

Invasive Insects of Eastern North American Sugarbushes

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Invasive pests have been identified as one of the major threats to biodiversity worldwide. Many bodies, including the United Nations, recognize invasive species for the long-term detrimental impacts that they could have on our ecosystems. We see this playing out in our woodlots as garlic mustard forms carpets in the undergrowth and spongy moth defoliation causes showers of green frass from stripped hardwoods at the height of summer.

Non-native species that become invasive (i.e. negatively impacting the ecological and economic health of a

new area) are often excellent hitchhikers and very strong reproducers. The most cost- and effort-saving way of dealing with invasive species is to prevent their initial spread into an area. This guide provides a brief summary of invasive insect pests threatening maple-producing regions of eastern Canada and the United States. Established invasives such as the spongy moth are not covered.

Asian Longhorn Beetle (*Anoplophora glabripennis*)

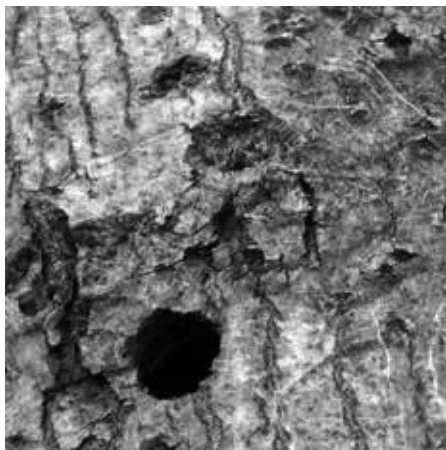
The Asian Longhorn Beetle (ALB) originates from China and other areas of Asia. Of its many potential tree host species, this beetle particularly favors maple trees.



ALB adults have a shiny black body, 1-1.5 inches long, with distinct white spots. They have black and white banded antennae that are longer than the length of the body. Legs may be blue. *Diamond Mowers*

It was first discovered in the US in New York in 1996 and has since spread to several other states. The beetle's Canadian journey highlights the importance of citizen awareness and diligent reporting; in 2003, the

Maple Syrup Digest



A dime-sized black exit-hole made by a departing adult. It is deep enough to insert a pencil into. Above it is a shallow egg-laying site that the adult females scraped into the bark with their jaws. *Massachusetts Introduced Pests Outreach Blog*

beetle was spotted just north of Toronto near a pile of wood pallets. After an aggressive eradication campaign which included tree removal, quarantine zones, and public education, the beetle was declared eradicated in 2013. However, another Toronto population was discovered soon after when a citizen walking to their car spotted the beetle on a windshield. Again, a combination of strong policy and citizen education initiatives combined eradicated the beetle for a second time from Canada.

Identification, Infestation and Damage

Symptoms include sawdust-like material (insect feces and wood dust) around the tree or on branches, dead branches, yellowing leaves, premature leafdrop on a healthy-looking tree, increased woodpecker activity, and deep holes in the trunk and branches.

After eggs hatch, the larvae tunnel under the bark and through the phloem (the cells responsible for nutrient transport). The majority of their feeding takes place in the xylem or sapwood (cells that transport water). Extensive damage to the xylem structurally weakens the tree, resulting in branches breaking and the tree's eventual death.

Where It's Found

USA: IL, MA, NJ, NY, OH, SC. Report new sightings immediately to the US Department of Agriculture Animal and Plant Health Inspection Service (USDA APHIS): 1-866-702-9938

Canada: Previously found and eradicated from ON. Report sightings immediately to the Canadian Food Inspection Agency (CFIA): 1-800-442-2342, EDDMaps or iNaturalist



Larval feeding tunnels in the sapwood of infested trees. *J. Boggs, Ohio State University.*

Management Tips

Do not move firewood outside of where you plan to burn it. In the US, quarantine zones have been established in areas where ALB was found; do not move any living or dead trees out of these areas. Monitor your sugarbush carefully for ALB signs and symptoms, and report anything suspicious.

Spotted Lanternfly
(Lycorma delicatula)

A colorful insect native to Asia, spotted lanternfly (SLF) can use over 70 different plant species as a host, including maple trees. SLF are a major destructive pest in areas where they have been introduced. Nymphs and adults pierce tree bark to feed on the sap. Adults



Adult female SLF covering their freshly-laid eggs with a messy white “paint”. This paint will dry to brown. *New York State IPM*

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A stylized map of the Great Lakes region. The lakes are labeled: Lake Superior, Lake Michigan, Lake Huron, Lake Erie, and Lake Ontario. A silhouette of a maple leaf is centered over Lake Michigan. The background consists of numerous thin, radiating lines emanating from the center of the map.

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also produce honeydew, which attracts other insects and which encourages the growth of sooty mold fungus.

Where It's Found

USA: CT, DE, IN, MA, MD, NJ, NY, OH, PA, VA, WV. Report new sightings immediately to USDA APHIS: 1-866-702-9938

Canada: Not yet found. Report sightings immediately to the CFIA: 1-800-442-2342, EDDMaps or iNaturalist

Management Tips

Spotted lanternfly strongly prefers tree of heaven (*Ailanthus altissima*) as a host, but are also fond of maples. Landowners can remove this tree or

treat it with a federally registered systemic insecticide to protect it against SLF. Ovicides and oils may be effective for targeting egg masses; follow federal or state/provincial recommendations. SLF are excellent hitchhikers on vehicles, outdoor gear, and even clothing. Make it a habit to quickly check your entire vehicle (including wheel wells, under the vehicle, and the roof) before traveling from a SLF quarantine area. Destroy any SLF you find.

Jumping worms (*Amyntas* spp.)

Pheretimoids are neither insects (which have 3 body segments and 6 legs) nor do they specifically target maple trees. However, they are highlighted here as they are an important pest that can have devastating long-term ef-

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fects on the health of our forests.

The last ice age wiped out most earthworms in North America, which means our forests have evolved for millennia without them. The slow, friendly earthworms (European nightcrawler (*Lumbricus terrestris*) and the red wiggler (*Eisenis fetida*)) that we were taught to love as children are actually invasive introductions from Europe. While they are beneficial for our agricultural fields and our gardens, they have transformed our forests for the worse by decomposing the layer of leaf litter and detritus (the duff layer) that is habitat for many understory animals and insects. This also has negative implications for native plants, including maple tree seedlings that rely on a healthy duff layer to grow.

Jumping worms (*Amyntas* spp.)

are a more recent introduction from eastern Asia, and they consume the duff layer much more quickly than the existing European earthworms. Jumping worms are distinctive from the European nightcrawler that we see in our agricultural fields and gardens.

Jumping worms are voracious consumers and quickly eat their way through the duff layer. Their castings, which resemble coffee grounds, greatly reduce the soil's ability to retain nutrients and moisture. The worms also disturb beneficial relationships between mycorrhizae and native plant seedlings. Ecosystem changes could include reduced native plant diversity and health, and a shift toward certain plant communities (including invasives) that perform well in the new soil type. The regeneration of native trees, such as maples, will be impacted.



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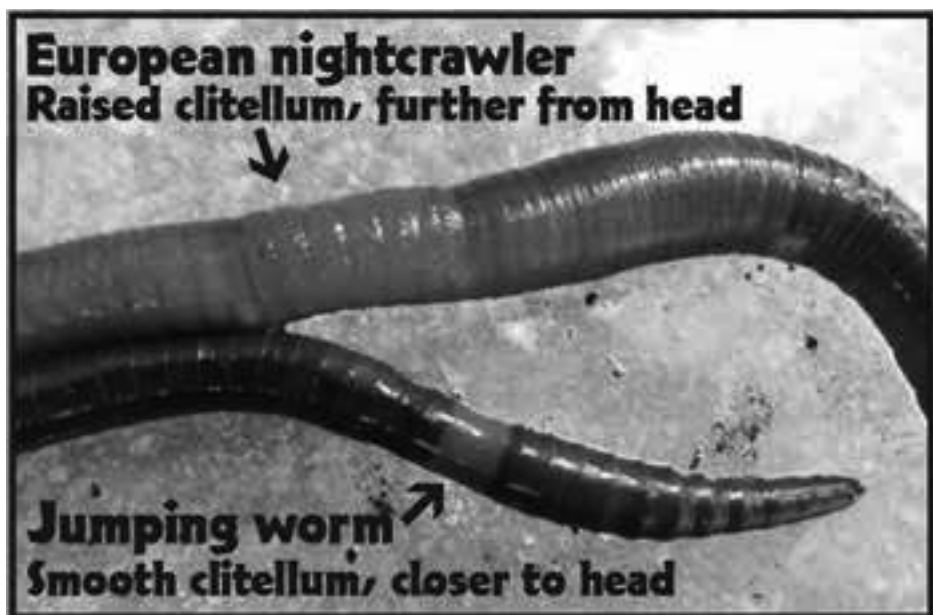
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Note the difference in smoothness, color, and positioning of the clitellum between the European nightcrawler and the jumping worm. The jumping worm also has a smooth, brownish body that is uncoated in slime. Most characteristically, they jump and thrash wildly when disturbed. *Maine Department of Agriculture, Conservation & Forestry, Wisconsin DNR*

There are currently no methods of eradicating the worms once they have been introduced. Preventing its spread is therefore critical. Actions to take include not purchasing nursery stock, compost, mulch, or potting mix from areas with established jumping worm infestations; only purchasing compost/mulch that has been heated to 104°F (40°C), the temperature at which the worm's egg casings are killed; not purchasing jumping worms for fishing bait ("Alabama jumpers", "snake worms", "crazy worms"), gardening, or compost; not moving soil, leaves, or plants from your garden into natural areas; cleaning shoes and your pet's paws after hiking before leaving the site.

Where It's Found

USA: DE, IL, IN, MN, NH, NJ, OH, VT, WI. Report new sightings immediately to USDA APHIS: 1-866-702-9938

Canada: ON. Report new sightings immediately to the CFIA: 1-800-442-2342 or to EDDMaps or iNaturalist

Important Pests of Non-Maple Trees

While a number of maple producers have firsthand experience with insects like the emerald ash borer, there are a few lesser-known invasives that could threaten the health of other trees in your woodlot, resulting in a loss of the mixed-species habitats where maples thrive.



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Hemlock Woolly Adelgid

The hemlock woolly adelgid (HWA) is native to Asia and attacks North American hemlock trees. HWA feed on cells storing nutrients and water at the base of hemlock needles, causing the needles to die. There are two reproductive forms of HWA in North America, each of which can lay several dozen to several hundred eggs per year. This can result in exponential population growth due to the absence of natural enemies.

In the US, HWA has caused widespread death and decline of hemlock trees, which in turn negatively impacts the types of organisms living in the ecosystem. Eastern hemlock in the southern Appalachian Mountains may be virtually eliminated in the coming years.

In its native range, HWA has a third, winged form. This winged form is believed to be unsuccessful in North America, so HWA rely on wind, humans, or animals for dispersal. Some tips for limiting spread: don't move firewood; do not place birdfeeders near hemlock trees; from fall to spring, check your hemlock trees for the cottony insects; in Canada, cut down infested trees and burn them on-site (after reporting); in the United States, use federally registered insecticides; contact your local extension specialist for more information.

Where It's Found

USA: AL, CT, DC, DE, GA, KY, ME, MD, MA, NH, NJ, NY, NC, OH, PA, RI, SC, TN, VT, VA, WV. Report new sight-



HWA nymphs and adults clustered at the base of hemlock needles. They are most easily spotted in spring. *Connecticut Agricultural Experiment Station Archive, Connecticut Agricultural Experiment Station / © Bugwood.org, CC BY 3.0 us, <https://commons.wikimedia.org/w/index.php?curid=8339006>*

ings immediately to USDA APHIS: 1-866-702-9938

Canada: NS, ON. Report new sightings immediately to the CFIA: 1-800-442-2342, EDDMaps or iNaturalist

Beech Scale Insect (*Cryptococcus fagisuga*)

Beech scale is an insect of European origin. It punctures holes into beech bark, through which the native *Neonectria* fungi can enter and gradually kill the tree. Together, these pests are known as the beech bark disease complex.

The beech bark disease complex reduces the number of large, healthy beech trees in the forest. Beech trees are an important habitat component to a number of native insects and animals, and influence the microclimate within forests. Beech tree die-off can also trigger increased suckering and regenerating beech in the understory, which can outcompete other trees such as sugar maple.



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Other tree symptoms include small, wilting, usually yellow leaves and thinned crowns. Large beech trees typically die first, as the beech scale appears to prefer rough, craggy bark.

It is difficult to eradicate beech scale once it has established in a forest. If you wish to address a beech bark disease outbreak in your woodlot, speak to a forester to create a holistic plan. They may recommend selective cutting to remove infested individuals in order to gradually select for trees that are resistant to beech scale. A professional will also be able to identify and retain trees that demonstrate resistance characteristics.

Prevent spread by avoiding transporting beech wood with intact bark.

Where It's Found

USA: CT, MA, MD, MI, MN, NJ, NH, NY, OH, RI, WI, WV. Report new sightings immediately to USDA APHIS:



The orange-red fruiting bodies produced by the fungi, which spread their spores by rain and wind. *Government of Ontario*

1-866-702-9938

Canada: NB, NFL, NS, ON, PEI, QC.
Report new sightings immediately to the CFIA: 1-800-442-2342, EDDMaps or iNaturalist



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