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MILLENNIUM SEED BANK PROJECT Kew

Parinari curatellifolia Planch. ex Benth.

Taxonomy and nomenclature

Family: Chrysobalanaceae
Synonyms: *P. mobola* Oliv.
Vernacular/common names: cork tree, hissing tree, sand apple, mobola plum (Eng.); grysappel (Afrikaans); mbula (Kinyamwezi, Kibende, Kizaramo); munanzi (Kihaya); mbura (Kiswahili).
Subspecies/varieties: there are two recognised subspecies, subsp. *curatellifolia* and subsp. *mobola* (Oliv.) R. Grah. (syn. *P. mobola* Oliv.)
Related species of interest: *Marathes polyandra* has leaves with fewer nerves. *Neocarya macrophylla* leaves have 13-20 pairs of nerves while *P. curatellifolia* leaves have 17-20 pairs of nerves.

Distribution and habitat

The species is widespread in tropical Africa from Senegal to Kenya and southwards to northern South Africa, with the highest concentration in Zimbabwe and the low veld region in South Africa. It is quite common, gregarious and locally abundant. It is found in open woodland, wooded grassland, savannah and often on rocky sites, in areas with a mean annual rainfall of 400-2300mm, a mean temperature of 10-30°C and altitudes of 1100-1900m. It grows in association with miombo woodland and is fire-resistant, making it a prominent feature of fire-maintained wooded grassland. It is typical of areas with a high water table and poor drainage, and is found near rivers. This species is characteristically left standing when woodland is cleared for cultivation. Local people tend to protect it due to its potentiality, however forest fires and land scarcity threaten its existence.

Uses

The tasty, sweet fruits are highly valued. The fruits have a high content of vitamin C and are eaten fresh, cooked as porridge or made into beer. They can also be dried and used as a reserve food. The nuts are eaten alone or mixed with vegetables. Oil can be extracted from the seeds which contain about 40% oil (c.70% in kernels). The edible oil is used for cooking, paint, varnish, soap and others. An extract from the bark is used in tanning and for dying in basketry. Roots and bark are used to treat several diseases and for the treatment of snake bites and fractures. The twigs are used as chew sticks, and teeth are washed with a root infusion for toothache. The timber is very durable, hard and heavy (720kg/m^3), and is often used for fine woodwork, mortars, canoes and mine timber. The wood contains a high quantity of silica crystals and is strongly fire resistant.

P. curatellifolia Harare, Zimbabwe. Photo: C. Rønne

Botanical description

This species is very variable in size and shape, ranging from small shrubs of 3m tall to large trees of up to 20m high. The tree is evergreen, with pale green, spreading foliage forming a dense, rounded, umbrella shaped crown, which casts heavy shade. The branching is low, and the bole twisted, 25-40cm in diameter. The bark is deeply fissured, with square or rectangular blackish scales and deep red slash. Young shoots are densely covered with yellowish woolly hairs. The leaves are simple, spirally arranged but sometimes looking alternate, elliptic to oblong, 5-17 by 3-8cm. They often have small galls and up to 20 pairs of fusing lateral veins. The petiole is pubescent, 6-10mm long, with 2 circular glands. Inflorescences are usually paired, terminal, many-flowered panicles of more or less lax cymes, up to 20cm long. The sweetly scented white flowers are tinged with pink, 4-6mm in diameter, with 5 petals and 5 sepals in compact heads.

Fruit and seed description

Fruit: The fruit is an ovoid or sub-globose drupe, yellow-red in colour, turning brown as it ripens. It has rough, scaly skin, with golden coloured warts on the surface. The fruit measures up to 50mm long by 30mm wide, with a hard stone embedded in a reddish thick fibrous pulp.

Seed: The hard and woody endocarp (stone), c. 2cm in diameter, contains 1 or 2 embryos (kernels). Each stone with the pulp removed is usually considered as a seed. There are 250-350 seeds per kg, or TSW of 3000-4000g.

Flowering and fruiting habit

The tree has long flowering and fruit ripening periods that often occur concurrently during the rainy and dry seasons. It takes 9-10 months from flower fertilization to fruit ripening. The tree flowers from July to October in Southern Africa and fruits from October to January. In Kenya flowering occur from December to March and the trees fruit in May-June. Not all trees bear fruit every year. This species naturally regenerates from seed and also from coppice.

Mature fruits. Fruits on the left have been depulped. Photo: C. Rønne

Harvest

The fruits can be harvested when they turn yellow-orange. They often fall to the ground before they are fully mature, but it is not recommended to collect fruits from the ground as they can be heavily infected. About 5kg of fruits produce 1kg of seeds.

Processing and handling

The fruit skin and pulp are removed with a knife and the seeds washed with water. For extraction of large quantities, the fruits are soaked in water for 24 hours, and then pounded in a mortar using a pestle with some coarse sand. After mixing well with large quantities of water, the fruit skin and pulp can be poured, leaving the cleaned seeds behind. Extracted seeds should be sun dried for at least 2 days.

Storage and viability

The seed is orthodox and should be stored at low moisture content. Well dried stones can be stored for up to 4 years, after which viability gradually decreases. Seed of this species has been stored at the MSBP since 2000. X-ray analysis of two seed lots found that viability was 46 and 72.5%, due to empty seeds.

Dormancy and pretreatment

The seeds show severe dormancy and difficulties in germinating. Seeds may need pretreatment with hot water or sulphuric acid to speed up germination but after being boiled for 15 minutes and soaked for 24 hours the seed may still take up to six months to germinate. The best results, a germination percentage of 34%, have been seen by complete removal of the seed coat and 60 days storage of the seeds before sowing.

Sowing and germination

The seeds should be sown in river sand in flat seedling trays. Press seeds down until they are level with the soil surface and cover with a thin layer of sand. Germination is very poor and prolonged, commencing after about 5 weeks. Seedlings should be transplanted in the 3-leaf stage. Be careful when transplanting the seedlings, the taproot is easily damaged. The tree grows quite fast and can be transplanted into the veld or garden.

Selected readings

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