Guaiacum officinale

L.

Zygophyllaceae

common lignum-vitae

LOCAL NAMES
Creole (gayak fran,gayak); Danish (frazostraee); Dutch (pokhout); English (lignum-vitae tree,gum guaiacum,guaiacum); French (arbre de vie,bois saint,gaïac,gaïac bâtard,gaïac franc,gaïac mâle,gaïac officnale); German (Guajakholz,franzosenholz); Italian (guajaco,legno guajacano,legno santo); Portuguese (guyaiaco); Spanish (palo santo,guayacan,guayaco,leno santo,bakaut,pano santo de las Indias); Swedish (fransosenholts); Trade name (common lignum-vitae)

Purple flowers emerging on tree in Motagua valley, Guatemala (Anthony Simons)

BOTANIC DESCRIPTION
Guaiacum officinale grows to a height of 9-12 m. Stem is generally crooked, wood intensely hard, the branches knotty and bark deeply furrowed. The dense crown of close-growing foliage gives the tree a rounded, compact, net appearance.

Each leaf is composed of 2 or 3 pairs of smooth, stalkless leaflets arranged on a slender mid-rib. The leaflets are 6-13 cm in length. There is much irregularity both in their size and shape: some are broadest above the middle (obovate), some almost blunt (obtuse).

Beautiful blue flowers grow in great profusion and almost cover the tree and remain for a long time. As the older blooms fade from deep blue to paler shades, some becoming almost white, a striking variegation of colour is produced. The flowers grow in clusters at the ends of the branches. Each flower has 5 petals cupped in a small, finely hairy calyx, supported on a slender stalk. There are 10 stamens bearing golden yellow anthers.

The fruit appears as small, round, compressed, yellow capsules, containing 5 cells; occasionally there are fewer. Each cell encloses a single seed.

The generic name is derived from the Spanish one, ‘guayacan’ or ‘guayaco’, which itself originated from ‘hoaxacan’, the Mexican appellation of the plant. The specific name officinale means ‘officinal’, ‘used of medicinal or other plants procurable at shops’, or ‘used or recognized in pharmacy or medicine’.

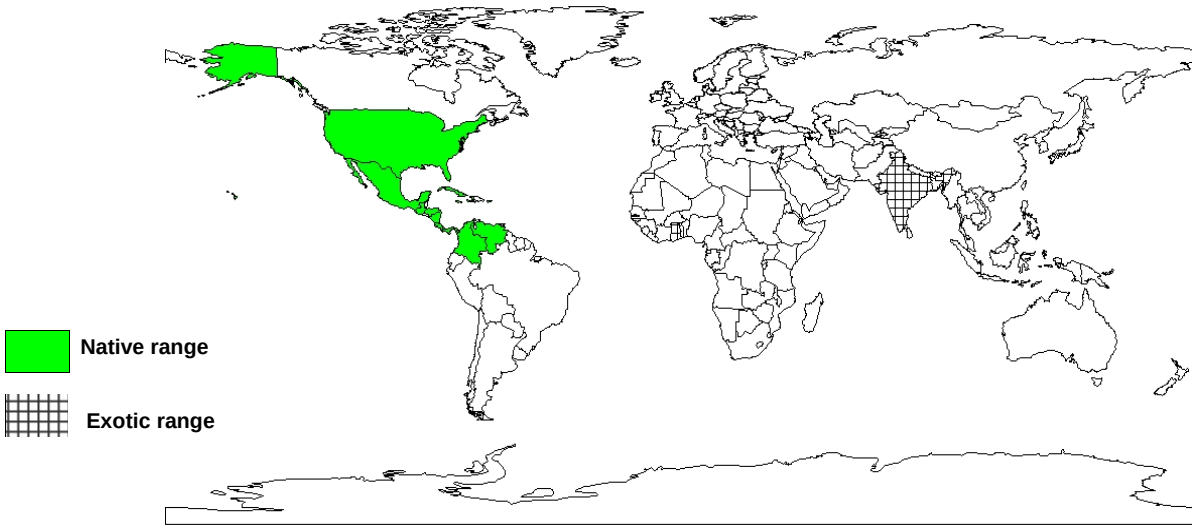
BIOLOGY
In India the tree flowers at the end of the cold season and the commencement of the hot weather. In Bombay some of the trees bloom the whole year round.

ECOLOGY
G. officinale is an inhabitant of the West Indies, whence it has been introduced into India. It also grows in the arid plains stretching form the Florida Keys of USA to Venezuela.
It is also credited to the natural flora of Honduras and Panama.

DOCUMENTED SPECIES DISTRIBUTION

Native: Antigua and Barbuda, Bahamas, Barbados, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Puerto Rico, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Trinidad and Tobago, US, Venezuela, Virgin Islands (US)

Exotic: Ghana, India



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
Timber: The heartwood is greenish-brown; sapwood pale yellow, and usually thin, though if the logs have lain for a long time on the ground or in the water it may be entirely absent. Its great strength and tenacity, combined with the self-lubricating properties due to the resin content, make this wood especially adapted for bearing underwater. It is remarkable for the direction of its fibres, each layer of which crosses the previous diagonally. The most important as well as the most exacting use for it is for bearing or bushing blocks lining the stern tubes of propeller shafts of steamships. Other uses are mallets, pulley sheaves, caster wheels, bowling balls, masthead trucks, stencil and chisel blocks, cable dressers, and turned novelties; it is employed to a limited extent for brush backs. Steel and tube mills are made using lignum-vitae in increasing amounts to replace brass and babbit metal for bearings in roller mills and pumps, as the initial cost is less than metal, the life is several times longer, and lubrication is unnecessary. When rubbed and heated it gives off a faint, disagreeable aromatic odour, its taste is pungent and aromatic.

Gum or resin: The most important product of G. officinale is resin obtained from the wood and bark, and used in powder, pill and tincture. It is an acrid stimulant and has been found efficient against various diseases, for example it is an ingredient of the well-known Plummer's Pills, and is also one of the chief means employed to detect bloodstains. The resin known as 'guaiac' or guaiaci resin' which is some demand by the drug trade, is extracted with alcohol or ether from sawdust and wood waste. It is obtained also in the form of exudations, called 'tears', from the living tree, or by heating sticks of the wood or by boiling chips and sawdust in water. The deep reddish brown colour of the resin changes upon oxidation to a blue or blue-green, a property made use of for differential staining. It has a brilliant resinous fracture. Of taste there is scarcely any, but it leaves a burning sensation in the mouth.

Medicine: Apothecaries use shavings and raspings of the wood for medicinal purposes, in the same way the bark is employed for medicine. Resin is applied to the tooth for a toothache, and applied externally for rheumatism. For gout, blood pressure and arteriosclerosis resin is taken orally.

SERVICES
Ornamental: G. officinale is distinctly ornamental on a lawn and is popular in Ghana and India.

TREE MANAGEMENT
The resin sometimes flows spontaneously from the stem of the tree; at other times, it is obtained artificially by jagging or notching the stem and allowing the exuding juice to harden, or by boring holes in logs of the wood and then placing them on a fire so that the resin is melted and runs through the hole, or by boiling chips in salt and water, when the resin floats on the surface of the water.

FURTHER READNG

Anon. 1986. The useful plants of India. Publications & Information Directorate, CSIR, New Delhi, India.

Blatter E and Millard SW. 1954. Some beautiful Indian trees. 2nd Ed. Bombay Natural History Society. Bombay, India.

CABI. 2000. Global Forestry Compendium. CD-ROM. CABI

Cowen DV. 1984. Flowering trees and shrubs in India. Thacker and Co. Ltd. Bombay.

Lanzara P. and Pizzetti M. 1978. Simon & Schuster's Guide to Trees. New York: Simon and Schuster

Record SJ. 1972. Timbers of the New World. Yale University Press.

Timyan J. 1996. Bwa Yo: important trees of Haiti. South-East Consortium for International Development. Washington D.C.

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/)