



A New Utah Forest Insect Pest: Balsam Woolly Adelgid

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Introduction

In 2017, the USDA Forest Service's Forest Health Protection (FHP) group in Ogden, Utah detected and confirmed the presence of a new invasive forest pest in Utah called the balsam woolly adelgid (BWA). First noticed in the mountains above Farmington Canyon and near Powder Mountain Resort, it has

This fact sheet introduces an invasive forest pest, the balsam woolly adelgid, and discusses its impacts on Utah forests, life cycle traits, identifying characteristics, control methods, and steps that Utah partners are taking to combat this pest.



Dieback and decline of subalpine fir due to attack by balsam woolly adelgid. Photo credit: Darren McAvoy.



Meeting of the Utah Balsam Woolly Adelgid Partnership members in Farmington Canyon, September 2017. Photo credit: Diane Alston.

now been confirmed in eight northern Utah counties (Box Elder, Cache, Davis, Morgan, Rich, Salt Lake, Summit, and Weber). So far, the damage is mostly north of Salt Lake City on high-elevation sites. BWA has not been detected in the valleys on ornamental firs. This tiny insect primarily attacks subalpine fir (*Abies lasiocarpa*), often called balsam trees in Utah, typically killing the tree within a few years. Subalpine firs are most easily identified by their narrow conical crowns, usually growing at elevations above 7,500 ft. in Utah. BWA also attacks white fir (*Abies concolor*), the only other fir native to Utah, but this species is more resistant to the insect. BWA is of particular concern because until now subalpine fir has been one of the few forest tree species that has resisted large scale insect infestations, such as bark beetles, that have killed millions of acres of trees across the West over the past 20 years. Now it looks likely that subalpine firs in the region may be facing a significant decline.

In 2015, forest health specialists first noted an increase in fir death in Utah. In 2017, the aerial detection surveyors, who regularly fly over the entire region mapping insect and disease outbreaks, noticed an increase in dead and dying subalpine fir trees. In June,

2017, forest health professionals visited Farmington Canyon on the ground and found branch node swelling (a node is where branch structures come together) and old deposits of woolly material on mature subalpine fir trees.

Suspected to have originated in the Caucasus Mountains between Europe and Asia, BWA was first detected in North America in Maine, in 1908, and in California about 20 years later. It was detected in Idaho near Coeur d'Alene in 1983 and has since spread across northern Idaho. It is believed that separate invasions of subspecies or races of BWA may differentially impact tree host species. Dieback of subalpine fir, pacific silver (*Abies amabilis*) and grand fir (*A. grandis*) in Idaho is widespread. In the western Payette National Forest, north of Boise, an estimated 70% of subalpine fir trees are dead and falling down.

Adding to the challenge of managing this insect is the low value of subalpine fir wood. Recovering treatment costs through the sale of saw logs is not an option. Moving subalpine fir firewood from the mountains down to town will likely result in the pest killing trees in urban areas; limiting the movement of infested firewood is key to prevention. Widespread native fir mortality has been observed and in many cases there are few other species of trees to occupy the growing site. This increases the potential for this insect to inflict ecological damage (e.g., erosion, decline in watershed health, loss of wildlife).



Adult female of *Adelges piceae* (balsam woolly adelgid) showing its ventral face and the long stylet that is normally inserted within the tree tissues. Photo credit: Gilles San Martin.

Identification & Life Cycle

Tree injury from BWA is most visible in the fall. Affected trees appear to be drought stressed, with a key

difference being that the crown starts thinning/browning from the inside out, instead of the outside in. Upon close inspection, impacted branches reveal a swelling and twisting deformity known as gouting. Although BWA prefers vigorously growing mature fir trees, it will attack trees of all sizes and ages. Most bark beetles and similar insects tend to favor larger, older trees. When BWA attacks smaller trees they take on a bonsai appearance; branch twisting and swelling is common in these smaller trees.

BWA is very difficult to see (0.5-1 mm long), the insects are covered in a white, woolly material on the bark of infested trees. This insect attacks branches and the main stem of the tree. Once a tree of any age starts to fade, it can take from 2-10 years to die. This is because two types of BWA infestations exist: 1) crown infestations, which take many years to kill a tree or 2) bole infestations, which kill trees in 2-3 years.

BWA nymphs, like scale insects called crawlers, are mobile typically from late June to late October. Once crawlers land on a branch or stem, they will remain in that spot for the remainder of their life as they mature into adults. Crawlers can be blown by wind or spread on the feet of birds, but their primary movement is by

walking. In North America BWA reproduces asexually, and only females are present.

Treatment

Effective BWA treatment should consider site objectives and current vegetation management plans. BWA on high-value trees such as near cabins, campgrounds, and ski areas, can be managed with insecticides, and in some cases, targeted tree removal. Additionally, many areas infested with BWA (e.g. Cottonwood Canyons) have limited chemical options due to water restrictions, complicating methods for control. If the infestation is not widespread when first detected, trees with live, active infestations should be removed. However, to avoid spreading BWA, infested trees should not be removed while BWA is in the mobile, crawler stage. If cutting must occur while BWA is mobile, or if tree removal is not possible, burn or chip infested trees onsite to prevent spread of BWA. Another option is to fell infested trees, apply insecticides, wait a year, then harvest for firewood. This is a way to create a valuable product and allows for the safe transportation of previously infested trees. Heavily infested trees are unlikely to recover despite treatment. Careful planning is needed when considering how, where, and when to conduct treatments. For areas



Wool-covered adelgid bodies are visible on the collar of a subalpine fir tree. Photo credit: Darren McAvoy.



"Gouting" of branches, the swelling and deformity caused by balsam woolly adelgid feeding. Photo credit: Darren McAvoy.

where insecticides can be used, there are many labeled for BWA control; however, it is not possible to maintain long-term insecticide treatments over large areas. The following chemical treatments may be applied by soil injection, soil drench, foliar, and/or trunk application at any time of year: Asana* (esfenvalerate), Astro (permethrin), Sniper^ (bifenthrin), Talstar (bifenthrin), and Safari (dinotefuran; applied as a foliar and trunk application).

Insecticidal soap should only be used from late fall to early spring, a time of year when no eggs are present. Horticultural oil should be used during September,

Chemical classes should be rotated annually to reduce insecticide resistance of BWA. This is especially important because BWA reproduce asexually and could potentially pass on insecticide resistant genes to offspring.

October, or November because it may burn foliage if trees are not dormant. Thorough coverage of the trunk and limbs is critical to penetrate the adelgid's waxy covering. Good coverage is more important than the choice of insecticide. A high pressure sprayer that delivers several hundred gallons of spray per acre is essential. More information is available in the Utah Pests Fact Sheet on Balsam Woolly Adelgid, ENT-191-18, at <https://goo.gl/pwxDpK>.

Integrated pest management (IPM) strategy is the most effective approach for BWA control. This may include targeting insecticide application to cover a certain portion of cone/seed producing, host trees that display resistance to BWA so those trees reproduce. Also couple

insecticide application with the establishment of site-appropriate, young, non-host tree species. Employing holistic practices can improve the likelihood of restoration and in some cases, resistance to BWA.



Utah's Response

A Utah partnership has been formed to survey, research, and implement education and management efforts for BWA. Led by the Utah Department of Agriculture, members represent a wide variety of concerned organizations including USDA Forest Service, USU Extension, the Utah Division of Forestry, Fire and State Lands, USDA Animal and Plant Health Inspection Service, and ski resort representatives. This group is coordinating efforts to secure grant funding to study BWA's spread and impact in Utah, and to develop public educational materials.

*Restricted use, only authorized for use in Christmas tree plantings, conifer plantations, conifer seed orchards, and forest tree nurseries.

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