

# *Saving Our Hemlocks*

## *From Hemlock Woolly Adelgid*

The hemlock woolly adelgid (a-DEL-jid), a tiny insect introduced into the western U.S. in the 1920s, kills eastern and Carolina hemlocks within a few years of first infesting them. 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 HWA Infestation Look Like?*

Native to Japan and China, the hemlock woolly adelgid is a tiny aphid-like insect that 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 the appearance of swab-sized cotton balls at the base of hemlock needles. Infested branches have also been described as looking like they’ve been flocked for Christmas. The “wool” is present throughout the year, but is most prominent in late spring.

HWA feeds on the sap at the base of hemlock needles, disrupting nutrient supplies 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 HWA Spread?*

Hemlock woolly adelgid has spread rapidly into the Southern Appalachians, borne by winds from storms or carried by migratory birds, mammals, and humans. Infested nursery stock has carried the insect into some areas.

### *How Will HWA Affect Our Forests?*

HWA was first detected in the eastern U.S. in Richmond, VA in the 1950s, where it began to spread rapidly, west into the Blue Ridge and north as far as Massachusetts. Hemlock woolly adelgid currently infests about one-half of the area where hemlocks grow in the eastern U.S. Eighty percent of the hemlocks in Virginia’s Shenandoah National Park are now dead. With them goes habitat for birds—many of them neotropical migrants that only nest in hemlock branches. Other forest birds will also be affected: in one study, 96 percent of all wood thrush nests found by surveyors were in hemlocks. Hemlocks help cool the mountain streams that are home to trout and other native fish, as well as crawfish, salamanders, and numerous aquatic insects.

Foresters warn of a potential disaster comparable to the chestnut blight, which eliminated chestnut trees from the Southern Appalachian landscape and radically changed the composition of the forests of the Southeast. The first HWA infestation in the Great Smoky National Park (GSMNP) was found in May 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 hemlock woolly adelgid.

### *What Works Against HWA?*

In the GSMNP, the National Park Service uses three methods to control the spread of HWA: systemic injections of pesticides, insecticidal oils and soaps, and biological control. The first two methods must be used carefully; the pesticides can be dangerous to other organisms. Injections, soaps and sprays must also be reapplied, are time-consuming, and show limited effects. 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.

*Think of a cool mountain stream on the hottest day of summer, a slight breeze, trout almost motionless in the shadows. This is what we stand to lose.*

*Hemlocks are widely distributed throughout the Southern Appalachians: the Great Smoky Mountains National Park is home to 5000 acres of hemlock-dominated forest, with 500 acres in old-growth forest, where some of the hemlocks are more than 400 years old and grow as tall as 175 feet.*



*Hemlock branch with hemlock woolly adelgid (HWA) infestation. Note the white, swab-sized “cotton balls.”*



<http://www.samab.org>

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## How Does Biological Control Work?

The goal of biological control is to establish enough members of a species that preys on the hemlock woolly adelgid to keep the pest in check. To be an effective control, the predator must be able to survive and to reproduce at the same rates as HWA, should feed exclusively on the adelgid, and should have minimum impact on other species.

Although a number of beetles have been studied, a tiny nonnative beetle, *Pseudoscymnus tsugae* (Pt beetle), shows the most promise. The Pt beetle actively seeks out the adelgid as prey, effectively dispersing over infested areas. In recent laboratory tests and releases in the Northeast, the Pt beetle has shown no significant impact on species other than adelgids.

The National Park Service recently released Pt beetle eggs on trees in the Elkmont area. If egg releases prove successful, it will be possible to disperse Pt beetles more effectively: eggs can be produced more quickly—and less expensively—than adults.

## How Safe Is It to Release Pt Beetles?

In its native Japan, the Pt beetle feeds exclusively on the hemlock woolly adelgid, although laboratory research shows that it may also feed on other nonnative adelgids such as the balsam woolly adelgid and the pine bark adelgid. HWA and the Pt beetle are highly synchronized with one another and seem to have evolved together. When there are no adelgid eggs present, Pt beetles quit reproducing and die.

There have also been concerns that Pt beetles could migrate into human dwellings—as their much larger cousins, the Asiatic lady beetles, have done. Field studies show no evidence that Pt beetles seek warm shelter in the fall. Pt beetles spend the winter in leaf litter on the ground, and unlike lady beetles, do not congregate in large groups.

## How Can I Protect My Hemlock Trees?

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

Hemlock woolly adelgid can be managed in home and nursery settings if detected early and treated. Some cautions:

**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.**

The Pt beetle does not eradicate or prevent HWA: beetle releases in your own backyard would be costly, ineffective, and a waste of resources needed for our public forest lands.

## How Can I Help Save Our Hemlocks?

The devastation caused by the hemlock woolly adelgid cannot be underestimated: to see the damage first hand, drive north into the Shenandoah Valley, where more than 80 percent of the hemlocks are dead. The good news is that there is something we can do. Tests in Connecticut and Virginia have shown that releases of Pt beetles can reduce HWA populations by 47 to 87 percent in five months.

Because Pt beetle eggs are killed by extreme cold, egg releases timed to the adelgid cycle are not feasible farther north. The warmer winters of the Southern Appalachians, however, enable us to release eggs when HWA breaks dormancy in February.

If we can establish a rearing laboratory in each affected State in the region, there may still be enough time to hold the hemlock woolly adelgid in check. Currently there are three active Pt beetle-rearing facilities, not nearly enough to meet the needs of the forests of the Southern Appalachian region. Two additional facilities are now in the works, one at Clemson University in Greenville, SC, and the other at the University of Tennessee in Knoxville.

Funds are needed to help open these and additional facilities and to support the ongoing expenses of producing eggs and rearing beetles. If you would like to contribute to this effort, please send your checks to:

**Friends of the Smokies**  
**PO Box 5650**  
**Sevierville, TN 37864-6550**

**Please indicate on your check or correspondence that your contribution is for the *Save Our Hemlocks* initiative.**

For more information about the hemlock woolly adelgid and how you can help, visit our website at:

<http://www.saveourhemlocks.org>

**You can also help us track the spread of HWA by learning to identify symptoms of infestation, which you can see at:**

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

If you suspect an infestation, please notify the following people:

*In Tennessee\**: Your County Agricultural Agent

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

*In North Carolina\**: Your County Agricultural Agent

<http://www.ces.ncsu.edu/assn/ncacaa/>

*In the Great Smoky Mountains National Park:*

**Kristine Johnson at [Kris\\_Johnson@nps.gov](mailto:Kris_Johnson@nps.gov)**

*USDA Forest Service Forest Health Protection:*

**Rusty Rhea at [rrhea@fs.fed.us](mailto:rrhea@fs.fed.us)**

\* For information about contacting agricultural extension agents for Southern Appalachian counties outside of North Carolina or Tennessee, please visit our website at <http://www.saveourhemlocks.org>.