

Hemlock Woolly Adelgid

Isabel Marez & Jeremy Slone, PhD, Entomologist

Hemlock woolly adelgid (HWA), *Adelges tsugae*, is a pest found on hemlock species in Asia and North America. The predominant hemlock species in the western U.S. and Canada are western hemlock (*Tsuga heterophylla*) and mountain hemlock (*T. mertensiana*). While both species are hosts of the adelgid, damage caused by this pest is considered minor. This is due to both the inherent resistance of these species to the adelgid and the presence of many endemic predators in this area. Western hemlock species have coevolved with this pest and are more resilient against outbreaks. In contrast, HWA was first discovered in the eastern U.S. in Virginia around 1950. This insect is a serious pest of both eastern hemlock (*T. canadensis*) and Carolina hemlock (*T. caroliniana*); heavy infestations can lead to mortality of either of these species in just a few years.

Description

Infestations of HWA are conspicuous due to the white, woolly covering produced by the adults for which it is named (Figure 1). Much of the canopy and outer growth may exhibit these woolly masses during large infestations. These secretions provide protection for the adults and eggs. Hemlock species in the West can support a noticeable population of the pest without the decline in plant health commonly seen in the eastern hemlock species within a few years.

Life Cycle

Populations of this species are completely female with only asexual reproduction. Newly hatched adelgids (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 commercial trade of hemlocks. Once crawlers settle on a feeding site, they become immobile-feeding nymphs and eventually develop into winged or wingless female adults (Figure 2). The winged adults search for the alternate plant host (*Picea torano*), which is not endemic to the U.S. The pest exhibits sexual reproduction on this species in ranges where both hosts are present. Wingless females that

Figure 1: Woolly accumulations indicative of HWA infestation



Figure 2: Crawler stage (brown), settled crawlers (black), and eggs (brown within cottony mass)



remain on the infested tree can each lay up to 300 eggs and start a new generation.

Damage

Damage to infested trees is characterized by discolored 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 significant mortality, especially in forest areas where pest management efforts are not economically or physically possible.

Management

Several therapeutic options are available and effective for controlling HWA. While these options are not always viable in a forest setting, control can be achieved in residential landscapes. Preventive treatment is rarely warranted but monitoring should occur on susceptible trees to detect infestations before populations accumulate.

Control of hemlock woolly adelgids can be achieved with the use of neonicotinoid insecticides. These have been proven to control the pest for multiple years with just one treatment. Some of these products have been banned at the U.S. state level. Due to the severity of decline caused by this pest, legislation in some states permits exceptions for the use of neonicotinoids to control HWA. Alternatives to control this pest continue to be investigated.

While naturally occurring predators suppress HWA in western North America, similar predators from the east are naïve to the pest or prefer native prey. Several beneficial species from the Pacific Northwest have been investigated and released in the eastern U.S., but control rates have proven insufficient in landscape settings. Production of these predators has largely stopped. Please contact your Bartlett Arborist Representative to learn about management strategies.



Founded in 1926, The Bartlett Tree Research Laboratories is the research wing of Bartlett Tree Experts. Scientists here develop guidelines for all of the Company's services. The Lab also houses a state-of-the-art plant diagnostic clinic and provides vital technical support to Bartlett arborists and field staff for the benefit of our clients.