Hemlock Woolly Adelgid (HWA) Damage & Seasonal Signs

St. Lawrence Eastern Lake Ontario Partnership for Regional Invasive Species Management (SLELO PRISM).

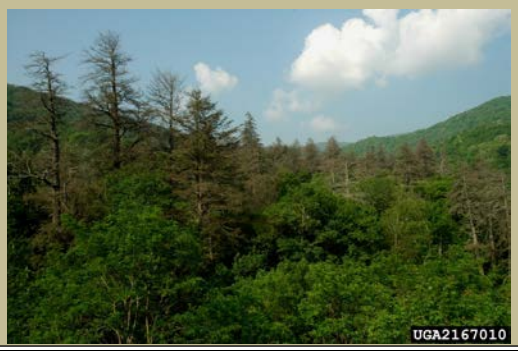
Learn more and join the SLELO Invasive Species Volunteer Surveillance Network at www.sleloinvasives.org

HWA Damage Seen Year-round to Infested Hemlock Trees

- Discolored needles
- Thinning foliage
- Dead twigs/branches
- Lack of bright-green foliage in spring

Report observations of this damage via www.iMapinvasives.org or contact the NYSDEC Forest Health Information Center: 1-866-640-0652

Record the GPS Coordinates & take clear photos of the damage



Seasonal Signs of HWA from November-May: The seasonal signs of HWA described in this guide may be more, or less apparent depending on the location of the hemlocks that will be surveyed. *HWA populations on cooler sites, such as on north-facing slopes, or in higher elevations/latitudes, may awaken from their dormant aestivation stage later than those on sites with other aspects, or in lower elevations/latitudes.*

Hemlock woolly adelgid begin feeding during Autumn (*often late October or early November).* As they feed, they secrete woolly filaments out of their pores, creating **white woolly masses** around their bodies. **During April & May you may see HWA "crawlers" on white woolly masses;** *you will likely need a magnifying glass to see the crawlers*. **Refer to the images below for visual guidance** *(photos compliments of bugwood.org).*

If you see these signs (white woolly masses or HWA crawlers), report observations via www.iMapinvasives.org or contact the NYSDEC Forest Health Information Center: 1-866-640-0652

Record the GPS coordinates of the location & take clear photos of the suspected signs

White woolly masses on hemlock branch.

Magnification of a HWA crawler on an ovisac.

Magnification of white woolly masses on hemlock branch.

Seasonal Signs of HWA Continued

Signs of HWA from June-October: The seasonal signs of HWA described in this guide may be more, or less apparent depending on the location of the hemlocks that will be surveyed. *HWA populations on cooler sites, such as on north-facing slopes, or in higher elevations/latitudes, may awaken from their dormant aestivation stage later than those on sites with other aspects, or in lower elevations/latitudes.*

From **June to October**, HWA nymphs remain dormant on the bases of needles. This period is known as the **Aestivating stage** in which the insect is essentially hibernating. **Refer to the images below for visual guidance**.

Look for black dots that have a distinct white halo around them at the base of hemlock needles or remnants of the white woolly masses attached to the host trees (*you will likely need a magnifying glass to see this*).

If these signs are present, report observations via www.iMapinvasives.org or contact the NYSDEC Forest Health Information Center: 1-866-640-0652

Record the GPS coordinates of the location & take clear photos of the suspected signs.

Magnified HWA crawlers, note the white "halo" around their bodies.

Photo provided by, Carri Marschner, Hemlock Initiative, Cornell University.

Dormant HWA appear as black dots at needle base.

Photo provided by, Carri Marschner, Hemlock Initiative, Cornell University.

Hemlock Woolly Adelgid Look-Alikes

Elongate Hemlock Scale

(Fiorinia externa Ferris)

What to Look For:

- White waxy secretions on leaves
- Flattened, elongated brown-orange or white wax-like scales attached to needles
- Needles turn yellow and fall off

This is an invasive species, if found please notify the NYSDEC Forest Health Information Center: 1-866-640-0652

The brownish/orange scales in these photos are female and the white colored scales are male **elongate hemlock scale. The white waxy threads are secretions from the insect often confused with HWA**. *All photos are compliments of bugwood.org.*

Spider Eggs:

- Egg sacs enclosed in a web attached to needles/twigs.

Pine Sap:

- Sticky residue buildup on needles/twigs

Distinguishing Hemlock Trees from Other Conifers

Comparing Tree Shape

Tips on Identifying Hemlock at a Distance

1. If you can see **large cones**; it is **not a hemlock**. Hemlock cones are small, 0.75 inches in length.
2. In landscape settings, young hemlocks have a soft, pyramidal form; older trees are pendulous (drooping) with a more open form.
3. **Wild hemlock trees growing in forests often (but not always):**
    - Grow together in large stands consisting of mostly hemlock trees.
    - Grow in moist, cool valleys along ravines and streams.
    - Grow on north-facing bluffs.
    - Only have branching and needles on the upper portions of the trunk.

Eastern Hemlock Silhouette
(*Tsuga canadensis*)

- Diamond shape
- Delicate foliage/drooping branches
- Rounded drooping top
- Narrow base with exposed trunk near ground

Norway Spruce Silhouette
(*Pinaceae picea)*

- Symmetric pyramidal shape
- Branch tips point upwards
- Slender pointed top
- Wide base with exposed trunk near ground

Balsam Fir Silhouette
(*Abies balsamea*)

- Dense pyramid shape
- Upward branching
- Tapered narrow top
- Wide base with branching near ground

Distinguishing Hemlock Trees from Other Conifers

Comparing Tree Needles

Eastern Hemlock: Check for Signs of HWA

Needles are connected by a peg.

Norway Spruce: Not attacked by HWA

Needles are connected by a peg.

Balsam Fir: Not attacked by HWA

Needles are not connected by a peg.

Eastern Hemlock Needles
Check for signs of HWA

- **0.5 inch long, flat with rounded, blunt tip**
- **Arranged opposite of each other and point away from the twig**
- **Connected to twig by a peg**
- **Needles will not roll between fingers**

Norway Spruce Needles
Spruce tree species are not attacked by HWA

- **0.5 to 1-inch long, 4-sided, with sharp tip**
- **Arranged in whorls and pointed forward along the twig**
- **Connected to twig by a peg**
- **Needles will roll between fingers**

Balsam Fir Needles
Fir tree species are not attacked by HWA

- **0.75 to 1.25 inches long, flat with rounded blunt tip**
- **Whorled around branch and arranged perpendicular along twig**
- **Connected to twig by a suction cup**
- **Needles will not roll between fingers**

Pine Trees:
Not attacked by HWA

- Needles are more than 1.5 inches long
- **Attached to the twigs by pegs, in bundles of 2, 3 or 5**

Pine Tree Needles

Tamarack Tree Needles

Tamarack Trees:
Not attacked by HWA

- 1.5 inches or less
- Attached to twigs by pegs, in tight clusters of 10-35 needles
- **Needles turn yellow in autumn and drop off**

Distinguishing Hemlock Trees from Other Conifers

Comparing Cones & Bark

Eastern Hemlock: Check for Signs of HWA

Norway Spruce: Not attacked by HWA

Balsam Fir: Not attacked by HWA

Eastern Hemlock Cones & Bark
Check for signs of HWA

- Cones are light brown, 0.75 inches long with rounded scales that mature in early fall.
- Younger trees have smooth then scaly gray-brown bark. Older trees have reddish-brown bark with wide ridges and furrows.

Norway Spruce Cones & Bark
Spruce tree species are not attacked by HWA

- Cones are light brown, 3-4 inches long with rounded papery scales that mature in fall.
- Bark is grayish to pale reddish-brown, with thin scales.

Balsam Fir Cones & Bark
Fir tree species are not attacked by HWA

- Cones are 2-4 inches long, purplish in color & stand erect on branch. *Cones are rarely seen as they grow at the top of the tree and disintegrate scale by scale.*
- Bark is very smooth, older bark cracks and has blisters that ooze sticky resin when broken.

Pine Tree Cones:
Not attacked by HWA

- Range from 2-8 inches in length
- Scales are brown in color
- Cones feel woody & thick
- Scales overlap & can be sharp and pointed

Pine Cones

Tamarack Cones

Tamarack Tree Cones:
Not attacked by HWA

- 0.5 – 0.75 inches long
- Purplish-red in color
- Cones point upwards from the twig
- Papery to the touch