

## Where did HWA come from?

Hemlock woolly adelgid (HWA) was first identified by the USDA in 1951, near a private arboretum in Richmond, VA. No control measures were taken at that time, and HWA was spread (presumably on nursery stock) to other areas in the eastern United States. By 2005, HWA had become established in 16 eastern states, from Georgia to Maine, with infestations observed in about half of the entire range of the eastern hemlock.

In 2007, USDA-sponsored DNA research analyzed all the world's known hemlock woolly adelgids and found an exact match for the HWA threatening our hemlocks in the eastern U.S. The researchers determined that the source for our HWA invader was southern Japan.

Because HWA has no native predators here, colonies thrive and can kill hemlock trees in as few as three years. The eastern hemlock, sometimes called the "redwood of the east," is a very ecologically important species, providing habitat for wildlife as well as shade to keep forests and streams cool. By treating the hemlocks on your property, you can help preserve this keystone species in western North Carolina!



forestryimages.org

"We know from DNA research that the adelgid originated in southern Japan and was apparently brought over on ornamental hemlocks in the early 1900s."

**Dr. Patrick Horan**  
[www.savinghemlocks.org](http://www.savinghemlocks.org)

## Contact us for more information!

Carolina Mountain Land Conservancy would like to help you help your hemlocks! Please let us know if you are interested in receiving more information about hemlock treatment options for your property.

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## Hemlock Restoration and Recovery

Carolina Mountain Land Conservancy  
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Applicators inject an insecticide into the soil near hemlocks. The tree moves the chemical up into its leaves, where the insect is killed.

## Treatment with insecticide

Insecticides containing the ingredients imidacloprid or dinotefuran have been successfully used to treat HWA infestations. A solution containing the active ingredients is injected into the soil or directly into the trunk of the tree when near streams or in areas with rocky soils. The tree translocates the insecticide into its leaves, making the foliage poisonous to HWA. This method, however, can harm native beneficial insects, such as a predator of mites, and in some situations the chemical has traveled to and polluted water supplies. This method is seen by many as a temporary way to keep hemlocks healthy until predator populations become established and are able to keep HWA populations at a level that our hemlocks can tolerate.

# Biological Control: predator beetles

Biological control involves the introduction of non-native predators to keep HWA populations in check.. The most effective and available predator of HWA is the beetle *Sasajiscymnus tsugae*, or Sasi for short.

## About Sasi >>>

*Sasajiscymnus tsugae* is a species of beetle native to Japan, where it lives in forests, where it is the native predator of our HWA “import.” Hemlock forests in Japan are not being decimated by HWA because an equilibrium exists between predator and prey; established Sasi populations keep the HWA in check and the hemlocks healthy.

Because Sasi feeds exclusively on HWA, the USDA has determined that the introduction of Sasi does not pose a threat to native insect populations. The first use of Sasi as a biological control agent was in Connecticut in the spring of 1995, and since that time,

approximately 2 million beetles have been released throughout the range of HWA in the eastern United States.

The use of biological control methods in the fight against forest pests is very appealing to many because it reduces the amount of synthetic chemicals deployed into our environment.

## Efficacy >>>

The Connecticut Agriculture Experiment Station has been conducting field studies on the efficacy of Sasi since the federal approval of release in 1995. Researchers have found an up to 80% adelgid reduction in a single season.

Because Sasi beetles reproduce twice annually, population growth is able to match that of the HWA. Sasi beetles have no problem overwintering and are capable of moving considerable distances, thus expanding the treatment area. Combined, these attributes make the Sasi predator beetle a prime candidate for the biological control of hemlock woolly adelgid.

## Costs >>>

HWA treatment with a biological control method will always cost less in the long run than the use of insecticides. Beetles only need to be deployed one time, where as chemical treatment needs to be repeated every 3-4 years. And

because the beetles have the ability to migrate, the treatment area can continue to expand as the beetle colony grows.

Currently the price for one colony (100 beetles) is \$250, which can treat up to three trees and establish a population of Sasi beetles. The goal of any predator beetle release is to start the natural reproductive processes that will allow the beetles to control HWA populations into the future, and larger releases can sometimes accelerate these predator reproductive cycles. CMLC is exploring release strategies and cost-share opportunities to help out interested landowners.



## Sources of Information >>>

- [savinghemlocks.org](http://savinghemlocks.org)
- US Forest Service – Forest Health Protection
- NC State University – Forestry Extension
- Cornell University, Entomology – Biological Control

## We would like to help you help your hemlocks >>>

At Carolina Mountain Land Conservancy, our mission is to work with landowners to protect land and water resources vital to our natural heritage and quality of life. The eastern and Carolina hemlocks in our forests provide shade, habitat, and timber - not to mention aesthetics - and to lose these hemlocks would be to lose part of the identity of western North Carolina. As a landowner of a protected property, you are in a unique position to take action in the war against invasive forest pests, and CMLC would like to partner with you in this fight. Together we can make a difference and work to protect our lands for generations to come!