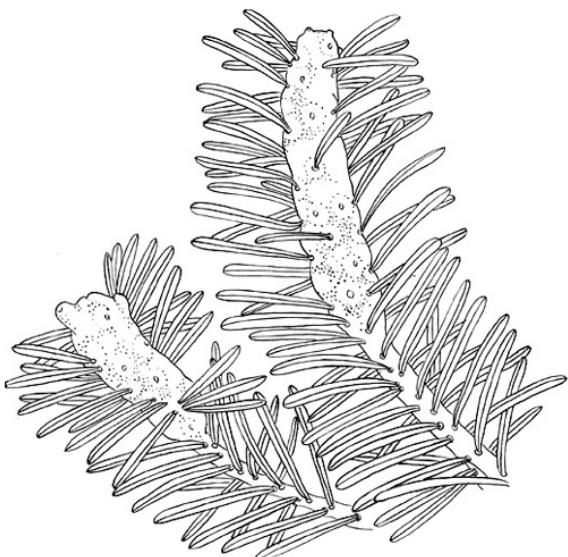


## Balsam Woolly Adelgid

*Scott Salom, Entomologist, Virginia Tech; Eric Day, Entomologist, Virginia Tech*

**DISTRIBUTION AND HOSTS:** Native to central Europe, the balsam woolly adelgid is now distributed throughout eastern and western North America. It attacks all true firs, *Abies* spp., including balsam and Fraser fir.

**DESCRIPTION OF DAMAGE** Introduced from Europe around 1900, the balsam woolly adelgid is considered a serious pest of forest, seed production, landscape, and Christmas trees. It generally concentrates either on the outer portions of tree crowns or on the main stem and large branches. Stem infestations are usually more serious, causing greater levels of damage and mortality. Abnormal drooping of the current shoots and gouting of the outer twigs characterize crown infestations. The crown becomes increasingly thin and dieback may occur. Persistent crown infestation can kill a tree over a number of years. Stem attacks are characterized by the conspicuous presence of white woolly masses that, under heavy attack, give the lower bole a whitewashed appearance. The wood responds to adelgid feeding in an "allergic" manner that causes swelling of the sapwood, and results in gouting of the twigs and increased heartwood formation in the sapwood, called "rotholz or redwood." This abnormal growth of sapwood tissue inhibits water flow within the tree.



Twig swelling and stunting made by the Balsam Woolly Adelgid. Line Drawing by Kathy Bourne

**IDENTIFICATION:** The life stages include the egg, three nymphal stages, and the adult. Adult females (there are no males) are wingless, oval, purplish-black insects, about 0.8 mm in length, and are covered with secretions of waxy threads that appear as dense white wool mass. A female is capable of

laying > 200 eggs in a cluster near her body. The first instar "crawlers," reddish-brown and about 4 mm in length are the only stage of the insect capable of moving and dispersing. Once the crawler finds a suitable feeding location, it inserts its tube-like mouthparts into the bark of the host and remains there for the rest of its life. The second and third instars are about 0.5 to 0.65 mm in length, respectively, and closely resemble the adult. Hemiptera: Adelgidae, *Adelges piceae* (Ratzeburg)



Balsam woolly adelgid on bark, Ladd Livingston, Idaho Department of Lands, Bugwood.org

**LIFE HISTORY:** The winter is passed as a dormant first instar nymph. Development is completed in the spring, with adult numbers peaking in late May or early June. The second generation peaks in mid August and produces the overwintering generation.

**CONTROL:** Christmas Trees: In Christmas tree plantations, if only a few trees are infested, removing or burning those trees should be sufficient for managing the pest. If only a few trees are infested, carefully wrap those trees in a tarp and remove them from the property. If the infestation is more wide spread, chemical treatment may be necessary.

Chemical control can be used effectively on ornamental, seed production, and Christmas trees. For chemical recommendations, please refer to the latest edition of the Pest Management Guide for horticultural and forest crops, Virginia Cooperative Extension Publication 456-017.

**Forest Situations:** In forest situations, silvicultural and management techniques can be used to reduce adelgid populations and damage. Tree stress may be minimized by thinning overstocked stands, by fertilizing sites of poor nutrient quality (although some nitrogenous fertilizers such as urea can increase the numbers of this pest), and by replanting or encouraging more tolerant tree species and varieties. A damage-hazard rating system based on site and stand characteristics associated with severe adelgid damage can be used to aid in management decisions (Page, 1975). The main variables used in the system are site elevation, soil moisture regime, percent balsam fir by basal area, total basal area of balsam fir, and stand age. In general, lower elevation, dry sites with >40 percent balsam fir, and >45 years old are most susceptible. Trees >25 and <45 years old are moderately susceptible, and trees <25 years old are least susceptible.



Gouting caused by Balsam woolly adelgid. Wayne Brewer, Auburn University, Bugwood.org

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