SEED LEAFLET

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Gliricidia sepium (Jacq.) Steud.

Taxonomy and nomenclature

Family: Fabaceae (Papilionoideae)

Synonyms: *Gliricidia lambii* Fernald, *G. maculata* var. *multijuga* Micheli, *Lonchocarpus roseus* (Miller) DC., *L. sepium* (Jacq.) DC., *Millettia luzonensis* A. Gray, *Robinia rosea* Miller, *R. sepium* Jacq., *R. variegata* Schltdl.

Vernacular/common names: mother of cocoa, Mexican lilac, gliricidia (Eng.); madre de cacao, madreado, madero negro (Sp.); quick stick (Jamaica).

Related species of interest: the genus comprises two other species, *G. maculata* and *G. brenningii* but only *G. sepium* is grown outside its native range in tropical America. *G. sepium* is distinguished from the other two species by having erect inflorescences, pink flowers and leaflets with pointed tips.

Artificial hybrids between *G. maculata* and *G. sepium* have been created but it is uncertain whether hybrids occur under natural conditions. The hybrids created in the trial showed little potential for planting.

Distribution and habitat

The true native distribution is obscured by early cultivation, but circumstantial evidence suggests that it is limited to the seasonally dry deciduous forests of the Pacific coastal lowlands and some dry inland valleys of Central America and Mexico. For several centuries it has been introduced outside tropical America and is now distributed all over the tropics. In many places where it grows as an exotic, the introduction originates from a narrow genetic base and several local land races suffer from inbreeding.

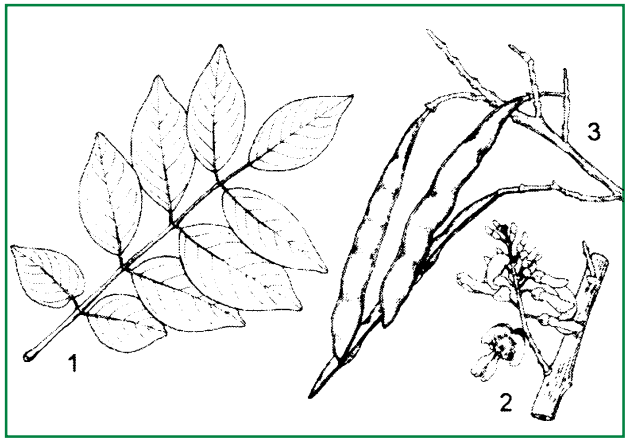
It is a pioneer species that readily colonises open ground and is used for reclaiming *Imperata* grasslands. It can grow in a wide range of habitats and soil types ranging from pure sand to deep alluvial lake bed deposits, with rainfall from 600-3500 mm/year and from sea level up to 1200 m altitude. It is rarely found at higher altitudes as prolonged frost will kill the trees and even occasional frost can cause leaf drop and dieback. Although it grows well in areas with high rainfall, a dry season of 8-13 weeks is necessary for seed production. As an aggressive coloniser it has the potential to become a weed but is rarely so perhaps because it in most places is coppiced regularly and not permitted to set seed.

Uses

Gliricidia is the quintessential multipurpose tree. It is probably the most common living fence species in the tropics. The ability to resprout vigorously and repeatedly after cutting allows a high production of animal fodder, fuelwood and poles. Under optimal conditions the annual biomass yield may be as high as 12 t dry weight per ha.

The nitrogen-fixing properties and leaves that can be used for mulch and green manure make it highly suitable in agroforestry systems. The name 'mother of cocoa' is due to the species being used as shade tree for cocoa, coffee and tea. The tolerance to cutting allows manipulation of the canopy to vary the intensity of shading at different times of the year.

The wood is hard and durable with a density of 0.5-0.8g/cm^3. It burns slowly, with little smoke and no sparks and has a calorific value of 4900 kcal/kg.



1, Leaf; 2, flowering branch; 3, fruiting branch. (Hanum and van der Maesen, 1997)

Botanical description

Single to multi-stemmed tree, rarely shrubby, 2-15 m tall. Stems erect, 5-30 cm diameter at base, with or without branches from near the base. Bark greyish-brown with minute furrows on older stems. Leaves pinnately compound, 19-30 cm long, normally with 13-21 leaflets. Leaflets opposite, 4-8 cm long, normally with pointed tips, rarely rounded. The size of the leaflets increases towards the tip of the leaf.

Flowers light-pink to pinkish, rarely white, in 2.5-15 cm long, erect inflorescences.

Fruit and seed description

Fruit: 10-17 cm long pod, light to dark reddish-brown, with short stalk and slightly constricted between the seeds. The valves are woody at maturity and the pod is explosively dehiscent. There are 3-10 seeds per pod.
Seed: round, 8.5-11.5 mm in diameter, uniformly brown. The number of seeds per kg varies between 4,500 and 11,000, typically about 8,000.

Flowering and fruiting habit

The species is strongly outcrossing and although mating between related individuals occurs, it does not tolerate a high level of inbreeding. Studies have shown that the percentage of ovules that develop into seeds is correlated to how closely related the parent trees are. The closer the parent relationship is, the smaller is the seed:ovule ratio.

Within the native range the flowers are pollinated by nectar-seeking bees, especially the large black bee, *Xylocopa fimbriata*. The low seed setting that is seen in some parts outside the native range may be caused by lack of pollinators.

In areas with pronounced dry season, the trees are deciduous, shedding their leaves during the dry season and flowering and fruiting while leafless. In Central America flowering occurs in December-March in the beginning of the dry season and seeds mature one or two months later. In non-seasonal, humid areas the trees may be evergreen and flowering sporadic. In these areas seed setting is often low.

Harvest

The pods are normally harvested just before they open when they are dry but it is possible to collect the pods up to two weeks before opening. The green pods must then be after-ripened in the shade in a well-ventilated place.

Processing and handling

The ripe pods are dried in the sun until they open. As the pods almost explode when they open, the drying patio must be covered with nets or alternately the pods can be dried in mesh bags.

Storage and viability

The seed is orthodox and at low moisture content (6-10%) at 4°C it can be stored for over 10 years without loss of viability.

Dormancy and pretreatment

The seed has no dormancy and pretreatment is not necessary.

Sowing and germination

Seeds are sown in containers and the seedlings are ready for planting out after 2-3 months when they are about 30 cm tall. Direct sowing is possible with 2-3 seeds per site at a depth of 1-2 cm. Site preparation must be carried out before sowing and followed by weeding until the trees are established.

Vegetative propagation by cuttings is easy. Both large and small cuttings can be used but it is important that the cuttings are taken from branches that are straight and healthy and without side branches. Trees that are established from cuttings have shallow root systems and short bole and are less resistant to strong winds.

Selected readings

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Iji, P.A., G. Tarawali and M.Baba. 1993. *The influence of stage of development and sowing depth on seed quality and seedling emergence of Gliricidia sepium*. Seed Sci. & Technol., 21, 197-202.

Stewart, J.L., G.E. Allison and A.J. Simons (eds). 1996. *Gliricidia sepium. Genetic resources for farmers.* Oxford Forestry Institute.

Live fences. Cochabamba, Bolivia. *Gliricidia sepium* is often used for live fences managed by regular pollarding. Photo: D. Jøker, DFSC.

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