

# RESEARCH LABORATORY TECHNICAL REPORT



## Hemlock Woolly Adelgid

By The Bartlett Lab Staff  
Directed by Kelby Fite, PhD



The hemlock woolly adelgid (*Adelges tsugae*) is an exotic insect pest of hemlock that was first introduced from Asia into North America in the Pacific Northwest in the 1920's. It was first discovered in the eastern U.S. in Virginia around 1950. This insect is a serious pest of both eastern hemlock (*Tsuga canadensis*) and Carolina hemlock (*T. caroliniana*) and heavy infestations can lead to mortality of either of these species in just a few years. The predominant hemlock species in the western U.S. and Canada are western hemlock (*T. heterophylla*) and mountain hemlock (*T. mertensiana*), and while both of these species are hosts of the adelgid, damage caused by this pest is considered negligible. This is due to both the inherent resistance of these species to the adelgid, and also the presence of over 50 endemic predators of the adelgid in the western part of North America.

Populations of this adelgid are completely female and reproduce asexually. Crawlers emerge in the spring and can move to other parts of the tree, or can be moved to new trees by wind, birds, and mammals. Once these crawlers settle on a feeding site, they become immobile feeding nymphs, and eventually develop into winged or wingless female adults. The winged adults search in vain for a spruce species that is not found in North America before dying, while the wingless adults can lay up to 300 eggs on hemlock and start a new generation.

### Symptoms

Infestations of the hemlock woolly adelgid are quite noticeable due to the white, woolly covering produced by the insect from which it gets its common name.

The damage to infested trees is characterized by off color needles, needle drop, and eventual twig and branch dieback. In the east, the pest has spread throughout the range of the eastern and Carolina hemlock, causing major mortality, especially in forest areas that are impossible to reach with control measures. In the west, as in the adelgid's native Asian range, populations are kept in check by natural enemies and resistant hemlock species. These hemlock species may support a noticeable population of the pest, but without the accompanying decline in plant health commonly found in the east. For the most part this insect is considered a cosmetic or aesthetic problem throughout its Pacific coast range.

## Control

There are several treatment options available for control of the hemlock woolly adelgid including horticultural oil, soap, and registered pesticides. While these options are not always viable in a forest setting, good control can be achieved in a landscape situation. Care must be taken to carefully monitor populations because a small surviving population can reproduce quickly and build up to damaging levels. Predatory insects have been tested for potential biological control of this pest in the eastern U.S. but none have been proven as an effective treatment in the landscape.



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