Dalbergia retusa Hemsl.

W.A. MARÍN and E.M. FLORES
Escuela de Biologìa, Universidad de Costa Rica and
Academia Nacional de Ciencias de Costa Rica, Costa Rica, respectively

FABACEAE (BEAN FAMILY)

Dalbergia hypoleuca Pittier [Journal of the Washington Academy of Sciences 12(3):62. 1922]; *Dalbergia lineata* Pittier [Journal of the Washington Academy of Sciences 12(3):63. 1922]; *Amerimnon retusum* (Hemsl.)Standl. [Journal of the Washington Academy of Sciences 13(20):442. 1923]; *Amerimnon lineatum* (Pittier) Standl. [Journal of the Washington Academy of Sciences 13(20):442. 1923]

Cocobola, cocobolo, cocobolo prieto, funera, granadillo, nambar, palo negro
(Chudnoff 1984, Holdridge and Poveda 1975)

Dalbergia retusa is distributed in Mexico and the Mesoamerican Pacific region from Guatemala to Panama (Berendsohn and Araniva de González 1989, Chudnoff 1984, Dwyer 1965, Holdridge and Poveda 1975, Janzen and Liesner 1980). *Dalbergia retusa* is a heliophyte, generally a subcanopy species that grows well in open areas. The species grows associated with other tree species, among them *Tabebuia ochracea* (Cham.) Standl., *Astronium graveolens* Jacq., *Tabebuia impetiginosa* (Mart. ex DC.) Standl., *Sideroxylon capiri* (A. DC.) Pittier, and *Swietenia macrophylla* (Jiménez 1993).

Dalbergia retusa is a small to medium-sized tree that reaches 15 to 20 m in height and 40 cm d.b.h. The bole has irregular growth (twisted) and branches at a low height. The crown is wide open with a few slim branches. The bark is blackish with fissures and exfoliates small plates (Holdridge and Poveda 1975, Jiménez 1993). Leaves are alternate, petiolate, and imparipinnate, with 7 to 15 leaflets. Leaflets are alternate, oblong to ovate-oblong, 2.5 to 12 cm long, and 2 to 3.5 cm wide. They are leathery and adaxially shiny. The leaflet base is obtuse; the apex is acuminate, often emarginate; and the margin is revolute; leaf venation is reticulate (Holdridge and Poveda 1975, Jiménez 1993, Record and Hess 1949). The species grows in soils of varying pH, texture, drainage, and fertility. The elevation range of *Dalbergia retusa* is 50 to 300 m. The tree is found on flatlands or moderate slopes in tropical, dry forests with an annual rainfall under 2000 mm and a temperature range of 24 to 30 °C.

The sapwood is whitish and sharply defined and varies in thickness as a result of age. After exposure to light and air, the heartwood usually becomes a deep, rich orange-red with black stripes or some mottling. Wood texture is fine, with straight or interlocked grain. The luster varies from medium to high. The wood has rather high oil content; it is tasteless and slightly pungent and fragrant when worked. The wood is hard, heavy, strong, and sometimes brittle. The basic specific gravity is 0.80 to 0.98; the air-dry density is 750 to 1000 kg per m^3. The wood has excellent drying properties and is free of surface and end checking. Shrinkage is usually low with very low moisture absorption. The wood is easy to work and finishing is smooth. However, wood dust may cause dermatitis or respiratory allergies (Allen and Allen 1981, Chudnoff 1984, Record and Hess 1949). The wood exhibits a high natural polish due to its oil content. Natural durability is high, and the wood is resistant to marine borer attacks. *Dalbergia retusa* is one of the most important woods in the cutlery trade for handles, inlay work, brush backs, musical and scientific instruments, jewelry boxes, chessmen, and other specialized items (Allen and Allen 1981, Chudnoff 1984, Record and Hess 1949).

Flowering occurs after 4 or 5 years, January through May; however, another flush occurs in August and September (Jiménez 1993, Molina and others 1996). Inflorescences are axillary or terminal panicles 4 to 18 cm long, appearing with or before the new leaves. The flowers are zygomorphic, with small caduceus bracts and small bracteoles, which are persistent. The calyx is campanulate, lobed to one-third its length, and slightly bilabiate; the five unequal lobes are acute. The corolla is white and glabrous. The standard is emarginate and clawed; the keel petals are oblong, obtuse, and fused distally. The stamens are fused into a single tube with an open slit distally, conspicuously curved distally, and exceeded by the style.

The ovary is shortly stipitate with one to several ovules; the style is short and distally curved, and the stigma is small.

Ripe fruits are found March to May. The fruit is a long, flat pod, ovate to orbicular, stipitate, generally attenuated at base, 6 to 13 cm long, and 1.5 to 2.5 cm wide. It has a reticulated circular wing with a thin exocarp, a fibrous mesocarp, and a chartaceous endocarp. The fruit is indehiscent with one to five seeds that are oblong, flattened, laterally compressed, 1.4 to 2cm long, and 0.6 to 1.1 cm wide. The seed is 4 to 9 mm long, and 4 to 6 mm wide, dark brown to blackish brown. It is ovoid, flattened, and has a membranous seedcoat (Allen and Allen 1981, De Lima 1990, Holdridge and Poveda 1975, Jiménez 1993, Van Roosmalen 1985). Fruit dispersal is anemochorous and hydrochorous; the latter has been observed in riparian and lacustrine forests (De Lima 1990).

Fruits are collected from the tree or the ground, placed on the floor, and exposed to sunlight for 1 or 2 days for 3 to 4 hours to dry the pericarp and open the samara. Seeds are manually extracted and cleaned. Seeds average from 4,000 to 20,000 per kg.

Seed behavior is orthodox. Seeds can be stored at 6 to 8 percent moisture content in sealed containers at 5 °C. Under these conditions, they remain viable for up to 5 years with 60 percent germination. The seeds are attacked by *Ctenocolum salvini* (Bruchidae, Coleoptera); the larvae develop in young fruits and destroy the embryo. The fungi *Alternaria* and *Aspergillus* also attack seeds.

Seeds can be immersed in running water for 12 to 24 hours before sowing. Seeds that have been stored for some time should be placed in hot water (60 °C) for 1 minute and then transferred to running water at 20 °C for 24 hours (Molina and others 1996). Fresh seeds have 80 to 90 percent germination. Germination is epigeal and seedlings are phanerocotylar. Root protrusion begins at 5 to 8 days.

The seeds are planted at a depth of 1 cm in germination boxes filled with sand. They are later transferred to nursery bags. Seedlings must be transferred to the field at 3 to 5 months, when they reach 25 to 30 cm in height. Early transplanting reduces stress and guarantees rapid plant recovery. Young seedlings (1 to 5 weeks old) are sensitive to dryness and direct sunlight exposure. Pruning of at least 50 percent foliage at the nursery stage is recommended. Seedlings outplant well but show a temporary foliar whitening. The damaged leaves are quickly replaced by new ones (Molina and others 1996). *Dalbergia retusa* is planted at a planting distance of 2 by 2 m (or 3 by 3 m). Due to its high branching rate, the species requires pruning to maintain a desirable shape. Pruning of 2-year-old saplings has provided good results. Seventeen-year-old trees may reach 13 d.b.h. and 8 m in height (Molina and others 1996).

Natural species regeneration is scarce; however, saplings and juveniles up to 4 m can be found in areas periodically exposed to fire. Some of them survive and continue growing after burning.


1cm
1cm
1cm