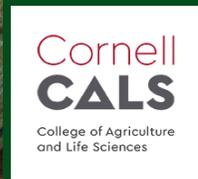


the Hemlock Tribune

New York State Hemlock Initiative Newsletter
Winter 2017-2018



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Hemlock Initiative News



^ The Hemlock Initiative team in our new biocontrol lab at Cornell University.

The New York State Hemlock Initiative had a very busy autumn season, filled with everything from preparing our lab for biocontrol bug arrival, to collecting and analyzing field samples, to providing trainings to our Citizen Science volunteers. Our lab's official opening was in November, attended by our DEC partners including Executive Deputy Commissioner Ken Lynch and Deputy Commissioner of Natural Resources Kathy Moser. Also in attendance were State Assemblywoman Barbara Lifton and Dean Kathryn Boor of Cornell's College of Agriculture and Life Sciences, representing the collaborative efforts of this project.

We have several ongoing experiments to keep our post-docs and lab technicians busy. When studying any organism, it is critical to understand its biology inside and out. Part of our studies involve learning more about hemlock woolly adelgid itself, and its response to different climate conditions including how seasonal variations in climate may affect HWA phenology. Key insights from this research will help us accurately time biocontrol releases around the state for more effective HWA management.

> These jars house our "families" of *Laricobius* beetles in the lab. With the help of our lab team, Little Lari will hopefully help us conserve New York's hemlocks.



Photo: Charlotte Malmberg

We are currently housing two species of *Laricobius* beetles, one wild-collected from the Pacific Northwest and one species of Japanese origin from the biocontrol colony at Virginia Tech. The beetles arrived in November, and we are researching and planning for their wild releases in Fall 2018. As with any biocontrol program, there are rigorous standards to meet to make sure that the insects we release are not harmful to native species. Luckily for us, and for New York's hemlock trees, our biocontrol bugs are prey-specific, meaning they're hungry for HWA and only HWA. With the help of biocontrol predators, we anticipate a successful HWA management program focused on long-term control of this invasive pest.

Our research would not be possible without our funders and local, state, and federal collaborators:



Department of
Environmental
Conservation



A Conversation with Mary Werner

An Infestation at Plotter Kill

Mary Werner first learned about hemlock woolly adelgid (HWA) at a fateful state-wide conference of the Environmental Management Council. It was 2015 and NYSHI's Mark Whitmore was giving a talk on HWA, which had been found at a Schenectady County location few years earlier in 2012. "It was a half mile from my house!" Mary recalls, surprised that she hadn't known about the infestation in Schenectady County, let alone in her own backyard. After the talk, Mary went home and surveyed her neighborhood, finding HWA not only on her own property, but on her neighbors' properties as well. "It immediately became personal," she said.



< An HWA infestation on a hemlock twig. Infestations of this invasive insect are characterized by balls of HWA wool clumped on twigs at the base of hemlock needles. Under each clump of wool is an individual adelgid.

Photo: Charlotte Malmberg

Two years later, Mary remains on the front lines, establishing a County Invasive Species Committee and helping seek out HWA-infested areas throughout Schenectady County. In fact, Mary was present when members of the Invasive Species Committee discovered HWA at Plotter Kill Preserve in April 2017. "We were doing an inventory of hemlock distribution within the preserve. We were shocked when we found HWA on several trees." Mary says, recalling the finding. Committee members had attended an HWA identification training, but hadn't expected HWA to be anywhere near the preserve. The Plotter Kill Preserve is a popular destination for recreation, known for its beautiful waterfalls and steep gorges, many of which are stabilized by hemlock roots. The Plotter Kill infestation is also the closest HWA infestation to Prospect Mountain in the Adirondacks, where HWA was discovered in July 2017. The Albany and Schenectady areas are HWA's gateway to the Adirondacks, where most of New York's hemlock trees are concentrated, so discoveries of HWA in nearby areas like the one at Plotter Kill are especially important.



Volunteer involvement has increased early detection of HWA in New York. Data collected by volunteers are used to pinpoint locations of infestations through applications like iMapInvasives. These sightings are leading to rapid responses from state officials. "Action is possible," Mary says, noting how quickly the DEC responded to the Plotter Kill infestation. She also cites the Adirondack infestation at Prospect Mountain, which was treated in October, less than four months from the initial discovery of HWA in the area. At Plotter Kill, 250 trees were treated November 7 and 8 by three DEC certified pesticide applicators, DEC Forester Jason Denham, and eight volunteers from the County Invasive Species Committee. The treatment will not only conserve many hemlocks in the preserve, it will also help slow the spread of HWA into new forests.

^ The HWA treatment team and volunteers at Plotter Kill Preserve; 45 DEC applicator team hours and 66 volunteer hours made this treatment possible. Photo: Jason Denham, NYSDEC

While citizen science volunteers are busy finding and documenting HWA infestations, public knowledge about HWA still seems to be less widespread about than the insect itself. "Despite the very active involvement of some people like those on our Invasives Committee, sometimes when I talk to others about HWA I get a blank stare," Mary says. Getting the knowledge out there is one half of the battle, and it's the key to the other half: getting boots on the ground searching for new infestations. As HWA becomes more and more widespread in New York, we hope that New Yorkers will rise to the challenges that this invasive pest poses by finding new infestations while we explore biocontrol options for HWA management.



< A certified pesticide applicator uses a systemic basal bark application to treat HWA in these forests. Treatments are effective for up to seven years, which buys us valuable time to make biocontrol a more widespread and impactful option for HWA management.

Photo: NYSDEC

A Conversation with Dr. Fred Hain

Saving the Legacy of Hemlocks in Southeastern Forests with the Forest Restoration Alliance

Hemlock woolly adelgid first made landfall in Virginia, and spread rapidly along the East Coast and throughout the Appalachians. Eastern and Carolina hemlock trees, some hundreds of years old and growing in iconic places like the Great Smoky Mountains and Shenandoah National Park, weakened and died from HWA damage. The loss of hemlocks devastated vast swaths of forests in a relatively short time. In 2007, a group of researchers out of North Carolina State University, led by Dr. Fred Hain, formed the Alliance for Saving Threatened Forests. The group recognized a need for a long-term solution to the hemlock woolly adelgid problem. Now known as the Forest Restoration Alliance, Hain and his team have set out to restore hemlocks to eastern forests in the wake of HWA by researching genetic diversity and potential resistance in native hemlock species as well as investigating and implementing Integrated Pest Management strategies for hemlock conservation.



^ Evidence of hemlock mortality in the Southern Appalachians, Pisgah National Forest, North Carolina. Photo: Steve Norman



^ A towering hemlock, what we stand to lose.

Photo: Caroline Marschner

The Forest Restoration Alliance (FRA) is currently undertaking several experiments for hemlock conservation and hemlock woolly adelgid research. Much of the work has been focused on restoring eastern and Carolina hemlocks within their native range. To do this, the FRA team and dedicated volunteers have been surveying for existing trees that have shown some level of resistance to HWA. From these hemlocks, the FRA collects cuttings and, when possible, seeds to test their offspring. The rooted hemlock cuttings are planted in the greenhouse at the Mountain Research Station in Waynesville, NC., then inoculated with HWA to test for short-term resistance. Longer-term resistance is being evaluated through field plantings of hemlocks, but evaluating the success of those plantings will take a decade or more. In addition to these resistance studies, the FRA team also partners with the National Arboretum to evaluate the Arboretum's hemlock hybrids at their Upper Mountain Research Station near Laurel Springs, NC. These studies, mirroring the work of the American Chestnut Foundation with chestnut trees, work on crossing hemlock species that are naturally resistant to HWA with eastern and Carolina hemlock species. While there has been some success with Carolina hemlocks, eastern hemlocks are unfortunately difficult to hybridize. Researchers remain hopeful, however. Hain, for one, knows that there won't be just one solution. He acknowledges that it will likely be a combination of strategies—an integrated approach involving host resistance, biocontrol efforts using pest predators, and hybridization—that will ultimately help restore Appalachian hemlock stands.

Here in New York, the story is very different, and we are at a critical point in our hemlock conservation efforts. While there are places that have had their fair share of HWA, such as Long Island and the Lower Hudson regions, there are also many areas that have not yet seen HWA infestations. Such regions are still very much at risk, especially when we consider the sheer number and density of hemlock trees present in New York State. Early detection of and rapid response to new infestations, as well as HWA management with pesticide treatments, remain the best ways to slow HWA's spread for now. In the long-term, the New York State Hemlock Initiative is optimistic that successful implementation of biological control strategies with HWA predator insects will provide the solution. Widespread biocontrol of HWA may be years away, but we can buy time with pesticide treatments and help keep hemlocks here in the short term while looking towards the future. In New York, we must conserve what hemlock resources we have in the present to preserve both the aesthetic and genetic legacies of our forests. If we are not acting now, restoration—rather than preservation—could be the name of the game.



^ A biocontrol release of *Laricobius nigrinus* beetles. These little straw nests are filled with bugs just waiting to snack on HWA.

Photo: Mark Whitmore

HWA to Become Part of the National Phenology Network

What causes the timing of hemlock woolly adelgid's life stages? What affect does climate have on HWA's biology? How can we learn more about the life cycle of HWA? These are all questions that we are beginning to answer with our Phenology Project! Currently there is very little known about the phenology, or the timing of major life stages due to climatic and seasonal variation, of HWA. Understanding HWA phenology is critical to a successful biocontrol program. That's why we have been working with several New York organizations to track HWA phenology, so we can synchronize our biocontrol releases with HWA's major life stages.



^ Tracking phenology helps us plan the timing of our biocontrol releases, like the releases of these *Laricobius* beetles planned for Fall 2018. Photo: Mark Whitmore



^ HWA nymph showing the first signs of breaking aestivation, back in September in Ithaca, NY. Photo: Nick Diestchler

This past fall we tracked a life stage called aestivation. During the summer season, HWA enters a period of rest called aestivation when it temporarily suspends its growth and development. When autumn hits, HWA will break its aestivation and begin feeding. This break occurs at different times depending on location, and our phenology project is tracking when aestivation break is occurring at several sites in New York. This year we received data from several locations showing aestivation break earlier than the previous year. Starting this winter and spring, we will be watching when HWA begins to lay its eggs. Once again, we will be interested in how location and climate affect this process.

Though we have only just started to monitor phenology, the information we have already found is prompting more questions. What will phenology look like in the spring if we have an earlier aestivation break? Will we continue to see aestivation break earlier or later as our summers grow warmer? Only time, and more research, will tell! Our data will deepen our understanding of HWA, and provide valuable benchmarks for releasing biocontrol insects.

Tracking HWA phenology is an important part of our biocontrol program. In order to successfully release our biocontrol insects, we must make sure that there is plenty of HWA available at a release site to sustain the predator populations. By matching our biocontrol release timing with the timing of major HWA life stages, we can optimize our HWA management efforts. In February 2018 it will become even easier to track HWA life stages, as our project will become part of the National Phenology Network. Citizen Scientists from all over the state will be able to report changes in HWA phenology throughout the year. These data will improve HWA management statewide and will provide a clearer look at HWA biology.

Contact Us:

You can keep up with the happenings at the NYS Hemlock Initiative or become a Citizen Science volunteer with us! Reach us by email, on the web, or on Facebook.

Email:

nyshemlockinitiative@cornell.edu

Website:

www.nyshemlockinitiative.info

Facebook:

[@nyshemlockinitiative](https://www.facebook.com/nyshemlockinitiative)

Report HWA Findings in one of the following ways:

> **Call** the DEC Forest Pest Information Line at **1-866-640-0652**.

> **Use NYiMapInvasives** either on your desktop computer or smartphone. You can download the mobile app at nyimainvasives.org/mobile.

> **Email** the NYS Hemlock Initiative at nyshemlockinitiative@cornell.edu, making sure to include photos and GPS coordinates or directions.

You can now find the **HWA Phenology Project** on the National Phenology Network Nature's Notebook website at www.usanpn.org/nn/Adelges_tsugae