

HWA Fall Phenology Monitoring Protocol

New York State Hemlock Initiative | | www.nyshemlockinitiative.info



1. Locating Sample Trees

Suggested sample size: Find 3 trees -> 2 branches per tree -> Look at 5 twigs -> Observe HWA on each twig 1X per week ****ONLY LOOK AT NEW GROWTH****

- It is helpful to locate trees with ample HWA before making observations and flag them ahead of time so it is easier to find them when collecting data each week.
- **Comments section:** Recording temperature, precipitation, and other abiotic factors can help to provide a clearer picture. Records of daily high and low temperatures on observation days also provide valuable information. **Nature's Notebook users are strongly encouraged to take brief notes in the comments field about what they are seeing, and/or questions they may have about what they are seeing.**

2. Observing Aestivation Break: Making weekly HWA observations

Magnification, either using a hand lens or dissecting microscope, is necessary for accurate observations.

Using a Hand Lens:

- 7x or 10x-magnification hand lenses may be used for observation; hand lenses in the 14x-20x range are harder to use but will give more accurate observations and data.

- Observations using a hand lens will be looking for HWA's shift from "inactive nymph" to "active adults". These data will help us determine when aestivation has taken place in your sample location.

- **Inactive nymphs** will appear like tiny, black sesame seeds surrounded with a thin halo of white wool.

- **Active adults** will show signs of development including increased size, wool accumulation, and body casings from HWA's first molt.

Using a Dissecting Microscope:

- When using a dissecting scope, look for HWA's shift from "inactive nymph" through "post-dormant nymph" to "active adult" stage. Take sample twig cuttings to view under the scope. Be sure to place samples in a sealable container during transport.

- **Inactive nymphs** will appear like tiny, black sesame seeds surrounded with a thin halo of white wool.

- **Post-dormant nymphs** will show signs of development including lighter/greyer color with a segmented appearance, increased size, and some wool accumulation. Variation in sizes of HWA individuals can be a good sign of this shift.

- **Active adults** will continue to show growth, wool accumulation, and body casings from HWA's first molt.

HWA Inactive Nymphs ↓



Post-Dormant Nymphs ↓



Active Adults (2nd Instar) ↓



Reporting Aestivation Break: Using Nature's Notebook Mobile App



Nature's Notebook - HWA sample tree

Select an animal
hemlock woolly adelgid

Add a new animal

Eggs **Y** **N** ?
Active nymphs **Y** **N** ?
Inactive nymphs **Y** **N** ?
Post-dormant nymphs **Y** **N** ?
Dead adults **Y** **N** ?

Inactive nymphs still in dormancy

Submit observation

Enter Observation Details

- There is a space to record how many HWA individuals were observed (up to 100). This field is optional but gives us a better picture of what is taking place at a given location. First-time observations should begin when inactive nymphs are still dormant. Record observations 1X per week.

- **Hand Lens Method:** Continue observing until you see active adult stage

- **Dissecting Microscope Method:** Observe true aestivation break at post-dormant stage and continue observing through until active adult phase

Using a Hand Lens:



Nature's Notebook - HWA sample tree

Select an animal
hemlock woolly adelgid

Add a new animal

Date
6-27-2018 10:54

Do you see?...

Circle All No

Active adults **Y** **N** ?
Feeding **Y** **N** ?
Eggs **Y** **N** ?
Active nymphs **Y** **N** ?
Inactive nymphs **Y** **N** ?
Post-dormant nymphs **Y** **N** ?
Dead adults **Y** **N** ?

First HWA with obvious wool growth/molting. Still see some Inactive nymphs on the twig.

Submit observation

Enter Observation Details

Using a Dissecting Microscope:



Nature's Notebook - HWA sample tree

Select an animal
hemlock woolly adelgid

Add a new animal

Eggs **Y** **N** ?
Active nymphs **Y** **N** ?
Inactive nymphs **Y** **N** ?
Post-dormant nymphs **Y** **N** ?
Dead adults **Y** **N** ?

First observation of Post-dormant nymphs, some HWA are still inactive

Submit observation

Enter Observation Details

Nature's Notebook - HWA sample tree

Select an animal
hemlock woolly adelgid

Add a new animal

Date
6-27-2018 10:54

Do you see?...

Circle All No

Active adults **Y** **N** ?
Feeding **Y** **N** ?
Eggs **Y** **N** ?
Active nymphs **Y** **N** ?
Inactive nymphs **Y** **N** ?
Post-dormant nymphs **Y** **N** ?
Dead adults **Y** **N** ?

First HWA with obvious wool growth/molting. Still see some Inactive and Post-dormant nymphs.

Submit observation

Enter Observation Details