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# EMERALD ASH BORER

## “The Most Destructive Forest Pest Ever Seen in North America”

Janine Wang



The emerald ash borer (EAB) is an invasive wood-boring insect threatening more than nine billion ash trees in North America. Millions of dead or dying ash trees have been removed since the pest was first detected in 2002 in the Detroit, Michigan, area. This burrowing beetle, named for its distinctive color as an adult, has few natural predators and is now found in thirty-five states and five Canadian provinces.

As many of us who work with wood have noticed, there is an abundance of ash lumber available for woodturning and flat work. But while EAB infestations have fed this abundance, they also bring the end of ash's availability that much closer. In the area where

I live, Philadelphia, EAB infestations could wipe out the region's ash population in five to ten years.

To learn more about this important topic, I spoke with Robin Osborne, Communications Coordinator for the Department of Entomology at Michigan State University (MSU). She works with Deborah McCullough, Ph.D., a forest entomologist at MSU, who has been working on EAB research and management since EAB was first

discovered in 2002. Following is our conversation in Q&A format.

**Janine Wang:** What does the emerald ash borer do to trees, exactly?

**Robin Osborne:** EAB attacks and kills most North American ash species. Adult beetles lay eggs on the tree bark, and the larvae from these eggs bore into the ash tree's phloem tissue. As they develop, they consume greater

**Of utmost importance is not moving infested ash wood—especially firewood—to other locations.**



amounts of active phloem tissue of this ring-porous tree species. An infested tree will show characteristic S-shaped tunneling patterns (called galleries) just beneath the bark, and D-shaped exit holes on its surface.

**JW:** What can we do about it?

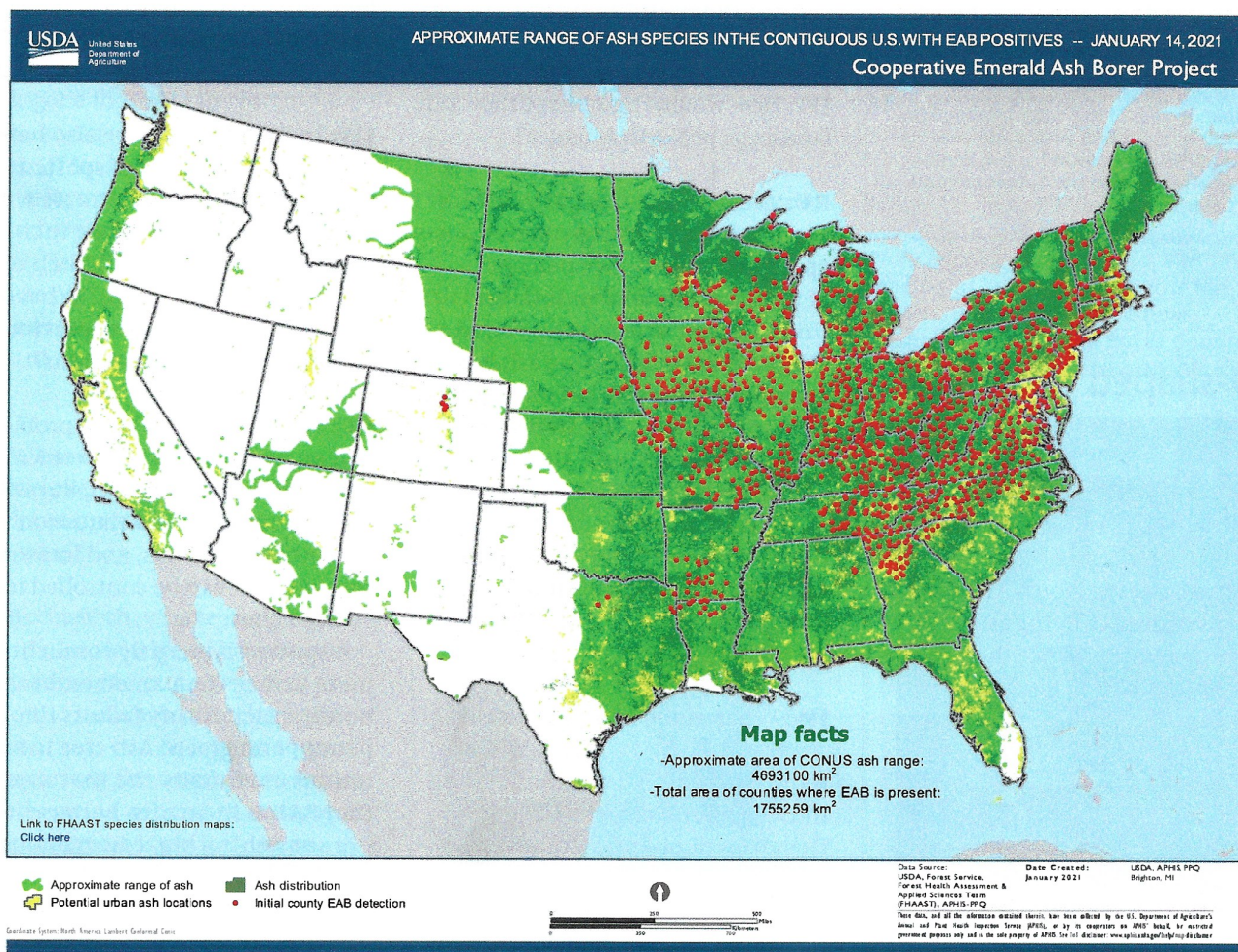
**RU:** Homeowners can help by carefully monitoring their ash trees for

signs and symptoms of EAB throughout the year. These include bark flecking in the upper branches of the tree (from woodpeckers), severe die-back of the tree's upper branches, and bark cracks, which often reveal S-shaped galleries beneath. If you see signs and symptoms of the borer, you can either decide to treat the ash tree or remove it.

Also of utmost importance is not moving infested ash wood—

especially firewood—to other locations to prevent spreading the pest to other areas. Firewood is not a regulated item, and it is easy to move without detecting the pests that it may harbor. Because of the human movement of goods (which has gone on since people have roamed the earth), there's no doubt that invasive species will continue to spread. World trade has definitely had an effect on the escalation of ▶

## Range of ash trees and EAB infestation

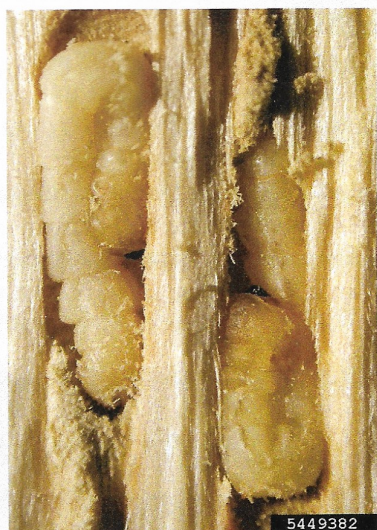


Range of ash species overlaid with EAB positives, as of January 14, 2021.

Image courtesy of USDA APHIS



## EAB larvae



Mature fourth-instar larvae, or “J-larvae,” of emerald ash borer in pupation cells in the outer sapwood of an ash tree. For EAB with a one-year life cycle, J-larvae are found in fall, winter, and early spring in the outer sapwood or outer bark.

Photo: Houping Liu, Michigan State University, Bugwood.org

## D-shaped exit holes



Emerald ash borer adults chew D-shaped emergence holes.

Photo: Debbie Miller, USDA Forest Service, Bugwood.org

invasive species. Some of these species may find a foothold in the area they invade and become a problem; others may not.

**JW:** What does this mean for the future of ash trees?

**RU:** EAB is now considered the most destructive forest pest ever seen in North America. The scope of this problem will reach billions of dollars nationwide if not dealt with. There are sixteen known species of ash trees in North America, and this pest has the capability to kill them all.

**JW:** How would this change the landscape of North America?

**RU:** According to the USDA Forest Service, ash tree canopy makes up approximately two percent of forests and woodlands in the United States, or more than eight billion ash trees. Because ash has been a popular tree species planted in municipalities, subdivisions, farm windbreaks, etc., those areas are also at high risk. Percentages of ash trees in urban forests range from between 20-30% to as much as 50%, according to research from Purdue entomologist Cliff Sadof.

**JW:** What would recovery look like?

**RU:** That’s a tough question. In December 2020, the U.S. Department of Agriculture’s Animal and Plant Health Inspection Service (APHIS) changed the way it deals with EAB, saying that domestic quarantine has not proven effective in stopping its spread. This means no more regulatory activities, including

issuing permits, certificates, and compliance agreements, and conducting investigations of suspected violations. In other words, people can do what they want with ash trees and ash wood since there are no federal regulations on ash materials. States do have the ability to invoke quarantines or other regulatory edicts if they so choose and [if they] have the money and manpower to enforce the regulations.

Since so little information was known about this pest before it was discovered in North America, and considering it had probably been here since the early 1990s, it has been difficult to manage.

**JW:** In Philadelphia, we also have a horrific infestation of spotted lanternflies. Do you think we will continue to have epidemic incidents like the EAB (e.g., Dutch elm disease, chestnut blight)? What distinguishes the EAB from previous tree diseases and infestations?

**RU:** Spotted lanternfly is a problem, and no doubt it will be a problem nationwide at some point, but with enough outreach and education to landowners, growers, and forestry specialists, it can be controlled to some extent.

A spotted lanternfly is much more visible than an emerald ash borer, which is tiny (adults fit on a penny) and green. Ash tree infestations are usually the first sign that EAB is in an area because it’s not something big, conspicuous, and bright red that people can see. Once that happens, ash trees can survive if insecticides are used (usually through injections or soil drenches), or homeowners have the option of cutting them down. But our forests are a different story. EAB



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is hard to treat by spraying; nor is it economically feasible to cut down or treat every infested ash tree in a forest.

**JW:** What else makes EAB different?

**RU:** It got a foothold in North America years before it was discovered. [And since] there was little information about the pest, researchers had to start from scratch. It's difficult to see adults because of their size and color, and they burrow under the bark, where it's hard to detect them.

**JW:** What do you have to say to woodworkers and woodturners, who have such a close relationship with trees?

**RU:** Because they have such a good working knowledge of how important trees are to our ecosystem and economic base, woodworkers and woodturners can be a great source for spreading the word about EAB and educating others who may not realize what an issue it is. As an example, Native American black ash basket makers have worked hard to get the word out about EAB and are even working with the Smithsonian to make it part of displays and presentations. [They] also talk about the threat of EAB to

their livelihood at workshops and presentations and when they sell their artwork.

Knowing what an impact EAB can have on their craft and getting the word out to those who use or are interested in their products is a really great way for woodworkers and woodturners to help.

**JW:** Where can we go for more information and to get involved?

**RU:** Emeraldashborer.info (EAB University) has so much information—credible, reliable resources that can give background

information, research, and management activities, as well as helpful links. [This resource] has some great webinars from knowledgeable sources that can be used in presentations, meetings, and the like to help spread the word. I suggest browsing the various webpages on the site, as well as using the “Search” feature to find information that may be useful.

There is also an emerald ash borer Twitter page ([twitter.com/emeraldashborer](https://twitter.com/emeraldashborer)) that highlights the latest news around North America pertaining to EAB and some of the other wood pests of concern. ■

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## A month's maturation



The gradual maturation of EAB pupae to the adult stage. This process takes about a month.

Photo: Debbie Miller, USDA Forest Service, Bugwood.org

## Telltale EAB “galleries”



Ash borer galleries beneath the bark of an ash log.

Photo: Janine Wang