographic Distribution: Thousand cankers disease (TCD), caused by the WTB/*Geosmithia* sp. complex, is killing or top killing eastern black walnut (CA, CO, ID, NM, OR, UT, and WA), as well as northern (*J. hindsii*) and southern (*J. californica*) California black walnut (CA) and English walnut (CA and UT). The impact of the disease in California walnut orchards is still being evaluated, but cases of the disease in English walnut have been reported from San Benito, Solano, Sutter, and Tulare Cos. Paradox rootstock infections have been observed in Sutter, Tulare, and Yolo Cos. The beetle has been recovered from Arizona walnut, *J. major*, at several locations in AZ and from a germplasm collection in CA. This new disease complex is a serious potential threat to eastern black walnut grown for timber or nut production in states like MO. Potential avenues of invasion include 1) movement of infested *Juglans* firewood or woodworking material from West to East; 2) dispersal of the WTB among adventive stands of eastern black walnut in communities in CO and KS; and 3) dispersal of the WTB among sympatric stands of *J. major*, *J. microcarpa*, and *J. nigra* in TX.

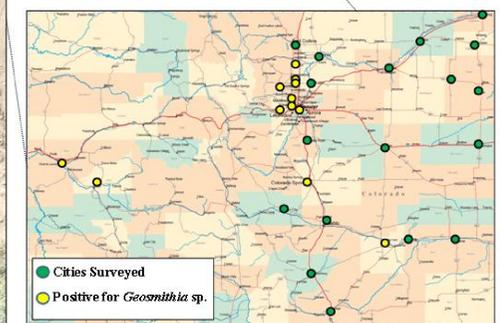
Confirmed county locations of thousand cankers disease



Intensive Survey of California



Intensive Survey of Colorado



Objective 1: Establish the range, rate of spread, and impact of the WTB and *Geosmithia* sp. in western native stands of *Juglans* spp.

Survey locations and hosts for the presence of the insect/fungal complex:

Arizona and New Mexico in Arizona walnut, *J. minor* (Apache-Sitgreaves, Coronado, Gila, Prescott, and Tonto National Forests)

New Mexico in little walnut, *J. microcarpa*, (Cibola, Gila, and Lincoln National Forests)

California in southern California black walnut, *J. californica* (Angeles, Los Padres, and San Bernardino National Forests); in northern California black walnut, *J. hindsii* (riparian areas, Solano and Yolo Cos.); and in fifteen species of black walnuts and Asian butternuts (*Juglans* collection of the USDA National Clonal Germplasm Repository, Winters, CA, Solano Co.)

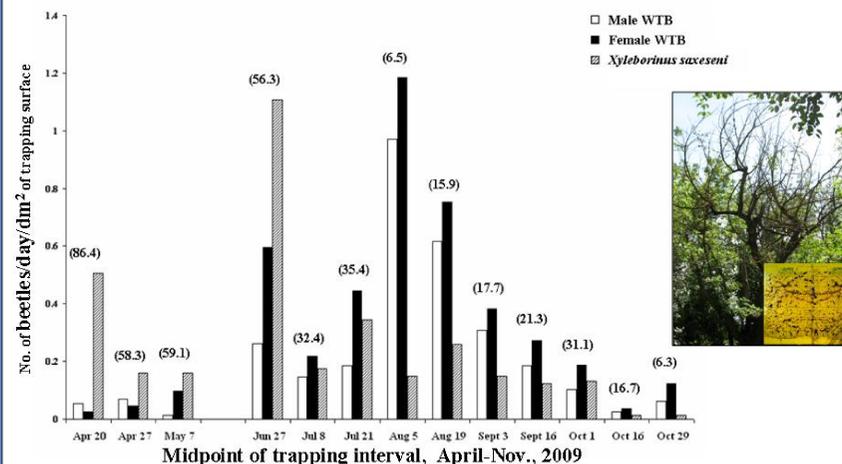
Texas, Oklahoma, and Kansas from isolated pockets of adventive eastern black walnut, *J. nigra*.

Colorado from adventive *J. nigra*.

Kansas and Nebraska in native riparian stands of *J. nigra*, in areas that represent a biological bridge for spread of the complex to native stands of *J. nigra*.

Objective 2: Determine life history of WTB, particularly flight periodicity (by using sticky traps), and distance and height of the flight relative to host location.

Trap catch of walnut twig beetle (WTB) and an ambrosia beetle on an eastern black walnut tree stem, April-Nov. 2009, Sutter Co., CA



The polyphagous ambrosia beetle, *Xyleborinus saxeseni*, has a cosmopolitan distribution and can easily be mistaken for WTB in trap catches. Percentage of *X. saxeseni* ranged from 6.3 – 86.4% of total Scolytidae at one site in California (see percentages above bars).

Summary:

- Surveys of *Juglans californica* and *J. hindsii* in CA have revealed widespread evidence of the presence of both TCD and WTB throughout the native ranges of these two tree species. Additionally, preliminary surveys of commercial orchards of English walnut, *J. regia*, in the Central Valley have detected the disease and insect at low levels.
- Surveys of *J. nigra* in CO have revealed an abundance of both TCD and WTB in and around the cities of Boulder, Colorado Springs, Denver, and the community of Rocky Ford, located just east of Pueblo.
- Surveys of *J. major* in AZ and NM have revealed low incidences of both TCD and WTB. While both the pathogen and insect are present, there is no noticeable dieback of this *J. major* in any of the counties in these states.
- A survey of native *J. nigra* stands in the Missouri River Valley and metropolitan Omaha (IA, NE, and SD) revealed no evidence of either TCD or WTB.
- Future surveys in eastern NM, western TX, OK, and KS on *J. microcarpa* will be particularly important because very little is known about the incidence of TCD or WTB in this area.
- A flight trapping survey of WTB has shown that beetles are in flight as late as November in CA. Throughout the flight period, female trap catch usually exceeded that of males.

References:

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