

 UI Extension Forestry Information Series

## White Pine Blister Rust: Pruning Can Increase Survival

*Chris Schnepf*

The beauty and value of western white pine inspired legislators to name it Idaho's state tree. White pine grows in other states, but is strongly identified with Idaho because historically it was so omnipresent here. Even outside the state, the tree is still often referred to as "Idaho white pine". White pine is much less present in Idaho's forests now than it once was, largely because of a disease called white pine blister rust.

**Blister Rust.** White pine blister rust was introduced to the United States from Europe in the early 1900's. The disease had a devastating effect on western white pine trees, since they had not evolved together with the disease. Blister rust also attacks other five needle pines such as whitebark pine, eastern white pine and sugar pine.

Blister rust will not spread from tree to tree. It requires a shrub in the genus *Ribes* (gooseberries and currants) as an alternate host to complete its life cycle. The disease goes from *Ribes* to white pine to *Ribes* and so on. Rust infects white pine through the needles. The fungus then spreads down the branch to the main stem of the tree, where it eventually kills the tree above that point.

**Combating Blister Rust.** From 1924-1966, blister rust control efforts concentrated on attempting to eradicate *Ribes* plants in the woods. The thinking was that if you removed *Ribes*, the rust would lose its alternate host and stop spreading. Ultimately, this method was not very effective. *Ribes* was difficult to eradicate, and few plants were needed to maintain the disease cycle.

Breeding rust resistance into tree seedlings, as was done with agronomic crops such as wheat, has been more effective. In the 1930's foresters began noticing

white pine trees in the woods that were resisting the rust. Starting in 1949, material was collected from these trees to start a white pine breeding effort. That program now produces trees that are at least 60% resistant to blister rust on most sites, using a variety of defense mechanisms. Planting these seedlings in conditions where they will thrive is a useful tool to restore Idaho's state tree to northern Idaho ecosystems.

**Naturally Seeded White Pine.** But what if you have lots of white pine establishing naturally? These trees have not been through an intensive genetics program, and will be more vulnerable to blister rust. Do not necessarily write them off. The branches closest to the ground are the highest risk for rust infection, because environmental conditions for rust infection are more favorable there. If the green branches are at least 8 feet off the ground, the tree has a lower risk of mortality from blister rust.

If a white pine has green branches lower than 8 feet, pruning those branches removes them as a source of infection. In plots studied by the US Forest Service throughout northern Idaho, pruning naturally regenerated white pine 8-10 feet up from the ground decreased blister rust mortality by nearly 50% over 20 years, compared to control plots.

### **Tips on Pruning White Pine for Blister Rust.**

*How many trees to prune?* Before pruning, you may want to sample for "prunable" trees. If a large percentage of trees have "lethal" cankers (bole cankers or branch cankers with margins < 6 inches from the bole) pruning may not be worthwhile, especially if you are

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paying someone to do it. Consider your objectives for the site. With normal forest pruning, you would probably prune 100-150 trees per acre on the first pruning. But if you are concerned about root disease (white pine is more resistant than Douglas-fir and grand fir) or for other reasons want to maximize white pine, you may want to prune every prunable tree, especially if you have few to begin with, since you are going to lose some trees to rust even with pruning.

*How soon to start pruning?* With normal forest pruning, you usually wait until trees are at least 17 feet tall, to increase the likelihood of pruning future crop trees. However, when pruning white pine primarily for blister rust, start pruning early, when the trees are 6-10 feet high. The sooner the lower branches are pruned, the better chance trees have of escaping blister rust. If you have more white pine than you need, you may want to wait, to let the rust “select out” the most vulnerable trees before pruning. Prune no higher than 50% of a tree’s height, to maintain a healthy crown (e.g. on a 6 foot tree you would only prune up 3 feet). You can prune up higher as the tree grows taller.

*Thinning and pruning.* Pruning is an intensive forest management practice. If you prune you should also consider thinning. Thinning in conjunction with pruning is beneficial because the increased growth helps pruning cuts seal sooner and grow more clean wood. However, thinning without pruning may increase blister rust potential because more understory light may increase Ribes and reduces self-pruning of lower branches. Normally, you would thin a year or two prior to pruning, to give trees time to use the increased light, moisture and nutrients to develop faster growth and seal pruning cuts faster. However, when thinning in conjunction with blister rust pruning, you may want to prune first. Pruning requires a closer inspection of individual trees for cankers than thinning. When thinning it may be easier to accidentally cut prunable trees and leave cankered trees.

*Check closely for lethal cankers before pruning.* Generally, if a tree already has lethal cankers it is considered unprunable – the rust is well on its way to killing the tree. Make sure you correctly identify cankers. A number of books have color photos of

blister rust cankers (see references below). Moistening cankers with a water bottle may help you see the margin of the canker more clearly.

*Pruning methods?* Most forest pathologists recommend leaving a branch collar when pruning, to leave a smaller wound, promote quicker healing, and minimize decay. Others believe that conifers seal pruning wounds with pitch and leaving a collar unnecessarily delays the formation of clear wood over the cut (“occlusion”). When pruning white pine branches for blister rust, you may want to be conservative and leave a branch collar. Generally you will be pruning branches when the bole is small enough to stay well within the 4-6 inch DOS (“diameter outside stubs”) desired for clear wood production. If you are using a saw to prune 1.5 inch diameter and larger branches, consider using a small undercut to prevent thin white pine bark from stripping. Although rust cankers are more obvious in the spring, avoid pruning then, as bark slips more easily (unless you are using a shears or loppers rather than a saw). Painting pruning cuts is not recommended. Paint can trap moisture – providing a more favorable environment for decay.

*Prune needles attached to bole.* Consider wiping needles attached directly to bole, as they provide blister rust with direct access to the bole. White pine can be very pitchy, so use gloves for this.

*Check for basal branches.* White pine commonly has small branches laying close to the ground or hiding in the duff then resurfacing a foot or more from the tree with green needles. These are easy to miss if you don’t “root around” a little at the base of the tree for them.

*Clear logs?* The most blister rust reduction comes from pruning up the first 8-10 feet. Pruning higher provides less rust reduction per branch cut. However, you should consider pruning up to 18-19 feet (16.5 feet for the log plus some allowance for stump height – perhaps even more if you want to consider metric log lengths) to get the added advantage of a large, clear, valuable white pine log at harvest time. Prune fewer trees (50-100 trees/acre). If conditions permit, pruning

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in the winter while standing on a snow pack may make this task easier.

### *Pruning tools.*

- *Shears/loppers.* For the first six feet, hand shears are often adequate for branches averaging <math><1/2</math> inch in diameter. Some hand shears have a “ratchet” mechanism that allows larger cuts. For larger diameter branches, loppers are useful. “New Zealand” style loppers (cattle polling shears modified for forest pruning) can cut larger diameter branches than conventional loppers. On both hand shears and loppers, “bypass” blades tend to make a cleaner cut than “anvil” style blades.
- *Saws.* Saws are also useful and come in many forms. Saws with chainsaw style teeth are easier to sharpen than the triangular tooth style, but the newer aggressively serrated teeth may cut a little faster. Saw blades may be mounted on simple handles, folding handles, or ax handles.
- *Pole saws.* For pruning to log lengths, pole pruning saws are effective. Be sure to check for the weights and “springiness” of the pole (less is better on each). For “Tim the Tool-Man Taylor” fans, there are mechanized pole pruners with a small chain saw on the end of a pole, but they are more expensive, may be heavy, and can take more time in repair and maintenance. They are also easier to damage the tree with.
- *Sources.* Hardware and garden stores stock many of these tools. For pruning tools specialized to forest pruning, check forestry supply catalogs. These should be available through your local chainsaw shops.

Western white pine is a valuable species on many levels. Pruning can significantly improve white pine survival, so much that some foresters are even considering pruning blister rust resistant stock. Pruning can also be a satisfying activity – no noise from chainsaws, an immediate concrete improvement in your forest, and you can do as much or as little as you want at your own pace. It is also a relatively safe practice, so it is easy to involve the whole family in the activity or provide work opportunities for young neighbors. For

more information on the topics discussed here, please see the references listed here. Some of these should be available through your local Extension office.

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