

Parkia biglobosa

soumbara, soumbal, dawa-dawa, dadawa

(Jacq.) R. Br. ex G. Don f.

Fabaceae - Mimosoideae

LOCAL NAMES

English (monkey cutlass tree, arbre à farine, two ball nitta-tree, African locust bean, fern leaf); French (Arbre à farine, nerre, néré, Arbre à fauve, caroubier African); Mandinka (Netto, Nété, Nér); Swahili (mnienze, mkunde); Trade name (dadawa, dawa-dawa, soumbal, soumbara)

BOTANIC DESCRIPTION

Parkia biglobosa is a perennial deciduous tree with a height ranging from 7 to 20 m, although it can reach 30 m under exceptional conditions. Crown large, spreads wide with branches low down on a stout bole; amber gum exudes from wounds; bark dark grey brown, thick, fissured.

Leaves alternate, dark green, bipinnate to 30 cm long, pinnae up to 17 pairs with 13-60 pairs of leaflets, 8-30 mm x 1.5-8 mm, of distinctive shape and venation. Leaflets held on a long rachis.

Peduncles 10-35 cm long; capitula 4.5-7 cm long and 3.5-6 cm in diameter, biglobose but distal portion much larger. Hermaphrodite flowers orange or red in colour: calyx 10-13 (16 max.) mm; corolla 10-14 (17 max.) mm long, lobes very short 1-3 mm long, connate in the middle and free or connate at base; filaments exerted about 4 mm beyond calyx mouth. Nectar-secreting flowers: calyx about 6-7 mm long. Staminal flowers: calyx about 5.5-7 mm long, filaments exerted 2-3 mm beyond calyx mouth.

Pods, pink brown to dark brown when mature, about 45 cm long and 2 cm wide; may contain up to 30 seeds embedded in a yellow pericarp. Seeds have a hard testa, are large (mean weight 0.26 g/seed) with large cotyledons forming about 70% of their weight.

Robert Brown described the genus *Parkia* in 1826. He named it after Mungo Park, a Scot who made 2 remarkable journeys of exploration into the interior of West Africa in 1795-1797 and 1805.

BIOLOGY

Anthesis is at dusk; large quantities of nectar and pollen are produced, and capitula may smell foetid and fruity like cow manure; pollination is by bats including *Eidolon helvum*, *Epomophorus gambianus*, *Micropteropus pusillus* and *Nanonychia veldkampii*; seed set can occur in the absence of bats; honeybees, flies, wasps, ants, tenebrionid beetles and tettigometid bugs may be involved; sunbirds also visit the capitula but contribute negligibly in pollination; it is possible that some degree of self-incompatibility may occur.

Trees 1st fruit at 5-10 years; they vary in precocity; fruits start to ripen just before the 1st rains and continue over most of the season; each hermaphrodite flower is potentially capable of producing a single pod, but this does not happen; up to 20 pods may develop per head, but there are usually fewer; dispersed by animals and birds eating fruits or seeds; pods are eaten by chimpanzees (which sometimes spit out the seeds), baboons, parrots and possibly hornbills; seeds have a thick, resistant testa that can possibly pass through the animal gut unharmed and dormant.



P. biglobosa pods and leaves. (Anthony Simons)



Parkia biglobosa slash (Joris de Wolf, Patrick Van Damme, Diego Van Meersschaut)



Parkia biglobosa flower (Joris de Wolf, Patrick Van Damme, Diego Van Meersschaut)

Parkia biglobosa

(Jacq.) R. Br. ex G. Don f.

Fabaceae - Mimosoideae

soumbara, soumbal, dawa-dawa, dadawa

ECOLOGY

Occurs on a wide range of natural and semi-natural communities such as open savannah woodlands, but it is most conspicuous and abundant in anthropic communities, principally bush fallow and wooded farmland where cultivation is semi-permanent. The tree can also grow on rocky slopes, stony ridges or sandstone hills. It is a fire-resistant heliophyte.

P. biglobosa occurs in a diversity of agroecological zones, ranging from tropical forests with high and well-distributed rainfall to arid zones where mean annual rainfall may be less than 400 mm. It has a capacity to withstand drought conditions because of its deep taproot system and an ability to restrict transpiration.

BIOPHYSICAL LIMITS

Altitude: 0-300 m; Mean annual rainfall: 400-700 mm; Mean annual temperature: 24-28 deg C.

Soil type: Prefers well-drained, deep, cultivated soils, but also found on shallow, skeletal soils and thick laterites.

DOCUMENTED SPECIES DISTRIBUTION

Native: Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Cote d'Ivoire, Democratic Republic of Congo, Gambia, Ghana, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Sao Tome et Principe, Senegal, Sierra Leone, Sudan, Togo, Uganda

Exotic: Antigua and Barbuda, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Puerto Rico, St Lucia, St Vincent and the Grenadines, Trinidad and Tobago, Virgin Islands (US)



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.

soumbara, soumbal, dawa-dawa, dadawa

PRODUCTS

Food: Seeds are fermented to make dawadawa, a black, strong-smelling, tasty food high in protein. Dried fermented seeds keep for more than a year in traditional earthenware pots without refrigeration, and small amounts are crumbled during cooking into traditional soups and stews that are usually eaten with sorghum- or millet-based dumplings and porridges. Because of the savoury taste and the high protein and fat values of the seed, it is sometimes described as a meat or cheese substitute, but it is not usually eaten in large amounts. Dawadawa is rich in protein, lipids and vitamin B2. *Parinari curatellifolia* is deficient in the amino acids methionine, cystine and tryptophan, but fermented beans are rich in lysine. The fat in the beans is nutritionally useful (approximately 60% is unsaturated). Seeds are used as a coffee substitute.

Seeds are embedded in a mealy pulp sometimes called dozim, that is high in energy value. It contains up to 29% crude protein and up to 60% saccharose, is rich in vitamin C and high in oil content. The pulp is eaten raw or made into a refreshing drink and is used as a sweetener. For storage, it is pressed into a cake. The fruit provides emergency food during severe droughts.

Young pods are sometimes roasted on embers and eaten. Leaves are edible but not commonly eaten. The leaves are mixed with cereal flour and eaten or fermented into balls and used in sauces.

Fodder: Whole pods are eaten by domestic stock, including cattle. The young seedlings are nutritious and heavily browsed by livestock. An important attribute of *P. biglobosa* trees is that most of their leaves remain green throughout the dry season and branches are lopped and used as fodder. Seeds are rich in calcium, sodium, potassium and phosphorus.

Apiculture: *P. biglobosa* attracts bees and is a popular tree among beekeepers.

Fuel: Branches are sometimes lopped for firewood.

Fibre: Pods and roots are used as sponges and as strings for musical instruments.

Timber: Wood is whitish, moderately heavy, 580-640 kg/cubic m when air seasoned, relatively hard and solid; it smells unpleasant when newly felled, but seasoning does not take long and only occasionally causes shape distortion; easily worked by hand or power tools; nails, glues, varnishes and paints well; mainly useful as a light structural timber, for example, for vehicle bodies, agricultural implements, boxes, crates and barrels, furniture, mortars and pestles, bowls, planks and carvings. Twigs are used to clean teeth; bark stains mouth red and contains saponins that clean teeth.

Gum or resin: Mucilage from part of fruit is made into a fluid and used for hardening earth floors and to give a black glaze in pottery; gum exudate is proteinaceous and contains as the constituent sugars galactose, arabinose, glucuronic and 4-O-methylglucuronic acid.

Tannin or dyestuff: Husks of pods mixed with indigo improve the lustre of dye products. Seeds and bark contain tannin, and bark is used in tanning.

Alcohol: Fruit pulp can be fermented into an alcoholic beverage.

Poison: Bark and pods contain piscicides; the alkaloid parkine that occurs in pods and bark may be responsible.

Medicine: Bark is used as a mouthwash, vapour inhalant for toothache, or for ear complaints. It is macerated in baths for leprosy and used for bronchitis, pneumonia, skin infections, sores, ulcers, bilharzia, washes for fever, malaria, diarrhoea, violent colic and vomiting, sterility, venereal diseases, guinea worm, oedema and rickets, and as a poison antidote. Leaves are used in lotions for sore eyes, burns, haemorrhoids and toothache. Seed is taken for tension, and pulp for fevers, as a diuretic and as a mild purgative. Roots are used in a lotion for sore eyes.

Other products: Burnt husks are added to tobacco to increase its pungency. Pulp is supposedly a water purifier but possibly just sweetens and disguises taste of foul water.

SERVICES

Shade or shelter: *P. biglobosa* is a useful windbreak and shade tree.

Soil improver: Soils under *P. biglobosa* trees are improved by leaf fall.

Intercropping: It is common practice to grow several crops such as maize, cassava, yams, sorghum and millet under *P. biglobosa* canopy.

Parkia biglobosa

(Jacq.) R. Br. ex G. Don f.

Fabaceae - Mimosoideae

soumbara, soumbal, dawa-dawa, dadawa

TREE MANAGEMENT

Deciduous in the dry season; often wholly or partially leafless while flowering; seedlings are harmed by browsing and hence need protection from stock. During the dry season, *P. biglobosa* retains green leaves with minimal shedding of old mature leaves; those shed are quickly replaced. During the dry season, farmers lop branches to feed their livestock to supplement low-quality grass forage; the age and the frequency of cutting are likely to influence regrowth: young trees cut more frequently and at lower cutting height decline in productivity quicker than old ones.

GERMPLASM MANAGEMENT

Orthodox storage behaviour; no loss in viability during 1 year of hermetic storage at 4 deg. C. There are about 2800-6700 seeds/kg.

PESTS AND DISEASES

Insects, small rodents or livestock may damage the seedlings, but they survive easily and the leaves are quickly replaced. A weevil and the pyralid moth have been observed on the fruits; the moth eats both pulp and seed. Leaves are attacked by Lepidoptera of 4 families, and timber is readily attacked by insects such as termites, by marine borers and by fungi. Fungal attacks cause discolouration and considerably reduce the value of the wood.

Parkia biglobosa

(Jacq.) R. Br. ex G. Don f.

Fabaceae - Mimosoideae

soumbara, soumbal, dawa-dawa, dadawa

FURTHER READNG

Bonkougou EG, Djimde M, Ayuk ET, Zougrana I, Tchoundjeu Z. 1999. The market potential of parkland trees: *Agroforestry Today*. 11(1-2):13-15.

Booth FEM, Wickens GE. 1988. Non-timber uses of selected arid zone trees and shrubs in Africa. *FAO Conservation Guide*. No. 19. Rome.

Hong TD, Linington S, Ellis RH. 1996. Seed storage behaviour: a compendium. *Handbooks for Genebanks*: No. 4. IPGRI.

Hopkins HC. 1983. The taxonomy, reproductive biology and economic potential of *Parkia* (Leguminosae: Mimosoideae) in Africa and Madagascar. *Botanical Journal of the Linnean Society*. 87:135-167.

Sabiiti EN, Cobbina J. 1992. *Parkia biglobosa*: a potential multipurpose fodder tree legume in West Africa. *The International Tree Crops Journal*. 7:113-139.

Traore F. 1998. Use of woody and non-woody products for the preparation of foods in Konodimini in Segou region. Bamako, Mali: University of Mali. 42p.

Whitmore T.C. 1972. *Tree Flora of Malaya*. Vol one. Forest Department, West Malaysia.

SUGGESTED CITATION

Orwa C, A Mutua, Kindt R, Jamnadass R, S Anthony. 2009 *Agroforestry Database: a tree reference and selection guide version 4.0* (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)