

National Pest Alert



Thousand Cankers Disease of Walnut

Distribution and Transmission

Thousand cankers disease (TCD) is caused by a fungus (*Geosmithia morbida*) that is vectored by the walnut twig beetle (*Pityophthorus juglandis*). It is unknown if *G. morbida* is native to North America. The walnut twig beetle is native to North America and was first recorded feeding on Arizona walnut (*Juglans major*) in the southwestern U.S., but it is not harmful to Arizona walnut. The walnut twig beetle has expanded its host range to other species of walnut including black walnut, which is not native to western states. TCD was



Figure 1. Walnut trees killed by Thousand Cankers Disease in Knox County, TN.

confined to western states (California, Oregon, Washington, Idaho, Utah, New Mexico, Colorado and Arizona) until 2010 when the disease was found in the native range of black walnut. It is unknown how widespread the disease will become or the long-term effects on black walnut. The beetles carry the fungal spores (conidia) on their bodies and transfer the spores to trees when they tunnel into the branches or trunk.

Biology

The fungus invades the phloem tissue located just beneath the bark and kills it. This darkened, dead (necrotic) tissue is called a canker. Cankers caused by *G. morbida* are small, but repeated feeding and egg laying by the walnut twig beetles lead to the introduction of the fungus into multiple areas on the same tree. Numerous cankers girdle and kill branches and/or the whole tree by halting the normal flow of nutrients. Essentially the tree is killed by thousands of cankers. This is very different from Dutch elm disease or oak wilt;

these insect-vectored diseases only require one introduction of the fungus into the tree and then the fungus spreads through the whole tree becoming systemic and even able to spread through root grafts. TCD requires multiple introductions by the beetle.

Host Plants

TCD affects many walnut trees (*Juglans* spp.) and species vary in their susceptibility to TCD, but black walnut (*Juglans nigra*) is very susceptible. Black walnut is an important tree in the forest ecosystem and landscape, and is highly valued for lumber, veneer and nut production.

Symptoms

A black walnut tree can be infected with TCD for many years before showing symptoms, but once branch dieback appears the tree rapidly declines and dies within a few years. The first symptom to appear is flagging leaves (leaves wilting and yellowing mid-summer) followed by thinning of the canopy from twig and branch dieback. Eventually the whole tree dies as thousands of cankers girdle branches and the trunk.

Symptoms of TCD include:

- Flagging leaves (Fig. 7)
- Wilting of foliage (Fig. 8)
- Branch dieback
- Thinning canopy (Fig. 9).
- Epicormic shoots (water spouts) (Fig. 9)
- Cankers under the bark (Figs. 5 and 6)
- Dying tree (Fig. 1)

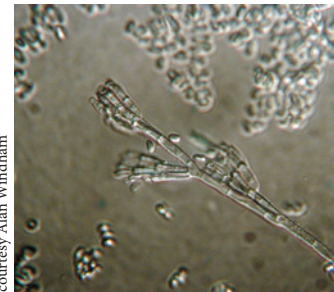


Figure 2. Microscopic view of the conidiophores and conidia of *Geosmithia morbida*.



Figure 3. The yellowish-brown walnut twig beetle is less than 2 mm in length with 4-6 broken grooves near its head (asperities), yellow hairs (setae) on its head and a sharp angle to its posterior (steep declivity of elytra).

courtesy Mark Windham



Figure 4. Walnut twig beetle feeding tunnels and emergence holes.

Management of TCD

The symptoms of TCD on black walnut are similar to other common diseases of walnut as well as decline from other causes, particularly environmental stresses. It is important to evaluate the whole tree and make a proper diagnosis. There are no management options for the disease or the beetle at this time and future control options will be limited due to the tree producing an edible nut.

Preventing the Spread of TCD

TCD can be spread by moving walnut wood for woodworking or as firewood. Nuts are not a concern since TCD is not systemic

in the trees and is not seed-borne. Do not move walnut wood across state lines without checking for state quarantines that have been instituted to prevent infected walnut from moving into the state.

If you have a walnut tree exhibiting signs of decline it is important to contact your state extension service. Do not mail samples to a diagnostic laboratory without contacting them first to receive packaging instructions to prevent beetle emergence during shipment.

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courtesy Mark Windham



Figure 7. Flagging (yellowing) of foliage is an early symptom of thousand cankers disease.

courtesy Mark Windham



Figure 8. Check wilted branches for walnut twig beetles.



courtesy Mark Windham

Figure 5. Canker damage to cambium and phloem tissues due to infection of *Geosmithia morbida* on black walnut tree.



Figure 6. Numerous cankers can be found close to each other in the same limb.

courtesy Mark Windham



courtesy Alan Windham

Figure 9. Thousand cankers disease can lead to shrinkage of canopy (dead limbs) and a profusion of water sprouts (epicormic shoots).

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