

INFORMATION LEAFLET
FOREIGN WOODS

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ALERCE

Fitzroya cupressoides (Molina) Johnston
(= F. patagonica J. D. Hooker)

Family: Cupressaceae
Division: Cupressineae
Order: Coniferae



By

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Introduction

Alerce is an evergreen tree, a softwood or conifer. Its scientific name Fitzroya was given in honor of Captain Fitzroy who commanded the Beagle on Darwin's expedition to South America. Alerce is regarded as one of the finest Chilean woods and has been described as ranking with the most useful woods in the world (2, 3, 4, 14, 21).² It is the only species in the genus Fitzroya and forms great forests, the "alercales" or "alerzales" in southern Chile (2, 5).

¹Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

²Underlined numbers in parentheses refer to the list of numbered references at the end of the article.

The name alerce was given by the Spanish Conquistadores who thought it resembled the alerce or larch (Larix) of Spain. The word alerce was derived from the Arabic "al arzar", meaning cedar, because of superficial resemblances (7). Alerce is called Lahuan by the Chilean Indians (2) or alercholz by the Germans (21).

At one time, more than a million acres of alerce were reported in Chile, with average stands of 30 trees per acre (1). A survey made about 1946 estimated the total volume of sound wood at 1,500 million cubic feet, or about 5,000 million board feet (11).

Distribution and Habitat

This species is a native of South America, occurring in Chile and northern Patagonia. It extends from the coast range immediately north of Valdivia southward to the island of Chiloe and the mainland opposite and reaches inland to the central cordillera of the Andes (7). It is more plentiful in remote and hilly areas, where it grows in mixed forests on the upper slopes and sometimes in clear stands on the ridges. It has largely disappeared from the lower areas, where exploitation was less difficult (11).

Typically, alerce grows on marshy ground in moist, peaty soils, but it also grows at higher elevations on the island of Chiloe and in the territory of Aysen in Patagonia. It is unique among Chilean conifers in that it forms many dense, nearly pure forests over thousands of acres (2).

Alerce has been found to be hardy in Great Britain at Kew Botanical Gardens.

The Tree

Size and Shape

Alerce trees somewhat resemble redwoods. They may be very large. Diameters of 48 inches and heights of over 100 feet are reported, and trees often attain an age of 1,000 years with some reported to be 4,000 years old. Trees up to 240 feet (76 feet to the first branch) in height and 30 feet in girth, 5 feet above the ground with diameters of 8 to 16 feet, are also reported (2, 7, 8, 11, 13). These trees grow slowly and tend to have narrow annual rings, but they are believed to reach the greatest age of any South American trees (10). Under adverse conditions, however, alerce develops into a bushy shrub (7).

Young trees have a conic-pyramidal form. Mature trees are often dead and hollow at the top or have a small crown and numerous dead branches (2). Many are also hollow at the butt. The remaining heartwood outside a decayed center, however, is serviceable and durable.

Bark

The outer bark is reddish (7), thin, and smooth at first; later, it is longitudinally fissured and has an inner layer of fibrous material impregnated with resin. The bark may become several inches thick and corky. When cut, it exudes an agreeable smelling resin. The inner bark "Estopa de Alerce" or alerce tow is harvested in summer, cut in thin strips, and baled. It is highly prized for calking boats and ships. The resin may also be collected separately and burned as incense (2, 8, 16).

Leaves

The trees have a very dense, dark green foliage. The leaves are heathlike (ericoid), and pointed, and occur only on young twigs. They persist for several years (7).

Flowers and Fruit

The cones are small and contain winged seeds. They ripen in 1 year (7).

The Wood

Color

The sapwood is thin and white. The heartwood is reddish-brown, resembling redwood in appearance and properties, but it is lighter in color and may show alternate light and dark streaks (11, 16, 21).

Weight

Alerce is a low-density wood. The approximate weight per cubic foot is 41.7 pounds green and 22 to 35 pounds after air drying (average about 29 pounds) (21). Table 1 shows specific gravities of 0.40 to 0.42 and reported (9).

Texture, Grain, and Figure

The texture is fine and uniform. The grain is straight. The growth rings tend to be narrow (6, 19).

Mechanical Properties

The wood is rated as fairly strong for its weight (23). It splits easily (8). A few strength tests were made at the University of Washington (15). More recent data obtained in Chile are given in table 1 in comparison with redwood.

Durability

The heartwood is rated as normally long-lived, but resistance to decay may be variable (8, 15, 21). Old windfalls have been found to be sound even in logs overgrown by the roots of old mature trees. These are said to have been dug up and to have yielded serviceable lumber. Roofing is said to have lasted in service, without repair, for 100 years.

Seasoning and Shrinkage

Alerce is reputed to season easily and retain its shape well (21). The shrinkage of alerce from green to oven-dry is reported as 9.1 percent in volume, 3.8 radially, and 5.8 tangentially (11).

Working Characteristics

Alerce wood is soft, light, and easy to work. Locally the logs, instead of being hauled to sawmills, have often been split by the natives into boards and shingles; they use hardwood (*Myrtus luma* Barn.) wedges. In the great alercales or alerce forests, the woodsmen are skilled in producing rived boards of uniform thickness. They often carry lumber and shingles to market on their shoulders. Woods operations are conducted only in the dry season. The timber is rated as the finest produced in Chile and ranks with the best and most useful in the world, but it requires the use of keen cutting edges to avoid surface crumbling. The wood takes glue, varnishes, and other finishes well (16, 17, 18, 20, 21).

Uses

Alerce is considered ideal for carpentry for general light, durable construction (6, 7) including floors, spars, masts, and roofing. Woodsmen also produce large quantities of edge-grain hand-split shingle shooks 4 feet by 6 inches by 1/2 inch, and sawn shingles are also made from this wood. After exposure to weather, shingles tend to acquire a bluish color, resembling slate (7). Musical instruments, furniture, poles, honey barrels, troughs, vats, wood-stave pipe, buckets, pencils,

and cigar boxes are also made from alerce (21). Its softness somewhat restricts its use. Limited amounts are exported for making pencil blocks and cigar boxes. It is used for core stock in veneered doors and table tops (11, 21).

Locally in Chile it is to be expected that alerce will displace imported Douglas-fir for mine props and beams. With the further industrialization of Chile, the lumber industry is expected to play an increasingly important part in export (6).

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Table 1.--Some strength values for alerce (Fitzroya cupressoides)¹
and virgin redwood (Sequoia sempervirens)²

Property	Alerce (<u>Fitzroya cupressoides</u>)		Redwood (virgin) (<u>Sequoia sempervirens</u>)	
	Moisture content		Moisture content	
	Green	12 percent	Green	12 percent
Specific gravity				
Based on oven-dry weight and volume at moisture content shown.....	0.40	0.42	0.38	0.40
Static bending				
Fiber stress at proportional limit.....p.s.i.:	3,900	5,650	4,800	6,900
Modulus of rupture....p.s.i.:	6,000	8,700	7,500	10,000
Modulus of elasticity.....				
.....1,000 p.s.i.:	940	1,160	1,180	1,340
Work to maximum load.....				
.....in.-lb. per cu. in.:	6.4	5.1	7.4	6.9
Total work.....				
.....in.-lb. per cu. in.:	16.3	12.7	15.2	8.8
Impact bending				
Fiber stress at proportional limit.....	7,450	10,500	8,900	10,200
Height of drop to produce complete failure (50-lb. hammer)..... inches:	23	20	21	19
Compression parallel to grain				
Fiber stress at proportional limit.....p.s.i.:	2,090	3,670	3,700	4,560
Maximum crushing strength....				
.....p.s.i.:	2,690	5,150	4,200	6,150
Compression perpendicular to grain				
Fiber stress at proportional limit.....p.s.i.:	370	650	520	860

¹From La Madera by Garcia and Torricelli Diaz (1942, Santiago, Chile, S.A.
(Values converted to p.s.i.)

²From Tech. Bull. No. 479 (1935), U. S. Forest Products Laboratory, Madison, Wis.