

A Walk in the Woods - Looking for the Balsam Fir

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The balsam fir - which I sometimes hear referred to as simply “Christmas trees”, even when in a mature forest- is one of our most common trees. And it is probably the tree that is most recognized by its scent. The smell of balsam fir is widely recognized due to its association with Christmas, especially a New England Christmas, in the form of Christmas trees and wreaths. When people think of smells associated with the holiday, the scent of balsam fir is probably one of the first to come to mind. It is also a scent strongly associated with the North Woods, due to the tree’s abundance.

As I write this, I’m thinking August is a strange time to be writing about things associated with Christmas and the holiday season. But what inspired me to write about the balsam fir this month is the numerous dead and dying fir I’ve been seeing on my visits to woodlots and travels throughout the region.

Pests and Diseases

On a recent woodlot visit I was looking at a number of mature balsam fir that were infested with balsam wooly adelgid (BWA), a tiny sapsucking insect that exudes a white, wooly looking substance. The BWA has a long thin mouthpart that pierces the bark and sucks out the sap. This non-native insect has been in New England for at least 80 years, and while it is prevalent in our forests, it has been kept in check by cold temperatures. This year, however, we have seen a large increase in the BWA population due to the mild winter. Heavy infestations of the insect can kill a tree within three years, and even when the tree survives, it develops a hard, brittle, “redwood” that affects the lumber quality. In addition, insect feeding affects the flow of sap in the trees, making them more susceptible to drought. So the mild winter and dry summer have created the perfect recipe for a large infestation and increased mortality this year.



In a forest setting, there are a couple of practical methods that reduce risk of loss to BWA. One is cold weather, which will hopefully resume this coming winter and knock back the BWA population. Unfortunately we don’t have control over the weather, but we do have control over how we manage the forest. So the most effective way to reduce risk is to manage the forest for species and age class diversity. A forest that has a greater variety of species and a range of age classes from seedling to sawtimber size trees will be less susceptible to BWA infestation than forests with a high percentage of fir of similar age. This is true of any forest- the greater the diversity of age classes and species, the more resilient it is to any one insect, disease, or other damaging agent.

Another problem in fir we are seeing this summer is needle cast, which turns needles brown. This is a fungus that thrives and spreads during wet summers, then the following summer symptoms begin to appear. These include the browning of needles and the dieback of branches, usually starting at the bottom of the tree and proceeding upwards. So even though this is a dry summer, it is last year’s wet summer that created the conditions for the current infestation. A year or two of infestation won’t kill the tree, but chronic infestations may eventually lead to the tree’s demise. There aren’t any practical controls for the needle cast in a forest setting. Again, diversity of species and size classes is key to reducing risk of loss.

Yet another insect that attacks fir, and a major one at that, is the spruce budworm. This is a native moth that, despite its name, prefers the balsam fir. It is the larval stage of the moth that feeds on the foliage of mainly fir trees, but also spruce. Populations of this insect experience periodic outbreaks, which can cause widespread mortality in mature stands. The population seems to reach epidemic levels every few decades. The last heavy outbreak in northern New England was in the late 1970s and early 1980s, and today there are large populations in Quebec and New Brunswick. Forests with high percentages of mature fir are more susceptible than those with more species and age class diversity.

In addition to insects, the balsam fir is susceptible to red heart rot and butt rot - fungal infections that affect the interior of the trunk and destroy the lumber value. They also weaken the tree and make them more susceptible to wind damage. Balsam fir is also shallow rooted, which also increases risk of wind throw.

A Prolific Tree

With its vulnerability to numerous insects, diseases, and wind damage, how does balsam fir stand a chance of survival, let alone be one of our more abundant trees? The answer is that it grows in a wide variety of soils and site conditions, and is a prolific seed producer. The balsam fir likes a cool climate with abundant rainfall and can grow on acidic soils that range from poorly drained to very well drained. It produces a good seed crop every 2 to 4 years, with some seed production every year. Seed fall begins in late August and can continue into November and through the winter. Seed can disperse long distances over snowpack. During an abundant seed year, one cone can produce more than 130 seeds, and there may be 5 to 18 pounds of seed per acre. Enough seed is produced so some of it escapes the depredations of feeding mice, voles, and birds. Seed can germinate in the shade quite well, and the seedlings and saplings will develop slowly in the understory until the removal of nearby trees gives them a chance to flourish. Research has shown some "sapling" size trees are actually 40-50 years old and older, and they grow quite well after release from competition.

Important for Wildlife

The balsam fir is an important tree for wildlife. The seeds provide food for mice, voles, squirrels, and birds. Birds excavate cavities in the trunks, and feed on the tips. Dense stands of fir saplings provide critical habitat for snowshoe hares to feed and hide from predators, among which are most of the predators of the northern forest, including lynx and bobcat. Mature balsam fir, in conjunction with spruce, hemlock, cedar, and pine, are an important part of deer wintering areas. The dense evergreen foliage in closed canopy stands retains snow, resulting in less snow on the ground underneath, and less exposure to the wind.

Uses

The balsam fir has many uses. Christmas trees are grown all over New Hampshire and sold far beyond its borders every holiday season. The boughs, called balsam brush in many areas and fir tips in Maine, are used to make wreaths, a multimillion dollar industry. When I worked on state lands in eastern Maine, I would start getting calls in October for "tipping permits". The gathering of balsam fir tips and the making of wreaths is an essential part of the economy in that area. Gathering fir brush and making wreaths are important activities in many rural parts of New Hampshire and Vermont as well.

In addition to the boughs of the tree, there are uses for the needles, the pitch, and of course the lumber. The needles are collected, dried and used to stuff pillows and sachets, which people buy to have something to remind them of the North Woods or the holiday season. The pitch found in the abundant bark blisters, or pitch pockets, on the surface of the trunk can be used as a salve on cuts and abrasions and was used by Native Americans for many more medicinal purposes. The balsam fir gets its name from the oleoresin found in the bark blisters. Oleoresins, according to Wikipedia, are “semi-solid extracts composed of a resin in solution in an essential and/or fatty oil”. Naturally occurring oleoresins are called *balsams*. The balsam derived from balsam fir is also known as Canada balsam. One interesting use of Canada balsam is as a medium for mounting microscopic specimens and as a cement for optical systems, because of its near invisibility after drying.

A Symbol of the North Woods

The balsam fir is an important tree of our northern forest, not only from an economic and ecological standpoint, but a symbolic one as well. The sight of dark green, pointed fir crowns, and the scent of balsam filling the air, is a quintessential scene of the North Woods. In spite of the many insects, diseases, and fungi that threaten individual trees, the balsam fir remains abundant in our forests and hopefully will continue to play a valuable role into the foreseeable future.

Reference – Balsam Fir, by Robert M. Frank, in USDA Forest Service publication Silvics of North America, Volume 1. Conifers