



Save Our Hemlocks!

The Greatest Environmental Loss of Our Lifetime Is Threatening



Healthy Hemlocks



Hemlock Killed by HWA

Similar to the blight that killed over 3 billion America Chestnut trees throughout eastern North America in the 1930's, another pest, the **Hemlock woolly adelgid (HWA)**, has been destroying our Hemlock forests since the 1950's. At present, the devastation from this tiny parasite has spread from Virginia north to Maine and south to Georgia. In Virginia alone 80% of the Hemlocks in the Shenandoah National Park have been killed, according to the National Park Service. Until recently, the average person in Georgia has been unaware of the approaching danger, but unless we become aware, alert, and active, we may only be able to describe to our grandchildren the graceful Hemlock giants that once forested north Georgia's mountains.

Be Aware

In Georgia, HWA infestations have reached Rabun, Habersham, Stephens, Towns, White, Union, Fannin, Gilmer, Pickens, Lumpkin, and Dawson Counties and are traveling fast. It is predicted that 90 % of our Hemlocks may die in the next few years. Brought into forests and neighborhoods by birds, squirrels, deer, wind, humans, and the planting of infested trees from other areas, the HWA, an aphid-like insect about 1/32 inch long, attaches itself to the base of the Hemlock's tiny green leaves and sinks its mouthpart into the tree's tissue, sucking out the sap and injecting a toxic saliva. Unless treated, the Hemlock sickens and dies, sometimes within only 2-4 years in the south.

Be Alert

This silent devastation often goes unnoticed until the first tell-tale signs appear – clumps of white, cotton-like material on the underside of the base of the Hemlock's needles. From just one of these egg sacs, 100 to 300 eggs hatch in early spring with another generation in late fall; upon hatching, the flat, reddish-brown crawlers emerge to attack their host tree, infest others nearby, and feed on them for up to two years. Depending on the weather conditions, each year the infestation spreads from 15 to 25 miles along the Hemlock range.



Because HWA can damage trees so quickly, it is important to detect infestations early. Frequent visual inspection is the best way to tell if a tree is infested. For most of the year, the white "wool" is quite conspicuous contrasted against the dark green needles on the undersides of the young twigs. Further evidence of HWA infestation is the thinning or grayish-green color of the needles on some branches. The branches then die back, starting with the lower ones, and growth slows. It's clear that vigilance is needed now. The next time you're in the forest, examine the underside of a Hemlock twig. If you find even a couple of white, woolly balls, be an advocate; report it to your local Cooperative Extension Service or Forestry Commission office immediately.

Be Active

The fight is for the very survival of the Hemlock species. Unless stopped or significantly slowed, the spread of the Hemlock woolly adelgid in Georgia will have enormous and lasting consequences:

- **For fish and other wildlife** – loss of the protection, habitat, and cooling effect of Hemlock canopy; permanently altered ecology or forest floor and hydrology of streams and rivers; decreased numbers of trout in particular as water temperatures rise.
- **For native plant species** – loss of a tremendous number of native plant species that depend on the deep shade and forest floor ecology maintained by hemlocks; resultant loss of food sources for wildlife; rampant increase of invasive, weedy plant species.
- **For homeowners** -- loss of aesthetics in their landscaping and possible decrease in property value.
- **For hunters, fishermen, and other outdoorsmen** – loss of recreational environment.
- **For tourism and related industries** that depend directly or indirectly on the Hemlock tree – huge loss of revenue that could reach into the millions of dollars as it already has in North Carolina.

Yet there is hope! There are cultural, chemical, and biological control measures that can be taken to slow the devastation. And ongoing research indicates that a combined three-pronged approach may be our best hope for ultimately managing the HWA pest.

For those who want to know what they can do to protect Hemlocks on private lands, the cultural and chemical controls are the best options. But the big picture – and most urgent need – is support for development and dissemination of biological controls in our state and national forests since this may be the best long-term solution for survival of the species.

Cultural Control Methods for Homeowners

Cultural controls should be used year-round for the general health of your trees. However, they are only temporary and inadequate measures against HWA *unless* combined with chemical controls.

- **Reducing invasion by adelgids** -- Because birds, squirrels and deer are important dispersal agents, any effort homeowners can take to discourage these animals from visiting Hemlocks will help. Locate birdfeeders away from Hemlocks in the yard.
- **Improving tree health** – Keep the Hemlocks in the landscape well watered and mulched to maintain stable moisture and soil temperature levels.
- **Mechanically removing adelgids** -- If you spot the signs of infestation early enough, depending on the size of the tree, you can prune infested lower limbs or spray them with powerful jets of water to remove *some* of the pests.
- **Removing understory Hemlocks** – Because untreated understory trees can serve as incubators for the HWA, consider removing most of the young hemlocks under 3 inches in diameter unless a particular tree is playing an important role in site stabilization (e.g., lone tree on an erodible slope or stream bank), canopy structure (occupies space in a gap), or is the perfect tree in the right location (specimen tree; matter of personal taste). It is not necessary to burn, chip, shred, or haul away the cut trees; once they're cut, the sap dries up and the attached adelgids die.
- **Do NOT bring in plant materials from areas that have HWA infestations.**

Chemical Control Methods for Private and Public Land

While there is no preventive that will keep adelgids from coming to your trees, there are chemical treatments that can keep them from killing your trees. Different treatment products require particular application times and provide varying lengths of residual protection.

- **Non-systemic products such as horticultural oils or insecticidal soaps** can be sprayed on infested trees to suffocate the adelgids. Newly hatched nymphs are vulnerable to sprays of natural products such as rotenone/pyrethrin insecticide, or neem oil soap. For a synthetic solution, use a pyrethroid-type insecticide such as permethrin or resmethrin. Thoroughly drench infested trees, tops and bottoms of branches, to cover every adelgid.

Note: These products kill by smothering the insects. Therefore they must be applied when the insects have emerged from their egg sacs and are exposed (mid-June through September). Non-systemic products are appropriate only for small trees and hedges, offer no residual protection, and must be repeated frequently.

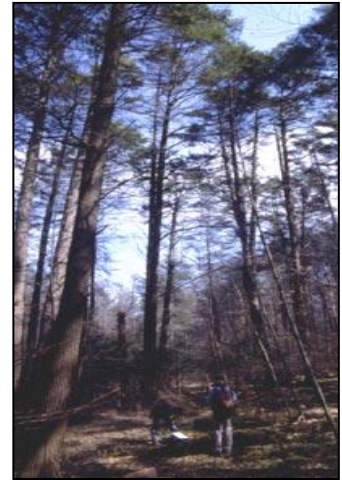
- **A systemic insecticide** containing a 75% concentration of the active ingredient Imidacloprid can be used to treat lightly to moderately infested trees. The most effective application method is soil injection, which delivers the treatment directly to the root system to be taken up and distributed throughout the tree. (It can also be applied as a soil drench or foliar spray.) Then, any insects that bite, chew, or suck on the tree will ingest the chemical and die.
Note: Imidacloprid is very effective at killing adelgids, is safe to handle and easy to apply, and provides residual protection for 5 years or more. It can be used year round, provided there is adequate moisture in the soil; spring and fall are the best times to treat; December and January are the least desirable.
- **When homeowners need help** – Trees that are heavily infested require a more powerful treatment product that is best administered by licensed pesticide professionals with the appropriate equipment and expertise. Homeowners should also seek the help of a professional for large trees on difficult terrain or situated in an environmentally sensitive area.

Biological Control Methods for Public Land

While cultural and chemical controls of the HWA are feasible in most nursery and landscape settings, they are not practical in large forest settings such as exist on public lands. The problems of space, numbers of trees, and cost may be too great. Biological control methods must be an essential part of the long-term solution if the beautiful Hemlock is to survive as a species.

Because the HWA is not a native species, it has no natural enemies in eastern North America. However, several predators known to feed exclusively on adelgids have been imported and are being investigated for biological control, one of which is a tiny, black lady beetle (*Sasajiscymnus tsugae*) from Japan. To date, millions of *S.tsugae* have been released in hundreds of sites in 15 eastern states from Georgia to Maine. Several species of lady beetles (*Scymnus* sp.) from China and a derodontid beetle (*Laricobius nigrinus*) from British Columbia have been imported, and the establishment of these predators is just beginning. Efforts to locate, evaluate, and establish additional natural enemies will continue to be a high priority for research and forest health practitioners in the coming years.

Forest managers, park officials, and scientists have great hope that a combination of these biological control agents will be able to establish an adequate predator-prey balance such that the Hemlocks can survive and even thrive again. The beetles are voracious eaters, have no known negative consequences in the environment, and have a life cycle that is well adapted to that of the HWA. However, they are expensive and labor-intensive to rear, costing from 2 to 4 dollars each, and millions more need to be released into our forests. There are beetle-rearing research laboratories in Connecticut, Pennsylvania, New Jersey, Virginia, North and South Carolina, and Tennessee, as well as three labs now in Georgia at Young Harris College, UGA, and North Georgia College.



Call to Action!

The threat is at our door. The need for your help is urgent. The time for action is now.

Stay well informed. Stay alert for early signs of the HWA. Protect the Hemlocks on your private land. And most importantly, support the effort to save all our Hemlocks by making a tax-deductible contribution to either of the first two organizations listed below. The money will be used to promote public awareness and to support the work of the beetle-rearing labs in Georgia.

For More Information:

If you have questions, need information about control options for your private property, or want advice on how to proceed, you can call the **Hemlock Help Line at 706-429-8010** and ask an expert. Or visit the Save the Hemlocks page of our web site at [www.lumpkincoalition.org/Save the Hemlocks.htm](http://www.lumpkincoalition.org/Save_the_Hemlocks.htm).

Additional Resources



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