

Thousand Cankers Disease of Walnut

Frequently Asked Questions for Missouri

Forest Health Program, Missouri Department of Conservation



April 2017

About Thousand Cankers Disease

What is thousand cankers disease (TCD) of walnut?

Thousand cankers is a disease complex recognized in 2008 consisting of the tiny walnut twig beetle and the fungus it carries to walnut trees. Beetles tunnel into tree limbs introducing the fungus. The fungus grows, producing cankers, or areas of infected tissue. As thousands of small cankers grow together to girdle branches, tree health declines and the tree finally dies.

Where has thousand cankers disease been detected?

Thousand cankers has caused widespread death of walnuts in western states (AZ, CA, CO, ID, NM, NV, OR, UT, and WA) over the past decade. TCD, the walnut twig beetle, or the fungus associated with TCD have also been detected in at least seven eastern states (IN, MD, NC, OH, PA, TN, and VA) within the native range of black walnut. TCD survey and detection work is ongoing in Missouri and other eastern states.

Is thousand cankers disease in Missouri?

As of April 2017, this disease has not been detected in Missouri.

Where did the walnut twig beetle come from?

The walnut twig beetle is believed to be native throughout the range of Arizona walnut (*Juglans major*), a walnut species found in New Mexico, Arizona, southern California, and northern Mexico (Chihuahua).

What is the fungus that causes the cankers?

The fungus that causes the cankers was first described in 2008 and named *Geosmithia morbida*. So far, it seems the fungus only causes cankers on walnut trees.

Is the fungus also native?

Research suggests the fungus is probably native to at least the southwestern US.

Why did the walnut twig beetle start attacking black walnuts?

Eastern black walnut has been planted as an urban street tree in western states where it is not native, and closer to the native range of the walnut twig beetle. Over the past couple decades, the walnut twig beetle has expanded its range and black walnut has been attacked. Movement of infested walnut materials spreads the walnut twig beetle to new areas.

SIGNS AND SYMPTOMS

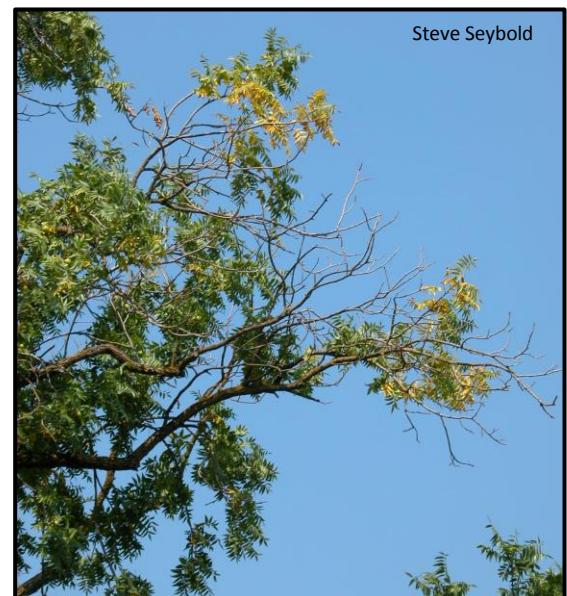
What symptoms should I look for?

Leaves on upper branches will turn yellow, wilt, and die. Branches die back gradually from the upper crown downward. Browning leaves often remain attached to twigs. New sprouts may grow from the tree roots or trunk giving the tree a bushy appearance below dead branches.

Are declining or dying black walnut trees always an indication of TCD?

No, black walnut can be affected by several other diseases and insects. A key to black walnut problems can be found at

http://www.na.fs.fed.us/spfo/pubs/howtos/ht_walnut/key.htm



Steve Seybold



SIGNS AND SYMPTOMS Cont.

Does drought have an effect on this disease?

Recent observations of TCD positive walnut trees in the eastern US indicate drought stress may enhance symptom development.

What is a canker?

A canker is an area of dead plant tissue (lesion) on a plant stem, twig, or branch. These dead areas can block water and nutrient transport to portions of the plant causing the plant to die back.

What do the cankers look like?

Cankers produced from the beetle/fungal attack are under the bark and may be hard to see. Some seepage from the bark may occur, and tiny "pinholes" mark the beetles' exits from the bark, but are difficult to detect. Carefully removing upper layers of bark from dying limbs exposes numerous dark brown cankers with tiny beetle tunnels in the centers of the cankers.

Whitney Cranshaw, Colorado State University



What does the walnut twig beetle look like?

The walnut twig beetle is dark brown and very tiny (1.5-2.0 mm). It is smaller than a grain of rice and similar in size to a broken tip of mechanical pencil lead.

What is the life cycle of the walnut twig beetle?

This insect has not been thoroughly studied. Recent observations in Tennessee suggest adults and larvae overwinter under the bark. In late March and early April the adults emerge and begin to initiate new tunnels under the bark and lay eggs. A generation can be completed in about 4-5 weeks. The number of generations per year is unclear; however several overlapping generations may be produced during a growing season. Adult beetles may also be active on warm winter days.



The twig beetle is the size of the letter "i" on a dime.

MANAGEMENT

If I am growing black walnut in an area where TCD does not occur yet, do I need to change any growing practices or marketing plans?

No. It is still reasonable to expect the spread of TCD will be slow within the eastern U.S. where black walnut is native. If TCD is introduced into the Midwest, walnut plantings near points where walnut twig beetles are introduced will succumb first; more distant areas may not see decline for decades.

Does TCD harm walnut wood?

No, both the beetle tunneling and the *Geosmithia* fungal growth and staining are primarily limited to the tree bark and extend only slightly into sapwood, causing no injury to marketed wood.

Can trees survive this disease?

Observations of eastern black walnut in the western states indicate TCD is usually fatal. However, in the eastern US the fate of affected trees is less clear. Some observations suggest trees that are well-sited may be less vulnerable to the effects of TCD when soil moisture is abundant. Additionally, some walnut species and hybrids seem to have more resistance than eastern black walnut. More research is needed.

What species of trees are susceptible to this disease?

In Missouri, black walnut (*Juglans nigra*) is the primary species susceptible to TCD. However, other walnut species such as butternut may be affected.

How long does it take black walnut trees to die?

We don't know how long it may take a tree to die after it is first attacked by the walnut twig beetle; possibly a decade or more. In Colorado, it takes several years for symptoms to begin to develop on a tree.



What treatments can be used to save infected trees?

So far, no effective treatment has been found. Research is ongoing to try and identify treatments for the walnut twig beetle and/or the fungal canker.

Are there any traps for this insect that could be used for detection before symptoms develop on trees?

Pheromone-baited walnut twig beetle traps are utilized for detection. However, traps have limited sensitivity and walnut twig beetles are likely well-established before detection occurs. Evaluation of trap catches requires trained professionals, because many similar looking beetles are also attracted to the traps.

WHY MISSOURI CARES

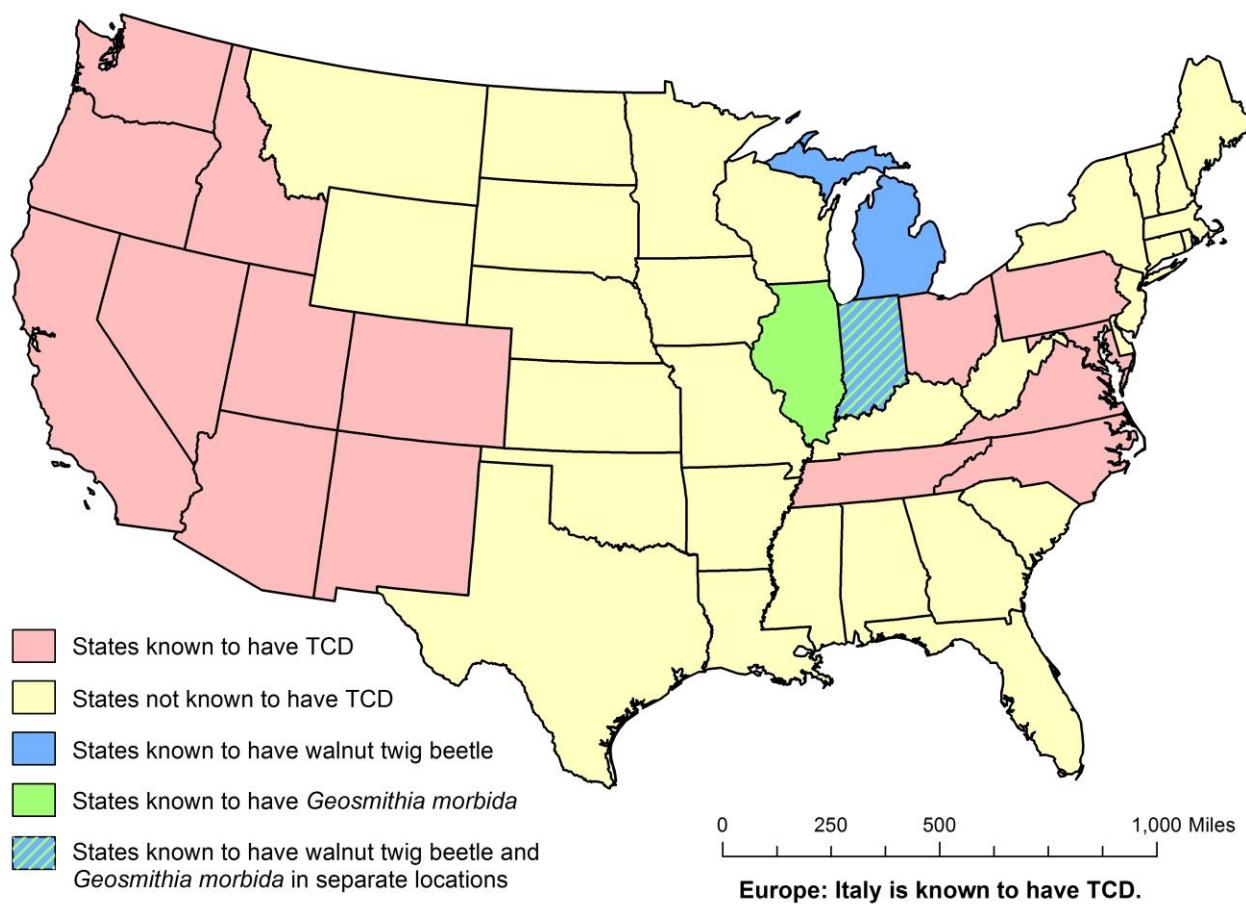
Is thousand cankers disease a concern for black walnut in Missouri?

Absolutely. TCD is presently having devastating effects on black walnut in most western states and has killed trees in some eastern states. This situation could become catastrophic if walnut twig beetles were allowed to colonize other areas where black walnut grows as a native tree.

How important is black walnut to Missouri?

Missouri is home to the largest natural black walnut population in the United States. Black walnut is a valuable tree; it is prized for its timber and nutmeats. Walnut growers invest many decades in growing walnuts in plantations. If TCD were introduced to Missouri in 2010, the Missouri Department of Conservation estimates the economic loss at \$851 million over 20 years.

States Known to Have Thousand Cankers Disease (TCD)





PREVENTION

What should be done to help prevent TCD from reaching Missouri?

It is extremely important that walnut wood is never moved from areas where TCD has been detected. Due to the high value of black walnut for woodworking purposes, the movement of walnut wood is a serious concern.

Can other insects spread this disease?

The walnut twig beetle is the primary insect known to transmit the thousand cankers fungus from tree to tree. In at least Indiana and Illinois, the fungus was detected on other species of insects besides the walnut twig beetle. So far, it appears these other insects are unlikely to cause enough infection for TCD development to occur. However, research is ongoing.

Can the walnut twig beetle and thousand cankers be spread on nuts or nut meat?

Neither the walnut twig beetle nor the *Geosmithia* fungus has been detected within nut hulls or meat.

Can the walnut twig beetle survive in bark mulch?

Yes, walnut twig beetles have survived after bark has been chipped for mulch.

What is being done in Missouri to prevent the introduction of TCD?

A Missouri state quarantine rule prevents movement of all hardwood firewood from states where TCD has been detected, as well as the walnut twig beetle, the *Geosmithia* fungus, and walnut plant parts. Exclusions include nuts, 100% bark-free, kiln-dried walnut lumber, and finished walnut wood products. More information can be found at <http://mda.missouri.gov/plants/pests/TCDEmergencyRule.pdf>

What is being done to look for TCD in Missouri?

Statewide surveys utilizing pheromone-baited walnut twig beetle traps are conducted annually at high risk sites by the Missouri Department of Conservation (MDC) and Missouri Department of Agriculture (MDA) with funding from USDA-Forest Service and USDA Animal Plant Health Inspection Service. In addition, visual surveys identify trees displaying potential symptoms with sample collection and lab analysis as needed. Both agencies are involved in outreach activities to raise awareness of TCD and follow up on reports of declining walnut trees from the public.

Where can I get more information on this situation?

University of Missouri TreePests website: treepests.missouri.edu

National TCD website <http://thousandcankers.com/>

MDC TCD website <http://mdc.mo.gov/thousand-cankers>

MDA TCD website <http://mda.mo.gov/plants/pests/thousandcankers.php>

USFS Pest Alert http://na.fs.fed.us/pubs/palerts/cankers_disease/thousand_cankers_disease_screen_res.pdf

What should I do if I suspect my black walnut tree has TCD?

If you believe your walnut tree is infested with TCD, take photographs of the entire tree, a close-up of the leaves, and any other symptoms. E-mail photos to forest.health@mdc.mo.gov or contact your local MDC forester.

Adapted from "Questions and Answers about Thousand Cankers Disease of Walnut", Whitney Cranshaw and Ned Tisserat, Colorado State University.

<http://bspm.agsci.colostate.edu/files/2013/03/Questions-and-Answers-Revision-April-2012.pdf>

