



Minnesota Department of Natural Resources  
Division of Forestry

# FOREST INSECT & DISEASE NEWSLETTER



<http://www.dnr.state.mn.us/fid/index.html>

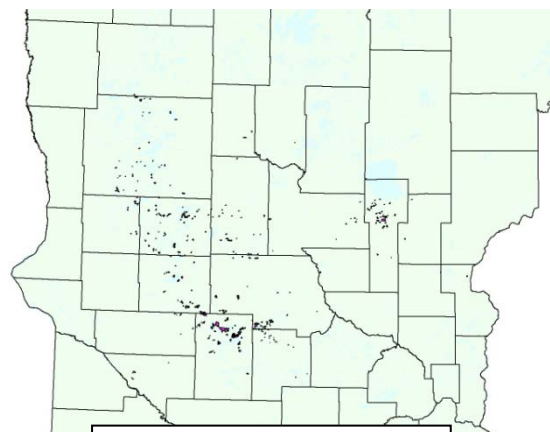
June 28, 2010

## *What's the Buzz?*

### **Forest tent caterpillar populations are building**

In May and early June, there were many sightings and reports of forest tent caterpillars in the western and central counties of MN and a few new locations were found, too. Based on defoliation that occurred last year, there are a few noteworthy "outlier" populations that are causing noticeable defoliation in 2010 which range from trace to severe levels. These occurred in Hubbard County, southern Cass County on the north shore of Gull Lake, in Waukenabo Township in Aitkin County, and in the Twin Cities. FTC populations seem to be intensifying in Ottertail and Kanabec Counties, too. Aerial survey may find some FTC polygons further north this year, we'll have to wait and see.

We expect that pupation and moth flight will be 7 to 10 days earlier than usual this year. So, if you keep your outdoor lights off from now until July 4<sup>th</sup>, FTC moths won't be attracted to trees in your yard. You'll have fewer caterpillars next year than your neighbors who left their lights on. More information for landowners and shade tree owners can be found at [http://www.dnr.state.mn.us/treecare/forest\\_health/ftc/index.html](http://www.dnr.state.mn.us/treecare/forest_health/ftc/index.html).



Forest tent caterpillar defoliation of hardwoods and aspen in 2009

### **Spruce budworm**

The main body of spruce budworm defoliation appears to extend from Hoyt Lakes north to Lake Vermillion and east to Ely. Scattered and isolated pockets of spruce budworm can be found well outside the main body of defoliation. An area of defoliation was reported near Little Pequaywam Lake in St Louis County in southeastern Cloquet Valley State Forest. A white spruce plantation with heavy defoliation was observed west of Longville in Cass County. The aerial survey, to be completed in June and July, will provide a more thorough picture of this year's defoliation.

Spruce budworm development is a couple weeks ahead of normal due to the warm weather we had in April and early May. Near Tower a few larvae had pupated by June 8<sup>th</sup> which was two or more weeks ahead of normal. By June 14<sup>th</sup> 75% of the budworms had pupated near Mountain Iron. By

#### **In this issue:**

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June 18<sup>th</sup> all spruce budworms had pupated west of Longville and about 50% had already emerged as moths.

Spruce budworm is a native insect in Minnesota. The larvae feed on the current year needles of balsam fir and white spruce trees and almost every year it causes defoliation someplace in northeastern Minnesota. The DNR has documented the presence of spruce budworm defoliation in Minnesota each year since 1954. Spruce budworms have a high reproductive capacity, but natural factors such as adverse weather, diseases, predators and parasites and birds (as reported in the May-June 2010 issue of Minnesota Conservation Volunteer magazine) play an important part in holding budworm populations in check. Favorable weather, abundance of host trees and suitable overwintering sites can lead to high population levels that are beyond the control of the natural agents. Widespread defoliation and tree mortality are the result.



*Spruce budworm pupa. Photo by Mike Albers.*

There is one generation of spruce budworms each year. The adult is a small tan moth. Eggs are laid in clusters on balsam fir and white spruce needles in late June or early July. After one to two weeks, tiny larvae hatch from the eggs but do little or no feeding. These tiny larvae find hiding places under bark scales where they spin a shelter and spend the winter. Just as the balsam fir buds began to expand in the spring, larvae emerge and start feeding on needles. The larvae prefer to feed on the new needles but, when populations are very high and as the larvae get older, they will feed on older needles as well. As they feed they use silk threads to web many of the damaged needles onto the shoots. As these damaged needles dry out, the tree takes on a tan or brown appearance and the trees may appear dead. Winds and rains eventually knock these dead needles off the tree. You will likely see that there are still healthy buds as well as some green needles remaining on the tree. Repeated years of defoliation may result in top kill and eventually entire tree mortality. Mortality in balsam fir after 3 to 5 years of heavy defoliation can be quite high. White spruce trees are better to handle the

defoliation, but some mortality may occur following 5 to 7 years of defoliation.

Young larvae are yellowish green with black heads. As they grow they change to a dark greenish brown with light-colored spots along their backs. When the larvae complete their development and feeding they pupate. This usually occurs in late June but with the warm temperatures this spring they have started pupating at least two weeks earlier than usual. The adult moth emerges about 10 to 14 days after pupation.

## Summer shorts

**Jack pine budworm** Based on larval surveys in the Northwest Region, no defoliation is predicted this summer. We found one lonesome larva on all the plots taken. It was found near Badoura Nursery in Hubbard Co. In the Northeast Region, a few larvae were found near Esquagama Lake in central St. Louis County; no defoliation is expected there.

**Balsam fir twig aphid** The diagnostic curled new growth on balsam firs is quite abundant throughout Itasca and St. Louis Counties this year.

**“It’s a larva-eat-larva world out there.”** Best entomology cliché overheard when discussing the eating habits of red turpentine beetles and *Ips* bark beetles.

**Found in Park Rapids Area this month by Forestry staff:** Forest tent caterpillars, eastern tent caterpillars, ugly nest caterpillars, red pine sawflies, yellow-headed spruce sawflies and mountain ash sawflies.

## Pine root collar weevils

Most people don’t realize that they have a serious problem until they see their young pine trees leaning and tipping over. By then, the weevils have usually infested a large percentage of the plantation. The pine root collar weevils, *Hylobius radicus*, have caused extensive mortality in Scots pine plantations in all of Minnesota, and red pine and jack pine plantations in northern Minnesota. Eastern white pines are rarely attacked. Serious damage by this insect is often observed in pine seed orchards and Christmas tree plantations because the trees are widely spaced and are usually grown on sandy, dry soils. Most often the weevils attack trees less than 4 inches in diameter, but they have also been found damaging trees up to 8 inches in diameter.

The white, legless larvae feed under the bark at the root collar. White pitch exudes from the feeding area and forms a black, encrusted layer of pitch combined with soil around the root collar. Tunnels, larvae and pupae can be found in this pitchy soil. Peeling back the pitchy crust on the root collar will reveal the larval feeding area. This feeding

girdles the bark and restricts the flow of nutrients. After several years of damage, you will find that the root collar appears to be sunken and it will be riddled with tunnels and galleries. At this point, the infested trees are so weakened that they have chlorotic or dead foliage and begin to lean. They will eventually tip over.

The weevil can over-winter as larvae, pupae or adults. Larvae of varying sizes can be found during the summer feeding season because egg-laying occurs all summer long. Adults normally survive and breed for two years and can often be found feeding on the bark at the base of the tree. Adults will overwinter in the duff.



*Pine plantation with root collar weevil mortality.*  
Photo by Jana Albers.

Plantations that have extensive grass and weed cover around the base of the trees favor the development of root collar weevils. Keeping long grass and weed cover away from the base of plantation trees is a preventative means of keeping these weevils from becoming established. The most efficient way to prevent root collar weevils in pine plantings is to plant with a denser stocking. It's a good idea to prune off the lowest branches until 1 foot of space exists between the ground the lowest branch as this also works to prevent and diminish weevil attack. If chemical controls become necessary, apply as a drench in mid-May and again in mid-August. These insects are devilishly difficult to control once they are established.

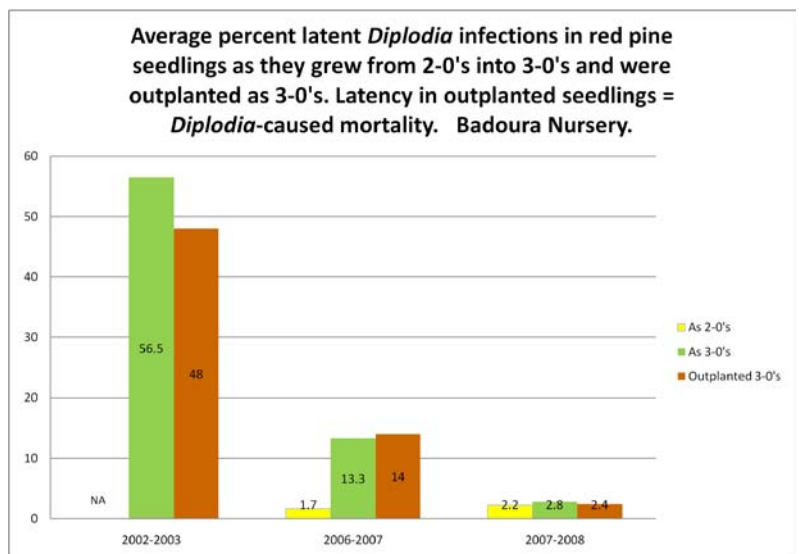
## Frost injury to tree foliage

Warmer than normal temperatures in March and April brought us an early spring. The ice had melted off Pokegama Lake near Grand Rapids by April 6<sup>th</sup>. This normally does not happen until April 20<sup>th</sup> or 21<sup>st</sup>. Temperatures in early and mid-April into the upper 60's were common in Itasca County. Leatherwood was blooming by April 16<sup>th</sup> and some aspen clones were leafing out by April 18<sup>th</sup>. This warm weather was followed by 4 to 5 inches of heavy wet snow in Grand Rapids on May 7<sup>th</sup> followed by 22 degree temperatures on May 9<sup>th</sup>. The cold temperatures resulted in frost damage to tender young tree leaves in locations scattered throughout the north. Frost killed the half-inch long red oak leaves near Brainerd. Red oaks and willows near Cass Lake were also reported to have suffered frost damage. In some locations new growth on balsam fir and white spruce were killed by the cold temperatures.

## Changes in *Diplodia* latency levels as red pine seedlings grow and are outplanted

Most of the *Diplodia* studies that we've reported center around its effects on 2-0 red pine seedlings. We have followed seedlings from 2-0's to 3-0's to survival of the 3-0's after outplanting. See chart. Latency in the 2-0 and 3-0 seedlings was determined by lab assays of seedlings growing in the nursery. Latency in outplanted seedlings was determined by lab verification of *Diplodia*-caused mortality of seedlings from 1/10 ac fixed-radius plots.

3-0 seedlings often have a higher level of latency than they did as 2-0's because they have had another year to accumulate infections, usually from adjacent dead seedlings. The mortality levels of outplanted seedlings were very similar to the level of latency found in the 3-0 seedlings because they did not have time (or opportunity) to acquire new infections.



# *Minimizing the spread of exotics*

## **Do you think your ash tree has EAB?**

With the discovery of emerald ash borer (EAB) in Minnesota last year, homeowners around the state have suddenly become more aware of the condition of their trees. This new awareness is great – it's an indication that the value of trees is increasing among the public. But starting to notice tree health leads to more phone calls to state agencies and perhaps waiting until a specialist is available to return the call to determine what is wrong with the tree. In Hennepin, Ramsey and Houston counties especially, where EAB quarantines are in place, homeowners who believe they have EAB call and want help (or want to help *us*) right away. In order to get information about EAB to the public and help the homeowner as quickly as possible, the Minnesota Department of Agriculture points callers to a checklist of EAB symptoms to rule out other causes.

### **Use the “Do I Have EAB?” checklist**

([http://www.mda.state.mn.us/en/plants/pestmanagement/~media/Files/plants/eab/eab\\_doihaveit.ashx](http://www.mda.state.mn.us/en/plants/pestmanagement/~media/Files/plants/eab/eab_doihaveit.ashx)) Since tree identification is not always easy for the general public, the checklist begins by asking if the symptomatic tree is an ash, and referring the reader to information on ash identification and how to rule out similar tree species. Once the tree is identified as an ash, the checklist asks if it has symptoms of EAB. To the untrained, a sick tree is a sick tree, and even describing its condition is a challenge for the average homeowner. Here the checklist refers the reader to photos of symptoms caused by EAB, with the intent that trees with ash anthracnose will not be mistaken for trees with EAB.

### **Symptoms and signs of EAB**

Because trees infested with EAB are likely to resemble a lot of other trees with symptoms of stress, it's not safe to assume that a thinning crown or dying from the top down means certain infestation. Profuse sprouting around the base or on the trunk of the tree is also an indicator of stress due to any number of factors. EAB kills trees slowly, as more and more larvae feed on the phloem below the bark and cut off the food supply. Observations have shown that as trees fill up with larvae, hungry woodpeckers leave tell-tale signs of feeding that can lead to a positive diagnosis, especially in winter when woodpecker feeding holes can be seen more easily. Often if bark is peeled from around the “wood-peck,” S-shaped EAB galleries can be seen, clinching the diagnosis. If a larva is lucky enough to escape a woodpecker's keen senses, it may grow to maturity and emerge from the tree as an adult beetle, leaving behind the characteristic D-shaped exit hole, another positive sign.

### **Identifying EAB**

If the homeowners think they have seen a live beetle, the checklist directs them to photos of EAB and insects that resemble EAB to compare them with what they saw. With EAB frequently in the media, people start reporting anything they haven't seen before – even such unlikely critters as cicadas. Once the checklist has helped the homeowner narrow down the possibilities, then the specialist can focus on the truly suspect trees.

### **Who you gonna call?**

If, after going through the checklist, the homeowner believes their tree is infested with EAB, they need to report it to the Minnesota Department of Agriculture (MDA). The best way to do this is to first contact [Arrest.The.Pest@state.mn.us](mailto:Arrest.The.Pest@state.mn.us). One may also call the Arrest the Pest line at (651) 545-6684 in the metro area, or 888-545-6684 toll-free. If the tree sounds truly suspect, staff at MDA may decide look at the tree, or a more likely scenario is that a trained Forest Pest First Detector will be contacted to make the trip.

### **Disposal of ash materials in Hennepin, Ramsey or Houston counties**

If you are located in one of the quarantined counties, ash logs, lumber, tree waste, chips, mulch and hardwood firewood are regulated materials and may not be moved beyond the quarantined boundaries unless given permission by the MDA and/or United States Department of Agriculture (USDA). A list of several disposal options in each quarantined county may be found at:

<http://www.mda.state.mn.us/en/sitecore/content/Global/MDADocs/pestsplants/eab/ashtreewaste.aspx>. If you do not have access to the Internet, contact a forest health specialist to request a mailed copy.

Since EAB appeared on the Minnesota scene, it seems that homeowners are taking a greater interest in the health of their trees. State agencies such as the MDA and DNR are happy to assist the public in identifying an EAB infestation, and provide homeowners with the above resources to help themselves first, so that all calls can be responded to as quickly as possible.

## What is the difference between “DNR-approved firewood” and “certified firewood”?

The DNR approved firewood vendor list has grown to more than 900 businesses statewide in the past three years. With the establishment of emerald ash borer in three counties within Minnesota, confusion has mounted concerning the difference between DNR approved firewood and certified firewood.

The DNR “approves” vendors to sell firewood to be used on DNR-administered lands. The DNR does not “certify” firewood or firewood vendors. Certification is a legal term usually requiring site inspection, a binding agreement of some kind and considerably more paperwork than currently required by the DNR. In Minnesota, two other agencies do certify firewood. Vendors can have their kiln certified by Minnesota Department of Agriculture (MDA). Or, if located in a quarantined county, vendors can have their firewood certified by the United States Department of Agriculture (USDA) for shipment outside of the quarantined area.

The DNR approves firewood so it can be used on DNR-administered lands. Ash firewood is not allowed on state-administered lands, regardless of how it has been treated. There are three criteria that the DNR uses as a basis for firewood approval. These include:

- 1) Untreated firewood that has been harvested within 100 miles of the DNR facility where it is to be used. Firewood harvested anywhere outside of Minnesota is not allowed on state-administered lands, regardless of whether or not it is federally certified.
- 2) Firewood that has been treated in a kiln certified by the Minnesota Department of Agriculture (MDA). To certify a wood kiln, the MDA inspects the operation and tests the kiln to make sure it is capable of holding the temperature required to meet federal standards. Once the kiln is certified, the vendor is given the state (MDA) shield to put on their label.
- 3) Firewood that has had 100% of the bark and ½ inch of the sapwood removed (federal standards). In this case, DNR staff inspects the product and/or operation prior to approval to ensure the treatment meets federal standards.

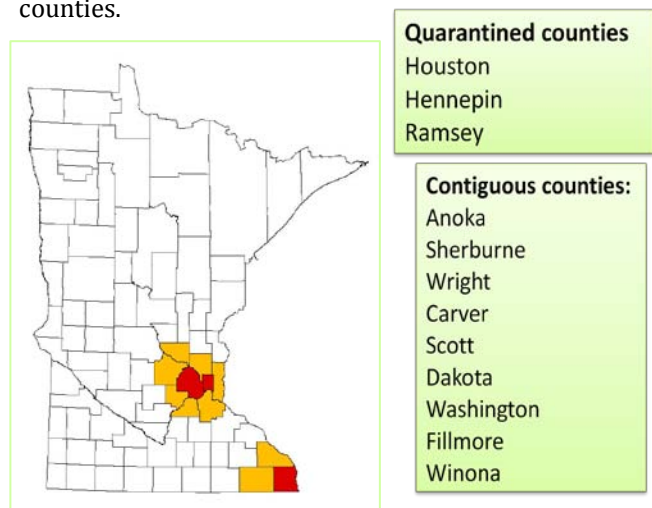
In all cases, the firewood user must have documentation that verifies the wood came from a DNR approved vendor in order to use the firewood on DNR-administered lands. This can be a proof of purchase, sales receipt, or firewood label that indicates the vendor’s business information.

Keep in mind that DNR firewood regulations do not apply to firewood use on non-state lands. Nor do they

apply to all firewood vendors selling to the public. The DNR firewood regulations are designed for the sole purpose of protecting DNR administered lands and thus only affect firewood vendors selling to individuals wishing to bring their firewood onto DNR administered lands. However, other organizations, such as federal campgrounds, county parks and communities may have similar firewood restrictions and a number of them have decided to require “DNR-approved firewood” for use on their own lands.

The MDA has quarantined three Minnesota counties because of the presence of the emerald ash borer. The movement of all hardwood firewood is restricted unless it is under a compliance agreement between the vendor and MDA. Quarantines are generally based on county boundaries. The DNR does not have the authority to restrict the movement of anything across county lines. However, to protect state lands, the DNR regulations allow firewood harvested in a quarantined county to be used only at DNR facilities in those or adjacent quarantined counties.

To further protect state lands, the DNR identified a “buffer” of counties surrounding the quarantined counties, from which firewood can only be used in those or adjacent buffer counties. See map and list of contiguous counties. This affects vendors operating in Anoka, Carver, Dakota, Fillmore, Scott, Sherburne, Washington, Winona, Wright, Fillmore, Winona and Houston Counties. For instance, a vendor harvesting firewood in Fillmore County can sell it for use in any DNR facility in Fillmore, Winona or Houston Counties but not for use in any DNR facilities outside of those counties.



The DNR approves vendors to sell firewood to be used on DNR administered lands. It does not “certify” firewood or firewood vendors. There are two types of certification from two other agencies:

1. Vendors can have their kiln certified by MDA.
2. If they are in a quarantined county, vendors can have their firewood certified by the USDA

for shipment outside of the quarantined area. USDA certification requires a compliance agreement before any regulated articles can be moved outside of the quarantined area.

Having a compliance agreement does not certify that the wood is pest free, however. It only certifies that the firewood has been treated as per federal standards. Because it originates from a quarantined area, i.e. an area with a known infestation of a regulated pest, federally certified firewood is more at risk of being infested than wood harvested outside of a quarantined area. So, if given the choice, buy or acquire firewood locally and outside of any quarantined areas.

In summary:

- DNR approved firewood is non-ash wood that was harvested in Minnesota and fits one of these three criteria:
  1. Untreated firewood that has been harvested within 100 miles of the DNR facility where it is to be used.
  2. Firewood that has been treated in a kiln certified by the MDA.
  3. Firewood that has had 100% of the bark and ½ inch of the sapwood removed.

- Wood from a MDA certified kiln has been heat treated, and may or may not come from a DNR approved vendor. Check the label for “DNR approved”. If approved, it can be used at any DNR administered facility.
- Federally certified firewood is that which comes from a quarantined county under a USDA compliance agreement and may or may not come from a DNR approved vendor. If it also is DNR approved, it can be used on DNR administered facilities only in those quarantined counties or in counties adjacent to quarantined counties.
- Any vendor wishing to become a DNR approved vendor must apply to the DNR, whether or not their kiln is MDA certified or their wood has been USDA certified.

If in doubt about the use of firewood in a state administered campground, state forest campground or wildlife management area, plan to purchase wood at the state facility where you’re staying or from a DNR approved vendor. And don’t forget your receipt!

## *Feature Article*

# News about Thousand Canker Disease of black walnut

Thousand Cankers Disease (TCD) is a pest complex that is causing mortality in walnut in many western states. It is caused by the walnut twig beetle (*Pityophthorus juglandis*) and an associated fungus (*Geosmithia sp. nov.*). Black walnut (*Juglans nigra*) is highly susceptible to this disease, but TCD has not yet been found in the native range of black walnut.

**USFS Pest Alert** In May, the USFS released a TCD Pest Alert; NA-PR-02-10. It has not been posted to their Pest Alert website, <http://www.na.fs.fed.us/pubs/palerts.shtm>, but you should be able to find it there in a few weeks. It is printed here with permission. See below.

**Also available is a field identification guide** Released in the fall of 2009, this guide can be found on [http://mda.mo.gov/plants/pdf/tc\\_fieldidentification.pdf](http://mda.mo.gov/plants/pdf/tc_fieldidentification.pdf). The walnut twig beetle, *Pityophthorus juglandis* Blackman (WTB), is native to California, the southwestern U.S., and Mexico, where its original hosts were western black walnut trees. Widespread ornamental plantings of eastern black walnut and English walnut in the western U.S. have provided new hosts for the WTB, and have permitted a range expansion of the beetle into additional western states. WTB may expand its range further into the eastern U.S., where it is not known to occur. Historically, this tiny beetle was not considered a pest of walnut trees, and was often overlooked due to its size and its behavior of colonizing branches. WTB is associated with a newly described fungus, *Geosmithia sp.*, which colonizes and kills the phloem of walnut branches and stems, and causes the formation of oozing bark cankers. This disease only occurs on walnut.

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## Thousand Cankers Disease

Dieback and mortality of eastern black walnut (*Juglans nigra*) in several Western States have become more common and severe during the last decade. A tiny bark beetle is creating numerous galleries beneath the bark of affected branches, resulting in fungal infection and canker formation. The large numbers of cankers associated with dead branches suggest the disease's name—*thousand cankers disease*.

The principal agents involved in this disease are a newly identified fungus (*Geosmithia* sp. with a proposed name of *Geosmithia morbida*) and the walnut twig beetle (*Pityophthorus juglandis*). Both the fungus and the beetle only occur on walnut species. An infested tree usually dies within 3 years of initial symptoms.

Thousand cankers disease has been found in many Western States (figure 1). The fungus and the beetle have not been found east of the Great Plains. However, a number of factors suggest that this disease could establish in eastern forests: the widespread distribution of eastern black walnut, the susceptibility of this tree species to the disease, and the capacity of the fungus and beetle to invade new areas and survive under a wide range of climatic conditions in the West.

### Disease Symptoms

The three major symptoms of this disease are branch mortality, numerous small cankers on branches and the bole, and evidence of tiny bark beetles. The earliest symptom is yellowing foliage that progresses rapidly to brown wilted foliage, then finally branch mortality (figure 2). The fungus causes distinctive circular to oblong cankers in the phloem under the bark, which eventually kill the cambium (figure 3). The bark surface may have no symptoms, or a dark amber stain or cracking of the bark may occur directly above a canker. Numerous tiny bark beetle entrance and exit holes are visible on dead and dying branches (figure 4), and bark beetle galleries are often found within the cankers. In the final stages of disease, even the main stem has beetle attacks and cankers.

### *Geosmithia* sp.

Members of the genus *Geosmithia* have not been considered to be important plant pathogens, but *Geosmithia morbida* appears to be more virulent than

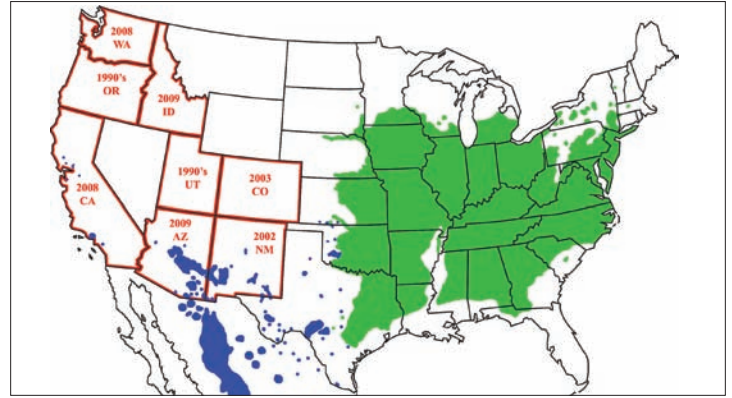


Figure 1. Thousand cankers disease has been confirmed in eight western states (outlined in red) as of April 2010. The year when symptoms were first noted is given. Native distributions of four species of western walnuts (blue) and eastern black walnut (green) are also shown. Eastern black walnut is widely planted in the West, but not depicted on this map.



Figure 2. Wilting black walnut in the last stages of thousand cankers disease.



Figure 3. Small branch cankers caused by *Geosmithia morbida*.

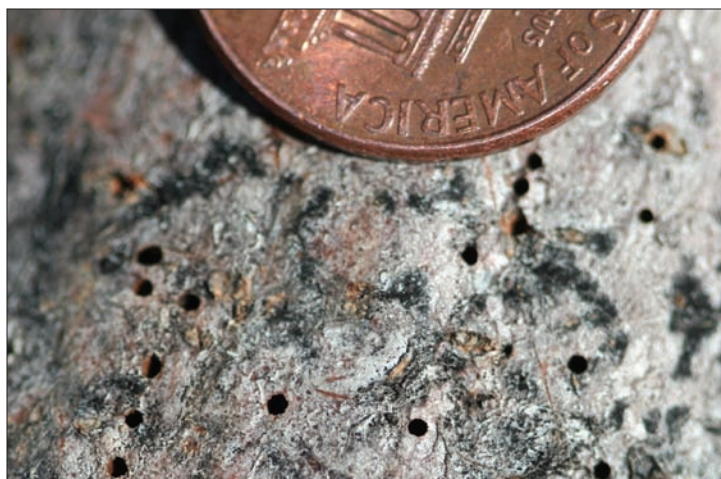


Figure 4. Exit holes made by adult walnut twig beetles.

related species. Aside from causing cankers, the fungus is inconspicuous. Culturing on agar media is required to confirm its identity. Adult bark beetles carry fungal spores that are then introduced into the phloem when they construct galleries. Small cankers develop around the galleries; these cankers may enlarge and coalesce to completely girdle the branch. Trees die as a result of these canker infections at each of the thousands of beetle attack sites.

## Walnut Twig Beetle

The walnut twig beetle is native to Arizona, California, and New Mexico. It has invaded Colorado, Idaho, Oregon, Utah, and Washington where walnuts have been widely planted. The beetle has not caused significant branch mortality by itself. Through its association with this newly identified fungus, it appears to have greatly increased in abundance. Adult beetles are very small (1.5 to 2.0 mm long or about 1/16 in) and are reddish brown in color (figure 5). This species is a typical-looking bark beetle that is characterized by its very small size and four to six concentric ridges on the upper surface of the pronotum (the shield-like cover behind and over the head) (figure 5A). Like most bark beetles, the larvae are white, C shaped, and found in the phloem. For this species, the egg galleries created by the adults are horizontal (across the grain) and the larval galleries tend to be vertical (along the grain) (figure 6).

## Survey and Samples

Visually inspecting walnut trees for dieback is currently the best survey tool for the Eastern United States. Look for declining trees with the symptoms described above. If you suspect that your walnut trees have thousand cankers disease, collect a branch 2 to 4 inches

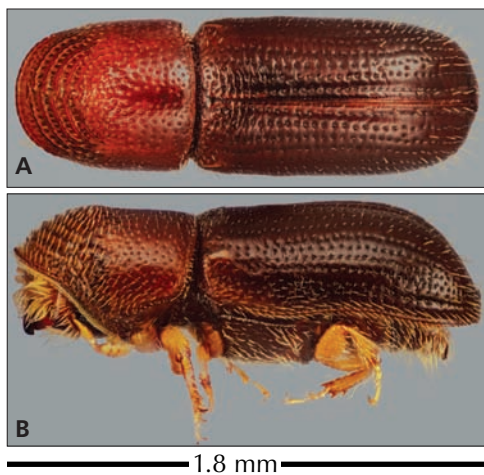


Figure 5. Walnut twig beetle: top view (A) and side view (B).



Figure 6. Walnut twig beetle galleries under the bark of a large branch.

in diameter and 6 to 12 inches long that has visible symptoms. Please submit branch samples to your State's plant diagnostic clinic. Each State has a clinic that is part of the National Plant Diagnostic Network (NPDN). They can be found at the NPDN Web site ([www.npdn.org](http://www.npdn.org)). You may also contact your State Department of Agriculture, State Forester, or Cooperative Extension Office for assistance.

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### Photographs:

Figure 1: Andrew Graves

Figure 2: Manfred Mielke, U.S. Forest Service

Figures 3, 4, 6: Whitney Cranshaw, Colorado State University, [www.forestryimages.org](http://www.forestryimages.org)

Figure 5: Steve Valley, Oregon Department of Agriculture

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This newsletter is developed as a service to forest managers and shade tree owners. The Forest Health Unit would appreciate comments concerning the newsletter and its contents. These can be directed to Jana Albers, Editor, 1201 E. Highway # 2, Grand Rapids, MN 55744. To add, change or delete your name from our mailing list, please contact the editor. Thanks.

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