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PLANTS PEOPLE
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Since 2004, there has been a Namibian SEPASAL team, based at the National Botanical Research Institute of the Ministry of Agriculture which has been updating the information on Namibian species from Namibian and southern African literature and unpublished sources. By August 2007, over 700 Namibian species had been updated.

Work on updating species information, and adding new species to the database, is ongoing. It may be worth visiting the web site and querying the database to obtain the latest information for this species.

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 *Display help*In names list include: synonyms vernacular names and display: All names per page*Your query found 3 taxa***Sclerocarya birrea (A.Rich.)Hochst. subsp. caffra (Sond.)Kokwaro**
[1362] [1880]

Family: ANACARDIACEAE

Synonyms

Sclerocarya caffra Sond.
 Sclerocarya caffra Sond. var. dentata Engl.
 Sclerocarya caffra Sond. var. oblongifoliata Engl.
 Sclerocarya schweinfurthiana Schinz
 Commiphora subglauca Engl.
 Poupartia caffra (Sond.)H.Perrier

Vernacular names

Afrikaans	maroela [1171] [1340]
Afrikaans (Namibia)	maroela [5083] [5087] [5098] [5121], maroelaboom [1304]
Afrikaans (South Africa)	maroela [2618] [5082] [5097] [5607], olifantsappel [5607]
Afrikaans (Southern Africa)	maroela [2795] [3045]
Arusha (Tanzania)	olmang'oi [2774]
Barakwengo-Bushmen (Namibia)	kàài [5087]
Boran (Kenya)	didissa [1597]
Borana (Kenya)	didisa [2719]
Central Shona (Zimbabwe)	muganu [2506]
Central Shona (Zimbabwe) [beer]	mapfura [2506]
Central Shona (Zimbabwe) [fruit]	pfura [2506]
Central Shona (Zimbabwe) [tree]	mapfura [2506]
Chonyi (Kenya)	fula (fruit) [2719], mfula [2719]
Chopi	tsula [1340]
Chwabo	motula [1340], motula-e-ntula [1340], mtula [1340]
Damara>Nama (Namibia)	goarus [5098]
Digo (Kenya)	mngongo [2719], mng'ongo [2719]

English	cider tree [1171] [1340] [2719], marula [1171] [1340], jelly plum, morula [1340], cat thorn, maroola nut, maroola plum [2082]
English (Botswana)	cider tree [5093], marula tree [5093]
English (Namibia)	marula [1304] [5083] [5088] [5098] [5111] [5121]
English (South Africa)	marula [2618] [5082] [5605] [5607], cider tree [5607], elephant's apple [5607], maroola [5607], meroola [5607]
English (Southern Africa)	marula [2795] [3045]
English (Zimbabwe)	cider tree [2506], marula [2506] [5082]
Eunda (Namibia)	omungongo [5087]
Gciriku (Namibia)	ugé [5087], uwongo [5087] [5098]
German (Namibia)	Marula [5083] [5087], marulabaum [5098]
Gogo (Tanzania)	mbwejele [2774]
Heikum Bushmen (Namibia)	quarob [5087], quaros [5087]
Herero (Namibia)	omukongo [5087] [5098], omungongo [5083], omuongo [5098]
Herero (Namibia) [fruit]	ongonga [5083] [5087], ozongongo [5091]
Herero (South Africa)	omuongo [5607]
Himba (Namibia)	omukongo [5087], omungongo [5091] [5098]
Hlengwe (Zimbabwe)	tsula [1340]
Iraqw (Tanzania)	gulgurchandi [2774]
Jul'hoan (Namibia)	gchi [5083], kàqé [5083] [5088]
Kalanga	morula [1340]
Kamba (Kenya)	muua [1597]
Khoekhoegowab (Namibia)	goarus [5083] [5121], quaros [5083]
Koba	morwa [1340]
Kung Bushmen (Namibia)	kae [5087] [5098]
Kwaluudhi (Namibia)	omungongo [5087]
Kwambi (Namibia)	omugongo [5087]
Kwangali	ufuongo [1171] [1340]
Kwangali (Namibia) [plant]	uwongo [5087]
Kwangali (Namibia) [fruit]	ewongo [5087]
Kwanyama (Namibia)	omoongo [5087] [5098], omwoongo [1304] [5098]
Kwanyama (Namibia) [fruit]	ongongo [5087]
Kwanyama (Namibia) [fruits]	omuongo [1304]
Kwanyama (Namibia) [plural]	omyoongo [1304]
Kwanyama (Namibia) [seed]	ongongo [1304]
Kwanyama (Namibia) [trees]	omuongo [1304]
Kxoe (Namibia)	qae [5083]
Lobedu	marula [1340]

Lovedu	marula [1171]
Lozi (Namibia)	malula [5121], milala [5083], milula [5083], mulala [5083] [5087], mulula [5083]
Maasai (Kenya)	ol-mangwai [1597]
Mbalantu (Namibia)	omuongo [5087]
Mbukushu	ufuongo [1340]
Mbukushu (Namibia)	ghuge [5087] [5098]
Mbukushu (Namibia) [fruit]	murwa [5087]
Mbundu (Angola)	omuongo [5087]
Meru (Kenya)	mura [1597]
Nama (Namibia)	quaros [5087]
Nama (South Africa)	goaros [5607]
Ndau	mufuna [1340], mukwakwa [1340], munganu [1340]
Ndebele	iganu [1171] [1340] [5607], ikanyi [1171] [1340], umganu [1171] [1340], umkano [1171] [1340]
Ndonga (Namibia)	omugongo [5098]
Ndonga (Namibia) [fruit]	ongongo [5087]
Ndonga (Namibia) [tree]	omugongo [5087]
Ngandjera (Namibia)	omungongo [5087] [5121]
Nkolonkadhi (Namibia)	omuongo [5087]
Nkumbi (Angola)	mungongo [5087], muongo [5087], omuongo [5087]
Norekau Bushmen (Namibia)	kai [5083]
Northern Sotho	morula [2618] [5097] [5605], murula [1340], nganu [1340]
Oshikwanyama (Namibia)	eegongo [5083], omoongo [5083]
Oshindonga (Namibia)	omugongo [5083] [5121]
Oshiwambo (Namibia)	ongongo [5083]
Pare (Tanzania)	mng'ong'o [2774]
Pedi (Southern Africa)	marula [2795]
Pedi [fruits]	lerula [1171], marula [1171]
Pedi [tree]	morula [1171], merula [1171]
Pokot (Kenya)	oruluo [1597]
Ronga (Mozambique)	nkanye [1340]
Rotse	mulala [1340], mulula [1340]
Rukwangali (Namibia)	ewongo [5083], mawongo [5083], uge [5083], uguva [5083], uwongo [5121]
Rumanyo (Namibia)	uge [5083]
SeTswana (Botswana)	morula [5093], morwa [5093], ntala [5093], nthula [5093]
Sebei (Kenya)	katetalum [1597]
Shambyu (Namibia)	uge [5098], ugé [5087]
Shangaan	inkanyi [1171]
Shangana	nkanye [1340], nkanyi [1340]
Shona	muganu [1171] [1340], mukwakwa [1171] [1340], mupfura [1171] [1340], mushomo [1171] [1340], mutsomo [1171] [1340], ikanyi [1340], marula [1340], mufuna [1340], mufura [1340]
Shona (Southern)	marula [2795]

Africa)	
Shona [fruits]	pfura [1171]
Shona [tree]	marula [1171], mafuna [1171], mufura [1171]
Swahili	mugongo [1340]
Swahili, Digo (Kenya)	mngongo [1597]
Swati	umganu [1171] [1340]
Swazi	umganu [5607]
Thimbukushu (Namibia)	ghuge [5083], ghumurwa [5083], murwa [5083]
Thonga	minkanye [5607], nkanye [5607]
Thonga [fruit]	kanye [5607]
Thonga [fruits]	makanye [5607]
Thonga [seed]	mongo [5607]
Tjimba (Namibia)	omuhongo [5087], omukongo [5087], omuongo [5087]
Tonga	tsua [1171] [1340], tsula [1171] [1340], umganu [1171] [1340]
Tonga (Southern Africa)	umganu [2795]
Tshivenda	mufula [5605]
Tsonga (South Africa)	ukanyi [5605]
Tsua	tsula [1340]
Tswana	morula [1171] [1340]
Tswana (Namibia)	marula [5083]
Tswana (Southern Africa)	morula [2795]
Tugen (Kenya)	tololokwo [1597]
Unknown (Mozambique)	canhu [5480], m'tula [5480], medangwa [5480], nkokwo [5480], tchumbo [5480]
Vasekele (Namibia)	k'ye [5111], malula [5111]
Venda (South Africa)	mufula [1280] [5607]
Venda (South Africa) [beer]	mukumbi [5607]
Venda (South Africa) [seed]	thambo [5607]
Venda (South Africa) [stone]	thebvu [5607]
Zaramo	ngongo [1340]
Zulu	nkanyi [1340], umganu [1340]
Zulu (South Africa)	umGanu [2618] [5097]
Zulu (Southern Africa)	umganu [2795]
Zulu [fruits]	amaganu [1171]
Zulu [seeds]	umganu [1171]
Zulu [tree]	umganu [1171]

Distribution

Plant origin	Continent	Region	Botanical country
Native	Africa	East Tropical Africa	Kenya [3] [1362], Tanzania [3] [1362]

		Northeast Tropical Africa	Ethiopia [2774]
		South Tropical Africa	Angola [3] [1362], Malawi [3], Mozambique [3] [1171] [5480], Zambia [3] [5481], Zimbabwe [3] [5419]
		Southern Africa	Botswana [3] [1171] [1257] [1669] [5104] [5150], Cape Province [1669], Caprivi Strip [3] [3045] [5121], Namibia [3] [1171] [1362] [1669] [5104] [5150], Natal [3] [1171] [1362] [1669] [2774] [5104] [5150], Swaziland [1171] [1669] [5104] [5150] [5452], Transvaal [3] [1171] [1362] [1669] [5104] [5150]
		West-Central Tropical Africa	Zaire [3] [1362]
		Western Indian Ocean	Madagascar [1362]
Introduced	Africa	Western Indian Ocean	Mauritius
	Asia-Temperate	Arabian Peninsula	Oman
	Asia-Tropical	Indian Subcontinent	Tamil Nadu

ISO countries: South Africa [3] [1171] [1362] [1669] [2774] [5104] [5150]

Descriptors

Category	Descriptors and states
DESCRIPTION	Single Stemmed [2618] [5155]; Can be Coppiced [2774]; Monoecious [2618] [2774] [2795] [5607]; Fast Growth Rate [5092] [5097] [5605] [5607]; Deciduous [187] [2506] [2774] [3045] [5082] [5093] [5097] [5121] [5155] [5605] [5607]; Erect [2795] [3045] [5093] [5605]; Dioecious [1171] [1257] [2506] [2618] [2774] [2795] [3045] [5082] [5093] [5121] [5150] [5607]; Terrestrial; Slow Growth Rate [187] [2506]; Tree [3] [187] [1171] [1597] [2774] [2795] [3045] [5088] [5093] [5097] [5104] [5121] [5586]; Perennial [5104]; Aromatic - infructescences [187] [1332] [1340] [2506] [5082] [5098] [5155]; Plant Height 3.5-18 m [1257] [1597] [2774] [5104] [5155]; Age at First Fruiting >= 7 years [5607]
CLIMATE	Not Frost Tolerant [5092] [5097]; Annual Rainfall >= 250 mm [5121]
SOILS	Well Drained [1257]; Boulders/Rocky [2719]; Gravels/Stony [5121] [5607]; Sandy [1171] [1257] [1332] [2506] [5097] [5121] [5605] [5607]; Dry [2719] [5121]; Sandy Loams [1171] [1257] [2719] [5097] [5605] [5607]
HABITAT	Lowland [5082] [5155]; Woodland [3] [1257] [1362] [3045] [5082] [5097] [5605] [5607]; Shrubland/Bushland/Scrub [1332] [3045] [5082] [5607]; Wooded Grassland [3] [1362] [1597] [2719]; Hillsides/Slopes [1257] [2719] [5121]; Outcrops/Kopjes/Inselbergs [5121]; Dunes [5121]; Watercourses [2774] [5121] [5607]; Anthropogenic Landscapes [2506] [2795]; Pans [5121]; Plains [5121]; Altitude 5-1700 m a.s.l. [5104]
PHYSIOLOGY	Drought Tolerant [5092] [5097] [5155] [5607]
WOOD	Low Density [5092] [5097] [5155]; Heartwood Brown/Shades of Brown [2795]; Workability -
PROPERTIES	Easy [2506] [2795] [5091] [5155]; Sawing - Easy [5155]; Finish - Good [5155]; Sapwood White/Yellow [5155]; Workability - Difficult [5092] [5155]; Nailing/Screwing - Difficult [5155]; Moderately Durable [2506]
PRODUCTION	Subsistence Value [1171] [2358]; Potential Food Uses [2795]; Wild Plants Utilised [187] [1332];

AND VALUE Traded Locally [5155]; Commercial Value [2358] [2618] [2795] [3045] [5097] [5121] [5155] [5586] [5605]; Traded Within a Country [2358] [2795]; Traded Internationally (Single Continent) [2358] [5092]; Traded Globally Between Continents [2358]; Recommended for Cultivation [187] [2795] [5607]

SOURCES OF PLANTING MATERIAL RBG Kew Seed Bank; Other Seed Sources [5181]

FURTHER DATA SOURCES Botanical Illustration [3] [1171] [1362] [2506] [5082] [5093] [5121] [5607]; Additional References [1748] [5155] [5192] [5306] [5308] [5312] [5350] [5371] [5585] [5587] [5588] [5589] [5590] [5591] [5592] [5593] [5594] [5603] [5604] [5606]; Included in PROTABASE [5450]; Regional Distribution Map [3045] [5082] [5361] [5450]; Botanical Photograph [1171] [2795] [3045] [5082] [5088] [5605]; Databases [5123] [5327] [5341]; PROTA - Precursor volume [5361]; Habit Illustration/Photograph [5082] [5093] [5607]; Use Related Illustration/Photograph [1340] [2795] [5088] [5092] [5605]; Grid Map [5093] [5121] [5123]

SEPASAL DATASHEET STATUS All Data Transferred from SEPASAL Paper Files; Nomenclature Checked

CHEMICAL ANALYSES Unspecified Alkaloids - bark [1340] [5092] [5097] [5155]; Unspecified Carbohydrates - infructescences [187] [2358]; Unspecified Lipids - infructescences [1340]; Unspecified Organic Acids - infructescences [5098]; Unspecified Carbohydrates - seeds [187] [2358]; Unspecified Lipids - seeds [1340]; Unspecified Flavonoids - unspecified parts [2618]; Laboratory Tested Biological Activity - bark [5155]; Tannins - bark [1340] [2358] [5092] [5097] [5155]; Unspecified Sugars - infructescences [1304] [5098]; Tannins - gum/resins [1340] [2358] [5605]; Nutritional Analyses - infructescences [1257] [5098]; Monosaccharides - infructescences [5097]; Nutritional Analyses - seeds [5098]; Oligosaccharides - infructescences [5097]; Proteins - infructescences [187] [1331] [2358]; Proteins - seeds [187] [1331] [1340] [2358] [5082] [5092] [5093] [5098] [5155] [5586]; Vitamin B1 (thiamine) - infructescences [187] [2358]; Polysaccharides - infructescences [2795] [5097]; Vitamin B1 (thiamine) - seeds [187] [2358]; Vitamin B2/Vitamin G (riboflavin) - infructescences [187] [2358]; Vitamin B2/Vitamin G (riboflavin) - seeds [187] [2358]; Vitamin B7/Vit. P-P (nicotinamide, nicotinic acid) - infructescences [187] [2358]; Vitamin B7/Vit. P-P (nicotinamide, nicotinic acid) - seeds [187] [2358]; Vitamin C (ascorbic acid) - infructescences [187] [510] [1279] [1331] [1340] [2358] [2795] [5082] [5093] [5097] [5098] [5121] [5155]

Uses

Major use
FOOD [5098]

Use group
Unspecified Parts
Leaves
Infructescences

Specific uses
condiments/relishes/chutneys [1171]
fruits, raw [510] [1171] [1188] [1257] [1304] [1340] [1597] [2506] [2774] [3045] [5091] [5092] [5093] [5118] [5155] [5586] [5605]; fruits, jams/jellies [1257] [1279] [1340] [2506] [3045] [5082] [5097] [5111] [5155]; fruits, beers [1171] [1257] [1279] [1304] [1340] [2506] [3045] [5091] [5092] [5093] [5097] [5118]; fruits, spirits [1279] [1304] [1340] [2358] [2506] [5111] [5121]; fruits, non-alcoholic beverages [187]; fruits, wines [1171] [1304] [1331] [5097] [5098] [5121]; fruits, beers, famine food [1171]; fruits, famine food [2795]; fruit pulp [5098]; fruit pulp, beers [187] [5098]; fruits [1332] [5098] [5101]; fruit pulp, juices [187] [5121] [5586]; fruit pulp, alcoholic beverages [187]; fruit pulp, jams/jellies [187] [1331] [2358] [2618] [2795] [5092] [5093] [5586]; epicarp, coffee substitutes [5097]; fruits, beverages [2506]; fruits, beers, ceremonial food [1171] [2506]; fruits, alcoholic beverages [1340] [5082] [5111] [5121] [5155]; fruit pulp, raw [2795]

		[5088] [5111] [5121]; fruits, juices [1304] [5097] [5098] [5111] [5587]
	Seeds	kernels, pseudocereals, porridges [1340]; raw [510] [1171] [1188] [1257] [1279] [1304] [1340] [2358] [5155]; seed oil, oils/fats [1171] [1304] [2358] [5098] [5586]; other seed parts, condiments/relishes/chutneys [1340]; nuts, cakes [1171] [2358]; kernels, confectionery, other situations when food is used [1171] [2506] [5092]; kernels, cakes, other situations when food is used [1171] [2506] [5092]; nuts [1171] [2795]; kernels, oils/fats [5098] [5121]; kernels, raw [1340] [5088] [5091] [5101] [5111]; nuts, raw [1171] [1304] [2795] [5082] [5092] [5605]; kernels [1188] [1304] [1340] [2210] [3045] [5091] [5092] [5121]; kernels, vegetable dishes [2358] [5605]; kernels, meat dishes [2358]; entire seeds, porridges [5155]
	'Roots'	roots, potable water [5092] [5155] [5607]
	Exudates	resin [1188]
FOOD ADDITIVES	Leaves	herbs [510] [1171] [1340]
	Infructescences	fruit pulp, beers, flavourings [2795]; fruit pulp, alcoholic beverages, flavourings [2618]; fruits, porridges, flavourings; fruits, porridges, sweeteners (non-sugar); fruit juice, porridges, sweeteners (non-sugar) [2358]; fruit juice, porridges, flavourings [2358]
	Seeds	seed oil, preservatives [1171] [1257] [2358] [5092] [5097]; kernels, meat dishes, flavourings [2506]; kernels, vegetable dishes, flavourings [2358] [2506]; kernels, condiments/relishes/chutneys, flavourings [2506]; kernels, preservatives [2506] [2795]
ANIMAL FOOD	Bark	game mammals, browse [2358] [3045] [5088] [5092] [5097] [5121] [5155]; cattle [5097]
	'Roots'	roots, game mammals, drought season [5092]
	Fertile Plant Parts	seeds, game mammals, concentrates; fruits, cattle [1171] [1257] [1331] [5097]; fruits, game mammals [1171] [1257] [1279] [1340] [2358] [2506] [2774] [5082] [5088] [5092] [5097] [5121] [5155]; fruits, mammals [1332] [2358]; kernels, birds [5097]; fruits, goats [2506]; fruits, primates [1340] [5155]; seeds, squirrels [2358] [5155]; seeds, rodents [2358] [5155]
	Aerial Parts	stems, browse; leaves, cattle, fodder [1331] [2774]; leaves, cattle [5097]; leaves, game mammals [5097] [5155]; fallen leaves, cattle [1331] [5097]; fallen leaves, game mammals [5097]; leaves, game mammals, browse [2358] [3045] [5155] [5605]; young leaves, game mammals [5607]; leaves, mammals, browse [2358] [5091] [5092]; leafy stems/branches, game mammals [5155]; leaves, mammals, grazing [5092] nectar source [1127] [2774] [5097]
BEE PLANTS		
INVERTEBRATE		
FOOD		leaves, edible insects/caterpillars/larvae [5155]; live plant in situ, poisonous insects/caterpillars/larvae [5092] [5155]
MATERIALS	Unspecified Materials	seed oil, cosmetics [1279]; bark, beehives; kernels, illuminants [1331]
	Fibres	inner bark, ropes [2358] [5097]; bark, buckets/pails [2358]; bark, containers/holders [2358] [2795]
	Wood	joinery; ornaments [1257] [1340]; wood, mortars [1340] [2358] [2774] [2795] [5155]; wood, membranophones [1331] [1340] [2358] [2795] [5092] [5093] [5155] [5605]; wood, carved

		wood, ornaments [2795]; wood, buckets/pails [2795] [5091]; wood, furniture [2358] [5097] [5605]; wood, tools [2358] [5097] [5155] [5605]; wood, dugout canoes [5092]; wood, spoons [2506] [2795] [5092] [5093] [5605]; wood, plates/bowls [1257] [1340] [1597] [2506] [2618] [5091] [5092] [5093]; wood, toys/games [1340]; wood, carved wood [1340] [5088] [5097] [5121] [5605]; wood, pestles [5092] [5093]; wood, yokes [2358] [5605]; wood, boats/ships [2358]; wood, boxes [2358]; wood, tool handles [2358]; wood, veneer [2358]; wood, timber, boxes [5155]; wood, timber, shelves [5155]; wood, panels [5097] [5605]; wood, floors [5605]; wood, sledges [5605]; stems, boats/ships [5605]
	Tannins/Dyestuffs	bark, dyes, red [2358] [2795] [5605]; gum, inks [1340] [2358] [2506] [5092] [5155] [5605]; bark, tannins [1340]; gum, tannins [1340]; bark, dyes, brown [2358] [2795] [3045] [5605]; seed oil, skin darkeners/tans [1304]; bark, dyes, purple [2795]; bark, dyes, baskets [2506]; seed oil, clothing [1340] [5092] [5098] [5121]
	Lipids	seeds, non-drying oils [1257] [1340]; seeds, soap
	Other Materials/Chemicals	seed oil, cosmetics [2358] [2506] [5082] [5098]; bark, other chemical types, hair oil/lacquer [5101]; seed oil, skin lotions/creams [2358] [5092]; ornaments [2506] [5092]; musical instruments [5092]; deseeded fruits, ornaments [2506]; kernels [1340]; seed oil [5092]; kernels, illuminants [1331] [2506]
FUELS [5101] [5121]	Fuelwood	
	Tinder	defoliated stems/branches, fire starters [5088]
SOCIAL USES	Unspecified Social Uses	kernels [1331]
	Smoking Materials/Drugs	snuff; epicarp, snuff [2358] [5097]
	Antifertility Agents	fruits; seeds, birth control [2358]
	'Religious' Uses	bark, ritual/religion/magic [1340] [5082] [5092] [5093]; fruits, ritual/religion/magic [1340]; kernels, ritual/religion/magic [5088]; fruit juice, ritual/religion/magic [2358] [2506]
	Miscellaneous Social Uses	live plant in situ [2358]
NON-VERTEBRATE POISONS	Arthropoda	fruits, Insecta, death [1340] [2358] [5121]; seed oil, Insecta; seeds, Insecta, death, plant pest control [5098]; fruits, Acari (mites/ticks), livestock pest control [1340] [2358] [5098]
MEDICINES	Blood System Disorders	bark, humans [5092]
	Circulatory System Disorders	bark, humans, haemorrhoids [2358] [5605]; leaves, humans, heart, heart disease [2795]; bark, humans, haemorrhoids, baths [5098]; bark, humans, vapour baths [2358]; bark, humans, gangrene, baths [1340]
	Digestive System Disorders	bark, humans, laxative [5605]; bark, humans, stomach [2358] [5139]; bark, humans, diarrhoea [1331] [3045]; bark, humans, liver [1597]; roots, humans, diarrhoea, oral ingestion [2618] [2795]; leaves, humans, indigestion [2795]; bark, humans, diarrhoea, enemas [2618]; leaves, humans, indigestion, oral ingestion [2618]; inner bark, humans, diarrhoea, oral ingestion [2506]; bark, humans, diarrhoea, oral ingestion [1340] [2618] [2795] [5082] [5092] [5097] [5098] [5155] [5605]; roots, humans, stomach [2358] [5139]; bark, humans, constipation [2358]; roots, humans, stomach, oral ingestion [2618]; bark, humans, stomach, oral ingestion [2618]; roots, humans,

	laxative [5605]; bark, humans, emetic [1340]
Endocrine System Disorders	bark, humans, diabetes mellitus, oral ingestion [2795]; roots, humans, diabetes mellitus, oral ingestion [2795]; leaves, humans, diabetes mellitus, oral ingestion [2618]
Infections/Infestations	bark, humans, malaria, prophylactic [1279] [1340] [5082] [5097]; bark, humans, fever [1340]; bark, humans, digestive system [1340] [1597] [2358]; leaves, humans, venereal diseases (non-specified); bark, humans, malaria [1279] [1340] [5093]; fruits, humans, arthropod infestations [1340] [5092] [5121]; bark, humans, fever, oral ingestion [2618] [2795] [5082]; bark, humans, malaria, oral ingestion [2618] [2795] [5082] [5098] [5155]; bark, humans, malaria, teas [1304] [5098]; bark, humans, gonorrhoea, oral ingestion [5098]; bark, humans, digestive system, oral ingestion [1340] [2618] [5082] [5097] [5098] [5155] [5605]; fruits, mammals, insect infestations, baths [1340] [5092]; leaves, humans, gonorrhoea, oral ingestion [2358] [5605]; fruits, arthropod infestations [1340] [2358] [5121]; bark, humans, prophylactic, external applications [1340]
Inflammation	bark, humans; bark, humans, rectum, inflammation [1340]
Injuries	leaves, humans, wounds, dressings [2358]; leaves, humans, burns, dressings [2358] [5097]; leaves, humans, abscesses [2358] [5097]; bark, humans, wounds, washes [2358]; inner bark, humans, blisters, external applications [2358] [5092] [5155]
Muscular-Skeletal System Disorders	bark, humans, rheumatism [1597] [2358] [5605]
Nervous System Disorders	fruits, humans, nerves, paralysis [5098]
Nutritional Disorders	bark, humans, tonic, oral ingestion [2618]; fruits, humans, vitamin C deficiency, oral ingestion [1340] [2358] [5092]
Pain	bark, humans, teeth [2358]; bark, humans, analgesic; bark, humans, abdomen, enemas [5098]
Poisonings	leaves, humans, insect stings [2358]; sap, humans, bites and stings, external applications [5097] [5098]; bark, humans, antihistaminic [3045] [5097]; leaves, humans, scorpion stings, poultices [2358]
Skin/Subcutaneous Cellular Tissue Disorders	bark, humans, antiseptic; bark, humans, warts; leaves, humans, boils, dressings; bark, humans, skin, baths [5098]; bark, humans, skin [2358]; leaves, humans, boils [2358]
ENVIRONMENTAL USES [1171] [2358] [5121]	Shade/Shelter gardens [5097]; parks [5097]; roads/streets/highways [5097]
Ornamentals	live plant in situ [2358]
Boundaries/Barriers/Supports	live fences [1331]

Picture

None recorded

Notes

NOMENCLATURE/TAXONOMY

There are three subspecies in Tanzania which differ in leaflet number and shape, length of flower spike and distribution; subsp. *birrea*, subsp. *multifoliolata* and subsp. *caffra* .

Name derivation:

Sclerocarya, "skleros" a Greek word for hard and "karya" greek for a nut tree, alluding to the hard, bony kernel; "birrea", based on the common name of this tree, "birr", in Senegambia; "caffra", derived from the Hebrew word "kafri", a countryman. Probably refers to British Caffraria, where it was first collected [5092] .

Fox and Norwood Young (1982) separate *Sclerocarya schweinfurthiana* Schinz as a separate species, it is included in this taxon after Arnold and de Wet (1993) [1171] [1669] .

There are possibly two subspecies of the marula present in Namibia. The most widespread is subspecies *caffra*. It is uncertain whether subspecies *birrea* occurs in Namibia [5121] .

VERNACULAR NAMES

The name marula comes from the Tswana for favourite haunt of barbets and woodpeckers, who make their nests in the soft wood [2506] .

DISTRIBUTION

South Africa:

In Transvaal marula occurs in the warm, frost-free areas, the most southern distribution being the northern slopes of the Magaliesberg-range [5607] .

Kruger National Park, South Africa:

Marula has the widest distribution of all trees in the Kruger National Park. It is found in every ecological niche in the area, is seldom dominant but frequently one of the most important of the woody components. The greatest concentrations of this species occur on the basalt plains west of the Lebombo Range and between the Olifants and crocodile rivers [5155] .

South Africa:

More dominant in the Baphalaborwa area in Limpopo [5605] .

Namibia:

Common in the Cuvelai and eastern Caprivi, occasional in the eastern Karstveld, the Nyae Nyae area and along the Okavango River, uncommon in the northwest [5121] .

Botswana:

Throughout south-eastern, eastern and northern Botswana with the highest densities occurring in the moister eastern areas [1257] .

Namibia:

The natural distribution is east Bushmanland, but it has been planted close to homesteads in the western part for some years [5111] .

Uganda:

May be present .

Africa:

From Ethiopia in the north to KwaZulu-Natal in the south [5097] .

Africa:

Widely distributed throughout the continent. In southern Africa, only the subspecies *caffra* is found, and it occurs over practically all of the subtropical regions [2795] .

Botswana:

It occurs throughout the eastern, southern and northern parts of the country, often growing at very low population densities per unit area [5093] .

Africa:

From the Sudan and Ethiopia in the north, through Kenya, Tanzania including Zanzibar also Zambia, Malawi, Mozambique, Malagasy Republic, Zimbabwe and northern Botswana to northern Transvaal and Natal in the south. In western Africa it is reported to occur in Senegal, Zaire, Angola and northern parts of Namibia [5607] .

Botswana:

Widely distributed in the Okavango Delta [5092] .

Zimbabwe:

Widespread at lower altitudes in warm dry areas [2506] .

Africa:

Found in Tanzania and the Democratic Republic of Congo (Za?re) south to South Africa and Madagascar. A very

common plant in Botswana. In Kenya, in coastal and adjoining areas [2719] .

RARITY/CONSERVATION

South Africa:

In the former homeland of Venda it is a criminal offence to cut down a living tree of this species [5605] .

South Africa:

The marula is legally protected in all regions of the Republic of South Africa. Applications to fell marulas have to be made through the local agricultural officer [2358] [5155] .

Namibia:

Protected locally by the communities that use them and by the Forestry Ordinance [5121] .

Namibia:

The tree is so highly valued for its fruit that it is never cut down [1304] [5091] .

Southern Africa:

Trees are rarely felled for timber because of their valuable fruit . To use the marula tree, special permission is needed from the local chief or headman (Krige 1937), and then care is taken to fell only male trees [2795] .

Southern Africa:

Trees are usually retained when land is cleared for crops [2795] .

Botswana:

The tree is often conserved, even in cultivated lands [5093] .

Zimbabwe:

The marula is left standing when lands are cleared for cultivation and is sometimes fenced against foraging animals [2506] .

DESCRIPTION

Flowers:

With red sepals and yellow petals [5121] .

Fruits:

Have a sharp, nauseatingly sweet smell and taste when quite ripe [5155] .

Height:

15-18 m [5155] .

Leaves:

Turn yellowy-green to pale yellow before being shed [5155] .

Fruits:

Almost round, tough-skinned, up to 4 cm in diameter, pale creamy yellow when ripe [5121] .

Fruits:

Fleshy with a firm skin and large, hard kernels [5101] .

Fruits:

Fleshy, almost spherical, ripening to yellow after falling to the ground. The stone is very hard, with 2 or 3 lids [3045] .

Fruits:

Fleshy, spherical and 3-3.5 cm in diameter, yellow when mature with a white clinging flesh and a large stone [5097] .

Fruits:

Greenish while on the tree, and turn a pale yellow after they have fallen. Soft-shelled and can easily be opened by hand [5088] .

Fruits:

Large, rounded, slightly flattened, about 3 cm in diameter, borne in profusion [2795] .

Fruits:

Plum-like drupe with fleshy, yellow skin [5098] .

Fruits:

The fruits have a rich scent [5082] .

Fruits:

Yellow when ripe [1171] [1340] [5093] .

Fruits:

With a very juicy mesocarp [5093] .

Fruits:

Yellowish green and plum shaped, the tough skin enclosing juicy sour-sweet white pulp, containing a single nut with 2-3 oil-rich seeds within [2506] .

Height:

3-18 m [5104] .

Height:

7-17 m [5082] .

Height:

Normally 10-12 m, but can reach 18 m [2506] .

Height:

Up to 12 m [5101] .

Height:

Up to 15 m [2618] [2795] [5111] .

Height:

Up to 18 m [3] [5097] [5607] .

Height:

Up to 20 m [5098] .

Height:

Up to 20 m or more [1304] .

Height:

Up to 8 m [5121] .

Inflorescences:

7-22 cm long in female [1362] .

Inflorescences:

Axillary and terminal in male, 7-17 cm long, with puberulous axis [3] .

Height:

10-18 m [2774] .

Bark:

Grey then black and thick with irregular cracks and raised scales, inner bark pink-red [2774] .

Leaf fall:

Mainly October to May, with young leaves October to December [5121] .

Leaves:

Compound, crowded at tips of braches, 3-18 pairs leaflets plus a central leaflet, each stalked, oval to 10 cm, tip pointed [2774] .

Flowers:

Male and female flowers on the same or different trees; pale green male flowers in spikes, hang down and attract insects; female flowers solitary, green-pink [2774] .

Fruits:

Rounded and fleshy to 3.5 cm across, skin cream, spotted, peeling away from sweet flesh which tastes a bit like mango; 2-3 large seeds inside, oily and edible [2774] .

Leaves:

Compound, about 10 cm long [5111] .

Leaves:

Compound, up to 30 cm long, leaflets margin entire or coarsely toothed especially in young plants [5121] .

Leaves:

Divided into 10 or more pairs of sharply pointed leaflets [2795] .

Leaves:

Imparipinnate, spirally arranged, crowded near the ends of the branches, with 3-7 pairs of opposite to sub-opposite leaflets plus the terminal one. Leaflets ovate to elliptic, 3-10 x 1.5-4 cm, green above, much paler and bluish green below, hairless [5082] .

Leaves:

Leaflets usually 3-7 pairs plus a terminal one, dark green above, much paler and bluish green below [3045] .

Leaves:

Unevenly compound with 7-13 pairs of leaflets plus a terminal one, crowded near the ends of branches, young leaves mostly toothed [5097] .

Leaves:

Young leaves are tinged pink and copper and the old leaves are bluish green, paler beneath. They are made up of 3-5

pairs of leaflets, the midribs set askew [2506] .

Odour:

Flowers are faintly scented [2506] .

Odour:

Fruits fall when still immature, but ripen quickly on the ground and become strongly aromatic [1332] .

Odour:

The fruit has an aromatic fragrance [5098] .

Odour:

The outer skin has a pungent apple-like odour [1340] .

Seeds:

The pip contains 3 oblong nuts, each protected by a small bony "lid" which becomes detached when the pip is cracked between stones [2795] .

Seeds:

The seed consists of a hard outer shell containing two or three kernels [5586] .

Flowers:

Large trees are dioecious [1171] .

Bark:

Grey, rough, flaking in patchy sections to give a mottled appearance. The ends of the branchlets stubby and stout [5082] .

Bark:

Mottled, showing red if slashed [2506] .

Bark:

On young branches smooth and grey with prominent scars formed by the dropped leaves, but grey and flaking in patches on older branches and stems [5097] .

Bark:

Yellowish to grey, covered with irregular flat, dark grey scales; young branchlets with conspicuous leaf-scars [5121] .

Crown:

Dense, spreading [5121] [5155] .

Crown:

Rounded, spreading [2795] [3045] [5082] [5093] [5097] [5155] [5605] .

Flowers:

Have 4-5 crimson sepals and 4-5 pink to light crimson petals. The female flowers occur singly or in small groups. The ovary is crimson and conspicuous when older. Usually there are 2 styles and stigmas, although occasionally one or three are present [5607] .

Flowers:

Borne in small oblong clusters. Male and female flowers occur separately, usually but not always on separate trees [2618] [2795] .

Flowers:

In 5-8 cm long sprays, yellow tinged red [5097] .

Flowers:

In unbranched sprays before the new leaves, yellowish, tinged with pink [3045] .

Flowers:

Inconspicuous and are produced in small sprays just before the appearance of the young leaves [1332] .

Flowers:

Male and female on separate trees, dark red in bud opening to pink, white and lilac lobes [2506] .

Flowers:

Male flowers, sepals about 0.2 cm long and broad, petals yellow to purplish-pink, red in bud, 0.4-0.6 x 0.3-0.4 cm [3] .

IDENTIFICATION

It is sometimes mistaken for *Lanea schweinfurthii*. However, *Sclerocarya birrea* has more pairs of leaflets, usually 4 or more, with distinct stalks, a round crown and bark with a mottled appearance, and the ends of the branchlets are stubby and stout. *Lanea schweinfurthii* usually has fewer pairs of leaflets, 1-4 or occasionally five, the petiolules are very short to almost absent, and the ends of the branchlets are thin and stiff [5082] .

FOOD - UNSPECIFIED PARTS

Marula is one of the plants that played a role in feeding people in ancient times [5605] .
An essential food plant for the Ovambo [5098] .

FOOD - LEAVES

Relishes:

The Pedi use the leaves as a relish [1171] .

FOOD - INFRUCTESCENCES

Fruits, beers:

The fruit makes alcoholic beer known as mukumbi by the Vhavenda people [5605] .

Fruits, jellies:

A delicious pale yellow to red jelly can be made from the fruits [3045] [5082] [5155] [5605] .

Fruits, juices:

The fresh fruit juice has a pleasant flavour and high vitamin C content [2358] .

Fruits, raw:

The fruit is astringent when eaten raw [2506] .

Fruits:

The marula is one of the most highly valued indigenous wild fruit trees among the black tribes of southern Africa [2358] .

Fruit pulp, beers:

Ambo make a type of beer from the fruit pulp [5098] .

Fruit pulp, jellies:

A good jelly can be made from the pulp [5093] .

Fruit pulp, jellies:

The high pectin content makes the fruit pulp ideal for jelly and considerable quantities have already been bottled and marketed [2795] .

Fruit pulp, juices, wines, spirits:

The juice made from the fruit flesh is drunk unfermented as a beverage, or is fermented to make wine which may be further distilled to make brandy [5121] .

Epicarp:

The outer skin has a flavour which resembles litchi, apple, guava and pineapple [1340] .

Fruit pulp, raw:

The fleshy pulp is sucked off the stone [5088] .

Fruits, beers, spirits:

Whole fruit are used in Mozambique and Eastern Transvaal for brewing beer and, in some districts, a spirit is distilled from it. The beer is known as "ukanya" and may be very intoxicating (Fox et al. 1938) [1340] .

Fruit pulp:

The fruit flesh, which is nutritious and high in vitamin C, is eaten fresh [5121] .

Fruits:

May be eaten fresh or dried for later use [1171] [2506] .

Fruits, alcoholic beverages:

In Mozambique the fruit is used universally for the making of a "national" fermented beverage (Almeida 1930) [1340] .

Fruits, spirits:

Marula liqueur is made by steeping the slashed ripe fruits in brandy and adding sugar syrup to taste [2506] .

Fruit pulp:

Bushmen in Namibia eat the flesh of the fruits [1171] .

Fruits, spirits:

The fruit is distilled to produce a strong alcoholic drink [5111] .

Fruits, alcoholic beverages:

The fruits can be made into an alcoholic drink of some potency [5082] .

Fruits, beers, famine food:

Mashona in Zimbabwe collect basketsful of the ripening fruits in February to prepare a beer. A pot is half-filled with

the fruits and cold water added, this is allowed to stand for 2 days after which the skin is discarded and the fruits squeezed back into the pot, which is then covered with a plate. A little soil is mixed with the liquid and the outside of the pot smeared with mud to prevent air entering. After 4 days the pot is uncovered and the liquid mupfura is ready. It is sour but is especially liked by the Vakaranga in times of famine and for ceremonies (Gelfand 1971) [1171] .

Fruits, beers:

Shonas and Ndebeles in Zimbabwe soak the ripe fruits in cold water, or pound to remove the skin and nuts. The pulp is put into a closed pot, the mixture being half pulp and half water. It is left to ferment overnight and is ready for drinking next day. Alternatively, it is sealed and left to ferment for 3 days, after which a gummy scum is skimmed off and the beer, drunk on the fourth day, is highly intoxicating [2506] .

Fruits, beers:

Fruits are collected by many different people to brew traditional marula beer, also known as makhope (Krige 1937) or ubuganu (Cunningham 1990b) [2795] .

Fruits, beverages, jellies:

The fruit is used to make a traditional drink and a tasty jelly [2506] .

Fruits, juices:

Unfermented fruit juice is mixed with water and drunk as a beverage called oshinua [1304] .

Fruits, famine food:

Phalaborwa people use the fruit in the lean time of the year when other food is scarce [2795] .

Fruits, jams, juices:

The boiled fruit can be used for preparing jam and juice [5111] .

Fruits, jams/jellies:

Jelly (3 kg fruit to make 1 kg jelly) and jam can be made from the fruit [5097] .

Fruits, jellies:

The fruit is slashed across the middle, covered with water and simmered for an hour. The juice is then strained off and boiled, equal cupfuls of sugar being added to the boiling liquid. After a further three quarter hour's boiling the jelly should be set and be ready for bottling [2506] .

Fruits, wines:

Ripe fruit yields a juice readily fermented into an alcoholic liquor called omongo or marula wine [1304] .

Fruits, juices:

The fruit is very juicy, with a characteristic odour and sweet/acid flavour [1171] .

Fruits, raw:

Fleshy, slightly acidic sweet fruit is eaten raw [1304] .

Fruits, spirits:

Marula wine can be distilled to make brandy (olambika), but the wine is preferred [1304] .

Fruits, wines, beers, juices:

The fruit produces good-quality semi-sweet and sweet wine, port, beer (about 200 fruit produce 1 litre) and juice [5097] .

Fruits, wines:

Marula wine is pleasant-tasting and potent [5098] .

Fruits:

The fruit has been eaten by indigenous people of southern and eastern Africa for centuries [5586] .

Fruits:

The fruit may be incorporated in porridge made of kaffir corn, kaffir millet or mealie meal [1171] [2506] .

Fruits:

The fruit is much sought after for its delicious pulp, high vitamin C content and tasty, edible nuts [2618] [2795] [5098] .

Fruits:

The fruits fall down and accumulate under the trees in large numbers. They ripen to a pale yellow colour, and are collected by many different people as an important foodstuff [2795] .

Fruits:

The marula is one of the best known wild fruits of Africa and many a traveller has blessed it on a hot day in the bush in late summer [2358] .

Fruits:

The ripe fruits are slightly sour tasting with a characteristic aromatic, fruity, mango-like flavour (Maguire 1978), consisting of about 150 flavour components (Wehmeyer 1976) [187] .

Fruit pulp:

The succulent flesh has a very sweet sour-sweet guava flavour [1171] .

Fruits, beers:

Made by stamping the ripe fruit in a 'kika' to remove the nuts and then adding 50% water to the pulp. After 24 hours it is strained and ready to drink but becomes more potent with age. After four days it goes off [1257] .

Fruits:

Eaten in Malawi (Williamson, 1960, cited in Grivetti, 1981) [1188] .

Fruits:

Eaten by Moshaweng Tlokwa of Botswana [1188] .

Fruits, wines:

Mukumbi is the Shona name of the wine made from the fruits [1171] .

Epicarp, beverages, coffee substitute:

The skin of the fruit can be boiled in water to make a drink. It is also burnt and used as a substitute for coffee [5097] .

Fruit pulp, jams/jellies:

A jam or jelly made from the fruit pulp is rich in vitamin C and protein [1331] .

Fruits, alcoholic beverages:

Among the Bantu and some Europeans the fruits are the most highly prized of all wild fruits, as an alcoholic drink, known among the Shangaans as "ukanya", is prepared from them [5155] .

Fruits, spirits:

In South Africa a liqueur called AMARULA is produced by Distillers Corporation in Stellenbosch from marula fruit; this has enjoyed great publicity [2358] .

FOOD - SEEDS

Seed oil:

Kernel rich in non-drying oil, 53.5-60% [1340] .

Kernels, porridges:

The Pedi use the ground up kernel for making a porridge [1340] .

Other seed parts, condiments:

The Pedi use the embryo as a condiment [1340] .

Nuts, vegetables:

The white nut is highly nutritious and is eaten as it is or mixed with vegetables [5605] .

Seed oil, oils/fats:

In Kavango, Namibia, seeds are pounded and placed in boiling water and the oil which can be collected is eaten together with porridge [2358] .

Nuts, porridges:

The seeds can be ground and a type of porridge prepared from the flour [5155] .

Nuts, vegetable dishes, meat dishes:

Krige (1937) reports that the Phalaborwa subsist largely on the seeds in winter, mixing them with spinach or meat. In summer they mix them with green mealies [2358] .

Nuts:

Some Africans consider a gift of marula seeds as a sign of great friendship (Palmer and Pitman 1972) and the Thonga appreciate the seeds to such an extent, that they regard them as "food for kings" (Junod 1913) [1171] [2358] .

Kernels:

Bushmen make use of the fruit after the pulp has been eaten or has rotted away, for the stone which remains contains a little oily flesh with a pleasant nutty flavour [1332] .

Kernels, cakes, confectionery:

The large hard seed contains 2 or more edible kernels. During the war the kernels were used in place of imported nuts in cakes and confectionery [1171] [2358] [5092] .

Kernels, oils/fats:

The kernels contain 50-60% oil and are rich in protein (28%) [5097] [5098] .

Kernels, raw:

The small, longish seed inside the kernel can be eaten raw and tastes like a nut [5111] .

Kernels, raw:

The stone is cracked open to remove the kernel, which is either eaten raw or used to extract oil [5088] [5091] .

Kernels, oils/fats:

Oil expressed from the kernel is protein-rich; it is eaten with porridge and also used for cooking [5121] .

Kernels:

In Zimbabwe the kernels are used on farms for cakes and confectionery in place of almonds [2506] .

Kernels:

Kernels of the stones are edible and highly nutritious, but difficult to remove intact [3045] .

Kernels:

The kernel is edible and very tasty, especially when cooked. The flavour resembles that of the groundnut (Gerstner 1953) [1340] .

Kernels:

Kernels are considered a great delicacy, despite the hard and thick shell [1304] [2210] .

Kernels:

Kernels are used as food by East African coastal fishermen (Weiss, 1979, cited in Grivetti, 1981) [1188] .

Kernels:

Kernels are eaten by Gwembe Tonga of Zambia. Available October to November (Scudder, 1971, cited in Grivetti, 1981) [1188] .

Nuts:

Nut is eaten by Moshaweng Tlokwa of Botswana [1188] .

Nuts, cake:

Phalaborwa subsist largely on the nut in winter which may be mixed with spinach or meat and in summer with green mealies and be stamped to form a cake which is eaten alone [1171] [2358] .

Nuts, raw:

Each seed contains 2 or 3 edible nuts. They can be eaten raw or roasted and are rich in oil and protein [1304] [5097] .

Nuts, raw:

Nuts are eaten raw or cooked with gravies and roasted chicken [1304] .

Nuts, raw:

The nuts may be eaten raw or cooked with porridge [2358] [5082] [5155] .

Nuts:

The tasty nuts, an important food item in rural areas, are difficult to extract from the stony pips [2795] .

Seed oil, oils/fats:

An oil is extracted from the seed, which is also used as salad oil [5098] .

Seed oil, oils/fats:

Seeds are put on a stamping block, and oil (okjove) is expressed to be used in cooking, especially of meat or boiled potherbs [1304] .

Seed oil:

Marula oil is highly suitable for use as a frying oil or as a coating on dried fruit. It may also replace the high-oleic safflower oil used in baby food formulas [5586] .

Nuts:

Bushmen in Namibia eat the seed [5098] .

Nuts:

The seeds are delicious, tasting like walnuts [5092] [5155] .

Nuts:

The Thonga eat the cooked seed with their mealie meal porridge (Gerstner 1953) [1340] .

FOOD - 'ROOTS'

Roots, potable water:

The marula has a well-developed root system which also serves to store water. A section 1 m long and 7 cm in diameter can yield a good cup of water (Shone 1979). Roots are a well known source of water among the Bantu in dry areas. A section of the thick, superficial roots, about 1-2 m long, is exposed without damaging it by digging from the stem outwards. The root is then chopped free quickly and the bark around one end removed for about 10 cm. When the root is held upright with the debarked side pointing downwards, clear water starts to drip from it within minutes [2358] [5155] [5607] .

Roots, potable water:

The roots are a source of water in times of drought [5092] .

FOOD - EXUDATES

Resin:

Eaten by Moshaweng Tlokwa of Botswana [[1188](#)] .

FOOD ADDITIVES - INFRUCTESCENCES

Fruit pulp, flavourings, beers, spirits:

Marula fruit pulp is used to flavour the well known Amarula liqueur and commercial marula beer [[2795](#)] .

Fruit juice, sweeteners (non-sugar), flavourings, porridges:

On the west coast of Africa, marula juice is used for sweetening porridge after it has been boiled to a thick consistency. The Pedi of South Africa also use marula juice to flavour porridge (Palmer and Pitman 1972) [[2358](#)] .

FOOD ADDITIVES - SEEDS

Kernels, vegetable dishes, flavourings:

The Pedi flavour "kaffir-corn" stew and green leaf relishes with marula seeds (Quin 1959) [[2358](#)] .

Kernels, flavourings, meat dishes, vegetable dishes, relishes:

Marula dovi is prepared from the kernels. The nut are very hard and need careful cracking but the delicious kernels are a prized delicacy. They are used to flavour relishes, greens and meat dishes [[2506](#)] .

Kernels, preservatives:

The kernels are crushed to express the rich oil, used to treat sliced meat, which is then preserved as biltong [[2506](#)] .

Nuts, preservatives:

The tasty nuts have been used to preserve meat for up to six months without refrigeration and the oil is considered to be suitable for glazing dried fruit (Holzhausen 1993), but may tend to go rancid [[2795](#)] .

Seed oil, preservatives:

The Venda utilise the properties of the seed oil to preserve meat. The meat is slightly steamed over water, moistened gradually with the oil and stored in a cool place; such meat will last up to a year. They also pound the embryos with lean sinewless meat and shape them into cakes which they dry, store and slice. This is called Venda biltong [[1171](#)] [[2358](#)] .

ANIMAL FOOD - BARK

Game mammals:

The bark is eaten to such an extent by elephants in the Kruger National Park that trees which have been completely debarked are a common sight in the overgrazed areas along the rivers [[2358](#)] [[5155](#)] .

Game mammals:

Elephants relish the bark and thus do extensive damage to the tree [[5092](#)] .

Game mammals:

The bark attracts elephant [[3045](#)] [[5088](#)] .

Cattle, game mammals:

Cattle and game (elephant, giraffe, eland, kudu, waterbuck and warthog) utilize the bark [[5097](#)] .

ANIMAL FOOD - 'ROOTS'

Roots, game mammals, drought season:

Elephants eat the roots in times of drought [[5092](#)] .

ANIMAL FOOD - FERTILE PLANT PARTS

Fruits, game mammals:

The fruits are eaten by elephants, warthogs, bushpigs, impala, bushbuck, duiker, eland, kudu, nyala and steenbuck [[5155](#)] .

Seeds, rodents:

For many rodents, for example the bush squirrel (*Paraxerus cepapi*), the seeds are a very valuable source of nutrition [[2358](#)] [[5155](#)] .

Fruits, cattle, game mammals:

Cattle and game (elephant, giraffe, eland, kudu, waterbuck and warthog) utilize the fruit [[5097](#)] .

Fruits, game mammals, cattle:

Elephant, bush-pigs and cattle enjoy the fruit [1171] .

Fruits, game mammals, goats:

Antelopes, elephants and goats eat the ripe fruits fallen and fermenting on the ground, and are said to become drunk on them [2506] .

Fruits, game mammals:

Game feed eagerly on the fruits lying on the ground [5082] .

Fruits, game mammals:

Marula tree is particularly attractive to elephants. The smell of ripe marula fruits is irresistible to them and they will scan their territory for every single fruit-yielding tree [5088] .

Fruits, game mammals:

The fruit has a distinctive smell, a fruity version of turpentine and alcohol mixed. It is this smell that attracts animals over vast distances, especially elephants, which shake the tree with their trunks and eat the fruit off the ground [5092] .

Fruits, game mammals:

The fruit is much sought after by elephants [1340] [5121] [5155] .

Fruits, primates:

The fruit is much sought after by the baboon and the monkey [1340] [5155] .

Kernels, birds:

Meyer's parrots feed on the kernels of green fruit [5097] .

ANIMAL FOOD - AERIAL PARTS

Leafy stems/branches, leaves, game mammals:

Elephants eat leaves and thin twigs, while giraffe, kudu and impala eat the leaves only [5155] .

Leaves, game mammals, browse:

Elephants, antelope, giraffe, zebra and many others browse the leaves [5605] .

Leaves, mammals, game mammals, browse:

The leaves are utilized extensively by many wild and domesticated animals. The tree is browsed as high as the animals can reach (Shone 1979) [2358] .

Young leaves, game mammals:

The leaves of young trees and seedlings are relished by animals [5607] .

Leaves, fallen leaves, cattle, game mammals:

Cattle and game (elephant, giraffe, eland, kudu, waterbuck and warthog) utilize the leaves on the tree as well as on the ground [5097] .

Leaves, mammals, grazing:

The leaves are grazed by most browsers [5092] .

Leaves, mammals, browse:

The leaves are browsed by small stock [5091] .

Fallen leaves:

Cattle eat fallen leaves [1331] .

BEE PLANTS

A bee plant in Botswana. Provides abundant nectar but flowers only 8-10 days in October-December [1127] .

INVERTEBRATE FOOD

Larvae, leaves:

In some years the trees are stripped of their leaves by worms which, like the mopane worms, are roasted and eaten by the Bantu [5155] .

Coleoptera:

The poisonous larvae of a small beetle (*Polyclada* species), which subsist on this tree, are used by Bushmen in certain areas to prepare their arrow poison [5092] [5155] .

MATERIALS

Wood properties:

Wood is white, drying to pink, and is light and woolly to the saw [1340] .

Wood properties, durability:

Liable to attacks by borers [1340] [5097] [5155] .

Wood properties:

In the Kruger National Park timber is white when freshly sawn and white with a reddish tinge which becomes darker towards the centre when dry. It is fairly light, viz. green 1070 kg per cubic metre and air-dry 560 kg per cubic metre. Green wood is easily cut and sawn but becomes exceedingly tough and difficult to work when dry. Linear shrinkage across the grain, from green to air-dry, is about 4%. It is coarse in texture but cross-cuts can be finished quite smoothly [5155] .

Wood properties:

The marula is not hard when fresh, and therefore pleasant to work with [2358] [2506] .

Wood properties:

The timber is said to warp while drying unless properly stacked. Borers are particularly fond of the dry timber and preservative treatment is advisable. It is difficult to drive nails into the dry timber [5155] .

Wood properties:

Light coloured, easy to work with [5091] .

Wood properties:

Light reddish-brown to whitish, with no definite heartwood, soft, light (air-dry 560 kg per cubic metre) [5097] .

Wood properties:

The wood does not crack easily [5092] [5093] .

Wood properties:

The wood is off-white with a reddish tinge and very light in weight (air-dry 360 kg per cubic metre. It has a coarse texture, making it tough and difficult to work [5092] .

Wood properties:

The wood has an attractive pink colour [2506] .

Wood properties:

The wood varies from pale brown to brown or pink, with the rays clearly visible (with the naked eye), in cross-section it appears more reddish than the background. The vessels are arranged in groups of two to four, and are visible with a hand lens as short lines on the tangential surface [2795] .

MATERIALS - FIBRES

Ropes, inner bark:

A relatively good-quality rope can be made from the inner bark [5097] .

Containers, bark:

Phalaborwa people make a hammock-like container made from bark fibres and suspend them between four poles, which is used to store large quantities of marula pips [2795] .

Buckets, containers, ropes, bark:

The bark is used by Africans for making buckets for water and containers, while the fibrous living bark is plaited into ropes (Shone 1979) [2358] .

MATERIALS - WOOD

Membranophones, yokes:

Drums and yokes for certain animals are made from the wood [5605] .

Floors, tools:

The wood is used for flooring, carvings and household utensils like spoons [5605] .

In Zimbabwe the wood is used for making dishes, mealie stamping mortars, drums, toys and curios and for carving. It is used for similar purposes in the Eastern Transvaal and the Venda make divining bowls and drums from it [1340] .

Sledges:

In Namibia some people use the wood for sledges [5605] .

Timber, boxes, shelves, mortars, membranophones, tools:

The timber is suitable for fruit-boxes, shelving, pounding blocks, drums and other household articles [5155] .

Tools, mortars, membranophones, yokes:

Various kitchen utensils, stamping blocks, drums, and cattle yokes are made from marula wood (Krige 1937, Quin 1959) [2358] [5139] .

Furniture, panels:

The wood is used for furniture and to a lesser extent for panelling [5097] [5605] .

Household items:

The tree provides a useful, splinter-free, and easily workable wood that is the source of household items such as wooden platters, spoons, stamping blocks, milk pails and drums as well as carved ornaments and woodroses [2795] .

Pestles:

As the wood does not crack easily, it is ideal for making pestles to stamp grain [5092] [5093] .

Plates/bowls:

Used to make bowls by the Pokot, Kenya [1597] .

Carved wood, tools:

A popular wood for carvings and household articles [5088] [5097] .

Boats, stems:

Boats are made from the trunk [5605] .

The wood is suitable for drums, bowls, plates, spoons etc [2506] [5092] [5093] .

Boats/ships:

Tribes in northern Namibia use the wood for sledges and wato's (boat made from tree trunk) [2358] .

Tools:

The wood is used to make household utensils [3045] [5155] .

Tools:

The light-coloured wood can be used for making utensils such as wooden pails, bowls and funnels [5091] .

Dugout canoes:

Mokoros (dugout canoes) are often made from the wood in the Okavango and it is presumed that warping in water is eliminated by their use [5092] .

During World War II, due to the critical timber shortage, a commercial exploitation began. The wood was primarily used for fruit boxes. Later paint brushes, handles, furniture and veneer were manufactured, while marula lavatory seats were even exported to Zimbabwe and Australia [2358] .

Membranophones:

Used for drum-making for use in war and summoning people [1331] .

MATERIALS - TANNINS/DYESTUFFS

Bark, tannins:

Madagascar bark contains 3.5% tannin. Transvaal bark, collected during October before the appearance of the leaf, contains 20.5% tannin [1340] .

Ink, gum:

The gum exuded is used to manufacture ink by dissolving it in water and adding soot [1340] [2358] [2506] [5092] [5155] [5605] .

Kernels:

Zulu women crush the kernel and boil the mass with water until an oily residue is obtained, which they use to rub on their skin shirts (sidwaba) to preserve them and keep them soft (Codd 1951) [1340] .

Seed oil, preservatives:

The seed oil is used to preserve leather clothing [5092] .

Skin darkener/tan, seed oil:

Seed oil can be mixed with red ochre and put on skin and women's cowhide or cow-stomach aprons [1304] .

Dyes, brown, bark:

Bark is used to obtain a pale brown dye [3045] .

Dyes, red, brown, bark:

Red-brown dye can be produced from the fresh skin of the bark [5605] .

Seed oil:

The oil expressed from the kernel is used for dressing hides and leather [5098] [5121] .

Dyes, brown, pink, mauve, red, bark:

The bark yields a brown, pink, mauve or red dye, depending on the methods used [2795] .

Dyes, red, brown, bark:

The bark was used by Voortrekker women to dye their sunbonnets. The red-brown colour fades with time, but it can be kept longer when salt is added during the dyeing process [2358] .

Gum, tannins:

Gum is rich in tannin [1340] .

MATERIALS - OTHER MATERIALS/CHEMICALS

Hair oil/lacquer, bark:

The bark is cut into strips and dried. When dry, it is burnt and then the ash is mixed with water and cooked until pulpy. This is applied to hair that has been combed out. After about 4 minutes the hair is rinsed and remains straight for about 3 months if washed regularly and anointed with fat [5101] .

Ornaments, deseeded fruits:

Ndebele woman use the empty shells decoratively on doorsteps [2506] .

Ornaments:

Flower-like shapes are formed by secondary growth caused by Mistletoe which make interesting decorative articles, such as ashtrays or bowls [5092] .

Seed oil:

The oil expressed from the kernel is used for dressing hides and leather [5098] [5121] .

Skin lotion/cream, seed oil:

The kernels can be boiled until an oil residue emerges which, being rich in protein and iodine, results in a substance that is an excellent skin moisturiser. It has been commercially exploited for this purpose and sold in Madagascar as "Sokoa oil" [5092] .

Kernels, illuminants:

The nuts are so oily that when lighted they burn with a bright flame like small candles [1331] [2506] .

Cosmetics, seed oil:

The nuts are crushed and boiled in water, and the resulting oil is skimmed off and massaged into the skin as a cosmetic [5082] .

Cosmetics, seed oil:

The oil expressed from the kernel is exploited commercially for use in cosmetics [5121] .

Cosmetics, seed oil:

Zulus crush and boil the nuts, skimming off the oil to use as a cosmetic ointment [2506] .

Cosmetics, seed oil:

The oil extracted from the seeds is used by different tribes as a skin cosmetic [2358] .

FUELS - TINDER

Fire starter, defoliated stems:

Straight branches are used for making fire-sticks [5101] [5121] .

Fire starter:

The softness of the wood also makes it suitable for the otjiya slab, on which a harder rod (ongune) is twirled to make fire [5091] .

Fire starter, defoliated stem:

Sticks are used to make fire by means of friction method [5088] .

SOCIAL USES - UNSPECIFIED SOCIAL USES

Nuts:

A kernel given as a gift is the greatest mark of friendship; the fruit of the tree is much prized, hence the value of the gift [1331] .

SOCIAL USES - SMOKING MATERIALS/DRUGS

Epicarp, snuff:

The skin of the fruit is burnt and used as a snuff [2358] [5097] .

SOCIAL USES - ANTIFERTILITY AGENTS

Seeds, birth control:

The Pedi use marula seeds for birth control (Wolhuter 1973) [2358] .

SOCIAL USES - 'RELIGIOUS' USES

Fruit juice, ritual/religion/magic:

The Tonga people celebrate the feast of the first fruits by pouring a libation of marula juice over the graves of dead chiefs and fresh marula branches are used in funeral rites [1340] [2358] [2506] .

Bark, ritual/religion/magic:

A decoction of the bark is taken internally by some African tribes to remove defilement caused by eating food in the house of relatives where there has been a death without the performance of the necessary purification rites [1340] [5092] .

Bark, ritual/religion/magic:

The Zulu and Thonga use a decoction of the bark as a ritual cleansing emetic before marriage (Gerstner 1953) [1340] .

Fruit juice, ritual/religion/magic:

The fruit juice is used in certain Shangaan and Thonga religious ceremonies [1340] .

Nuts, ritual:

Some Jul'hoansi hunters chew the kernels and smear the enriched saliva on their faces. This is believed to ensure a successful hunt [5088] .

Nuts, religion:

Shangaan n'angas use the nuts as stones in divining rites [2506] [5605] .

Nuts, religion:

The divining dice of the Shangaan diviners include a Sclerocarya nut which represents the vegetable kingdom or medicine [1340] [2358] .

Bark, religion:

In Botswana and South Africa it is believed that a pregnant woman can influence the sex of the unborn child by drinking an infusion of the bark from either a male or female tree [1340] [2358] [2506] [5093] [5605] .

Bark, ritual/religion/magic:

An infusion of the bark is administered to a pregnant woman to pre-determine the sex of a child. Bark of a male for a boy and from a female for a girl [5092] .

Bark, ritual:

The Zulus and Tongas call the marula the "marriage tree" and a brew of the bark is administered during a cleansing ritual before marriage [2358] [5092] .

The beer (unkumbi) is used on ritual occasions and for the social gathering known as hoka [2506] .

Twigs:

The marula symbolises fertility, softness, tenderness and early maturity. It is claimed that by washing a baby girl in an infusion of the twigs, these properties are transferred to her [5092] .

SOCIAL USES - MISCELLANEOUS SOCIAL USES

Live plant in situ:

The marula tree is used by the Batlokwa of Botswana as a calendrical marker (morule = December) [2358] .

Live plant in situ:

In Zimbabwe, an outstanding marula is generally the meeting place for the village elders [2506] .

NON-VERTEBRATE POISONS - ARTHROPODA

Fruits, insecta, death:

Zulus regard the fruits as a potent insecticide [1340] .

Fruits, acari, livestock pest control:

The fruit is considered to be an effective insecticide and is often relied upon for the treatment of ticks on pregnant cows. For this purpose the fruit is destoned and rubbed into the infested areas. A fruit decoction can likewise be employed for this purpose [5098] .

Seeds, insecta, death, plant pest control:

The dried seed is pulverized, stirred in water (two large handfuls to one bucket of water), left standing overnight and used the following day as an effective insecticide to be sprayed over infected plants. The powder can also be moistened, pressed in oil and then used to impregnate the plants [5098] .

Fruits, acari, livestock pest control:

Zulus use the fruits for destroying ticks (Bryant 1909) [1340] [2358] .

Fruits, insecta, death:

The fruit can be used as an insecticide [2358] [5121] .

MEDICINES - BLOOD SYSTEM DISORDERS

Bark, humans:

The bark contains 10-20% tannin, as well as traces of alkaloids. It is therefore a coagulant [5092] .

MEDICINES - CIRCULATORY SYSTEM DISORDERS

Bark, humans, haemorrhoids, baths:

In Namibia the bark is used for haemorrhoids, preferably as an admixture to bath water [5098] .

Bark, humans, haemorrhoids:

The bark is an excellent remedy for haemorrhoids [2358] [5605] .

Bark, humans, vapour baths:

A mixture of the bark extracts from marula, Dalbergia melanoxylon, Vitex doniana and Piliostigma thonningii and a root extract of Afrormosia angolensis is used as a steam bath for poor circulation of the limbs [2358] .

Bark, humans, gangrene, rectum, inflammation, prophylactic, baths:

The Zulu use a decoction of the bark, externally and internally, as a prophylactic against gangrenous rectitis. If a Zulu medicine man is called to treat a patient suffering from gangrenous rectitis, he bathes his body with a decoction of the bark as a prophylactic and administers some of the decoction to the patient (Bryant 1909) [1340] .

MEDICINES - DIGESTIVE SYSTEM DISORDERS

Bark, humans, intestine, diarrhoea, oral ingestion:

A decoction of the bark is taken in half-pint doses for diarrhoea [1340] [5082] [5097] [5098] [5605] .

Inner bark, humans, intestine, diarrhoea, oral ingestion:

The soft inner bark, cut small and infused in warm water, provides a drink widely used in Zimbabwe to cure diarrhoea [2506] .

Leaves, humans, indigestion, oral ingestion:

Chewing the fresh leaves and swallowing the astringent juice will help with indigestion [2618] .

Leaves, humans, indigestion:

Fresh leaves are used medicinally for heartburn [2795] .

Bark, humans, intestine, diarrhoea, oral ingestion:

An infusion of one cup of bark to 3 litres of water, boiled for three hours is taken at regular intervals for diarrhoea [5092] .

Bark, humans, intestine, diarrhoea, oral ingestion:

The bark is astringent and the anti-diarrhoeal effects have been linked by Galvez et al. (1993) to procyanidins [2795] .

Bark, humans, liver:

Decoction of the bark is taken by the Pokot, Kenya for a bad liver [1597] .

Bark, roots, humans, intestine, diarrhoea, oral ingestion, enemas:

In South Africa decoctions of the bark or roots are taken orally or as enemas (Hutchings 1996, Pujol 1993) to treat diarrhoea and unspecified stomach problems [2618] .

Bark, humans, emetic:

The Zulu and Thonga use a decoction of the bark as a ritual cleansing emetic before marriage (Gerstner 1953) [1340] .

Bark, roots, humans, stomach:

The roots and bark are used by the Tsonga of Gazankulu to make a cleansing medicine for the stomach [2358] [5139] .

MEDICINES - ENDOCRINE SYSTEM DISORDERS

Leaves, humans, diabetes mellitus, oral ingestion:

Leaf infusion or decoctions are drunk for diabetes [2618] .

MEDICINES - INFECTIONS/INFESTATIONS

Bark, humans, digestive system, oral ingestion:

A decoction of the bark is taken in half-pint doses for dysentery [1340] [5082] [5097] [5098] [5605] .

Fruits, arthropod infestations:

Zulus use the fruits for destroying ticks (Bryant 1909) [1340] [2358] .

Leaf juice, humans, gonorrhoea, oral ingestion:

A drink made from marula leaves is used for the treatment of gonorrhoea [2358] [5605] .

Fruits, arthropod infestations:

The fruit can be used as an insecticide [2358] [5121] .

Fruits, mammals, insect infestation, baths:

In Botswana an infusion of the fruits is used to bathe tick-infested livestock. The fruit are generally regarded as a potent insecticide [5092] .

Inner bark, humans, malaria, prophylactic, oral ingestion:

The soft inner bark, cut small and infused in warm water, provides a drink widely used in Zimbabwe to prevent malaria if correctly prepared [2506] .

Bark, humans, digestive system:

In south and east Africa the bark is used as a remedy for dysentery (Githens 1949) [1340] .

Bark, humans, fever, malaria, oral ingestion:

In South Africa a decoction of the bark is believed to be of value in combatting fever and in the treatment of malaria [2618] .

Bark, humans, malaria, prophylactic, oral ingestion:

The bark is believed to prevent malaria, particularly if gathered before the first flush of leaves [1340] [5082] [5098] .

Bark, humans, malaria, gonorrhoea, digestive system, oral ingestion:

One mugful of chopped pieces of bark is boiled for three hours in 3 litres of water. Small doses of this decoction are taken for dysentery, malaria and gonorrhoea [5098] .

Bark, humans, malaria, prophylactic, oral ingestion:

A brandy tincture of the bark is taken in small doses as a prophylactic against malaria [1340] [5097] [5605] .

Bark, humans, digestive system:

Decoction of the bark is taken by the Pokot, Kenya for dysentery [1597] .

Bark, humans, malaria, oral ingestion:

In the north eastern Transvaal the powdered bark in teaspoonful dose is taken in treatment of malaria [1340] [5605] .

Bark, humans, malaria, teas:

Bark is used by some tribes as a bitter tea for malaria (de Winter et al. 1966) [1304] .

Bark, humans, malaria:

In Botswana the bark is traditionally used for treating malaria [5093] .

Bark, roots, humans, fever, malaria, oral ingestion:

Bark or root decoctions is used for fever and malaria [2795] .

Bark, humans, fever, oral ingestion:

When bark is taken as a tincture in brandy or powdered and swallowed in teaspoonsful, it is thought to provide an effective cure for the fever [5082] [5098] .

Fruits, arthropod infestations:

The fruit is considered to be an effective insecticide and is often relied upon for the treatment of ticks on pregnant cows. For this purpose the fruit is destoned and rubbed into the infested areas. A fruit decoction can likewise be employed for this purpose [5098] .

Fruits, arthropod infestations:

Zulus regard the fruits as a potent insecticide [1340] .

Seeds, arthropod infestations:

The dried seed is pulverized, stirred in water (two large handful to one bucket of water), left standing overnight and used the following day as an effective insecticide to be sprayed over infected plants. The powder can also be moistened, pressed in oil and then used to impregnate the plants [5098] .

MEDICINES - INFLAMMATION

Bark, humans, rectum, inflammation, prophylactic, baths:

The Zulu use a decoction of the bark, externally and internally, as a prophylactic against gangrenous rectitis. If a Zulu medicine man is called to treat a patient suffering from gangrenous rectitis, he bathes his body with a decoction of the bark as a prophylactic and administers some of the decoction to the patient (Bryant 1909) [1340] .

Bark, humans, rectum, inflammation:

In south and east Africa the bark is used as a remedy for proctitis (Githens 1949) [1340] .

MEDICINES - INJURIES

Leaves, humans, stings, wounds, external applications:

Leaves are applied to stings and wound (Grivetti 1982) [2358] .

Inner bark, humans, wounds, external applications:

The inner bark is used on wounds for its astringent effect [5098] .

Leaves, humans, burns, abscesses:

Burns and abscesses are treated with an essence made from the leaves [2358] [5097] .

Inner bark, humans, blisters, external applications:

Blisters caused by hairy worms can be effectively treated by placing the fresh, juicy, mashed inner bark on it [2358] [5092] [5155] .

Bark, humans, wounds, washes:

According to Haerdi (1964) a bark extract is used by the people of the Ulanga district in Tanzania for washing wounds [2358] .

MEDICINES - MUSCULAR-SKELETAL SYSTEM DISORDERS

Bark, humans, rheumatism:

Decoction of the bark is used by the Pokot, Kenya [1597] [2358] .

Bark, humans, rheumatism:

A decoction of the bark treats rheumatism [5605] .

MEDICINES - NERVOUS SYSTEM DISORDERS

Fruits, humans, nerves, paralysis:

When fully ripe, the fruit has an effect which simulates intoxication, but in reality is believed to be a type of nervous paralysis [5098] .

MEDICINES - NUTRITIONAL DISORDERS

Fruits, humans, vitamin C deficiency, oral ingestion:

The beer made from the fruit is highly antiscorbutic (preventative for scurvy) [1340] [2358] [5092] .

Bark, tonic:

Bark is used as a general tonic (Pujol 1993) [2618] .

MEDICINES - POISONINGS

Leaves, humans, scorpion stings, poultices:

People in the west African Republic of Niger apply the leaves as a poultice on scorpion stings (Beckwith 1983) [2358] .

Bark, humans, antihistaminic:

The moist inner bark shows an antihistaminic action against insect bites and the burns of hairy caterpillars [5097] .

Sap, humans, bites, external applications:

Bushmen in Namibia rub the red sap of the inner bark onto their skin for insect bites and irritation from hairy caterpillars [5098] .

MEDICINES - SKIN/SUBCUTANEOUS CELLULAR TISSUE DISORDERS

Leaves, humans, skin, boils:

An extract of the leaves is used by Black tribes for boils (Shone 1979) [2358] .

Bark, humans, skin, baths:

In Namibia the bark is used for skin conditions, preferably as an admixture to bath water [5098] .

Bark, humans, skin:

A bark decoction is used in Ghana for "skin eruptions" (Ayensu 1978) [2358] .

ENVIRONMENTAL USES - SHADE/SHELTER

The marula can be used most successfully as a shade tree in the garden or park and as a street tree [5097] .
The marula is a very important shade tree, utilised by people and animals [5121] .

ENVIRONMENTAL USES - AGROFORESTRY

Fruit-farming communities prefer planting a couple of these trees to attract pollinators to their farm in early spring [5605] .

NUTRITIONAL VALUE

Fruit pulp (g/100g):

Moisture 85.0, ash 0.9, protein 0.5, fat 0.4, fibre 1.2, carbohydrate 12.0, energy value 225 kJ/100g [187] .

Fruit pulp (mg/100 g):

Ca 20.1, Mg 25.3, Fe 0.5, Na 2.24, K 317, Cu 0.07, Zn 0.1, P 11.5, thiamin 0.03, riboflavin 0.02, nicotinic acid 0.27, vitamin C 194 [187] .

Fruit pulp, vitamin C:

The flesh is rich in vitamin C, containing up to 200 mg per 100 g of fruit (i.e. a better source of vitamin C than citrus fruits) (Wehmeyer 1980) [187] .

Fruits, vitamin C:

Vitamin C content is 54 mg/100 g. Fruit juice contains 2 mg/ml [1340] .

Fruit pulp, vitamin C:

The pulp contains four times as much vitamin C as orange juice, around 200 mg per gram (Holzhausen 1993) [2506] [2795] [5082] [5098] .

Fruit pulp:

The fruit pulp contains citric and malic acids, sugar, and is rich in vitamin C [5092] [5098] .

Seed (g/100 g):

Moisture 4.0, ash 4.2, protein 30.9, fat 57.0, fibre 2.4, carbohydrate 1.5 [2358] .

Seed (mg/100 g):

Calcium 106, Mg 467, Fe 0.42, Na 338, K 677, Cu 1.99, P 836, thiamin 0.04, riboflavin 0.12, nicotinic acid 0.71 [2358] .

Fruits, vitamin C:

The fruit is rich in vitamin C, with up to 2 mg/cc recorded [2358] [5097] .

Fruits, carbohydrate:

Beneath the exocarp is a fleshy mesocarp containing sugar and an acid resinous pulp [1304] .

Fruits, vitamin C:

The fruit contains four times as much vitamin C as orange juice [1331] [2358] [5092] .

Nut (g/100 g):

Moisture 4.0, ash 3.8, protein 28.3, fat 57.3, fibre 2.9, carbohydrate 3.7, energy value 2703 kJ/100g [187] .

Nut (mg/100 g):

Ca 118, Mg 462, Fe 4.87, Na 3.81, K 601, Cu 2.81, Zn 5.19, P 808, thiamin 0.42, riboflavin 0.12, nicotinic acid 0.72 [187] .

Seed oil, protein:

Each fruit has a single stone, inside which there are 2 or 3 seeds containing an oil rich in protein [5082] [5098] .

Kernels, oils/fats:

The kernels contain 50-60% oil and are rich in protein (28%) [5098] .

Fruits, vitamin C:

Jelly prepared from the fruit has been found to contain appreciable amounts of vitamin C (Fox and Stone 1938) [2358] .

Fruit pulp (g/100 g):

Moisture 91.7, ash 0.2, protein 0.5, fat 0.1, fibre 0.5, carbohydrate 7.0 [2358] .

Fruit pulp (mg/100 g):

Vitamin C 67.9, Ca 6.2, Mg 10.5, Fe 0.1, Na trace, K 54.8, Cu 0.04, P 8.7, thiamin 0.03, riboflavin 0.05, nicotinic acid 0.25 [2358] .

BIOLOGICAL ACTIVITY

Tests showed negative results in the treatment of malaria [5155] .

CHEMICAL ANALYSES - MISCELLANEOUS

Kernels:

Contain 60% non-drying oil and also have a high protein content [1331] [1340] .

Fruit pulp (g/100g):

Moisture 85.0, ash 0.9, protein 0.5, fat 0.4, fibre 1.2, carbohydrate 12.0, energy value 225 kJ/100g [187] .

Fruit pulp (mg/100g):

Ca 20.1, Mg 25.3, Fe 0.5, Na 2.24, K 317, Cu 0.07, Zn 0.1, P 11.5, thiamin 0.03, riboflavin 0.02, nicotinic acid 0.27, vitamin C 194 [187] .

Fruit pulp, vitamins C:

The pulp contains four times as much vitamin C as orange juice, around 200 mg per gram [1340] [2358] [2795] [5082] [5098] [5155] .

Fruit pulp:

The fruit pulp contains citric and malic acids, sugar, and is rich in vitamin C [1340] [5098] .

Fruit:

Average mass 17.99 g, skin 41%, seed 52.51%, edible flesh 6.47%, vitamin C 67.9 mg/100 g, Ca 6.2 mg/100 g, Mg 10.5 mg/100 g, P 8.7 mg/100 g, K 54.8 mg/100 g, fructose 0.97 g/100 ml, glucose 0.75 g/100 ml, sucrose 5.95 g/100 ml [5097] .

Seeds, seed oil:

The seeds contain 50-60% oil which is particularly rich in protein (28%) [5155] .

Fruits, vitamin C:

The vitamin C content of the fruit is 54 mg per 100 g and the citric acid content is 2.02% (Quin 1954) [1340] .

Kernels, oils/fats:

The kernels contain 50-60% oil and are rich in protein (28%) [5098] .

Kernels:

Seed kernels are rich in oil and protein [5093] .

Nut (g/100g):

Moisture 4.0, ash 3.8, protein 28.3, fat 57.3, fibre 2.9, carbohydrate 3.7, energy value 2703 kJ/100g [187] .

Nut (mg/100g):

Ca 118, Mg 462, Fe 4.87, Na 3.81, K 601, Cu 2.81, Zn 5.19, P 808, thiamin 0.42, riboflavin 0.12, nicotinic acid 0.72 [187] .

Nuts, protein:

The nuts have a protein content of as much as 28% and an oil content of 50-60% [5092] .

Seeds:

Nuts or seeds weighing 1000 kg will yield approximately 40 kg oil and 40 kg edible protein [5586] .

Chemical analysis of fresh marula fruit (Wehmeyer, 1967):

Edible portion of Marula Flesh (mg/100 g): Vitamin C 67.9; Calcium 6.2; Magnesium 10.5; Iron 0.1; Sodium trace; Potassium 54.8; Copper 0.04; Phosphorus 8.7; Thiamin 0.03; Riboflavin 0.05; Nicotinic acid 0.25. Marula flesh (g/100 g): Moisture 91.7; Ash 0.2; Protein 0.5; Fat 0.1; Fibre 0.5; Carbohydrate (by difference) 7.0 [2358] .

Chemical analysis of fresh marula fruit (Wehmeyer, 1967):

Edible portion of Marula seed (mg/100 g): Calcium 106; Magnesium 467; Iron 0.42; Sodium 338; Potassium 677; Copper 1.99; Phosphorus 836; Thiamin 0.04; Riboflavin 0.12; Nicotinic acid 0.71. Marula seed (g/100 g): Moisture 4.0; Ash 4.2; Protein 30.9; Fat 57.0; Fibre 2.4; Carbohydrate (by difference) 1.5 [2358] .

Bark:

Bark contains 10-20% tannin as well as traces of alkaloids [5092] [5155] .

Bark:

Bark contains 20.5% tannin and some alkaloids [5097] .

Bark:

Madagascar bark contains 3.5% of tannin (Deforge et al. 1928, Heim de Balsac et al. 1928). Transvaal bark, collected during October before the appearance of the leaf, contains 20.5% of tannin and a trace of alkaloids (Brandwijk 1928) [1340] .

Bark:

The bark contains procyanidins (Galvez et al. 1993) and the plant is also said to contain gallotannins, flavonoids and catechins (Iwu 1993) [2618] .

Bark:

The bark of a young marula tree was analysed and was found to contain 10.7% tanning matter [2358] .

Energy:

The energy value of the marula fruit is 130 kJ per 100 g fruit flesh and 2699 kJ per 100 g seed [2358] .

Seeds, seed oil:

Contains up to 28% protein and some iodine [1340] .

CONSTRAINTS - MISCELLANEOUS

Wood:

Warps badly on drying so only useful for rough work [1340] .

The Phalaborwa women use a modukulo and the Pedi women a modikola to obtain the marula seeds after the hard endocarp has been cracked between two stones (Krige 1937, Quin 1959). Seed extraction is simple if the marula stones are immersed in boiling water for a couple of minutes and dried in the sun. The lids of the fruit locules then come off easily [2358] .

TEMPERATURE

Occurs mainly in frost-free warm areas [1171] .

ALTITUDE

Kenya:

0-1200 m [2719] .

In Malawi, Kenya and Tanzania, marula occurs at altitudes of up to 1200 m (Kokwaro and Gillett 1980) [5607] .

Southern Africa:

Occurring at medium to low-altitude [5082] [5607] .

East Africa:

5-1200 m [1362] .

5-1600 m [1362] [2719] [2774] .

Southern Africa:

5-1700 m [5104] .

TOPOGRAPHY/SITES

Kenya:

Rocky hillsides [2719] .

Frequently on or in association with hills [1257] .

Namibia:

Found in various, but mainly on plains. Also found on hill slopes in the Karstveld and northwest, along rivers in the northeast and northwest, on dunes and around pans in the Cuvelai [5121] .

SOILS

Prefers red or stony sandy soil, sandy loams and sandy granite soil [5607] .

Grows on sand to sandy loam [5097] .

Namibia:

Grows on a sandy substrate, but sometimes on gravel, stony ground or dolomite [5121] .

Various types [3] .

VEGETATION

Kenya:

Open bushland [2719] .

South Africa:

Often associated with Acacia species [5607] .

South Africa:

Closely associated with Acacia nigrescens and usually is the subdominant species [5155] .

Mixed deciduous woodland and wooded grassland [1362] .

Southern Africa:

Grows in various type of woodland [[5097](#)] [[5605](#)] .

Botswana:

Open woodland [[1257](#)] .

Southern Africa:

Occurs in open woodland and bushveld [[1279](#)] [[5082](#)] [[5607](#)] .

Africa:

Woodlands and savannas of several types [[3](#)] .

ENVIRONMENTAL FACTORS - MISCELLANEOUS

Young trees are susceptible to fire damage [[2774](#)] .

POLLINATION

Insects pollinate the flowers [[5605](#)] .

FLOWERING/FRUITING/SEED SET

Fruiting, Namibia:

March to June [[5118](#)] .

Fruiting, Namibia:

October to August [[5121](#)] .

Fruiting, Zimbabwe:

April to June and last most of the year [[2506](#)] .

Fruiting, southern Africa:

February to June [[5082](#)] .

Fruiting, southern Africa:

January to March [[5097](#)] .

Fruiting, southern Africa:

Late summer to midwinter, but mainly between January and March [[2795](#)] .

Flowering, South Africa:

August or September [[5155](#)] .

Flowering, Namibia:

October to January, with individual records until July [[5121](#)] .

Flowering, Zimbabwe:

September to November [[2506](#)] .

Flowering, southern Africa:

September to November [[5082](#)] [[5097](#)] .

Fruiting, South Africa:

February to June [[5605](#)] .

Fruiting, South Africa:

Fruits ripen in January or February [[5155](#)] .

Fruiting, South Africa:

The fruit is shed during January to March before fully ripened. Ripening takes place while the fruit is lying on the ground, the ripening time depending on the temperature and rainfall [[5607](#)] .

Fruiting:

Usually starts bearing fruit when about seven years old (Shone 1979) [[5607](#)] .

Flowering, Botswana:

8-10 days in October-December [[1127](#)] .

DISPERSAL

Animals spread the stones and it is known that the seeds germinate where the faeces of these animals is deposited [[5607](#)] .

Dispersed by people eating the fruit and dropping the seed [[5121](#)] .

GERMINATION

Viability of seed is no problem. It is also not affected by passage through animals (Shone 1979) [5607] .
40% after six weeks [2774] .

VEGETATIVE GROWTH

Growth rate:

It is one of the fastest-growing indigenous trees [5607] .

Growth rate:

One of the fastest growing trees in South Africa with a growth rate of up to 1.5 m per year [5097] [5605] .

LONGEVITY

This species has a high vitality and can even survive a ring-bark, which feat is only equalled by the Baobab [5092] .

CYTOLOGY

$x = 13$ [5150] .

BREEDING SYSTEM

Sex of plant:

In a random sample of 119 trees Baijnath (1983) found only 15 to be monoecious trees. These 15 were predominantly male flowered, the female flowers being borne with male flowers on the lowermost 1-2 inflorescences of a particular twig. Most of the trees are dioecious [5607] .

Usually dioecious [1257] .

PHYSIOLOGICAL TOLERANCES

Frost:

Sensitive to frost [5092] .

Frost:

Young trees are frost-sensitive [2506] [5097] .

The tree is very sensitive to frost and grows best in frost-free areas under warm conditions. If planted in areas where there is mild or occasional frost, it must be protected at least during the first few growing seasons. It would be wise to plant it on the northern side of a building where there is always enough light, for example [5605] .

Frost tolerance:

Occurs mainly in frost-free warm areas [1171] .

Frost tolerance:

Although marula trees prefer frost-free areas, they will do well in colder regions if protected during the first few winters [5607] .

ASSOCIATED BIRDS

Barbets and woodpeckers make their nests in the soft wood [2506] .

ASSOCIATED INSECTS

Lepidoptera:

Pupal cases (Polyclada sp.) found in the soil under marula trees are important sources of arrow poison (Marais, pers. comm.) [5088] .

Lepidoptera:

Several moths breed on the tree, including the beautiful green African moon moth (Argema mimosae) [3045] .

Lepidoptera:

The larvae of the green lunar moth (Argema mimosae) feed on the leaves [5092] [5605] .

Lepidoptera:

The poisonous larvae of Polyclada flexuosa is found under the tree [5101] .

Lepidoptera:

The larvae of the green lunar moth produce cocoons which are filled by Tswanas in the Okavango Delta with tiny pebbles or pieces of ostrich egg-shell, and then threaded for use as ankle rattles for dancing [5092] .

Diptera:

The mosquito is more intimately linked to this tree than any other, because of the hollows in the trunk which trap water [5092] .

ASSOCIATED ORGANISMS - MISCELLANEOUS

A very valuable fodder grass occurs under marula trees (Shone 1979) [2358] [5155] .

Flowers attract vast numbers of insects, and therefore birds as well [2506] .

PARASITIC PLANTS

The marula is a host to numerous types of mistletoe, of which *Loranthus dregei* is the most important [5155] .

It is a sole host to a mistletoe-type parasite (family Loranthaceae) [5092] .

Woodrose-producing mistletoes are most often found on marula trees, but also on *Combretum collinum* and various other trees [2795] .

The marula hosts several mistletoes, of which *Erianthemum degrei* is the most important species [2358] [5155] .

CULTIVATION

The improved strains of the marula can be planted in an orchard format for the commercial production of fruit [5097] .

SEED WEIGHT

400-450 seeds per kg [2774] .

The kernel represent 13.9% of the total seed weight (Ligthelm et al. 1951) [1340] .

SEED STORAGE

Can retain viability for up to 3 months at room temperature .

PROPAGATION FROM SEED

If seven to eight month old stones are put out untreated and undamaged, good germination is ensured (Shone 1979, van Wyk 1974). Shone (1979) mentions that the stones (best sown in September) should be covered with 30 mm of pure river sand. The nursery soil should be sandy loam which is particularly well drained [5607] .

The stone should be planted untreated with the endocarps undamaged to ensure good germination [5092] [5155] .

The tree grows easily from seed sown in washed river sand in spring [5605] .

Germination trials at the Forestry Research Station in Namibia showed that the hard kernel has to be cracked carefully at those points where the germinating seed will grow out of the seed cage. If the seeds are then soaked for 24 hours in cold water, a germination rate of up to 27% could be achieved [5111] .

Soak in cold water for 24 hours [2774] .

The tree sprouts easily from seed [2506] [5092] .

Easily raised from seed. Plant seed directly into black nursery bags filled with river sand and keep in the shade until seedlings appear [5097] .

PROPAGATION - VEGETATIVE

The plants can grow from a truncheon planted in the early spring [5605] .

Can be propagated from truncheons [1279] .

Plant young plants or truncheons in scattered groups of 5-10 individuals in a suitable habitat in camps [5097] .

The tree sprouts easily from truncheons but is very slow-growing [2506] .

The tree strikes readily from cuttings and truncheons to form a live hedge, especially when cut at the time of bud

swelling. Truncheons should be about 10-15 cm in diameter, about 2 m long and planted a meter deep. They need to be planted close together and kept trimmed at the top and sides. The cuttings should have all the leaves removed and the end that is to be put into the ground should be cut with a long, slanting angle [5092] .

Branches 10-20 cm in diameter root fairly easily. Softwood cuttings from pruned trees root easily in spring [5155] [5607] .

Truncheons of 10-15 cm in diameter and 2 m long can be planted in early spring [5097] .

HARVESTING

January to March or April [1257] .

The fruit is particularly highly valued, and collected in large quantities at the end of the rainy season by the Jul'hoansi of Namibia [5088] .

STORAGE

The extracted seeds are winnowed by the Phalaborwa and kept in closed calabashes where they keep for some days. The marula stones are stored in "hammock-like receptacles made of strings of bark, lined with grass and supported by four poles" (Krige 1937). The Pedi store the stones on elevated platforms (Quin 1959) [2358] .

YIELDS

Fruits, Israel:

In the Negev Desert in Israel, 12-year-old trees are producing around 500 kg of fruit per year. Yields of up to 3 tons per tree have been recorded (Holzhausen 1993), and superior wild variants have been identified which produce large fruits of up to 98 g each [2795] .

The average yield of fruit per tree for 11 Botswana trees was 36 550 fruit, weighing approximately 550 kg [1257] . Over a season 4 trees produced from 22 000 to 91 000 fruits. On one occasion no less than 12 000 fruits were collected from one tree on one day [1171] .

A single tree can yield between 21 000 and 91 000 fruits in a season (Quin 1959) [187] .

Seed oil, Namibia:

A minimum of 30 kg of cold-pressed oil that has a value of not less than N\$ 80.00 per kg can be obtained from 100 kg of marula kernel [5587] .

Botswana:

An average annual yield for trees in the Delta is about 570 kg, yet 1000 kg yields have been reported. 70 000 fruits from a single tree were once counted [5092] .

The fruit has an average mass of 18 g [5097] .

Fruit juice:

Up to a ton of juice can be retrieved from the fruit of a prolific bearer in one season when using the rack and cloth press method [2358] .

TRADE

Marula juice forms part of a "New Range of Tropical Concentrates" sold by SIMO products, P.O Box 861, Tzaneen 0850. AMARULA, a liqueur made from marula juice is also commercially available [2358] .

South Africa:

Shelled nuts are frequently offered for sale by Bantu children [5155] .

The wood has been subject to commercial utilization for many years [2358] .

Namibia:

The oil expressed from the kernel is exploited commercially for use in cosmetics and for the production of alcoholic beverages [5121] .

South Africa:

It has become a commercial fruit crop in recent years, the fruit pulp being used to produce a jelly and to flavour liqueur [2618] .

Southern Africa:

A marula liqueur is available commercially [3045] .

Southern Africa:

The high pectin content makes the pulp ideal for jelly and considerable quantities have already been bottled and

marketed [2795] .

Southern and eastern Africa:

Several products, such as beer, juice, jam and jelly have been developed and successfully marketed, the most recent being a marula liqueur. These products are manufactured from the fleshy part of the fruit (mesocarp), the unutilized nuts remaining as a by-product [5586] .

A marula liqueur is available commercially [5605] .

The improved strains of the marula can be planted in an orchard format for the commercial production of fruit [5097] .

During World War II, due to the critical timber shortage, a commercial exploitation began. The wood was primarily used for fruit boxes. Later paint brushes, handles, furniture and veneer were manufactured, while marula lavatory seats were even exported to Zimbabwe and Australia [2358] .

SUMMARY EVALUATION/POTENTIAL

Has a wide range of uses and should be considered for large-scale planting [1331] .

The edible fruits and the multiple uses associated with all parts of the marula, make it one of southern Africa's most valuable trees [5605] .

The fruit has economic potential as juice and liqueur are manufactured from it [2358] .

One of 7 plants in Botswana considered suitable for immediate commercial utilisation, if it occurs in sufficient volume to be harvested without detriment to the local population [1257] .

Marula is one of the most important of all indigenous African trees and shows great potential as a cultivated, multi-purpose fruit crop of the future [2795] .

Experimental plantings in southern Africa and in Israel indicate that the marula has considerable potential as a cultivated fruit tree [2795] .

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Updated for southern Africa by M. Sinkela; checked by C. Mannheimer and A. Jarvis, May 2005. Entire species edited by C. Mannheimer, April 2007. SEPASAL Namibia, National Botanical Research Institute .

Additional information added from Mbuya et al. 1994 by Staline Kibet, KENRIK, National Museums of Kenya, June 2003 .

Data transferred from original datasheet (M Daily-Hunt 1/3/96) .

ADDITIONAL DATA SOURCES

Treated at the species level in PROTA (Plant Resources of Tropical Africa) [5361] [5450] .

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