

Science of the Seasons: Podcast 9 - Hemlock Woolly Adelgid

Kelly van Frankenhuyzen talks with scientists and a forester about Hemlock Woolly Adelgid

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Narrator: This is Science of the Seasons, episode 9. I'm your host Kelly van Frankenhuyzen with the U.S. Forest Service Northern Research Station. Could one tiny sap sucking insect cause widespread death and decline of hemlocks? Scientists are studying the hemlock woolly adelgid, an invasive insect from Asia, found in the Eastern United States. It has killed hemlock trees in 17 states in the Eastern U.S. from Georgia to Maine, and is now infesting hemlock trees in Michigan. I spoke with a forester and scientists about what hemlock woolly adelgid is, and what it means to forests on the east coast and in Michigan.

Andrea Hille: I'm Andrea Hille, the forest silviculturist on the Allegheny National Forest in northwestern Pennsylvania. Well, the Allegheny National Forest is the only national forest in Pennsylvania and it's located in the northwestern part of the state towards Erie. It consists of about half a million acres of predominately hardwood forests and visitors to this area would see a landscape of rolling hills with deeply incised valleys and covered with a predominately hardwood forest with a smaller conifer component. Hemlock woolly adelgid has been a concern for us here on the Allegheny National Forest for over a decade. It's only been known to occur on the forest since 2013 when we found it in three separate locations on the forest. So, eastern Hemlock comprises about seven percent of all the trees on the ANF-the Allegheny National Forest, making it a pretty unique component of the ecosystem, so it provides unique ecosystem services that are not provided by the hardwood tree species, things such as shade along streams to help maintain cool water temperatures. Eastern hemlock on the Allegheny National Forest and throughout the Eastern United States is considered to be a foundation or a keystone

species, as it creates stable conditions for other species and stabilizes fundamental ecosystem processes. There's really, to me, no replacement tree species that provides the unique ecosystem services that eastern hemlocks provide.

Narrator: Northern Research Station Scientists have been studying hemlock woolly adelgid for more than two decades.

Nathan Havill: I'm Nathan Havill, I'm a research entomologist with the Northern Research Station in Hamden, Connecticut. The hemlock woolly adelgid is an insect that's closely related to aphids which are commonly known as pests of things like rose bushes, and the hemlock woolly adelgid is an insect that was introduced, we now know from Japan, introduced to the Eastern United States, brought here sometime before it's first record, first time it was seen was in 1951, so we know it came sometime before 1951, perhaps as early as about 100 years ago.

Narrator: Hemlock woolly adelgid was detected in Michigan in 2006 in a few counties and eventually eradicated. Recently, in 2015 four counties in southwest Michigan have been infested. An estimated 173 million hemlock trees are growing in Michigan. Most of the trees are located in the Upper Peninsula and the northern Lower Peninsula.

Therese Poland: My name is Therese Poland and I'm a research entomologist and the project leader of the Ecology and Management of Invasive Species in Forest Ecosystems Unit of the Northern Research Station, and I am located in Lansing, Michigan. It most likely came to Michigan in infested nursery stock. So, people plant hemlock trees on their property and buy them from nurseries and they may have been imported from one of the infested states, either before the quarantine was in place or in violation. Well, it has been detected in Michigan as early as at least 2006 in very small localized infestations in little spots around the state. However, those spots were always eradicated, found early, the trees were treated with insecticides, cut down, burned and eliminated. As far as we know, most of those spots have

been completely eliminated and no hemlock woolly adelgid remains there. However in 2015 through 2017 some new spots have been found in four counties in southwest Michigan along the Lake Michigan lakeshore that are a little larger, more widespread and are not able to be eradicated.

Narrator: Genetic research suggests hemlock woolly adelgid is several species, not just one. Scientists are able to pinpoint the lineage and populations in the Eastern U.S. as coming from southern Japan.

Nathan Havill: And it was a surprise to find out the hemlock woolly adelgid in western North America is actually native to western North America. That was always assumed to have been introduced there also, but the genetics tell us it was probably there for a long time and we can do some genetic dating based on the DNA data and that tells us that it probably got there around the last ice age so around 23 to 40,000 years ago. One other thing that we found with the genetic work was that the adelgids that are here in the Eastern U.S. were actually a single clone. So it's possible that there was one insect that was introduced from Japan to the Eastern United States, and since they reproduce asexually, that single individual could have reproduced and been responsible for the huge problem that we have here in the Eastern United States with this insect.

Narrator: Biological control is being used to combat larger infestations. Northern Research Station scientists are exploring predators from Asia and the Western U.S. as a control; if enough of these predators are released and establish a large enough population, they may slow the spread of hemlock woolly adelgid.

Nathan Havill: In addition to biological control, another approach is to look at whether there is any natural resistance in our eastern hemlock and, there is two ways to get at this. One would be to find resistance that's already in our native hemlock species and there are some groups, again with the support of the Forest Service, that are looking for called remnants or trees that are left behind after the adelgid comes in and kills off trees, and those trees are potentially resistant. So, if folks find a tree that

survives the initial onslaught of the adelgid, they can let us know and we can take cuttings of that tree and test it to see whether it is resistant. So there is a pretty big effort going on from that angle. The other angle would be to see if we can hybridize our eastern North American hemlock species with Asian hemlock species, which we know are resistant to the adelgid because that where the adelgid originated, and there's some work that's been going on at the National Arboretum in Washington D.C. That's a much longer term project because it takes a long time between generations to try to breed that resistance and it's similar to what's being done with chestnut or American elm.

Narrator: For more information on hemlock woolly adelgid visit

[www.nrs.fs.fed.us/disturbance/invasive\\_species/hwa/](http://www.nrs.fs.fed.us/disturbance/invasive_species/hwa/)

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