

# HEMLOCK WOOLLY ADELGID IN MICHIGAN

## *Recommendations for Landowners*

September 2016

[www.michigan.gov/HWA](http://www.michigan.gov/HWA)



### What is Hemlock Woolly Adelgid?

The Hemlock Woolly Adelgid (*Adelges tsugae*) or HWA, is an invasive, aphid-like insect that attacks North American hemlocks. HWA are very small (1.5 mm) and often hard to see, but they can be easily identified by the white woolly masses (ovisacs) they form on the underside of branches at the base of the needles. These masses or ovisacs can contain up to 200 eggs and remain present throughout the year.

### How did it get here?

Native to Asia, HWA was introduced to the western United States in the 1920s. It was first observed in the eastern US in 1951 in Virginia after an accidental introduction from Japan. HWA has since spread along the East Coast from Georgia to Maine and now occupies nearly half the eastern range of native hemlock where it has become a devastating pest. HWA can be moved from tree to tree by birds, other wildlife, the wind, and on gear, equipment, clothing, infested nursery stock or other hemlock materials. HWA is most easily spread April through July. HWA is believed to have arrived in Michigan on infested hemlock nursery stock that was brought in either prior to, or in violation of, Michigan's exterior HWA quarantine which was first implemented in 2001. The quarantine prohibits the importation of hemlock nursery stock into Michigan from areas outside of Michigan that are known to be infested with HWA. For more information on the Michigan HWA quarantine visit: [www.michigan.gov/pestquarantines](http://www.michigan.gov/pestquarantines).

### What trees are affected?

All species of hemlock are vulnerable to attack. Severe damage and death of eastern hemlock (*Tsuga canadensis*) has been documented. Eastern hemlock is the most common species of hemlock in Michigan. For information on "Hemlock Tree Identification" visit [www.michigan.gov/HWA](http://www.michigan.gov/HWA).

### What does HWA do to trees?

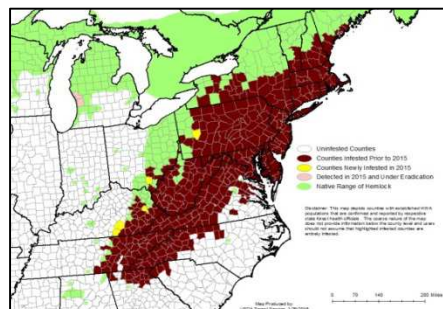
Once hatched, juvenile HWA, known as crawlers, search for suitable sites on the host tree on the twigs at the base of the needles. They insert their long mouthparts and begin feeding on the tree's stored starches. HWA remain in the same spot for the rest of their lives, continually feeding and developing into adults. Their feeding severely damages the canopy of the host tree by disrupting the flow of nutrients to its twigs and needles. Tree health declines and mortality usually occurs within 4 to 10 years.

White woolly ovisacs on a branch of eastern hemlock



Connecticut Agricultural Experiment Station, Bugwood.org

HWA infested counties/Hemlock native range



Map produced by: USDA Forest Service 1/28/16

Tree mortality caused by HWA



Jason Van Driesche, Bugwood.org

### ❑ What is the importance of hemlock in Michigan?

More than 170 million hemlock trees grow in Michigan forests and landscapes. Hemlocks are ecologically important due to the unique environmental conditions they create under their dense canopies. These environments are critical to the survival of a variety of species that rely on them for food, protection, and ideal growing conditions. They are often found along streams, where their shade helps moderate water temperatures, maintaining a suitable environment for cold-water species such as trout. Removal of hemlock from Michigan's ecosystems can dramatically change ecosystem processes and may result in the loss of unique plants and wildlife.

### ❑ What are the signs of an infestation?

- White cottony masses (ovisacs) about one-quarter the size of a cotton swab attached to the twigs, at the base of needles, on the underside of branches.
- Needle loss and branch dieback.
- Gray-tinted foliage.

### ❑ Are there other things that look like HWA?

Elongate Hemlock Scale (EHS) has been observed on trees in areas infested with HWA, at a relatively high incidence. The main distinguishing feature between EHS and HWA is that EHS is primarily attached to the underside of the needles and HWA is attached to the twigs, at the base of needles. There are a number of other things that are commonly confused with HWA. For more information on "Hemlock Woolly Adelgid Look-Alikes" visit: [www.michigan.gov/HWA](http://www.michigan.gov/HWA).

### ❑ What can be done?

#### Pesticide applications

Trees can be treated with systemic insecticides and other compounds. The most frequently utilized systemic insecticides are dinotefuran and imidacloprid. They can be applied as a soil drench, soil injection, or basal trunk spray. They can also be applied using trunk injection methods. Dinotefuran, although quicker to have action on HWA than imidacloprid, may need to be reapplied every 1-2 years. Imidacloprid may only need to be reapplied every three to five years. It is often recommended that both products be applied as the initial treatment on heavily infested trees, especially larger ones. For the treatments to be effective, trees must still be relatively healthy in order to move the insecticide up to, and throughout, the canopy. Landowners can treat their own trees but it is highly recommended that they seek professional guidance.

HWA Infested Hemlock Branch



Keith Eldred, Michigan Department of Agricultural and Rural Development

HWA white woolly masses are found on the twig at the base of the needles



Chris Evans, University of Illinois, Bugwood.org

Elongate Hemlock Scale



Eric R. Day, Virginia Polytechnic Institute and State University, Bugwood.org

**❑ What can be done?**

**Mechanical/physical control**

- Severely infested trees can be cut down and destroyed.
- April through June, eggs and crawlers may be dislodged by hosing down infested branches with a strong stream of water.
- Heavily infested twigs/branches can be pruned out and destroyed.

*Note: Neither of these last two practices, however, is effective enough to attain control without the use of other control options.*



What not to do: Allow hemlock material to move off of your property

**❑ What else can be done?**

- Don't be responsible for moving HWA from one place to another.
  - Limit activity in infested areas, especially April-July.
  - Brush off and wash clothing, equipment, and gear after it has been near an infestation.
  - Leave infested hemlock materials where they originate; whenever possible dispose of debris from infested hemlock on-site.
  - When possible, burn or bury, cut infested branches (obtain burn permits as required).
  - If burning is not possible:
    - ✓ Drench cut stems and branches with soapy water (1/4 cup per gallon) or
    - ✓ Cover debris for three weeks with a clear plastic tarp (if daytime temperatures are above 50°F).
- Take down or empty birdfeeders and bird baths April-July, or move them at least 100 feet from hemlocks.
- Maintain proper soil moisture in hemlock root zones, especially in times of low rainfall/drought.
- Avoid use of nitrogen fertilizers on infested hemlock.
- Treat for other pests that may stress hemlock.
  - Scales, mites, gypsy moth, loopers, etc.
- Consider alternate species for future plantings.

**❑ If you have hemlock on your property that has not been inspected for the presence of HWA, please inspect them or have them inspected by a qualified arborist.**

To locate an International Society of Arboriculture Certified Arborist in your area visit: [www.treesaregood.org](http://www.treesaregood.org)

**❑ If you believe you have found Hemlock Woolly Adelgid:**

- Take pictures of the infestation signs and symptoms and note the location.
- Contact the Michigan Department of Agriculture and Rural Development at:
  - 1-800-292-3939
  - OR
  - [MDA-Info@michigan.gov](mailto:MDA-Info@michigan.gov)
  - OR
- Report the infestation through the Midwest Invasive Species Information Network at: [www.misin.msu.edu](http://www.misin.msu.edu)

For more information please visit the Michigan Department of Agriculture and Rural Development's Hemlock Woolly Adelgid webpage at:

[www.michigan.gov/HWA](http://www.michigan.gov/HWA)