



WESTERN LARCH

Larix occidentalis, Pine family—Pinaceae

People who see western larch for the first time are immediately impressed by its tall, ramrod-straight form and narrow, pyramidal crown made up of fine, bright-green needles that contrast with the somber dark green of most conifers. In autumn, larch foliage transforms to a stunning golden yellow that seems to light up whole mountainsides. Then a few weeks later the needles fall, making newcomers think these barren conifers are dead.

Western larch grows faster and larger than most of its associates, and it can survive many of the fires that kill other trees. Also, after fire or logging opens up a forest, the shade-intolerant (sun-loving) larch are among the first trees to seed in and regenerate. Larch needs these advantages because it faces stiff competition from a host of more shade-tolerant species.

On good sites, the imposing orange- or purplish-brown trunks of old western larch trees often attain 4 feet (120 cm) in diameter and 180 feet (55 m) in height, making them the largest of the world's eleven or so species of larch. Monarch western larch 500 to 1000 years old often have heart rot that allows woodpeckers to create cavities, which provide nesting sites for a variety of birds and small mammals.

"Is it larch or tamarack?" People familiar with forests of the northeastern United States and Canada often identify western larch at first sight as "tamarack," because of its obvious similarity to the tamarack or eastern larch (*Larix laricina*). Tamarack is a smaller tree that usually grows on boggy ground and can be found growing naturally in the boreal forest east of Jasper, Alberta, and in northern British Columbia. The name "tamarack" is often applied colloquially to any species of larch and in the Sierra Nevada to lodgepole pine.

Where It Grows

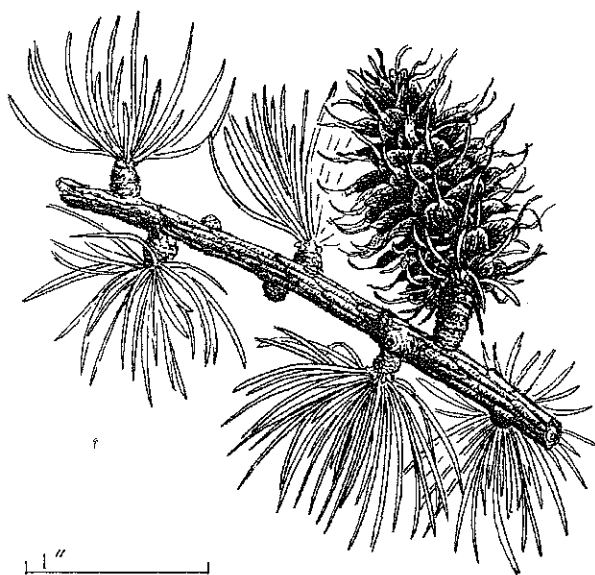
Western larch is essentially restricted to the Columbia River drainage east of the Cascade crest from about the latitude of Bend in central Oregon and Weiser in west-central Idaho (44 degrees N) northward to the vicinity of Kamloops in interior British Columbia (51 degrees N). Within its limited geographic distribution, western larch is locally abundant on moist mountain slopes at lower and middle elevations, up to about 6000 feet (1800 m) on average.

Larch is sparse in the Cascades, but it can be found here and there along the eastern slope from central Washington to northern Oregon. It becomes more abundant in the Blue Mountains and other ranges farther east. It is plentiful west of the Continental Divide in Montana and southeastern British Columbia, but only scattered individual trees are found in the drier climatic region immediately east of the divide.

Appearance

Western larch forms a slender sapling whose pointed crown projects above its competitors. It grows rapidly, developing a high, open canopy that filters but does not block sunlight. At maturity, it is usually the tallest tree in the forest. Finally, the oldest larches become grizzled patriarchs with a storm-battered top and a cinnamon-colored, pillarlike trunk incised by blackened fire scars.

Western larch needles are about 1½ inches (4 cm) long, bright yellow-green, and soft, unlike the hardened needles of firs and other evergreen conifers. Most of the larch foliage grows in tufts on the end of small, woody spur shoots. Tips of growing shoots bear needles singly from all around the twig, as with Douglas-fir. In winter, the leafless larch branches are readily

*western larch*

identified by their lumpy appearance. The cones are only 1 to 1½ inches (2.5 to 4 cm) long and have a long, pointed bract sticking out far beyond the end of each cone scale.

The bark becomes very thick and flaky on mature trees. It is deeply furrowed into large, orange-brown plates and often appears pinkish-purple when sliced. The base of a larch trunk appears fluted because at ground level the corky bark becomes astonishingly thick, often 6 inches (15 cm) on old trees.

Ecological Role

Western larch's closest associate in Northwestern forests is lodgepole pine. These two shade-intolerant species dominate postburn communities across a broad range of forest habitats. Lodgepole pine trees have low resistance to fire and rely on seeds stored in closed cones to regenerate after severe fires. In contrast, larch is highly fire-resistant because of its thick bark; high, open canopy of non-flammable foliage; and ability to resprout and form new branches to replace those that are badly scorched. At least a few tall larch trees

or perhaps just the green cones in some tree tops survive fires, and they can shower lightweight seeds onto the burned site.

Larch and lodgepole pine produce the fastest-growing saplings in much of the inland forest, which helps them get established ahead of more shade-tolerant competitors, including Douglas-fir and grand fir. While lodgepole pine matures and ceases height growth at an early age, western larch keeps growing much longer and may eventually become twice as tall. Larch can also persist several centuries between fires, while competition from shade-tolerant trees becomes increasingly intense.

The history and development of the exceptional "big larch forest" at Seeley Lake in western Montana illustrates how this species benefits from fire. The Lolo National Forest recreation



A natural forest in western Montana in 1899 shows large western larch that survived a circa 1880s fire, as well as saplings of lodgepole pine (dark) and larch (light) that regenerated afterward. (U.S. Geological Survey photo)

areas bordering Seeley Lake retain many of the original, ancient larch trees, including the largest-known larch, which is more than 7 feet (2 m) in diameter, 162 feet (50 m) tall, and about 1000 years old (Van Pelt 2001). A study that dated tree ages and fire scars found that the big larch forest was maintained in open conditions for hundreds of years by low-intensity surface fires occurring at average intervals of about 25 years (Arno and others 1997). Archaeological and other evidence suggests that Native peoples camped here seasonally for at least 3500 years and set many of the fires. This unusually frequent burning for a moist, productive site allowed larch to predominate over competing and less fire-resistant Douglas-fir, subalpine fir, and Engelmann spruce. Many age classes of larch are present, dating from shortly after historic fires, but the most recent fire and the youngest larch date from the late 1800s.

Human History

The Salish and Kutenai peoples in western Montana prized the sweet syrup that they harvested from larch trees (Hart 1976). When the sap was flowing, they hollowed out a cavity, creating a basin in the trunk, and allowed perhaps a gallon of the sap to accumulate. After a while, evaporation concentrated the syrup. Certain trees produced a sweeter sap than others.

Several tribes made medicinal uses of larch. The gum was chewed for sore throat and applied on cuts and bruises, and a tea made of larch bark or foliage was drunk for relief from various diseases. In modern times, larch extracts are marketed as health-enhancing supplements. Larch contains a special water-soluble gum (arabinogalactan), about the consistency of honey, which is used in commercial printing, food, pharmaceuticals, paint, ink, and other industrial uses.

Larch wood—dense, strong, and durable—is used extensively for structural lumber. Tall,

straight larch trees are processed into large utility poles. Larch wood also has many other commercial uses, and because of its density and ease of splitting, it has long been the premier firewood in the inland Northwest.

Considering the great size and fine form of the original larch trees on favorable sites, it may seem surprising that many of the largest trees were spared from logging. Early lumbermen recognized that the oldest larch trees often have extensive bole rot. The quinine conk (*Fomitopsis officinalis*), a cream-colored fungal growth or bracket fungus, is often seen high up on an old larch trunk, and it indicates the tree is so rotten that it is worthless for timber. That larch trees can survive at least a couple centuries despite a rotten bole makes them of great value for cavity-nesters including woodpeckers, owls, various songbirds, and flying squirrels.

Even trees without rot often have ring shake—complete separation of the wood along individual growth rings—which renders the base of the tree useless for lumber. This defect in old trees is thought to result from continual bending in strong winds that eventually breaks the bond between growth rings. To avoid some of the basal rot and ring shake, early-day loggers would cut larch trees high above ground, leaving 10-foot-tall (3-m-tall) stumps. These century-old arboreal relicts still have the notches that held the springboards that fallers stood on while wielding the ax or pulling the two-man crosscut saw known as a misery whip. Another technique for discarding the base of big trees was to cut off or “long butt” a section, about 6 feet (2 m) long, from the base of the fallen tree.

While western white pine was historically the prime timber tree in humid northern Idaho, a combination of old-growth western larch and ponderosa pine filled that role in the drier climate of western Montana. The larch, most abundant in cooler, moist habitats, and “yellow pine” on

adjacent drier sites codominated much of the landscape as a result of their ability to prosper under the influence of frequent fires. When growing in mixed stands, the cinnamon-colored boles of old larch and ponderosa look so similar that it is often necessary to look up into the canopy to distinguish them.

The Big Blackfoot River drainage northeast of Missoula, which includes the Seeley Lake country, produced vast quantities of larch and ponderosa pine. From 1885 until the 1920s, huge accumulations of logs were floated down the Blackfoot canyon to the sprawling sawmill at the river's mouth. (Later, logs were transported through the canyon by train and truck.) This was about when the young Norman Maclean was first introduced to the Blackfoot's

exceptional fishery that he recounted in *A River Runs Through It*. Tree buffs beware: Maclean's story (University of Chicago Press, 1976) and Robert Redford's 1992 movie version of it omit the omnipresent lumber industry centered on the Blackfoot River in those days. Worse yet, the movie was filmed on the distant Gallatin River, which has none of the Blackfoot's beautiful larch or ponderosa pine.

By the 1980s, larch forests at Seeley Lake had been engulfed in ladder fuels—a dense understory of Douglas-fir, grand fir, and other conifers that promotes crown fire. The 1988 Red Bench fire torched a similar forest in Glacier National Park, Montana, killing most of the trees, including old larch, on 26,000 acres (10,500 ha). In previous centuries, the area had



Log drive on Big Blackfoot River in 1910. (Archives & Special Collections, University of Montana, Missoula)

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experienced less-intense fires that larch survived (Barrett and others 1991). Land managers came to recognize that nearly a century of suppressing fires had created an unprecedented threat of crown fires. Also, many old larch trees were dying as a result of excessive competition from shade-tolerant trees.

During the 1990s, the Seeley Lake Ranger District initiated restoration projects that by 2005 had expanded to cover a few thousand acres of the historic big larch forest surrounding the Seeley Lake community (Arno and Fiedler 2005). Most understory trees and many midsized firs were removed carefully on snow-covered ground so as

to prevent damage to the larch trees. Much of the treated forest was then "underburned" using low-intensity prescribed fire. In the thinned and burned areas, a new age-class of larch seedlings became established for the first time in a century.

In the old larch forests of Montana's Glacier National Park and the Bob Marshall Wilderness, managers have allowed many lightning fires to burn under surveillance since 1994. These fires have already begun to restore a pattern of variable-intensity burns on the landscape that promote regeneration and survival of western larch, a unique and venerable treasure of the inland Northwest.

