



Pinus monticola

Western White Pine

In Washington, western white pine (*Pinus monticola*) is found throughout the Cascade Range, the Olympic Mountains, in the Okanogan Highlands, and in a small area of the Blue Mountains in the southeastern corner of the state (Fowells 1965). This species occupies an area with short growing seasons where the majority of the precipitation occurs during the winter. In the Cascades, western white pine grows primarily on the western slopes and only extends eastward a short distance across the crest. Its elevation spread is not large; it is generally found between the Douglas-fir and Pacific silver fir zones (Bingham et al., 1972). In the Olympic Mountains it occurs from sea level to 1800 feet (Fowells 1965). White pine is usually associated with several different tree species growing together in a mixture.

Blister rust, an introduced pathogen, is a serious disease of western white pine. Resistance to this disease is highly heritable with large differences among trees within stands. A number of programs have existed since the 1950s to take advantage of this variation and develop white pine resistant to this disease. One program is operated by the USDA Forest Service and the Inland Empire Tree Improvement Cooperative from Moscow, Idaho. Seedlings from this program that are suitable for parts of northeastern Washington can be obtained from a nursery operated by the University of Idaho. When planning white pine plantings, you should evaluate the risk of this disease in your area and the availability of resistant seed.

There is little genetic variation among sources of western white pine; however, there is large genetic variation within local stands (Rehfeldt 1979, Steinhoff 1979, Steinhoff *et al.* 1983, and Campbell and Sugano 1989). Local elevation did not influence genetic variation. Populations from northern Idaho and the Olympic Peninsula show similar growth and survival when grown in northern Idaho (Steinhoff 1981). Western white pine populations from northern Idaho (Rehfeldt 1979), coastal Washington, and western British Columbia (Steinhoff 1981) show little or no difference in growth or phenology when grown in Idaho. Variation based upon isozyme patterns separates the entire western white pine range into two populations, a broad northern population and a more restricted southern one; separated near the Oregon-California border (Steinhoff *et al.* 1983). Rehfeldt *et al.* (1984) further subdivided the northern population in the central Oregon Cascade at 44° north latitude. Their research indicated that populations west of the Cascades suffered the most frost injury and thus may not be well adapted to Rocky Mountain sites. Throughout all areas they found that genetic variation was not related to elevation of the seed source.

Recommendations for British Columbia, based on 13-year-old provenance plantations, are that California and Oregon sources are not suitable because of poor height growth. Washington and Idaho sources are suitable for coastal sites but not for northern-interior sites. For the northern-interior region use local sources (Meagher and Hunt, 1998).

These reported variation patterns indicate that seed movement should not be restricted very much. Western white pine seed zones should be large compared to those for Douglas-fir. Western white pine seed zones were adopted by the U.S. Forest Service in 1988 for both Washington and Oregon based on these genetic publications and on recommendations from Robert Campbell of the Pacific Northwest Forest and Range Experiment Station, Corvallis, Oregon (Campbell and Sugano 1989, and U.S. Forest Service Region Six, April 20, 1988, documentation on file at Regional Office Portland, Oregon). Seed zones and the numbering system cover both states.

New recommendations for seed transfer zone boundaries

These seed transfer rules apply only to sites where white pine occurs or occurred naturally.

TWIN HARBORS (Zone 1): Includes the Olympic Peninsula and nearby areas to the south. Consists of old seed zones 011, 012, 030, 221, 222, and 241.

PUGET SOUND (Zone 2): Includes coastal areas near the Puget Sound. Consists of old seed zones 201, 202, 211, 212, 231, and 232.

SNOQUALMIE (Zone 3): Includes portions of the Puget Trough and the west slope of the Cascades in the northern part of the state. Consists of old seed zones 401, 402, 403, 411, 412, 421, and that portion of seed zone 422 in Pierce County.

LOWER COLUMBIA (Zone 4): Includes portions of the Puget Trough and the west and east slope of the Cascades in the southern part of the state. Consists of the portion of old seed zone 422 in Lewis County, and those portions of the old seed zones 042, 242, 430, 440, 651, 652, and 653 that are within the natural range of western white pine.

CHELAN (Zone 5): The east slope of the Cascades in all but the southern part of the state. Consists of the portions of old seed zones 600, 621, 622, 631, and 641 that are within the natural range of western white pine.

UPPER COLUMBIA (Zone 6): Includes the natural distribution of western white pine in the Okanogan Highlands in the northeast corner of the state. Consists of old seed zones 614, 801, 802, 811, 812, 813, 821, 822, and 830. Seed for this area can also be obtained from nearby parts of Idaho, particularly if it is disease resistant.

GRANDE RONDE (Zone 7): Includes the natural distribution of western white pine in the Blue Mountains in the southeast corner of the state. Consists of old seed zones 851 and 861. Seed for this area can also be obtained from nearby parts of Oregon.

Elevation bands within geographic seed transfer zones

There are no elevation restrictions on seed transfer. Transfers are permitted for all elevations within a zone.