

Ceiba pentandra

(L.) Gaertn.

Bombacaceae

LOCAL NAMES

Amharic (yetit zaf); Arabic (shajaret al kutun); Bengali (schwetsimul); Creole Patois (mapou); Dutch (fuma,kapokboom); English (white silk cotton tree,true kapok,cotton silk tree,cotton tree,kapok tree,java kapok); French (kapokier,kapokier de Java,faux kapokier,mapou coton,arbre à coton,arbre a boure,fromagier); German (fuma,kapokbaum,wollbaum,ceiba); Hindi (safed simal,katan,hattian); Indonesian (kapok,enia,randu,kapu); Khmer (koo); Lao (Sino-Tibetan) (nguiz baanz); Luganda (kafamba,kifampa); Mandinka (busana,bantango,katan,bana,bada); Portuguese (mocmayn,mai das arvores,samu-meria paineria,sumauma); Sanskrit (sveta salmali); Spanish (ceibo,ceyba,ceiba,yuca,piim,peem,árbol capoc,mosmote); Swahili (msufi); Tamil (illavam-panju,ilavum); Thai (nun); Vietnamese (gon,gau)

BOTANIC DESCRIPTION

Ceiba pentandra is a tall, deciduous tree bearing short, sharp prickles all along the trunk and branches; supported by pronounced buttresses at the base. It has a light crown and is leafless for a long period.

The leaf is glabrous and digitate, being composed of 5, 7 or 9 leaflets. Leaves are alternate with slender green petioles. There are usually 5 leaflets in a mature form. The leaflets hang down on short stalks; short pointed at the base and apex, not toothed on edges, thin, bright to dark green above and dull green beneath.

Great quantities of flowers are in lateral clusters near the ends of the twigs. Calyx cup-shaped, with 5-10 shallow teeth. Petals 5, white to rose coloured; brown, silky, densely hairy on the outer surface; stamens 5, longer than petals, united into a column at the base. Pistil a 5-celled ovary with a long style curved near the apex and an enlarged stigma.

Fruit a leathery, ellipsoid, pendulous capsule, 10-30 cm long, usually tapering at both ends, rarely dehiscent on the tree. White, pale yellow or grey floss originates from the inside wall of the fruit. Seed capsules split open along 5 lines. Each capsule releases 120-175 seeds rounded black seeds embedded in a mass of grey woolly hairs. Seeds dark brown.

The generic name comes from a local South American word. The specific name, 'pentandra', is Latin for 'five-stemmed'; from the Greek word 'penta' (five) and 'andron' (male).

BIOLOGY

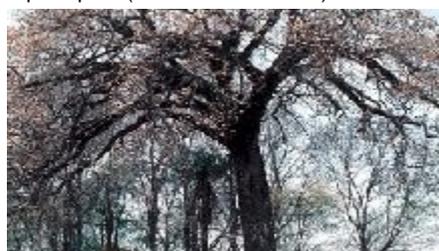
Flowers open at night, emitting a powerful odour and secreting nectar at the base of the large, bisexual flowers. The pollen is sticky, and the shape of the flowers suggests cross-pollination, although self-pollination may occur when stamens and stigmas of adjacent flowers of the same tree come into contact. Flowers open soon after dark and fruit bats visit them. Hawk moths and several other small moths also visit the flowers at night and many bees visit soon after dawn. Seeds are widely disseminated and find ideal conditions for germination in abandoned agricultural land.



Buttress (L. Gilbert UT Austin)



Spinescent (L. Gilbert UT Austin)



Trunk (L. Gilbert UT Austin)

ECOLOGY

C. pentandra can be found in various types of moist evergreen and deciduous forests, as well as in dry forests and gallery forests. As a pioneer species, it mostly occurs in secondary forests.

BIOPHYSICAL LIMITS

Altitude: 0-900 m, Mean annual temperature: 18-38 deg. C, Mean annual rainfall: 750-3 000 m

Soil type: Deep permeable, volcanic loam, free from waterlogging.

DOCUMENTED SPECIES DISTRIBUTION

Native: India, Indonesia, United States of America

Exotic: Cambodia, Eritrea, Ethiopia, Gambia, Ghana, Kenya, South Africa, Tanzania, Thailand, Uganda, Zanzibar



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

PRODUCTS

Fodder: The pressed cake is a cattle feed containing about 26% protein. Sheep, goats and cattle relish the foliage.

Apiculture: The tree is an important honey source. Honey light amber with a characteristic flavour.

Fibre: The fibre from the inner wall of the fruit is unique in that it combines springiness and resilience and is resistant to vermin, to make it ideal for stuffing pillows, mattresses and cushions. It is light, water repellent and buoyant, making it ideal for life jackets, lifeboats and other naval safety apparatus. It is an excellent material for insulating iceboxes, refrigerators, cold-storage plants, offices, theatres and aeroplanes. It is a good sound absorber and is widely used for acoustic insulation; it is indispensable in hospitals, since mattresses can be dry sterilized without losing original quality. Practically the entire supply of kapok is obtained from Java.

Timber: *C. pentandra* wood is variable in colour, from white to light brown, but sap-staining fungi may darken it. The wood is very light, with specific gravity of 0.25 g/cc. The wood machines easily but not satisfactorily. Machining characteristics include excellent planing and sanding and resistance to splitting when screwed. Shapes and bores poorly but mortises well. Logs and lumber are very susceptible to insect and fungal attack, but preservation treatment is easy; either pressure-vacuum systems or open-tank methods give good absorption and penetration. The wood is easy to peel for veneer. Reported uses of wood include plywood, packaging, lumber core stock, light construction, pulp and paper products, canoes and rafts, farm implements, furniture and matches.

Lipids: *C. pentandra* seed contains 20-25% non-drying oil, similar to cottonseed oil, used as a lubricant, in soap manufacturing and in cooking.

Medicine: Compressed fresh leaves are used against dizziness; decoction of the boiled roots is used to treat oedema; gum is eaten to relieve stomach upset; tender shoot decoction is a contraceptive and leaf infusion is taken orally against cough and hoarse throat. In Tamilnadu, India, the leaves are pounded together with fermented boiled rice water and the extract is administered to cows orally as a remedy for reproductive problems. The dose is approx. 500 ml three times a day for three consecutive days.

SERVICES

Ornamental: *C. pentandra* is grown around villages and temples in Tamil Nadu, India, as an ornamental tree. As the floss is irritating to the eyes and nose, the tree is not recommended for town planting.

Boundary or barrier or support: In Java, the tree is grown as a boundary tree and fences along roadsides.

TREE MANAGEMENT

The species is generally raised at a spacing of 7.3 x 7.3 m in a taungya system with agricultural crops for the 1st 5 years, after which, as the canopy closes, further cultivation of crops is impossible. In the intervening strip, all rank growth that is likely to suppress the *C. pentandra* seedlings should be cut once or twice during the 1st 2 years, by which time *C. pentandra* grows above the level of weeds. General tending may be done in the 3rd and 5th years, consisting of cutting the climbers and removing dead and diseased trees. Thinning is not necessary where spacing is 7.3 x 7.3 m unless a cover crop like *Dalbergia latifolia* is grown, in which case it may be necessary for the best growth and development of *C. pentandra*.

GERMPLASM MANAGEMENT

Seed storage behaviour is probably orthodox. Since the seeds contain food reserves in the form of oils that tend to go rancid quickly, their viability diminishes rapidly. It has not been possible to preserve seeds over lengthy periods of time, not even by using special storage techniques. The seeds maintain viability for only 1 year in normal conditions. The number of seeds per kilogram varies between 10 000 and 45 000, depending on provenance.

PESTS AND DISEASES

Insect defoliators include *Ephyriades arcas*, *Eulepidotis modestula*, *Oiketicus kirbiyi* and *Pericalia ricini*. The tree is also a host to parasitic plants such as *Dendrophoe falcata* and *Loranthus* spp. Pathogenic fungi that attack the tree include *Armillaria*, *Calonectria*, *Camillea*, *Cercospora*.

FURTHER READING

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SUGGESTED CITATION

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