

Thousand Cankers Disease Now in Three East Coast States

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As the known geographic range of thousand cankers disease continues to expand in California, the disease has also emerged in three East Coast states, now threatening eastern black walnut (*Juglans nigra*) in its native range. The disease, caused by the fungus *Geosmithia morbida*, is vectored by the walnut twig beetle (wtb) (*Pityophthorus juglandis*). The association between *Geosmithia* species and bark beetles is a worldwide phenomenon; however, *G. morbida* has only been observed in the USA, and is specific to *Juglans* (walnut) species.



Walnut twig beetles bore through tree flagging upon emergence. Holes in flagging are an excellent initial indicator of possible wtb colonization. Photo: E. Fichtner

Thousand cankers disease timeline

Over the past decade, thousand cankers disease has been associated with decline and mortality of eastern black walnut in several western states. Although eastern black walnut is native to the eastern United States, it is planted extensively in landscapes in western states and serves as a rootstock for commercial production of English walnut (*Juglans regia*) in California. In 2008, the disease was first observed in California on northern California black walnut (*Juglans hindsii*) in Yolo County. By the close of 2009, however, the disease was known to affect commercial walnut orchards throughout the state, with infections documented on both black and Paradox rootstocks and on several varieties of English walnut.

Since 2010, thousand cankers disease has been reported in three East Coast states: Tennessee, Virginia, and Pennsylvania. Although the pathogen and insect vector are native to North America, they are still exotics when introduced to eastern landscapes. In eastern landscapes, the pathogen and wtb vector are introduced, exotic species attacking eastern black walnut in its native range.

Active Quarantines

In Tennessee six counties are currently under quarantine in the Knoxville area, and ten surrounding counties serve as a buffer zone. In Virginia seven counties are quarantined around the Richmond area. Bucks County, Pennsylvania is also under quarantine. In these situations, the quarantine prevents the movement of walnut wood, and associated materials (ie. stumps, roots, mulch, etc) out of quarantined counties. The success of quarantine activities in preventing the spread of thousand cankers disease is challenged by the fact that spores may be transmitted over some distance by wtb flight.

Ohio is considering implementation of an exterior quarantine for thousand cankers disease, which would restrict movement of walnut materials from infected counties in the 11 states known to have thousand cankers disease, including California. Nuts, nut meats, hulls, processed lumber and finished wood products (ie. furniture or gunstocks) would be exempt from quarantine.

The take-home-message for California walnut growers is that the pathogen and wtb are not moved in walnut meats or hulls; therefore, these commercial products do not pose a risk of disease transmission. To prevent the spread of the disease to uninfested regions of the state and country, however, infected, untreated wood should not be moved.

Where did thousand cankers disease come from?

The current dominant hypothesis purported by the scientific community is that both the wtb and pathogen are native to the southwestern United States. The wtb has a long-term association with Arizona walnut (*Juglans major*), with the first report of the beetle made in New Mexico in 1929. The beetle tends to exhibit limited colonization of Arizona walnut, and cankers induced by the pathogen are smaller on Arizona walnut than on black walnut. The limited affect of both the pathogen and insect on Arizona walnut suggest the potential for a long-term coexistence of host, pathogen, and vector. Similarly, wtb were reported in the Los Angeles area in 1959 in the native range of California walnut (*Juglans californica*), another host exhibiting some level of resistance to the disease.

Over the next few years, genetic analyses of the wtb and *G. morbida* will likely elucidate the origin and distribution pattern of the disease within North America.

California walnut growers have facilitated nationwide research and monitoring efforts

Numerous walnut growers in California have cooperated with UCCE Farm Advisors to participate in a statewide wtb trapping program led by US Forest Service Entomologist, Dr. Steve Seybold. Since 2009, in Tulare County alone, five growers have permitted weekly trapping of wtb in orchards. The year-round monitoring of wtb activity provides valuable insight into the epidemiology of the disease in diverse walnut growing regions in California, and has provided a framework for the guidelines now utilized nationwide for early detection of new forest infestations. Early results of the wtb monitoring program demonstrate that the beetles are active in winter, particularly after a period of mild temperatures. Consequently, infected trees remaining in orchards over the dormant season may serve as primary inoculum for disease transmission by winter beetle flight.



The latest design in walnut twig beetle traps employs a patent-pending pheromone to enhance beetle detection. Photo: E. Fichtner

Upcoming UCCE research efforts

With support from the UC ANR Competitive Grants program and the Specialty Crops Research Initiative (SCRI), collaborating Farm Advisors throughout the state will be conducting extensive local surveys for the disease in commercial orchards. Upcoming surveys will be conducted in September and October 2012. Orchards in both Tulare and Kings Counties will be included in the statewide survey, with the goal of understanding the distribution of the disease in diverse geographic orchard systems.