National Arbor Day

14th October 2011

Marula

Photos: C. Mannheimer, J. Mendelsohn, M. Müller, PhytoTrade Africa, A. van Wyk. Poster and booklet design: Alice Jarvis

Tree of the Year

Sclerocarya birrea

Forests for People

2011: International Year of Forests

Sclerocarya birrea

Scientific Name

Sclerocarya birrea (A. Rich.) Hochst.

Common Names

- maroela, maroelaboom (Afrikaans)
- kàài (Barakwengo (San))
- marula (English)
- uwongo, ugè (Gciriku)
- Marula (German)
- uwongo (Kwangali)
- morula (Tswana)
- mulula (Silozi)
- goarus (Damara)
- omukongo, omungongo (Otjiherero)
- ongongo, omuongo (Oshiwambo)

Background

Marula forms an integral part of the lives of the people within its distribution range. It contributes to economic, social and environmental stability. In Namibia, this important, indigenous fruit tree provides diverse benefits at subsistence level. The main product is the fruit that is the source of the traditional brew, *omaongo*, of the Owambo people. Its usefulness is not only recognised locally but it is acknowledged nationally and internationally as a valuable species for domestication and commercialisation. Various business initiatives in northern Namibia generate income though the harvesting of fruit to produce marula oil for both local and international markets. Marula has been identified as one of five fruit tree species that should be integrated in the domestication process in farming systems in Africa to support nutritional, health and income security. The usefulness of this plant for rural communities in Namibia is significant, making it an ideal choice for the Tree of the Year 2011, and also in celebration of the UN International Year of Forests, which has the slogan 'Forests for People'.

Classification and Taxonomy

Sclerocarya birrea is a member of the Anacardiaceae family. It is typical of this plant family as it has resinous leaves and branches and bears fleshy fruit on female trees. Commercially important members of this family include mango (*Mangifera indica*) and cashew (*Anacardium occidentale*).

The species is represented by two subspecies in Namibia: *Sclerocarya birrea* (A. Rich.) Hochst. subsp. *birrea* and *S. birrea* subsp. *caffra* (Sond.) Kokwaro, with the latter being by far the most common. This taxon generally has a more southern distribution in sub-Saharan Africa. The most significant morphological features that distinguish the two subspecies are the petiole (4–8 mm long in subsp. *caffra*; 25–35 mm long in subsp. *birrea*) and the leaflet shape (sharp-tipped in subsp. *caffra*; elliptic to inverted egg-shaped in subsp. *birrea*).

The name *sclerocarya* is derived from the Greek words *skleros* for 'hard' and *karya* for 'nut', referring to the hard kernel in the fruit. *Birrea* is derived from 'birr', a common name used in Senegal for the tree while *caffra* derives from the Arabic 'kafir', meaning unbeliever, but usually applied in a botanical context to taxa described from South Africa.

Distribution and Habitat

Marula is native throughout the semi-arid, deciduous savannas of southern and Tropical Africa, predominantly in open woodlands. Its distribution mirrors the Bantu migrations through Africa, as it has always been an important component of their diet. In Namibia, its occurrence is highly correlated to annual rainfall. It occurs only in the forested, northern parts of the country that receive higher rainfall. The north-central regions (Oshana, Oshikoto, Ohangwena and Omusati) have the densest populations of this species, due to its domestication by local communities. While marula seldom grows in dense groups, it has a highly clumped distribution in the mountainous parts of Otjozondjupa, Oshikoto and Kunene Regions. It is widely distributed in the wild in Kavango and Caprivi Regions in open woodlands along rivers. Marula commonly occurs on sandy and clay soils, but has been recorded on gravel or stony soil, with a preference for well-drained soil. The key factor limiting its distribution may be its sensitivity to frost. Other habitat requirements include an altitudinal range of 0–1,800 m above sea-level and mean annual rainfall ranges from 200–1,500 mm, but more typically between 400–1,000 mm per annum.

Botanical Description

The marula is a medium to large deciduous tree, reaching 7–18 m in height. The tree is single-stemmed with an erect trunk and a dense spreading crown. Initially the **bark** is yellowish, becoming grey to dark grey on old stems. The bark peels off in disc-shaped flakes, giving the trunk a mottled appearance, while the interior bark is red or pink with darker stripes. **Leaves** are dark green, hairless with a dull waxy coating. They are imparipinnately compound, mostly crowded at the end of the branches, terminal leaflet with a petiolule up to 5 cm long. The margins are entire or only so along upper margins with lower

margins coarsely dentate, 30–100 x 15–40 mm. Young branchlets have conspicuous leaf-scars. Male and female **flowers** are borne on separate trees, the flowers of male plants producing pollen and female flowers producing the fruit for which the tree is so well known. Flowers are pinkish red in colour, forming mainly from October to January.

The **fruit** is a spherically shaped, tough-skinned drupe, up to 40 mm in diameter. These fruit drop before ripening (February to June); at this stage the skin colour is green and the fruit is firm. The ripe fruit has a thick, yellow peel and a translucent, whitish flesh, rich in vitamin C (about eight times the amount found in an orange). The outer skin is often described as having a pungent, apple-like odour. The flesh is aromatic with a pleasant, sweet-sour taste due to its citric acid, malic acid and sugar content. Inside is a walnut-sized, thick-walled kernel. These kernels, when dry, expose the **seeds** by shedding two (sometimes three) small circular plugs at one end. The whitish fruit-flesh and kernel are edible, delicious and sought after by man and various animals.

Uses

Marula is an important indigenous fruit tree that has numerous uses. **Food:** Fruit are commonly used as a source of food and drink. The fruit pulp is eaten fresh or fermented to make alcoholic drinks, a common practice in the Owambo communities. The fruit can also be processed to make jam, jellies, sweets, vinegar and juice. A prominent product on the international market is the liqueur 'Amarula'. The kernels are high in protein and fat and constitute an important emergency supplement. The kernels have a delicate, nutty flavour and are much sought after. The kernels are consumed more than the fresh fruit by Kavango and Caprivi communities. Oil extracted from kernels is eaten with porridge by the Mbukushu. **Animal Fodder:** Leaves are browsed by livestock and wildlife. Marula fruit are known to be desired by wildlife, particularly elephants and primates. **Cosmetic:** Marula oil has been found to have excellent cosmetic qualities. A paste made from crushed seeds is used as a cosmetic and extracted for export by the Owambo people. **Medicinal:** Roots, bark and leaves are important traditional medicines for heartburn, diarrhoea, diabetes, fever and malaria. **Environmental:** This large tree is an important habitat for small vertebrates and invertebrates, as well as parasitic plants. It is also planted for shade and used to make live fences. **Timber:** Wood is pale reddish-brown to whitish with no definite heartwood, soft and light (air-dry 560 kg/m³). As trees attain large diameters, the wood is preferred for traditional canoes, mortars, pestles, bowls and various local crafts. Due to its many uses and value to local people, marula is usually spared from being cut in rural areas.

Cultivation

Marula is fast-growing, with a growth rate of up to 1.5 m per year. This tree is very sensitive to frost and grows best in frost-free areas under warm conditions. Kernels are soaked in warm water to soften the plugs then planted directly into a nursery bag filled with river sand and kept in the shade until the seedling emerges. It can also be grown directly in the soil. If raised in a nursery or taken as wilding, transplanting should be done when the plant has two leaves. It can also be propagated by means of shoot cuttings. Truncheons of 100 to 150 mm in diameter and 2 m long can be planted in early spring. Marula trees can also be propagated successfully by means of grafting. Seedlings can be grafted when they reach 20 cm high. Grafted trees have a better root system than trees developed from, for example, air-layering. Grafted trees are usually shorter and bear fruit from the third to the fifth year, while seedling trees usually bear fruit in five to seven years. It can tolerate seasonal waterlogging, and experience with planted stands in Israel indicates tolerance of a salinity level of 4 dS/m in irrigation water. This species has significant underground growth. The roots are large compared to above ground growth.

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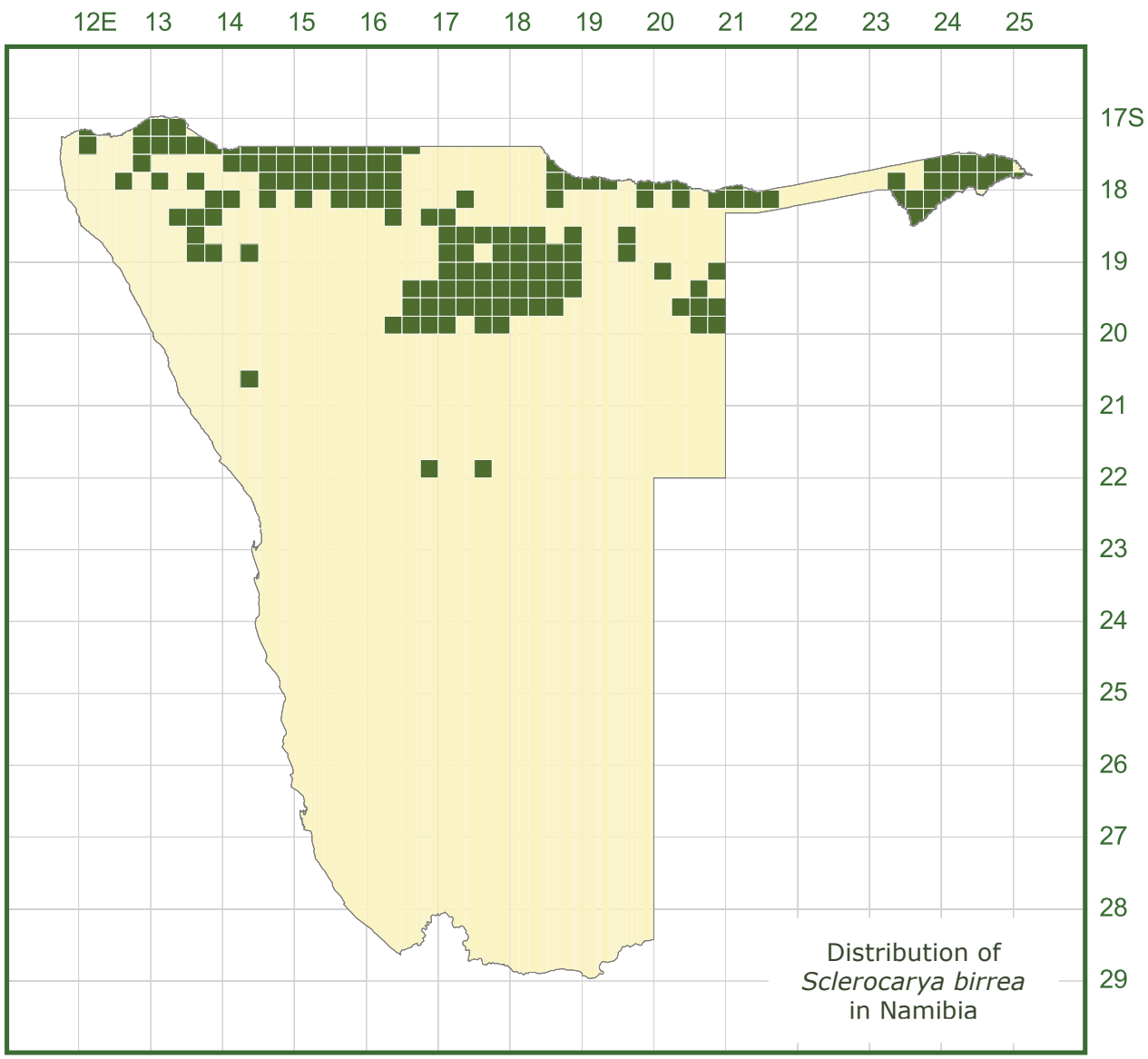

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