

Castanospermum australe

black bean

Cunn. et Fraser ex Hook.

Fabaceae - Papilionoideae

LOCAL NAMES

English (Moreton Bay chestnut, black bean, Australian chestnut); Trade name (black bean)

BOTANIC DESCRIPTION

Castanospermum australe is a tall tree up to 40 m in height and with a stem diameter to 1.2 m. The stem is not prominently buttressed while the crown is very dense, consisting of abundant dark-green glossy foliage. Bark grey to brown, slightly rough with very small pustules; outer blaze cream and granular in texture, inner blaze bright yellow with orange vertical stripes. The outer cut blaze has an odour like that of cucumber or pumpkin.

Leaves alternate, imparipinnate, 20-35 cm long, about 8-17 mostly alternate leaflets with entire margins; petiolules 0.4-0.7 cm long; narrow elliptical or oval, often unequal-sided at base, obtuse, about 8-17 x 3-6 cm, upper surface glossy green. Lateral veins (6-14) and net veins visible on both sides.

Inflorescences in racemes up to 15 cm long, pedicels slender and about 2.5 cm long. Flowers 4-5 cm long and very attractive, cauline or produced on twigs below the leaves. Calyx waxy-yellow, bell-shaped up to 2 x 1.5 cm and 5-lobed at the apex, sparsely covered with small brown hairs. Petals coriaceous, changing from greenish-yellow to deep orange, the standard petal is 3-4 x 3 cm and lobed at the apex. Stamens yellow, 8-10, all free, incurved, about 0.4 x 0.15 cm and can dehisce in the bud stage. Ovary on a stalk about 1.5-2 cm long, 1-celled, ovules about 3-4. Style 1-2 cm long, glabrous with a small terminal stigma.

Fruits large and woody. Pods cylindrical in shape, 15-25 x 4-5 cm, 2-valved and slightly falcate. Contain 3-5 round or compressed, brown-coated seeds. Seed diameter 3-5 cm.

The generic epithet is derived from Latin and Greek and means chestnut-seeded, the specific epithet refers to its southern distribution.

BIOLOGY

The Australian chestnut is dioecious. Flowers between October and November, fruits mature from February-April.



Castanospermum australe flowers on the stem. (AFT team)



Castanospermum australe (AFT team)



Castanospermum australe showing fruits at the Nairobi arboretum, Kenya. (AFT team)

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ECOLOGY

C. australe typically occurs in gallery-type rainforests. These include subtropical and tropical rainforests. The species often dominates dry riverine rainforests and is commonly associated with *Syzygium floribundum*, *Grevillea robusta*, *Streblus brunonias*, *Podocarpus elatus* and various *Ficus* spp. In northern Queensland common associates include *Beilschmeidia obtusiflora*, *Nauclea orientalis* and *Syzygium paniculatum*.

BIOPHYSICAL LIMITS

Altitude: 50-750 m

Mean annual temperature: 28 deg C

Mean annual rainfall: 1 000-3 800 mm

Soil type: Generally prefers fertile soils, consisting largely of alluvia and also deep loams on basalt.

DOCUMENTED SPECIES DISTRIBUTION

Native: Australia

Exotic: India, Malaysia, Papua New Guinea, Sri Lanka, United States of America



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

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PRODUCTS

Food: The seeds are edible, but must be first sliced and washed in water for several days before cooking. The seeds cause severe gastrointestinal disturbance.

Apiculture: The yellow-orange to reddish flowers of the Australian chestnut are an important source of nectar and pollen for bees.

Fuel: Black bean wood can be used as fuel.

Timber: The Australian chestnut Produces one of the most valuable woods in Australia. The sapwood varies from white to yellow. The heartwood is dark-brown to almost black, slightly greasy and straight grained but sometimes interlocked. This wood is suitable for carved work, furniture, panelling, plywood and joinery. The sliced veneers of this wood can be good substitute for teak. Black bean wood has a density of 700 kg /cu m.

Poison: Black bean seeds contain toxic saponins which are reportedly toxic to a serious pest of stored grain, *Callosobruchus analis* (Rahila-Tabassum et al.1994).

Medicine: *C. australe* is used to treat post-prandial hyperglycaemia in diabetic patients.

Other products:

Seeds of *C. australe* contain the indolizidine alkaloid castanospermine which has been shown to inhibit several glucosidases. Castanospermine has been shown to inhibit growth of the AIDS virus in tissue-cultured cells by exhibiting an antiretroviral effect. Other glucosidase inhibiting substances are 7-Deoxy-6-epi-castanospermine, a trihydroxyindolizidine alkaloid and Australine, a pyrrolizidine alkaloid.

SERVICES

Erosion control: Protects riverbanks and catchment areas in Australia.

Shade or shelter: Planted in India, Sri Lanka & Malaysia as a shade tree and windbreak.

Ornamental: A valued ornamental tree, most attractive at flowering time with sprays of orange-red flowers. The large pendant, cylindrical, bean-like fruits are also conspicuous in the crown. The young plants are hardy indoor and patio plantings.

Boundary or barrier or support: Wood used as fencing material.

Intercropping: The Australian chestnut is a shade tolerant tree with prospects of intercropping with other forest or plantation trees.

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GERMPLASM MANAGEMENT

C. australe seeds are recalcitrant, presently wet storage is the only means of short-term storage. *C. australe* seeds produce dehydrins, proteins that may provide protection against low temperatures in temperate seeds and against water loss to which the seeds may be naturally exposed. There are 35 seeds /kg.

PESTS AND DISEASES

C. australe harbours a spectrum of surface and internal fungal contaminants at harvest. During wet storage (which is presently the only means of short-term storage of such seeds) the range of fungal genera narrowed, with *Fusarium* spp. becoming dominant. Black bean sapwood is susceptible to *Lyctus*.

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FURTHER READNG

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SUGGESTED CITATION

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