

PRESS RELEASE
DEPARTMENT OF PUBLIC WORKS
TOPIC: EMERALD ASH BORER

AUGUST 24, 2009

FOR MORE INFORMATION CONTACT:

Joseph Cavallaro, Village Manager
Village of West Dundee
847/551-3800

Richard Babica, Director of Public Works
Village of West Dundee
847/551-3815

Village of West Dundee Latest Victim of EAB

WEST DUNDEE, ILLINOIS, Kane County is the latest community to discover the ravages of the emerald ash borer (EAB). The EAB infestation was found on Market Loop and Village Quarter Road within the Old World Subdivision. The Illinois Department of Agriculture has confirmed the infestation on August 21, 2009. The EAB discovery was made on August 19, 2009, when a private tree maintenance contractor notified Village staff. Richard Babica, Director of Public Works and Tim Brim, Street Superintendent, went out to survey the tree. "It is unfortunate that we have found the Emerald Ash Borer within West Dundee," says Richard Babica, Director of Public Works. "The Village has been planning for it and expecting it, but the impact it will have on the trees within our community will be dramatic."

A survey of the immediate area indicted that eleven parkway ash trees were found to be infested. These trees are scheduled to be removed by Public Works Staff the week of August 24, 2009. The EAB infestation will be discussed at the August 31, 2009 Regular Board Meeting at 7:30 PM that will be held at Village Hall, 102 South Second Street, West Dundee.

The recent and numerous EAB finds underscore the need for all communities, and especially neighboring communities, to be proactive against EAB. IDA urges community officials to initiate an ash-tree reduction-strategy within their districts. "Begin by taking inventory of all ash trees within the community, budget needs for labor and equipment should large-scale ash tree removals be necessary. Then aggressively begin to cull your poor-conditioned ash trees. Work with local tree care professionals, as they are generally the first line of detection. Establish a formal plan to record and report inventory reduction and reforestation activities. Start now to develop a communication plan should the emerald ash borer be found in your community," says Warren Goetsch, Environmental Programs Bureau Chief.

The emerald ash borer (EAB) is a small, metallic green, non-native invasive pest whose larvae feast on the trunks of ash trees, thereby cutting off their ability to transport nutrients and ultimately causing the tree's decline. Ash trees can be infested with EAB for a few years before the tree begins to demonstrate any signs of EAB infestation. Symptoms of EAB include canopy dieback, D-shaped exit holes, shoots sprouting from the tree trunks and S-shaped larval galleries underneath the bark.

Ash tree owners may ask about treatment options in order to avoid removing their trees; however the only guaranteed method to control Emerald Ash Borer is to remove the host tree(s). When considering usage of insecticidal control, one should weigh the value of the tree against the cost of treatment.

"The Illinois Department of Agriculture certainly supports a tree owner's right to determine for themselves whether a pesticide treatment is appropriate in their specific circumstance," Illinois Department of Agriculture Bureau Manager

of Environmental Programs Warren Goetsch said. "Tree owners are encouraged to thoroughly research the various treatment options currently available and carefully weigh the costs associated with the required repeated treatments. Please be advised, however, that treatment of an ash tree will not guarantee that a specific tree might eventually be required to be removed."

The Village of West Dundee will be reviewing several treatment options for EAB prevention for all public trees, which are generally divided into two methods. The first is known as injection, in which the pesticide is mechanically injected into the tree trunk. Only licensed professionals have access to these pesticides. The second method is known as a deluge method, in which the pesticide is applied to the ground under the tree canopy and is then taken up through the root system. The pesticides for this application are available both commercially and to licensed professionals. More information on both these methods can be found on the Village's website: www.wdundee.org. The Village strongly encourages homeowners with ash trees on their property to evaluate these options.

Under the provisions of the State of Illinois' Insect Pest and Plant Disease Act, as well as the Nuisance Declaration issued in July 2006, the State has the authority to order the removal of any tree infested with the Emerald Ash Borer, regardless of whether it has been previously treated with a pesticide or not. The State has not exercised this authority to date, as all Emerald Ash Borer-related tree removals have been done on a voluntary basis.

EAB was first discovered in Illinois in June 2006, in the Windings near Lily Lake in Kane County. The Illinois Department of Agriculture has since confirmed EAB infestations in several communities within Kane, Cook, DuPage, LaSalle, Will and, most recently, McHenry counties and has issued a quarantine affecting all or parts of 18 of the northeastern-most counties of the state. As part of a cooperative agreement with the USDA Animal and Plant Health Inspection Services (APHIS), IDA is responsible for EAB survey, control/eradication and outreach.

EAB was first discovered in North America in 2002 in the Detroit and Ontario areas. Since then, it is estimated that approximately 25 million ash trees in North America have been felled due to EAB. Other communities affected by this pest within Kane County include: Batavia, Campton Hills, Elburn, Elgin, Geneva, Hampshire, North Aurora, South Elgin, St. Charles, Sugar Grove and Virgil.

The Village of West Dundee initiated a community-wide tree survey as part of the preparation for this pest. This survey has been ongoing since May 2009, with the Carrington Reserve, Enclave, Timbers and Valleys, Grand Pointe (High Acres), Miller Ridge and Tartans Glen Subdivisions completed to date. The survey will continue throughout the remainder of the Village until all parkway trees and trees on public properties have been surveyed. A preliminary estimation indicates about 15% of our public tree inventory are ash trees.

"This is unfortunate for the Village of West Dundee for two reasons," stated Village Manager Joseph Cavallaro. "First, obviously, is the pride and investment that the Village puts into its public treescape. Secondly, this infestation requires a significant amount of financial resources, which include the costs of tree removal and special disposal methods for the wood. The State of Illinois had made some funding available for this early on, when the problem was first identified, but those funds have dried up."

Village staff members will respond immediately to suspect sightings of EAB. It is very important for area residents to be aware and vigilant in inspecting their ash trees for this pest. If you suspect you may have found adult or larval forms of this insect, contact the Village of West Dundee's Public Works Department, at 847.551.3815, or email digital photos to the Illinois Department of Agriculture at agr.eab@illinois.gov.

Additional information can be obtained by visiting the following links:

www.emeraldashborer.info

www.aqr.state.il.us/newsrels/r0727062.html

www.IllinoisEAB.com

www.aqr.state.il.us/

www.na.fs.fed.us/thp/eab

www.aphis.usda.gov/ppg/ep/eab/

www.mortonarb.org



Figure 1—The adult emerald ash borer, an exotic wood-boring beetle, attacks ash trees exclusively.

The emerald ash borer (EAB) is a very small but very destructive beetle. Metallic green in color, its slender body measures 1/2 inch in length and 1/8 inch wide. The average adult beetle can easily fit on a penny.

Native to China and eastern Asia, the EAB probably landed in North America hidden in wood packing materials commonly used to ship consumer goods, auto parts, and the like. Although no one can say for sure when EAB arrived in southeastern Michigan, the scientific community now believes the beetle went undetected for up to 12 years, based on its widespread distribution and destruction. EAB was officially identified in the summer of 2002.

This beetle is currently known to be responsible for the death or decline of more than 15 million ash trees in a 20-county area around Detroit. EAB has also impacted various communities in Ontario, Canada. Essex County, across the river from Detroit, was declared infested with EAB in 2002. Canadian officials estimate that between 100,000 and 200,000 ash

trees are infested and will die in Essex. The neighboring county, Chatham–Kent, has recently been declared to be infested with EAB.

Although large EAB infestations are concentrated in Michigan and parts of Canada, the States of Ohio, Maryland, Indiana, and Virginia have also found EAB in smaller, somewhat contained areas.

In terms of the range and extent of the EAB infestation in North America, the human element is of particular significance. Unknowingly, people's behaviors associated with everyday living and commerce have greatly contributed to the spread of the EAB. The movement of any ash tree products (e.g., branches, logs, woodchips, nursery stock, and firewood) advances the spread of EAB. Consider this: current research suggests that the natural spread or movement of the EAB is about 1/2 mile each year. If that estimate is accurate and the length of time EAB has been present is 12 years, at press time (April 2005) the generally infested area in Michigan* should cover about 113 square miles. But as of 2005, Michigan's generally infested area covers almost 13,000 square miles! Human behavior is a defining factor in the spread of EAB.

Scientifically Speaking

Entomologists from the United States and Canada have been studying the EAB to learn more about its biology and behavior. Because this pest has never been found anywhere in North America prior to the current infestation, this information is being continually updated.

Scientists have discovered that, in a temperate climate, the beetle can develop from egg to adult in as little as 1 year. From May to August, adults emerge from overwintering sites under bark and mate. Females lay eggs in bark crevices, and the eggs hatch in about 10 days. The eggs develop into wormlike larvae, which tunnel under the bark to feed and grow

* These calculations are based on the beetle's having appeared at only one point of introduction.

throughout the fall. This activity eventually kills the tree. Larvae lay dormant during the winter and emerge from trees in May as adults, leaving a unique D-shaped exit hole.

Here are some key discoveries about the EAB.

- On this continent, EAB attacks only ash trees (*Fraxinus* spp.), and all the ashes—green, white, and black, etc.—are at risk except the mountain ashes (*Sorbus* spp.), which are not a true ash.
- EAB is a good flyer but tends to fly only relatively short distances (about 1/2 mile).
- We cannot count on natural predation to control EAB: the beetle has no known predators in North America, although woodpeckers will eat them.
- EAB infestation is always fatal to ash trees. Infested trees will decline from the top down and will be dead in 1 to 3 years, even if the trees were healthy before being attacked by EAB.
- EAB is under a great deal of scientific scrutiny now. New information and discoveries will improve managers' ability to detect, control, and eradicate the beetle.

Signs and Symptoms

It is extremely difficult to determine whether an ash tree is infested or not infested with EAB because tree decline is usually gradual. Early symptoms of an infestation might include dead branches near the top of a tree or perhaps wild, leafy shoots growing out from its lower trunk. D-shaped exit holes and bark splits exposing S-shaped tunnels are significant signs of EAB.

If a tree is infested with the EAB, tree removal is recommended as the most effective way to eliminate these exotic pests and prevent the species' further spread. Considering the most current science, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service recommends felling infested trees, chipping them, and burning the chips.

Treatment options may eventually be approved for some homeowners living in a generally infested area where suppression efforts are being used, with the understanding that treatments are not a cure. At best, a homeowner might only prolong a tree's decline. Every EAB-infested tree will die.

Because new treatment options and methods are expected to become available in the future, we encourage homeowners to talk to their local Extension Office or State department of agriculture for the most up-to-date information.



Figure 2—S-shaped tunnels, made by EAB larvae, riddle infested ash trees.



Figure 3—The D-shaped exit hole is a unique signature of the EAB.



Figure 4—Epicormic shoots are a telltale sign of a tree under stress.

The Cooperative Mix

Detection, control, and eradication of EAB is a huge undertaking. Cooperation between Federal and State government agencies, municipalities, universities, the greening industry, and the public at large is essential to eliminate this pest.

Here are some things you can do *now* to lessen the likelihood of EAB's becoming established in the United States.

■ **Don't move firewood.** Humans unknowingly contribute to the spread of EAB when they move firewood. EAB larvae can survive hidden under the bark of firewood. Play it safe: don't move *any* firewood and you won't move *any* beetles.

■ **Visually inspect your trees.** Early detection is a key factor. If trees display any sign or symptom of EAB infestation, contact your State agriculture agency.

■ **Spread the word.** Talk to your neighbors, friends, and coworkers and get them onboard. Public awareness and education is an ongoing process; support the effort.

■ **Know State and Federal regulations.** Make sure you understand the regulations that govern your own State and those States and Provinces you may visit.

■ **Ask questions.** If you receive ash nursery stock, know its point of origin and your supplier. EAB larvae may be hiding under the tree bark.



Figure 5—EAB larvae can be transported to new locations while hidden under the bark of firewood.



Figure 6—The female beetle lays eggs in bark crevices of ash trees.

These Web sites offer more-detailed information about the EAB.

<http://www.aphis.usda.gov>

<http://www.na.fs.fed.us/spfo/eab>

<http://www.emeraldashborer.info>

Toll-free information line: 1-866-322-4512



The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Cover photo: Bark's-eye view of the emerald ash borer, a foreign insect that attacks all species of ash trees except the mountain ash, which is not a true ash.

Photo credits: The cover photograph and figure 6 were taken by APHIS PPQ employee Dr. James E. Zablotny. APHIS gratefully acknowledges the cooperation of Michigan State University's David Cappaert, who supplied the images used in figures 1 and 5. Those photographs are reproduced by permission. The images in figures 2, 3, and 4 were supplied by PPQ employees David R. McKay, Brian Sullivan, and James W. Smith, respectively.

Web sites: <http://www.aphis.usda.gov>

<http://www.na.fs.fed.us/spfo/eab>

<http://www.emeraldashborer.info>

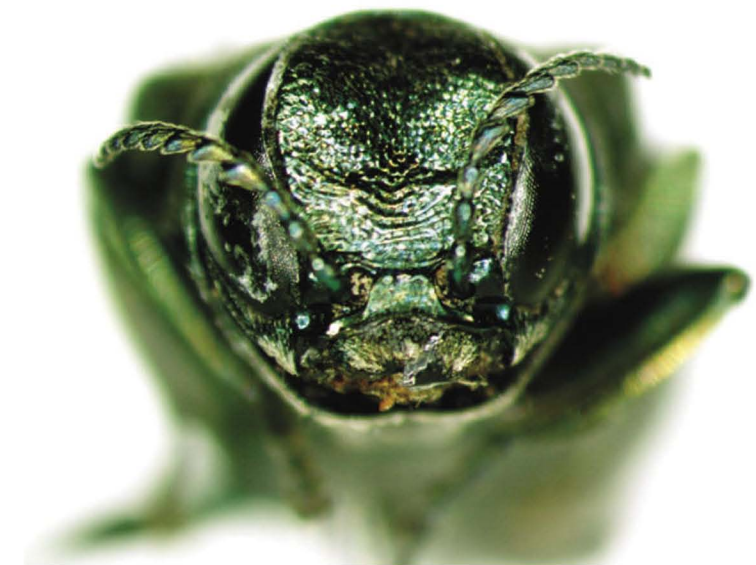
Issued July 2004
Revised April 2005

United States Department of Agriculture
Animal and Plant Health Inspection Service

Program Aid No. 1769

Emerald Ash Borer

The Green Menace



Emerald Ash Borer



An exotic beetle from Asia was discovered in July 2002 feeding on ash (*Fraxinus* spp.) trees in southeastern Michigan. It was identified as *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae). Larvae feed in the cambium between the bark and wood, producing galleries that eventually girdle and kill branches and entire trees. Evidence suggests that *A. planipennis* has been established in Michigan for at least six to ten years. More than 3000 square miles in southeast Michigan are infested and more than 5 million ash trees are dead or dying from this pest. This exotic pest is also established in Windsor, Ontario, Canada. In 2003, newly established populations were detected in other areas of southern Michigan and several locations in Ohio. Infested ash nursery trees were also found in Maryland and Virginia.

Identification

Adult beetles are generally larger and a brighter green than the native North American species of *Agrilus* (Fig. 1). Adults are slender, elongate and 7.5 to 13.5 mm long. Males are smaller than females and have fine hairs on the ventral side of the thorax, which the females lack. Color varies but adults are usually bronze or golden green overall, with darker, metallic, emerald green wing covers. The top of the abdomen under the wings is metallic purplish red and can be seen when the wings are spread. The prothorax, the segment behind the head to which the first pair of legs is attached, is slightly wider than the head but the same width as the base of the wing covers.

Larvae reach a length of 26 to 32 mm, are white to cream-colored and dorso-ventrally flattened (Fig. 2). The brown head is mostly retracted into the prothorax and only the mouth-parts are visible externally. The 10-segmented abdomen has a pair of brown, pincer-like appendages on the last segment.

Biology

The emerald ash borer generally has a one-year life cycle in southern Michigan but could require two years to complete a generation in colder regions. In 2003, adult emergence began in early June, peaked in late June and early July, and continued into late July. Beetles usually live for about 3 weeks and are present into mid-August. Adult beetles are active during the day, particularly when conditions are warm and sunny. Most beetles remain in protected locations in bark crevices or on foliage during rain, heavy cloud cover, high winds, or temperatures above 32°C (90°F). Beetles feed on ash foliage, usually in small, irregularly-shaped patches along the margins of leaves.

Females can mate multiple times and egg laying begins a few days after the initial mating. Females can lay at least 60 to 90 eggs during their lifetime. Eggs are deposited individually in bark crevices on the trunk or branches. Eggs hatch in 7 to 10 days.

After hatching, first instar larvae chew through the bark and into the cambial region. Larvae feed on phloem and the outer sapwood for several weeks. The S-shaped feeding gallery winds back and forth, becoming progressively wider as the larva grows (Fig. 3). Galleries are packed with fine, sawdust-like frass. Individual galleries often extend over an area that is 20 to 30 cm in length, though the length of the affected area can range from 10 to 50 cm or longer.

Feeding is completed in autumn and pre-pupal larvae overwinter in shallow chambers excavated in the outer sapwood or in the bark on thick-barked trees. Pupation begins in late April or May. Newly eclosed adults often remain in the pupal chamber for 1 to 2 weeks before emerging head-first through a D-shaped exit hole that is 3–4 mm in diameter (Fig. 4).



Figure 1. Adult emerald ash borer.



Figure 2. Second, third, and fourth stage larvae.



Figure 3. Galleries excavated by larvae.



Figure 4. D-shaped exit holes where adult beetles emerged.



Figure 5. Jagged holes left by woodpeckers



Figure 6. Much of the canopy is dead on a heavily infested ash tree.

Distribution and Hosts

The emerald ash borer is native to Asia and is known to occur in China, Korea, Japan, Mongolia, the Russian Far East and Taiwan. A Chinese report indicates high populations of the borer occur primarily in *Fraxinus chinensis* and *F. rhynchophylla* forests. Other reported hosts in Asia include *F. mandshurica* var. *japonica*, *Ulmus davidiana* var. *japonica*, *Juglans mandshurica* var. *sieboldiana* and *Pterocarya rhoifolia*. In North America, this borer has only attacked ash trees. Green ash (*F. pennsylvanica*), white ash (*F. americana*) and black ash (*F. nigra*), as well as several horticultural varieties of ash have been killed.

Symptoms

It is difficult to detect emerald ash borer in newly infested trees. Jagged holes excavated by woodpeckers feeding on pre-pupal larvae may be the first sign that a tree has become infested (Fig. 5). When a tree has been infested for at least one year, the D-shaped exit holes left by emerging adults will be present on the branches and the trunk (Fig 4). Bark may split vertically above larval feeding galleries. When the bark is removed from infested trees, the distinct, frass-filled larval tunnels that etch the outer sapwood and phloem are readily visible on the trunk and branches (Fig. 3). An elliptical area of discolored sapwood, usually a result of secondary infection by fungal pathogens, sometimes surrounds larval feeding galleries.

Serpentine tunnels excavated by feeding larvae interrupt the transport of nutrients and water within the tree during the summer. Foliage wilts and the tree canopy becomes increasingly thin and sparse as branches die. Many trees appear to lose about 30% to 50% of the canopy after 2 years of infestation and trees often die after 3-4 years of infestation (Fig. 6). Epicormic shoots may arise on the trunk of the tree, often at the margin of live and dead tissue. Dense root sprouting sometimes occurs after trees die.

Emerald ash borer has killed trees of various size and condition in Michigan. Larvae have developed in trees and branches ranging from 2.5 cm (1 inch) to 140 cm (55 inches) in diameter. Stress likely contributes to the vulnerability and rapid decline of infested ash trees. However, emerald ash borer has killed apparently vigorous trees in woodlots and urban trees under regular irrigation and fertilization regimes.

Bibliography

Yu, Chengming. 1992. *Agrilus marcopoli* Obenberger. In Xiao, G., ed. Forest insects of China. 2d ed. Beijing, China: China Forestry Publishing House; 400-401. Translation by Houping Liu, USDA Forest Service.

Jendek, E. 2002. *Agrilus planipennis* fact sheet. PDF file provided by Eduardo Jendek, Institute of Zoology, Slovak Academy of Sciences, Bratislava, Slovak Republic.

Resources

Visit the following websites for information on emerald ash borer biology, identification, management, quarantines and related topics:

1. Michigan Multi-Agency Emerald Ash Borer Web Site: <http://www.emeraldashborer.info>
2. USDA Forest Service: <http://www.na.fs.fed.us/spfo/eab/>
3. Michigan Department of Agriculture: <http://www.michigan.gov> (keyword emerald ash borer)

Contact your State Department of Agriculture, State Forester, or County Extension Office for more information.

Authors:

Deborah G. McCullough, Associate Professor, Dept. of Entomology and Dept. of Forestry, Michigan State University

Steven A. Katovich, Forest Entomologist, USDA Forest Service, Northeastern Area State and Private Forestry, Forest Health Protection.

Photo credits:

David L. Cappaert and Howard Russell, Michigan State University and Steven A. Katovich, USDA Forest Service.

Prepared by:



USDA Forest Service
Northeastern Area,
State & Private Forestry
Newtown Square, PA

You Can Help...

Do Not Move Firewood!



Photo: Canadian Food Inspection Agency

- Emerald ash borer can easily be transported in ash logs.
- Purchase firewood locally from a known source.
- Be sure to use all of the firewood in the cold months so that no hidden emerald ash borer larvae or adults can survive on logs left through the spring.
- Monitor the health of ash trees. Look for dead and dying branches at the top of the tree's crown.

If You Think You Have Emerald Ash Borer:

- For assistance in identifying suspect insects visit www.emeraldashborer.info/ or www.na.fs.fed.us/fhp/eab/
- Call the national EAB hotline 866-EAB-4512
- Contact Illinois Department of Agriculture's Pesticide Hotline at 800-641-3934 or in the Chicago area use 312-74BEETL (312-742-3385)
- Contact your city or village forester or arborist for assistance.
- Contact the University of Illinois Extension Service office in your county. Find a nearby office at <http://web.extension.uiuc.edu/cie2/offices/findoffice.cfm> or by calling 217-333-5900
- Contact a certified arborist. You may find one nearby at www.isa-arbor.com/findArborist/findarborist.aspx
- Or contact The Morton Arboretum Plant Clinic at 630-719-2424



For more information about The Morton Arboretum
visit www.mortonarb.org

The Morton Arboretum
4100 Illinois Route 53, Lisle, IL 60532-1293



*Stop the Borer,
Save Ash Trees*



Emerald Ash Borer

Emerald Ash Borer

The emerald ash borer, (*Agrilus planipennis* Fairmaire) is a small (1/2 inch long, 1/8 inch wide) metallic green beetle native to Asia. Though it was first found in Michigan in 2002, it was likely that a beetle population had been established in the Detroit area for many years prior. More than 15 million ash trees have been killed. It has been also detected in Ohio, Indiana, Virginia, Maryland, and Ontario, Canada.



Actual size

Biology

The adult emerald ash borer emerges in May – July and the female lays numerous eggs in bark crevices and between layers of bark.

The eggs hatch in 7 – 10 days and larvae bore into the tree where they chew the inner bark and phloem creating serpentine galleries as they feed. This cuts off the flow of water and nutrients in the tree, causing dieback and death.



Larva

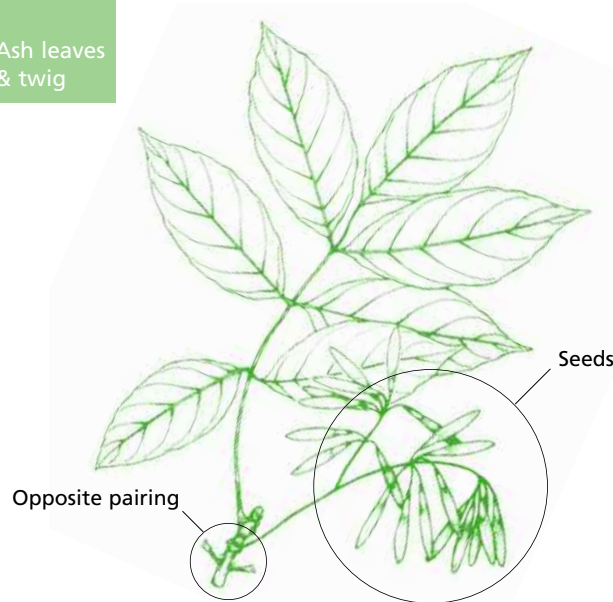


S-shaped galleries

Ash Trees

Ash trees are very common in landscapes and most species, namely white ash (*Fraxinus americana*) and green ash (*F. pennsylvanica*) are native to Illinois forests. It is estimated that as much as 20% of street trees in the Chicago area are ash.

Ash leaves & twig



Opposite pairing

Seeds

Characteristics of ash:

- Compound leaves made up of small, glossy green leaflets.
- Leaves, twigs and branches grow in opposite pairs.
- Bark of mature trees is gray and furrowed, often appearing in a diamond pattern.
- Some ash trees will produce small canoe paddle-shaped seeds.
- Seedless ash trees may develop ash flower galls that turn from green to brown and may persist in the crown throughout the year.



Dieback



Epicormic branching or suckers



Bark slits



Emergence hole - Shown actual size of 1/8" and D-shaped

Signs and Symptoms

The most visible sign of infestation is crown dieback, which appears after the first year. Branches at the top of the crown will die and more branches will die in subsequent years. Typically, the tree will be completely dead in about three years, though suckers will sprout from the base of the tree and on the trunk. The bark may also split vertically and woodpeckers may feed on the beetle leaving visible damage on the bark. Treatments with insecticides are being studied. However, all ash trees proximate to any new infestation will be lost.

Adult beetles emerging from trees will leave a very small, 1/8 inch diameter distinctly "D" shaped exit hole that may appear anywhere on the trunk or upper branches.

Other Stressors:

Ash trees may suffer from a large number of pest and disease problems that cause similar symptoms. Native borers also attack ash trees, though they leave larger exit holes up to a 1/4 inch in diameter that are usually circular or oval in shape.

EMERALD ASH BORER



THE PROBLEM

EMERALD ASH BORER WAS CONFIRMED IN ILLINOIS FOR THE FIRST TIME ON JUNE 9, 2006. ORIGINALLY DISCOVERED IN MICHIGAN IN 2002, IT HAS SINCE SPREAD INTO OHIO, CANADA, INDIANA, MARYLAND AND NOW INTO ILLINOIS. IT IS ESTIMATED THAT ONE IN EVERY FIVE TREES IN NORTHEAST ILLINOIS IS AN ASH. WE HOPE THAT EARLY DETECTION AND PUBLIC AWARENESS CAN HELP PREVENT THE SPREAD OF THIS TREE KILLING INSECT.

A. EMERALD ASH BORER ADULT
 B. ADULT BEETLE EMERGING
 C. D-SHAPED EXIT HOLES
 D. S-SHAPED GALLERIES UNDER BARK
 E. ASH TREE LEAF
 F. ADULT SIZE COMPARED TO A PENNY
 G. LARVA
 H. DIFFERENT STAGES OF LARVA
 I. GALLERIES WITH AN EXIT HOLE
 J. ADULT BEETLE

PHOTOGRAPHS TAKEN FROM WWW.EMERALDASHBORER.INFO AND MSU EXTENSION BULLETINS.

IF YOU SEE THIS INSECT OR A SICK ASH TREE IN OUR TOWN, PLEASE CALL



BEETLE IDENTIFICATION:

- 1/2" LONG (CAN FIT EASILY ON A PENNY) BY 1/8" WIDE.
- BRIGHT GREEN METALLIC IN COLOR—HARD TO SPOT
- ONLY KILLS ASH TREES
- EGGS HATCH IN SUMMER, THEN CREAMY WHITE LARVAE TUNNEL UNDER BARK THROUGHOUT THE WINTER. THIS TUNNELING IS WHAT KILLS THE TREE.
- ADULT BEETLES EMERGE THE FOLLOWING MAY-JULY.
- ADULTS EMERGE THROUGH A TINY (1/8") D-SHAPED HOLE IN THE BARK.
- ADULTS MATE AND LAY EGGS IN BARK CREVICES—THE CYCLE STARTS OVER AGAIN.

SYMPTOMS OF INFESTED ASH TREE:

- YELLOWING OF LEAVES.
- DIEBACK STARTING IN THE TOP OF THE TREE.
- SOMETIMES SUCKERS OR SPROUTS FORM AT THE BASE OF THE TREE, BELOW THE INSECT TUNNELING.
- TREES USUALLY DIE IN 2-4 YEARS.
- SOMETIMES WOODPECKERS DAMAGE BARK ON THE TRUNK.

- CITIZENS ARE ASKED TO:**
- 1) MONITOR ASH TREES, REPORT POSSIBLE EAB OR INFESTED ASHES.**
 - 2) STOP MOVING FIREWOOD. RELOCATING FIREWOOD CAN SPREAD THE INSECT.**
 - 3) CARE FOR ASH TREES. KEEP TREES WATERED; USE ISA CERTIFIED ARBORISTS.**
 - 4) LIMIT ASH PLANTINGS, DIVERSIFY.**
 - 5) KEEP INFORMED. CHECK WWW.EMERALDASHBORER.INFO FOR UPDATES.**

PLEASE TAKE AN INFORMATION PACKET!

An insect new to North America, emerald ash borer, *Agilus planipennis*, attacks and kills healthy ash trees. It is closely related to the bronze birch borer, so its damage, appearance, exit holes and biology are similar to that pest's except that it attacks healthy ashes rather than birches in at least the early stages of decline. Its native range includes China, Korea, Japan, Mongolia, the Russian Far East and Taiwan. In the United States, it was first identified in the Detroit, Michigan area in July 2002. Since then, it has also been found in other areas of Michigan, the Toronto, Canada area, areas of Ohio and other locations outside the Midwest.

Adult beetles are 1/3 to 1/2 inch long and elongate, with metallic emerald green wing covers on a bronze body. They emerge primarily in late spring through 1/8 inch wide, D-shaped holes in the bark of ashes. Adult beetles are present through June into mid- to late July. After mating, the female inserts her eggs, one or two at a time, between bark flakes.

Eggs hatch into larvae that tunnel through the bark into the cambium, where the water, nutrient and sugar-conducting tissues, the xylem and phloem, are located. The larvae are white, elongate and flattened, growing to about 1-1/2 inches long. The larvae pupate in the cambium and emerge the following spring.

The larvae create slender, winding tunnels that frequently wind back and forth, creating a series of S shapes that run into one another. Just as commonly, the tunnels meander under the bark with no particular pattern. As the tunnels become numerous, they effectively girdle the branch, causing the branch to die due to lack of water and nutrients.

Emerald ash borer attacks at the top of the tree first, causing dieback of the top. Attack continues down the tree, resulting in the gradual death of branches and the tree dies in 2 to 3 years. The bark on attacked trees separates from the trunk, allowing the larval tunnels to be easily seen. Once the tree dies to the ground, suckers form around the base of the trunk.

It is thought that emerald ash borer is most likely to enter Illinois by people bringing in young ash trees from infested areas or bringing in firewood from those areas. To help prevent this, billboards asking people not to take firewood from Michigan have been placed along interstate highways leaving the state.

Where emerald ash borer is found, quarantine is set up. Infested trees are removed, as well as all ashes near them. In Ohio infestations, all ash trees have been removed in a 1/2 mile radius around infested trees. In the Windsor, Ontario, Canada area, an ash-free zone 5 to 6 miles wide has been established across the peninsula to stop borer movement inland. The difference in the ash-free areas is based partly on evolving research. It was initially thought that emerald ash borer adults would fly only about 1/4 mile to a new host. Very recent research has found that they can fly at least 5 miles; however, it is unclear how often that will occur. Research studies are ongoing on this and many other aspects of the emerald ash borer.

Several insecticides to control this insect have been found through research primarily conducted by Michigan State University. Because the adults are out for only a few weeks (instead of the several month's duration that occurs with Asian long-horned beetle flight), foliar and bark sprays are effective, as well as injected insecticides. This makes it likely that if emerald ash borer is found in Illinois, a combination of quarantine, tree removal and insecticide application would be used in and around infested areas.

Here is a link to the webpage of a very good brochure on the Emerald Ash Borer for you to distribute:

www.aphis.usda.gov/lpa/pubs/pub_pheab.pdf

If there is anything else we can help you with, please let us know.

State of Illinois
Rod R. Blagojevich, Governor

Department of Agriculture
Tom Jennings, Acting Director



EAB NEWS

EAB NEWS

MAR/APR/MAY 2008

EAB NEWS ~
VOLUME 2, ISSUE 3



Purple Traps Become Focus of Detection Strategy for EAB



It's purple, it's sticky and it hangs in trees. It is also intended to help officials find a cunningly deceptive creature, the emerald ash borer (EAB).

The Illinois Department of Agriculture in cooperation with USDA Animal and Plant Health Inspection Service (APHIS), is using these purple traps in Illinois and other states to look for EAB, an invasive pest that is deadly to ash trees. EAB is small

and stealth-like in its behavior patterns and is extremely difficult to detect. If not controlled, EAB threatens to devastate the entire ash species in North America.

These box-kite-looking purple traps will be hung in trees primarily in a 100-mile band on the outskirts of the last known southernmost infested site (Peru, IL). Essentially the area is a 100-mile wide arc including 49 counties across central and northwestern Illinois where approximately 2,700 of these traps will be placed. An additional 750 traps will be placed in the Chicagoland area and another 250 will be placed in southern Illinois at various high risk sites such as tree nurseries and campgrounds.

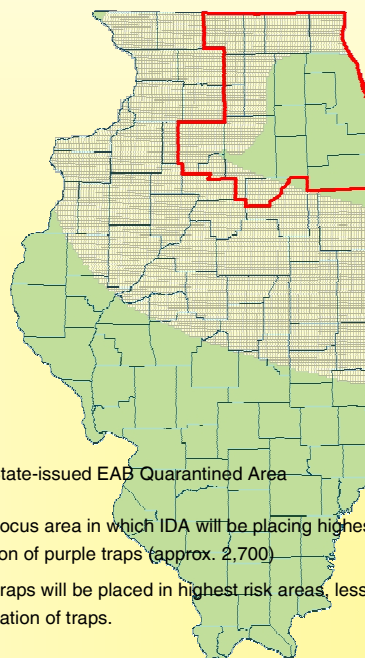
The color purple is essential to the trap's effectiveness. The traps will also be bated with Manuka oil as an attractant to lure the beetle if it is in the area. "It is important to note that these traps will not bring EAB to a non-infested site. They will simply let us know if it is already there," says Paul Deizman, IDA's EAB program manager.

IDA officials are asking for the public's cooperation in ensuring that these traps are left alone to "do their thing." "We realize that these traps may be an eye-sore

to some and a source of entertainment to others but in order for these traps to work, they must be left alone. It's important that the public is aware of their purpose and help us keep them in place," says Goetsch.

First discovered in Illinois in June 2006, EAB has since been confirmed in communities within Kane, Cook, La-Salle and DuPage counties. An 18 county quarantine has been issued for the northeastern-most area of the state.

The emerald ash borer is difficult to detect, especially in newly-infested trees. Citizens should watch for metallic-green beetles about half the diameter of a penny on or near ash trees that are showing signs of disease or stress. Other signs of infestation in ash trees include D-shaped holes in the bark of the trunk or branches and shoots growing from its base. Anyone who suspects a tree has been infested is urged to contact their county Extension office. For more information, visit www.IllinoisEAB.com on the internet.



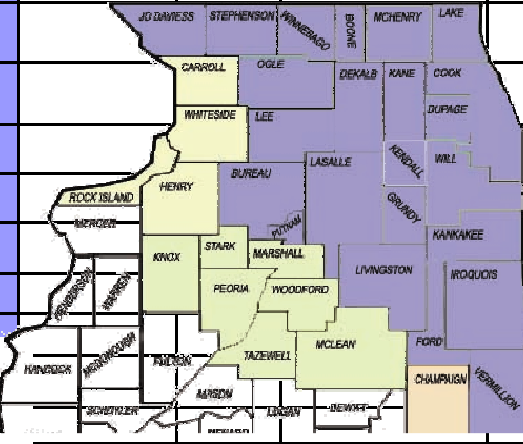
- State-issued EAB Quarantined Area
- Focus area in which IDA will be placing highest concentration of purple traps (approx. 2,700)
- Traps will be placed in highest risk areas, less concentration of traps.

Illinois Concludes EAB Destructive Survey

Due to the change in the USDA-funded detection strategy for determining where the highly evasive pest, emerald ash borer is, Illinois has wrapped up their destructive bark peeling survey efforts.

IDA officials worked with three tree removal contractors to harvest and bark peel a total of 2,720 ash trees. The majority of trees selected were every four square miles and on public rights-of-ways, for an average of nine trees per township.

| Priority Zone 1 | | Priority Zone 2 | | Priority Zone 3 | | Priority Zone 4 | |
|-----------------|---------|-----------------|-------|-----------------|-------|-----------------|-------|
| County | Trees | County | Trees | County | Trees | County | Trees |
| ✓ Lake | 112 | ✓ Kankakee | 166 | ✓ Stephenson | 141 | ✓ Putnam | 40 |
| ✓ Northern Cook | 33 | ✓ Iroquois | 279 | ✓ Jo Daviess | 150 | Marshall | 96 |
| ✓ Central Cook | 33 | ✓ Vermillion | 225 | Carroll | 111 | Stark | 72 |
| ✓ Southern Cook | 33 | Champaign | 249 | Whiteside | 171 | Knox | 179 |
| ✓ Will | 209 | ✓ Ford | 121 | ✓ Bureau | 217 | Peoria | 155 |
| ✓ DuPage | 83 | | | Henry | 206 | Woodford | 132 |
| ✓ McHenry | 151 | | | Rock Island | 106 | Tazewell | 162 |
| ✓ Kane | Limited | | | | | McLean | 296 |
| ✓ Kendall | 90 | | | | | ✓ Livingston | 261 |
| ✓ Grundy | 10 | | | | | | |
| ✓ LaSalle | 263 | | | | | | |
| ✓ DeKalb | 158 | | | | | | |
| ✓ Boone | | | | | | | |
| ✓ Winnebago | 126 | | | | | | |
| ✓ Ogle | 166 | | | | | | |
| ✓ Lee | 18 | | | | | | |

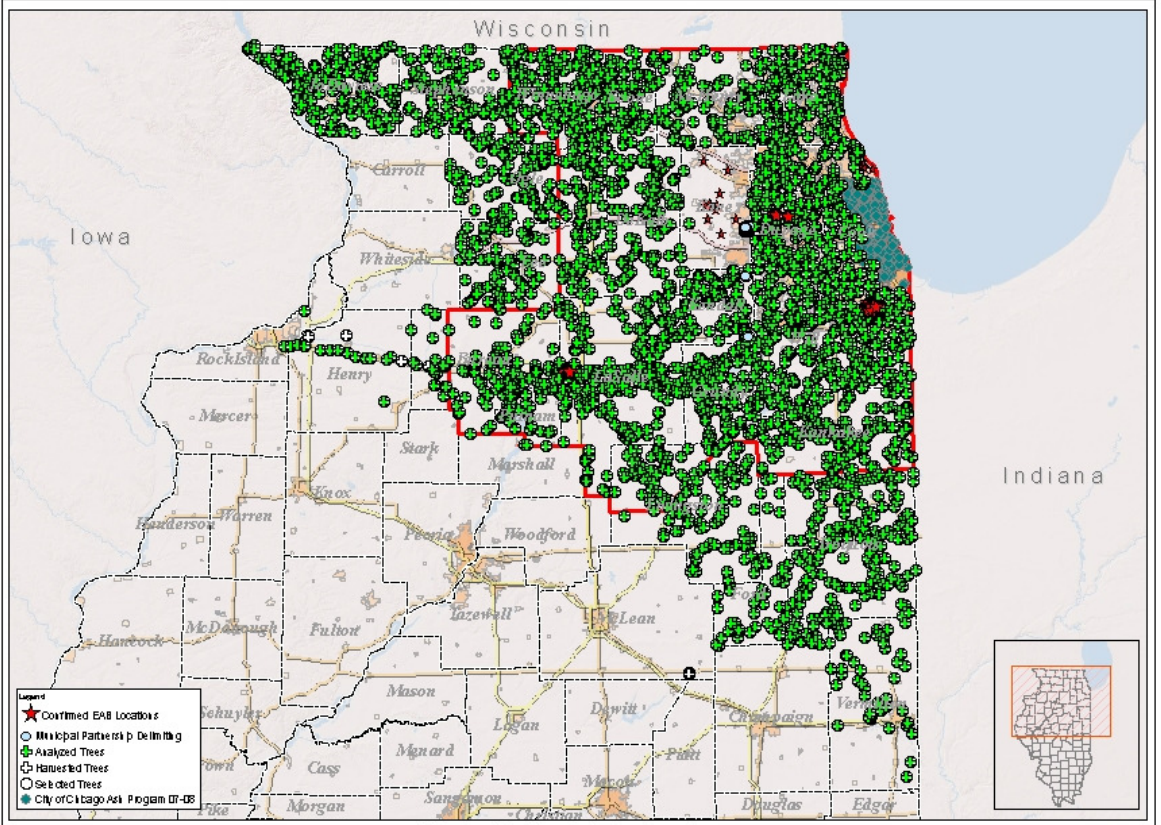


✓ Survey completed

EAB bark-stripping crew atop of the bark-peeled shavings.

After harvesting, the samples were shipped to one of four bark-stripping facilities where IDA officials stripped and inspected each one looking for EAB larva. The destructive survey efforts concluded with no new positive finds of EAB. IDA finalized the project April 10 and will now direct our attention to the 2008 EAB adult trapping program.

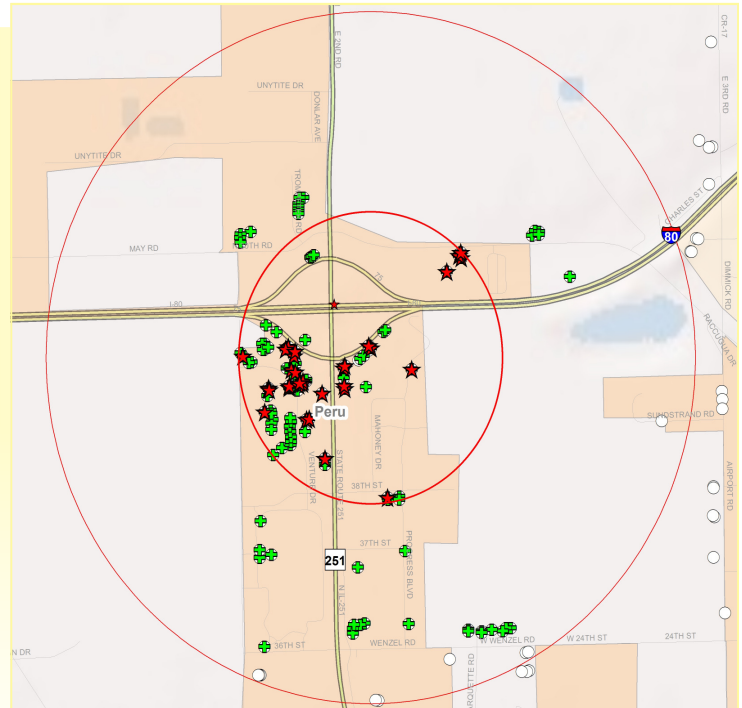
In all, trees were harvested from 23 counties plus several along I-80 in Henry and Rock Island counties as shown on the map to the right.



Eradication Cut Just About Complete

Illinois Department of Agriculture is about to complete its EAB eradication cut in the LaSalle/Peru area.

The farthest west known EAB infestation was in Peru, Illinois at the cloverleaf interchange encircling Interstate 80 and Illinois Rt. 251. IDA officials performed a delimiting survey and have removed 111 trees within a half mile of the outermost infestation outside of the interchange. Additionally, IDA, their contractor, and a crew from the Illinois Department of Transportation removed another 800 ash trees in the EAB-infested interchange.



What's That Purple Thing in the Tree?

It's not a decoration. It's not a kite. It's a trap.

The Illinois Department of Agriculture is using these purple traps to look for the Emerald Ash Borer (EAB), an invasive pest that is deadly to ash trees. EAB is small and stealth-like in its behavior patterns and is extremely difficult to detect. If not controlled, EAB threatens to devastate the entire ash species in North America.

These traps will help us determine if EAB is in the area. The traps will be used throughout the summer months.

We are asking for your cooperation in ensuring that these traps are left alone to "do their thing." Spread the message about these purple traps and EAB.

EAB likes to hitchhike on firewood. Don't move firewood. Buy locally and burn locally.

For more on EAB, visit www.IllinoisEAB.com



Celebrate Arbor Day Diversify the Canopy

Celebrate Arbor Day and plant a variety of foliage in your community. Arbor Day is April 25 and the Illinois Department of Agriculture encourages planting a diversity of trees for community canopies to avoid landscape devastation from invasive pests.

The best long-term defense against catastrophic tree loss is to use several species in our landscapes, selecting varieties that have proven their tough and tenacious growth in urban and suburban environments. "Trees are an important component of our community landscape both environmentally and aesthetically. It is vital that every community have a healthy variety of trees within their landscape to help withstand the arrival of new invasive species. Emerald ash borer (EAB), which affects all species of the ash (*Fraxinus*) family, is today's crisis but with growing international trade we can expect other invasive insect species to attack our urban forests," says Mark Cinnamon, IDA's nursery inspection program manager.

For more information regarding Arbor Day celebrations ideas and planting trees in memory of someone, visit: www.arborday.org

Illinois is broken down to three planting zones. A list of trees that are best to plant in your zone, are available on our website at www.IllinoisEAB.com



This product is approved for distribution and use only under FIFRA Section 24(C) for control of arthropod pests in trees. The user must have a copy of the state-approved FIFRA Section 24(c) label which permits use of this product at the time of pesticide application and follow all directions for use, restrictions, and precautions. Contact your state department of agriculture or state agency responsible for pesticide regulation to determine if a Section 24(c) is in effect in your state.

TREE-äge™

Injected insecticide for the control for arthropod pests in trees.

ACTIVE INGREDIENT:

Emamectin Benzoate¹ 4.0%

Other Ingredients 96.0%

Total 100.0%

¹CAS No. 155569-91-8

Net Contents: 1.06 quarts (1 liter)

EPA Est. 39578-TX-1

**KEEP OUT OF REACH
OF CHILDREN.
WARNING/AVISO**

NEW TOOL APPROVED IN FIGHT AGAINST DEADLY BEETLE

Illinoisans will now have an effective alternative to tree removal in their arsenal against the Emerald Ash Borer, a deadly wood-boring beetle

that has plagued Illinois and North America long before its initial discovery in 2002.

The Illinois Department of Agriculture on April 15, approved a special local need request for the use of Tree-äge™, an insecticide touted as the most effective chemical weapon against EAB. Nearing 100 percent effectiveness, the product, developed by Swiss agro-chemical company Syngenta and Massachusetts firm Arborjet, has an active ingredient called emamectin benzoate which is injected directly into the ash tree's vascular system where EAB larvae feast. The direct injection affects only the beetle larvae and will not harm anything coming into contact with the tree such as butterflies, birds and squirrels.

After yearlong preliminary studies, Michigan and most recently, Indiana officials have approved the chemical. Based on results in Michigan, preliminary evidence suggests that a single treatment could provide up to two years of control.

Ideally intended as a preventative treatment for healthy, non-EAB-infested trees, Tree-äge™ is most suitable for trees in close proximity to EAB-infested areas.

"IDA encourages property owners to consult with a certified arborist or tree care company to discuss treatment pricing and other options suitable for their situation," says Warren Goetsch, bureau chief of Environmental Programs. "Cost will be a factor for most homeowners. This tool will most likely be used by golf courses and other landscape areas where entire canopies may be devastated affecting their local commerce."

If you suspect EAB, please contact your city forester or local arborist or take digital photographs of the tree and the symptoms it is expressing and email them with contact info to: AGR.EAB@Illinois.gov



Illinois Department of Agriculture ~ DeKalb Office

2280 Bethany Road, Suite B ~ DeKalb, IL 60115

815/787-5476 ~ 815/787-5488 fax

Hotline: 800/641-3934

WWW.ILLINOISEAB.COM



State of Illinois
Rod R. Blagojevich, Governor

Department of Agriculture
Tom Jennings, Acting Director



EAB NEWS

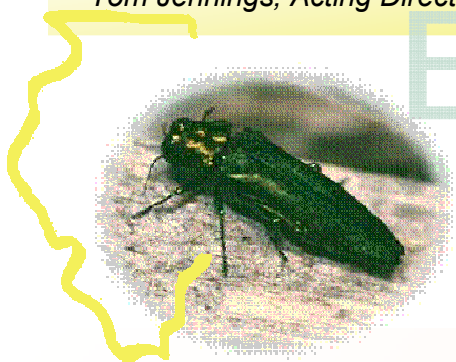
EAB NEWS

JUNE 2008

EAB NEWS
VOLUME 2, ISSUE 4



Will County Latest Infestation



The City of Naperville received confirmation from the United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Services Wednesday of the presence of the Emerald Ash Borer in a portion of southwest Naperville. This is the first confirmed case of the Emerald Ash Borer in Naperville and Will County.

On Thursday, June 5, during a routine inspection, the city forester discovered a potential case of Emerald Ash Borer in the Ashwood Park Townhome development, located near 248th and 103rd streets. Approximately a dozen ash trees, located on the parkway and on private property, were found to have evidence of the insect.

On Friday, June 6, the Department of Public Works removed the 11 infested ash trees in that area by cutting and chipping the trees in accordance with Department of Agriculture disposal protocol. The city is also taking care to properly discard the chips so as not to cause further spread of the insect.

"Leaving infested ash trees standing would allow for the spread of adult Emerald Ash Borer," City Forester Jack Mitz said. "These adults would then lay eggs and infest other nearby ash trees. To date we have found no other infested areas in our community."

City staff immediately contacted the Illinois Department of Agriculture (IDA), who investigated the site with staff and confirmed the presence of the Emerald Ash Borer. A sample of the insect was also sent to the USDA, the coordinator of the Federal Emerald Ash Borer program, for official confirmation.

"We appreciate Naperville's quick response in confirming and removing the known EAB-infested ash trees," IDA's Bureau Manager of Environmental Programs Warren Goetsch said. "Immediately removing known infestations helps to minimize the beetles' spread. Also, area residents should remain vigilant in monitoring the health of their ash trees. If you suspect EAB, please contact your city forester. For more information regarding EAB and the overall state and national programs, please visit www.IllinoisEAB.com."

"The city is taking this very seriously," Department of Public Works Director Dave

Van Vooren said. "We are fortunate that this is a fairly new development area and the trees planted are small. We have a plan in place to contain this insect and educate residents on the Emerald Ash Borer so we can work together to prevent further spread of this beetle."

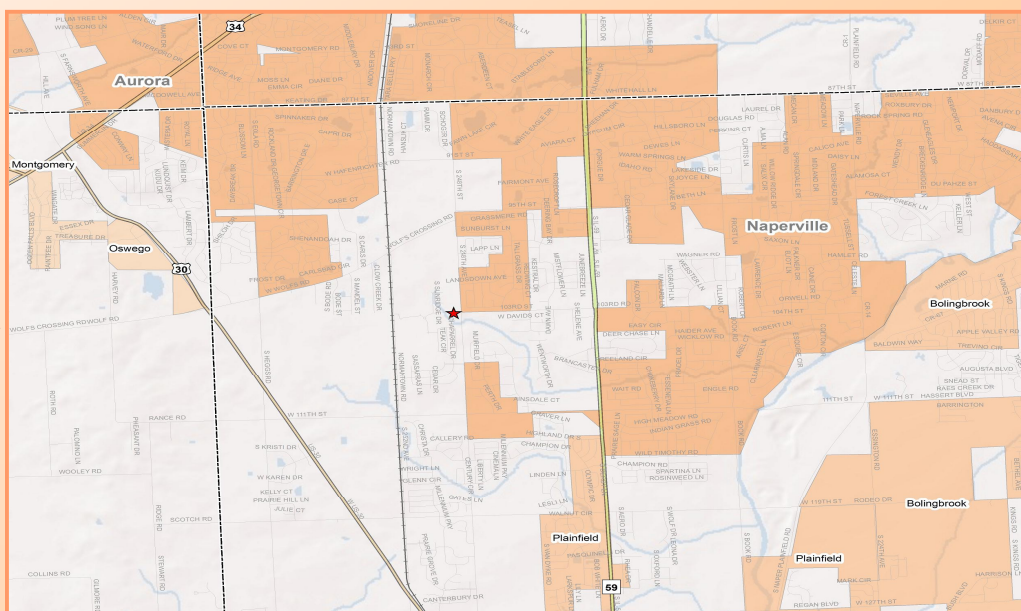
The city will take the following steps to prevent the spread of the Emerald Ash Borer:

- All area ash trees will be inspected and inventoried by the Department of Public Works.
- The State of Illinois will install four to six traps in the area to determine the extent of the beetle's presence.

The city is contacting nearby governments to inform them of the beetle's presence.

The infested ash trees vary in size between two and four inches in diameter.

DuPage and Will Counties are in the Emerald Ash Borer quarantine area. Within the quarantine area, branches and logs of ash trees must be chipped to a size of one inch or less and must be inspected for any evidence of infestation. The movement of firewood is also regulated and firewood cannot be transported through or outside of the quarantine area. Live ash trees cannot be transplanted from quarantine areas to non-quarantine areas as well.





**REMOVE INFESTED ASH
IMMEDIATELY
(Be sure to cover
during transport)**

Having observed the documented spread of Emerald Ash Borer across Michigan, Ohio, Indiana, Ontario (Canada), and now other states, it is very alarming. Looking at what has been found through survey efforts here in Illinois should lead one to believe we are in for a long significant battle against this pest. Current survey data is revealing that we are about to enter a period of time where EAB is on the verge of rapid spread, especially in areas where it has already been confirmed. This will be a significant urban management problem for every municipality with large ash inventories.

It is strongly recommended that known EAB infested ash be removed immediately. Leaving infested ash to stand will allow for the emergence of hundreds, or possibly thousands of adult EAB. These adults would then lay eggs and infest other nearby ash trees, which will then greatly impact communities' management strategies and budgets. EAB is an extremely insidious pest which multiplies at an estimated minimum of ten fold per year.

When removing infested ash during the adult flight season, please try to have all ash debris processed to a deregulated state on site if at all possible. This would be for example chipping of all debris to less than one inch in two dimensions. (Many chippers, if well maintained, chip to less than one inch in two dimensions.) During flight season one must cover all unprocessed material that is removed from the site of the ash tree removal with a tightly bound tarp or in an enclosed container. This material can not be removed from the regulated area and should be processed to a deregulated state immediately upon destination arrival. The destination site must be a company working in compliance with the Illinois Department of Agriculture. To access an Emerald Ash Borer Compliance Agreement visit:
<http://www.agr.state.il.us/eab/data/200804106183.pdf>

Slow the spread!

Don't move firewood:

buy locally and

burn on site

What's That Purple Thing in the Tree?

It's not a decoration. It's not a kite.
It's a trap.

The Illinois Department of Agriculture is using these purple traps to look for the Emerald Ash Borer (EAB), an invasive pest that is deadly to ash trees. EAB is small and stealth-like in its behavior and is extremely difficult to detect. If not controlled, EAB threatens to devastate the entire ash species in North America.

These traps will help us determine if EAB is in the area. The traps will be used throughout the summer months.

We are asking for your cooperation in ensuring that these traps are left alone to "do their thing."
Spread the message about these purple traps and EAB.

EAB likes to hitchhike on firewood.
Don't move firewood.
Buy locally and burn locally.

For more on EAB, visit
www.IllinoisEAB.com



Rising from ASHES:

Furniture from Lost Trees

August 22 - Spring 2009





TRAPS DEPLOYED

Illinois Department of Agriculture EAB officials along with the nursery staff, began deploying the 'purple-sticky' traps around central and northwestern Illinois last May. These purple traps are the major focus of the latest detection strategy sponsored by the United States Department of Agriculture—Animal Plant and Health Inspection Services.

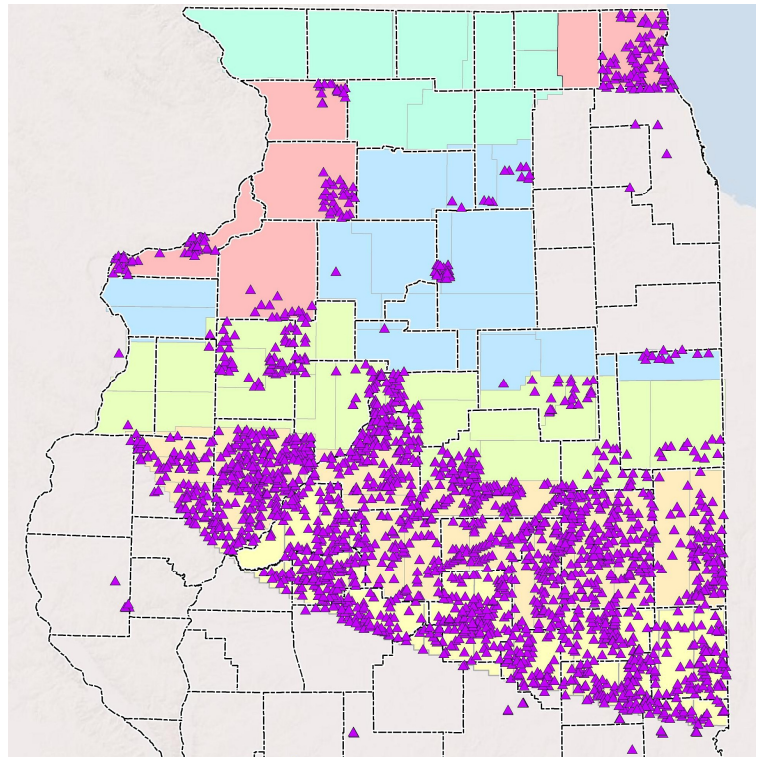
The traps are being placed in the 100-mile band on the outskirts of the last known EAB infestations. The traps are also being deployed in the more high-risk areas of southern Illinois. To dispel any confusion, the traps are not an exterminating tool, but rather are being used to detect if EAB is in the area.

The traps are 2' x 1' x 1' and are made of a plastic corrugated cardboard material and use Manuka oil as an attractant to the trap. They are lightweight and have a tendency to fall from their perch. Should you see a downed purple trap, please call us and report its location, including cross streets and the county in which it is located and trap number to 217/785-5575 or email us at agr.eab@illinois.gov

REPORT DOWNED TRAPS

If you find a 'downed purple trap'; one that has fallen from the tree please contact us at 217/785-5575 or at agr.eab@illinois.gov Please give as specific information to the location of the trap as best you can. Include street and cross streets, city, county, trap number (located on the inside of trap) and a contact name and number if possible.

As of June 12, 2008, these purple triangles represent the progress of trap placement thus far. There are 2,332 EAB trap locations based on the GPS-submitted data from field staff.



EAB or Not EAB?

IDA has received many calls about that little green metallic beetle on the upper right, thinking it is that deadly little green metallic beetle lower left. The one on the right is actually a Six-spotted Green Tiger Beetle; an insect commonly confused with the emerald ash borer.



↑ Six-spotted Green Tiger Beetle—
Harmless to Ash trees.

They are commonly found sitting on sidewalks and other open areas. The six-spotted green tiger beetle is about one-half inch long and bright metallic green with small white spots on the wing covers.



↑ Emerald Ash Borer
—Deadly to Ash Trees

ers. They actively fly in sunny conditions, always facing anyone nearby. Their light-colored larvae have large dark heads with huge jaws. The larvae lurk in holes in the soil, waiting for insects and other prey to pass by.

*Courtesy of Dr. Phil Nixon, Entomologist
University of Illinois Natural History Survey*

IDA has also received quite a few calls about this pesky Japanese Beetle on the left, again, mistaking it for the Emerald Ash Borer, shown bottom right.

Japanese beetles are major pests feeding on the leaves of many trees, shrubs, and other plants. Japanese beetle adults range from three-eighths to one-half inch long. They are stocky beetles with a metallic green base color and coppery wing covers. The larvae are one of the white grubs that commonly attack the roots of turf grasses. Full grown larvae are white, C-shaped, and up to one inch long.

The Emerald Ash Borer, however, may nibble on ash leaves, but it is most destructive during its larval stage when boring into the trunks and limbs of ash trees as it matures and ultimately cutting off the nutrient supply to the tree and thereby causing the tree to die.

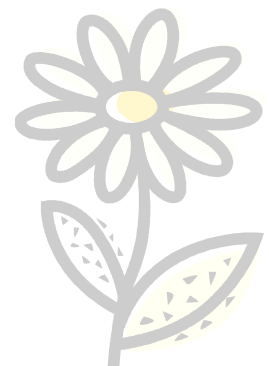


↑ Japanese Beetle
- NOT EAB.



↑ Emerald Ash Borer—Deadly to Ash Trees

If you suspect EAB, please contact your city forester or local arborist or take digital photographs of the tree and the symptoms it is expressing and email them with contact info to: AGR.EAB@Illinois.gov



Illinois Department of Agriculture ~ DeKalb Office

2280 Bethany Road, Suite B ~ DeKalb, IL 60115

815/787-5476 ~ 815/787-5488 fax

Hotline: 800/641-3934

WWW.ILLINOISEAB.COM



State of Illinois
Pat Quinn, Governor

Department of Agriculture
Tom Jennings, Director



EAB NEWS



2009 EAB Trapping Strategy

SUMMER 2009

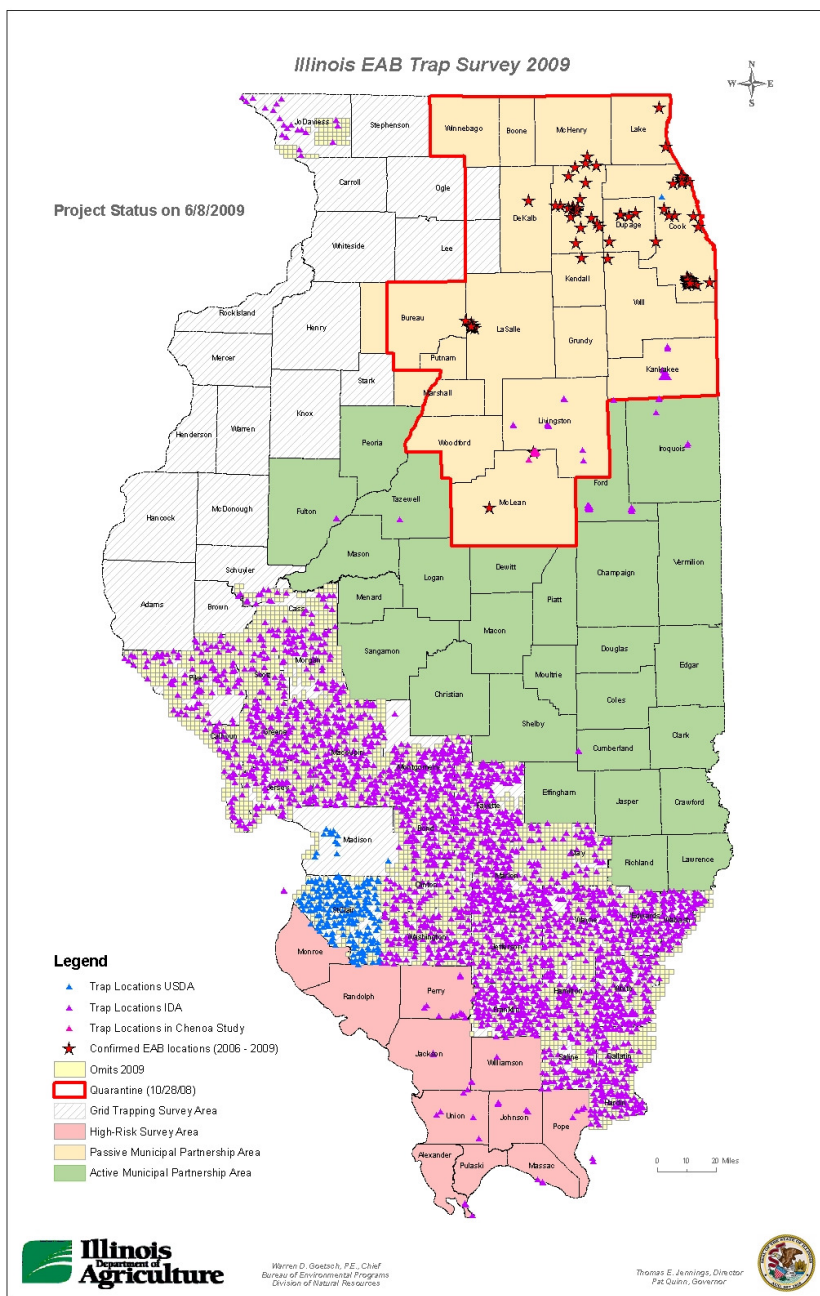
EAB NEWS ~ VOLUME
3, ISSUE 3



In early April, IDA staff members began deploying the purple “sticky” traps in far southern Illinois to determine if EAB is in the area. The highest concentration of traps can be found in a 50-mile buffer zone that runs along Illinois’ western border from northern to central Illinois and then cuts a swath across the south-central portion of the state to the Indiana border.

. IDA and USDA-APHIS staff members will be visiting over 10,000 grid areas (1.5 x 1.5 mile squares) throughout southern and western Illinois to place 1ft x 2 ft prism-shaped purple “sticky” traps in ash trees to assist in the detection of EAB infestations. The purple traps are a detection tool designed to help IDA determine if EAB is present in certain areas of the state. After the EAB flight season concludes, IDA will take down the traps, inspect them and adjust our pest management plan accordingly. During this time, we’re asking for the public’s assistance in not touching or removing these unmistakable purple boxes from the trees.

Additionally, IDA is working in cooperation with several municipalities which are just outside the 21-county quarantine zone that affects the northeastern quadrant of the state. These 42 central Illinois communities are providing an invaluable service to IDA by deploying and managing a nominal number of traps in their area while IDA manages the USDA 50-mile trapping zone.





Insecticide Options for Protecting Ash Trees From Emerald Ash Borer

Daniel A. Herms¹, Deborah G. McCullough², David R. Smitley², Cliff Sadof³, R. Chris Williamson⁴, and Philip L. Nixon⁵

¹Professor, Department of Entomology, Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, OH 44691

²Professor, Department of Entomology and Department of Forestry, Michigan State University, East Lansing, MI 48824

³Professor, Department of Entomology, Michigan State University, East Lansing, MI 48824

⁴Professor, Department of Entomology, Purdue University, West Lafayette, IN 47907

⁵Associate Professor, University of Wisconsin-Madison and University of Wisconsin Cooperative Extension, Madison, WI 53706

⁶Extension Entomologist, Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign, Urbana, IL 61801

Emerald ash borer (*Agrilus planipennis* Fairmaire), an invasive insect native to Asia, has killed tens of millions of ash trees in urban, rural and forested settings. This beetle was first discovered in 2002 in southeast Michigan and Windsor, Ontario. As of May 2009, emerald ash borer (EAB) infestations were known to be present in 11 states and two Canadian provinces. Many homeowners, arborists and tree care professionals want to protect valuable ash trees from EAB. Scientists have learned much about this insect and methods to protect ash trees since 2002. This bulletin is designed to answer frequently asked questions and provide the most current information on insecticide options for controlling EAB.



EAB larvae damage the vascular system of the tree as they feed, which interferes with movement of systemic insecticides in the tree.



EAB adults must feed on foliage before they become reproductively mature.

Answers to Frequently Asked Questions

What options do I have for treating my ash trees?

If you elect to treat your ash trees, there are several insecticide options available and research has shown that treatments can be effective. Keep in mind, however, that controlling insects that feed under the bark with insecticides has always been difficult. This is especially true with EAB because our native North American ash trees have little natural resistance to this pest. In university trials, some insecticide treatments were effective in some sites, but the same treatments failed in other sites. Furthermore, in some studies conducted over multiple years, EAB densities continued to increase in individual trees despite annual treatment. Some arborists have combined treatments to increase the odds of success (e.g., combining a cover spray with a systemic treatment).



Healthy ash trees that have been protected with insecticides growing next to untreated ash trees killed by EAB.



Our understanding of how EAB can be managed successfully with insecticides has increased substantially in recent years. The current state of this understanding is detailed in the bulletin. It is important to note that research on management of EAB remains a work in progress. Scientists from universities, government agencies and companies continue to conduct intensive studies to understand how and when insecticide treatments will be most effective.

For the full 8 page report, visit www.IllinoisEAB.com or <http://www.agr.state.il.us/eab/data/200906015797.pdf>



About Getting Your

EAB First Detector Certification

For Master Gardeners and Master Naturalists

Emerald Ash Borer (EAB) is a major threat throughout the Midwest. One of the primary focus areas is to reduce human movement of EAB. Therefore, these training programs are concentrated along major traffic routes or campground areas throughout the state.

Those who attend will learn about identification and control and will receive information on the first detector program. Our goal is to train you so you can spread the word by talking with local civic groups, garden clubs and school groups.

University of Illinois Extension entomologists and educators will provide an overview of Emerald Ash Borer—its life cycle, how it spreads, where it came from and what management options are available. Pesticide tree injections will be demonstrated.

As a First Detector Certification participant, you will experience hands-on borer identification to help you determine if what you may see is EAB, one of the many borers already found in Illinois, or even an ash tree. You will also learn what trees are good alternatives for ash trees.

Other topics that will be presented include how to get your community aware of the potential threat and what plans need to be made in case it shows up in your backyard.

The day will wind up with the First Detector Certification program for Master Gardeners and Master Naturalists.

There is no fee to attend but reservations are required for all locations. There two options for registration:

1. Email David Robson at drobson@illinois.edu
Subject line: "EAB Registration" and include the date attending, your name and contact information (phone, cell, email).
2. Or Call Martha Smith at 309/836-2363.

Friday, June 19, 9 a.m.—2:30 p.m.

Reservation deadline: June 16
Lavender Crest Winery
5401 U.S. Highway 6
Colona, IL 61241
Directions: www.lavendercrest.com

Monday, June 22, 9 a.m.—2:30 p.m.

Reservation deadline: June 17
University of Illinois Extension
Madison County Office
900 Hillsboro, Box 427
Edwardsville, IL 62025
618/650-7050
Directions: <http://web.extension.uiuc.edu/madisonstclair/findus.html>

Thursday, June 23, 9 a.m.—2:30 p.m.

Reservation deadline: June 18
University of Illinois Extension
Vermilion County Office
12190 U.S. Route 150
Oakwood, IL 61858
217/442-8615
Directions: <http://web.extension.uiuc.edu/vermilion/findus.html>

Monday, June 29, 9 a.m.—2:30 p.m.

Reservation deadline: June 24
University of Illinois Extension
Jackson County Office
402 Ava Rd.
Murphysboro, IL 62966
618/687-1727
Directions: <http://web.extension.uiuc.edu/jackson/findus.html>

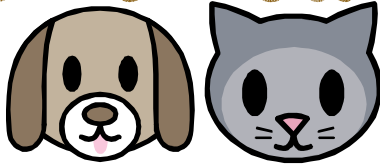
Wednesday, July 1, 9 a.m.—2:30 p.m.

Reservation deadline: June 25
Wildlife Prairie Park
3826 N. Taylor Rd #1
Hanna City, IL 61536
309/676-0998
Directions: www.willifeprairiestatepark.org

Tuesday, July 7, 9 a.m.—2:30 p.m.

Registration deadline: July 2
University of Illinois Extension
Sangamon County Office
2501 North 8th Street
Illinois State Fairgrounds, Bldg #30
Springfield IL 62702
217/782-4617
Directions: <http://web.extension.usuc.edu/sanamonmenard/>

Two New Staffers



Two new contractual trappers Kyle Nevill and Sheri Bonnett reported for duty June 1 at IDA. They will be filling some recent vacancies within the EAB program. The new trappers will be assisting in deploying, data-recording and retrieval of EAB traps. After training, the two trappers will concentrate their efforts in the placement of EAB traps in Schuyler, Brown and Adams counties.

ATTENTION ALL FIREWOOD IMPORTERS

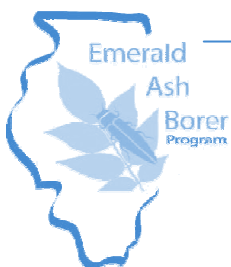


Be sure you are registered in compliance with the Illinois Department of Agriculture. Please register by filling out this form:

<http://www.agr.state.il.us/eab/data/200901026261.pdf>

www.IllinoisEAB.com

If you suspect EAB, please contact your city forester or local arborist or take digital photographs of the tree and the symptoms it is expressing and email them with contact info to: AGR.EAB@Illinois.gov



Illinois Department of Agriculture ~ DeKalb Office
2280 Bethany Road, Suite B ~ DeKalb, IL 60115
815/787-5476 ~ 815/787-5488 fax
Hotline: 800/641-3934

WWW.ILLINOISEAB.COM



State of Illinois
Pat Quinn, Governor

Department of Agriculture
Tom Jennings, Director

EAB NEWS

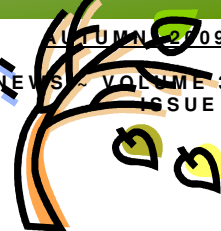
EAB NEWS



ALFUMN 2009
EAB NEWS VOLUME 3,
ISSUE 4



THE FIGHT IS ON!!!



EAB adults emerging from an ash tree after their destructive life cycle

In that corner, emerald ash borer (EAB), the metallic green beetle wreaking havoc on ash trees across North America -

and in
THIS corner
Oobius:
EAB's
NEMESIS!!



Oobius agrili-Solitary, egg parasitoid. Photo shows female laying egg in EAB egg

USDA Forest Service, USDA APHIS, and City of Chicago and Evanston land-managers released a few hundred parasitic wasps called *Oobius* on EAB-infested ash trees this July. These non-stinging wasps, each smaller than a poppy seed, are now spending long summer days searching and destroying EAB eggs, which are laid on the bark of ash trees. *Oobius* is one of three EAB natural enemies from China being evaluated for efficacy as biological control agents of EAB.

In 2004, Forest Service researchers discovered *Oobius* attacking EAB eggs on ash trees in northeastern China and began studying them in their laboratory in East Lansing, Michigan. *Oobius* and other small parasitic wasps coevolved with EAB in Asia and are important in controlling EAB populations and subsequent damage to ash trees. Hopefully, *Oobius* will restore the balance of nature for ash trees in North America as well.

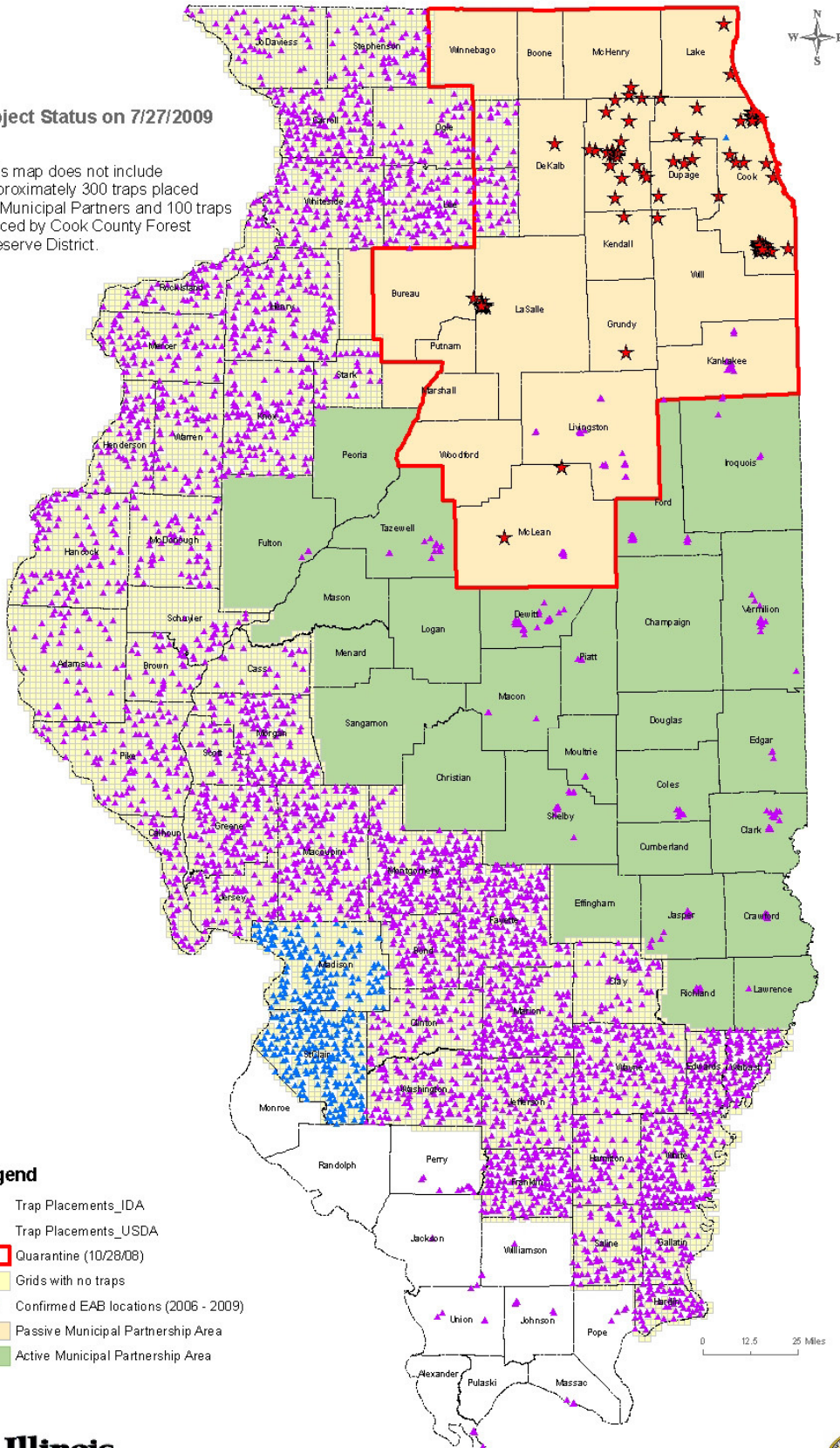
Oobius is harmless to humans but deadly to EAB. These mini-wasps kill EAB by laying eggs inside EAB eggs, consuming them to reproduce. They are predators of EAB, and may help provide natural and sustainable control of EAB in North America. Although biological control of EAB may be too late for many of the older, EAB-infested ash trees, these natural enemies offer hope as a management strategy in future years for young ash tree growing throughout the forests in our parks and riparian areas. For more info on *Oobius* and other natural predators of EAB, please visit www.emeraldashborer.info



Illinois EAB Trap Survey 2009

Project Status on 7/27/2009

This map does not include approximately 300 traps placed by Municipal Partners and 100 traps placed by Cook County Forest Preserve District.



EAB adult trap placement completed – IDA staff members have completed the placement of purple “sticky” traps throughout the state. The trap placement began in far southern Illinois on April 6. IDA and USDA-APHIS staff members visited over 10,000 grid areas (1.5 x 1.5 mile squares) throughout southern and western Illinois to place 1ft x 2 ft prism-shaped purple “sticky” traps in ash trees to assist in the detection of EAB infestations. The traps have been baited with an EAB attractant. Traps will remain deployed until mid- August when they will be retrieved and analyzed. Final numbers regarding traps deployed, grids visited, etc., will be provided in future reports as the final deployment data is added to the database. A status map and table regarding the deployed traps follows. During the next few weeks, staff members will be visiting municipalities that are participating in the trapping program to verify trap locations and complete data collection in those areas.





| <i>Item</i> | <i>Total # of traps deployed</i> | <i>Total # of grids omitted</i> | <i>Total # of grids visited</i> | <i>% of grids receiving traps</i> |
|---------------------------|----------------------------------|---------------------------------|---------------------------------|-----------------------------------|
| [Current as of 7/28/2009] | | | | |
| IDA | 4,267 | 6,248 | 10,507 | 41 |
| USDA (grid area) | 373 | 192 | 565 | 66 |
| USDA (passive area) | 112 | --- | --- | --- |
| U of I / INHS | 46 | --- | --- | --- |
| Municipalities | 729 | --- | --- | --- |
| ISU (Chenoa) | 70 | --- | --- | --- |
| TOTALS | 5,597 | 6,440 | 11,072 | --- |

NEW FINDS

EAB Program staff members are currently conducting EAB field investigations in targeted locations to find and confirm the presence of EAB. In mid July, five new communities were confirmed to have EAB infestations: Hinckley, Rosemont, Elgin, Schiller Park, and Bartlett. An additional eight new communities were confirmed in late July: Frankfort, Sycamore, Marengo, Addison, Lombard, Hanover Park, Park Ridge, and Flossmoor. IDA continues to investigate other suspicious areas in other communities.

MONITORING

EAB staff members are also monitoring EAB municipal traps set in targeted locations in NE Illinois and continue to respond to numerous leads and suspect sites statewide including survey work with IDNR forestry staff at larger state parks. Similar work including confirmation investigations will continue. Staff have also begun to remove and analyze purple traps within our statewide grid beginning in mid-August.



ATTENTION ALL FIREWOOD IMPORTERS

Be sure you are registered in compliance with the
Illinois Department of Agriculture.

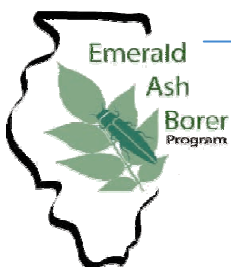
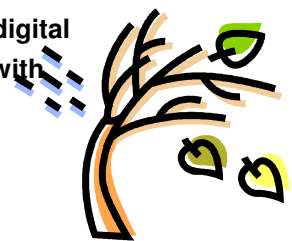
Please register by filling out this form:

<http://www.agr.state.il.us/eab/data/200901026261.pdf>



www.IllinoisEAB.com

If you suspect EAB, please contact your city forester or local arborist or take digital photographs of the tree and the symptoms it is expressing and email them with contact info to: AGR.EAB@Illinois.gov



Illinois Department of Agriculture ~ DeKalb Office
2280 Bethany Road, Suite B ~ DeKalb, IL 60115
815/787-5476 ~ 815/787-5488 fax
Hotline: 800/641-3934

WWW.ILLINOISEAB.COM





THE UPPER GREAT LAKES CENTER FOR EXOTIC SPECIES

Quick Guide

MichiganTech

Emerald Ash Borer, *Agrilus planipennis*

Prepared by Elizabeth E. Graham, Jordan M. Marshall and Andrew J. Storer



Andrew Storer - Michigan Technological University

Introduction

- This metallic green beetle, in the family Buprestidae, was recently discovered on dead or dying ash trees in southeastern Michigan
- Beetles in this group generally attack already weakened or stressed trees.
- This is an exotic species to Michigan. Its native range includes eastern Russia, northern China, Japan, and Korea.
- This insect appears to have a one year life cycle in Michigan with adults emerging between late May and mid-June.

Description

- The adult beetle is recognizable by its striking metallic green color. It is 3/4 inch in length and 1/16 inch wide.
- Adult emergence holes are D-shaped (right).
- Egg-laying occurs after emergence, and larvae then tunnel into the tree to feed on the living portion of the bark.
- To date, this species has only been found in ash.
- The role of this beetle in the death of weakened ash trees is unclear.



Andrew Storer - Michigan Technological University



Andrew Storer - Michigan Technological University

Signs of Infestation

- Infested trees often exhibit symptoms of canopy dieback which often progresses down from the top of the tree.
- Characteristic 2-4 inch vertical splits in the bark result from larval tunneling activity.
- Removal of the outer bark reveals winding tunnels in the inner bark where their larvae have tunneled (left).

Prospects for Management

- Ash trees throughout the north central region are also affected by other serious pest problems, including ash yellows and ash decline. This borer is currently known to be present only in southeastern lower Michigan.
- Research is needed to determine whether insecticides can be used to treat infested trees or to protect healthy trees from attack.
- Ash trees that are cut down or pruned should be chipped and left on site if possible.
- Preventing the spread of this beetle is very important and can be achieved by limiting the movement of ash trees from nurseries, untreated ash logs, ash firewood and other ash products.

Center for Exotic Species
Forest Resources and Environmental Science
Michigan Technological University
Houghton, MI 49931
forestry.mtu.edu/ces/

105°W 100°W 95°W 90°W 85°W 80°W 75°W 70°W 65°W

55°N

50°N

50°N

45°N

45°N

40°N

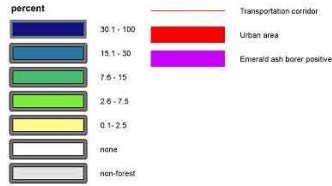
40°N

35°N

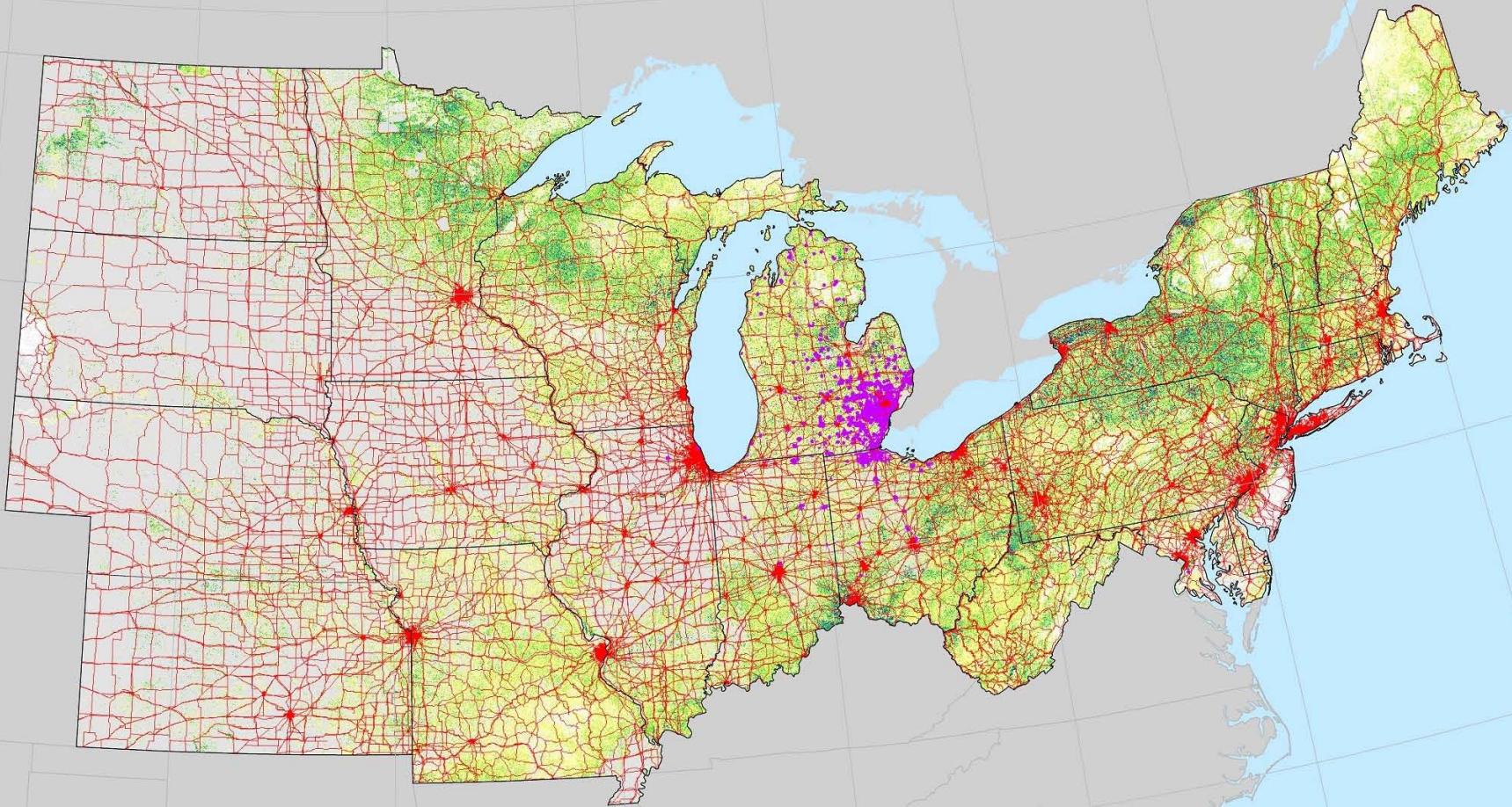
35°N

Forests of the Northern United States

Net volume of live ash trees on forest land



This map was produced via nearest neighbor imputation of annual FIA field plots using 250 meter MODIS imagery with climatological and topographic data. The field data and imagery were collected during the period 2001-2005. Geographic base data were derived from the National Atlas of the USA. EAB data were derived from USDA/APHIS/PPQ. FIA data and mapping tools are available at <http://fia.fs.fed.us/tools-data/>.



Compiled by B. Tyler Wilson, Forest Inventory and Analysis, Northern Research Station, Forest Service, USDA
May 2007

Albers equal area conic projection, standard parallels 29°30'N and 45°30'N and central meridian 90°W

100°W 95°W 90°W 85°W 80°W 75°W

Insecticide Options for Protecting Ash Trees from Emerald Ash Borer

North Central
IPM
Center

Daniel A. Herms
Deborah G. McCullough
David R. Smitley
Clifford S. Sadof
R. Chris Williamson
Philip L. Nixon



Insecticide Options for Protecting Ash Trees from Emerald Ash Borer



**Daniel A. Herms¹, Deborah G. McCullough²,
David R. Smitley³, Clifford S. Sadof⁴, R. Chris Williamson⁵,
and Philip L. Nixon⁶**

¹Professor, Department of Entomology, Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, OH 44691

²Professor, Department of Entomology and Department of Forestry, Michigan State University, East Lansing, MI 48824

³Professor, Department of Entomology, Michigan State University, East Lansing, MI 48824

⁴Professor, Department of Entomology, Purdue University, West Lafayette, IN 47907

⁵Associate Professor, University of Wisconsin-Madison and University of Wisconsin Cooperative Extension, Madison, WI 53706

⁶Extension Entomologist, Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign, Urbana, IL 61801

Contents

| | |
|---|----|
| Answers to Frequently Asked Questions. | 3 |
| What options do I have for treating my ash trees? | 3 |
| I know my tree is already infested with EAB. Will insecticides still be effective? | 3 |
| My ash tree looks fine but my county is quarantined for EAB. Should I start treating my tree? | 4 |
| I realize that I will have to protect my ash trees from EAB for several years. Is it worth it? | 4 |
| Insecticide Options for Controlling EAB | 5 |
| Using Insecticides to Control EAB | 6 |
| Soil-Applied Systemic Insecticides | 6 |
| Trunk-Injected Systemic Insecticides | 7 |
| Noninvasive, Systemic Basal Trunk Sprays | 7 |
| Protective Cover Sprays | 7 |
| How Effective Are Insecticides for Control of EAB? | 8 |
| Soil-Applied Systemic Insecticides | 8 |
| Trunk-Injected Systemic Insecticides | 9 |
| Emamectin benzoate | 9 |
| Imidacloprid | 9 |
| Noninvasive Basal Trunk Sprays with Dinotefuran | 10 |
| Protective Cover Sprays | 10 |
| Acknowledgements. | 10 |
| Key Points and Summary Recommendations | 11 |

Insecticide Options for Protecting Ash Trees from Emerald Ash Borer

Emerald ash borer (*Agrilus planipennis* Fairmaire), an invasive insect native to Asia, has killed tens of millions of ash trees in urban, rural and forested settings. This beetle was first discovered in 2002 in southeast Michigan and Windsor, Ontario. As of June 2009, emerald ash borer (EAB) infestations were known to be present in 12 states and two Canadian provinces. Many homeowners, arborists and tree care professionals want to protect valuable ash trees from EAB. Scientists have learned much about this insect and methods to protect ash trees since 2002. This bulletin is designed to answer frequently asked questions and provide the most current information on insecticide options for controlling EAB.

Answers to Frequently Asked Questions

What options do I have for treating my ash trees?

If you elect to treat your ash trees, there are several insecticide options available and research has shown that treatments can be effective. Keep in mind, however, that controlling insects that feed under the bark with insecticides has always been difficult. This is especially true with EAB because our native North American ash trees have little natural resistance to this pest. In university trials, some insecticide treatments were effective in

some sites, but the same treatments failed in other sites. Furthermore, in some studies conducted over multiple years, EAB densities continued to increase in individual trees despite annual treatment. Some arborists have combined treatments to increase the odds of success (e.g., combining a cover spray with a systemic treatment).

Our understanding of how EAB can be managed successfully with insecticides has increased substantially in recent years. The current state of this understanding is detailed in the bulletin. It is important to note that research on management of EAB remains a work in progress. Scientists from universities, government agencies and companies continue to conduct intensive studies to understand how and when insecticide treatments will be most effective.

I know my tree is already infested with EAB. Will insecticides still be effective?

If a tree has lost more than 50 percent of its canopy, it is probably too late to save the tree. Studies have shown that it is best to begin using insecticides while ash trees are still relatively healthy. This is because most of the insecticides used for EAB control act systemically — the insecticide must be transported within the tree. In other words, a tree must be healthy enough to carry a systemic



insecticide up the trunk and into the branches and canopy. When EAB larvae feed, their galleries injure the phloem and xylem that make up the plant's circulatory system. This interferes with the ability of the tree to transport nutrients and water, as well as insecticides. As a tree becomes more and more infested, the injury becomes more severe. Large branches or even the trunk can be girdled by the larval galleries.

Studies have also shown that if the canopy of a tree is already declining when insecticide treatments are initiated, the condition of the tree may continue to deteriorate during the first year of treatment. In many cases, the tree canopy will begin to improve in the second year of treatment. This lag in the reversal of canopy decline probably reflects the time needed for the tree to repair its vascular system after the EAB infestation has been reduced.

My ash tree looks fine but my county is quarantined for EAB. Should I start treating my tree?

Scientists have learned that ash trees with low densities of EAB often have few or no external symptoms of infestation. Therefore, if your property is within a county that has been quarantined for EAB, your ash trees are probably at risk. Similarly, if your trees are outside a quarantined county but are still within 10-15 miles of a known EAB infestation, they may be at risk. If your ash trees are more than 15 miles beyond this range, it is probably too early to begin insecticide treatments. Treatment programs that begin too early are a waste of money. Remember, however, that new EAB infestations have been discovered every year since 2002 and existing EAB populations will build and spread over time. Stay up to date with current EAB quarantine maps and related information at www.emeraldashborer.info. You can use the links in this Web site to access specific information for individual states. When an EAB infestation is detected in a state or county for the first time, it will be added to these maps. Note, however, that once an area has been quarantined, EAB surveys generally stop, and further spread of EAB in that area will not be reflected on future maps.

I realize that I will have to protect my ash trees from EAB for several years. Is it worth it?

The economics of treating ash trees with insecticides for EAB protection are complicated. Factors that can be considered include the cost of the insecticide and expense of application, the size of the trees, the likelihood of success, and potential costs of removing and replacing the trees. Until recently, insecticide products had to be applied every year. A new product that is effective for two years or even longer (emamectin benzoate) has altered the economics of treating ash trees. As research progresses, costs and methods of treating trees will continue to change and it will be important to stay up to date on treatment options.

Benefits of treating trees can be more difficult to quantify than costs. Landscape trees typically increase property values, provide shade and cooling, and contribute to the quality of life in a neighborhood. Many people are sentimental about their trees. These intangible qualities are important and should be part of any decision to invest in an EAB management program.

It is also worth noting that the size of EAB populations in a specific area will change over time. Populations initially build very slowly, but later increase rapidly as more trees become infested. As EAB populations reach their peak, many trees will decline and die within one or two years. As untreated ash trees in the area succumb, however, the local EAB population will decrease substantially. Scientists do not yet have enough experience with EAB to know what will happen over time to trees that survive the initial wave of EAB. Ash seedlings and saplings are common in forests, woodlots, and right-of-ways, however, and it is unlikely that EAB will ever completely disappear from an area. That means that ash trees may always be at some risk of being attacked by EAB, but it seems reasonable to expect that treatment costs could eventually decrease as pest pressure declines after the EAB wave has passed.

Insecticide Options for Controlling EAB

Insecticides that can effectively control EAB fall into four categories: (1) systemic insecticides that are applied as soil injections or drenches; (2) systemic insecticides applied as trunk injections; (3) systemic insecticides applied as lower trunk sprays; and (4) protective cover sprays that are applied to the trunk, main branches, and (depending on the label) foliage.

Insecticide formulations and application methods that have been evaluated for control of EAB are listed in Table 1. Some are marketed for use by homeowners while others are intended for use only by professional applicators. The “active ingredient” refers to the compound in the product that is actually toxic to the insect.

Formulations included in Table 1 have been evaluated in multiple field trials conducted by the authors. Inclusion of a product in Table 1 does not imply that it is endorsed by the

Table 1. Insecticide options for professionals and homeowners for controlling EAB that have been tested in multiple university trials. Some products may not be labeled for use in all states. Some of the listed products failed to protect ash trees when they were applied at labeled rates. Inclusion of a product in this table does not imply that it is endorsed by the authors or has been consistently effective for EAB control. See text for details regarding effectiveness.

| Insecticide Formulation | Active Ingredient | Application Method | Recommended Timing |
|---|--------------------|--|---|
| <i>Professional Use Products</i> | | | |
| Merit® (75WP, 75WSP, 2F) | Imidacloprid | Soil injection or drench | Mid-fall and/or mid- to late spring |
| Xytect™ (2F, 75WSP) | Imidacloprid | Soil injection or drench | Mid-fall and/or mid- to late spring |
| IMA-jet® | Imidacloprid | Trunk injection | Early May to mid-June |
| Imicide® | Imidacloprid | Trunk injection | Early May to mid-June |
| TREE-äge™ | Emamectin benzoate | Trunk injection | Early May to mid-June |
| Inject-A-Cide B® | Bidrin® | Trunk injection | Early May to mid-June |
| Safari™ (20 SG) | Dinotefuran | Systemic bark spray | Early May to mid-June |
| Astro® | Permethrin | Preventive bark and foliage cover sprays | 2 applications at 4-week intervals; first spray should occur when black locust is blooming (early May in southern Ohio to early June in mid-Michigan) |
| Onyx™ | Bifenthrin | | |
| Tempo® | Cyfluthrin | | |
| Sevin® SL | Carbaryl | | |
| <i>Homeowner Formulation</i> | | | |
| Bayer Advanced™ Tree & Shrub Insect Control | Imidacloprid | Soil drench | Mid-fall or mid- to late spring |

authors or has been consistently effective for EAB control. Please see the following sections for specific information about results from these trials. Results of some tests have also been posted on www.emeraldashborer.info.

Strategies for the most effective use of these insecticide products are described below. It is important to note that pesticide labels and registrations change constantly and vary from state to state. It is the legal responsibility of the pesticide applicator to read, understand and follow all current label directions for the specific pesticide product being used.

Using Insecticides to Control EAB

Soil-Applied Systemic Insecticides

Systemic insecticides applied to the soil are taken up by the roots and translocated throughout the tree. The most widely tested soil-applied systemic insecticide for control of EAB is imidacloprid, which is available under several brand names for use by professional applicators and homeowners (see Table 1). All imidacloprid formulations can be applied as a drench by mixing the product with water, then pouring the solution directly on the soil around the base of the trunk. Dinotefuran was recently labeled for use against EAB as a soil treatment (in addition to its use as a basal trunk spray discussed below). Studies to test its effectiveness as a soil treatment are currently underway in Michigan and Ohio.

Imidacloprid soil applications should be made when the soil is moist but not saturated. Application to water-logged soil can result in poor uptake if the insecticide becomes excessively diluted and can also result in puddles of insecticide that could wash away, potentially contaminating surface waters and storm sewers. Insecticide uptake will also be limited when soil is excessively dry. Irrigating the soil surrounding the base of the tree before the insecticide application can improve uptake.

The application rates for the homeowner product (Bayer Advanced™ Tree & Shrub Insect Control) and professional formulations

of imidacloprid are very similar. Homeowners apply the same amount of active ingredient that professionals apply. However, there are certain restrictions on the use of homeowner formulations that do not apply to professional formulations. Homeowner formulations of imidacloprid can be applied only as a drench. It is not legal to inject these products into the soil, although some companies have marketed devices to homeowners specifically for this purpose. Homeowners are also restricted to making only one application per year. Several generic products containing imidacloprid are available to homeowners, but the formulations vary and the effectiveness of these products has not yet been evaluated in university tests.

Soil drenches offer the advantage of requiring no special equipment for application other than a bucket or watering can. However, imidacloprid can bind to surface layers of organic matter, such as mulch or leaf litter, which can reduce uptake by the tree. Before applying soil drenches, it is important to remove, rake or pull away any mulch or dead leaves so the insecticide solution is poured directly on the mineral soil.

Imidacloprid formulations labeled for use by professionals can be applied as a soil drench or as soil injections. Soil injections require specialized equipment, but offer the advantage of placing the insecticide under mulch or turf and directly into the root zone. This also can help to prevent runoff on sloped surfaces. Injections should be made just deep enough to place the insecticide beneath the soil surface (2-4 inches). Soil injections should be made within 18 inches of the trunk where the density of fine roots is highest. As you move away from the tree, large radial roots diverge like spokes on a wheel and studies have shown that uptake is higher when the product is applied at the base of the trunk. There are no studies that show that applying fertilizer with imidacloprid enhances uptake or effectiveness of the insecticide.

Optimal timing for imidacloprid soil injections and drenches is mid-April to mid-May, depending on your region. Allow four to six weeks for uptake and distribution of the insecticide within the tree. In southern Ohio, for example, you would apply the product by

mid-April; in southern Michigan, you should apply the product by early to mid-May. When treating larger trees (e.g., with trunks larger than 12 inches in diameter), treat on the earlier side of the recommended timing. Large trees will require more time for uptake and transportation of the insecticide than will small trees. Recent tests show that imidacloprid soil treatments can also be successful when applied in the fall.

Trunk-Injected Systemic Insecticides

Several systemic insecticide products can be injected directly into the trunk of the tree including formulations of imidacloprid and emamectin benzoate (see Table 1). An advantage of trunk injections is that they can be used on sites where soil treatments may not be practical or effective, including trees growing on excessively wet, compacted or restricted soil environments. However, trunk injections do wound the trunk, which may cause long-term damage, especially if treatments are applied annually.

Products applied as trunk injections are typically absorbed and transported within the tree more quickly than soil applications. Allow three to four weeks for most trunk-injected products to move through the tree. Optimal timing of trunk injections occurs after trees have leafed out in spring but before EAB eggs have hatched, or generally between mid-May and mid-June. Uptake of trunk-injected insecticides will be most efficient when trees are actively transpiring. Best results are usually obtained by injecting trees in the morning when soil is moist but not saturated. Uptake will be slowed by hot afternoon temperatures and dry soil conditions.

Noninvasive, Systemic Basal Trunk Sprays

Dinotefuran is labeled for application as a noninvasive, systemic bark spray for EAB control. It belongs to the same chemical class as imidacloprid (neonicotinoids) but is much more soluble. The formulated insecticide is sprayed on the lower five to six feet of the trunk using a common garden sprayer and low pressure. Research has shown that the insecticide penetrates the bark and moves systemically throughout the rest of the tree.



Dinotefuran can be mixed with surfactants that may facilitate its movement into the tree, particularly on large trees with thick bark. However, in field trials, adding a surfactant did not consistently increase the amount of insecticide recovered from the leaves of treated trees.

The basal trunk spray offers the advantage of being quick and easy to apply and requires no special equipment other than a garden sprayer. This application technique does not wound the tree, and when applied correctly, the insecticide does not enter the soil.

Protective Cover Sprays

Insecticides can be sprayed on the trunk, branches and (depending on the label) foliage to kill adult EAB beetles as they feed on ash leaves, and newly hatched larvae as they chew through the bark. Thorough coverage is essential for best results. Products that have been evaluated as cover sprays for control of EAB include some specific formulations of permethrin, bifenthrin, cyfluthrin and carbaryl (see Table 1).

Protective cover sprays are designed to prevent EAB from entering the tree and will have no effect on larvae feeding under the bark. Cover sprays should be timed to occur when most adult beetles are feeding and beginning to lay eggs. Adult activity can be difficult to monitor because there are no

Healthy ash trees that have been protected with insecticides growing next to untreated ash trees killed by EAB.



EAB adults must feed on foliage before they become reproductively mature.

effective pheromone traps for EAB. However, first emergence of EAB adults generally occurs between 450-550 degree days (starting date of January 1, base temperature of 50°F), which corresponds closely with full bloom of black locust (*Robinia pseudoacacia*). For best results, consider two applications, one at 500 DD₅₀ (as black locust approaches full bloom) and a second spray four weeks later.

How Effective Are Insecticides for Control of EAB?

Extensive testing of insecticides for control of EAB has been conducted by researchers at Michigan State University (MSU) and The Ohio State University (OSU). Results of some of the MSU trials are available at www.emeraldashborer.info.

Soil-Applied Systemic Insecticides

Efficacy of imidacloprid soil injections for controlling EAB has been inconsistent; in some trials EAB control was excellent, while others yielded poor results. Differences in application protocols and conditions of the trials have varied considerably, making it difficult to reach firm conclusions about sources of variation in efficacy. For example, an MSU study found that low-volume soil injections of imidacloprid applied to small trees averaging 4 inches in DBH (diameter of the trunk at breast height) using the Kioritz applicator (a hand-held device for making low-volume injections) provided good control at one site. However, control was poor at another site where the same application protocols were used to treat larger trees (13-inch DBH). Imidacloprid levels may have been too low in the larger trees to provide adequate control. Higher pest pressure at the second site also may have contributed to poor control in the large trees.

In the same trials, high-pressure soil injections of imidacloprid (applied in two concentric rings, with one at the base of the tree and the other halfway to the drip line of the canopy) provided excellent control at one site. At another site, however, soil injections applied using the same rate, timing and application

method were completely ineffective, even though tree size and infestation pressure were very similar. It should be noted that recent studies have shown that imidacloprid soil injections made at the base of the trunk result in more effective uptake than applications made on grid or circular patterns under the canopy.

Imidacloprid soil drenches have also generated mixed results. In some studies conducted by MSU and OSU researchers, imidacloprid soil drenches have provided excellent control of EAB. However, in other studies, control has been inconsistent. Experience and research indicate that imidacloprid soil drenches are most effective on smaller trees and control of EAB on trees with a DBH that exceeds 15 inches is less consistent.

This inconsistency may be due to the fact that application rates for systemic insecticides are based on amount of product per inch of trunk diameter or circumference. As the DBH of a tree increases, the amount of vascular tissue, leaf area and biomass that must be protected by the insecticide increases exponentially. Consequently, for a particular application rate, the amount of insecticide applied as a function of tree size is proportionally decreased as trunk diameter increases. Hence, the DBH-based application rates that effectively protect relatively small trees can be too low to effectively protect large trees. Some systemic insecticide products address this issue by increasing the application rate for large trees.

In an OSU study with larger trees (15- to 22-inch DBH), Xytect™ (imidacloprid) soil drenches provided consistent control of EAB when applied experimentally at twice the rate that was allowed at that time. Recently, the Xytect™ label was modified to allow the use of this higher rate, which we now recommend when treating trees larger than 15-inch DBH. Merit® imidacloprid formulations, however, are not labeled for application at this high rate. Therefore, when treating trees greater than 15-inch DBH with Merit® soil treatments, two applications are recommended, either in the fall and again in the spring, or twice in the spring, about four weeks apart (for example in late April and again in late May). This is not an option for Bayer Advanced™ Tree and Shrub Insect Control and other

homeowner formulations of imidacloprid, which are limited by the label to one application per year. Homeowners wishing to protect trees larger than 15-inch DBH should consider having their trees professionally treated.

Treatment programs must comply with any limits specified on the label regarding the maximum amount of insecticide that can be applied per acre during a given year.

Trunk-Injected Systemic Insecticides

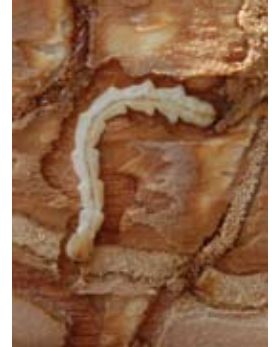
Emamectin benzoate • In several intensive studies conducted by MSU and OSU researchers, a single injection of emamectin benzoate in mid-May or early June provided excellent control of EAB for at least two years, even under high pest pressure. For example, in a highly-replicated study conducted on trees ranging in size from 5- to 20-inch DBH at three sites in Michigan, untreated trees had an average of 68 to 132 EAB larvae per m² of bark surface, which represents high pest pressure. In contrast, trees treated with emamectin benzoate had, on average, only 0.2 larvae per m², a reduction of > 99 percent. When additional trees were felled and debarked two years after the emamectin benzoate injection, there were still virtually no larvae in the treated trees, while adjacent, untreated trees at the same sites had hundreds of larvae.

In two OSU studies conducted in Toledo with street trees ranging in size from 15- to 25-inch DBH, a single application of emamectin benzoate also provided excellent control for two years. There was no sign of canopy decline in treated trees and very few emergence holes, while the canopies of adjacent, untreated trees exhibited severe decline and extremely high numbers of emergence holes.

One study suggests that a single injection of emamectin benzoate may even control EAB for three years. Additional studies to further evaluate the long-term effectiveness of emamectin benzoate are underway. To date, this is the only product that controls EAB for more than one year with a single application. In addition, in side-by-side comparisons with other systemic products (neonicotinoids), emamectin benzoate was more effective.

Imidacloprid • Trunk injections with imidacloprid products have provided varying degrees of EAB control in trials conducted at different sites in Ohio and Michigan. In an MSU study, larval density in trees treated with Imicide® injections were reduced by 60 percent to 96 percent, compared to untreated controls. There was no apparent relationship between efficacy and trunk diameter or infestation pressure. In another MSU trial, imidacloprid trunk injections made in late May were more effective than those made in mid-July, and IMA-jet® injections provided higher levels of control than did Imicide®, perhaps because the IMA-jet® label calls for a greater amount of active ingredient to be applied on large trees. In an OSU study in Toledo, IMA-jet® provided excellent control of EAB on 15- to 25-inch trees under high pest pressure when trees were injected annually. However, trees that were injected every other year were not consistently protected.

In a discouraging study conducted in Michigan, ash trees continued to decline from one year to the next despite being injected in both years with either Bidrin (Inject-A-Cide B®) or imidacloprid. The imidacloprid treatments consisted of two consecutive years of Imicide® (10% imidacloprid) applied using Mauget® micro-injection capsules, or an experimental 12% formulation of imidacloprid in the first year followed by Pointer™ (5% imidacloprid) in the second year with both applied using the Wedgle™ Direct-Inject™ System. All three treatment regimes suppressed EAB infestation levels in both years, with Imicide® generally providing best control under high pest pressure in both small (six-inch DBH) and larger (16-inch DBH) caliper trees. However, larval density increased in treated and untreated trees from one year to the next. Furthermore, canopy dieback increased by at least 67 percent in all treated trees (although this was substantially less than the amount of dieback observed in untreated trees). Even consecutive years of these treatments only slowed ash decline under severe pest pressure. In another MSU study, ACECAP® trunk implants (active ingredient is acephate) did not adequately protect large trees (greater than 15-inch DBH) under high pest pressure.



EAB larvae damage the vascular system of the tree as they feed, which interferes with movement of systemic insecticides in the tree.



Noninvasive Basal Trunk Sprays with Dinotefuran

Studies to date indicate that systemic basal trunk sprays with dinotefuran are about as effective as imidacloprid treatments. MSU and OSU studies have evaluated residues in leaves from trees treated with the basal trunk spray. Results show that the dinotefuran effectively moved into the trees and was translocated to the canopy at rates similar to those of other trunk-injected insecticides, and faster than other soil-applied neonicotinoid products.

As with imidacloprid treatments, control of EAB with dinotefuran has been variable in research trials. In an MSU study conducted in 2007 and 2008, dinotefuran trunk sprays reduced EAB larval density by approximately 30 percent to 60 percent compared to the heavily infested untreated trees. The treatment was effective for only one year and would have to be applied annually. In general, control is better and more consistent in smaller trees than in large trees, but more research is needed with larger trees. Studies to address the long-term effectiveness of annual dinotefuran applications for control of EAB are underway.

Protective Cover Sprays

MSU studies have shown that applications of Onyx™, Tempo® and Sevin® SL provided good control of EAB, especially when the insecticides were applied in late May and again in early July. Acephate sprays were less effective. BotaniGard® (*Beauveria bassiana*) was also ineffective under high pest pressure. Astro® (permethrin) was not evaluated against EAB in these tests, but has been effective for controlling other species of wood borers and bark beetles.

In another MSU study, spraying Tempo® just on the foliage and upper branches or spraying the entire tree were more effective than simply spraying just the trunk and large branches. This suggests that some cover sprays may be especially effective for controlling EAB adults as they feed on leaves in the canopy. A single, well-timed spray was also found to provide good control of EAB, although two sprays may provide extra assurance given the long period of adult EAB activity.

It should be noted that spraying large trees is likely to result in a considerable amount of insecticide drift, even when conditions are ideal. Drift and potential effects of insecticides on non-target organisms should be considered when selecting options for EAB control.

Acknowledgements

Production and distribution of this bulletin were supported in part by cooperative agreements from the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS) and the U.S. Forest Service, Northeastern Area, Forest Health Protection. This bulletin may not necessarily express the views of the USDA.

Key Points and Summary Recommendations

- ✓ Insecticides can effectively protect ash trees from EAB.
- ✓ Unnecessary insecticide applications waste money. If EAB has not been detected within 10-15 miles, your trees are at low risk. Be aware of the status of EAB in your location. Current maps of known EAB populations can be found at www.emeraldashborer.info. Remember, however, that once a county is quarantined, maps for that county are no longer updated.
- ✓ Trees that are already infested and showing signs of canopy decline when treatments are initiated may continue to decline in the first year after treatment, and then begin to show improvement in the second year due to time lag associated with vascular healing. Trees exhibiting more than 50 percent canopy decline are unlikely to recover even if treated.
- ✓ Emamectin benzoate is the only product tested to date that controls EAB for more than one year with a single application. It also provided a higher level of control than other products in side-by-side studies.
- ✓ Soil drenches and injections are most effective when made at the base of the trunk. Imidacloprid applications made in the spring or the fall have been shown to be equally effective.
- ✓ Soil injections should be no more than 2-4 inches deep, to avoid placing the insecticide beneath feeder roots.
- ✓ To facilitate uptake, systemic trunk and soil insecticides should be applied when the soil is moist but not saturated or excessively dry.
- ✓ Research and experience suggest that effectiveness of insecticides has been less consistent on larger trees. Research has not been conducted on trees larger than 25-inch DBH. When treating very large trees under high pest pressure, it may be necessary to consider combining two treatment strategies.
- ✓ Xytect™ soil treatments are labeled for application at a higher maximum rate than other imidacloprid formulations, and we recommend that trees larger than 15-inch DBH be treated using the highest labeled rate. Merit® imidacloprid formulations are not labeled for use at this higher rate. When treating larger trees with Merit® soil treatments, best results will be obtained with two applications per year. Imidacloprid formulations for homeowners (Bayer Advanced™ Tree & Shrub Insect Control and other generic formulations) can be applied only once per year.
- ✓ Homeowners wishing to protect trees larger than 15-inch DBH should consider having their trees professionally treated.
- ✓ Treatment programs must comply with any label restrictions on the amount of insecticide that can be applied per acre in a given year.



The Cooperative Emerald Ash Borer Program

For more information and to order
additional copies of this bulletin:

www.emeraldashborer.info/

The Ohio State University EAB Outreach Team

www.ashalert.osu.edu

Purdue Extension

www.entm.purdue.edu/eab/

University of Wisconsin

www.entomology.wisc.edu/emeraldashborer/

University of Illinois

ipm.illinois.edu/landturf/insects/

University of Minnesota

www.extension.umn.edu/issues/eab/

June 2009



Bibliographic Citation: Herms DA, McCullough DG, Smitley DR, Sadof C, Williamson RC, and Nixon PL. 2009. Insecticide options for protecting ash trees from emerald ash borer. North Central IPM Center Bulletin. 12 pp.