

## Hymenaea courbaril

West Indian locust

### LOCAL NAMES

Chamorro (kawanari); Creole (gòm anime, koubari, courbaril); Dutch (rode lokus); English (Brazilian cherry, Brazilian copal, cayenne copal, copal, demarara copal, kerosene tree, stinking toe, Latin American locust); French (gomme animée, pois confiture); Portuguese (jatobá); Spanish (algarrobo, curbaril, cuapinol, jataí, guapinol, azúcar huayo, algarrobo de la antillas, algarrobo das antilhas, jutaby); Trade name (West Indian locust)

### BOTANIC DESCRIPTION

*Hymenaea courbaril* is a tree usually 30-40 m high, sometimes reaching 50 m in high forest; trunk up to 2 m in diameter, bark usually smooth, greyish, 1-3 cm thick and red internally; in the forest branching 10-20 m above ground level, much lower in exposed sites, crown wide and open or dense; root system fairly superficial with large roots often seen on the surface.

Leaves alternate, compound, bifoliate; stipules soon falling; petiole 12-30 mm long; leaflets 2, ovate to lanceolate, curving slightly towards each other, 3-12 x 1.5-7 cm, apex acute to obtuse, base oblique, margins entire, glabrous, shiny and leathery with small glands and prominent veins below, petiolules 2-8 mm long.

Inflorescence a short, terminal panicle with few branches and flowers; flowers bisexual; pedicels 3-10 mm long. Sepals 4, concave, oblong-obovate, 12-22 mm long, stamens 10, filamentous, anthers 3-8 mm long, ovary 1-locular, ovules 6-18 or more.

Fruit an indehiscent oblong pod, 8-15 x 3-5 cm, pericarp dull dark brown, hard, woody, about 5 cm thick; seeds 1-6, light to dark brown, hard, flattened, obovoid to ellipsoid, 1-2 cm long, surrounded by a dry, creamy brown or greenish pulp. Pods weigh 10-50 g and the pulp accounts for less than 20% of this weight.

### BIOLOGY

Flowers during the dry season and the early rainy season. Flowers are believed to be pollinated by bats such as *Coptotermes curvignathus*. The fruits mature chiefly during the rainy season, especially late in the rainy season when the leaves fall. *H. courbaril* fruits at 8-12 years of age. Gravity is the only important means of dispersal in many of the Caribbean islands. On the mainland of Central and South America, seeds are transported by agouties and peccaries, both of which open the pods and eat the pulp and sometimes the seeds.

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Fabaceae - Caesalpinioideae



*H. courbaril* pod (Anthony Simons)



Seed orchard in Honduras (Anthony Simons)



Flowers of *H. courbaril*. (Colin E. Hughes)

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### ECOLOGY

*H. courbaril* occupies a wide range of habitats. It has been reported in tropical dry forest, transition to premontane moist forest, and tropical wet forest as well as subtropical moist forest. Tolerates not only poor fertility and waterlogging but also 4 months or more of drought, with temperatures typical of the wet lowland tropics, that is, diurnal temperature fluctuations are normally greater than seasonal temperature changes. The precipitation may be evenly distributed through the year or monsoonal. The tree develops best on ridges or slopes and high riverbanks.

### BIOPHYSICAL LIMITS

Altitude: 0-900 m, Mean annual temperature: 20-30 deg. C, Mean annual rainfall: 1500-3000 mm

Soil type: Tolerates and will grow on all textures of soil from sand to clay but develops best on deep, fertile, moist and well-drained sandy soils; pH 4.8-6.8.

### DOCUMENTED SPECIES DISTRIBUTION

Native: Antigua and Barbuda, Barbados, Belize, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, French Guiana, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Puerto Rico, Surinam, Trinidad and Tobago, Venezuela

Exotic: Bahamas, Chile, Grenada, Montserrat, Netherlands, Paraguay, Philippines, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, United States of America, Uruguay, Virgin Islands (US)



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**

**Food:** Seed pods contain an edible powdery pulp. This pulp contains 3.2% sugar, 1.1% fat, and 35.8% crude fibre. It has its own peculiar smell and sweet flavour, slightly reminiscent of bananas, and is generally considered pleasant but not very attractive. The texture is that of dry flour turning to a paste in the mouth, and some people find this unpleasant. It is very dry and largely starchy, so it is a good source of calories. Jatoba bark tea is a quite popular drink for lumberjacks working in the forests in Brazil, because it is a natural energy tonic.

**Fodder:** The pods and leaves are not eaten. The seeds and pulp are removed from the pod, ground and readily consumed by livestock.

**Timber:** The hard, durable, tough wood is one of the best from the region. Heartwood is salmon pink to orange-brown when fresh, becoming russet to reddish-brown when seasoned; often marked with dark streaks. Sapwood is usually wide, white, grey, or pinkish. Texture is medium to rather coarse; grain mostly interlocked; golden lustre, without distinctive odour or taste. The wood is moderately difficult to saw and machine, largely because of its high density, but except in planing it can be machined to a smooth surface. It is easy to glue and finish satisfactorily. Wood very resistant to brown-rot and white-rot fungi. Heartwood is also rated very resistant to dry-wood termites; it has little resistance to marine borers. This important timber tree is used for furniture (sometimes compared with mahogany), carpentry, general construction, wheels and cogs, dugouts, shipbuilding, posts, looms, cartwheels and rail ties. The wood is also attractive for cabinetwork, musical instruments, interior trim, plywood, turnery, and veneer.

**Gum or resin:** The roots and trunk yield a pale yellow or red resinlike gum known commercially as South American copal. The gum exudes and forms hard lumps that become buried in the soil at the base of a tree. Sometimes as much as a barrel of gum has been found around the roots of a large tree or at the site of a former tree. The gum is used mainly in varnish but also for incense and local medicines. The copal is also used for patent leather and in stains for tin ware. About 35 tonnes/year are collected in Brazil for local use.

**Tannin or dyestuff:** The thick bark is a good source of tannin.

**Medicine:** The bark is common in local folk medicine as a cure-all, being especially useful for coughs. Besides being used to give energy and stamina, jatobá tea has been used for centuries as a tonic for the respiratory and urinary systems by the indigenous people of the Amazon Basin. Jatobá is known for its ability to fight fungus and yeast such as *Candida albicans*.

Macerated bark is used for diarrhoea. The bark, sap or resin, and leaves are used medicinally for cystitis, hepatitis, prostatitis and cough. The sap is used for coughs and bronchitis, and a bark tea is used for stomach problems as well as athlete's foot and foot fungus. In Brazilian herbal medicine today, jatobá bark and resin are still recommended for the same indications and problems as they have been since the 1930s, documented to be tonic, stomachic, astringent, balsamic, vermifuge, and haemostatic. The fruit is used to treat mouth ulcers, and the leaves and wood are used for diabetes.

**SERVICES**

**Shade or shelter:** A suitable species when planted as a shade tree and has occasionally been used for coffee shade.

**Ornamental:** *H. courbaril* is used to some extent as an ornamental in parks and gardens.

**TREE MANAGEMENT**

*H. courbaril* seedlings grow at an angle with a drooping leader, a habit that may persist for 2 or 3 years. Open planting sites and good weed control until the seedlings reach about 2 m is important for best planting stock. Rate of growth is steady, and yields are large with some trees capable of producing several thousand pods a year. Considering the tree is a hardwood, seedling growth is rapid and under 50% shade reaches a height of about 78 days after germination. Trees may reach a height of 8 m in 5 years and 18.5 m in 16 years. The species is intolerant to shade when mature. Planting in the open, for shade and ornamental purposes, produces attractive and spreading trees more rapidly. *H. courbaril* coppices well and thus maintains itself in frequently cut-over areas; however stumps of large trees do not coppice.

**GERMPLASM MANAGEMENT**

Seeds germinate in 20-30 days with 40-90% success. Scarification of seeds by nicking or soaking for 1 hour in concentrated sulphuric acid increases germination percentage and reduces germination time. Orthodox seed storage behaviour; seeds can be stored for as long as 12 months in dry conditions with little loss of viability. Seeds that are to be stored for more than 1 year should be refrigerated at 2-4 deg. C in a sealed container; germination following 2 years in hermetic air-dry storage at 3-5 deg. C was 29%. There are approximately 270 seeds/kg.

**PESTS AND DISEASES**

A weevil (*Rhinochelus* spp.) bores through seedpods and eats the seeds in Costa Rica and Trinidad and Tobago. Other insects (*Acanthoscelides* spp., *Hypothenemus buscki* and *Myelois decolor*) feed inside seedpods in Puerto Rico. An unidentified insect cuts twigs and branches after depositing eggs in Trinidad and Tobago. Leaf-cutter ants (*Atta* spp.) harvest young leaves in Costa Rica. In the Caribbean, wet-wood termites (*Nasutitermes costalis* and *N. nigriceps*) eat dead wood, and marine borers (*Toredo* spp.) attack wood.

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### FURTHER READING

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### SUGGESTED CITATION

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