EMERALD ASH BORER
IN SOUTH CAROLINA

Photo courtesy of David Cappaert
Michigan State University
–Bugwood.org

South Carolina
Forestry Commission

EMERALD ASH BORER DETECTED IN SOUTH CAROLINA

The emerald ash borer (EAB), a beetle pest that has devastated ash trees throughout the midwestern and eastern United States, has been officially detected in Greenville, Oconee and Spartanburg counties.

According to Clemson University's Department of Plant Industry, the beetles were found Aug. 3, 2017 during a routine check of Emerald Ash Borer traps and confirmed by the USDA Animal and Plant Health Inspection Service (APHIS).

What is EAB, and why is it so destructive?

The emerald ash borer, *Agrilus planipennis*, is the most destructive insect pest of ash trees in North America, decimating ash trees in urban and forest environments. They have killed tens of millions of ash trees as they have moved from their initial infestation in Michigan in 2002.

Hosts

This insect pest attacks all native ash trees (*Fraxinus* spp.) and has also been recorded in fringe trees (*Chionanthus virginicus*), both in the olive family. Manchurian ash is resistant, and there are hybrids between native ashes and Manchurian ash that are tolerant or even resistant.

Signs/symptoms

Adults are approximately a third of an inch long (8.5 mm). Symptoms include epicormic growth (shoots emerging from the base of the tree) and reduced foliage and chlorotic foliage. Signs of infestation include bark splitting, galleries beneath the bark and D-shaped emergence holes in the bark. Heavily infested trees often attract woodpeckers that feed on the larvae and the prepupae.

Life cycle

Adult emergence generally coincides with full bloom of black locust trees in the spring. The adults feed on ash foliage and lay eggs on the bark. The larvae chew through the bark into the phloem and cambium of the tree where they feed and develop. Infestations usually start high in the trees, moving down the trunk as the population of borers grows. Larval feeding in the phloem reduces the transport of nutrients and water, causing the tree to decline. Eventually, the feeding galleries girdle the tree, killing it.

Adult emerald ash borer beetles are approximately a third of an inch long. But it is the larvae that are the destructive agents, chewing galleries under the bark, reducing the tree's ability to move nutrients, thereby killing it.

Timeline

Adults emerge in the spring and, like most *Agrilus* spp., nibble on the foliage of their ash hosts. They mate, and the females oviposit in crevices in the bark. In cold environments or very healthy trees, it may take two years for a larva to mature to an adult.

Range

This buprestid beetle is native to Asia, but has invaded the northeast and Midwest of North America. It is steadily moving southward. Isolated populations have been recorded from suburban Atlanta, Ga., to much of North Carolina and Tennessee.

Management

There are systemic insecticides available to protect "high-value" trees (see page 4 for more information).

Quarantine

South Carolina is now under a statewide quarantine for ash. A quarantine simply means that neither ash trees (or any component thereof) nor any type of hardwood firewood can be transported out of the counties that are under quarantine into those that are not; by extension, mills outside of those quarantined counties cannot accept it either. The quarantine applies only between March and October, as that is the period during which the adult insects fly (in South Carolina) and are capable of infesting new trees.

Such a measure is imposed not only to help slow the spread of the beetle, but also to facilitate the expeditious removal and processing of the affected trees and their wood. Extending the quarantine's boundaries outside of the counties where EAB was detected will allow landowners to harvest ash in the affected counties and move it to counties with the hardwood, veneer or other mills that take ash.

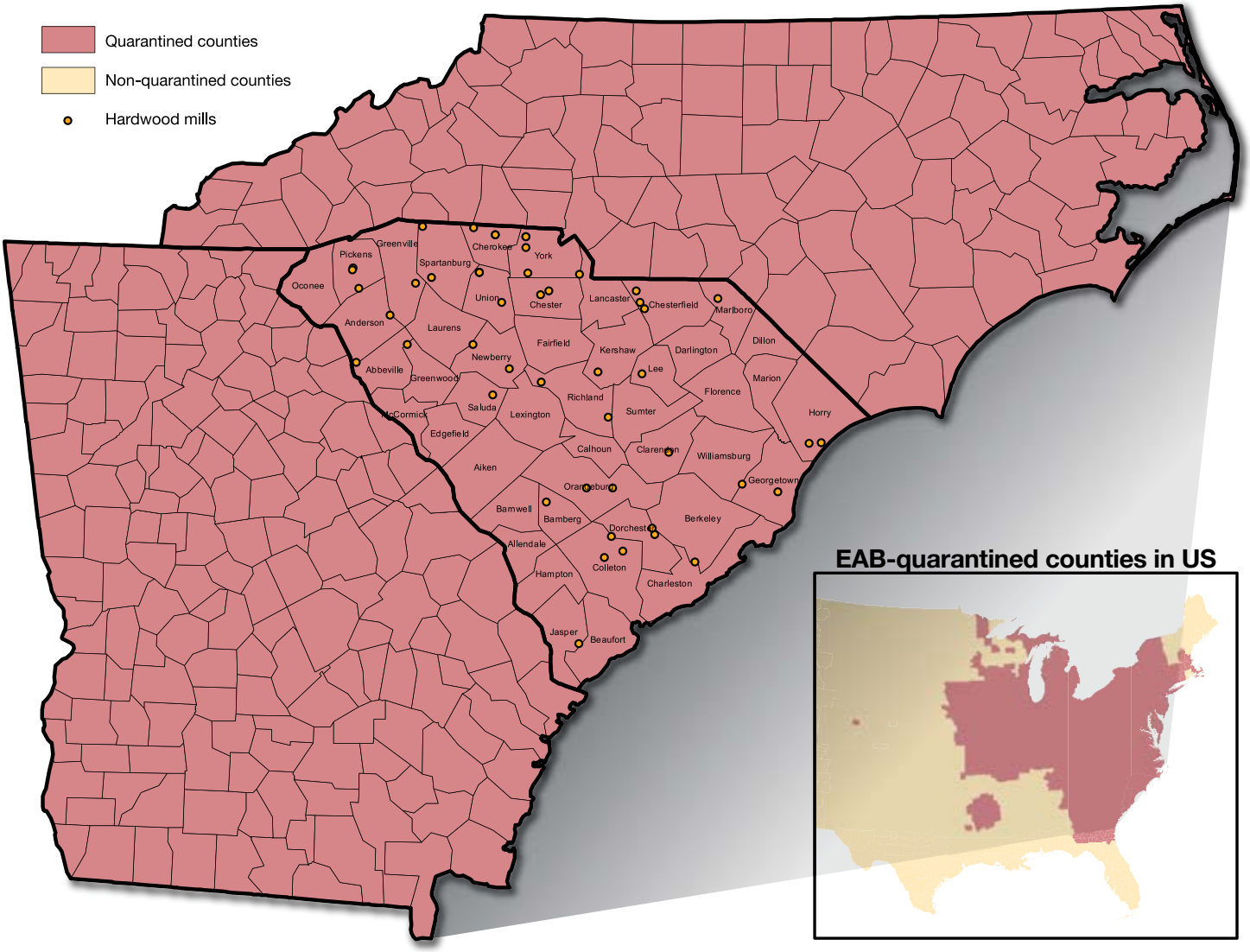
After being processed in the mills, the wood is no longer subject to quarantine.

Material that falls under a quarantine include EAB insects themselves, ash trees, limbs, branches, stumps, roots, logs, lumber, chips and bark, and again, ALL hardwood firewood. Firewood is defined as any hardwood species cut to less than 4 feet in length.

Clemson University's Department of Plant Industry and APHIS will be working with industry to develop compliance agreements for ash material subject to the following treatments and/or conditions:

- heat-treated (140°F or 60°C for 60 minutes);
- if the bark plus 1/2 inch of sapwood removed;
- if the material is chipped to 1 inch or less in 2 dimensions; or
- if the material can be composted (composted material must reach 140°F or 60 °C for four days, AND the pile must be stirred after four days).

EAB-quarantined counties in SC, GA and NC



Compliance agreements will allow ash wood to be moved from quarantined counties to counties that are not under quarantine. Although infested logs can be used by these industries, the massive die-off that is expected will mean that much less ash wood will be available to these industries in the future.

Management/treatment recommendations

Eradicating the emerald ash borer is not a likely outcome, given the record of its persistent, state-by-state advance out of Michigan since 2002. Thirty states from Minnesota to Texas and Colorado to New Hampshire, plus the District of Columbia, have detected the invasive beetle and have imposed a mosaic of county-to-county and full-state quarantines, depending on the severity of the outbreak.

Evidence suggests the beetle is present long before it is found, in which case the recent detection in South Carolina suggests that it is already present elsewhere in the state.

But treatment options are still available for both homeowners and forest landowners who want to protect individual trees from this pest. High-value trees can be saved through annual treatment with an array of insecticides; however, the cost of these treatments and the requirement to treat the entire stem of each tree makes this option less feasible – in fact, nearly cost-prohibitive – for large forested areas.

For those interested in pursuing pesticide treatment options, a coalition of universities under the banner of the North Central Integrated Pest Management Center has already developed a very comprehensive publication that landowners will find very useful and informative. Titled, *Insecticide Options for Protecting Ash Trees from Emerald Ash Borer*, the guide is an extensive resource that lists all approved treatments and answers the most frequently asked questions. View/download this publication at **www.emeraldashborer.info/files/multistate_eab_insecticide_fact_sheet.pdf**.

The biggest costs associated with the arrival of the emerald ash borer in other states have been related to the mitigation efforts in urban environments with a heavy ash component. These efforts include pesticide treatments for high-value trees, tree removal and disposal, and replanting efforts. Because South Carolina's urban environments do not have a large component of ash, the biggest impacts are likely to be environmental; the loss of ash trees in bottomland hardwoods where they are typically found will create gaps that invasive plants, including Chinese privet, can capitalize on.

Occurrence per acre of ash trees, by county

The ash resource in South Carolina

Ash species occur in all 46 counties. The four species of ash in South Carolina (white, green, Carolina and pumpkin) all generally perform well under moist to wet conditions, and in rich soils. Ash is also planted as an ornamental shade tree in neighborhoods and other urban settings.

Carolina and pumpkin ashes, which occupy frequently flooded or inundated areas for portions of the year, are not considered as economically important as the green and white ash species, and they compose less than 10 percent of the ash species group across the state by occurrence. White ash, in particular, may be found from lower to mid-slope sites, and prefers more well-drained soils. It is also considered the most economically valuable of the ash species, though all species in this group are often marketed together as simply ash spp.

Green ash is the dominant ash species in the state, accounting for 84 percent of the recorded occurrences. All four species of ash together account for just 1.17 percent of the state's forest inventory.

Ash wood is valued for its toughness and elasticity; it is frequently used in tool handles and implements, and also in furniture making and interior finishing.

The ash group ranks in the top 20 species by volume for the state, with a total of 12.1 million tons for all trees 5-inch or greater on timberland in the current inventory. Average annual removals has experienced large shifts over time, from just over 100,000 tons in 1968 to 52,000 tons in 2014, with peaks over 160,000 tons in 1986, 1993 and 2006. The current growth/drain ratio is 2.84.

published October 2017