Project Impacts

NSRC-FUNDED RESEARCH FINAL REPORT

Naturally Occurring Fungi Show Promise in Decline and Control of Hemlock Woolly Adelgid

PROJECT AWARD YEAR AND TITLE:
2011
Dynamics of Naturally-Occurring Fungal-Induced Epizootics of Hemlock Woolly Adelgid (HWA)

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Eastern hemlock is a valued component of New England's forest. It contributes to the biodiversity of the Northern Forest, plays a role in erosion control along streams, and provides food, shelter, and shade for wildlife and fish. Hemlock woolly adelgid (HWA), an exotic invasive insect, is ravaging hemlock along much of the eastern seaboard and continues to spread, threatening the tree's entire range. In 2008, foresters observed a significant natural decline in HWA populations in New Hampshire. HWA in these areas showed signs of infection, from which fungi were isolated. NSRC researchers confirmed that one fungus was *Myriangium* sp., an insect-killing fungus found in past field studies.

Using this fungus, researchers conducted spray trials at HWA-infested sites in southern Vermont, with no previous history of fungal epizootics, or widespread outbreaks. Researchers planned to demonstrate the virulence of *Myriangium* sp. against HWA and assess persistence and spread of the fungus.

They observed 74-92% mortality of HWA nymphs, or settleds, one month after treatment. In one trial, they recorded a carryover effect, with lower numbers of eggs in the spring and greater settled mortality one year after treatment. They did not observe a significant impact on HWA on untreated branches. In other field trials, they observed high levels of HWA mortality caused by a *Phoma*-like fungus, which is usually considered a plant rather than insect pathogen. Overall results demonstrate that a broad spectrum of naturally-occurring fungi, predators, and other mortality factors (e.g., cold winter temperatures) contribute to natural declines in HWA populations, and a multi-pronged approach is essential to achieve sustained management.

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