



Central States Forest Health Watch



Current forest health information for land managers in Illinois, Indiana, Iowa and Missouri

November 30, 2006

About This Newsletter...

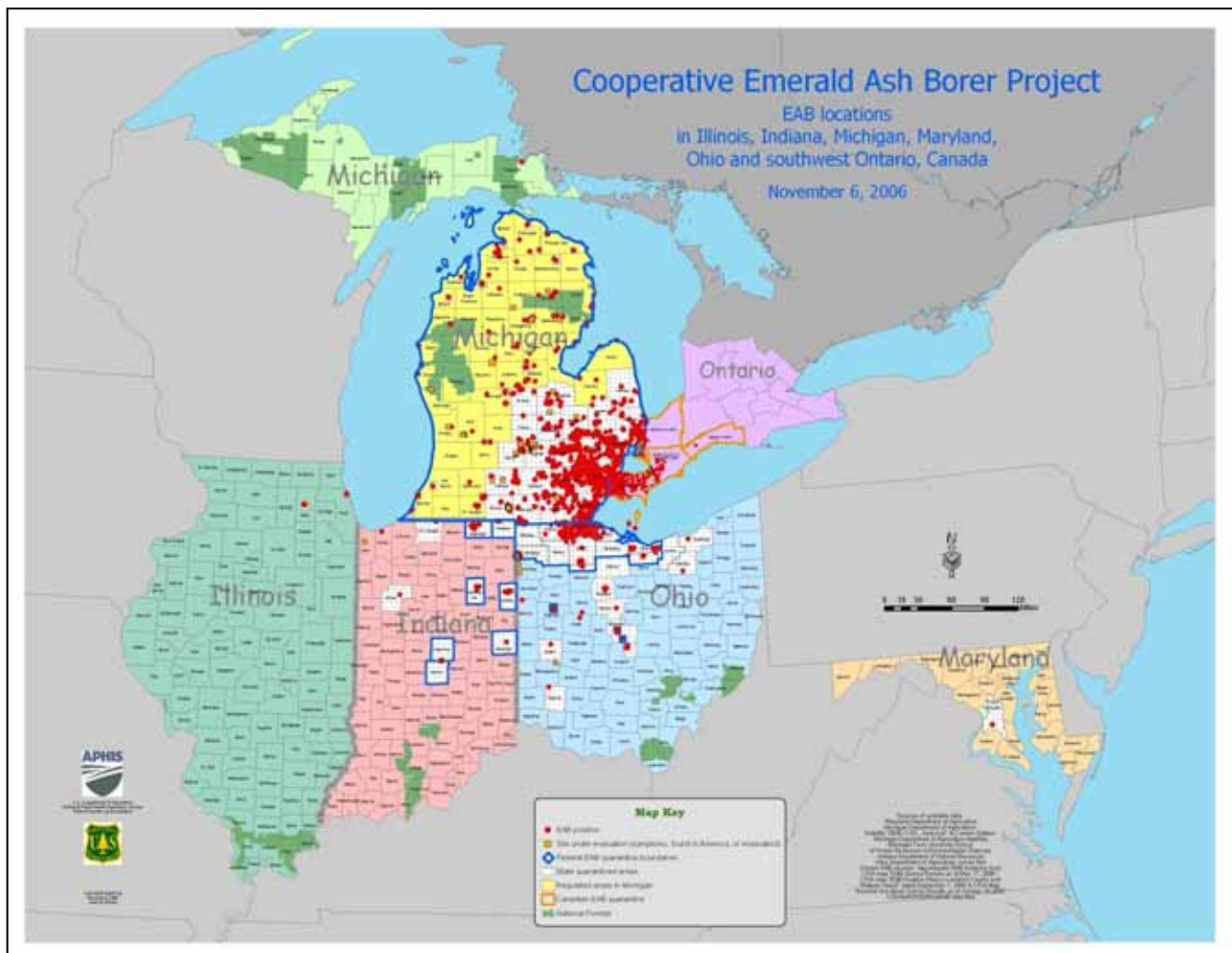
This collaborative effort of the USDA Forest Service Northeastern Area, Missouri Department of Conservation, and Indiana, Iowa and Illinois Departments of Natural Resources will provide updates three times per year (Spring, Summer, Autumn) on forest health issues of regional interest. *[Note: no summer 2006 edition was produced.]*

Important Regional Forest Health Issues

Below you will find updates some of our “most popular” exotic forest pests: emerald ash borer, Sirex woodwasp, gypsy moth, and sudden oak death.

Emerald Ash Borer

In 2006, emerald ash borer (EAB) infestations were found near Indianapolis and South Bend, Indiana; in the Chicago area; and near Dayton, Ohio (see map below). Additional infestations were found in northern Ohio, northern Indiana and southern Michigan. A couple of infested trees were found in Maryland, near a nursery



that had received infested nursery stock back in 2003. Most of these infestations are not considered “new” introductions; rather we are finding infestations that were probably introduced 4-6 years ago. In many cases, local tree decline and tree death are drawing the attention of homeowners, park managers, and city forestry officials. Girdled trap trees are also being used to find low-level emerald ash borer populations. Firewood movement is a likely culprit in a number of the sites found to date. Land managers looking for emerald ash borer should focus efforts on areas where firewood use is likely. Anything that can be done to eliminate the long distance movement of firewood may help keep insects such as emerald ash borer out of uninfested areas.

Some of the key recent developments in EAB include:

- Effective on December 1st, USDA APHIS has expanded its emerald ash borer (EAB) quarantine to include the entire states of Illinois, Indiana and Ohio, more than doubling the previously quarantined area which includes the entire lower peninsula of Michigan. The federal order restricts the interstate movement of regulated articles that originate within the quarantine area. Regulated articles include ash nursery stock and green lumber; any other ash material including logs, stumps, roots, branches, as well as composted and uncomposted wood chips. Due to the difficulty in distinguishing between species of hardwood firewood, all hardwood firewood, including ash, oak, maple and hickory are regulated articles.
- State agencies in Wisconsin have greatly increased their educational outreach efforts to targeted groups (including campers and hunters) regarding movement of firewood and other potential means of transporting exotic pests. Other States are following suit.

For emerald ash borer status and information visit:

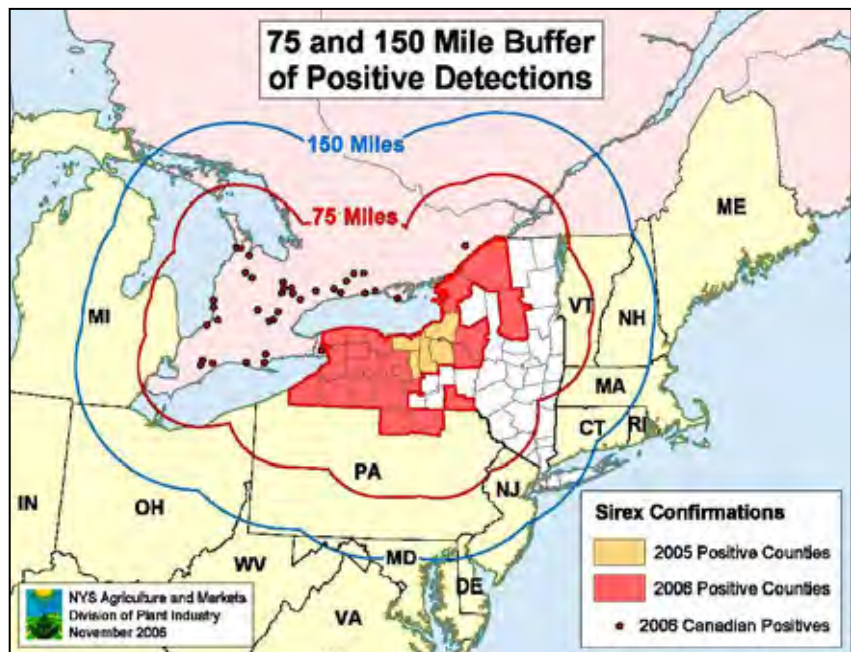
<http://www.emeraldashborer.info/>

Sirex Woodwasp

Sirex woodwasp, *Sirex noctilio*, is native to Europe and Asia, and it is an exotic pest of pine plantations in the Southern Hemisphere. It has been recognized as a serious potential threat to our North American pine resource for many years. A single *Sirex* specimen was found in packing material at an industrial site in Indiana in 2002, but subsequent surveys have determined that it is not established near that location. *Sirex* woodwasp was found established near the port area of Oswego, NY in May 2005. Surveys in 2005 detected it in 5 NY counties, and in a couple locations in Ontario along the NY border. Further surveys in 2006 have detected it in 20 additional NY counties, 2 counties in PA, and over much of southern Ontario. Surveys in the remainder of the East, including MN, WI, MI, IL, IN, and OH, did not detect *Sirex* woodwasp in 2006. This insect raises great concern because of its history of large scale damage and the wide number of pine species that it has attacked in the Southern Hemisphere. We will keep you posted of new developments in future editions of the CSFW.

For further info on *Sirex* woodwasp, visit the following website:

http://www.aphis.usda.gov/ppq/ep/emerging_pests/sirexnoctilio.html



Gypsy Moth Activities

The tables below summarize the summer 2006 activities in the Central States.

States without established populations:			
	# traps set	Total moths captured	Comments
Iowa	4,647	20	Traps were placed by coordinated effort of State and Federal agencies and city and county foresters across Iowa. Out of the 20 moths captured, 10 were caught in a single trap at a nursery in Linn County. Another trap in Johnson County caught 2 moths. The remaining 8 moths were single catches spread across 6 counties in Central and Eastern Iowa. No eradication treatments are planned for 2007.
Missouri	Over 9000	17	Traps were placed in 61 out of 114 counties. Trapping density is based on risk of introduction, with the highest density of traps being set in the lakes regions and St. Louis, because of the elevated risk of introduction by out-of-state visitors to those areas. 13 moths were trapped in the St. Louis area in 2006

In states with established populations, the state is generally divided into 3 zones. The “quarantine area” is the portion where gypsy moth is considered established. The “STS Action zone” is the portion of the state where treatment activities are undertaken to limit moth population, and thus “slow the spread” of gypsy moth. The remainder of the state is considered uninfested, and actions may be taken to eradicate any infestations that are found in those areas.

States with established populations:					
	Quarantine Area	Slow-The-Spread (STS) Actions	Counties with STS treatments	STS trapping results	Trapping trends outside quarantine and STS area
Illinois	One county (Lake) is generally infested and is under quarantine.	20,341 acres treated with mating disruption 4,022 acres treated with Btk .	Boone, Cook, DuPage, Kane, Ogle, Will, and Winnebago	24,834 moths captured in the 6176 traps set in the 18 county STS trapping area	6,330 traps were set by APHIS in 85 counties in central and southern IL. A total of 19 gypsy moths were caught across 12 counties. Egg mass surveys will be conducted this winter at a Rock Island County site and a Bond County site.
Indiana	Steuben, LaGrange, Elkhart, Noble, DeKalb, Allen, and Porter counties are under quarantine. No defoliation was observed during aerial survey.	26,529 acres on 11 sites were treated with mating disruption; 11,085 acres on 19 sites with Btk. 11 sites were treated with Dimilin from the ground.	Kosciusko, Whitley, Allen, Porter, Noble, St. Joseph, Scott, Elkhart, Lake, and La Grange.	4814 moths were captured in the traps set in the STS Action area.	Traps set by APHIS & IDNR in the remainder of the state below the STS zone captured 146 moths. 25 moths were caught at a Scott County site that was treated in 2006. A trap in Delaware County caught 21 moths, and egg masses were discovered on site. This site will be treated in 2007. All positive traps in 2006 will be delimit trapped in 2007

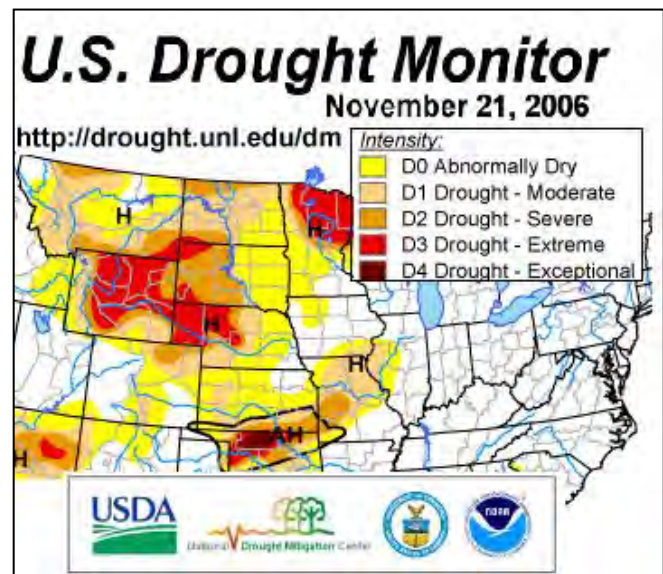
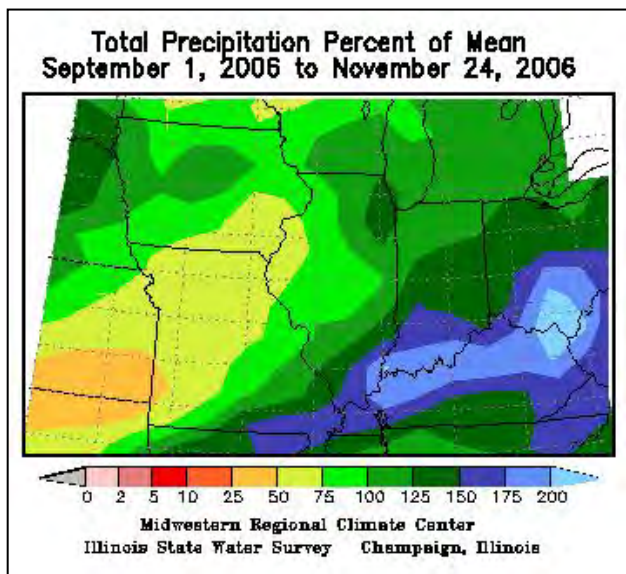
Sudden Oak Death

As you may recall, nursery material (primarily rhododendrons, viburnum, and other ornamental plants) potentially infected with *Phytophthora ramorum*, (the pathogen that causes Sudden Oak Death) has been distributed all across the USA, originating from infested nurseries in California and Oregon. This unfortunate series of events has spawned widespread surveys of nurseries and forests to detect whether the pathogen has been introduced or become established in the Eastern USA. To date many *Phytophthora* species (including *P. cinnamomi*, *P. citricola*, *P. cambivora*, and others) have been detected in forest surveys, but no established populations of *P. ramorum* have been confirmed in the Eastern US.

Based on negative results from nursery perimeter and general forest surveys over the past 4 years, and research results on survey methodology, the survey focus will shift to stream baiting in 2007. Stream baiting using *Rhododendron* leaves has been shown to be a very effective way to identify watersheds that are infected by *P. ramorum*. High priority watersheds are those within the highest risk areas, including those with high populations of host plants that have the potential to produce inoculum, plus areas where SOD positive plants that have been shipped to nurseries and retail outlets.

Weather Overview

Moderate to severe drought conditions began in western Iowa and across most of Missouri by mid-August. The situation remained abnormally dry in northwest Iowa, but intensified to extreme drought in central Missouri. Autumn rainfall was above normal in parts of Illinois and much of Indiana, but most of Missouri missed out (see map). The result is that we are going into winter with continued drought across much of Missouri, and abnormal dryness in NW Iowa (see map). For the trees in this area, this means increased chance for winter drying on conifers and greater stress to trees.



As for other weather conditions this fall, the beginning of October was unseasonably warm, but by the middle of October, record low temperatures were being recorded in parts on Iowa, Missouri, Illinois, and Indiana. On October 12th, early measurable snowfall blanketed parts of northern Iowa, Illinois, and Indiana, and again in northern Iowa on November 10th. Warm temperatures returned to the region around Thanksgiving, giving one more chance to put up holiday lights and water conifers before winter truly sets in.

What Else is Being Reported around the Region

Weather conditions during spring and summer 2006 resulted in development of significant **anthracnose** on sycamore in southern Indiana and oak and ash in northern Indiana.

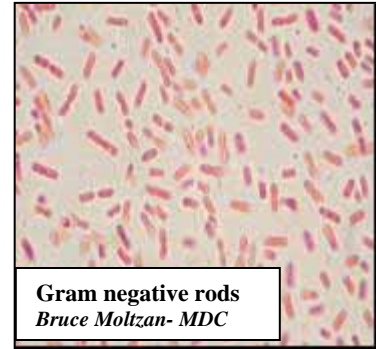
The **Forest Tent Caterpillar** (FTC) epidemic in Southeast Indiana continued in 2006, resulting in moderate to severe defoliation in Ohio and Dearborn Counties. This epidemic is the northwestern edge of a multi-state epidemic centered in Kentucky. Natural controls, such as the “friendly fly” that parasitizes FTC, are expected to cause a collapse of the southern part of the epidemic in 2007, but significant damage is still expected in the northern part of the epidemic area.

Dead elms from the recent **Dutch elm disease** outbreak are very prominent across the Indiana landscape, with trees killed in woods, fencerows, and yards across the state.

Feature Topic: Bacterial Leaf Scorch (BLS) by Bruce D. Moltzan

Importance

Bacterial leaf scorch (BLS) is a widely distributed disease which occurs throughout the Western Hemisphere. Its host range is diverse causing two types of damage based on symptomology either as leaf scorch or stunted plants. Best known for its economic impact upon viticulture as the cause of Pierce's disease of grape, it has recently gained much attention for damage to amenity trees grown in urban landscapes. Crop specific problems such as citrus variegated chlorosis, coffee leaf scorch, phony disease of peach, and plum leaf scald are just a few examples of important production trees susceptible to this disease. The extent of BLS was originally thought only to be a problem on landscape trees east of the Appalachians, but now is frequently diagnosed or suspected on various hardwoods, especially oaks, throughout much of the Midwest. Bacterial leaf scorch distribution and severity is still largely unknown.



Cause

Bacterial leaf scorch is caused by *Xylella fastidiosa* Wells *et al.* 1987 which is the type species for the genus. The pathogen is characterized as a gram negative, xylem-limited, fastidious plant bacterium. The term 'fastidious' is used to convey that the nutritional requirements for *Xf* are known to be complex and that it can only be grown in special artificial media under exacting temperatures, salt content, anaerobic, aerobic, and/or other specific conditions. Many bacteria can synthesize the complex molecules they need from basic minerals, but fastidious bacteria require preformed organic molecules such as vitamins, amino acids, nucleic acids, and carbohydrates. Once introduced into the xylem, *Xf* primary mode of action is digestion of adjacent cell walls via enzymatic activity. It then remains in the xylem sap and may be further spread via root grafts and insect vectors.

Vectors

All sucking insects that feed on xylem sap may be vectors of *Xylella fastidiosa*. Vectors acquire the pathogen by feeding on infected plants where the bacterium adheres to the foregut (between the needle-like mouthparts and the stomach) where it is transmitted by the vector to other plants. Once picking up the bacteria, the insect vectors remain infectious indefinitely; exceptions may occur once the insect sheds its external skeleton by molting. After this molt, the vector must feed again on infected plant material before they can transmit the bacterium. The most likely candidate vectors in the Central States are the glassy-winged sharpshooter and to a lesser extent spittle bugs.



Distribution and Hosts

Bacterial leaf scorch has been identified in the urban forest (landscapes, street plantings, and small woodlots) throughout the eastern and southeastern US to Kentucky and New Jersey and as far west as Texas. Rare occurrence has been noted in Kansas. In some New Jersey municipalities, BLS is known to affect up to 35% of oaks planted as street trees and in landscapes. Some of the more important shade trees susceptible to BLS include maple, elm, dogwood, sycamore, hackberry and sweet gum. There are 12 red oak species and six white oak species known to be impacted by this disease in varying degrees. In Missouri, arborist's have recently had positives returned from large older pin oaks in the St. Louis metro area.

Similarly, positive BLS was confirmed on oaks sent to the MU Diagnostic Clinic in August and additional reports on Bur oaks in Iowa occurred in late summer. *Xylella fastidiosa* has more than 100 potential plant hosts both non-woody and woody, representing over 30 families where no symptoms are formed. It is speculated that these asymptomatic plants may serve as localized reservoirs of the pathogen thereby confounding accurate understanding of BLS distribution.

Symptoms and Signs

Marginal reddening or yellowing followed by browning of leaves, decline in vigor, stunting, dieback, and eventually death can occur on a perennial basis over time with severely infected trees. Bacterial leaf scorch can increase during dry, hot weather developing first on older leaves of the shoot then moving toward the tip where some leaves remain green. A yellow or faintly red-brown band may delineate scorched leaf areas from green leaf tissue, though this not always the case. In Missouri, there are problems using symptoms alone when diagnosing the disease since a bronzing or browning of leaves can occur in response to multiple tree problems, especially on oaks. Oak wilt and abiotic drought stress occur throughout the growing season with oak wilt expressing reliable symptoms in late May through June then becoming confounded by drought, decline, and possible BLS later in the summer. Many samples sent in for oak wilt test return false negatives, particularly by the end of July and beyond in Missouri. Proper identification of *Xf* is obtained utilizing ELISA testers or through known DNA sequences using PCR. Diagnostic techniques such as these are costly to run, so it's best to collect a number of



Scorch symptoms on red oak
Bruce Moltzan- MDC



Scorch symptoms on white oak
Lonnie Messbarger- MDC



Scorch symptoms on pin oak
MU Diagnostic Clinic

leaf samples and send them to labs that routinely run these tests such as labs at Rutgers or the University of Kentucky.

Disease Cycle

Infection begins when homopteran insects, ('sharpshooters' or 'spittle bugs') carrying the bacteria introduce *Xf* into one or a few vessels within a susceptible host. Once transmitted, the bacteria become systemic digesting cell walls and moving into adjacent vessels. It is hypothesized that digestive enzymes of the bacteria increase during infection inducing a rapid host response. Defensive responses include a rise in ethylene production causing the formation of tyloses, which can impede water transfer in the tree. Further, xylem cavitations may occur in response to insect feeding or during BLS progression stressing the tree of water causing the scorch-like symptoms on leaves.

Management

There are few cost-effective methods for the management of BLS in landscape plantings. The best management tool is to maintain tree vigor. The development of BLS is enhanced by other diseases, insects, and environmental stresses such as drought. So in general timely mulching and watering during dry spells is a must. Branches that have died due to BLS should be pruned and trees that are in a severe state of decline should be removed. In areas where BLS occurs, avoid planting highly susceptible trees, and design new tree plantings with a diverse complement of tree species. Management of BLS in many regions of the eastern United States may ultimately depend on the identification of trees resistant to the disease. Management of BLS is further made difficult because it is not known how long hosts may remain asymptomatic prior to the first expression of symptoms. The antibiotic tetracycline (Mycoject, trade name), when injected into an infected tree, will temporarily alleviate the symptoms. However, as the tetracycline breaks down in the tree, symptoms reappear.

More info:

<http://www.cnr.berkeley.edu/xylella/index.html>

<http://www.apsnet.org/online/feature/bls/>

This newsletter is also available on the WWW at:

<http://na.fs.fed.us/fhp/fhw/csfhw/>

			
	<p>For More Information:</p> <p>Forest Health Protection USDA Forest Service 1992 Folwell Avenue St. Paul, MN 55108 (651) 649-5029 lhaugen@fs.fed.us</p>		