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Adansonia digitata L.

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MILLENNIUM SEED BANK PROJECT Kew

PhytoTrade AFRICA

DARWIN INITIATIVE

Adansonia digitata L.

Taxonomy and nomenclature

Family: Bombacaceae

Synonyms: *Adansonia bahobab* L., *A. integrifolia* Raf., *A. situla* (Lour.) Spreng., *A. somalensis* Chiov., *A. sphaerocarpa* A. Chev., *A. sulcata* A. Chev., *A. digitata* L. *var congolensis* A. Chev, *Baobabus digitata* (L.) Kuntze, *Ophelus sitularius* Lour.

Vernacular/common names: baobab tree, monkey bread tree, upside-down tree. Local names include: mbuyu (Swahili), mwamba (Kamba), olimisiera (Maasai), toega (Mooré), Sira (Bambara), mramba (Kipare), isimuhu (Zulu).

Distribution and habitat

Distributed throughout Tropical and Sub-Saharan Africa, from Senegal to Sudan, eastern Africa, from Ethiopia to Mozambique and Natal. It is also found in Madagascar and has been introduced to Tropical America. It is usually located at low altitudes (up to 1000m), with mean annual rainfall of 100-1000mm, and a mean annual temperature of 20-30°C. However, it does not grow at high altitudes, or in moist tropical forests. It occurs on well drained soils of varying quality and is often left standing when land is cleared for cultivation. Bush burning in the dry season, grazing and seed diseases limit the number of trees. Damage to mature trees is often caused by elephants and mortality rates vary from 1 to 4% per year. Unfortunately, the population is declining and there is very low regeneration in its natural environment probably because of poor seed germination in some places and livestock, which readily eats the young trees. It is largely protected as a socio-cultural tree.

Uses

The baobab is an important indigenous fruit tree species, the white pulp is rich in vitamin C and used for making juice. The roasted seeds are very nutritious, rich in proteins and fats and this socio-economically important species is essential in the local diet. Fibres from the inner bark are long (90-120cm) and used to make rugs, mats, rope etc. The leaves, shoots and fruits are used as fodder. Most parts of the tree are used medicinally for a variety of illnesses. The wood is light (210-320kg/m^3) and easily attacked by fungi. It has no commercial value as a timber, is unsuitable as fuelwood, but used for canoes and fishing floats.

Botanical description

Deciduous tree, usually not more than 20m tall, with a hugely swollen trunk of 3-10m (up to 28m on very old individuals) in diameter. It is one of the longest living trees in the world (3000 years). Bark is smooth, folded, reddish-brown or greyish brown. Primary branches stout. Leaves are compound with 3-9 leaflets, each 5-15cm long. Flowers are large, white, solitary in leaf axils.

Baobab tree. Road to Kariba border, Zambia.
Photo: C. Rønne

Fruit and seed description

Fruit: the mature indehiscent fruits, which hang on long stalks, are yellow-brown in colour, cylindrical in shape, slightly tapered at each end and up to 13 by 35cm. The fruit can be very variable and irregular in shape and has a hard woody shell covered in yellow-grey hairs. The pericarp is 8-10mm thick, enclosing the dry pulp. The fruits are persistent on the tree. Each fruit contains over 100 seeds, within its pulp.

Seed: the dark brown, angular, oval seeds are c. 1.3 by 0.9cm, and are contained within the fruit's whitish-pink, dry, acidic pulp. The seeds are smooth and laterally flattened. The seed coat is hard. There are typically 1700-2500 seeds per kg. Seeds have an oil content of c. 14%.

Flowering and fruiting habit

Flowering primarily occurs before the beginning of the rainy season. Some trees may be in flower at other times, except during the height of the dry season. The trees typically begin to flower when they are 8 to 23 years old. The pungently fragrant, white waxy flowers are large (up to 20cm in diameter) and showy. They open fully soon after sunset and stay open until morning, and are pollinated mainly by bats, but possibly also by wind and insects. Each flower wilts and falls within 24 hours of opening. The fruits mature 5-8 months after pollination and an average mature tree produces 200kg of fruit a year. When fruits fall to the ground termites enter and release the seeds. Monkeys, baboons, elephants, birds and rodents help to disperse the seeds.

Harvest

When the fruits seem dry and hollow they are mature. Fruits can be collected from the crown of standing trees by using a hook to cut the hanging fruits or by climbing into the crown. It is not recommended to collect from the ground. 3-8kg of fruit are required to obtain 1kg of seed.

Processing and handling

Dry fruits are collected and seeds are extracted by hitting the fruit on a hard surface in order to break it. The mixture of seeds and pulp is then soaked in water for up to 6 hours to remove the pulp by gentle squashing and floating in water. Floatation also separates dead seeds, with those that float being discarded; this is in general about a third of the total. The seeds can then be dried in the sun for 2 days.

Baobab seed. Photo: M. Sacandé

Storage and viability

The seed of this species displays orthodox seed storage behaviour. Dry seeds can be stored for up to 4 years at room temperature, without significant loss in viability. Seeds stored at c. 8% moisture content in a cool room (4°C) at CNSF for 15 years, germinated 94% at 25°C. The species has been stored at the MSB since 1991.

Dormancy and pretreatment

The seeds are known to remain dormant in the soil for several months. The limiting factor in germination is mainly the seed coats' impermeability to water. For optimum germination the seeds are scarified, e.g. with a hot wire, sulphuric acid (c. 1 hour), or soaked in boiling water for 5-7 min. and left to cool overnight. The seeds that swell should then be planted and the remaining seeds re-immersed, until they also swell. If properly pretreated, baobab seed normally has a high germination rate.

Sowing and germination

Seeds can be sown in beds or containers. Under optimum conditions they germinate in 15-40 days. Germination is epigeal, the seed coat cracking and the radicle protruding from the scar end. Seedlings should be protected from livestock (as the leaves are very palatable) and fire until they are well established.

When seedlings emerge it is best to shade them for 8 days, provide half shade for 4-7 days and then expose to full sun. Seedlings need to be 3-4 months old, reaching a height of 40-50cm, before transplanting.

Selected readings

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