Lecythis ampla Miers

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LECYTHIDACEAE (BRAZIL-NUT FAMILY)

Lecythis ampullaria Miers (Transactions of the Linnean Society of London 30[2]: 201, t.38, f.1-2; 1874); *Lecythis bogotensis* Miers (Transactions of the Linnean Society of London 30[2]: 203-204, t.41; 1874); *Lecythis costaricensis* Pittier (Contributions from the U.S. National Herbarium 12: 99, t. 6-8, f. 3-4; 1908); *Lecythis curranii* Pittier (Contributions from the U.S. National Herbarium 20[3]: 130; 1918); *Lecythis armiliensis* Pittier (Contributions from the U.S. National Herbarium 26[1]: 9, t.8; 1927); *Lecythis boyacensis* R. Kunth (Das Planzenreich IV. 2190 [Heft 105]: 55-56; 1939)

Coco de mono, coco salero, jícaro, monkey pot, olla de mono, pansuba, sapucaia
(Flores 1994d; Mori and others 1978, 1990a; Pittier 1910; Prance and Mori 1978)

Lecythis ampla is an endemic species and its range of distribution extends throughout Central America along the Atlantic watershed, from southern Nicaragua down to Darien, Panama. The geographical range in South America encompasses the Magdalena River Valley and the Choco zone in Colombia, as well as the north coast of Ecuador.

Lecythis ampla is a large tree 45 m in height and 1.0 to 1.6 m d.b.h. The bole is straight and cylindrical and lacks branches in the basal two-thirds. It does not have buttresses but shows short, thick abutments. The crown is branched and spherical. The bark is gray (grayish brown in shady places) and has many sharp vertical fissures. The inner bark is 13 to 15 mm thick, brown, laminated, and fibrous due to the high number of phloem fibers. Phyllotaxy is spiral. The tree is deciduous and most leaves abscise before the flowering period. New leaves appear in fluxes and their production is synchronized with the beginning of bloom. Leaves are simple, alternate, petiolate, narrow elliptic or wide elliptic, glabrous, chartaceous, shiny, and hypostomatic (stomata anisocytic) and have abaxial cuticular papillae. The species grows well in alluvial and sandy soils and is frequently found in clayey soils. It does not grow well in periodically flooded areas or poorly drained soils (Flores 1994d). The elevational range of the species is 0 to 800 m (Flores 1994d, Mori and others 1990a). The species is emergent in the canopy of very humid tropical forests, where temperature range is 24 to 35 °C and annual rainfall is more than 3500 mm.

Sapwood and heartwood are quite different. Sapwood is fibrous, creamy in fresh condition and light brown when dried; heartwood is brown in green condition and reddish brown after drying. Growth rings are inconspicuous. The wood has a straight grain, sometimes interlocked, and a regular texture, and it lacks luster; the radial surfaces are finely banded. It is tasteless and odorless. The wood is heavy (green weight 1200 to 1300 kg per m^3, with 93 to 96 percent moisture content; basic specific gravity is 0.70 to 0.74). Volumetric contraction is normal for its density, and mechanical properties are high. The air-dried wood shows small splittings and twistings. It is moderately difficult to work and saw and does not polish well. The silica content is 0.32 percent. Its natural durability is high and preservation is difficult. The Peteri's coefficient of flexibility is 1.03 and the Runkel factor is 4.6 (group V: not useful for making paper). The wood is excellent for ship construction, agricultural tool handles, frameworks, railroad foundations, furniture and cabinets, turnery, heavy general construction, bridge and marine construction (especially in waters with marine borers), piles, posts, and stakes (Flores 1994d, Herrera and Morales 1993, Llach 1971). The bark can be used as oakum, rolling paper for cigars, boat caulking, native clothing, tinder, and cordage; it is also used in tannery because of its high tannin content (Flores 1994d).

Annual flowering occurs during the rainy season, May through July. Inflorescences are terminal or lateral racemes, solitary or grouped (Flores 1994d). The peduncle and the rachis are thick and lenticellate. The flowers are semisessile; pedicels are puberulent and leave a knob (subarticular region) 1 mm long after disarticulating (pedicels split during flower abscission; the abscission zone constitutes the articulation).

The flower is hermaphrodite and zygomorphic. The flower's calyx has six wide ovate lobules; the corolla has six wide elliptic petals, pink or pale purple, fading to white after the anthesis. The zygomorphic, highly specialized androecium has numerous stamens. Filament fusion as well as the degree of specialization produces a complex organ formed by a staminal ring, a ligule (area lacking stamens placed between the staminal ring and the hood), and a hood; this organ is not morphologically equivalent to an androphore or androgynophore. The staminal ring has 130 to 170 stamens, those of the basal zone being fertile; filaments are 1 to 2 m long and are dilated at the distal end. Anthers are basifixed and 0.5 to 0.6 mm long. The hood is flat, pinkish or light purple, with well-developed appendages, the proximal being antheriferous. The hood is strongly compressed against the staminal disc, and the flower androecium is considered closed (Flores 1994d; Mori and others 1990; Prance and Mori 1977, 1979; Tsou 1994). The hypanthium is puberulous. The ovary is inferior, tetracarpelar, and tetralocular with 4 to 10 ovules developed per locule.

A 10-month fruit development period ends with fruit ripening from March to May. Usually, the tree produces one or two fruits per inflorescence. Fruit ripening is quite uniform and crops are annual. The fruit is large but shows strong variation in size and form (20 to 30 cm long by 15 to 20 cm wide) (Flores 1994d). It is a dry pyxidium or circumscissile capsule, woody and ovoid or oblong. The fruit hangs upside down, so when the operculum abscises and falls on the forest floor, the seeds are exposed. Later, gravity or monkey activity causes the fruit to fall (Flores 1994d ; Prance and Mori 1978, 1979).

The mean number of seeds per fruit is 36. Of these, 25 percent are abortive or of a smaller size. Well-developed seeds are large (5.0 to 5.5 cm long by 2.5 to 3.0 cm in diameter) and ovoid, with a dark brown or black seedcoat, thick and longitudinally ridged; the tegmen is collapsed in the mature seed (Corner 1976, Flores 1994d). The micropyle is formed by the exostome. The seed has a prominent aril, funicular in origin, at the proximal end; it is whitish or creamy, broad, fleshy, and oily (Flores 1994d). Seeds average 150 to 160 per kg, with a moisture content of 46 to 48 percent (Flores 1994d).

Seedcoat removal to promote plumule development is not successful. The application of giberellic acid to intact seed, seems to promote plumule development (Flores 1994d).

Seed behavior is recalcitrant. Viability diminishes with increasing dehydration. Seeds collected from the ground should be separated by size and form and submerged in running water for 24 hours before sowing. Germination is 95 to 96 percent for soaked seeds. The first root, usually adventitious, develops at 45 to 60 days and shows rapid growth; the main root emerges later. Germination is hypogeal and seedlings are phanerocotylar (if the pair of minute squamiform structures emerging with the plumule are morphologically the cotyledons).

Under greenhouse conditions, 11-month-old seedlings reach a height of 25 cm. Seedlings are shade tolerant (Flores 1994d).

The species has not been introduced in reforestation programs, and information on plantation behavior is lacking. Its greenhouse and nursery behavior is very good, although its development is very slow. The species seems suitable for natural forest management (Flores 1994d).

ADDITIONAL INFORMATION

The genus name derives from the Greek *lekythos* and means oil jar. It refers to the urn-like fruits typical of the genus (Flores 1994d). The species is one of four belonging to Sectio Pisonis Mori. The group is collectively known as monkey pots or sapucaias. The group type is *L. pisonis* Cambessèdes (Prance and Mori 1979).

The leaves oxidize and acquire a greenish blue color when damaged. Apex is acuminate, margin crenate, base obtuse or rounded, narrowly decurrent onto the petiole. Venation is pinnate, brochidrodromous with 10 to 15 pairs of secondary veins, forming an acute angle when diverging from the midvein. They arch upwards and fuse distally (Flores 1994d).

Ovules are anatropous, bitegmic, tenuinucellate and have a conspicuous funiculus. The embryo sac is of the Polygonum type. It is surrounded by an endothelium developed from the inner layer of the inner integument. The endothelium plays an active role in nutrient transport from the integuments up to the embryo sac and disappears during seed development. Placentation is axilar and ovules develop at the ovary septum base (proximal end). The style is slender and short, with annular expansion towards the distal end. The androecium is closed. Pollination is carried out by medium to large euglossine bees. They collect pollen from the hood and the staminal disc (Flores 1994d, Tsou 1994).

The fruit's pericarp is thick (2.5 to 3.0 cm), fibrous, reddish brown, dull, and rough; it is built from ovary, androecium, and perianth tissues. Externally (exocarp), three zones are defined by two rings of scars. The proximal ring indicates the calyx position (sepal position) and is named calycine ring (calycary, calycinal, or calycine zone). The distal ring is the line of opercular abscission. The zones delimited by those rings are the infracalycine zone (basal band), the supracalycine (interzonal band), and the deciduous operculum. The infracalycine zone extends from the fruit base up to the calycine ring and includes the pedicel scar; the supracalycine zone extends from the calycine ring up to the ring of opercular dehiscence. The operculum has a four-ridged inner columella. The ridges are remnants of the ovary septa.

Immature seeds have nuclear endosperm which is consumed by the developing embryo; the latter is big, fusiform, massive, undifferentiated, and macropodial and is formed by a fleshy hypocotyl with a thick wall epidermis. Cotyledons, plumule, and radicle are not developed. The hypocotyl stores mainly lipids as a reserve material. The embryo's mean length is 4.0 cm and the mean diameter is 1.5 cm. Plumule development begins when the seedling is 7 months old. A pair of minute (1.0 to 2.0 mm long), opposite, green, squamiform organs appear between the hypocotyl and the plumule; they probably correspond to cotyledons. Protophylls are produced later. Metaphyll production begins at 8 months.

Holes produced by insect attacks are frequently observed and damage extends to heartwood (Flores 1994d).


1 cm
2 cm
2 cm
2 cm
2 cm