

Alien bugs at our door

■ *Asian longhorned beetle and emerald ash borer are poised to decimate Adirondack forests.*

By Judith Harper and Phil Brown

Exotic insects have invaded the Adirondacks before. Since the 1960s, the beech-scale insect has devastated the region's beech trees—so much so that scientists believe the species may not survive here. More recently, the *Sirex* wood-wasp has infested red and white pines in several Adirondack counties.

But the worst may be yet to come.

Two especially rapacious insects—the Asian longhorned beetle and emerald ash borer—are already present in New York State, and some experts fear that it's just a matter of time before they reach the Adirondacks. If they do, these small bugs could create huge ecological and legal problems for those whose job it is to protect the Forest Preserve.

Of the two, the Asian longhorned beetle has the potential to do more damage if it reaches the Adirondacks. The insect prefers to feast on sugar maples, the predominant hardwood of the Adirondack Park (and the source of the region's maple-sugar industry). But it also will infest most other hardwoods, including birches, poplars, and mountain ash, eventually killing the host trees. Hardwoods make up 70 percent of the Adirondack forest. These trees are vital to the timbering industry and fall tourism.

Emily DeBolt, education coordinator with the Lake George Association, says a longhorned beetle invasion could decimate the region's hardwoods and leave the forest with gaping holes, with possibly dire consequences for plants and animals. "We could lose a



Asian longhorned beetle

"We could lose a third of our forest canopy."

—Emily DeBolt
Lake George Association

instance, officials destroyed more than twenty thousand trees in response to an infestation of the longhorned beetle. Following both types of infestation, the trees are cut into chips and burned to ensure the insects do not survive.

Scientists and state officials say the Adirondack Park is at high risk because the longhorned beetle and ash borer can be transported in firewood. Vacationers could unwittingly bring bug-infested wood to campgrounds, motels,

For more

**For more
on invasive
species see
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ably dire consequences for plants and animals. "We could lose a third of our forest canopy," she warns. "And that would result in fragmentation and habitat loss."

Some think that may be overstating the case, but no one denies that the longhorned beetle poses a huge threat to the Park's ecological and economic health.

As its name suggests, the emerald ash borer attacks only trees in the ash family. Scientists are predicting that the insect eventually will kill all the ash trees in North America. In the Adirondacks, ash accounts for less than 5 percent of the forest, according to the state Department of Environmental Conservation (DEC).

It's believed that both the Asian longhorned beetle and emerald ash borer were inadvertently transported to the United States in wooden packing materials from Asia. The longhorned beetle appeared in Brooklyn in 1996 and has since been found in a number of states and in Canada. The ash borer appeared in Michigan in 2002 and later turned up in several other states. It was discovered in southwestern New York State in June.

The ash borer already has destroyed tens of millions of trees in the United States, mostly in the Midwest, and is expected to kill billions, according to Therese Poland, an entomologist with the U.S. Forest Service. She says virtually all the ash trees in the country are at risk. The longhorned beetle, though it attacks more species, is easier to stop. It has infected more than eight thousand trees in Massachusetts, New Jersey, and southern New York State.

In places where either insect has been found, the remedy has been drastic. In and around Worcester, Mass., for

Lake George Association



Emerald ash borer

can be transported in firewood. Vacationers could unwittingly bring bug-infested wood to campgrounds, motels, and summer residences, triggering a large-scale infestation.

Last year, DEC enacted regulations forbidding the importation of untreated firewood into the state and the long-distance transportation of untreated firewood within the state. But many people may not have heard of the regulation. So while it's possible that the insects could reach the Park on their own, either by migration or borne by the wind, contaminated firewood remains the most likely route. Some observers also worry that infested logs from Canada or elsewhere could loose the insects in the Park.

Rob Davies, chief of DEC's Division of Lands and Forests, believes the ash borer is more likely than the longhorned beetle to infest the Adirondacks.

For one thing, the ash borer can migrate about four miles a year and its holes are inconspicuous, so by the time an outbreak occurs, it may be hard to contain.

Also, the ash borer kills trees quickly because its larvae reside in and feast on the phloem, the part of the tree that carries nutrients. "By eating just that layer, the emerald ash borer girdles the tree, cutting off the nutrients, whereas the Asian longhorned beetle tunnels through that layer and goes into the sapwood," said Poland, the U.S. Forest Service scientist.

And once a tree dies, the insect moves on to another. In contrast, trees infested by the longhorned beetle stay alive longer. The beetles will re-infest the same tree over and over, moving on only after it dies. Hence, they spread more slowly.

Unless scientists find new ways of fighting the ash borer, Davies predicts that it will spread throughout the state. The Adirondacks has three species of ash. ▶▶

Courtesy of U.S. Forestry Service

►► White ash is the most common, and it's found mostly in the Champlain Valley, southern Adirondacks, and the High Peaks region. The other species are black ash (found in swamps) and green ash. Mountain ash, which often grows at high elevations, is not a true ash and would not be affected by the borer.

The ecologist Jerry Jenkins, author of *The Adirondack Atlas*, said small mammals and some birds eat the seeds of ash trees. Would the death of the ash trees create ripple effects through the ecosystem? Which trees would replace them?

"I don't have an answer to that," Jenkins said, "especially because it comes at a time when things are getting warmer [due to climate change] and trees are going to be shifting around."

Charles Canham, a forest ecologist with the Cary Institute of Ecosystems Studies in Millbrook, N.Y., cautions against saying that the state will lose all its ash trees, but he believes it could lose nearly all of them, perhaps more than 99 percent. Asked about ripple effects, he replied, "Just simply losing white ash is bad enough."

Davies is more optimistic about stopping the spread of the Asian longhorned beetle. Not only do they tend to infest the same trees rather than migrate, but their holes are easier to spot, in part because the beetles leave behind telltale frass, or excrement, that looks like sawdust. If an outbreak is found early, Davies said, the beetles can be eradicated. DEC has been able to contain infestations in New York City and on Long Island.

"I'm hopeful we'll be able to prevent it from getting to the Adirondacks," Davies said.

DEC has the authority to take steps to deal with an invasion on private land. In most cases, Davies said, landowners are eager to cooperate to protect the health of their forests. Ironically, DEC has less of a free hand to deal with an infestation on the state-owned Forest Preserve—due to the forever-wild clause of the state constitution.

Consider this: the federal protocol for eradicating the longhorned beetle calls for destroying all potential host trees within a half-mile of an infestation. In one hypothetical exercise, DEC assumed the beetle was found at Putnam Pond State Campground in the eastern Adirondacks. To follow the protocol, state officials determined that they would need to destroy sixty-three thousand trees in the Preserve.

Such extensive cutting would seem to run afoul of Article 14, the clause in the constitution mandating that the Forest Preserve in the Catskills and Adirondacks "shall be forever kept as wild forest lands." It goes on to say that timber in the Preserve shall not be "sold, removed or destroyed."

The ban against cutting timber is not absolute. State courts have countenanced limited cutting in the Preserve for building trails, parking lots, and other facilities, but these decisions offer little guidance for the situation now facing DEC. "The extent to which Article 14 allows the cutting of timber to deal with invasives is not at all clear," said Kenneth Hamm, a DEC associate counsel.

Hamm also raised a philosophical question about the forever-wild clause: "Does that mean we're supposed to let nature take its course? Or are we supposed to preserve the type of forest that's there now?"

The legal question would be moot if the



Photo by Judith Harper

Forest Ranger Ben Thomas inspects damage caused by beech-bark disease.

state were to amend the constitution to give DEC the authority to cut as many trees as necessary to protect the Preserve from invasive insects. But even if such a measure were desirable, Davies said, it takes a long time—at least three years—to get an amendment ratified, and DEC needs to be able to respond at once to an infestation. "Waiting for a constitutional amendment is not a viable way to proceed," he said.

Nevertheless, John Davis, conservation director of the Adirondack Council, said such an amendment should be adopted prior to any large-scale cutting. He argues that only a small number of trees can be cut without violating Article 14. "If the DEC

must do a strategic emergency cut and can't wait for an amendment," he said, "then we'd want them to sit down not only with foresters, but with ecologists and conservation biologists, before any action is taken."

He said the Adirondack Council might support an amendment to permit larger cuts to eradicate invasive insects, "but it would have to be narrowly written and crafted very carefully."

Neil Woodworth, executive director of the Adirondack Mountain Club, agreed



Emerald ash borer

LIFE CYCLE:

The ash borer lays eggs in bark crevices in summer.



Adults emerging from tree.

After hatching in 1-2 weeks, the larvae tunnel through the bark and into the tree's cambium layer.

The larvae feed for several weeks in summer and fall. Most overwinter in the tree.

After pupation, the adult bores out of the tree in May or June, creating a D-shaped exit hole.

Adults feed on ash foliage.

Appearance: The adult borer has metallic green wings and a reddish-purple abdomen. The green is not iridescent as found on some native beetles. The adults are about 3/8 of an inch long.

Adult

Host trees: White ash, green ash, black ash.

Signs of infestation: Canopy thinning; dying branches; D-shaped holes on trunk; intense woodpecker activity; leaf sprouts at base of trunk.



If you see signs of **EAB**, call this toll-free number: **1-866-640-0652**.

Larvae

Asian longhorned beetle

LIFE CYCLE:

The Asian longhorned beetle lays eggs just under the bark of a tree. After hatching, the larvae bore into the tree and feed on the vascular layer.

A larva becomes a pupa and remains in the tree until adulthood.

The adult beetle bores its way out of the tree, creating an exit hole.

After emerging from late spring to early fall, the adults feed on tree bark and tender twigs. The beetles usually remain on or near their birth tree.

Appearance: The adult beetle is black and glossy, with irregular white spots and long black-and-white antennae. It ranges from 3/4 to 1 1/2 inches long.

Host trees: All maples, poplars, birches, willows, elms, and most other hardwoods. It does not infest conifers.

Signs of infestation: Canopy thinning; round exit holes (about 3/8 of an inch in diameter); sawdust-like frass at base of tree or branches; egg niches on bark (like tiny moon craters); and intense woodpecker activity

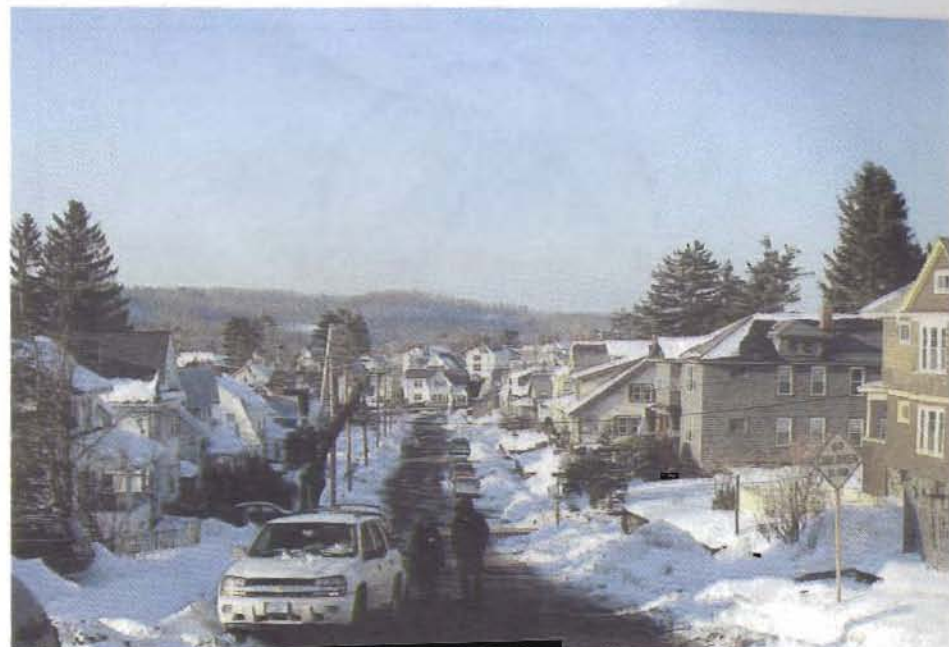
If you see signs of **ALB**, call: **1-866-265-0301**.



Exit holes



Adult



These photos show a street in Worcester, Mass., before and after hardwood trees were cut to eradicate the Asian longhorned beetle.

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with Hamm that it's uncertain how many trees can be cut without violating Article 14. "If you could stop an infestation by cutting right at the epicenter three hundred trees, I doubt a court would find that unconstitutional," he said. "But a thousand trees might be over the line. We just don't know."

Aside from the legal issue, there is a question of effectiveness. Cutting thousands of trees requires lots of time and lots of loggers, Woodworth said, and the loggers might not be able to work fast enough to contain a major outbreak.

Both DEC and environmentalists hope they won't have to make a choice between cutting thousands of trees and letting an infestation go unchecked. If an outbreak is detected early, Davies said, DEC should be able to control it with less-drastic measures.

Let's say, for example, that an infestation of Asian longhorned beetles is discovered at a campground in the

Adirondacks. Rather than chop down all the trees within a half-mile radius, DEC could remove only those known to be infested. Afterward, the agency would conduct intensive monitoring of the remaining trees in the vicinity to make sure no beetles escaped. "I'm confident we could limit any outbreak of Asian longhorned beetle in the Adirondacks," Davies said.

The emerald ash borer might be harder to contain. In an effort to detect the insect before it gets established, the U.S. Department of Agriculture and DEC have hung traps along roads throughout the Adirondacks, especially near campgrounds. Made of purple fabric, the traps are coated with glue and scented. Any ash borer lured by the scent will get stuck. So far, no ash borers have been found, Davies said.

Environmentalists hope that scientists will find natural



Ash borer trap

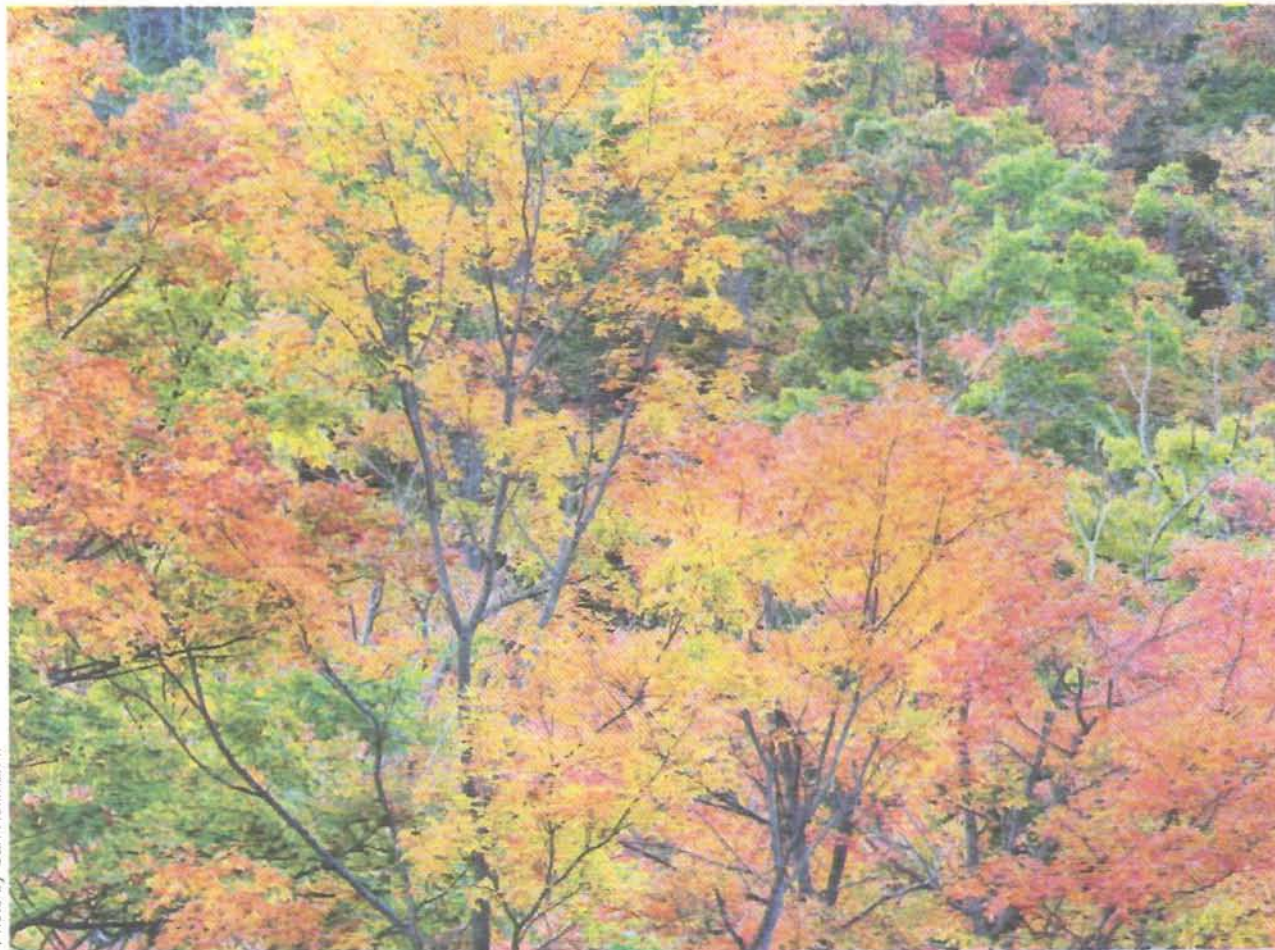
Courtesy of U.S. Forestry Service

predators and other biological controls to deal with outbreaks. The digger wasp, a native insect, holds promise as one biological control. Melissa Fierke, a forest entomologist with the state College of Environmental Science and Forestry, said the digger wasp stings and paralyzes the emerald ash borer and feeds it to the wasp's larvae. The wasp also can help scientists locate infestations of the ash borer.

Researchers are looking in China for other means to control the invaders. "Our greatest hope is that we will come up with a virus or a fungus that's already here or that can be brought over from the pest's homeland," said Randall Swanson, an associate professor of forestry at Paul Smiths College.

Woodworth said if the invaders do get loose in the Adirondacks, they may encounter other natural predators. "We don't have a good idea what either the emerald ash borer or the Asian longhorned beetle will do in a big, diverse ecosystem," he said. "They may have more enemies than the wasp."

If the insects cannot be eradicated, we may have no



Adirondack hardwoods are vital to the logging and maple-sugar industries and to fall tourism.

do in a big, diverse ecosystem," he said. "They have more enemies than the wasp."

If the insects cannot be eradicated, we may have no choice but to try to limit their spread as much as practical and learn to live with them. They would not be the first invaders to take up residence here. More than a dozen exotic insects exist in the Park. Most cause little damage to trees, with two exceptions.

The beech-scale insect, in tandem with the *Nectria* fungus, is responsible for beech-bark disease, first identified in Maine in the 1930s. Starting in the 1960s, the disease spread unchecked through the Adirondacks. Scientists believe it ultimately will doom the beech. Although young trees may appear healthy, they succumb as they age.

The Sirex woodwasp has decimated millions of pine trees worldwide and was first discovered in the United States in Oswego County in 2004. It now infests red and white pines in Hamilton, Herkimer, St. Lawrence, and Jefferson counties. Experts say the wasp has probably spread all over the state. State and federal officials are less concerned about this invader because it primarily infests stressed pines. At this time, DEC is only monitoring the wasp. The agency is investigating a nematode that may be used as a natural predator.

The hemlock woolly adelgid is another exotic from Asia on our doorstep. This insect attacks hemlocks by sucking sap at the base of needles, often resulting in the death of the infested trees. It first appeared in the eastern United States, in Virginia, in 1951. Swanson said the adelgid has moved north into New York State, and he believes it may eventually reach the Adirondacks, especially if the region continues to see milder winters.

"If we consider the worst-case scenario, where our major forest species are under attack by invasive insects—we could lose the beech trees, sugar maples, hemlocks, and the ash—it's quite frightening," Swanson said. ■