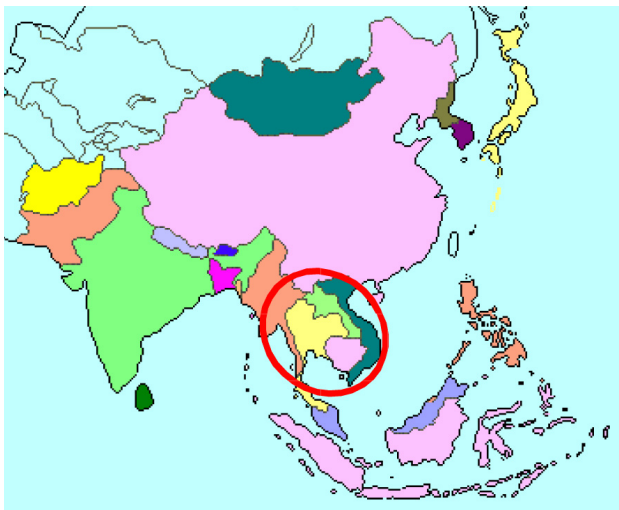


Dalbergia cochinchinensis Pierre. ex Laness.

Family: Leguminosae (also placed in Papilionaceae)

Vernacular names: Cambodia: kra: nhoung; Lao: kha nhoung; Thailand: phayuung (general name), kra-yung (Khmer-Surin), daeng cheen (Prachin Buri), pradu tom (Chanthaburi), pradu laai (Chon Buri), pradu sen (Trat), phayuung mai (Sayaburi); Vietnam: Trac; English trade names: Thailand rosewood, Siamese rosewood

Distribution and habitat: Distributed through Thailand, across Lao and Cambodia to southern Vietnam. It prefers deep sandy clay and calcareous soil. The tree grows sparsely or occasionally in pure stands. In Cambodia it has an extensive distribution throughout much of the country, in almost all ecological zones with an average rainfall of 1300–3000 mm, a variable dry period and at an altitude of up to 500 m. The species is found mainly in semi-deciduous, and sometimes in evergreen and riparian forests. It also occurs throughout much of Thailand, except the far southern and north-western regions. In Vietnam, it is found from the central provinces (Quang Nam, Da Nang) southwards, mainly in Gia Lai and Kon Tum. In other provinces, it is sparsely distributed in some localities.



Distribution restricted to Thailand, Laos, Cambodia and Vietnam

Uses: *D. cochinchinensis* is categorized as a “luxury” timber in Cambodia, whereas in Vietnam it is considered a “first class prime timber”, as it is hard, durable, easy to work and resistant to insects and termites. The distinctive sapwood and heartwood makes beautiful patterns when sawn. Sapwood is greyish, whereas heartwood is brown-red or black, with a fine texture; it is very hard and heavy with a density of 1.09. It is very popular in the manufacture of luxury furniture (beds, wardrobes, desks etc.) and in wood turnery, fine-art, musical instruments, sewing-machines and sports equipment. It is also used as a decorative timber, for

example, in passenger ships and for instrument cases. Because of its strength and durability it is suitable for all kinds of construction work, for doors, window frames and wagon building. It is also used for heavy-duty striking tools such as hammers, felling axes and agricultural implements such as ploughs, harrows, rollers, etc. In cart and carriage building, it is used for felloes, spokes, poles, shafts, rims, etc.

Description: The species is easily recognizable by its light yellow bark, sometimes with multiple stems and branches. It is a medium to large evergreen tree, 8–30 m in height and 60 cm in trunk diameter. The bark is brownish-yellow, longitudinally fissured, sometimes peeling into fragments. The crown is spherical, and leaves are pinnately compound, alternate, 15–20 cm long. Leaflets number 7–9, are oval, alternate or sub-opposite, top obtuse, or shortly acuminate, base cuneate, 3–5 cm long and 1.8–2.5 cm wide, and leathery. The terminal leaflet is the largest. Veins are slightly prominent. Inflorescence is paniculate, axillary, bracteate and bracteolate.



1: tree; 2: leaves; 3: fruits; 4: seeds.

From: Natural forest during fruiting season year 2003 in Siem Reap Province, Cambodia. Photo: So Thea.

Reproductive biology: This species has white flowers; sepals connate, 5-dented at the top and glabrous; standard rectangular petals with straight claws and 9 stamens. Fruits are 5–6 cm long, 1 cm wide, and tapering, with very flat indehiscent pods: 5–6 cm long and 1 cm wide, generally containing one, or sometimes two seeds per pod. Flowering occurs in May–July and seed matures in September–November. The seed is mature when the pod changes colour to dark brown. Seed collection can be done by climbing the mother tree and cutting small branches or allowing the seed to drop onto tarpaulins on the ground. To minimize insect

predation the seed can be collected as soon as the colour turns from green to yellow.

Ecology: This species is shade tolerant as a sapling and becomes light demanding when mature, drought-tolerant but not demanding with regard to soil conditions. The species regenerates naturally by seed and especially by coppicing. Individuals of *Dalbergia cochinchinensis* are scattered and form small populations in dense tropical evergreen forest. Nodules, which are the result of symbiotic nitrogen-fixing bacteria, are found on the roots of seedlings. In natural habitats it is usually associated with *Dipterocarpus obtusifolius*, *Shorea roxburghii*, *Shorea obtusa*, *Shorea siamensis*, *Pterocarpus macrocarpus*, *Lagerstroemia calyculata*, and *Cratogeomum spp.* It is a nitrogen fixing species, suitable for incorporation in agroforestry systems and for soil improvement.



A beautiful stem form of *D. cochinchinensis* in a registered seed source of semi-deciduous forest in Siem Reap province, Cambodia.
Photo: So Thea. January 2003.

Conservation status and tree improvement: Population reduction of *D. cochinchinensis* is mainly caused by habitat destruction and illegal cutting. The species is considered critically endangered in Cambodia, vulnerable in Viet Nam, a high priority species for conservation in Thailand and Lao. The World Conservation Union (IUCN) categorizes this species as vulnerable. *In situ* and *ex situ* efforts have begun in all four countries where this species occurs naturally, but are in the infant stage. In the north-west of Cambodia (Siem Reap) a natural stand of 50 ha has been conserved *in situ* since 2002, with 121 mother trees marked for seed collection. A seed production area of one ha was established in 2004 to the east (Kampong Cham). The species also reportedly occurs in many protected areas in which the tree is relatively well conserved. In Thailand the species is recorded as occurring in 28 protected areas in 24 provinces. It is, at present, moderately well conserved *in situ* in the north-east, north, north-central and east. The Forest Genetic Resources Conservation and Management Programme (FORGENMAP) (Thailand)

established 13 seed sources over 112 ha. In Lao, as of 2003, three seed sources of *D. cochinchinensis* had been registered in natural forests over a total area of 108 ha. In Vietnam two *ex situ* stands with 2,600 trees have been established by the Forest Science Institute of Vietnam since 1990. Tanh Linh Forest Enterprise (Vietnam) planted 10 ha of the species for conservation and seed supply.

Research on genetic conservation: The seeds are orthodox and can be easily stored in dry places. There are about 35,000 seeds/kg. Propagation can be done through air layering, cuttings and grafting. The planting technique is quite simple and seedlings are usually vigorous, therefore the species can be used in development programmes. A report about diseases occurring in seedlings of *D. cochinchinensis* in nurseries in the Northeast of Thailand showed that three kinds of diseases occur on leaves and stems of seedlings: rust (*Ravenelia* sp., *Olivea tectona* and some unknown species), black tar spot (*Phyllachora* sp.), and brown circular leaf spot.

Agencies active in genetic conservation of this species:
Thailand: Royal Forest Department. Lao PDR: Lao Tree Seed Project, Forest Research Centre, National Agriculture and the Forestry Research Institute. Vietnam: Forest Science Institute of Vietnam; Central Forest Seed Company. Cambodia: Department of Nature Conservation and Protection, Forestry Administration, Cambodia Tree Seed Project.

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