

Saving Our Hemlocks

From the Hemlock Woolly Adelgid

The hemlock woolly adelgid (a-DEL-jid), a tiny insect first detected in the western United States in 1924, kills eastern and Carolina hemlocks within a few years of first infesting them. The hemlock woolly adelgid (HWA) is steadily spreading south into the oldest and largest stands of hemlocks in the Southern Appalachians, threatening a unique forest ecosystem and the animal and plant communities it shelters.

What Does an HWA Infestation Look Like?

Native to Japan and China, the hemlock woolly adelgid is an aphid-like insect you can barely see with the naked eye. What you can see is the white, waxy “wool” that covers the adelgid. A sure sign of HWA infestation is tiny cottony tufts at the base of hemlock needles. The “wool” is present throughout the year, but is most prominent in late spring.

The HWA feeds on the sap at the base of hemlock needles, restricting nutrients to the foliage and causing the needles to change from deep green to a grayish green and then fall off. Without needles the tree starves to death, usually within three to five years of the initial attack. Another sign of HWA infestation is thinning in the crown of the hemlock tree.

How Does the HWA Spread?

Hemlock woolly adelgids have spread rapidly into the Southern Appalachians, borne by winds or carried by migratory birds, mammals, and humans. Infested nursery stock has carried the insects into some areas. Adelgid populations can increase dramatically, since all HWA are female and they reproduce asexually twice a year. One individual can lay up to 300 eggs yielding up to 90,000 new adelgids in one year!

How Will the HWA Affect Our Forests?

The hemlock woolly adelgid was first detected in the Eastern United States in Richmond, Virginia in the 1950s, where it began to spread rapidly west into the Blue Ridge and north as far as Maine. The HWA currently infests about one-half of the area where hemlocks grow in the East. In Virginia’s Shenandoah National Park, 80 percent of the hemlocks are dead.

Hemlocks may live up to 800 years or more. They thrive in the shade where their thick, evergreen foliage helps maintain moisture and moderate temperatures on the forest floor. Hemlocks help cool mountain streams that are home to trout and other native fish, as well as crawfish, salamanders, and numerous aquatic insects. In winter, hemlocks moderate ground-level temperatures and help keep streams ice-free. In thick hemlock boughs, many birds find shelter and places to nest. In one study, 96 percent of all wood thrush nests found by surveyors were in hemlocks. Some warblers only nest in hemlocks.

The devastation caused by the hemlock woolly adelgid cannot be underestimated. Foresters warn of a potential disaster comparable to the chestnut blight, which eliminated chestnut trees from the Southern Appalachians and radically changed the forest composition of the Southeast. The first HWA infestations were found in the Pisgah and Nantahala National Forests in 2001 and in the Great Smoky Mountains National Park in 2002. The number of infested sites in our region continues to grow. The good news is that the National Park Service, the USDA Forest Service, and State and local agencies are moving aggressively to control the spread of the hemlock woolly adelgid.

Think of a cool mountain stream on the hottest day of summer, trout almost motionless in the shadows. Imagine standing in awe among ancient giants. This is what we stand to lose.

Hemlocks live throughout the Southern Appalachians where some of the trees are more than 400 years old and grow as tall as 175 feet. These mountains are home to thousands of acres of hemlock-dominated forest, with many acres of old-growth.



Hemlock branch with hemlock woolly adelgid (HWA) infestation. The white, woolly tufts hide the adelgids.

What Works Against the HWA?

Resource managers recommend three methods to control the spread of the HWA: systemic injections of pesticides, insecticidal oils and soaps, and biological control. Pesticide-based methods work best on individual trees and small stands, but are impossible to apply in backwoods areas, where the most promising treatment option is biological control.

Biological control seeks to establish enough predators to keep a specific pest in check. Although scientists have studied a number of possibilities for HWA control, two tiny nonnative beetles, *Laricobuius nigrinus* (Lari beetle) and *Pseudoscymnus tsugae* (Pt beetle), show the most promise. Both beetles actively hunt the adelgid as prey, feed voraciously, and only eat adelgids. Tests in Connecticut and Virginia show that releases of Pt beetles can reduce HWA populations by 47 to 87 percent in five months.

How Safe Is It to Release Beetles?

The Pt beetle from Japan and the Lari beetle from British Columbia both feed exclusively on the hemlock woolly adelgid. Both beetles and the HWA are highly synchronized with one another. When no adelgid eggs are present, the beetles quit reproducing.

Pt beetles spend the winter on the tree or in leaf litter on the ground. The Lari beetle emerges with the HWA and is the only predator that feeds on the HWA during the winter.

How Are Beetles Raised and Released?

Laboratories for rearing Pt beetles in the Southeast are established at universities in South Carolina and Tennessee, as well as at the North Carolina Department of Agriculture lab in Cary. Lari beetles are difficult to rear; both beetles need lots of HWA to eat and have exacting requirements for survival. Researchers at Virginia Tech are working to develop new rearing methods.

Beetles have been released in areas of Pisgah and Nantahala National Forests, including Joyce Kilmer Memorial Forest, Linville Gorge, and along the South Toe River. In the Great Smoky Mountains National Park, beetles have been released in Cades Cove, Greenbrier, and Cataloochee, among other places. In North Georgia and South Carolina, beetles have been released in the Chattooga River watershed.



How Can I Protect My Hemlock Trees?

To prevent HWA infestations, locate your birdfeeders away from the hemlocks in your yard. If your trees become infested, contact your county extension office to report the infestation and to get information about available treatments.

Hemlock woolly adelgids can be managed in home and nursery settings if detected early and treated.

Do NOT use petrochemicals on HWA infestations.

Horticultural oil sprays and soaps work well when properly used; homeowners can treat smaller trees themselves. Trees over 30 feet tall should be treated by a professional arborist.

Do NOT spray trees that are not yet infested; oil sprays and soaps do not act as deterrents.

Do NOT fertilize infested trees; adding nitrogen can actually promote HWA infestation.

Do NOT try to use Pt beetles in a home or nursery setting. Pt beetles do not eradicate or prevent HWA infestation. Beetle releases in your own backyard would be costly and ineffective.

Do NOT carry HWA to uninfested trees. Be aware of HWA infestations and be careful not to brush against infested hemlock boughs.

For more information about the hemlock woolly adelgid and what you can do, visit:

<http://www.saveourhemlocks.org>

<http://fhpr8.srs.fs.fed.us>

<http://www.fs.fed.us/na/morgantown/fhp/hwa/hwasite.html>

If you suspect an infestation, please notify your county extension agent:

In Georgia: <http://extension.caes.uga.edu/>

In North Carolina: <http://www.ces.ncsu.edu/counties/>

In South Carolina: <http://virtual.clemson.edu/groups/extension/>

In Tennessee: <http://www.utextension.utk.edu/>

If you spot a HWA infestation in the Great Smoky Mountains National Park contact:

Kristine Johnson at Kris_Johnson@nps.gov