



What We Can Do To Save New York's Hemlocks

Mark Whitmore, Forest Entomologist, Department of Natural Resources, Cornell University

Hemlocks in New York are currently threatened by the invasive Hemlock Woolly Adelgid (HWA), *Adelges tsugae*. HWA is a small aphid-like insect imported from Japan that feeds on hemlock twigs, gradually killing trees in 4 to 10 years. Countless millions of trees have been killed in the eastern US since it was first detected near Richmond, VA in the early 1950s. For more information on HWA biology go to: nyis.info/index.php?action=invasive_detail&id=24.



HWA feeding on hemlock twig near the base of needles. Ithaca, NY © Mark Whitmore

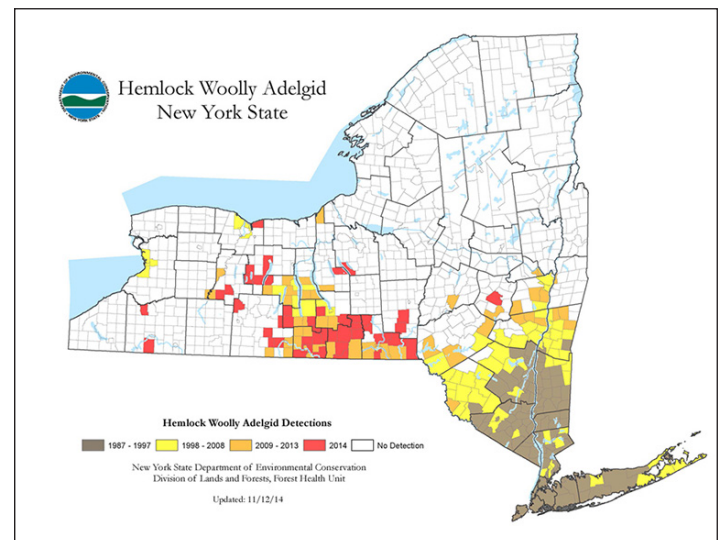


Dead hemlocks in western North Carolina © Mark Whitmore

Distribution

In New York, HWA was first found in the lower Hudson Valley in the late 1980s and has since spread through the Catskill Mountains north to near Albany and westward through the Finger Lakes to Allegany State Park and Zoar Valley, just south of Buffalo. Mortality is widespread in the Catskills and HWA spread has accelerated in the west. In the past research has shown HWA to be cold sensitive

thereby limiting its ability to move into colder climates. However, research over the past two cold winters suggests HWA is adapting to cold and spread northward into the vast hemlock forests of the Adirondacks could be just a matter of time. How much time is hard to say, but it is becoming rapidly apparent that if we do nothing we risk losing one of our most iconic trees. A visit to the Great Smoky Mountain National Park will help illustrate the destruction we face here in New York with our third most abundant forest tree species.



Map of the distribution of HWA in New York by town as of 11/12/14. Courtesy of New York State Department of Environmental Conservation

Insecticide Treatment

The good thing is that we do have options. There are some valuable lessons to be learned from regions to the south where they have been working to manage HWA for many years. The first is that trees can be saved with insecticides. Insecticide treatment is not only inexpensive but one treatment can last for years making this a viable option not only for landscape trees but also in small forest stands. For more information on insecticide treatment of hemlock in New York go to <http://branchingout.cornell.edu/HWA.html>. The most important reason to treat trees is not so much for their scenic beauty but so that we have seed with which to establish future forests from a diverse population of trees. Hemlock seed does not store well so it is imperative that we keep magnificent individuals alive for future forests.

The good thing is that we do have options.

Biological Control

Although management of HWA with insecticides is effective and relatively inexpensive it is untenable across the landscape and over time. Biological control is the only long term management strategy to conserve our hemlock resource and it is critical that resources be brought to bear to develop a state-wide strategy to implement HWA biological control now, before it is too late. It takes many years to research and build predator populations and luckily some of that legwork has already been done for us.



Laricobius nigrinus feeding on HWA. © Mark Whitmore.

A number of predators have been released on the East Coast since the national HWA Biocontrol project was initiated but only a couple currently show promise. The most widely established is the beetle *Laricobius nigrinus* which is native to the Pacific Northwest. This beetle has been released in many states over the past 12 years with wild collected and lab reared beetles. In North Carolina it has spread over 20 miles from the main point of introduction and is now abundant enough that we have been collecting it there for release in New

HWA is spreading far too rapidly for the small supply of beetles available.

York. Even though we have released almost 4000 *L. nigrinus* at 14 locations over the past five years, the main problem in New York is that HWA is spreading far too rapidly for the small supply of beetles available. *L. nigrinus* has been successfully reared in laboratory insectaries but the cost is becoming prohibitive, perhaps \$8 per beetle, and production is still low compared with needs. We are currently working to establish a network of “field insectaries” across New York to produce quantities of locally adapted predators for release into forests.



Closeup of *Laricobius nigrinus* feeding on HWA. © Mark Whitmore.

A field insectary is basically a hedge of hemlock trees trimmed so that all branches can be easily reached allowing predators to be collected rapidly. This concept was derived from our experience collecting predators in North Carolina where trimmed hemlock hedges yielded hundreds of *L. nigrinus* daily as the adults emerged

in fall. Field insectaries can be created by planting hemlocks in favorable locations or they can utilize pre-existing hemlock hedges planted as landscaping. Hemlock hedges need to be located, their owners identified, permissions gained, and HWA populations assessed before releases can be made. We have already begun to develop a network of field insectaries across the state but many more are currently needed and this is something anyone with a bit of training can help with.

Field insectaries can utilize pre-existing hemlock hedges planted as landscaping.

The future for HWA biological control is still developing. We have just received permits to release *Leucopis argenticollis*, a predatory fly from the Pacific Northwest, and there are a few other beetles that are looking promising. Hopefully with a number of different predators to fill the different habitats we will over time achieve effective biological control.



Leucopis argenticollis larva feeding on hemlock woolly adelgid.

New York State Hemlock Initiative

We recently created the New York State Hemlock Initiative (NYSHI) to organize the state-wide efforts of multiple agencies, volunteers, and other stakeholder groups to save our hemlocks. This organization will work as a clearinghouse for information about HWA, to work on a statewide level to identify priority hemlock stands for management, and serve as a portal to organize volunteer detection and monitoring efforts. If you are interested in working with the NYSHI you will soon be able to find information on the website of the New York State Invasive Species Research Institute (www.nyisri.org).

By saving magnificent trees for seed and the implementation of biological control we can save New York’s hemlocks for future generations to enjoy, but we’ve no time to lose.

