Copaifera langsdorfii

Desf.

Fabaceae - Caesalpinioideae

óleo de copaíba, baume de San Paulo, bálsamo

LOCAL NAMES
English (diesel tree); French (copahu); German (copaiva); Portuguese (copaiba); Spanish (kupay,cupay,cabismo); Trade name (óleo de copaíba,baume de San Paulo,bálsamo)

BOTANIC DESCRIPTION
Copaifera langsdorfii is an evergreen tree to 6-12(-35) m tall, and 1m diameter.

Leaves paripinnate, glabrous, subcoriaceous, 5-10cm long; leaflets 2-4 pairs, opposite or semi-alternate, petiolulate, elliptic ovoid, 2-6cm long, 1.2-2.5cm broad, with finely pinnate reticulate nervation, glandular-punctate.

Flowers in terminal racemes to compound panicles with numerous, subsessile whitish flowers. Sepals 4, lanceolate, concave, firm, glabrous outside, pubescent inside. Petals absent. Stamens free, (8)10, anthers elliptic, versatile. Ovary hirsute, briefly stipitate.

Fruit ovoid, compressed, 2 x 3cm, coriaceous, with one large seed partially covered with a thick aril.

BIOLOGY
C. langsdorfii shows a tendency towards a tri-annual reproductive pattern and partial deciduousness, with most leaf fall occurring during the dry season. Apis mellifera and Trigona spp. are important pollen vectors for C. langsdorfii.

ECOLOGY
Copaiba is a climax species probably ranging from subtropical to tropical dry and wet forest, it is found in both riparian forest and montane semi-deciduous forest. The tree tolerates annual precipitation of 1000-4000mm, annual temperature of 20-27 deg C (with no frost), and soil pH of 4.5-7.5.

BIOPHYSICAL LIMITS
Mean annual temperature: 20-27 deg C
Mean annual rainfall: 1000-4000mm
Soil type: Copaiba grows well on dark-red latosols and lithosols, it tolerates soil pH of 4.5-7.5 and some waterlogging.

DOCUMENTED SPECIES DISTRIBUTION

Native: Argentina, Brazil, Paraguay, Venezuela
Exotic:

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
Apiculture: Bees are major visitors of the tree for pollen.

Fuel: The balsamiferous wood, with density of 700-900 kg/cu m, burns readily, perhaps even when green. The hydrocarbon obtained from the trunk can be used directly by a diesel-powered car.

Timber: The timber is highly resistant to natural decay caused by Gloeophyllum trabeum, Coriolus versicolor and Poria monticola. The wood is used in carpentry.

Gum or resin: The oleoresin called copaiba is obtained by incising the trunk. The hydrocarbon is used as an emollient and for other non-energy-related purposes by the natives. The copal is used in lacquers, massage preparations, medicines, and paints. Copaiba is thin and clear but on aging becomes thick and acquires a yellowish tinge.

Poison: It creates an irritant action on the whole mucous membrane, causes an eruption resembling measles attended with irritation and tingling.

Medicine: The balsam is stimulant, diuretic, carminative and laxative; in large doses it is purgative, causing nausea, vomiting strangury, bloody urine, and fever. A good remedy for chronic catarrh and bronchitis, as it assists expectoration and is antiseptic; given with advantage in leucorrhoea, chronic cystitis, diarrhoea, and hemorrhoids. It is chiefly used in gonorrhea (though not advocated for chronic cases), often combined with other substances. It has also been recommended externally for chilblains. It is considered a valuable hydragogue diuretic in obstinate dropsy. The resin, not the oleoresin, is used as diuretic. This species is a folk remedy for dermatosis, eczema, and gonorrhea. In Panama, Yaviza negros mix cabismo resi with honey and give it to the newborns, to impart knowledge and ward off hexes. The gum is also used for treating venereal diseases and for massage.

Other products: From the wood polyalthic acid; (-)-jkaur-16-en 19-oic acid, (-) 16 betakauren- 19-oic acid and eperu-8(20)-en-15,18-dioic acid diterpenoids have been isolated. An extremely potent antitumour neo-clerodane diterpene, (-)-kolavenol, has been isolated from the oleoresin of C. langsdorfii. (-)-Kolavenol exhibited activity against IMC carcinoma as determined from the increase in lifespan of treated mice.

TREE MANAGEMENT
Planting at a spacing of 3 x 1.5m, C. langsdorfii showed high growth rate in height and stem diameter after 5 months. Reports of 40 liters yields of hydrocarbon per tree per year have been recorded.

GERMPLASM MANAGEMENT
Seed storage behaviour is orthodox. Viability is maintained after 8 months storage at 7.8% moisture content and 3 deg C.

PESTS AND DISEASES
A lepidopterous pest of C. langsdorfii in Brazil was provisionally identified as a species of Stenoma near S. assignata.

FURTHER READNG

Crestana C de SM and Kageyama PY. 1989. Pollination biology of oleo-de-copaiba (Copaifera langsdorfii). Revista do Instituto Florestal. 1(1): 201-214.

Hong TD, Linington S, Ellis RH. 1996. Seed storage behaviour: a compendium. Handbooks for Genebanks: No. 4. IPGRI.

Langenheim J.H. 1981. Terpenoids in the Leguminosae. In: R.M. Pollhill and P.H. Raven (eds.), Advances in legume systematics. 2 vols. Royal Botanic Gardens, Kew. 627-655.

Macedo CA and Langenheim JH. 1989. Intra- and interplant sesquiterpene variability in Copaifera langsdorfii: relation to microlepidopteran herbivory. Biochemical Systematics and Ecology. 17(7-8): 551-557.

SUGGESTED CITATION

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. Agroforestree Database:a tree reference and selection guide version 4.0 (http://www.worldagroforestry.org/af/treedb/)