

Flies released to attack hemlock-killing pest

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Like tufts of cotton on each branch, the egg sacks of an invasive pest, hemlock woolly adelgid, mean death for this eastern hemlock in Tennessee -- unless a West Coast fly can come to the rescue. A team of scientists from the University of Vermont, Oregon State University, and the US Forest Service have released adelgid-eating flies from the Pacific Northwest in two spots on the East Coast. If their experiment succeeds, this fly could save the hemlock from the fate of the now-vanquished chestnut and elm. Credit: Bud Mayfield, USFS

A tiny fly from the Pacific Northwest may provide new hope for towering hemlock forests dying along the East Coast.

Deep-green hemlock forests stretch from Georgia to southern Canada. Or at least they used to. Over the last few decades, the [hemlock woolly adelgid](#), an invasive insect, has killed millions of these trees as it spreads north and south along the spine of the Appalachians—leaving behind only ghostly acres of gray trunks.

But now a team of scientists, co-led by Kimberly Wallin with the University of Vermont and U.S. Forest Service, and Darrell Ross at Oregon State University, have shown that two species of silver [flies](#) from the Pacific Northwest—*Leucopis piniperda* and *Leucopis argenticollis*—will attack and eat adelgids not just on western hemlock, but also on eastern and Carolina hemlocks.

Free Flies

On May 12, working with Forest Service scientist Bud Mayfield, the team released silver flies from Washington State on infested eastern hemlocks near Grandview, Tennessee. And on June 5, the team, with Mark Whitmore from Cornell University Extension, released the flies on infested trees along Skaneateles Lake in central New York State.

Most of the flies were released inside bags secured to infested branches on trees; "we call them bug dorms," Wallin said. Some of the bags received four flies, some ten, and some were left empty as a control. In Tennessee, some flies were also released on infested branches without a bag enclosure.

"This is the first time this has been done with these flies; it's a brand-new idea. We're hopeful," said Wallin. The researchers will monitor the experimental trees for evidence that the silver flies have successfully

mated, laid eggs—and preyed on hemlock woolly adelgids. Early results from Tennessee, analyzed by team members Nathan Havill, an entomologist with the Forest Service, and Arielle Arsenault, a research technician at UVM, indicate that the flies reproduced inside the bags. "It's very exciting," Wallin said, opening the possibility that populations of these Western flies—that specialize on eating hemlock adelgids—could be established in the East.

Awaiting Answers

"We don't hope that the flies will eradicate all the adelgids," Wallin explained, "but if they could provide a check on the pest's population size and territorial expansion, it could allow some hemlocks to persist and recover."

"That is as good as we could have hoped for at this point," said Darrell Ross. "It remains to be seen whether they will survive and if their populations will grow to densities that significantly impact the hemlock woolly adelgid populations and, ultimately, the survival of hemlocks. We probably won't have answers to those questions for a year or two."

The releases in Tennessee and New York were done under a permit from the USDA's Animal Plant Health Inspection Service. To get to this point—where the scientists and regulators felt that an experimental release was safe and useful—took a decade of research by Wallin, Ross, and their colleagues. First they had to identify the flies, then better understand their basic natural history and diet—and finally see if they would feed on the species of hemlock woolly adelgid found in the East.

"We've successfully done all that," says Wallin, a forest entomologist who holds a joint position in UVM's Rubenstein School of Environment and Natural Resources and the U.S. Forest Service's Northern Research Station. "Now we'll see if they can help the trees."

Hemlock Habitat

For years, scientists have been looking for biological controls against this pest, including releasing beetles. But nothing has been successful yet. Forest Service experiments with *Laricobius* beetles are ongoing, "but these flies are the most promising lead in a long time," Wallin says. "It's a complement to the beetle work."

There's a silver fly species in the East known to prey on adelgids in pine trees, but those flies are not known to be attracted to hemlocks.

"Populations of flies in the West search for [hemlock trees](#), and that's where they find their hosts," said Oregon State's Darrell Ross. "The same species in the East has evolved to look for pine trees. They probably use chemical cues from those trees to find their habitat and their hosts.

That's why it's useful to take the flies from out here, because they'll look for hemlock trees and feed on the hemlock woolly adelgid in the East." At least that's the hope.

"We need to be conservative when it comes to these kinds of releases of novel species," Wallin said, "but the adelgids are killing all the hemlock trees." Comparable to Dutch elm disease and chestnut blight, scientists anticipate that, without a control, the hemlock woolly adelgid could largely eliminate hemlock trees from eastern forests. This strain of the invasive adelgid—native to Japan, and first detected in Virginia in 1951—has now spread to seventeen states from Georgia to Maine. And hemlocks are a so-called keystone species: they create cool, shaded conditions important for many understory plant species, trout and other fish, and a host of wildlife. "Once hemlock is removed, the soil type changes, the stream dynamics change, the forest type changes—and it's hard to recover," Wallin said. "We need to try to do something to protect these trees."

Provided by University of Vermont

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