Schinziophyton rautanenii

(Schinz) Radcl.-Sm.

Euphorbiaceae

mugongo

LOCAL NAMES
Bemba (mukusu); English (wild akkerneut,manketti tree,featherweight tree); Trade name (mugongo); Tswana (mongongo)

BOTANIC DESCRIPTION
Schinziophyton rautanenii is a deciduous tree 8-20(-24) m tall with a closed, spreading crown; trunk to 1 m in diameter, 3-4 clustered, or single bole; bark smooth and flaking.

Leaves alternate, digitately compound, consisting of 5-7 leathery segments usually hairless below and with grey wooly hairs above. There are usually 1 or 2 black glands on the upper side of each leaf-stalk.

Flowers whitish or yellow, dioecious, in loose rusty sprays. Male flowers in long rusty sprays, female shorter in length.

Fruit ovoid, waxy and brown in colour; weighing 7-10 g with a thick leathery skin, fleshy, dry, spongy pulp 2-5 mm thick, shell tough 3-7 mm thick.

Seeds 1 or 2 in the fruit.

BIOLOGY
The tree is dioecious and fruits after 15-25 years of growth and may live up to 100 years. From March/ May- October/ November the trees are leafless, whitish flowers appear from September -December (late spring/early summer) just before the beginning of the rains. Fruits develop from December-March, most fall off the tree from April-May, thereafter ripening continues on the ground. Some fallen fruits are eaten by elephants and dispersed in dung. The leaves resprout with onset of rains in September.

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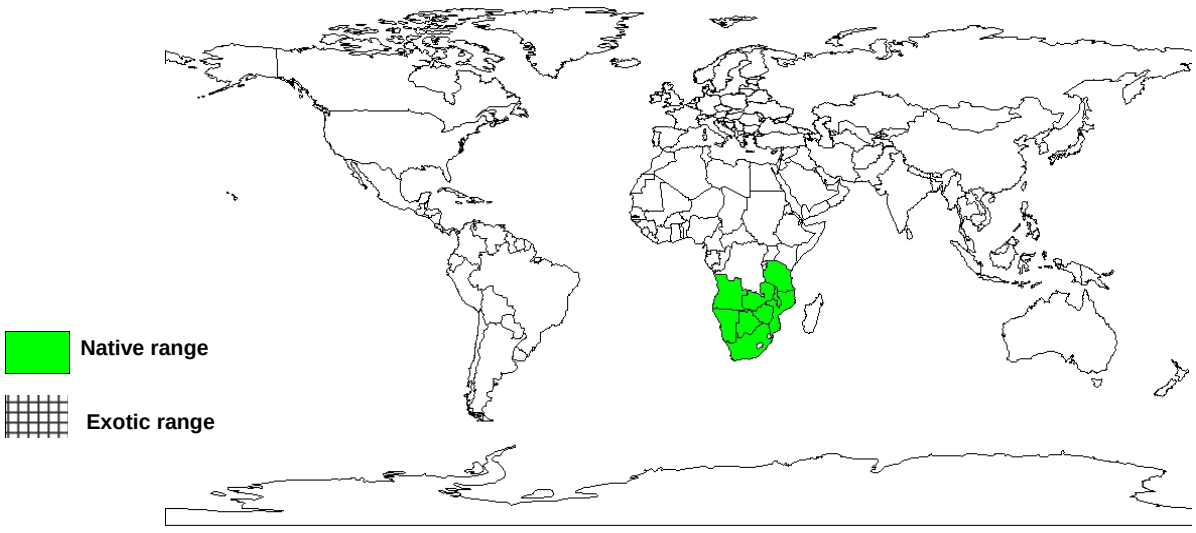
ECOLOGY
S. rautanenii occurs naturally in the southern and western parts of Zambia, its distribution heartland. It is most frequent, occasionally dominant in Kalahari sand woodlands but is also found in munga woodland, scrub mopane and Lake basin chipya. In core distribution areas it occurs in large groves of open woodland as a dominant or co-dominant tree species with Afzelia quanzensis, Baikiaea plurijuga, Brachystegia, Burkea africana, Combretum, Copaifera, Guibourtia coleosperma, Ostyroderris, Pseudolachnostylis, Pterocarpus angolensis, Sclerocarya, Spirostachys and Strychnos cocculoides. The largest groves can be 450 ha and occur on sand dune crests, smaller ones are found where sand banks against bedrock. Also common on hummocks along alluvial margins of important water courses e.g. Zambesi-Mashi.

BIOPHYSICAL LIMITS
Altitude: 200-1 500 m
Mean annual temperature: 20 deg C
Mean annual rainfall: 150- 1 000 mm
Soil type: Well drained deep sandy, sandy alluvium or rocky soils, not waterlogged, poorly drained or subject to flooding. Rare on calcerous soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: Angola, Botswana, Democratic Republic of Congo, Malawi, Mozambique, Namibia, South Africa, Tanzania, Zambia, Zimbabwe

Exotic:



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.

PRODUCTS

Food: The fruit is edible and can be eaten fresh, dried or cooked and have a pleasant taste likened to that of plums. The fruit retains its flavour even when dry. The fruit is normally skinned after steaming in a pot with little water, then boiled in fresh water to separate the nuts. The fruit is used in making aromatic soups and sweet porridge, they can be dried and consumed as sweetmeats. During roasting direct contact of seeds with the fire coals is avoided by roasting in a sand heap. Fruit carbohydrate content is between 65-77%, fibre 2.5-3%, crude protein 6-9% and Ca levels are 85-100 mg/ 100 g. In the abscence of moisture fruits can remain edible for up to 8 months if left on ground where they fall.

Fodder: Fruit enjoyed by both cattle and game. Fruit pulp and the seed meal which is very rich in protein was fed to cattle up to 1962, however this feed is suspected to cause a discolouration of beef. Elephants feed on the bark.

Fuel: Not an important firewood provider.

Fibre: The inner bark is used in making string for nets.

Timber: The whitish wood is soft, very light but not very durable, and although wooly it is easy to work and is strong. It was at one time used to make particle board on a commercial scale, and a reasonable paper has been made from it on experimental scale and has potential use in making packing cases and matches. Current uses are the making of masks, drums and temporary canoes.

Lipids: The kernel is rich in oil, up to 60% and is suitable for exploitation as an edible oil, this oil is high in linoleic, elaeostearic acid and gamma-tocopherol. The oil's perishability seems a hindering attribute in its commercial usage. Margarine has been made from the oil in Germany and England.

Wax: The highly unsaturated oil may serve well as paint medium and for varnishing purposes.

Alcohol: The fruit pulp is fermented to give a refreshing potent beer, distilled for alcohol.

Poison: Toxicological results suggest a tenous link between oil use and goitre.

Medicine: The roots are used as a remedy for stomach pains, the nuts tied around the ankles are said to relieve leg pains.

Other products: Seed cake is rich in protein but deficient in the amino acids lysine. The oil can be used for saponification, cosmetics, linoleum and oil cloth industry.

SERVICES

Erosion control: S. rautanenii roots protect sandy soils from wind and water erosion.

Shade or shelter: Offers shade in hot areas e.g. in the Kalahari desert.

Reclamation: Has potential use in desert encroachment prevention and sand dune stabilization. Its hardiness makes it ideal for arid land reclamation.

Boundary or barrier or support: Truncheon-cuttings used for fencing around homes in southern Angola.

In some places the tree is highly held culturally and venerable.

TREE MANAGEMENT
Once established, the tree requires very little attention. S. rautanenii can withstand years of drought and has few pest and disease incidences. Seed should be sown in sandy soil.

GERMPLASM MANAGEMENT
Seeds remain viable for up to 2 years when stored at 10 deg C. Pretreatment for seed involves removal of seeds from the woody endocarp followed by soaking in 1% ethrel for 24 hrs, however the ethrel treatment seems insignificant (Chimbelu, 1983).

PESTS AND DISEASES
Moth larvae parasitise on fallen fruits, eventually eating all the fleshy parts. Timber is rapidly attacked by a sap stain fungus, Ceratocystis moniliformis. Elephants occasionally break branches of the tree reducing productivity.

FURTHER READNG

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

Chimbelu EG. 1983. A germination and survival study of Mugongo (Ricinodendron rautanenii Schinz) under laboratory and greenhouse conditions. Indian Forester. 109(11): 804-809.

Storrs AEG. 1982. More about trees: interesting facts and uses of some common Zambian trees. The Forest Department. Ndola, Zambia.

SUGGESTED CITATION

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. Agroforestree Database:a tree reference and selection guide version 4.0 (http://www.worldagroforestry.org/af/treedb/)