

Home Owner Options & Prevention

How do I save my hemlocks? By Mark Warren

Now that there has been a few years in the adelgid war zone, some of the conventional wisdom about the adelgid problem and treatment has changed. This help sheet has been updated (April, 2008) to reflect new information and new attitudes in the plight to save our hemlocks. ~ MW

Problem and hope: In 2002 the Hemlock Woolly Adelgid arrived in Georgia along the Chattooga River, and now it is fast spreading through both the Etowah and Chestatee watersheds. (Infested Lumpkin areas include Yahoola, Two Run and Nimblewill Creeks.) We were told by scientists to expect in one decade the loss of 90% of our hemlock trees. As an individual landowner, you can change that prophecy for your hemlocks. You can save most of them. This paper will tell you how.

Meanwhile more hope lies in the research being done: raising and releasing of several species of adelgid-eating beetles; cross-breeding the eastern hemlock with adelgid-resistant hemlocks of the western U.S. and Orient; and finding adelgid-killing fungi.

In New Jersey and Connecticut, studies on public lands show a comeback among ravaged hemlocks (that had been written off) in just a few years after the release of adelgid-eating beetles.

Why save my hemlocks?

- The efforts of the U.S. Forest Service and Georgia Department of Natural Resources will only address trees growing inside public (non-private) lands and only a small percentage of those.
- Of all the Georgia acres containing hemlocks, most are privately owned. As majority caretakers, we - the private landowners - stand to lose the most ... or contribute most to saving the species, which is at risk.
- The deep shade provided by stream-side hemlocks ensures the crucial cool temperature (for high oxygen content) necessary for aquatic life. With the hemlocks gone, certain aquatic species might be critically affected. Would trout populations suffer? Most fisheries experts think so.
- As far as aesthetics: Does a mental picture of your favorite spot in the mountains include hemlock trees?

Understanding the adelgid

When is my hemlock tree under attack? It begins non-dramatically. A few white fuzzy specks show up at the bases of needles. Each mass (with hundreds of eggs) is the size of a pin head or slightly larger. The aphid-like adelgids hatch as “crawlers” and during April and May migrate to new feeding spots where they settle in to do damage. Once they infest a tree, they reproduce quickly, running through two generations in one year. Within as little as three years after attack, a heavily infested tree could die and stand as its own grave-marker – a bare woody bone picked clean.

How did the adelgid find its way to my hemlocks? It's a strange story. The only flying stage of adelgids sends the insects in search of spruce – which the U.S. doesn't have a suitable species. And so

the flyers die. But non-flying adelgids hitchhike on wind, birds, cars, machinery and humans and, having found hemlock, each produces 20-75 eggs. A fisherman brushing past an infested bough in one county might bring the problem back to his favorite local fishing hole in his own county.

What can be done about the adelgid problem? To date there are three approaches for treatment:

- Insecticidal soap sprays and horticultural oils applied topically.
- Pesticide injected into either soil or tree trunk.
- Biological control using predatory beetles.

What is being done about the adelgid problem? Utilizing the above methods, the United States Forest Service and the Georgia Department of Natural Resources have begun a counterattack to preserve individual trees or small stands of hemlocks scattered throughout public lands. Their goal is not to save as many trees as possible but to ensure the survival of the species for the sake of bio-diversity. Private landowners are successfully halting the adelgid problem in their trees by hiring arborists or landscapers to implement the insecticidal or chemical options listed above (and detailed below). Many individuals have taken the initiative to do the work themselves – especially now that the Georgia Forestry Commission has made available soil injectors for the public to borrow. More on this below.

I have hemlocks on my property. What are my options?

Do nothing

Be prepared to lose your trees 3 to 4 years after infestation begins. On a cost basis alone, because resident hemlocks increase property value and because of the expense of removing dead trees, this option is not appealing.

Spray with insecticidal soap or horticultural oil

Spray small trees, whose every branch can be reached. Spray upward along the bottoms of boughs April through mid-May. Thoroughly coat the adelgids. Repeat in spring or fall if the adelgid is still visible. Examples of products are Talstar-One, Safari 20 SG, insecticidal soaps, and dormant oils. Look for these products at landscaping businesses, garden centers and nurseries. A hose and spray attachment are needed. Because the product is diluted in water, allowing a little to go a long way, the cost is reasonable. But there are negative concerns regarding spraying. (See Application Warnings below.)

Soil drenching with imidacloprid

This treatment is for trees not growing close to a stream or wetland and involves pouring a prescribed concentration and quantity (as instructed on the label according to tree size) of a nicotine-related chemical (imidacloprid) around the base of the tree into a shallow trench. First rake away mulch, leaf litter and duff (for good soil absorption) and build a small earthen berm to contain the poured liquid. Carefully follow the directions on the product. Repeat if infestation recurs (perhaps in 3, 4, or 5 years) until the adelgid is no longer evident. Apply in cool weather from early fall to early summer when the soil is visibly moist. If the soil is dry beneath the tree, thoroughly water it before application so that the tree can absorb the chemical. Further dampening will be required for two weeks if rain does not accommodate. One imidacloprid product (Bayer Advanced) is available to the public at Ace Hardware in Lumpkin. Call landscaping businesses, garden centers and nurseries. Other brands include: Merit, Imidipro, Touchstone, Zenith, and Lesco. In determining the proper dosage for a given tree, you might be asked to calculate the “dbh” (diameter at breast height) of a tree. Simply measure the tree’s girth 4 and ½ feet off the ground. Then you’ll know how to mix the proper quantity of chemical. Follow the recommended guidelines on the package that tell you how far from the tree to make the trench. After applying, cover the trench with the leaf litter you had removed earlier.

The use of certain brands (“restricted use” pesticides are so labeled) requires the user to have a certified pesticide application license. A homeowner can get a license if actively producing an agricultural commodity and if willing to study and then pass a series of tests. One local certified and licensed applicator is Mark Shearer (706-864-4787, markshearer@windstream.net). Some sites may not be appropriate for drenching. (See Application Warnings below.)

Soil injection with imidacloprid

We who are active in the plight to save hemlocks have gained a healthy respect for the soil injection treatment over trunk injection. For the general public, soil injection is recommended. This technique delivers a chemical by pressure through a specialized injector (one brand is Kioritz) 6 inches or less underground. This subterranean application has proved to be the safest and most effective method, showing a higher mortality rate for adelgids. The Georgia Forestry Commission offices in Fannin, Habersham, Lumpkin and Union counties do have a limited number of injection devices for the public to use. A \$250 refundable deposit is required. Instructions come with this loan. (For more information on this, have a look on the Internet site). As in soil drenching, we once recommended not using imidacloprid near streams or wetlands; but University of Georgia research has shown that accurate injection into the root ball is a plausible application that does not endanger stream biota – as long as the tree’s root system is not undercut by a stream and the soil is not rocky or sandy. However, as a safety buffer, we do recommend that injection be done only on the side of the trunk away from the stream. Apply from early fall to early summer. Re-application might be needed every 2-4 years. Use the same dampening preparation and follow-up as mentioned above in option 3. If neighboring stewards who live in heavy stands of hemlocks foresee the need for long-term use, they might consider buying the tool for joint use. The cost of an injector runs about \$350. Depending on the number of trees to be treated, consider the cost effectiveness of hiring a professional. Some arborists charge about \$12 to \$25 per injection. The number of injections depends upon tree size. (See #3 above for name of certified applicator.) (See Application Warnings below.)

A new product by Bayer is called SilvaShield – a tablet that is pushed into the ground to release imidacloprid. For each inch of DBH for a given tree, one to three tablets are placed in holes around the base of the tree.

Stem (trunk) injection with imidacloprid

This application is typically reserved for sensitive areas: trees near surface water or saturated soil or located on rocky or sandy soil. A low-pressure stem injector is needed, because this application can potentially wound a tree by damaging its tissue – thereby weakening the tree in a time of adelgid-induced stress. Because of the potential harm to the tree and the fact that the chemical and equipment needed for this procedure is specialized, it might be prudent to hire professionals to inject. That said, Bayer has a product on the shelf called Merit Interjectible. A hole must be drilled into the trunk to specification, and a capsule with a measured dose of pesticide is tapped in. Professional stem injection costs from \$12 to \$25 per injection and the number of injections depends upon tree size. One company charges \$15 X inches of trunk diameter at breast height. Though not as effective as soil injection, it is the necessary option for special-case trees. (See Application Warnings below.)

Signs of success with imidacloprid. Soil treatments and stem injections may take several months to produce visible results. The tree’s health and the weather are factors that cause significant variations in the time it takes a tree to translocate the chemical and distribute it to the branch ends. As the adelgids die, their white wool turns gray and starts to disintegrate, and in subsequent seasons, less wool will be observed. If you don’t see good results on the lowest branches, don’t be overly concerned. Hemlocks “prioritize” their upper branches; therefore the chemicals will not be distributed as well to lower branches.

[Release of predatory beetles on infested trees](#)

This is, perhaps, the most misunderstood approach to the adelgid problem; because, while fighting the infestation by using beetles seems such a clean and natural avenue, it is generally not a feasible solution to a landowner. This biological (beetle) approach is a part of a much broader concept. It is a regional effort, not one pinpointed at certain acreage or specific trees.

That said, if you happen to live near federal or state lands where beetles have been released, your hemlocks have a good chance of benefiting from that. *What is important to understand is that you cannot release a bagful of beetles onto your infested hemlock trees and expect those beetles to remain there to serve your needs.* In time, we simply hope to have established a balance of beetle/adelgid populations that can sustain a healthy hemlock population. This is what exists in Japan. As much as we would like to, we cannot expect to annihilate all the adelgids. We can only hope for the hemlocks to live with an adelgid population that is held in check by the beetles. It's got to be a working triangle. The paradox is that for the beetles to survive (to kill adelgids), we need adelgids in the equation. If they aren't, the beetles will die. Then when adelgids get reintroduced, once again history repeats itself and our hemlocks are caught without a natural protector in the wild.

Two of the Lumpkin Coalition's goals were getting beetle-rearing labs established at the University of Georgia (Athens) and the University of North Georgia's Dahlonega Campus and both facilities are now up and running. At present, both facilities provide beetles only for federal or state land.

The beetle-rearing lab at Young Harris College (Georgia's first, conceived by and managed by Dr. Paul Arnold) does sometimes hand over beetles for private use, but there are criteria that must be met for such cases: Beetle release will only occur on public lands that have been designated as good release sites by the U.S. Forest Service, Georgia Forestry Commission, or Georgia DNR ... or ... the private land in question must fit the following criteria:

- 100 acres or more of contiguous forest land.
- A high percentage of the forested area is in hemlock.
- The hemlocks are within the first 5 years of infestation.
- The hemlocks are at least 30% infested.
- The hemlocks are in good health.
- The land will have guaranteed protection from development for at least the next 10 years.
- The landowner(s) must allow access to their forest for research and follow-up purposes for at least the next 10 years.

Also, priority will be given to sites that are of great ecological importance, or have trees of great age.

As you can see, beetle-rearers care about their beetles. They want to make sure the beetles are not being wasted. At the time of this writing, sources for beetles to be purchased by the private sector are not abundant:

Jayne Lynne Longo
Owner and Environmental Scientist
Forever Green Environmental Svcs
P.O. BOX 270
Scranton, PA 18504
570-941-9752

[EcoScientific](#)

Opinions differ on how many beetles should be released on an individual tree, 15, 50, 100 or some other number? This number hinges on the beetles' propagation success in the wild. But releasing a relatively small number of beetles (say a few hundred) in one area will probably not deliver a desired effect. Better results would come from landowners pooling their resources to

	purchase and release thousands of beetles, but only where a substantial amount of acreage that is rich in hemlocks is involved.
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And most important: Beetles should never be released in areas where imidacloprid has been used. If beetles eat adelgids that are contaminated with this chemical, the beetles will perish.

What is my first step?

Consult a hemlock-savvy arborist, county agent, Georgia Forestry Commission forester or qualified landscaping specialist. Then make a realistic management plan that fits your budget. Decide how many and which trees you will save and which you will remove to maintain a healthy forest. Why not take advantage of a service which you pay for through state taxes. Agents of the Georgia Forestry Commission will be glad to counsel you. Talk to a GFC forester in your county.

As you ponder your options, consider these two points: First, protecting those trees that reach above the general canopy of the forest, as they are contributors of widespread-traveling pollen that can benefit other trees that might survive farther out in the forest. Plus, they will distribute seeds in a larger radius. And second, saving clumps of trees (rather than interspersed individual trees) might be a more realistic plan. A cluster of hemlock trees provides its own best growing environment.

What application warnings should I be aware of?

1. Do not begin any treatment at all until your trees are infested.
2. Directed sprays: Potential problems of exposure to these products by humans and animals makes this option unattractive. We recommend against this method unless you hire specialists. Spraying tall mature trees results in pesticide “drift” outside your target area. If spraying small trees, do not allow drift or drip into nearby surface waters. Do not spray during the heat of summer as this can “burn” the needles. Spray only during the “crawler” stage of the adelgid, April to mid-May.
3. Imidacloprid is highly toxic. Although drenching is the cheapest method of application, there is risk concerning the environment. Researchers fear that a misuse of the chemical would eradicate large numbers of invertebrates in a contaminated area - especially aquatic life - thereby upsetting the food pyramid. If using a brand made for homeowners, carefully follow all label directions and warnings. For products marked “restricted-use,” a licensed applicator must be hired for chemical application.
4. The soil type where an infested hemlock lives might not be compatible with imidacloprid use. Dark, rich soil and clay are good compositions for use of imidacloprid, but rocky or sandy or swampy soils are not.
5. Trunk injection does deliver trauma to a tree, especially when repeated every few years. This method should be considered for “special case” trees where other treatment options are not feasible.
6. Beetles (the good guys) die when they eat adelgids containing imidacloprid. Do not use both chemical and biological control in the same area. Beetles must be released not on solitary trees but on 15-50 infested trees in the same hemlock grove, where colonies can be established; otherwise, the beetles will have nothing to eat and nowhere to migrate after egg-laying (to leave their offspring the nearest available food). Trees need to be monitored to determine when and if additional beetles should be released.

Prevention

- Be aware of your surroundings. The hemlock woolly adelgid is a skilled hitchhiker. Therefore avoid brushing up against infested branches and parking your car next to hemlocks.

Try and brush off any adelgids as soon as you come in contact with them instead of giving them a lift.

- Don't place birdfeeders next to your hemlocks. One way HWA is spread is by bird traffic.
- Monitor your trees. There is no need to pre-treat trees chemically. It is better to wait until there are signs of infestation. Also don't fertilize infested trees as you just provide additional nutrients to the HWA.
- Manually prune of adelgids if you see them on your trees. Especially if you don't plan on treating them. Another option could be removing the hemlock if you choose not to treat, which will prevent generations of adelgids surviving on your tree and spreading to others.
- Don't transport infested saplings to be planted elsewhere.
- If you have lots of hemlocks on your property and can't treat them all you can thin out your hemlocks and save the best ones.