Insecticide Treatment of Hemlock Trees for Hemlock Woolly Adelgid, *Adelges tsugae*, in New York State

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The Hemlock Woolly Adelgid (HWA), *Adelges tsugae*, was introduced from Japan and is now a major threat to our Eastern hemlock forests. In New York HWA kills Eastern hemlock trees in as little as six years. Systemic insecticides are the most effective and least costly treatment for HWA. Treatment with systemic insecticides should be made in spring or fall when the soils are moist and hemlocks are actively growing. The spring treatment window begins when the soils thaw and fall treatments can start with the rains and finish usually around the end of October or in early November when soils cool down. Two systemic insecticides are recommended for HWA: imidacloprid and dinotefuran.

Treatments with any one of the several formulations of imidacloprid (active ingredient) registered in NY have been found to be effective up to 7 years with just one soil application. Imidacloprid can be applied by soil drench, soil injection, time-release soil tablets, trunk injection, or basal bark spray. The only formulation available to homeowners is a soil drench; all others must be applied by Certified Pesticide Applicators. For the soil drench you need to pull the leaves and other organic material 2 feet away from the base of the tree then pour the correct amount onto the mineral soil. Homeowners should be aware that a soil drench could possibly move through a porous soil and get into waterways. It's best not to use a soil drench within 75 feet of any body of water. Soil drench and soil injection work best when the soil is moistened after a rainstorm, not when it is dry.

The time-release imidacloprid soil tablets (Coretect™) need to be placed just under the surface of the mineral soil near the trunk of the tree. Bulb planters have been one of the application tools of choice. One advantage of this formulation is that application can be made when soils are dry in summer since the imidacloprid is only released when the tablets are moistened. Another advantage is that since the full dose of imidacloprid is released over a two year period, twice as many trees can be treated per acre than with other application methods.

Techniques that inject imidacloprid into the tree after drilling a small diameter hole into the xylem are effective controlling HWA but are costly and time consuming. However, this application technique is useful near waterways because the imidacloprid does not come into contact with soil.

One of the drawbacks to imidacloprid is that it moves slowly through the tree, sometimes taking up to a year to reach the canopy. Older trees that may have compromised vascular systems or crown decline from HWA may not be able to move imidacloprid into the crown fast enough to survive. A recent development in New York is the Special Local Needs (SLN) registration of dinotefuran (active ingredient), under the trade name Safari® 20SG, to be used as a basal bark spray. This is significant because Safari® moves into the tree canopy much more rapidly than imidacloprid, usually within 2 to 3 weeks. The basal bark spray technique uses a low pressure sprayer to apply the product to the bark surface on the base of

the trunk from 4" to 54" above the soil line. Safari® solution is sprayed on the bark until it is wet, but before the solution begins to drip. No surfactants are necessary for the product to penetrate the bark. A bark spray is faster and easier than trunk injection and is non-invasive (no holes need to be drilled). Basal bark spray can also be used near waterways since no product comes into contact with the ground. Safari® is a restricted use pesticide in New York and must be applied only by Certified Pesticide Applicators.

Safari® is indispensable when treating large, old trees and any tree that has crown thinning symptoms. The one drawback is that its efficacy is limited to 1 or 2 years. It is therefore prudent to treat with imidacloprid at the same time. In these circumstances, Safari® will rapidly reduce HWA so the trees can recover and have time to take up imidacloprid for more long-term protection. Dr. Richard Cowles at the Connecticut Agricultural Experiment Station has found imidacloprid to be effective as a basal bark spray but efficacy may be for only 5 years. To facilitate rapid and cost effective treatment with both pesticides at the same time some imidacloprid products were recently registered (2ee) in New York for use as a basal bark spray by Certified Pesticide Applicators. Now both imidacloprid and Safari® can be applied at the same time as a basal bark spray in a tank mix thereby affording fast protection for a number of years with one application.

Directions for tank mixing Safari® 20 SG and imidacloprid as a basal bark spray for Certified Pesticide Applicators:

Mix 9.0 oz (dry weight) of Safari® 20SG and 12.8 fl oz of Imidacloprid 2F in one gallon of water. There are 128 fl oz of water in one gallon and it typically takes 1.5-2.0 fl oz of solution to wet one diameter inch* of bark just to point of runoff. Therefore, at the labeled application volume of 2.0 fl oz/diameter inch, one gallon of bark spray solution will treat 64 diameter inches of trunk. Keep bark spray solution agitated during application to keep product in suspension.

You then need to calibrate the amount of time it takes for your sprayer to deliver 2 fl oz of bark spray solution at a constant pressure. You can then multiply that amount of time by the diameter of the tree to determine the correct amount to apply.

Always refer to product label use directions and restrictions when making HWA treatments.

*Trunk diameter = width of trunk at breast height (4.5ft.); Trunk circumference = distance around the outside of the trunk