Dipteryx panamensis (Pittier) Record & Mell

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FABACEAE (BEAN FAMILY)

Coumarouna panamensis Pitt., *Dipteryx oleiforma* Benth., *Oleiocarpon panamensis* (Pittier) Dweyer

Almendro, almendro amarillo, almendro de montaña, almendrón, eboe, tonka bean tree

Dipteryx panamensis is endemic to Costa Rica, Panama, and Colombia and grows primarily in the lowlands of the Atlantic plains.

Dipteryx panamensis is a slow-growing tree that reaches 15 to 50 m in height and 1 to 1.6 m d.b.h. The tree has a trunk with ample basal roots but without buttresses, red-brown and smooth bark with vertical lenticels, ascendant branches, and a semispherical crown. Leaves are alternate, exstipulated, pinnated, with 10 to 20 stipeled leaflets, opposite, and subopposite alternative. The last leaflet or pair of leaflets is in acropetal direction and located 3 to 6 cm from the tip of the rachis. The leaflets are ovate, asymmetrical, slightly sinuated with entire margin, acuminate apex, oblique base; the proximal leaflets tend to be smaller in size. Both surfaces of the leaflets are almost glabrous.

It is an emergent tree, quite abundant in humid and very humid tropical forests, where annual temperatures vary between 24 and 30 °C and annual rainfall from 3500 to 5500 mm. The species grows on very humid plateaus, in alluvial or sandy soils, and sometimes in acid and clayey soils at elevations ranging from 20 to 1300 m.

The wood has a specific gravity of 0.83 to 1.09 and is considered extremely heavy. Transition between sapwood and heartwood is very light and difficult to detect. In green condition the sapwood is whitish and the heartwood yellow; in dry condition, the sapwood is brown-yellow and the heartwood yellow-red. The growth rings are not well defined; the wood has a strong intercrossed grain and median and a waxy texture, and the pores are visible. The rays, the vessels, and the fibers contain an abundance of white, pink, or yellow resinous materials. The wood is dense, hard, very durable, and medium-textured and rates high in mechanical resistance. It dries well with no defects but is difficult to saw and cut due to its weight, density, and crystalline deposit content. It is also difficult to impregnate with preservatives. The wood can be used for industrial floors, bridges, railroad ties, marine construction in waters infested with marine borers, boats, oxcarts, handicrafts, sport implements, springboards, industrial machinery, and agricultural tool handles. In Costa Rica, the wood is used in veneer. The roasted seeds are eaten in some regions of Panama (Standley 1937). As one of the prettier trees in the forest, *D. panamensis* has great potential for use as an ornamental.

The flowering period is dependent on the beginning of the rainy season and varies among regions (Arnáez and Moreira 1995). The flowers are hermaphrodite, zygomorphic, gamosepalous, tubular, and pubescent glandular. The pink flowers are grouped in terminal or lateral panicles, 30 to 50 cm long, with numerous secondary axes. The trees begin to flower and set fruit when they are 11 to 12 years old. Fruits develop in about 4 months, usually during a dry period. The fruits are pods 6 to 8 cm long, 4 to 5 cm wide, and 2 to 3 cm thick. Seeds are cotylecosperm and correspond to the overgrown type. The seed, limited by the size of the pod, ranges from 4.5 to 6 cm long, 3 to 3.5 cm wide, and 1 to 1.6 cm thick.

The fruits are gathered from the ground and approximately 10 percent are well developed well but lack seeds. The fruits collected from the ground usually have exocarpic scars caused by the insects that oviposit in the immature fruit. *Lepiota* aff. *procera mycelia* adhere to the inner surface of the exocarp and the mycelial filaments of the same fungus are present in the fleshy mesocarp. The mature, gold-colored sporocarps of *Lycogala*, and the black sporocarps of *Darcula filum* yeast as well as several insect larvae infect the fruit.

Fresh seeds average between 55 and 60 per kg; dry seeds (38 percent moisture) average 300 per kg (Muller 1995). Seed viability is generally restricted to a period of 9 to 10 days (Flores and Sanchez 1992). Even though the seeds could be recalcitrant, they can endure a certain degree of dryness (Muller

1995). The dry fruits can be stored in moist sawdust for at least 3 months and some seeds will germinate.

Without pretreatment, germination takes 12 to 20 days and is 80 to 90 percent (Rodríquez 1996a). The fruits should be placed on a germination bank or in sand with the peduncle up, taking care that they are half-covered by the medium. Sometimes fruits are planted directly in plastic bags. After 3 to 4 months in the nursery, seedlings can be outplanted. When pseudocuttings are used for reproduction, they must remain in the nursery for at least 6 months. Once seedlings or pseudocuttings are outplanted, they must be weeded periodically.


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