

THE MONGONGO/MANKETTI NUT

Ricinodendron rautanenii (*Schinziophyton rautanenii*)

Names:

!Kung Bushmen - //xa, mongongo

Lozi - mungongo

Shona - mungongoma

Tswana - mongongo, mugonga

Herero - mangetti, mongongo

Kwangali - ugongo (ngongo)

Africaans - wilde okkerneut

English - manketti nut, mongongo nut, featherweight tree (the wood is very light)

Description of the tree and fruit

Ricinodendron rautanenii is a large (up to 15 metres) straight trunked tree, with a broad spreading crown with dark green compound leaves of 5 to 7 ovate to elliptical leaflets at the end of a stalk up to 15cm (6 inches) long, not unlike those of *Casimiroa edulis*. The branches are stubby and contorted. There are separate male and female trees, so solitary specimens will not fruit. In addition, trees take around 25 years to commence fruiting. The tree flowers - depending on local climatic variations - in Southern Africa's hot dry season, which is around October to December. The small whitish-yellow flowers become a somewhat oval, vaguely plum-like fruit about 3.5 cm long and 2.5 cm wide. The young fruit is at first covered in fine small hairs on its thin but tough outer skin; under the skin is a narrow spongy layer, at first green, then turning whitish brown with maturity. The fruit fall from the tree with the skin still green (variably, april to may), and matures on the ground. There, the skin turns brown, and the flesh softens and develops full flavor. This soft spongy pulp layer is about 20% of the fresh fruit (by volume), pleasantly aromatic and sweet at maturity. Its taste has been compared to a date, and although high in sugars there is not an absolutely high amount:: there is (very approximately) 1 gram of sucrose in the dried flesh of each manketti fruit.

Like many trees of seasonally arid or cold climates, the trees lose their leaves every year, towards the end of the cold-dry season of autumn and winter (variably, about June to the end of August). And it is at this time that the last of the ripe fruit fall. They are a lot easier to see when the leaves fall at this time, and it is easy to pick up the fallen fruit. The supply of fruit decreases after winter, as the rainy season (very variably, at some time in the period November to April, broadly regarded as the 'summer rainfall' area) comes on; insect and animals destroy the fruit where they fall. Even the dried, crumbly flesh of old fruit is edible -there may be edible dried fruit on the ground for as long as eight months, overlapping the fall of the new crop. Some bushmen remove the flesh from the fresh fruit, dry it in the sun, and store it for use later in the year. Both Bantu and Bushman peoples use the fruits, with the modern preference being to boil the whole fruit to remove the tough and indigestible outer skin, and make a sweet, maroon colored porridge - very similar to 'applesauce'(USA)/stewed apples (British colonial) - from the flesh.

But the sugar content is only part of the story.

The big value is in the seed. The skin takes up 10% of the fruit by volume, the flesh 20%. The remaining 70% is the nut-like seed, including the wide hard shell around it. The 'shell' (endocarp) around the 'kernel' is very thick indeed, and although porous, it is very hard and tough. So hard that even elephants, which love the sweet fruit, can't crack them.

"A forester in Rhodesia [Zimbabwe] set this author some Manketti nuts and on the package under the scientific name Ricinodendron, he had written "recovered from elephant dung". This startled

me. The nuts are like oversized pecans which have had smallpox and were covered with pockmarks. I wrote the forester to ask why the special inscription, and he replied that there are three reasons: (1) The elephants eat the fruits greedily and it is much easier to let the elephants do the job of picking; (2) The seed will not germinate until it has spent a week inside the elephant, and (3) The elephant enjoys the fruit but his digestive mechanism does not affect the extremely hard shell and the nut inside. The natives of Rhodesia, therefore, follow the elephant, recover the hardshelled nuts where they have been dropped, clean and dry them, then crack the extremely hard shell, and find the contents perfectly delicious."
 Edwin A. Menninger, 'Edible Nuts of the World'.

Elephants, *Loxodonta africana*, are not the only animals to feast on the sweet fruits. The greater Kudu, *Tragelaphus strepsiceros*, produces the 'nuts' cleaned of the fruit as well, but from the other end; it regurgitates the nuts some time after eating the fallen fruit, leaving them in neat piles, ready for collection.

The Nut Meat

Once collected, the hard shell can be broken between two rocks, and the single kernel (sometimes there are two) extracted. It is easier to crack if it is roasted in a fire first - or, as in some areas, covered in sand and a fire built on top. The kernel or 'nut meat' is surrounded by a hard but thin seed coat which is easy to remove by hand. The kernel is about the size of a hazelnut (the weight of Botswana and South West African kernels is about 1.4 grams).

The creamy yellow nut meat is oily and nutritious; it is very good eaten raw, and even more delicious when it is roasted. Indigenous people sometimes mix the nut meat with sand and red hot ashes from the fire, after which the roasted seeds taste like roasted cashews. Curiously, it is reported that roasted for longer, they then taste like 'fine old cheese'.

Nutritional value of the kernel

Their nutritional content is outstanding. The kernel is 57% by weight fat. Of this, about 43% are polyunsaturated fats (almost entirely linoleic acid), about 17% saturated fats (palmitic and stearic), and about 18% monounsaturated (oleic). Add the sugars in the fleshy part, and, by one estimate, an adult man would meet 71% of his daily energy requirement by eating 100 fruits (kernels and flesh). Indigenous people have been reported as eating around 100-300 fruit a day in parts of Namibia.

The kernel has 26 grams of protein per 100grams, an amount similar to peanuts and other protein rich legumes.

The kernel has, per 100 grams, approximately 193 mg of calcium, 527 mg magnesium, 3.7 mg iron, 2.8 mg copper, 4 mg zinc, 0.3 mg thiamine, 0.2 mg riboflavin, 0.3 mg nicotinic acid, no vitamin C (the flesh has about 15 mg), and a stunning 565mg of vitamin e (almost entirely as γ -tocopherol).^[1] Due to the very high γ -tocopherol content, the oil is very stable, and doesn't oxidise into 'rancidity' for a very long time, in spite of the African heat.

Productivity

That these are a productive tree in their environment is undisputed: one estimate is that each female tree has around 950 fruit a year, given a sufficient rainy season. In a good year, they may be "knee deep" under the trees, with yeild depending in part on how good the rains of the previous year were. In areas where they are the dominant species they can occur every 20 metres or so; some large stands have been estimated at up to 60,000 hectares. In the early 1900's, around 2,000 tons of nuts a year was exported from Namibias dryland Tsumeb forests; presumably with little consideration they were commandeering the local peoples most important food source in an unforgiving environment.

Natural Distribution

The Manketti is a tree of seasonal drylands, surviving unreliable rains, temperatures ranging from maybe 14° F in winter to well over 100° F in summer. In its native Southern Africa it grows in suitable

environments in a rough band from the Northern Namibia/Southern Angola, past the Etosha pan, the Tsumeb region, through Namibia's Caprivi strip area, the Okavango of Botswana and Southern Zambia, across to Northern Zimbabwe, the uplands of Central Mozambique and Transvaal in South Africa. In its 'core' area, virtually coast to coast in the middle part of Southern Africa (about latitudes 15-21 degrees) on suitable soils it usually occurs in large groves or more extensive stands, and is either the dominant tree in the stand, or co-dominant. Some groves are as much as several hundred metres wide, and may run for several kilometres.

Its core area is mainly in more upland areas, generally above 1200 metres, although it is found down to 200 metres. It is a rather 'plastic' species, in that the rainfall varies over the various regions of its range can be from 400mm to 1,000mm. As mentioned, it survives light frost through to extreme daily highs.

It may be associated with alluvial soils near rivers, but most commonly with stabilised dunes and raised sandy plains of the deep Kalahari sands. It cannot tolerate areas subject to flooding. Generally it is found in mixed open woodlands, and, as mentioned, sometimes as dominant stands of large extent.

Outside its core area it appears only sporadically, or as a small isolated stand.

Where it occurs in mixed woodland, one region in Southern Africa has found it associated with *Azelia quanzensis*, *Baikiaea plurijuga*, *Burkea africana*, *Combretum* spp., *Guibourtia coleosperma*, *Pterocarpus angolensis*, *Strychnos coculoides*, and *Terminalia sericea*.

It is used as a street tree in Victoria Falls, where the Zambesi river falls off the arid southern Zambian plains at North western Zimbabwe.

Distribution to other Countries

There is little information on what attempts have been made to introduce this extraordinary nut to other areas of the world with suitable climates and soil conditions.

Seed was introduced to Australia in the late 1980's; some of the drier areas, so long as they are not salinated, may suit it well.

However, I have seen no reports on whether or not the plants survived.

Israeli researcher Dr. Yosef Mizrahi introduced the tree to several desert sites. So far, some trees could not tolerate the salinised soils. The best growth has been in Besor, a cooler climatic region. The plants became dormant in winter (in December) at this site, and did not break dormancy until quite late - in June. Active growth continued for the next five months, until November.

7 degrees Celsius below freezing was enough to kill young plants. This will limit the number of sites it can be tried at.

Dr. Mizrahi found germination could generally be started by removing the hard exocarp and treating the seeds with either ethylene or ethephon. Germination is erratic, and takes place over an extended period. The seedlings develop very deep roots very quickly - an adaptation to desert conditions - and need appropriate nursery practices to accommodate this fact.

Another report says seeds planted in a glasshouse germinated within one or two weeks when the hard outer exocarp was removed.

Other Ricinodendron species

Ricinodendron heudelotii ssp. *africanum* is a fairly common species in rainforests of West tropical Africa from Guinea down to Angola, and as far east as Uganda. It has been recorded in Wamba forest, Congo Democratic Republic (formerly Zaire), more or less right on the equator, as well as in the Mahale Mountains on the shores of Lake Tanganyika in Tanzania, just below the equator, but only at higher altitudes - more than 1,600 metres above sea level. It is a quick to establish, fast growing, straight boled

tree that is usually around 100 feet high, although sometimes it is much smaller. This species seems to be a relatively early and fairly successful colonizer of grasslands, in areas where farming has been abandoned. It is therefore most widespread in secondary forest, rather than mature primary forest.

There are separate male and female trees, and trees in drier, more marginal areas can defoliate and regrow leaves when moisture returns. Each fruit contains between two and three kernels. This species has a very similar nut to the Mongongo, except that the kernel is a smoother and plumper, and the seed coat is a little thicker. It is said to be as good eating as the Mongongo nut. It is wild harvested and regularly traded in markets in Cameroon, and is one of the major food sources of the Mbuti people, of the Ituri forest in Zaire.

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-Note: the above reference is a 'key world information resource' for this species, in my view.

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