

LOCAL NAMES

Creole (piyon); English (gliricidia, tree of iron, St. Vincent plum, Mexican lilac, mother of cocoa, quick stick, Nicaraguan cacao shade); Filipino (kakwate, madre-cacao, kakawate, kukuwatit, balok-balok, apatot); French (lilas étranger, madre de cacao, immortelle); Indonesian (gamal, liriksida); Javanese (gamal); Lao (Sino-Tibetan) (kh'è: no:yz, kh'è: fàlangx); Malay (bunga Jepun); Portuguese (madre de cacao); Sinhala (maikona gaha); Spanish (bien vestida, desnodo florecido, floresco, piñón florido, amory celos, palo de parque, piñón de cuba, almacigo extranjero, mataraton, varita de San José, mata ratón, madre de cacao, madre negro, piñón amoroso); Thai (kha farang, khae-farang); Vietnamese (anh dào gisa, anh d[af]o g[is]a, sát thu, s[as]t thu, hông mai, h[oo]ng mai)

BOTANIC DESCRIPTION

Gliricidia sepium grows to a height of 2-15 m, has a medium crown and may be single or multistemmed. The bark colour is variable but is mainly greyish-brown, and it can be much fissured. The tree has deep roots when mature.

Leaves are alternate and pinnate with (min. 7) 13-21 (max. 25) leaflets, papery, oblong with a distinctive pointed tip. Leaflet size increases towards the distal end of the leaf. At maturity, the upper surface ranges from smooth and hairless to bristly and usually has no tanniniferous patches. The lower surface can also be smooth and hairless or bristly but commonly has purplish tanniniferous patches concentrated toward the centre of the lamina.

Flowers arranged on conspicuously short, upward-curving to erect inflorescences, which are usually pink, fading to whitish-brown or pale purple with age.

Pods explosively dehiscent, strongly laterally compressed and pale green or reddish-pink when unripe, turning pale yellow-brown when fully ripe. Seeds transversely oriented, lenticular, not constricted in the middle. Seeds uniformly light brown, turning dark brown with age; 3-10 seeds in a single pod.

The generic name *Gliricidia* refers to "mouse killer" in Latin, and the species epithet is named from the Latin *saepes* meaning hedge.

BIOLOGY

G. sepium has hermaphrodite flowers and is strongly outcrossing with a robust self-incompatibility mechanism. It is insect pollinated, the most frequent visitor being the black bee, *Xylocopa fimbriata*. In natural populations, timing of flowering and seed production are predictable and uniform within a population, although there is no strict synchrony in flowering. In many parts of the naturalized range and where *G. sepium* is an exotic, flowering can occur any time of the year if there is no pronounced dry season; 10 days after the 1st petals emerge, and when they are approximately 15 mm long, the flower has fully opened. Individual flowers persist for a variable length of time depending on climatic conditions, but most last only 24-48 hours.

Pod-ripening time ranges between 35 and 60 days. Pods can grow to full size within 3 weeks of fertilization. On maturity, pods dehisce explosively; tension builds up in the pod valves and the seeds are ejected to a distance of 25 m. This phenomenon facilitates rapid establishment, especially in disturbed sites. Wind plays a part in the direction of seed dispersal. Secondary dispersal by rain is also possible.



Seed collection in La Garita, Honduras
(Anthony Simons)



Flowers in seed orchard, Honduras
(Anthony Simons)



Dissection of mature but un-opened flower
(Anthony Simons)

ECOLOGY

G. sepium occurs naturally in early and middle successional vegetation types on disturbed sites such as coastal sand dunes, river banks, floodplains and fallow land. It establishes well on steep slopes (40% gradient). Temperatures below 15 deg. C cause leaf fall and poor growth.

BIOPHYSICAL LIMITS

Altitude: 0-1200 (1 600) m, Mean annual temperature: 15-30 deg. C, Mean annual rainfall: 600-3500 mm

Soil type: Ranging from pure sand to deep alluvial lake-bed deposits. In much of its natural range the soils are acidic (pH 4.5-6.2); however, where parent material is limestone, the soils are slightly alkaline. It performs well on marginally saline vertisols but will not tolerate very acidic soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, United States of America

Exotic: Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Benin, Bolivia, Brazil, Burkina Faso, Cameroon, Chad, Chile, Colombia, Costa Rica, Cote d'Ivoire, Cuba, Dominica, Dominican Republic, Ecuador, French Guiana, Gambia, Ghana, Grenada, Guadeloupe, Guinea, Guinea-Bissau, Guyana, Haiti, India, Indonesia, Jamaica, Kenya, Laos, Liberia, Malaysia, Mali, Martinique, Mauritania, Montserrat, Netherlands Antilles, Niger, Nigeria, Paraguay, Peru, Philippines, Puerto Rico, Senegal, Sierra Leone, Sri Lanka, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Surinam, Tanzania, Thailand, Togo, Trinidad and Tobago, Uganda, Uruguay, Venezuela, Vietnam, Virgin Islands (US), 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

Food: Flowers can be fried and eaten.

Fodder: *G. sepium* leaves are rich in protein and highly digestible, and low in fibre and tannin. There is evidence of improved animal production (both milk and meat) in large and small ruminants when *G. sepium* is used as a supplement. Goats on *G. sepium* gained weight and maintained a positive N balance. However, non-ruminants fed on *G. sepium* have shown clear signs of poisoning. Perceptions of palatability vary greatly around the world. There are reports from India and Indonesia of limitations to its use because animals will not eat it. In some areas, such as Colombia and Sri Lanka, there is no palatability constraint and it is an important dry-season feed.

Apiculture: The flowers attract honeybees (*Apis* spp.), hence it is an important species for honey production.

Fuel: Often used for firewood and charcoal production. The wood burns slowly without sparking and with little smoke, so it is an important fuelwood in the subhumid tropics. The calorific value of a 5-year-old tree is 4550 kcal/kg.

Timber: *Gliricidia* has light brown sapwood and dark brown heartwood, turning reddish-brown on exposure to air. It is hard, coarse textured with an irregular grain, very durable and termite resistant. Wood is utilized for railway sleepers, farm implements, furniture, house construction and as mother posts in live-fence establishment.

Poison: The leaves, seeds or powdered bark are toxic to humans when mixed with cooked rice or maize and fermented. The mechanism of toxicity is not understood. *G. sepium* has found application as a rodenticide and general pesticide.

Medicine: Crude extracts have been shown to have antifungal activity. Reported to be expectorant, sedative and suppurative. Madre de cacao is a folk remedy for alopecia, boils, bruises, burns, colds, cough, debility, eruptions, erysipelas, fever, fractures, gangrene, headache, itch, prickly heat, rheumatism, skin tumours, ulcers, urticaria and wounds.

SERVICES

Erosion control: Hedgerows in alley cropping serve to suppress weed growth and control erosion and have been shown to reduce the incidence of disease in groundnut crops.

Shade or shelter: *G. sepium* is widely cultivated as shade for perennial crops (tea, coffee and cocoa). It is also used as a nurse tree for shade-loving species. Attributes contributing to its value as a shade tree include its fine, feathery foliage giving light shade, and the ability to withstand repeated pruning and to resprout vigorously.

Reclamation: *G. sepium* has been planted to reclaim denuded land or land infested with *Imperata cylindrica*.

Nitrogen fixing: The tree is capable of fixing atmospheric nitrogen.

Soil improver: As a green manure, *G. sepium* increases soil organic matter; it aids in recycling of soil nutrients as it produces much litter. It also improves soil aeration and reduces soil temperature. It is a drought-resistant and valuable water-conserving species, because in the dry season it sheds most of its leaves, hence reducing water loss through transpiration.

Boundary/barrier/support: Suitable for live fencing around cattle pastures and for delineating boundaries. Its fast growth, ease of propagation, nitrogen fixing ability and light canopy makes it ideal as a live stakes. It has been used to support black pepper, vanilla and yam in West Africa and India.

Other services: The predictable relationship between flowering in *G. sepium* and the onset of the rainy season in Venezuela shows that it is a promising indicator species.

TREE MANAGEMENT

Pruning and pollarding are the main management activities. Pruning at 0.3-1.5 m will stimulate leaf production. Pollarding at 2 m or above is recommended for optimal wood biomass production. Coppicing is used where the primary objective is fuelwood production. *G. sepium* has been shown to tolerate lopping and browsing.

GERMPLASM MANAGEMENT

Seed storage behaviour is orthodox. Viability is maintained for 12 months in open storage. There are about 8500 seeds/kg.

PESTS AND DISEASES

Cercosporidium gliricidiasis, causes small, light brown, rounded spots with dark borders and is widely recorded. Other diseases include *Sirosporium gliricidiae*, which is associated with poor-growing trees, on which attacks can often result in moderate defoliation; *Cladosporium* sp., which caused defoliation in Costa Rica; and scab, *Sphaceloma* spp., which is manifested as brown lesions on the petioles and stems, has been found in Honduras. Of significant interest is the fact that it is resistant to the psyllid *Heteropsylla cubana*, which has caused serious devastation to *Leucaena leucocephala*.

Twig, stem and branch die-back caused by *Botryosphaeria*, *Nectria* and *Phomopsis* spp. have been recorded in Central America, Asia and Africa. Virus-like symptoms, including leaf curl, shoestring leaves, foliar distortion, mosaic, and mottle, have been noted in Central America. Leaf defoliators such as *Hylesia lineata*, *Erynnis* spp. and *Spodoptera* spp. have been reported to attack trees less than 3 years old as well as older trees in Central America. The aphid *Aphis craccivora* has been reported widely in India, Uganda and Trinidad. There have been no serious attacks from these insect pests except in the Dominican Republic, where serious aphid attacks have been recorded.

In its natural range, *G. sepium* has been observed to die back extensively following production of abnormally small leaves (little leaf disease).

FURTHER READING

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SUGGESTED CITATION

Gliricidia sepium

(Jacq.) Walp.

Fabaceae - Papilionoideae

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