

Couratari guianensis Aubl.

W. A. MARÍN and E.M. FLORES

Escuela de Biología, Universidad de Costa Rica and Academia Nacional de Ciencias de Costa Rica,
Costa Rica, respectively

LECYTHIDACEAE (BRAZIL-NUT FAMILY)

Lecythis couratari Spreng. (*Systema Vegetabilium* 16.4, Cur. Post. 208; 1827); *Couratari panamensis* Standl. (*Publications of the Field Columbian Museum, Botanical Series* 4(8): 239; 1929); *Couratari pulchra* Sandw. (*Bulletin of Miscellaneous Information Kew* 1932: 217 1932); *Couratari bragancae* R. Kunth (*Das Pflanzenreich* IV. 219a (Heft 105): 129; 1939)

Balalabouá, balata blanc, bourrac, braka ingie pipa, cachimbo, coco-cabuyo, congolo-garapelo, copo hediondo, couratari, couroubara, djoemoe, fine-leaf wadara, ingie pipa, ipipjo, irimariye, irimiyar, kabba matjauw djoemoe, kalienja tamere, kariodan, kiesiepolloe joelle malledie, maho cigarre, maho couratari, maho fer, maou, marimari, mori-mori, oelemali, oelemallie, oelemarie, ollemellie, oremerie, oremerivadili, powasa djoemoe, sipoeloejoeroe maladi, tabarí, tauarí, tawary, tawekin oromariri, urimari, wadala, wadara, wadara-kakawalli, waranaka, wataala, watala, wata dje, zwarte ingie pipa (Aublet 1775, Chudnoff 1984, Jiménez 1993, Polak 1992, Record and Hess 1949)

Couratari guianensis is a widespread species; its range of distribution extends from Costa Rica to the coastal forests of eastern Brazil (Mori and others 1990a).

Couratari guianensis is a medium to very large tree that may reach 50 m in height and up to 1 m d.b.h. The bole is straight, cylindrical, and buttressed up to 7 m; it lacks branches in the basal two-thirds. Young branches are short tomentulous, becoming glabrous with age (Mori and others 1990a). The crown is branched and spherical. The bark is light brown, dark brown, or red brown (grayish brown in shade) and lenticellate (lenticels round to elongate), with vertical cracks and slight longitudinal fissures (Polak 1992). 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, oblong, obovate-oblong elliptic, entire margin, glabrous adaxially, pubescent abaxially, coriaceous, shiny, and hypostomatic (stomata anisocytic). The leaf apex is round or retuse; the leaf base is round. The species grows well in alluvial and sandy soils and is frequently found in clayey soils and on small, well-drained slopes. The elevation range of the species is 0 to 700 m. It is emergent in the canopy of very humid, nonflooded tropical forests, where temperature range

is 24 to 35 °C and annual rainfall is more than 3500 mm.

Fresh sapwood is light brown; heartwood is creamy or light brown, with a pinkish tinge (Chudnoff 1984). The wood is very fibrous with a scent of linseed oil (Polak 1992). Growth rings are conspicuous. The grain is straight or uniformly interlocked; texture is medium to coarse; and luster is high. Silica content is 0.8 percent (Chudnoff 1984). Wood taste is not distinctive. The wood is heavy (green weight 840 to 900 kg per m³, with 90 to 95 percent of moisture content; specific gravity is 0.49 to 0.57) and strong. Volumetric contraction is normal for its density, and mechanical properties are high. The air-dried wood shows small surface checking and warp. It is easy to work and saw, and it finishes smoothly. Its natural durability is in the medium range and it is easily preserved by either pressure or open tank systems. The wood is excellent for general and heavy construction, carpentry, furniture, veneer and plywood, agricultural tool handles, framing, railroad ties (treated), furniture, and turnery (Chudnoff 1984, Record and Hess 1949). The bark can be used as calking, rolling paper for cigars, boat caulking, native clothing, tinder, and cordage; it is also used in tanning because of its high tannin content (Simpson and Sagoe 1991).

Annual flowering occurs during the rainy season, July through September, when the tree is leafless. Inflorescences are terminal or axillary panicles or racemes, solitary or

grouped. The peduncle and the rachis are thick and tomentulous; bracts are lanceolate and deciduous. 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 calyx has six sepals; the corolla has six petals alternating with the sepals. The hood is curved inward and outward assuming an S shape (Tsou 1994). The staminal ring consists of 10 to 75 fertile stamens arranged in several whorls surrounding the style (Tsou 1994). The style is short and straight. The ovary is inferior with three locules. Pollination is carried out by medium-to-large bees. They collect pollen from the hood and the staminal disc (Tsou 1994).

Fruits ripen January 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 and shows strong variation in size and form (20 to 30 cm long by 15 to 20 cm wide). It is a cup-shaped, dry pyxidium, cylindrical and rather triangular in cross section, hard, woody, brown or black, lenticellate; the columella is triangular (Prance and Mori 1978, 1979). There are many seeds in every fruit. Seeds are winged, oblong-elliptic, papery, brown, surrounded by a symmetrical wing, and wind-dispersed. The embryo has two foliaceous cotyledons; the radicle is large.

Fruits are collected from the tree before pyxidium opening. Seeds extracted from the pyxidium should be submerged in running water for 24 hours before sowing. Seed behavior is orthodox. Viability diminishes with increasing dehydration. Seeds do not require special treatment. Germination is 85 to 90 percent for soaked seeds. Germination is epigeal and seedlings are phanerocotylar (if the pair of minute squamiform structures emerging with the plumule are morphologically the cotyledons). The root develops at 30 to 40 days; the seedling taproot is small.

Seeds are sown in beds or plastic bags filled with humid sand or a mixture of soil and sand. Seedlings do well in greenhouses and nurseries, although development is very slow. Seedlings are shade tolerant. The species has not been intro-

duced in reforestation programs, and information on plantation behavior is lacking. The species seems suitable for natural forest management.

ADDITIONAL INFORMATION

The genus name derives from the Caribe term *couratari* (Aublet 1775).

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 androecium has numerous stamens. It is zygomorphic and highly specialized. Filament fusion and degree of specialization produce 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 hood is flat, the proximal being antheriferous. The hood is strongly compressed against the staminal disc, and the flower androecium is considered closed (Mori and others 1990a, Prance and Mori 1979, Tsou 1994). Ovules are anatropous, bitegmic, tenuinucellate, and have a conspicuous funiculus. The embryo sac is of the Polygonum type. Placentation is axilar and ovules develop at the ovary septum base (proximal end). The style is slender and short, with annular expansion toward the distal end. The androecium is closed.

The fruit's pericarp is thick, fibrous, 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, which indicates the calyx position (sepal position) is named calycine ring (calycary, calycinal, or calycine zone). The distal ring is the line of opercular abscission. The zones delineated by the rings are the infracalycine (basal band), the supracalycine (interzonal band), and the deciduous operculum. The infracalycine zone extends from the fruit base to the calycine ring and includes the pedicel scar; the supracalycine zone extends from the calycine ring to the ring of opercular dehiscence. The operculum has a four-ridged inner columella. The ridges are remnants of the ovary septa.

