

## Melia volkensii

Guerke

Meliaceae

### LOCAL NAMES

English (melia); Somali (boba,baba)

### BOTANIC DESCRIPTION

*Melia volkensii* is deciduous, open crowned and laxly branched. Mature trees range between 6 and 20 m tall. Trees with 25 cm diameter are common. The bark is grey, fairly smooth, furrowing with age.

Leaves are a light, bright green, bipinnate with (sub)opposite leaflets, 3-7 per pinna, up to 35 cm long, and are densely hairy when young. The leaflets are oval to lanceolate, tapering to the apex. The margins are entire or serrated, becoming almost glabrous when mature. Dimensions range between 4 and 7.5 cm long.

Flowers are small, white and fragrant, in loose sprays. Male and female flowers are on the same tree (andromonoecious). Inflorescence is congested, up to 12 cm long, axillary and on older branchlets. Petals are tetra- to pentamerous, white, free and may curl backwards; stamens are the same number as the petals, sometimes twice as many, and united into a tube.

The fruit is drupe-like and oval; colour changes from green to pale grey as the fruit matures. Fruit size is normally 4 cm long with a very thick, bony endocarp.

Because of the divided leaves, the generic name is derived from the Greek melia (the ash).

### BIOLOGY

*M. volkensii* has been reported to start flowering as early as 2-3 years. It sheds its leaves twice a year, flushing new leaves towards the end of the dry season. Flowers and fruits are also produced twice a year, with fruits becoming ripe at the end of the dry season as the leaves emerge. Literature on pollination mechanisms of *M. volkensii* is scarce. Reports are that flowers are visited by bees, an indication of insect pollination. Anecdotal evidence suggests that the species could be self-pollinating.

Fruit development takes 12-13 months from the onset of flowering to maturity. Stages of fruit development lack a seasonal pattern; it is not uncommon to have trees at the same site flowering and fruiting at different times of the year. Fruits at different stages of development occur on the same branch, making it difficult to differentiate mature from immature fruits, except for colour.

The fleshy fruits are eaten by animals like giraffe, kudu and goat, which are the main dispersal agents apart from human beings.



Fruit and bark (Anthony Simons)



*M. volkensii* root cuttings. (Hannah Jaenicke)



Boundary planting showing competition effects on maize, Machakos, Kenya (Anthony Simons)

**ECOLOGY**

*M. volkensii* is common in association with acacia-commiphora vegetation. It is an emergent in acacia-commiphora deciduous bushland, sometimes fringing seasonal watercourses or appearing on rock outcrops.

**BIOPHYSICAL LIMITS**

Altitude: 350-1 680 m, Mean annual rainfall: 300-800 mm

Soil type: Physical characteristics of the soils in its natural range are sandy, clay and shallow stony. Good drainage is a common characteristic, although stands on sites classified as imperfectly drained soils in Tharaka-Nithi and Isiolo in Kenya have been reported.

**DOCUMENTED SPECIES DISTRIBUTION**

Native: Ethiopia, Kenya, Somalia, Tanzania

Exotic:



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

**PRODUCTS**

**Fodder:** Farmers believe leaf fodder is of high quality for both cattle and goats. The tree comes into leaf and is pruned for fodder towards the end of the dry season, a time when fodder is extremely scarce. Goats eat the large, fleshy drupes after they fall. The fruit pulp is reported to contain almost 10% crude fat and over 12% crude protein; the mature leaves are reported to contain over 5% crude fat and 21% crude protein.

**Apiculture:** *M. volkensii* is one of the principal species used to make log hives because the wood is easily worked and shaped. The flowers are said to provide excellent bee forage.

**Fuel:** Branches lopped during routine management and to provide fodder are often left to dry in the field before being used for firewood. The firewood produces an unpleasant smoke, and the tree is said to produce poor quality charcoal.

**Timber:** The wood is easily worked and shaped, making it suitable for making acoustic drums, containers and mortars. The coarse-textured heartwood with a density of around 0.62 works easily, planes well, is durable and extremely termite and decay resistant comparing favourably with *Ocotea usambarensis*, *Vitex keniensis* and *Khaya* species. The timber is valued locally for door and window frames, doors shutters, rafters, poles and furniture.

**Poison:** Leaf preparations are used as flea and fly repellents; they are said to be particularly effective on goat kids. Antifeed activity against *Schistocerca gregaria* is reported; larvicidal and growth inhibitory effects have also been observed against mosquitoes.

**SERVICES**

**Soil improver:** A few farmers have suggested that the heavy leaf fall of *M. volkensii* during the later stages of crop development may increase crop yields.

**Intercropping:** Most farmers in Kenya believe that *M. volkensii* is compatible with all crops grown. This, however, is dependent upon good silvicultural practice in reducing the shade effect of canopies, which would otherwise adversely affect light-demanding crops such as sorghum and millet. Due to its deep rooting nature, its interference with ox-plough cultivation is minimal.

**TREE MANAGEMENT**

Almost all growers plant *M. volkensii* irregularly dispersed within crops, generally at spacing in excess of 10-15 m. Some farmers plant trees along boundaries but rarely near dwellings as branches tend to break off during storms. The tree tends to develop heavy lateral branching; therefore farmers prune *M. volkensii* from the 1st year onwards to maintain a clean straight bole. When the crown is fully developed, it is thinned heavily each year to reduce shading on underplanted crops like sorghum and millet. The operation is carried out in the dry season to provide clear conditions at planting time. Pruning with the flush of new leaves and fruits coincides with the time when fodder is scarce. Some farmers pollard their trees, believing that this induces an increase in diameter. Many farmers, however, believe that pollarding induces rot and is counter-productive.

**GERMPLASM MANAGEMENT**

Seed storage behaviour is orthodox, and viability can be maintained for several years in hermetic storage at room temperature with 11-15% mc. Preliminary results on germination trials at the Kenya Forestry Seed Centre, using seeds stored for 3 months at -3 deg. C, obtained a mean germination of 3%. Other reports from the centre are that mature and properly dried 'stones' can be stored in air-tight containers at a temperature of 3 deg. C for several years without damage. Seeds were extracted with a pocket knife before a seed extractor was designed in 1994. On average, there are 200 extracted seeds/kg, depending on provenance and the climatic conditions of the ripening year.

**PESTS AND DISEASES**

No serious pests and diseases have so far been reported for *M. volkensii* in either natural populations or trees on farms. Animal damage through browsing and trampling does occur, especially during the juvenile phase. In the wild, however, the tree has been reported to suffer some damage from elephants (*Loxodonta africana*).

**FURTHER READING**

- Albrecht J. ed. 1993. Tree seed hand book of Kenya. GTZ Forestry Seed Center Muguga, Nairobi, Kenya.
- Beentje HJ. 1994. Kenya trees, shrubs and lianas. National Museums of Kenya.
- Birnie A. 1997. What tree is that? A beginner's guide to 40 trees in Kenya. Jacaranda designs Ltd.
- CABI. 2000. Global Forestry Compendium. CD-ROM. CABI
- Dale IR, Greenway PJ. 1961. Kenya trees and shrubs. Buchanan's Kenya Estates Ltd.
- Hong TD, Linington S, Ellis RH. 1996. Seed storage behaviour: a compendium. Handbooks for Genebanks: No. 4. IPGRI.
- ICRAF. 1992. A selection of useful trees and shrubs for Kenya: Notes on their identification, propagation and management for use by farming and pastoral communities. ICRAF.
- Kidundo M. 1997. Participatory technology development and Nursery Propagation of *Melia volkensii*: A potential Agroforestry tree species for semi-arid Mbeere. MSc Thesis, University of Wales, Bangor.
- Mulatya JM, Wilson J, Ong CK, Deans JD, Sprent JI. 2002. Root architecture of provenances, seedlings and cuttings of *Melia volkensii*: implications for crop yield in dryland agroforestry: *Agroforestry Systems*. 56(1):65-72.
- Noad T, Birnie A. 1989. Trees of Kenya. General Printers, Nairobi.
- Stewart M, Blomley T. 1994. Use of *Melia volkensii* in a semi-arid agroforestry system in Kenya. *Commonwealth Forestry Review*. 7(2): 128-31.

**SUGGESTED CITATION**

Orwa C, A Mutua, Kindt R, Jamnadass R, S Anthony. 2009 Agroforestry Database: a tree reference and selection guide version 4.0 (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)