

Children's Guide to Hemlock Woolly Adelgid



In this lesson, you will learn so many interesting facts about Hemlock Woolly Adelgid, or HWA. You may not know this, but nature conservancies near hemlock trees have been working to identify and rid the forests of these invasive insects!

If you love nature or are planning to help it when you are older and want to start now, this is the place to start! You will learn the importance of hemlocks, the damage HWA causes, and what you can do to help!

Lesson 1: Hemlock Trees



Hemlock trees are a coniferous evergreen tree which can stand up to 100 feet. Though they are known for having a diameter of 1-2 feet, they can have a diameter of up to 5 feet! The brown trunks are tall and slender with their

branches, which do not fork, forming a cone shape. It has thin, straight needles for leaves and small cones. These needles do not grow 360 degrees around but are flat which is distinctive for this tree. These trees are native to the north eastern region of the US and into Canada. Hemlock trees are the base of the ecosystem in which it creates.

Think of Hemlock trees as the foundation of a house, the walls and roof as the streams and terrain, and the décor as the wildlife. Without the Hemlock trees, the rest of the ecosystem would collapse and would not exist to begin with.



Lesson 2: Why are Hemlock Trees important?

Hemlock trees create a variety of benefits for all living beings. Of course, the most known benefit is producing oxygen which animals need to breathe. Another helpful benefit of Hemlock trees as mentioned before is that they create the ecosystem in which they inhabit. Many smaller animals use the trees for homes such as squirrels, and we have seen beds created by deer under the low and fuller branches. Another cool resident is the mushroom and many species as well!

These beautiful trees provide food sources for smaller animals, as well as larger such as deer through their bark, seeds and twigs. With a productive, mature forest for many woodland creatures their ecosystem thrives and helps in unseen



ways as well. The trees scrub the environment of harmful pollutants which can be found in the air and runoffs. For example, farming substances like manure or antibiotics, can be found in runoff which would flow into the streams in some areas, but luckily, the fibrous and taproot systems of the tree prevent this. They also benefit the streams by regulating the temperature through shade in the hot

season. The hemlock trees maintain the soil by holding it in place through their roots.

Lesson 3: HWA

Hemlock Woolly Adelgid is an invasive aphid-like insect which originate from Japan and kill Hemlock trees. They are approximately $\frac{1}{4}$ the size of a cotton ball and spread rapidly at around 10 miles per year. Spreading can be done



quite easily by wind, animals, and human activity. You can find them on the underside of primarily higher up branches at the base of the needles where they feed on sap. As this occurs, the tree tries to heal itself by walling off wounded areas of the leaves and in doing so it closes off the nutrient transportation within the tree and will die within 4 or up to 10 years. The domino effect occurs first in an individual tree and then those around it suffer the same slow death. Ovisacs are what can be seen in the winter months which are white woolly masses in which HWA encloses itself in and again, are at the base of the needles. This is the reason HWA surveying is conducted in the winter. HWA is extremely difficult to rid an area of due to its resistance. It can maintain its population even if only 10% survive and they finally die at around -29 degrees Fahrenheit. Along with a complex, two stage life cycle which involves asexual and sexual reproduction.

Lesson 4: Who Uses Hemlock Trees?

White-tailed deer- Food Source



Red Squirrels- Food Source



Humans (ft. HWA interns)- Wood



Rabbits-Shelter



Mice-Food Source



Porcupines-Food Source



Lesson 5: Ways to Help

The best way is to identify and notify environmental specialists of HWA when you find any. How to identify will be explained in the next lesson! However, I will mention now that it is imperative that if HWA is present, do NOT attempt to remove it in any way. If you do, spreading the insect is inevitable and will only make matters worse.



Methods Used By Professionals: When HWA is identified a variety of methods can be used and should only be used by environmental specialists unless they advise otherwise! The method that is currently in place is biological control on a forest wide level which consists of releasing *Sasajiscymnus tsugae**, a black lady beetle that specifically feeds on adelgid species like HWA. *Laricobius nigrinus** is another predatory beetle that is used in the same way but is native to the area HWA has invaded. On an individual scale, chemical methods are the current accepted practice. Nontoxic insecticidal soap and horticultural oil is sprayed on smaller trees. Soil injections are used on tree that cannot be properly sprayed and Trunk injections are used when the soil is not adequate for absorption.

Lesson 6: How to Identify HWA/Surveying

When identifying HWA, the prime time to do so is November to April when the insect is concealed in their visible ovisacs, or wooly masses. Volunteering with a parent or guardian at Jamestown Community



College or at Roger Tory Peterson Institute is of course always welcome, especially during those months! You will find these at the base of the needles of hemlock trees, and they are usually in higher branches, but can be found lower. With the help of a parent or guardian, a GPS or using the iMapInvasives app while surveying is encouraged. The GPS will allow you to keep track of where invasions are, where you've looked and where you are, while the app will also do this but can send the information conveniently straight to professionals. Other items to consider: a parent or guardian at all times, a camera, a pen and pad to record your data, flagging tape, a compass, and appropriate clothing! When surveying, be sure to pick random trees and check at least 6 branches around the tree. The HWA will be on the underside of the branches so be sure gently lift the branches to analyze them.

Look Alikes:



Vocabulary

Aphid-like: insects which feed on sap of plants

Asexual Reproduction: one parent is necessary for this type of reproduction

Coniferous: cone-bearing trees, shrubs, and other evergreens

Ecosystems: a community of organisms within an environment which interact with each other

Evergreen: plants which are green all year round and do so by only shedding their leaves after the previous season's leaves have been replaced

Fibrous and Taproot System: a system of roots which have a main root which gives off smaller roots of very fine branches which are approximately all the same length

Invasive: in this case an invasive species is one that does not belong or originate from an area or an environment; usually harmful and causes imbalances

Native: species belong or originate from an area or an environment.

Pollutants: a substance which causes uncleanliness or foulness, primarily chemical waste

Runoff: water which does not get absorbed by the soil or atmosphere and flows downhill carrying substances it encounters such as pollutants

*Scientific Names: two-part names of every species of organisms which allows scientists everywhere to know exactly what organism the other is referring to

Ex.) One bird may be called a hawk in one country, and an eagle in another, but with one scientific name it is clear what bird is being referred to!

Sexual: two parents are necessary for this type of reproduction