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Prosopis africana (Guill. & Perr.) Taub.

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SEED LEAFLET

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MILLENNIUM SEED BANK PROJECT Kew

Prosopis africana (Guill. & Perr.) Taub.

Taxonomy and nomenclature

Family: Leguminoseae, sub-family Mimosoideae
Synonyms: *Coulteria africana* Guill. & Perr., *Prosopis oblonga* Benth.
Vernacular/common names: Iron wood, locust bean (English), abu suruj (Arabic), nagile (Dagomba), ubwa (Ibo), yir (Wolof), langbina (Mamprussi), kohi (Fulani), karbon (Creole), kyembo (Mandinka).

Distribution and habitat

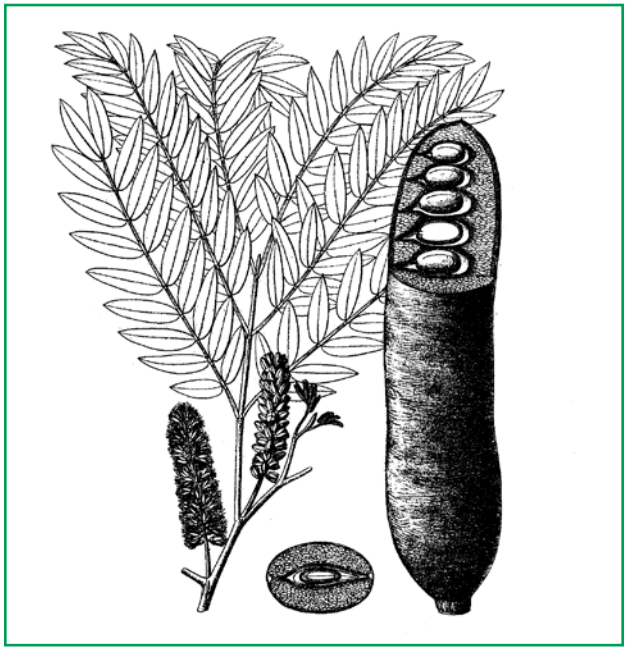
The only African *Prosopis* species. It has a natural distribution south of the dry Sahel from Senegal to Cameroon eastwards to the Sudan, and in East Africa south to Lake Victoria. It is present in savannah, wooded grassland and riverine forests; and it grows at altitudes of up to 1000 m, with a mean annual rainfall between 600 and 1200 mm. It grows on a variety of soil types from sandy to clay soils. *Prosopis africana* is locally a fairly common species but populations are being fractioned by cutting. In West Africa it is a seriously threatened but important agroforestry tree. It is not classified on the IUCN red list of threatened species.

Uses

The yellow to pale brown wood is hard, fairly heavy and has a fine grain; the dark brown core of the wood is very hard and termite resistant. It has high value for fuel wood and charcoal, and has multiple uses in construction, furniture, tools, poles and posts. The bark is used to make beehives. The leaves and shoots are palatable to livestock. The pods are edible. Dry pods are used as fish poison. The roots, leaves and bark are used in local medicine to treat a variety of ailments, such as rheumatism, migraine, fevers, vertigo, wounds and tooth decay. The tree is planted as windbreaks, hedges and for soil conservation; it also improves the soil through nitrogen fixation and mulching. Due to its usefulness and as a result of over-collecting for fuel the species has been greatly over-exploited.

Botanical description

Usually a deciduous tree ranging from 4 to 20 m in height. It has an open crown and drooping pale green foliage. It has no thorns. The bark is grey, rough and very scaling, 4-8 mm thick and with orange-brown slash. The leaves are bipinnate, 7-15 cm long with 2-4 pairs of opposite pinnae and 6-12 pairs of opposite leaflets per pinnae. Between the bases of each pair of pinnae is a fleshy pore-like gland. The leaflets are 1.5-4 cm long and 0.5-1.5 cm wide, with an apiculate apex and a rounded base. Towards the end of the growth season thick and brush-like spikes are produced on new growing branches. The inflorescence comprises a solitary spike, set at the base of a leaf. The spike is pedunculate, 4-6 cm long and c. 1.5 cm in diameter.



Prosopis africana, branch with inflorescences, fruit in cross section and fruit in pod. From: Andrews 1950: The flowering plants of the Anglo-Egyptian Sudan, Vol. II

Flowering and fruiting habit

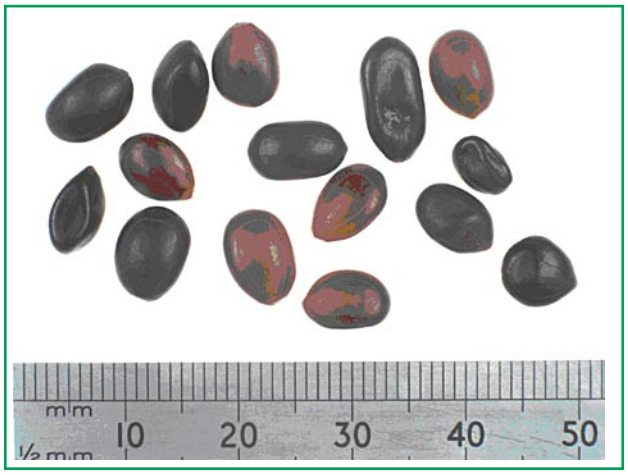
Flowering occurs in the second part of the dry season or during the first rains, just after the leaves open. The white or yellow-green flowers are fragrant and pollinated by insects.

Fruit and seed description

Fruit: The dark brown, shiny, indehiscent pods are 10-20 cm long, circular with 2-3 cm in diameter, hard, thick and woody, and remain on the tree for a long time. The pods have a thick pericarp consisting of three layers: a hard woody exocarp, a pulpy mesocarp and a thin septate endocarp between the seeds. The pod is fleshy when immature, but dries at maturity leaving the seeds loose 'rattling'. Each pod contains c. 10 seeds, each one in its own compartment (septum).
Seed: The dark brown, glossy seeds are ellipsoid, 8-

10 mm long, 4-9 mm across, and have a thin intramarginal line all around (pleurogramme). The seeds are embedded within a pulpy matrix (mesocarp). The hard seed coat is impermeable to water. The mean thousand seed weight is 146 g. The seeds contain c. 2% neutral lipids.

PHOTO: H. VAUTIER



Seeds of *P. africana*

Harvest and processing

The pods are usually picked directly from the tree by shaking or beating fruit bearing branches. The period of time within which the pods can be collected is relatively short.

Extraction of *Prosopis* seed is generally difficult because the seeds are imbedded in a pulpy mesocarp within a hard dry pod. Grinding mills have been used to remove the outer dry pod. The pods are then soaked in a 0.1 M solution of hydrochloric acid for 24 hours. The pods can then be washed in water for 1 hour and sun dried. The dried mass can then be pounded to separate the seeds from the coating. An alternative method is to allow the pods to dry for several days, followed by immersion in boiling water and allowing them to cool as they soak for 24 hours, after which the fruits are easily opened. With effort the seeds can be cleaned by hand.

Storage and viability

Seeds exhibit 'orthodox' storage behaviour. Air dried seeds can remain viable for several years at room temperature. Seeds stored with c. 8% MC in a cool room (4°C) at CNSF for 15 years germinated 90%. For the longer term it is recommended to further dry the seeds at 5±1% and store them in air-tight containers at -18°C. Seeds of this species have been stored in the MSB since 1990, and actual X-ray analysis showed 90-100% viability.

Dormancy and pretreatment

Fresh non-dried seed lots do not require a pretreatment. Pretreatment is often required to overcome physical dormancy in dried seeds. Scarification using a scalpel, knife or file, makes the seed coat permeable to water, and hence facilitates germination. Alternatively boil seed and leave them to cool in the water for 24 hours. Seeds that are treated with 95% sulphuric acid (H2SO4) for 5 minutes show increased levels of germination. In their natural environment, pods are eaten and the seeds distributed by animals; the conditions experienced in the digestive tract assist germination. This process can be simulated by soaking the seeds in 0.5 M HCl for 24 hours.

Sowing and germination

Once seed-coat dormancy is broken, germination usually occurs within a week at 25°C (+/-5°C). In a germination test germination was observed on day 5 at 30ºC, day 6 at 25ºC and day 8 at 20ºC. Seed germination reaches 80% by day 8 at 25ºC, which is the optimum germination temperature for *P. africana*. Growth is fairly slow, therefore seedling protection is recommended.

Selected readings

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