

Walnut Thousand Cankers Disease Alert

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First occurrence of Thousand Cankers Disease of Black Walnut (*Juglans nigra*) in Virginia:

On June 24th, 2011, the first case of thousand cankers disease of black walnut was found in two trees with severe epicormic branching on the lower trunk and advanced decline in Chesterfield County, Virginia. Presence of the vector and pathogen associated with this disease, the walnut twig beetle (*Pityophthorus juglandis*) and the fungus *Geosmithia morbida*, was confirmed in the samples. This is the first report of thousand cankers disease of black walnut in Virginia. The Virginia Department of Agriculture and Consumer Services (VDACS) is conducting a delimiting survey to determine the extent of the infestation surrounding the positive find. Initial delimiting survey work has found additional trees with thousand cankers disease in Chesterfield and Henrico Counties.

The first report of thousand cankers disease of black walnut east of the Mississippi River (<http://news.tennesseeanytime.org/node/5684>) was previously reported when the Tennessee Department of Agriculture announced the occurrence of the disease in black walnut trees in Knox County, Tennessee in August 2010. Although this lethal disease has been present in parts of the western U. S. for at least a decade, it had not previously been reported east of the Mississippi River in the native range of the black walnut. The presence of this devastating disease in the southeastern U. S. poses a great risk to black walnut trees in their native range. Virginians should be on the lookout for this disease in black walnut trees.

General information on thousand cankers disease:

Thousand cankers disease is caused by the newly named fungus, *Geosmithia morbida*, which is vectored by the twig beetle, *Pityophthorus juglandis*. When the beetles form galleries beneath the bark of walnut trees, they carry the fungus with them. The fungus forms dark cankers in the phloem around the beetle galleries. The number of beetles that attack an individual tree is enormous and the number of cankers that form is correspondingly large. On black walnut the disease is lethal, causing cankers that coalesce and eventually girdle the trunk and branches. Hickory and pecan (*Carya* species) are resistant to thousand cankers disease. English walnut (*Juglans regia*), the species primarily responsible for commercial nut production, seems to be resistant. More work on the resistance of various tree species is ongoing.

Symptoms of thousand cankers disease:

Despite the graphic name of this disease, cankers are not the most obvious symptom. Initial symptoms of infection may be subtle. Leaves may flush in spring, but then suddenly wilt. Gradually the upper branches die back. Cankers are hidden beneath the bark and can only be seen in the early stages of disease when a thin layer of bark is cut away. A dark brown stain is apparent in the phloem just beneath the outer bark. The discoloration does not extend into the xylem (the wood), so care should be taken to



Early canopy symptoms of thousand cankers disease
(photo by Ned Tisserat, courtesy of Bugwood Network).

avoid cutting too deeply when examining trees for cankers. Beetle galleries are also present in affected phloem tissue and tiny exit holes may be present, especially in branch crevices. Beetles are approximately 2 mm long, so exit holes are very small and may be hard to see. On smooth barked branches the exit holes are easier to see than on branches that have developed rough bark. Trees typically die about two years after the first symptoms are noticed, but this is thought to be many years after the initial infection actually occurred. Trees may resprout from the base, but sprouts are also infected and killed.

History of the Disease:

Thousand cankers disease was first identified in 2001 in infected black walnut trees in Colorado; however, mortality in black walnut stands was observed in Oregon in the presence of twig beetles as far back as the 1990's, so the disease was likely present earlier than 2001. Both the beetle and the fungal pathogen are thought to be native to North America, so the epidemics that occurred in black walnut at that time were not due to an introduced species. On the contrary, the epidemic in black walnut is thought to be due to an expansion of the twig beetle's host range, which followed the introduction of the black walnut, an eastern species, to western states. Previously, Arizona walnut (*Juglans major*) was the main host of the twig beetle and the canker disease did not occur on this host species. The discovery of thousand cankers disease in black walnut in Colorado raised the strong risk that the disease and its vector could be introduced to the native range of the black walnut east of the Mississippi. Such an introduction could easily occur through transport of infected walnut products, especially infected logs or firewood. The lack of resistance in the native population of black walnut could mean rapid spread of the disease in the eastern forest.



*Later stage of thousand cankers disease
(photo by Gary Griffin).*

Preventing the spread of thousand cankers disease:

Currently there are no known control measures for thousand cankers disease of black walnut. Because transport of logs and/or firewood is one of the main avenues for spread of the disease, several states have enacted quarantines restricting the movement of black walnut logs. The movement of timber and nursery stock is also restricted by these quarantines. Education of the public about the need to prevent the transport of logs and firewood is also of paramount importance.

To prevent the spread of thousand cankers disease:

- **Don't transport walnut logs, lumber or firewood.** If you are camping, buy firewood from a local source. Similarly, firewood from the camping location should NOT be transported home. Leave any extra firewood at the camping location.
- **Don't buy walnut (logs, lumber, firewood) from an unknown source.** If you purchase wood from a door-to-door or online vendor, make sure you know where it comes from. If it is not from a local source, don't buy it, and make sure you educate the vendor about the potential for transporting lethal plant pathogens and insect pests on walnut wood.
- **Watch for symptoms of thousand cankers disease in your black walnut trees.** If you suspect your black walnut tree may have thousand cankers disease, contact your local county Extension agent (<http://www.ext.vt.edu/offices/index.html>) for more information on submitting a plant sample to the Virginia Tech Plant Disease Clinic for diagnosis.

Tips for field diagnosis:

- Look for clusters of dead or dying black walnut.
- Look for dieback in the tops of black walnut trees.
- Carefully slice away a thin layer of bark on live branches or the trunk of suspect trees. If you notice beetle galleries or a dark brown stain in the phloem, the tree is suspect for the disease.

Sampling black walnut for thousand cankers disease:

- Cut affected, but still live branches or sections of branches that are between 1-inch to 4-inches in diameter. Smaller branches rarely have the beetles or the cankers and larger pieces of wood present shipping and processing problems. Try to get branches that have beetle holes or galleries.
- Do not remove the bark on branches for submission. Underlying wood often discolors naturally when bark is removed and this can make the cankers difficult to detect.
- Place branch samples in two ziplock-style plastic bags, one inside the other, for submission to the local county Extension office. **Samples submitted by the public** should be taken to the local county Extension office (refer to: <http://www.ext.vt.edu/offices/index.html>) for mailing to the VT Plant Disease Clinic and Insect ID Lab. You will be asked to complete a disease diagnostic form for mailing with the sample. Please take time to fill out the form completely. If you find small, dark brown beetles less than ¼” long, place them in alcohol in a vial and complete an Insect ID form for submission with the sample. Samples will be mailed to the respective labs by the county office.

Problems that could be confused with thousand cankers disease:

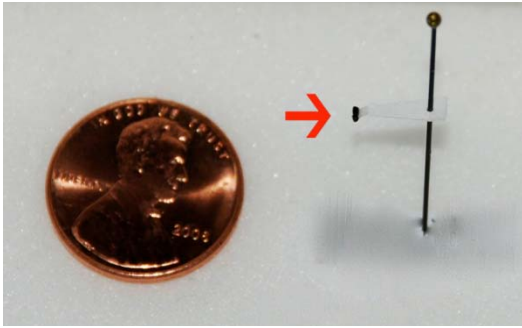
- Environmental stresses, such as frost injury or drought can cause dieback in black walnut, as well as other tree species.
- Mechanical damage to the base of the tree by lawnmowers or soil moving equipment could cause dieback in black walnut, as well as other tree species.
- Neonectria canker, a different fungal disease, could be confused with thousand cankers disease, but cankers caused by the Neonectria fungus are very different in appearance from thousand cankers disease cankers. With Neonectria canker, the bark sloughs away from the surface of the cankers naturally and the sunken cankers are very visible. Edges of Neonectria cankers also typically have ridges of callus tissue that form each year and are apparent without having to cut into the tree. Older Neonectria cankers have a target-like appearance.
- Phytophthora collar rot is a disease caused by a pathogen that attacks at the soil line. Dark brown discoloration occurs under the bark, but is only present at the base of the tree, whereas with thousand cankers disease, the cankers are present all over the tree.
- Root and butt/trunk rot diseases can also cause dieback on black walnut.



*Cankers caused by the fungus *Geosmithia morbida* (photo by Elizabeth Bush).*



Twig beetle galleries associated with thousand cankers disease (photo by Whitney Cranshaw, courtesy of Bugwood Network).



Small size of walnut twig beetle, Pityophthorus juglandis (photo by Eric Day).



The walnut twig beetle, Pityophthorus juglandis (photo by Eric Day).

For further information on this disease, the following web sites may be helpful:

- <http://www.ppd.l.purdue.edu/PPDL/pubs/walnutthousandcankersdisease.pdf>
- <http://tn.gov/agriculture/regulatory/tcd.html>
- <http://www.thousandcankerdisease.com/>
- <http://www.dontmovefirewood.org/>

Note that this disease is an emerging situation. We will send out updates as we acquire more information on this disease.