Forest Service

United States
Department of
Agriculture

FS–258

Western White Pine

An American Wood

Western white pine has been called "the king of pines," because of its impressive diameter, height, and form. Blister rust and mountain pine beetle will probably prevent white pine from attaining its historically impressive dimensions in the future. Its light-colored wood has an average specific gravity of 0.36, and it is straight grained, easy to glue and work with tools, and fairly stable. Western white pine has been a preferred species for pattern stock and, at one time, was the most popular wood for kitchen matches. Today it is used for millwork, plywood, and pulp manufacture.

Western White Pine
(Pinus monticola Dougl. ex D. Don)

David P. Lowery[1]

Distribution

Western white pine grows on western mountain ranges from southern British Columbia and southwestern Alberta to northern Idaho, northwestern Montana, and eastern Oregon to the southern end of the Sierra Nevada Mountains in California, from about latitude 53° N. to about latitude 36° N. (fig. 1). The species attains its greatest size in northern Idaho and adjacent sections of Montana, Washington, and British Columbia.

The species grows on a great variety of soils, but growth is best on deep, well-drained, medium- to fine-textured soils with high water-holding capacity. In the most northerly part of its range, white pine grows from sea level to about 2,500 feet. On Vancouver Island, it grows at elevations as high as 5,000 feet, and, in California, it is found at 10,000 feet. The best growth, in Idaho and adjacent areas, is obtained at elevations between 2,000 and 6,000 feet in steep and broken topography in the northern sector and on more gently rolling country in the south. White pine grows in mixture with practically all the western conifers, and, in white pine timber types, it makes up about half the stand by volume.

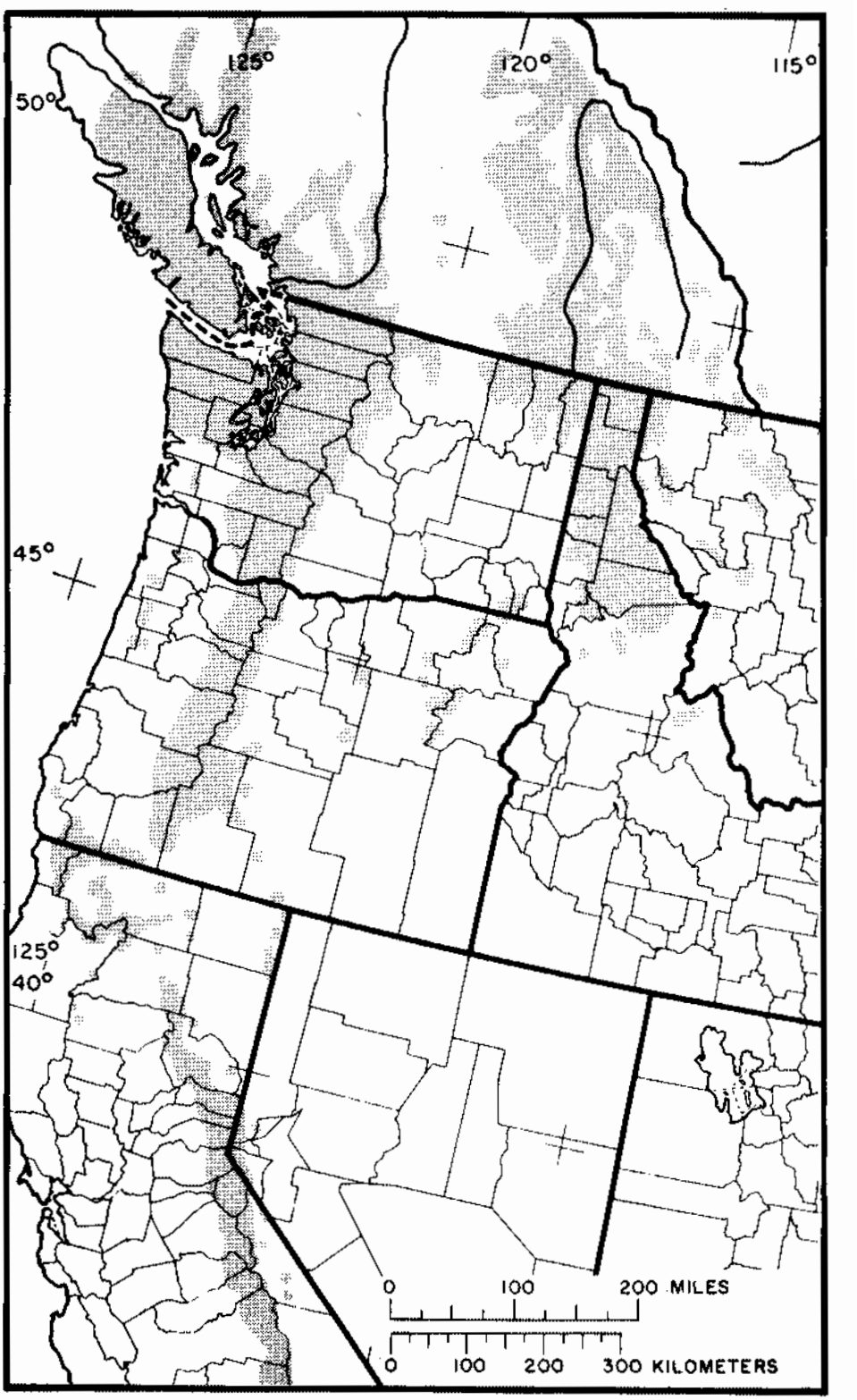

Figure 1–Natural range of western white pine. F–532731

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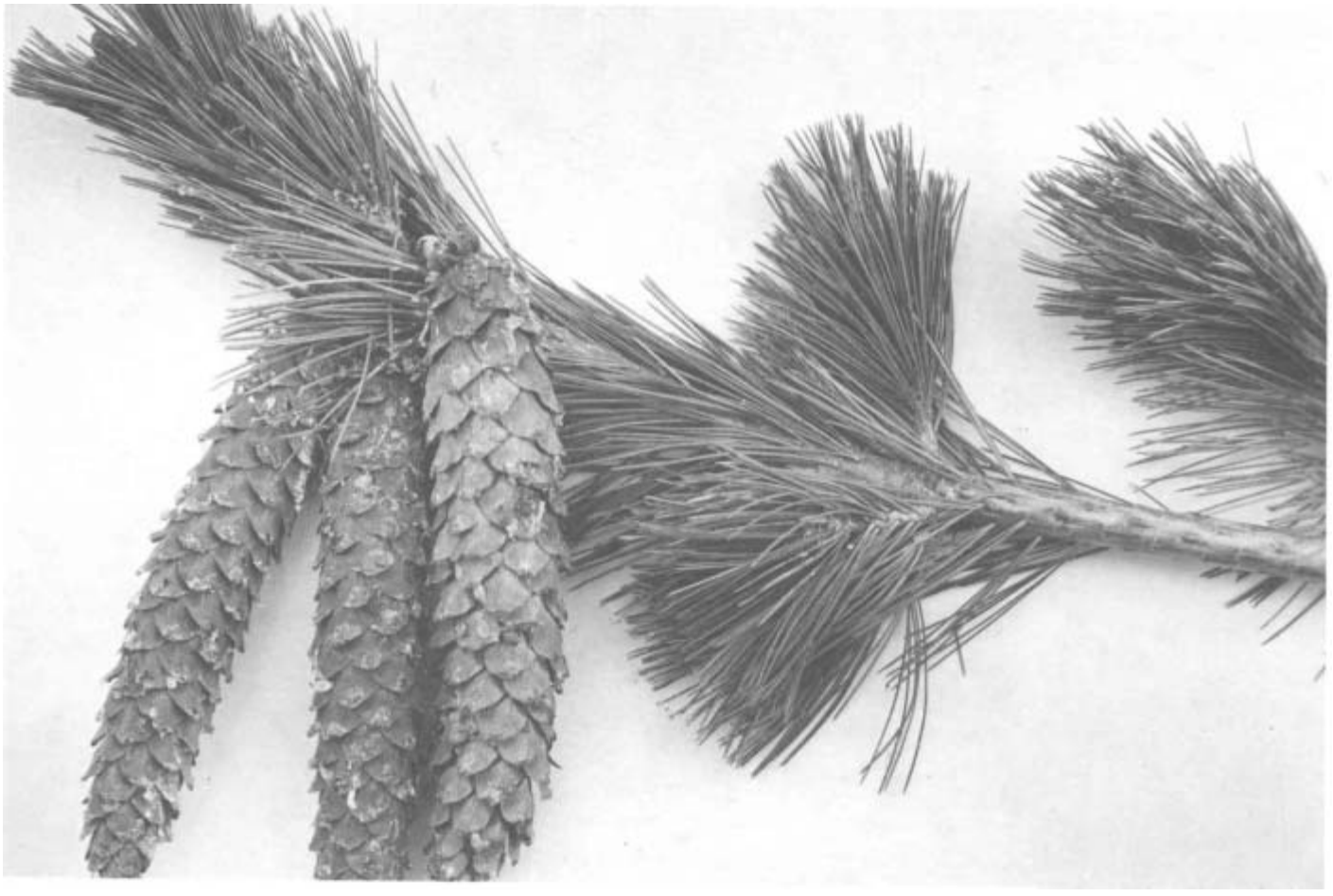

Figure 2–Needles and cones of western white pine.

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Description and Growth

Mature western white pines are among the most impressive trees in the forest. Reaching heights of 150 to 180 feet and diameters of 30 to 42 inches at maturity, the trees have slightly tapering stems that are often free of branches for 70 to 100 feet. The crowns are generally symmetrical and somewhat open. Normally, the species is long lived, frequently reaching ages of 300 to 400 years; occasionally trees live as long as 500 years. Diseases and insects will probably prevent white pines from attaining these ages in the future.

The needles of western white pine are blue green, 2 to 4 inches long, and grow in clusters of five. The needle color is a distinctive characteristic. The cones are about 8 inches long, narrowly cylindrical, often curved, stalked, and distinctively pendant from the limbs (fig. 2). The bark on young trees is thin, smooth, and gray green turning dark gray to purplish gray on older trees. On mature trees the bark breaks up into nearly square blocks, separated by deep fissures (fig. 3).

The root system of western white pine is generally fully developed with both taproot and lateral roots. This characteristic enables the species to resist strong winds.

On most growing sites, some seed is produced every year. Cone production may begin in 10-year-old trees and increase thereafter, until by age 40, production is fairly abundant. Good cone crops occur every third or fourth year. The seeds ripen from about mid-August to the end of September, and most of the seed has fallen by the end of October. The seeds are about one-third of an inch long with a 1-inch-long wing and average about 27,000 to a pound. The seeds are dispersed principally by the wind although animals may distribute some. The seed usually germinates the following spring in soils saturated by melting snow.

Stands of the western white pine type are typically even aged, and the species can be regenerated under seed tree, shelterwood, or clearcut methods of

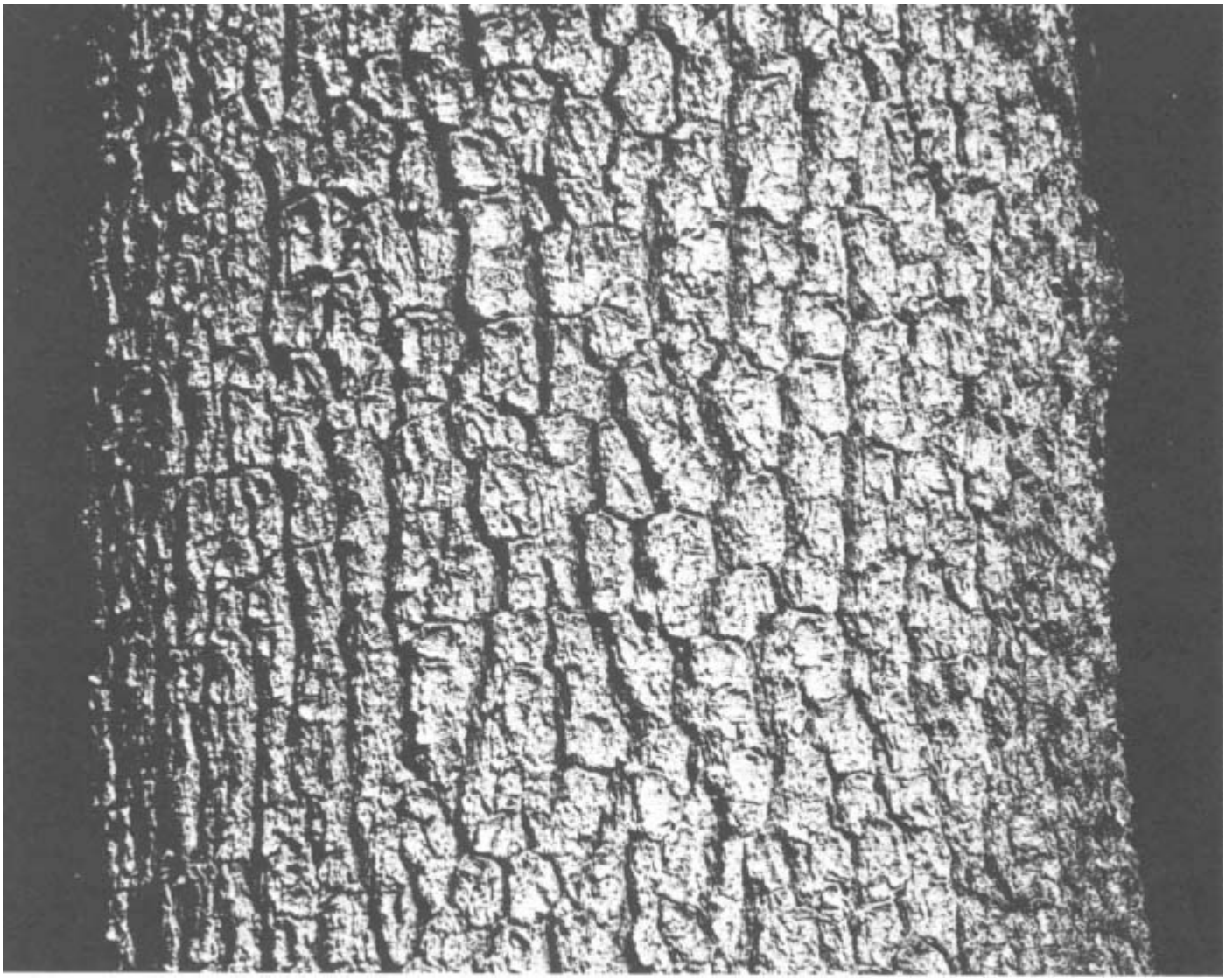

Figure 3–Bark of western white pine. **F–208109**

harvesting. The stands usually are not only very dense but also contain a broad mixture of intolerant and tolerant hardwood and softwood species.

Common Names

Western white pine is often called Idaho white pine or white pine, and frequently, silver pine. Lumber derived from this tree is called Idaho white pine or white pine by the industry.

Related Commercial Species

Because of its physical properties and value, western white pine is inventoried by itself in forest statistics. In considering the western white pine type, however, only those stands containing a majority of sawtimber volume or sapling stems are classified as this type. In most lumber and plywood products western white pine is marketed under its own name or as Idaho white pine. Some lower common grades are occasionally mixed with ponderosa pine *(Pinus ponderosa),* sugar pine *(P. lambertiana),* or other soft-textured pines for ease in marketing.

Supply

The total present acreage occupied by western white pine is about 446,000 acres.

The net volume of western white pine growing stock on commercial forest lands in 1977 was estimated to be about

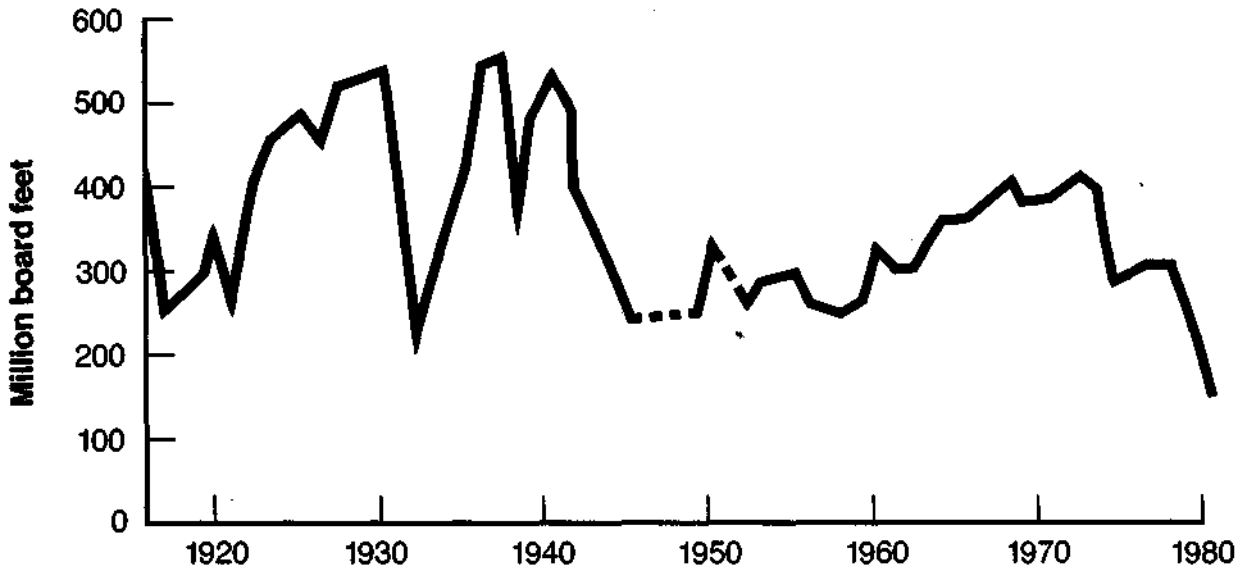

Figure 4–Western white pine lumber production, 1915-80

3.3 billion cubic feet and the estimated sawtimber volume about 17 billion board feet. Approximately three-fifths of this volume grows in Idaho and Montana.

Production

Until 1980, western white pine lumber production exceeded 200 million board feet annually (fig. 4). The record production occurred in 1937, when an estimated 563 million board feet was produced. Following World War 11, production leveled off at about 300 million board feet annually. Idaho has always been the leading State in western white pine lumber production. Now, it leads not only in lumber production, but also in plywood production. The decline in the use of wooden household matches has greatly reduced the demand for the species.

A change made in white pine management in 1%8 has had a major impact on the species production. Since the mid-1920's the species has been attacked by an introduced pathogen, the white pine blister rust *(Cronartium ribicola).* Blister rust grows on gooseberry bushes *(Ripes* spp.) for part of its life cycle. Control of the disease was attempted by removing the alternate host from areas where infected bushes threatened white pines. That method of controlling blister rust largely ended in 1968. Since that time an effort has been made to hasten the salvage of infected trees and to develop a disease-resistant tree that can be used as replanting stock. This management change resulted in a temporary spurt in white pine lumber production.

The most severe threats to western white pine production are fire, insects, and diseases. Although the species is established in most instances as new growth after fire, it is only moderately fire resistant, and small trees are vulnerable to crown fires. The mountain pine beetle *(Dendroctonus ponderosae)* is the species' most serious insect pest. The adult beetle lays its eggs under the bark, and the broods of larvae girdle the tree and kill it. Group killing of trees occurs in mature as well as young overstocked stands.

The most serious disease that affects western white pine is the blister rust. Pole blight, a disorder of trees in the 40- to 100-year age class, is the second most important disease. This disease, currently on the decrease, does not appear to be caused by a pathogen but apparently results from rootlet deterioration and the roots' subsequent inability to meet the tree's water requirements. *Heterobasidion annosum* and *Armillariella mellea* are important root pathogens of white pine.

Characteristics and Properties

The heartwood of western white pine is cream colored to light reddish brown and turns dark on exposure. The sapwood is nearly white to pale yellowish white and is usually less than 2 inches wide. The wood has a slight resinous odor, but no characteristic taste. It is straight grained with medium coarse to rather coarse texture.

Western white pine is a moderately soft and light wood. It is moderately weak in bending, moderately strong in endwise compression, and moderately

low in shock resistance. The wood works easily with tools, is easy to glue, and holds paint very well. It does not split readily when nailed, but has only medium nail-holding ability. It is fairly easy to dry, shrinks moderately, and stays in place well when properly dried. The wood is rather low in decay resistance. Average specific gravity, based on green volume and ovendry weight is 0.36; density is about 27 pounds per cubic foot at 12 percent moisture content.

Principal Uses

Western white pine has always been a preferred lumber species and has carried a correspondingly high price at most times. Until the wooden match was essentially replaced by the paper book match, white pine was the principal match species. Also, before the advent of the fiberboard box, it was used extensively for boxes and crates because of its light weight, stability, and ease with which it is nailed. The lower grades of lumber are used occasionally for wall and roof sheathing. The better lumber grades are used for interior paneling, windows, panel doors, and trim. Considerable volumes are made into moldings and cut stock. The shop and clear grades are in high demand for patterns in the foundry industry, mainly because of the wood's dimensional stability.

Western white pine is also used for softwood furniture, much of it colonial period reproductions. About one-third of the annual production goes to cut-up plants for remanufacture. Some common grade lumber is used in the fabrication of laminated roof decking.

Plywood, too, is made from western white pine. Rotary cut veneer is made into construction plywood, and sliced veneer is used to make decorative plywood for interior paneling. Residues from primary processing operations are used in the manufacture of pulp, paper, and particle board. Trees killed by the mountain pine beetle or the blister rust are frequently made into house logs.

The western white pine range includes some of the finest outdoor recreation areas, and the species has considerable esthetic value. The long, distinctive cones are collected in substantial numbers for novelties or souvenirs.

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