

Threats to Forest Health: The Exotic Emerald Ash Borer

By Lynne K. Rieske-Kinney

Ash trees in urban areas had been declining for several years throughout southeastern Michigan. Tree crowns were thinning, branch dieback was common, excessive sprouting was evident, and trees were dying. Homeowners, landscapers, and urban foresters were attributing the decline to a variety of diseases, and it wasn't until 2002 that a small, shiny green beetle, the emerald ash borer, was identified as the causal agent.

Since its initial discovery in the Detroit area, it has been found throughout Michigan's Lower Peninsula and was also discovered in the Upper Peninsula, affecting more than 50 counties. It was soon discovered across the Detroit River in Windsor, Ontario (Canada). It has since spread to 15 counties in Ohio and seven in Indiana, with

spot infestations in Maryland and Virginia (distribution as of March 2006).

Although the beetle was discovered in 2002, evidence suggests that the infestation had been present in southeastern Michigan for about five years prior to its discovery and probably arrived in this country in solid wood packing material. Human movement of infested nursery stock and firewood allowed it to spread at such a rapid rate.

Adult emerald ash borers are $\frac{1}{2}$ inch long, elongate, and bright metallic green. After mating, female beetles lay their eggs in bark crevices. Eggs hatch and the small larvae immediately burrow into the bark, feeding on cambial tissue, and later sapwood, as they develop. Larvae overwinter within the sapwood, protected from temperature extremes.

They are cream-colored and mature to a length of $1\frac{1}{4}$ inch.

Because they feed beneath the bark, larvae are rarely seen. Larval tunneling beneath the bark destroys the plant vascular system, effectively girdling the stem or branch. Pupation occurs in the outer sapwood, and adult beetles emerge through exit holes in the trunk and branches. Adults are excellent fliers and are visible on warm, sunny days. Adult beetles live two to three weeks and are present in late May through early July. One generation is produced each year.

Look for yellowed, thinning foliage, branch dieback, thinning crowns, and excessive suckering, which are



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all signs of an emerald ash borer infestation. Unusual woodpecker activity is a sign of borers, since the birds readily feed on larvae developing beneath the bark. Looking closely at the bark, D-shaped emergence holes about 1/8 inch in diameter will be visible where newly developed adults emerged from their pupal chambers. Meandering, S-shaped galleries are visible beneath the bark of infested trees; the bark will have to be peeled back to see this sign.

Infestations of the emerald ash borer are difficult to detect because symptoms are easily confused with various ash diseases, the decline of infested trees is relatively slow, and the insect is visible only for a brief period in early summer. Although the adults are highly mobile, movement of infested firewood and nursery stock poses the greatest threat to its spread. Because of its long life cycle, larvae remain in cut firewood for several months. The emerald ash borer appears to be capable of completing development in relatively small trees, heighten-

Larval galleries beneath bark



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ing the risk of its movement in infested nursery stock.

State and federal quarantines are in place to prevent movement of this pest. These quarantines restrict movement of ash trees, branches, logs, and firewood out of infested areas and also require removal of ash trees within a half mile radius of an infested tree. Destroying host trees has proved costly and only marginally effective, and so in areas where emerald ash borer is well established, this approach may no longer be mandated.

In its native Asian range (China, Mongolia, Korea, Japan, Taiwan, and far eastern Russia), the emerald ash borer attacks not only ash but also elm, walnut, and butternut. In North America, the emerald ash borer appears confined to ash. Of the 16 North American ash species, five are native to Kentucky, playing an integral role in forests and urban landscapes. All are probably susceptible to emerald ash borer.

Since the emerald ash borer is not found in Kentucky, it is difficult to predict its impact. However, it undoubtedly poses a threat to the ash species in our forests and has the potential to devastate our urban landscapes. Research on approaches for controlling infestations is under way. Our best approach to guarding against emerald ash borer is to comply with all quarantine restrictions regarding movement of nursery stock and firewood and immediately contact the State Entomologist's Office if you suspect emerald ash borer (859.257.7450).

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Quarantine restrictions against emerald ash borer prohibit movement of nursery stock and firewood from infested areas.

Branch dieback and thinned crown due to emerald ash borer



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