



HEMLOCK RESTORATION INITIATIVE

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General Information Regarding Chemical Treatments for Hemlock Woolly Adelgid (HWA)

The hemlock woolly adelgid (HWA) is an invasive insect pest that affects eastern and Carolina hemlock trees. There are several options available to homeowners to treat HWA. Other pests and issues aside from HWA can affect the health of hemlocks; however, as HWA is the hemlock pest most likely to cause tree mortality, this document only addresses HWA chemical treatments. For more general information about HWA and other hemlock health concerns, please visit the Hemlock Restoration Initiative (HRI) website at <https://savehemlocksn.org/factors-threatening-the-appalachian-hemlock/>.

How can I treat my hemlocks for HWA?

Because HWA is an insect, you can use an insecticide to treat it. Insecticides are toxic to invertebrates and therefore should be applied according to the label to minimize risks to aquatic and terrestrial organisms. There are two main categories of insecticides that can be used to treat HWA: **systemic insecticides** and **contact insecticides**. Both are effective at treating HWA on hemlock trees, but their modes of action and the application methods you can use for them are different. This document will first discuss systemic insecticide treatment options and then contact insecticide options.

What is the difference between a systemic and contact insecticide?

Systemic Insecticide	Contact Insecticide
Effective when ingested by HWA	Effective when applied externally to HWA
Applied so the active ingredient is absorbed into the roots or stem and transported to the canopy of the tree where HWA feeds	Applied directly to the hemlock's foliage where it comes into contact with HWA
Generally take several weeks to months to provide effective control	Goes into effect immediately when applied
Remains effective for one year or longer	No residual effect after application
Appropriate for trees of all sizes	Appropriate for smaller, more accessible trees that could be treated frequently; not appropriate for large or inaccessible trees

Which systemic insecticides can I use to treat HWA?

There are two main ingredients in systemic insecticides used to treat HWA: **imidacloprid** and **dinotefuran**. Both chemicals are extremely effective at treating HWA because they are highly toxic to invertebrates (including insects). Their major differences are outlined below.

Imidacloprid	Dinotefuran
Effective within months of application	Effective within weeks of application
Remains active in the tree for 5-7 years	Remains active in the tree for 1-2 years
Often used on trees with lighter HWA infestations and/or earlier stages of decline	Often used on trees with heavy HWA infestations and/or more advanced decline
Not effective for elongate hemlock scale (EHS) control	Also effective for elongate hemlock scale (EHS) control
Generally less expensive (generic versions available; previously patented by Bayer under the name Merit)	Generally more expensive (still under patent)
Brand names include: Merit, Zenith, Lada, Advanced Tree & Shrub Protect & Feed, CoreTect	Brand names include: Safari, Transtect

Where needed, dinotefuran can be used for an initial quick knock down of heavy infestations, followed by imidacloprid for longer HWA control.

Which product should I buy?

Systemic products should have imidacloprid or dinotefuran listed as the active ingredient (please see product label) and be labeled for treatment of hemlock woolly adelgid. Products with additional active ingredients are not preferred. Several options are listed below, but this is not an exhaustive list.

Imidacloprid 2F (2 = 21.8 % of active ingredient; F = Flowable)

- This is a concentrated liquid formulation that needs to be further diluted before being applied.
- It stays in suspension longer than the powder or WSP formulations, but is heavier than the dry powder in its concentrated form, so it is harder to carry for long distances.
- It is the cheapest formulation available.

Imidacloprid 75 WSP (75 = % of active ingredient; WSP = Water-Soluble Packet)

- One envelope contains four 1.6-oz packets.
- The packet dissolves in water, so an entire unopened packet is added to water to form a solution.
- A soil drench application of imidacloprid 75 WSP is the most commonly used systemic chemical treatment on public forests and park lands.

CoreTect Tablets

- Slow-release tablets that include both imidacloprid and a fertilizer.
- Often used in sites where getting water to the trees is virtually impossible.
- Over time rain slowly dissolves the tablets that are buried in the soil.
- As the tablets are absorbed by the tree more slowly than with other methods, avoid using CoreTect in locations where children and pets could dig them up, or for trees in more advanced stages of decline with a moderate to high HWA infestations.

Safari 20SG (20 = % of active ingredient “dinotefuran”; SG = Soluble Granules)

- Granules mixed with water can be used for soil drench, soil injection, stem injection, or basal bark spray applications

You can view more products and where to buy them on [HRI's product comparison chart](#).

How much should I buy?

The number and size of hemlocks to be treated will determine how much pesticide should be purchased. You should measure the diameter of hemlocks you plan to treat in advance to have an idea of how much pesticide to purchase. You can find HRI's [diameter-measuring guide](#) on our website.

Per acre limits: The product label specifies how much of the product you can apply per acre. Please be sure to read and follow the label to not exceed the limit per acre per year on the label. If you have several trees in close proximity and want to treat them all, you may have to spread it out over a few years, e.g., treat all trees ≥ 10 " in diameter this year and then the smaller ones next year, etc. Larger, forest grown old growth trees don't have the active live crown that open grown trees do. In a heavy HWA infestation, these trees will succumb first so it is imperative to focus on these if the larger diameter trees are priority at a site.

How should I apply my systemic insecticide?

- There are several application method options to treat HWA with a systemic product, including soil drench, soil injection, trunk injection, basal bark spray, and foliar spray.
- In general, soil-based application methods should not be used on a hemlock that is near water or flowering plants that may be visited by pollinators. For hemlocks in these locations, a non-soil-based application method (such as bark spray or stem injection) is a better choice to minimize the risk of off-target impacts.
- Soil drench and slow-release tablets are both methods that don't require any specialized equipment. HRI has [simple dosing and application instructions](#) for both imidacloprid 75 WSP and Safari 20SG soil drench, as well as CoreTect tablets, which you can find on our website.
- Stem injections create wounds in tree, increasing the stressors from which tree must recover. They also require more specific equipment and expertise; therefore best applied by a professional.
- Applying systemic insecticides via foliar spray leads to increased risk of off-target impacts. It may result in increased spider mite and hemlock rust mite occurrence. It is not recommended.

What about contact insecticides?

- The primary contact insecticides used to treat HWA are insecticidal soaps and horticultural oils applied via foliar spray, which work by smothering HWA (and any other insects on the hemlock at the time of application).
- They must be applied with a high-pressure sprayer when the pest is susceptible to smothering and will not burn foliage.
- Once the product dries and flakes off or is washed off by rain, there is no residual protection.

What if I want to hire a tree care professional to treat my hemlocks?

- While treating trees yourself costs less, experienced, licensed, professional applicators may be able to identify issues and offer solutions regarding hemlock health not covered in this document.
- Applicators vary widely in terms of treatment methods and costs. The current average pricing for professional treatments is as follows:
 - Imidacloprid treatment for lightly to moderately infested trees: \$0.50 - \$4.00 per inch diameter

- Safari (dinotefuran) treatment for heavily infested trees in advanced stage of decline: \$1.50 - \$9.00 per inch diameter
- Prices may vary based on property location, number of trees, proximity to water, or difficulty of the terrain.
- Professionals may also be hired for consultation services only.

How do I find a tree care professional who can treat my hemlocks?

If you want to hire a professional to treat your trees, be sure to get the following information:

- Do they have a current commercial pesticide applicator license?
- Do they carry insurance?
- Are they an ISA-certified arborist? (optional; see below)
- What application methods and products do they use?
- Do they have experience with the application method you prefer?
- How do they calculate their costs?
- Is there a minimum charge?
- How do they guarantee their work?
- Ask for references and compare quotes from a couple of different providers.

Find an International Society of Arboriculture (ISA)-certified arborist for your area here:

<https://www.treesaregood.org/findanarborist>

How do I learn more?

Visit the “Info for Landowners” page on the Hemlock Restoration Initiative website at SaveHemlocksNC.org for more information on treating hemlocks yourself. Upcoming treatment workshops for landowners will be posted on the events page of the website. Additionally, free hands-on training may be available by volunteering with the HRI to treat hemlock trees on NC public lands! Give back to the forest while getting educated!

Contact: info@savehemlocksnc.org or (828) 252-4783

Recommendations for the use of chemicals are included in this publication as a convenience to the reader. The use of brand names and any mention of commercial products or services in this publication does not imply endorsement nor discrimination against similar products or services not mentioned by the Hemlock Restoration Initiative or NCDA&CS. Individuals who use chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Be sure to obtain current information about usage and examine a current product label before applying any chemical. For assistance, contact an agent of the North Carolina Cooperative Extension Service in your county.

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