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Planting White Pine: Risks and Rewards for Private Landowners

Ron Mahoney

Most private forest owners have had at least some exposure to the story of the dominance, decline, and potential restoration of western white pine in Idaho forests. The story is well-told in a recent publication *WHITE PINE in the American West: A Vanishing Species – Can We Save it?* by UI Professor Dr. Leon Neuenschwander and several UI and Forest Service colleagues (Rocky Mountain Research Station GTR-35). Copies of the publication are available through the station's publication site at http://www.fs.fed.us/rm or by calling 970-498-1392. Additional background on the devastating effects of white pine blister rust and the genetic program to enable its comeback has been provided in several presentations by Dr. Lauren Fins, UI Professor and Executive Director of the Inland Empire Tree Improvement Cooperative. Her message, entitled *White Pine—The Return of the Giant* is available from the UI Extension Forestry office at (208) 885-6356.

Can you have confidence in rust-resistant stock? Many private forest owners want to plant white pine, and encourage its natural regeneration where a viable seed source remains, but they are hesitant for several reasons. Most are aware that a breeding program has developed blister-rust resistant seed, but a lot of fact and fiction circulates about rust-resistant seedling performance. In general, the goal of about 60% resistance (60% of seedlings are rust free, the remainder have varying degrees of infection) has been met. A few sites with seedlings of known origin from resistant seed have had greater percentages of infection. This has led to speculation that the rust is mutating and the breeding program will fail. Scientific evidence shows that the rust has not changed. Furthermore, it is unlikely to at the level of resistance targeted by this program. Agricultural breeding for immunity has shown us that the immunity approach (100% resistance) leads to selection and success of mutants that can overcome the breeding program.

Blister rust cankers that do form on resistant trees are usually develop much slower, and the tree often matures before the rust kills the tree or impacts log quality. This is where early pruning can be of real benefit (for details, please read the article referenced above). Pruning can also greatly reduce mortality for naturally regenerated trees, where natural selection has achieved a level of 10 to 20 percent resistance since the rust was introduced in Idaho about 80 years ago.

Why should you plant white pine? Fire suppression is only one factor in the historically unprecedented predominance of shade tolerant conifers in northern Rocky Mountain forests. The other factor is the decline of the ability of white pine to reproduce. Many large white pines were over-zealously logged on the assumption that rust would get them anyway. The likelihood of mortality of those big, tall trees was much lower because they had self-pruned already and had their green branches above the general zone of infection. We not only lost the big trees, we lost most of the younger ones too. Firs, cedar, and hemlock soon overtopped the few seedlings that survived because white pine was suppressed by rust. Eventually, only scattered trees remained that either escaped due to isolation or had some degree of natural resistance. In addition to losing a predominant species of the natural flora, and all the ensuing effects on ecosystem characteristics and processes, white pine stands typically had twice the timber productivity as the fir-dominated

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stands that replaced them. Many of the pre-blister rust stands of 100 year-old white pine averaged 50 thousand board feet/acre (MBF/ac) whereas the best fir stands today are projected to average only 25 MBF/ac.

Additionally, white pine resists root rots and other forest health problems that are plaguing fir stands. With a price premium of 25%-100% in addition to increased productivity, there are compelling economical and ecological reasons to plant resistant white pine and favor it over other species.

Where should you plant? For conservation of the gene pool and to maintain healthy white pine specimens, some researchers recommend that you plant in locations free of the alternate host of the rust, species of the genus *Ribes*, commonly called currants or gooseberries. Blister rust cannot directly transfer from one white pine to another but must cycle through an infection stage on *Ribes*. Those locations, however, are generally not suited to timber production. Rather, they are in parks or yards where *Ribes* plants are less likely (watch for cultivated specimens though!) and the trees can be watered where natural precipitation is insufficient.

Some cultivated lands, particularly those in the Conservation Reserve Program (CRP), may also provide a *Ribes*-free environment, but many of these lands lack sufficient moisture, and are too exposed, for white pine to survive and grow well enough for timber production. Where CRP lands are suitable for white pine (they are likely located in the eastern fringe of the Palouse) adjacent timber stands are likely to contain *Ribes* plants (the rust can easily travel ¼ mile). Timber adjacent to farm fields is also prime habitat for deer and elk, which regularly predate on white pine seedlings and cause a high percentage of mortality and deformation.

It is a sad fact that the best sites for white pine are also the best for species of *Ribes*. Timber production is further complicated by the fact that the best cultural techniques for white pine—full sunlight, little wildlife browsing, plenty of available soil moisture, and well-spaced trees—are also the best cultural situation for *Ribes*. Currently, scientists are experimenting with a compromise situation—little site preparation and moderate shade provided by a light shelterwood (20-30 residual trees/acre) or smaller (1/4 acre) forest openings. Survival is better because of reduced wildlife browsing and reduced *Ribes* populations, but growth can be dramatically reduced if the overstory is not removed after about 3 years. While these results are preliminary, and ongoing research is yet to confirm them, they indicate that on good, forested sites (indicated by the presence of cedar, hemlock, or the wetter-site associated vegetation of grand fir), minimal site preparation (generally just clearing on each planting spot) is best. Underplanting shelterwoods or group-selection harvests gives the best chance for initial survival where wildlife browsing and *Ribes* increase are likely. Overstory removal in shelterwoods or expansion of openings for group-selection sites will be necessary after about 3 years, and pruning will greatly lessen the incidence and severity of rust infections.

What planting stock should you use and where can you get it? Nearly all conifer planting stock used in the intermountain west is now containerized or "plug" stock. There are various sizes and, generally, larger stock performs better but is initially more costly to buy and plant. The subject is covered well in *Choosing Nursery Stock for Landscaping, Conservation, and Reforestation* (UI College of Agriculture Extension CIS 923) and in the UI Forest Research Nursery Publication *A Guide to Seedling Selection* produced annually and available through all UI Extension offices.

White pine seedlings in the smaller, less expensive 7 cubic inch plug size perform well on good sites where competing vegetation is controlled and there is little to no animal damage problem. Research has shown that the extra large "super-cells" with a 20 cubic inch plug perform the best in all situations, and may be worth the much higher cost on sites where animal damage is likely. There are many devices, including tree shelters and repellants, that are designed to reduce or eliminate wildlife browsing. While most work to some degree, they are expensive, require a lot of maintenance or repeated application, and have highly variable perfor-

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mance. My personal experience is that the availability of alternative forage has little effect on the amount and severity of wildlife browsing on both conifers and deciduous hardwoods. Deer, elk and rodents, and increasingly moose, just like to eat trees, and they will gladly eat the alternatives you provide as well!

In past years, availability of rust-resistant white pine seed was limited, but it is now abundant. Northwest Management, a Moscow-based forestry consulting firm, holds the contract to distribute the seed produced by the blister rust resistance project. At $400/lb it seems expensive, but with 27,000 seeds/lb and better than 70% average germination, the cost is minimal per seedling produced. Several regional nurseries produce seedlings on contract, for large landowners. At least two RC&D's (Resource Conservation and Development Districts) are buying seed, having it produced into seedlings, and then making them available for private landowners. Currently, the only seedlings available in smaller lots (25-5,000 seedlings) of the resistant white pine seedlings are from the UI Research Nursery. If you are contemplating planting white pine next year or beyond, get your planning and site preparation done ahead of time, and order seedlings early.

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About the Author: *Dr. Ron Mahoney* is an Extension Forester and Professor at the University of Idaho.