CATIE

SEED LEAFLET

No. 40 September 2000

Pinus caribaea Morelet

Taxonomy and nomenclature

Family: Pinaceae

Varieties: *Pinus caribaea* var. *bahamensis* (Griseb.) W.H.G. Barrett & Golfari, *P. caribaea* var. *caribaea*, *P. caribaea* var. *hondurensis* (Sénéclauze) W.H.G. Barrett & Golfari.

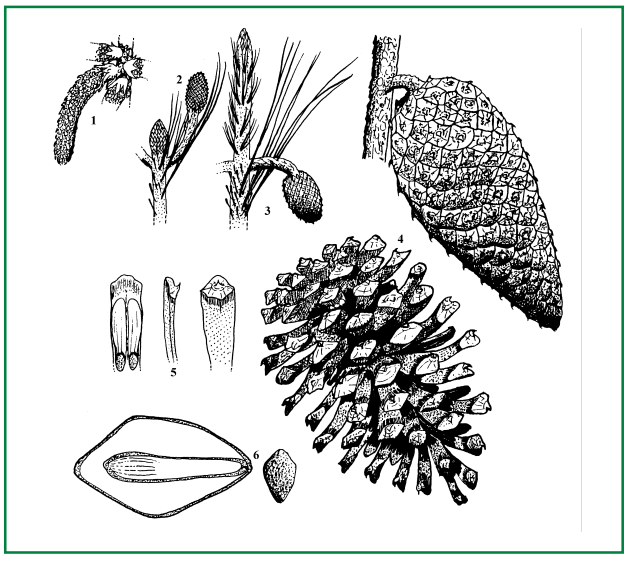
Synonyms: *Pinus taeda* var. *heterophylla* Elliott, *P. recurvata* Rowlee.

Vernacular/common names: Caribbean pine, pitch pine (Eng.); pino de la costa, ocote blanco, pino caribe, pino caribeño de Honduras (Sp.); pin jaune, pin mate (Fr.); karibische kiefer (Germ.); Honduran yellow pine (trade name).

Distribution and habitat

Native to Central America and the Caribbean, widely planted throughout the American, Asian and African tropics and subtropics. *P. caribaea* var. *caribaea* is confined to Cuba and the Isla de la Juventud, *P. caribaea* var. *bahamensis* is indigenous to certain islands of the Bahamas and the Caicos groups and *P. caribaea* var. *hondurensis* can be found in the eastern half of Central America south-east from the Yucatán peninsula.

Grows best in frost-free areas up to 700 m altitude on more fertile sites with good drainage and annual rainfall of 1000 - 3000 mm.



1, mature male strobili; 2, female strobili at receptive stage; 3, female strobili two months old; 4, mature cones; 5, cone scales; 6, seeds. From: Robbins, 1994.

Uses

Used for fuel, pulpwood, timber, resin and land reclamation.

Botanical description

Tree up to 45 m tall and 1 m in diameter, with conical and irregular crown. Bark is grey on young trees, later dark and with fissures. Needles in fascicles of 3-5 at the ends of twigs, mostly 15-25 cm long, up to 1.5 mm broad, slightly toothed, with whitish lines. The needles remain attached for 2 years.

Strobili appear before the new leaves; male strobili in clusters, mostly in the lower part of crown; female strobili 2-5 together, mostly in the upper part of the crown.

Fruit and seed description

Seed about twice as long as broad, triangular and pointed at the ends. On average less that 6 mm long, 3 mm broad and black to grey or brown. The membranous wing is up to 20 mm long, sometimes fused with the seed coat but becoming detached when moistened. There are 35-40 seeds per cone. and 59,000-72,000 dewinged seeds/kg, depending on the variety.

Flowering and fruiting habit

The cones mature at the onset of the rainy season but there is often variation between trees and stands. In general, cones tend to mature during the same period, despite variation in flowering times. Seed production in exotic plantations is often poor due to either cool temperatures preventing the formation of flowers or humid conditions during flowering preventing pollination.

When the tree is 3-4 years old, it begins to produce female cones but seed setting is low unless there are mature pollinating trees close by.

Harvest

The cones are mature when: 1. more than half of the cone has turned brown, 2. when cut in two, the cone axis is dark brown, 3. the apex of the cone feels firm when pressed with the thumb 4. the seed coat is darkening in colour and 5. the inside of the seed is white and firm and filling the cavity.

Collection is done directly from the tree. Care must be taken not to break the fragile branchlets as this can seriously reduce crop size for several years. Once the

cones have become brown and are still moist, the scales may start to open and pregermination occur. A cutting test will reveal this.

Processing and handling

After harvest the cones should not be left in sacks for more than 1-2 days and always in a cool, dry and properly ventilated place. Before drying, the cones are precured on trays with wire mesh, under shade, until the cone has turned completely brown (5-10 days). After precuring, the cones open relatively easily and sun drying is normally adequate, provided the climate is not too humid.

When the seeds have been extracted they are dewinged and cleaned and then dried in the sun on a sheet and raked frequently. The seeds will lose about 1-1.5 % moisture per hour. Cleaning the seed before sowing to eliminate empty and dead seed can improve germination considerably.

Storage and viability

The seed is orthodox and can be stored at temperatures below 0°C. At 6-8% mc and 3-4° C in airtight containers, the seed can be stored for at least 5 years with little loss in viability. At room temperature, few seeds will survive one year of storage. As long as the seed is kept dry and cool, fumigation and application of fungicides are not necessary and may be harmful.

Dormancy and pretreatment

The seeds are not dormant, but in some places it is practice to soak the seeds in clean water for 12 hours followed by 2-3 days cold stratification at 4-5°C to obtain a more uniform germination.

Sowing and germination

Germination normally begins seven days after sowing and after 12-15 days reaches some 80%. The seeds can be sown directly in plastic bags with 1-2 seeds per bag, or in germination trays from where they are transplanted into bags when they are 3-4 cm long. Mycorrhiza is necessary for the sapling growth, and soil taken near established trees should be added. Suitable sowing medium is sand:forest soil in a 3:1 ratio. If the seedbeds are covered with mulch, it reduces the risk of fungi.

Phytosanitary problems

Cones that are inadequately stored are easily susceptible to infestation by fungal moulds, which may cause problems during germination. Infestation by pathogenic fungi may also happen especially in seed from high rainfall areas.

Selected readings

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P. caribaea var. *hondurensis*. Alamikamba, Nicaragua. Photo: E.A. Gutierrez, CAMCORE.

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