Bertholletia excelsa

Humb. et Bonpl.

Lecythidaceae

Brazil nut

LOCAL NAMES
Chinese (pahsi li); English (Brazil nut,para nut,cream nut,butter nut); French (chatáigne du brésil,noix du pará,noix du brésil); German (paranuss,Paranußaum,Brasilnußbaum); Italian (noce del brasilie); Japanese (burajiru nattsu); Portuguese (castahna-do-brasil,castanha-do pará,castanheira); Spanish (castaña,canstana do pará,canstana do brasil,nuez del brasil,castanha-do-maranhao); Swedish (paranot); Trade name (Brazil nut)

BOTANIC DESCRIPTION
Bertholletia excelsa is a large tree, 40-60 m tall; trunk very straight for 20 m or more; diameter ranges from 2 to 4 m; bark grey-brown, 1.5 cm thick, resinous, with deep, narrow, longitudinal fissures that are reddish internally; crown 10-20 m in diameter and round or umbrella shaped; seedlings and adult trees develop strong taproots that may penetrate up to 3 m or more in heavy clays.

Leaves simple, alternate, lack stipules and have petioles 2-6 cm long; blade oblong to elliptic, 17-45 cm long, 6.5-15.5 cm wide; apex rounded and acuminate; base rounded; leathery, coppery to bright green; margins wavy; veins prominent, especially on the leaf underside.

Inflorescence terminal or in axillary panicles, 10-20 cm in length, with 10-40 subsessile, bisexual, globose flowers, 2-3 cm in diameter; calyx 15 mm long with subcircular concave lobes, enveloping the flower except for a narrow slit at the apex; 6 oblong, yellow-cream petals curve over a thick receptacle; stamens short and numerous; inferior ovary that contains 4 or more locular ovules with short styles.

Fruit a large, indehiscent, globose, woody capsule (pixidium), 8-15 cm in diameter, weighing 500-1500 g; pericarp 1 cm thick and barklike. Seeds 15-25, 3-4 cm long, angular, with hard, woody coat and thin, adhering testa; tightly packed within the fruit; they have a white kernel and a nutty texture.

The generic name commemorates Claude-Louis Berthollet (1748-1822), a French chemist. The specific epithet alludes to its lofty height.

BIOLOGY
B. excelsa begins flowering during the drier months, and the flowers drop soon after opening during the early part of the season. B. excelsa trees are self-incompatible, and the hooded bisexual flowers prevent wind pollination. Flowers are pollinated by bees in the genera Xylocarpa, Bombus, Centris, Epicaris and Eulaema. A pronounced dry season is necessary for good fruit set. Fruiting starts at 12-16 years in the forest and as early as 8 years if trees are well managed in the open. Mature nuts are produced approximately 15 months after fertilization and take 1 year to ripen. Nuts are dispersed mainly by rodents.

Emergent tree (55m) in Tapajos forest, Brazil. (Anthony Simons)

Inflorescence (Mori S.A.)

Open fruit (southern Peru) (Wilson H. (Vascular Plant Images))

ECOLOGY
B. excelsa is found in the warm, wet lowland rainforest but is also common in the drier regions of transitional forests. Trees normally occupy well-drained sites, but some populations occur on seasonally flooded alluvial soils along the Amazon near Alenquer, Pará, in Brazil.

BIOPHYSICAL LIMITS
Mean annual temperature: 24-27 deg. C, Mean annual rainfall: 1400-2800 mm

Soil type: The species is well adapted to heavy clay and low-fertility Oxisols but is not tolerant to waterlogging.

DOCUMENTED SPECIES DISTRIBUTION

Native: Brazil
Exotic: Bolivia, Colombia, Guyana, Indonesia, Jamaica, Malaysia, Peru, 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.

PRODUCTS
Food: Dry nuts contain 63-69% oil, 14-17% protein and 4% fibre, so they are a good source of calories and protein. Kernels are eaten raw, toasted or used in confectionery, often as a substitute for other nuts or grated coconut.

Fodder: The oil in the nut is expressed and used as livestock feed.

Fuel: Dried fruit capsules are useful as fuel; the nut, which has an elevated oil content of 63-69%, burns with a candlelike flame when lit.

Fibre: The bark has been used in remote regions for fibre production.

Timber: B. excelsa is a source of fine timber, and the durable wood is sought by boat builders. Fruit pericarps are sometimes used to make carvings.

Medicine: Folk medicine for liver problems is obtained from the bark of the tree.

Other products: Empty fruit capsules are used to carry small, smoky fires to discourage black flies (Simulium spp.) from attacking people working in the field during the rainy season. Open capsules are sometimes used to collect latex from rubber trees.

SERVICES
Reclamation: There are some attempts to use the species in poor pasture, initially as a shade tree and eventually as a revegetation material.

Soil improver: A mixture of B. exelsa shells and manure is used in Brazil to fertilize Brachiaria humidicola pasture.

Intercropping: B. excelsa is an excellent candidate for an overstorey species in mixed cropping systems, and Brazilian farmers are interplanting it with cacao in the vicinity of Tomé Açu, Pará, in eastern Amazonia.

TREE MANAGEMENT
Grafted trees are planted in clay soils at a spacing of 10 x 15 m or 20 x 20 m. Small fires may be set at the base of trees during the dry season to clear away debris so that capsules can be easily collected later; heat or smoke from the fire also stimulates flowering and increases yield. Trees 16 years old produce 30-50 fruits, mature trees usually 200-400, and a yield of 1000 fruits has been reported. Fruits are collected beneath the trees within a few weeks of falling. If nuts are stored and transported under precarious conditions for many weeks before they are dried, they may become infected with aflatoxins.

GERMPLASM MANAGEMENT
Storage behaviour is intermediate: 3% germination after 18 months in open storage at room temperature. Viability is maintained better in storage with intact seeds than those with no pericarp and is reduced from 60 to 2% on desiccation from 14.2 to 4.2% mc. The lowest safe moisture content is 12%. There are about 65 seeds/kg.

PESTS AND DISEASES
Rodents and leaf-cutting ants have attacked seedlings. Macaws (Ara spp.) manage to gnaw through some B. exelsa nut capsules while they are still green and partially consume the immature nuts. In the wild, some B. excelsa trees produce a sticky red resin, apparently in response to boring insects.

Trees are generally hardy and healthy, although Cercospora blight is sometimes seen, especially on older leaves. Aspergillus spp. are able to slowly penetrate moist nuts, so producers are attempting to speed up nut collection and improve storage conditions.

FURTHER READNG

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SUGGESTED CITATION

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