Thousand Cankers Disease of Walnut

Frequently Asked Questions for Missouri

Forest Health Program, Missouri Department of Conservation

December 2010

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, OR, UT, and WA) over the past decade. In August, 2010 TCD was found in eastern Tennessee, within the native range of black walnut.

Is thousand cankers disease in Missouri?
As of December 2010, 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, 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?
Preliminary research suggests the fungus might be native or has been present in the walnut twig beetle range a long time.

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 range has expanded and black walnut has been attacked.

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. In Colorado, black walnut trees usually die within three years after initial crown symptoms are observed.

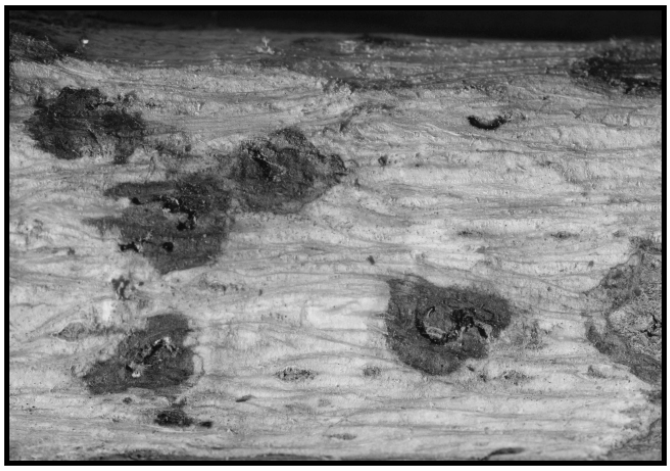
SIGNS AND SYMPTOMS Cont.

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

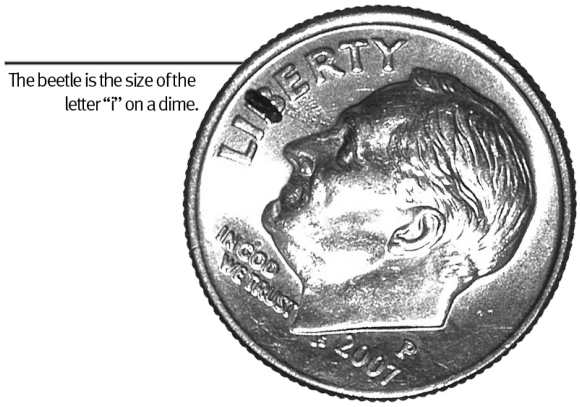
Does drought have an effect on this disease?
Well-watered and maintained black walnut trees have been killed by the disease, as have trees affected by drought.

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. Carefully removing upper layers of bark from dying limbs exposes numerous dark brown cankers with tiny beetle tunnels in the centers of the cankers.



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 Colorado suggest a majority of adult beetles overwinter in small chambers in the thick bark of walnut trunks. In late April and early May the beetles emerge and fly to limbs where they initiate tunneling under the bark and lay eggs. A generation can be completed in about 6-7 weeks. Two, possibly three, generations will be produced during a growing season. In Missouri, beetles may emerge a few weeks earlier, possibly as early as late March in southern Missouri.

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 declines 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, trees that are well-sited and grow vigorously may be more resistant to the effects of TCD. Additionally, some walnut species and hybrids seem to have more resistance than eastern black walnut.

What species of trees are susceptible to this disease?
In Missouri, black walnut is the primary species susceptible to TCD. Other walnut species such as butternut may be affected.

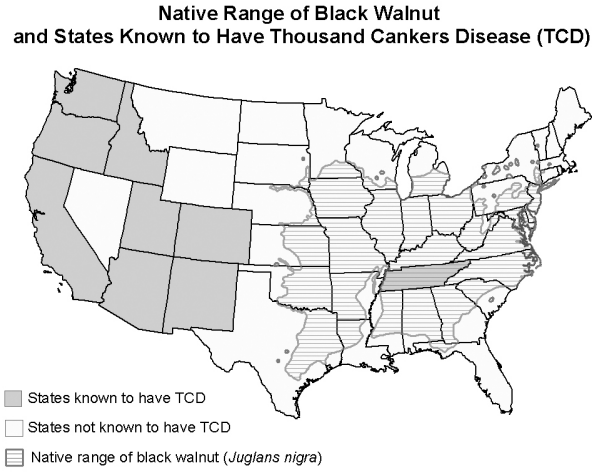
How long does it take black walnut trees to die?
We don't know how long it may take a tree to die after it is first attacked by the walnut twig beetle; possibly a decade or more. In Colorado it takes several years for symptoms to begin to develop.

What treatments can be used to save infected trees?
So far, no effective treatment has been found, but 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?
Walnut twig beetles can be trapped in traps designed for other bark beetles, however this trapping has not proven to be very efficient. Sex pheromones produced by the walnut twig beetle may be useful in the future to make trapping more efficient and effective.

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 in Tennessee. This situation could become catastrophic, eliminating the black walnut species, if walnut twig beetles were allowed to colonize other areas where black walnut grows as a native tree.



WHY MISSOURI CARES Cont.

How important is black walnut to Missouri?
Missouri is home to the largest natural black walnut stand 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 (MDC) estimates the economic loss at $851 million over 20 years.

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 only insect known to transmit the thousand cankers fungus from tree to tree.

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 introducing 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, processed and 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?
High risk sites are being identified and trees at locations where decline is occurring are being evaluated by U.S. Forest Service, MDC and Missouri Department of Agriculture (MDA).

Where can I get more information on this situation?
See the USFS Pest Alert at http://na.fs.fed.us/pubs/palerts/cankers_disease/thousand_cankers_disease_low_res.pdf, the MDC website at http://mdc.mo.gov/thousand-cankers and the MDA website at http://mda.mo.gov/plants/pests/thousandcankers.php

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 leaves, and any other symptoms. E-mail photos to forest.health@mdc.mo.gov or contact your local Missouri Department of Conservation forester.

Adapted from "Questions and Answers about Thousand Cankers Disease of Walnut", Whitney Cranshaw and Ned Tisserat, Colorado State University. http://mda.mo.gov/plants/pdf/tc_qa.pdf