



**Emerald  
Ash Borer**

## Commonly Asked Questions about the Emerald Ash Borer

- 1. Where did the emerald ash borer come from?** The natural range of *Agrilus planipennis*, the emerald ash borer (EAB), is northern China and Korea. It may also occur in eastern Russia, Japan, and Mongolia. Before June of 2002, EAB had never been found in North America or anywhere outside of Asia. It is not a major pest of ash trees in Asia and little was known about EAB biology or control methods.
- 2. How did it get here?** We don't know for sure, but EAB probably arrived in solid wood packing material that originated in China or another Asian country. This could include ash wood used for crating, pallets or stabilizing cargo in ships.
- 3. What types of trees does the emerald ash borer attack?** In North America, it has only been found in ash trees. Ash trees in any setting such as woodlots, forests, hedgerows or landscaped areas in cities have been affected. Larval galleries have been found in trees or branches measuring as little as 1 inch in diameter. Large ash trees that are more than 2 feet in diameter have been killed. All species of North American ash appear to be susceptible.
- 4. Where has it been found?** In 2002, EAB was thought to occur in six counties in southeast Michigan: Livingston, Macomb, Monroe, Oakland, Washtenaw and Wayne, and in Essex County, Ontario. Our ability to detect and find EAB has substantially improved since then, however, and we now realize that a much greater area was infested than what was initially thought. Currently, 21 counties in southeastern Michigan are quarantined for EAB. Other significant infestations have been found in northern Ohio and areas of Indiana. In addition, at least 35 localized "outlier" infestations have been detected in other areas of lower Michigan, Ohio and Indiana. These small populations were started when infested ash nursery trees, ash logs or ash firewood were transported into new areas. Nearly all of the outliers that have been found originated before EAB was discovered in 2002. Quarantines are now in effect to limit artificial transport of EAB in ash trees or logs. Infested ash firewood is difficult to regulate, however. It is important to watch for signs and symptoms of EAB in non-quarantined areas where the beetle may have been accidentally transported in ash firewood or other ash material.
- 5. What happens to infested ash trees?** Tunnels excavated by feeding larvae destroy the water and nutrient conducting tissues under the bark. The canopy of heavily infested trees will begin to die, usually near the top of the tree and progressing down the trunk. Sometimes ash trees produce epicormic sprouts or "water sprouts" on the trunk or large branches where EAB damage is heavy. Bark may crack over larval galleries. Adult beetles leave a characteristic "D"-shaped exit hole in the bark, roughly 1/8 inch in diameter, when they emerge in June. Woodpeckers often attack larvae, especially during the winter. Woodpecker holes are larger and easier to see than the D-shaped exit holes left by EAB. Several infestations have been discovered because people noticed woodpecker damage on ash trees.
- 6. What do emerald ash borers look like?** The adult beetle is dark metallic green in color, 1/2 inch-long and 1/8 inch wide. When adults flare their wings, you can see their violet abdomen. Larvae feed in the inner bark between the wood and the rough outer bark. They are flat, cream-colored grubs with wide heads.

**7. What is the life cycle of this borer?** Recent research has shown that in heavily infested trees or in trees that are stressed, most EAB have a one year life cycle. In healthy trees that have only a few larvae, most EAB require two years to complete their development. Adult beetles begin emerging in mid to late May with peak emergence in June. Beetles are most numerous in late June and early to mid July. Females usually begin laying eggs about 2 weeks after emergence. Eggs hatch in 1-2 weeks, and the tiny larvae bore through the bark and into the cambium and phloem. This is the area between the bark and wood, where nutrients are transported within the tree. The larvae feed under the bark for several weeks, usually from late July through October. The larvae typically pass through four stages, eventually reaching a size of roughly 1 to 1.25 inches long. Most EAB larvae overwinter in a small chamber in the outer bark or in the outer 0.5 inch of wood. Pupation occurs in spring and the new generation of adults will emerge in May or June, to begin the cycle again.

**8. How is this pest spread?** We know EAB adults can fly at least 1/2 mile from the tree where they emerge. Many infestations, however, were started when people moved infested ash nursery trees, logs, or firewood into uninfested areas. Shipments of ash nursery trees and ash logs with bark are now regulated. Transporting firewood outside of the quarantined areas is illegal, but many people are not aware of this restriction. Transport of infested firewood remains an ongoing concern. *PLEASE – do not move any ash firewood or logs outside of the quarantined area.*

**9. How long has the emerald ash borer been in Michigan?** No one knows for sure, but scientists are working on this question. Experts feel that it may have been in the Detroit area for at least 10 years before it was discovered. The initial infestation probably started from a small number of beetles. Over the next few years, the population began to build and spread. By 2002, many trees in southeastern Michigan were declining and dying. In North America, native ash trees have little or no resistance to EAB. Even the healthiest trees have been killed when EAB population densities are high. Natural enemies have so far had little effect on high EAB populations in North America.

**10. Does it only attack dying or stressed trees?** Closely related beetles that are native to North America such as two-lined chestnut borer and bronze birch borer only attack very stressed trees. Scientists have found that EAB adults are more attracted to stressed ash trees than to healthy trees and larvae develop more rapidly in stressed trees. But will attack and eventually kill healthy ash trees, even those under irrigation and fertilization. When EAB populations are high, small trees may die within 1-2 years of becoming infested and large trees can be killed in 3-4 years.

**11. What is being done on a statewide basis about this new pest?** Several universities and agencies are working together on the EAB situation, including Michigan State University, Ohio State University, Purdue University, the departments of Agriculture in Michigan and Ohio, the departments of Natural Resources in Michigan, the USDA Animal and Plant Health Inspection Service and the USDA Forest Service. An intensive survey and detection program has been implemented across Upper Michigan and areas of Ohio and Indiana. Some high priority outlier sites have been eradicated. Funding is limited, however, and most outlier sites cannot be managed or contained. Some funding has been allocated to public education and awareness programs to increase recognition of EAB and the risks associated with transporting firewood.

Scientists are working to learn more about the biology of EAB, its rate of spread, methods for EAB detection, predators and other natural enemies that may attack EAB, and how insecticides can be used to protect trees in infested areas.

**12. How big a problem is EAB?** EAB is becoming an international problem, with infestations in Canada as well as Michigan, Ohio, Indiana. The economic costs of ash mortality in urban and forested areas, restrictions on shipments of nursery stock, logs and firewood are already in the tens of millions of dollars. Potential costs of EAB are estimated to be in the hundreds of billions of dollars if this exotic pest continues to spread across the U.S. Ecological consequences of EAB are not yet well known but could be severe, especially in riparian areas, swamps and forests where ash is a major component.

**13. Where can I get more information on the Emerald Ash Borer?** The EAB web site at [www.emeraldashborer.info](http://www.emeraldashborer.info) is a great source of objective, up-to-date information, including photos to help you identify EAB and ash trees. New research results, quarantine regulations, shade tree recommendations, and links to other useful web sites are also available.

This fact sheet was updated by Dr. Deborah McCullough, Dr. David Smitley and Dr. Eric Rebeck  
Michigan State University Extension, March 2006.