

Issued October 7, 1907.

United States Department of Agriculture,

FOREST SERVICE.

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SILVICAL LEAFLET 9.

INCENSE CEDAR.

Libocedrus decurrens Torr.

Incense cedar, like white fir, when it occurs in mixture with the more valuable yellow and sugar pines, is often regarded as a weed tree. In the Sierra Nevada where the pines are extensively cut incense cedar is used only to a limited extent, and its prolific seeding and aggressiveness in occupying the ground threaten to reduce the proportion of the more valuable trees in the future forest.

Since it grows in mixed stands with more valuable trees, such as sugar pine, yellow pine, western white pine, and Douglas fir, which are all light-needing species, the silvical importance of the more tolerant incense cedar is to serve as a filler and preserve a better forest cover. Incense cedar will readily restock adjacent openings and open stands, and this fact can be taken advantage of in cuttings where its reproduction is desirable. Usually, however, the presence of more valuable species will govern the system of cutting, and the incense cedar will take care of itself.

RANGE AND OCCURRENCE.

Incense cedar ranges from the headwaters of the Santiam River in the Cascade Mountains of Oregon southward to Mount San Pedro Martir in Lower California. It is common in the Coast ranges of California and in the Cascade Mountains of Oregon, and especially in the Sierra Nevada in California, whence it extends eastward to western Nevada in the vicinity of Lake Tahoe. In general it is more common on the western than on the eastern slopes of mountain ranges, and on the latter grows at somewhat higher elevations. It is most abundant and attains its largest size on the western slope

of the Sierras, especially in situations where sugar pine and yellow pine thrive.

Its altitudinal range is variable. Owing to the great climatic variations within its range, incense cedar grows at increasingly higher altitudes from north to south. In the Cascades it grows mainly between 2,000 and 6,000 feet above the sea; in the Sierras, between 3,000 and 7,000 feet; in the Santa Barbara National Forest, between 4,500 and 7,000 feet, and in the San Jacinto National Forest, between 3,000 and 8,000 feet.

CLIMATE.

Within the range of incense cedar the chief drawbacks to forest growth are insufficient precipitation and excessive heat. This is especially the case in southern and Lower California. Precipitation occurs during the winter months in the form of snow at high altitudes and rain at lower elevations. The average annual precipitation varies from less than 15 inches to more than 50 inches. The relative humidity of the air varies also. In the Cascades and Sierras the moisture conditions are more favorable than farther south in the Coast ranges of California. Fogs are common, especially on the western slope of the Sierras. There is usually a rainy and a dry season. The dry season extends over the months of July, August, and September, and in southern California through October.

HABIT.

Incense cedar usually has a large conical crown with flat branchlets and a straight stem which tapers rapidly from an enlarged base. The taper is, however, more apparent than real, since it is largely due to the greater thickness of the bark at the base. The root system is rather shallow and the tree is not especially wind-firm. In the Sierras it frequently reaches a diameter of 7 feet and a height of 150 feet, though in southern California trees from 3 to 4 feet in diameter and from 90 to 100 feet high are considered large. In exposed situations and on dry soils it is scrubby, deformed, and defective. It is commonly infected with rot. Ordinarily a cull of from 25 to 40 per cent has to be deducted from the general estimate of stands for defects due to fire and fungus.

Its wood is light, soft, close grained, and durable in contact with soil, and is used for fencing, laths, shingles, interior finish, and furniture.

ASSOCIATED SPECIES.

Although a common and widely distributed tree, incense cedar seldom forms pure stands, but is usually associated with other species,

occupying, as a rule, a subordinate position. It grows scattered through the forest, singly, in groups, or in patches, and under conditions favorable for its development forms as high as 50 per cent of the stand. In the Coast ranges of southern California it associates chiefly with yellow pine and Jeffrey pine, and to some extent with white fir and bigcone spruce, and along streams at lower elevations with hardwoods, such as elder and cottonwood. In the Cascade Mountains of Oregon it grows with yellow pine, Douglas fir, white fir, western white pine, and sugar pine. On the slopes of the Sierras it associates with sugar pine, yellow pine, Jeffrey pine, and white fir; in the sequoia groves it is an associate of the bigtree; and toward its lower altitudinal range it frequently mixes with different species of oaks and other hardwoods.

SOIL AND MOISTURE.

Incense cedar reaches its best development in cool and humid situations with fresh, porous soils. While with a moderate amount of moisture it will grow on almost any kind of soil, a fairly deep, porous soil is essential when the moisture supply is deficient. In regions of little precipitation incense cedar is chiefly confined to moist stream bottoms, canyons, gulches, and cool northerly slopes, where it finds favorable conditions of soil moisture. Toward its northern limit, in the Coast ranges and Cascades in Oregon, it grows on warm southerly slopes. Often it grows on rather dry, warm exposures, not because it prefers these situations, but because it is able to reproduce itself on the sunny open slopes where less adaptable species can not establish themselves. It does not thrive, however, in localities with an annual precipitation of less than 20 inches.

TOLERANCE.

Incense cedar is more tolerant of shade than sugar pine, yellow pine, Jeffrey pine, Douglas fir, or western white pine. On account of its tolerance and its slow growth it usually occupies, in mature stands, an intermediate or a subordinate position.

While it is fairly tolerant of shade, incense cedar thrives under full sunlight. Like most other trees, it is more able to endure shade in moist situations than in dry ones, and decreases in tolerance with advancing age. Too much shade stunts its growth.

REPRODUCTION.

Incense cedar is a prolific seed bearer; with the right soil and moisture conditions it reproduces itself freely. Although some seed may

be borne each year, abundant production takes place at irregular intervals of from two to three years. Seed is borne most freely by mature trees growing in full sunlight. In good seed years the crown of such trees may be completely enveloped in a mantle of cones. In exposed situations small, scrubby trees often produce seed abundantly.

The seeds of incense cedar mature in one season. They are light winged, and are scattered by the wind. With sufficient moisture they will germinate, and the seedlings will grow both on mineral soils and on a vegetable cover. A moist seed bed which contains a moderate amount of organic matter is, however, best for germination. During its early seedling stages partial shade is needed to reduce the evaporation of moisture from the soil.

Reproduction takes place in the shade of mature stands and in the open. It is especially good in openings and under thinned stands. In places in the Sierras, young incense cedar frequently forms thickets, often to the exclusion of other more valuable species. In cool, moist situations white fir often forms a part of these thickets, and sometimes predominates.

The adaptability of its young growth to varying conditions of light, moisture, and soil makes incense cedar a pioneer species, which frequently forms the advance growth of conifers in the chaparral and oak at the lower limit of the timber belt.

[Leaf. 9]