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WESTERN LARCH.

Larix occidentalis Nutt.

Its size, form, and clearness, together with the durability and strength of its wood, make western larch one of the most valuable western trees. Its lumber is in demand far outside of the region in which it grows. Its light foliage affords little protection to the soil. Under silvicultural treatment this lack of cover should be counteracted by an undergrowth of some tolerant species.

RANGE AND OCCURRENCE.

The distribution of western larch is limited to a relatively small portion of the northwestern United States and southwestern British Columbia. It inhabits mountain valleys and slopes at elevations of from 2,000 to 7,000 feet in northwestern Montana, northern Idaho, and Washington, and extends southward along the Cascades—mainly along the eastern slope—and the Blue Mountains into northern Oregon. It attains its best development and greatest commercial importance in northern Idaho and in the Flathead Valley of Montana, where it sometimes forms pure, open forests of limited extent in valleys and on mountain slopes at moderate altitudes.

It is not very particular in choice of aspect, but usually shows some preference for northerly exposures. In northern Idaho it grows on stream bottoms and lower slopes, and in northwestern Montana it is often the chief timber tree of the valleys. In the Blue Mountains of eastern Washington and Oregon it is one of the typical trees of the flats, but is rare in canyon bottoms and on mountain summits.

CLIMATE.

The tree experiences a seasonal range of temperature of between -30° and 100° F., and an annual precipitation of from 20 to 30 inches, with a moderately heavy snowfall, which remains on the ground until early summer. Rains are frequent in spring and fall, but the summers are often hot and dry.

HABIT.

Western larch is a large, symmetrical tree, with a straight, regularly tapering trunk and a narrow crown, which is short and conical in the forest, but often reaches nearly to the ground in the open. Its root system is strong and extends well into the ground, affording security from windfall. The bark of mature trees varies in thickness with locality, from 2 inches, in the Blue Mountains of Washington and Oregon, to nearly a foot, in the Bitterroot Mountains of Idaho. Except in youth, the tree is not subject to severe damage from ground fires.

Larch attains its largest size in northern Idaho, where it occasionally reaches a height of from 170 to 180 feet and diameters up to 4 feet. The average size of mature timber varies from 90 to 100 feet in height and 13 inches in diameter, in the Blue Mountains of Oregon, to 150 feet in height and 2 feet in diameter, in more favorable situations in northern Idaho. In the forest it has a clear length of one-half to two-thirds of its total height.

The foliage is light and does not afford shade heavy enough to prevent the development of competing species. It is one of the earliest of the deciduous trees to display new growth in the spring, the leaves appearing toward the last of April. In September the foliage turns yellow and during October falls from the tree.

Larch is a tree of rather slow but persistent growth. In the region of its best development its most rapid growth in height occurs between the tenth and thirtieth years, and it makes its best diameter growth between the ages of 20 and 50 years. Its rate of growth begins to decrease in height at about 60 years and in diameter at from 90 to 100 years of age. In the Priest River drainage basin of northern Idaho it reaches a merchantable size of 12 inches in about 100 years. Larch usually remains sound 150 years or more before the decay incident to old age sets in, and mature trees frequently show from 200 to 350 rings.

ASSOCIATED SPECIES.

Though it occasionally forms pure stands, larch is usually associated with other species. In the Priest River region of northern

Idaho it nowhere occurs pure enough or in sufficient stand to be called a type. It reaches here its largest size in lower altitudes, in mixture with white pine, giant arborvitæ, and scattered Douglas fir, western hemlock, Engelmann spruce, and lowland fir, but is numerically more important in the Douglas fir forest at somewhat higher elevations, associated with Douglas fir, lodgepole and white pine, lowland and alpine fir, Engelmann spruce, cottonwoods, and birches. In the Bitterroot Mountains of northern Idaho it grows in pure stands or with slight admixtures of Douglas fir and western yellow pine. In central Washington its chief associates are Douglas fir, lodgepole pine, and western yellow pine. In the Blue Mountains of eastern Washington and Oregon, groups of larch and lodgepole pine are interspersed through the forest of Engelmann spruce, white, lowland, and Douglas fir, and western yellow pine. In its silvical requirements larch somewhat resembles lodgepole pine in this region, and the two are commonly associated.

SOIL AND MOISTURE.

Larch is rather exacting in its soil moisture requirements, and makes its best development in soils at once moist and well drained, such as the banks of streams. It will also grow in low, moist situations and on the dry soils of exposed mountain slopes, though it does not attain the size and form which it exhibits in deep, fresh, and porous soils.

TOLERANCE.

Larch is very intolerant of shade throughout its life, and is more light demanding than yellow pine. Its inability to endure shade is compensated for, to some extent, by its rapid early growth, which enables it to rise above the suppressing influence of heavy foliated associates of about the same age. Larch is more tolerant on moist than on dry soils. In moist situations it is able to grow in fairly dense stands, in which it quickly clears itself of branches and produces tall, clear boles. On dryer soils it grows as isolated individuals or in open stands, and is more branchy, its crown sometimes extending to the ground.

REPRODUCTION.

Normally, larch is a prolific seed bearer, but shows considerable local variation in this respect. Seed production rarely begins as early as the twenty-fifth year, and the tree does not begin to bear prolifically until 40 or 50 years old. The cones ripen in August and September. The cone scales open very readily in dry weather, but close during rains, so that the duration of the period of seed

dispersion varies to some extent with local climatic conditions. The seeds are winged, and many of them are scattered on the surface of the snow, over which they may be blown to a considerable distance.

The seeds possess a fairly high percentage of vitality, and require abundant moisture for germination. The chief competitor of larch in establishing reproduction is lodgepole pine. Both species find conditions suitable for germination in burned-over areas with exposed mineral soil. On such situations, the character of the type depends upon the priority of seeding. If lodgepole pine appears first, its dominance in the stand is assured, as it is able to shade out the more intolerant larch. If both species start at the same time, larch may preserve its numerical importance in the stand by means of its more rapid growth. Its light foliage is, however, insufficient to prevent the growth of lodgepole pine, spruces, and firs, and the result is the typical growth of larch in mixed and not in pure stands. Favorite situations for larch reproduction are areas burned over so thoroughly as to preclude immediate heavy reproduction of lodgepole pine.

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