Pinus caribaea Morelet

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PINACEAE (PINE FAMILY)

No synonyms

Pino caribea, pino cubano

Pinus caribaea is a medium-growing tree that reaches 45 m in height and more than 1 m d.b.h. The shafts are generally straight and free of branches. The bark is thick with wide fissures and is reddish brown to ashy brown. This variety has fascicles of three, and in the young trees these fascicles have four to six acicular leaves. The acicular leaves are 15 to 25 cm long and 1.5 mm wide; they are stiff and finely serrated, dark green to yellowish green, and covered with white stripes of stomata. The tree has a pivot root in deep soils, and superficial roots in slightly deep soils. It adapts very well to a wide variety of environments, including degraded, poor, lixiviated, rather low soils with good drainage. The species grows well in acid sandy soils (pH 4.3 to 6.5) and, to a lesser degree, sandy-clayey soils. Generally, moisture in the soil determines development more than the availability of nutrients. The tree grows well in oxisol soils that are not very deep, are saturated with water during the rainy season, and are very dry in the rainless season. In wet climates of the Tropics the species tends to form foxtail. It can tolerate drought for up to 6 months and sporadic floods. However, drought can also cause large losses in young stands (Lamprecht 1990). *Pinus caribaea* grows well where temperatures range from 20 to 27 °C and annual precipitation is between 1000 and 1800 mm. Some trees grow where precipitation is 600 to 3900 mm. In its native region the tree grows from sea level to 850 m; it is occasionally found at 1000 m.

The hard wood of *P. caribaea* is appropriate for floors and all types of construction. Treated with a preservative, the wood is used in mines, pilings, and railroad ties. Primarily used in construction and carpentry, the wood is also dried and turned (Centro Agronómico Tropical de Investigación Enseñza 1994, SEFORVEN 1993). In Villanueva, Casanare, Colombia, wood obtained by precommercial thinning at 8 to 10 years is used in tongue and groove boards and cabinetmaking (portable crates, doors, windows, desks, and bookcases) (Koenig and Venegas 1978, Venegas 1982). It is used for pulp even though its resin content is high. It is traditionally used as firewood and in the manufacture of charcoal. The trees are used as windbreaks and to control erosion and recover soils. Resins are also extracted to produce colophony and turpentine. The seeds of this species have a high commercial value.

The cones are 6 to 14 cm long. The dark grayish seeds are ovoid and winged and sometimes have light brown speckles. Most of the seeds lose their wings. Fire is essential for natural regeneration; however, the young plantules are damaged or killed by fire. Outside its native area, the species rarely regenerates naturally.

Seeds can be stored up to 10 years if placed in hermetic containers at 3 to 4 °C and 6 to 9 percent humidity. A pregermination treatment is unnecessary; however, seeds submerged in water for 12 hours will germinate more uniformly. Germination percentage reaches 80 percent (Trujillo 1984, Wong 1983).

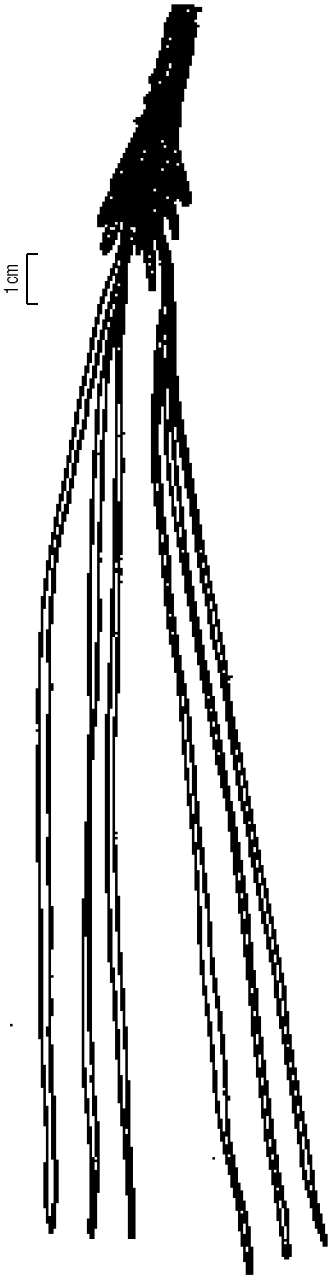
The species can be propagated in nurseries by seeds or bare roots. Seeds are sowed in germinators and transferred to bags; seeds with a high germination percentage can be planted directly in bags. Two hundred seeds are planted per m^2 to ensure that 100 plants per m^2 are produced. Seeds germinate within 17 days. One month after sowing, the soil must be removed from around the plantule. The plantules must also be fertilized with nitrogen, phosphorus, and potassium.

Mycorrhizal fungus must be applied to improve plantule development; an application of 20 g per ha of spores of the *Pisolithus tinctorius* or *Telophoroa terrestri* fungus is also recommended. Furthermore, fertilizers must be applied periodically. Roots should also be routinely pruned, and the plantules should be hardened. Plantules are outplanted when they reach 20 to 30 cm in height.

The planting site should be thoroughly cleared; burning the site produces the best results. In deep soils, holes must be 20 cm deep and 20 cm in diameter. In shallow, compacted soils, holes must be 30 cm in depth and diameter. Up to 80 percent of the roots will remain when outplanting by lifting the plantules with clods of earth on the roots.

Silvicultural treatments during the first 2 years in reforestation of savannas provide fire protection. Removal of underbrush by trampling is also essential. Reforestation of pasture prairies should occur within 6 months after formation of the prairie to inhibit competition from arboreal species and cattle. In intense plantations, Gramineae, such as *Brachiaria*, should be planted.

In the production of trees for pulp, firewood, or small posts, plantules are planted 1,600 per ha, at an initial spacing of 2.5 by 2.5 m. Trees are harvested at 8 to 12 years, with no thinning. In plantations for sawwood, veneer, and large posts, 1,100 trees are planted per ha at 3.0 by 3.0 m. The best trees are pruned during the first years; an initial thinning occurs when the crowns close; and thinning continues until 250 to 400 trees per ha remain. These trees can be harvested at 15 and 25 years (Koenig and Venegas 1978).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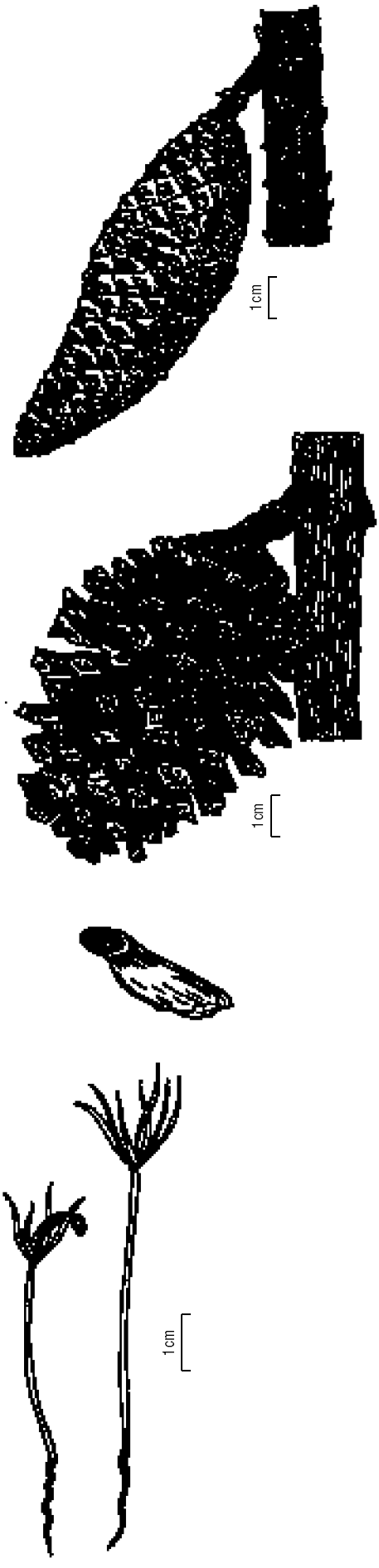
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