



Plants visited by bees, and other useful plants of Umalila, Southern Highlands, Tanzania



*Harvesting honey
at Yalenga*

Paul Latham



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Note: The manual is being produced to encourage the conservation and planting of useful plants in the Southern Highlands of Tanzania. Many of the plants mentioned are however present in the upland areas of Central and Eastern Africa so that it is hoped the manual will be of interest to schools, development workers and beekeepers throughout this region.

Warning : A number of the plants listed in this publication are known to be poisonous. The author does not accept responsibility for any harm resulting from their use.



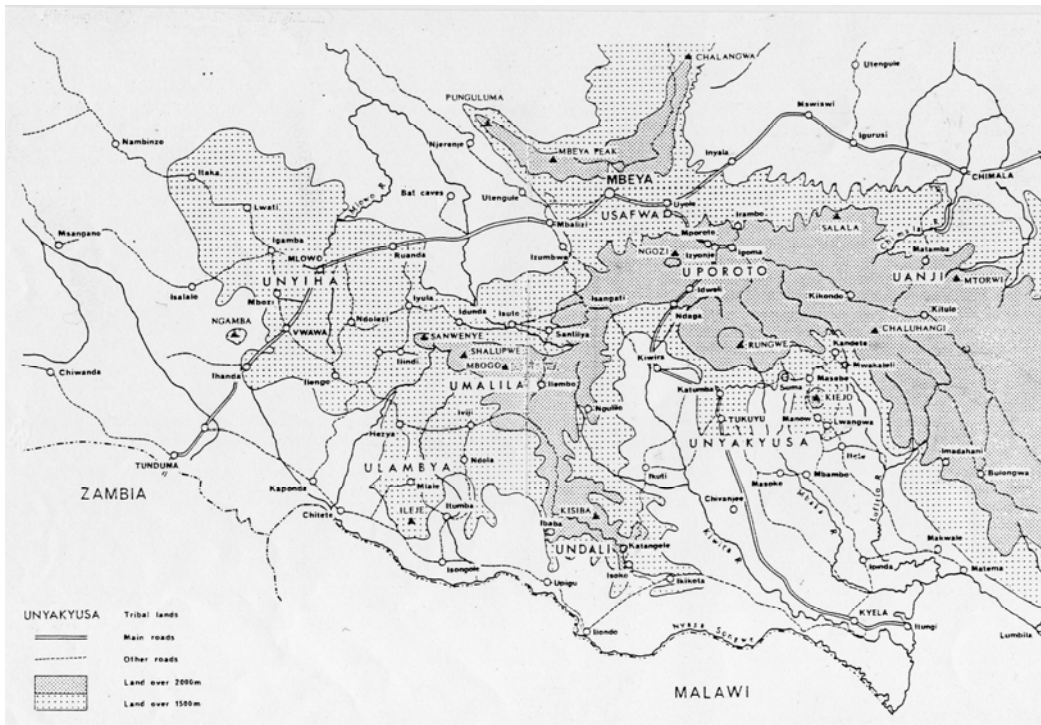
"O Lord, what a variety you have made ! And in wisdom you have made them all ! The earth is full of your riches".

Psalm 104:24 The Living Bible

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Unless stated otherwise common names of the plants are given in Kimalila



Map of the central area of the Southern Highlands : Cribb & Leedal (1982) The Mountain Flowers of Southern Tanzania.



Finger millet growing near Ilembo in April

Introduction and acknowledgements

My first visit to Umalila, Mbeya region, took place in the early 1980's, after having been asked by the Salvation Army to assist the Itundu secondary school agricultural programme. A return visit was made in the 1990's to set up a project to help school leavers find self employment. As a result I became interested in the potential for beekeeping and particularly in the bee flora of the area. On retirement I was able to continue my visits to Umalila to collect information on plant use and to take photos of the various indigenous and introduced plants. During the period from 1997 to 2006 a total of six visits were made to Umalila where I was based at the villages of Ilembo, Shilanga, Sasyaka, Maendeleo and Izumbwe, approximately 60 – 70 km south of Mbeya town.

On my return to Britain, I contacted Dr. P.J. Cribb who, together with Rev G.P. Leedal, had studied the flora of the Southern Highlands of Tanzania some years previously. I am grateful for permission to use the map from their book: *The Mountain Flowers of Southern Tanzania* (See previous page). Dr. Cribb, and subsequently Dr. Kaj Vollesen, very kindly identified most of the plant specimens and photographs I collected on my early visits. Subsequently Frank Mbago, Dr. Roy Gereau and the staff of the Botany Dept. at the University of Dar es Salaam identified the plants for which I am also very grateful. I am also grateful to Dr. Henk Bentje for his helpful comments on some of the photos I took in 2006.

I wish to thank the following people, mostly officers of the Salvation Army, for their very kind hospitality during my visits:- Mr. and Mrs. Mlaga, Major and Mrs. Pepete, Captain and Mrs. Siani, Colonels David and Jean Burrows, Majors Benjamin and Grace Mnyampi, David and Maiching Palmer, Lloyd and Yvonne Cooper, Major and Mrs. Kusilimka, Major and Mrs. Muzumbe, Envoy and Mrs. Ndere, Envoy and Mrs. Akim, Captain and Mrs. Sanawa, Captain and Mrs. Marwa and Majors David and Chris Watson. My special thanks also to Seth and Pam LeLeu who introduced me to Umalila during the setting up of the agricultural training and loan scheme to assist school leavers in the area and for their help and hospitality during my travels.

I also wish to thank a number of people who have very kindly allowed me to use their photos in the book. The credits for these appear below each photo. The International Bee Research Association has also kindly provided reference material from their library.

As with previous books I wish to thank my wife, Ena, for her help and encouragement in the preparation of this manual.



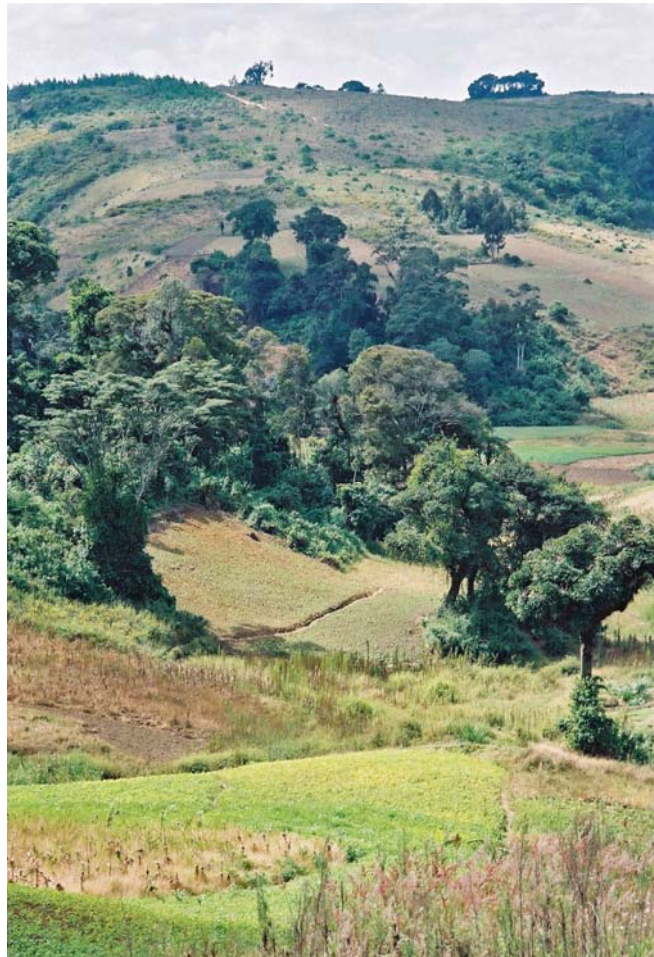
Eliya Mwampamba with a traditional beehive. The hive has holes bored in the base to allow rain water to drain out. Note the V shaped entrances cut at either end of the upper section.



A Tanzanian Top Bar hive hung on wires between two poles to prevent ants and honey badgers from getting at the hive.



Umallilla is intensively farmed, normally without fertilizers, and much of the designated forest land is now in cultivation. However villagers do maintain woodlands, these being planted with eucalyptus, pine and cypress.



Beehives, sited in this patch of indigenous forest, provide a good reason for preserving it.

Beekeeping in Umalila

Beekeeping is an important secondary industry in Umalila. Many of the beekeepers are however elderly, and beekeeping does not appear to be attractive to most young people. In addition much of the original forest is in a degraded state and is being gradually lost to logging and cultivation. As the forest has traditionally produced the bulk of the honey the future for beekeeping is uncertain. This is unfortunate for three reasons:- 1. Beekeeping could provide a useful income particularly to young people, many of whom do not have access to land unless they hire it. 2. It is important for the adequate pollination of crops such as sunflower, passion fruit, peaches, pumpkins and pole beans. Bees are known to be the most important group of pollinators of all insects for these crops. 3. It is traditional to site hives in areas of forest thus affording some protection to the remaining patches of indigenous forest. One tree in particular, Impembati (*Polyscias fulva*), is frequently used, and even planted, because of its branching habit and thus its suitability for placing hives.



Polyscias fulva used as a hive support

Beehives were traditionally constructed from this tree, Iliogoti (*Hagenia abyssinica*) and Ilangali (*Euphorbia nyikae*). Now they are usually made from *Euphorbia nyikae* and *Cupressus lusitanica*. The hives are made approximately 1 m long and divided into two halves. These are bound together with a cord made from Isintu (*Ipomoea involucrata*), or other creepers. Hives are always placed in trees, mainly to keep flying bees above people living nearby or cultivating surrounding crops, to catch the warmth of the early sun, particularly during the dry season, when it can be cold at an altitude of over 2,000 m, and to provide some protection from pests. A serious pest known as Homba in Malila, probably the large spotted genet, is able to climb trees and can get into a hive to take the honey unless it is very well secured. It often gets into hives where the wood is rotten. New hives appear to be less at risk.



A hive sited approximately 4 m above the beekeeper's home compound. A bamboo sheath covers the hive. This gives additional protection from rain.

A bamboo 'ladder', fastened to the tree, assists the beekeeper to reach his hive.



The two halves of the hive are hauled up and assembled high in the tree and then covered over with bamboo sheaths, supported and held down with sticks. The hive is baited with beeswax which is normally effective in attracting a colony to enter. Occasionally, I was informed, two colonies will take up residence at either end of a hive. They may amalgamate or remain separate.

When harvesting honey the beekeeper uses lighted pieces of bamboo or Ipekeso stalks (*Conyza bonariensis*) surrounded with leaves from Igawo, the false banana, (*Ensete ventricosum*), to produce smoke but he can nevertheless get badly stung. Sometimes he will lower the hive to the ground where two forked sticks are used to support the hive. Harvesting can then be carried out more easily as most of the flying bees will return to the original hive site in the tree. Not all combs are taken during harvest. Some of the honey is left, together with brood combs. There is normally a small harvest at the end of June (up to 10 litres being taken) but the main harvest takes place in November and December when between 18 and 25 litres can be taken. Honey has a ready local market being mainly eaten in the comb. Wax is sold separate from the honey and is used by local carpenters and for shoe repairs.

A smoker made up from bamboo stems surrounded with banana leaves. This has a sling, which enables it to be hauled up the tree and secured to a branch during harvest or inspection. The lighted end is held downwards and smoke is blown or allowed to drift into the hive from the top.



Left : A bee suit enables the beekeeper to work with bees calmly and safely. A piece of plastic mosquito netting is sewn into the head section. A pair of trousers can be used as an alternative to the bottom half of the suit.

Design by Ntangu Targou

The Importance of Beekeeping

The value of bees is not so much for the honey and wax they produce as for their work in pollinating farm crops, fruit and vegetables. Without bees the production of many of these would be greatly reduced. Bees, more than any other insect, tend to work methodically and thoroughly, concentrating on one species of plant at a time. It is therefore important that beekeeping is encouraged. It is natural today that young people are less interested than their fathers in the traditional methods of beekeeping, especially if it involves getting badly stung ! It is for this reason that the Top Bar hive is currently recommended. It is comparatively safe and easy to operate, cheap and easy to construct and usually yields more honey than the traditional hive.

The Tanzanian Top Bar Hive or Transitional Hive

By using a Tanzanian Top Bar hive and making sure one is protected with suitable clothing, beekeeping can be a safe and worthwhile occupation, yielding a useful profit in most years. In the Bas-Congo Province of the Congo, where the author is also involved in a beekeeping programme, there is no tradition of beekeeping, yet groups of women, as well as men, have recently taken up this activity with great enthusiasm. For them honey has provided a very useful source of income.

Top Bar hives differ from traditional hives in having moveable combs. The combs can be taken out, inspected and put back again so that the beekeeper can see when honey is ready, which combs have brood, whether bees are healthy and whether the queen is laying properly. Essentially the hive is an open box 1 m long, 50 cm wide and 30 cm deep. The top of the box is made up of bars 48 cm long and 3.2 cm wide. The width of the top bar is very important and the bars must fit tightly together with no gaps between them. In a traditional hive the centres of each comb, looking vertically down on them, are 3.2 cm apart and it is for this reason that Top Bar hives follow the same dimension.



Inside the Top Bar Hive showing comb attached to the top bar.

Plants and beekeeping

The southern highlands of Tanzania are rich in plants attractive to bees. Of particular importance are Intenga (*Kotschyia recurvifolia*) and Inzigula (*Dodonaea viscosa*) and crop plants such as maize (mainly for pollen) and sunflower. Peaches, bananas and avocado are also valuable. Bees are considered to be vital for pollinating peaches. Hedge plants such as Ifipa (*Salvia coccinea*), sisal, Inyangwa (*Caesalpinia decapetala*), Iteti (*Dracaena steudneri*) and Intwiti (*Brugmansia* spp. and *Solanecio manni*) are also important because of their long flowering seasons. Traditional vegetables – Igagara (*Brassica carinata*) and Umuzimu (*Cleome gynandra*) are good sources of nectar and pollen. Many trees are important pollen and nectar producers, for example eucalyptus, Itanji (*Dombeya rotundifolia*), Iseve (*Erythrina abyssinica*), Iliogoti (*Hagenia abyssinica*), Isangati (*Ilex mitis*), Imogoro (*Schefflera* spp.), Ifwomi (*Syzygium cordatum*), which grows around water sources, and Impembati (*Polyscias fulva*). Even weeds have their part to play. In particular Mputira (*Bidens steppia*), which in May and June colour the hillsides yellow, is an important source of both pollen and nectar.

Certain plants, such as sisal, produce a bitter honey when on their own. However, as long as there are plenty of other sources of nectar flowering at the same time, this should not flavour the honey adversely. Ilangali (*Euphorbia nyikae*) and Iwoti (*Lobelia gibberoa*) are said to produce poisonous honey. Again, providing they are not the only source of nectar at the time, there should be no problem with the honey produced. Many of the plants illustrated in the following pages have multiple uses. The information is given to help farmers and development workers identify them and, in some cases, to encourage them to plant or conserve them. The author would be particularly glad to hear of other important bee plants and additional information regarding uses for those mentioned.

A supply of fresh water is important for bees during the dry season. If there is no water close by it is necessary to provide it, as this beekeeper has done. Floating pieces of wood assist the bees to drink without drowning.



Left: *Costa Mwamahonje with a consignment of honey from beekeepers in Umalila. The honey is marketed by Shukrani International College, Box 535, Mbeya.*

Photo : David Watson

Acacia mearnsii

(Mimosaceae)

Common names Naluyami (Malila), muwati (Swahili), black wattle



Description A fast growing tree up to 15 m tall. The tree often leans over due to the shallow root system. The bark is grey becoming black and splits and curls. A brown gum is secreted from the bark. The compound leaves are produced on stalks up to 12 cm long. Flowers are sweet scented, pale-yellow and in small rounded heads. Fruit pods are flat, 5 – 15 cm long, and contain up to 14 black seeds.

Ecology Usually grown in small plantations in Umalila but also grown commercially elsewhere at altitudes between 1,500 and 2,500 m. The tree grows well on light textured, moist, acid soils.

Propagation Large numbers of seedlings emerge following the burning of felled plantations. Trees can be planted using seed put in boiling water for 5 minutes or soaked in water for 24 hours. A second species which spreads by root suckers is also present.

Management Trees should be thinned out and kept weeded while young.

Uses The tree provides a quick growing source of high quality firewood and charcoal. The timber is hard, heavy, fairly tough and durable. It is moderately easy to work and polishes well.

It is used for house poles and maize stores, tool handles and general construction. The bark is an important source of tannin, containing 30 - 45% high quality tannin. Bees are reported to be the main pollinators. If densely planted, the tree can be useful in erosion control. It also fixes nitrogen, thus improving the soil.

References Little 1983,
Crane & Walker 1984,
Mbuya et al. 1994,
ICRAF 1998

*Carrying firewood home
from Itale forest*



Acanthus ueleensis

(Acanthaceae)

Common names Inzonya, ihahatu (Malila), bear's breeches



Description A semi-succulent perennial herb or shrub up to 4 m high. Leaves are irregularly lobed with margins bearing spines towards the base. The plant produces large pink to pale mauve flowers.

Ecology Common in forest undergrowth in Umalila. Also present in Malawi, D.R. Congo and Uganda.

Acanthus ueleensis in a forest near Maendeleo village

Propagation Can be grown from seed, by division of the rhizomes or by rooting cuttings.



Uses In Umalila the leaves are pulped, put in water, together with the leaves of *Physalis peruviana* and *Coleus* sp., and taken to relieve stomach-ache. Another species, *A. montanus*, present in upland forest, is used in Nigeria mainly as a cough medicine. *A. arboreus*, *A. eminens*, *A. montanus* and *A. pubescens* are also used as medicinal plants in Africa. *A. eminens* and *A. sennii*, present in the Ethiopian highlands, are visited by honeybees when other sources of nectar and pollen are in short supply. Some species, for example *A. montanus* and *A. mollis*, are grown for their foliage and ornamental flowers.

References Burkill 1985, Brickell 1994, Fichtl & Adi 1994, Philips & Rix 1998, Neuwinger 2000, Llamas 2003, Burrows & Willis 2005

Aframomum zambesiacum

(Zingiberaceae)



Common names Nangawo

Description A leafy plant growing from a short, branched rhizome. The leafy stems grow in clumps up to 2 m tall. Leaves are 20 – 45 cm long and 5 – 14 cm wide. Margins and midribs bear dense hairs underneath. 20 – 50 flowers are borne in heads arising from the base of the shoots. Petals are whitish to creamy white with a large crimson patch at the base. The red fruits are oval 7 cm long and 4 – 5 cm wide, thick walled, with prominent ridges running from top to bottom. The shiny, dark brown seeds are ellipsoid, 4 – 5 mm.

Left : *Plant growing beside a stream near Izumbwe*

DR Congo, Cameroon and Nigeria in upland forests and secondary growth often near paths and streams between 1,450 and 2,050 m altitude.

Ecology Grows in Malawi,

Right : *Flowers and fruits are borne on a stalk 10 – 40 cm long.*

Uses In Umalila the juice surrounding the seeds is reported to be effective in curing tropical ulcers. Seeds are also pounded and eaten to expel tape worms.

References FTEA 1985



Agarista salicifolia

(Ericaceae)

Synonym *Agauria salicifolia*

Common names Izenya (Malila), myunguvo (Swahili)



Description A small, often twisted, evergreen tree or shrub which grows up to 12 m high. The bark is very rough and split, having corky ridges. Leaves are leathery, shiny, 2 - 12 cm long and 0.8 – 3.5 cm wide, yellowish to pale whitish beneath and having a rounded base. The midrib of the leaf may have some hairs. The flowers are numerous, yellowish-white or pink, crimson at the base, on stalks to 12 cm long growing from the axils. Fruits are reddish-brown, round, 5 - 7 mm in diameter.

Agarista salicifolia in flower in October

Ecology Grows at the forest edge or in secondary forest and in high altitude grassland. Also found in Cameroon and Fernando Po, and widely dispersed in East, Central and southern Africa and in Madagascar. The shrub is fire resistant.

Uses Branches are used as firewood in Umalila. Elsewhere in Tanzania the leaf ash is used medicinally being rubbed into scratches made on the area affected by rheumatism. In Madagascar leaf powder is rubbed on the skin to treat scabies, itch mite and skin problems. Some people report that bees visit the flowers in Umalila. An edible caterpillar (Insega) feeds on this plant and is usually found in March. A bark infusion is used by the Maasai to aid indigestion after eating too much meat. The Chagga use the leaves as an insecticide.



Remarks Though some people in Umalila reported that goats eat the plant the leaves are known to be lethally toxic to both man and stock. Even dead leaves cause vomiting, convulsions, respiratory difficulties and coma. The roots are also toxic. Smoke from burning the leaves is also said to be poisonous.

References Watt & Breyer-Brandwijk 1962, Beentje 1994, Burkill 1994, Neuwinger 2000, Kihwele et al. 2001, Lovett et al. 2006

Agave sisalana

(Agavaceae)

Common names Ikatani (Malila), mkonge (Swahili), sisal.

Description Sisal is a short lived perennial with a thick stem up to 120 cm high having a rosette of leaves each growing up to 120 cm long. The plant produces 200 - 250 leaves each tipped with a sharp spine. A flowering pole, 5 – 6 m tall, is produced at the end of the plant's life. Though the plant flowers, seeds are rarely produced and the plant multiplies by bulbils produced on the flowering pole after the flowers have fallen.



Ecology A hardy plant which grows best where rainfall is between 1,000 and 1,250 mm. It is still commercially grown in Brazil and East Africa. It grows on a wide range of soils from sandy loam to clay, but prefers calcareous soils with adequate potassium. Water-logging results in stunted plants. It is drought hardy.

Propagation Suckers or preferably bulbils, which are collected when they fall, are used for planting and grow easily.

Uses Sisal is widely grown in villages in Umalila as a hedge plant. The fibre is extracted from the leaves, and used for making string and rope for tethering livestock. It can also be used for making bags and mats. Leaf fibres may be up to 1 m long and are very strong. Sisal is naturally hard wearing and resistant to sunlight and these qualities have ensured its continued use. The poles are used for fuel once they are dry or can be split and used for light construction work, though they are very susceptible to termite attack. Sisal is a valuable bee plant because of its irregular and long lasting flowering periods and is of great attraction especially during times

Sisal grown as a hedgerow plant near Sasyaka.

of pollen shortage. It provides sufficient nectar for stimulating brood rearing. The honey is however dark and of strong and unpleasant flavour. The plant also has a number of medicinal uses.

Remarks *A. fourcroydes* is also grown for its fibre. Leaves for fibre production can be cut after two years. The whole plant dies after about seven years.

References Iwu 1993, Pursglove 1972, Fichtl & Adi 1994, Mbuya et al. 1994, van Wyk & Gericke 2000, Raemaekers 2001



Kikapu made from sisal fibre

Albizia gummifera

(Fabaceae)

Common names Mkenge (Swahili).

Description A large deciduous tree up to 30 m high. Bark grey and smooth. Up to 16 pairs of leaflets, 1 – 2 cm long, shiny, dark green, almost rectangular with a diagonal midrib and one outer corner rounded. Flowers white with long protruding red stamens. Bundles of flat, shiny brown pods are produced, having raised edges, 20 cm long and 3 cm wide. The tree is fast growing.



Ecology Grows in East and Central Africa and in Madagascar. In Tanzania the tree is found from the coastal hills to Kilimanjaro and Kagera at altitudes between 600 and 2,350 m. It is often associated with high altitude forests.

Propagation Can be grown from seed, in seedbeds or by direct sowing, or by using wild seedlings. Seed normally has a germination rate of 70 – 80% within 3 – 10 days. Fruits should be collected while on the tree to minimize insect damage. Older seed should be soaked in warm water which is then left to cool. Alternatively the seed coat can be nicked to hasten germination. Seed can be stored for up to one year.

Management The tree can be lopped or coppiced when young.

Uses In Umalila the flowers are reported to be visited by bees in October. In Ethiopia *A. gummifera* var. *gummifera* produces large quantities of pollen and nectar and is very attractive to bees. The tree produces a strong timber that is light, soft and straight grained and easy to work. It has a golden finish. It is used as a substitute for oak, making mortars, water troughs and beehives. It has good elastic and tensile properties and glues and lacquers well. It is used for making beds in Malawi. The timber is used for firewood and charcoal. The pods, roots, bark have medicinal uses. The leaves can be fed to livestock. The tree has value for soil conservation, nitrogen fixing and shade. Leaves can be put in between bunches of bananas to ripen them. The bark exudes a clear insoluble gum.

References FTEA 1959, Wild et al. 1972, Williamson 1975, NAS 1979, Coates Palgrave 1983, Fichtl & Adi 1994, Mbuya et al. 1994, Dharani 2002, Lovett et al 2006

Albizia schimperiana

(Fabaceae)



Common names Intanga (Maliia), long podded Albizia

Description A semi-deciduous tree growing to 30 m, having an umbrella shaped crown. Bark smooth, pale grey to brown, the small branches having velvety-brown hair. Leaves are compound with 2 – 7 pinnae on stalks about 25 cm long. Leaflets are less than 2 cm long, usually hairy, shiny above, paler below with a diagonal midrib and rounded tips. Flowers white or cream in loose, conspicuous heads, the flower stems being hairy. The numerous, dull brown seed-pods persist for a long time and are 18 - 34 cm long x 2.8 - 5 cm wide. They have thick edges and contain up to 5 seeds.

Ecology Grows well in cool mountain areas up to 2,000 m. Also present near water and in lowland areas in eastern, central and tropical Africa.

Propagation Best grown from seed rather than wild seedlings. The seed should be collected from the fruits as soon as they mature to prevent insect damage. Soak in hot water unless seed is fresh. Seed can be stored for up to 2 years if kept cool and dry.

Management Seedlings should not be kept in the nursery for too long. Plant out under the shade of other trees. The tree can be grown along contours with grass for soil conservation. It is a fast growing species.

Uses The yellowish-brown, fairly hard timber is used for building and furniture, hoe handles, grain mortars, honey barrels, charcoal making and firewood. The tree fixes nitrogen and is useful for soil conservation. It is sometimes grown as a shade for coffee. Bees collect nectar and pollen throughout the day, though the flavour of the honey produced may not be liked by some people. The bark is used traditionally as a cough remedy.



Photo : Najma Dharani

References Fichtl & Adi 1994, Mbuya et al. 1994, Msanga 1998, Lovett et al. 2006

Allium cepa

(Alliaceae)

Synonym *A. ascalonicum*

Common names Ishitunguru (Malila), kitunguu (Swahili), onion, bulb onion, shallot



Description Both the common onion, producing a single bulb and grown from seed, and shallots, producing a cluster of smaller bulbs grown from a single mother bulb are grown. Bulbs are variable in shape, size and colour and are covered with a thin papery skin.

Left : *Common onion*

Ecology Onions are usually planted in May in Umalila. They tolerate a wide range of soils. Loose sandy soils with a high level of organic matter produce good crops. High temperatures encourage bulb development. Yields are likely to be reduced during heavy rainfall, due to

the greater risk of disease. A dry period is required for ripening the bulbs. Shallots are grown on a small scale and are best planted so that they ripen in the dry season.

Propagation Onions are planted from seed and then transplanted. Shallots are planted by dividing the clumps of mature shallot bulbs, which have completed their dormant period by being stored for at least 6 weeks after harvesting. The clusters are separated and individual bulbs planted, two-thirds below the surface, in prepared beds with a well-firmed surface. Spacing is usually 25 - 30 cm apart and 12 - 15 cm between bulbs. Bulbs are usually planted towards the end of the rain season.



Right : *Shallots*

Management Shallot bulbs, which are formed in clusters of 4 - 8, can normally be harvested 60 - 100 days from planting, by which time the leaves will have become yellow.

Uses Shallot leaves are used for flavouring, the bulbs are eaten raw or cooked; sometimes they are picked and dried or preserved. It is generally considered that shallots have a stronger flavour than bulb onions. Onion and garlic extracts are known to have antibacterial properties.

References Pursglove 1972, Tindall 1983, Messiaen & Rouamba 2004

Allium sativum

(Alliaceae)

Common names Kitungu sumu (Swahili), garlic

Description An erect herb, 30 – 60 cm tall, with a shallow root system. The bulbs are composed of a disc-like stem, thin dry scales, which are the bases of foliage leaves, and smaller bulbs or cloves formed from buds of the younger foliage leaves.



Ecology Garlic is grown at high altitudes in East and southern Africa. In Umalila the crop is sometimes planted with onions. The plant requires a fertile, well-drained sand or silt loam soil, preferably with good moisture retaining properties. Yield depends on the amount of growth before bulb development takes place. Bulbs form during longer days at higher temperatures though lower temperatures afterwards help the bulbs to mature. Altitudes between 500 - 2,000 m provide good growing conditions. Bolting does not seem to be influenced by temperature. High humidity and rainfall are bad for both vegetative growth and bulb formation.

Propagation Plant cloves at 30 x 15 cm spacing at a depth of 5 -7 cm, timed so that the plants mature in the cool dry season. When the tops die down lift the bulbs and hang in bundles in a dry well aired place. Keep good bulbs for planting the next season.

Management The crop must be kept clean weeded. Garlic responds well to organic manure. Bulbs mature 4 - 6 months after planting, when the tops begin to dry and bend over. Bulbs should be dried for a week or so in the field or under shade. Cured bulbs can be stored for

several weeks.

Uses The cloves are used to flavour meat, fish, sauces and salads either cooked or eaten raw. Garlic contains a chemical with anti-bacterial properties and is also used to lower cholesterol and to treat colds, but can react with some other medicines. The juice can be used to repair glass and china. Garlic extract has been shown to be effective in killing root knot nematodes. It is also used to repel birds and to control a variety of insect pests. Soak 100 g finely grated garlic for 24 hours in 2 teaspoons of engine oil. Dissolve 10 gm soap in 500 ml water, mix with the garlic and mineral oil, stir well together and filter through a fine cloth. Dilute this solution with 20 parts water for spraying on crops. Alternatively soak 3 finely ground garlic bulbs for 2 days in liquid paraffin and then stir well with a large spoonful of soap flakes and 10 litres water. Use the mixture straight away to protect crops.



Remarks Some varieties will not produce bulbs under tropical conditions.

References Hadfield 1960, Jones & Mann 1963, Tindall 1968, Uphof, 1968, Purselove 1972, Tindall 1983, Stoll 2000, Messiaen & Rouamba 2004, van Wyk & Wink 2004

Amaranthus cruentus

(Amaranthaceae)

Common names Inzembwa (Malila), mchicha (Swahili), amaranth, African spinach, Indian spinach

Description An annual herb up to 2 m tall. The leaves are twice or three times as long as wide and often have pointed tips. This species is known to be highly resistant to root-knot eelworms.



Ecology Cultivated throughout the tropics and subtropics. Growth rate is best at high temperatures, in bright light and with adequate water and minerals. Daily watering is required as shortage of water causes early flowering, reduces yield and produces a poor quality crop. Amaranths perform better than *Celosia* species in open areas, the latter preferring some shade. The crop responds well to organic manure, which tends to encourage leaf production and delay flowering.

Propagation By seed, but germination is irregular. Planting can be done at any time and the seedlings can be either left in the planting bed and harvested whole or transplanted 20 x 20 cm apart once they are 5 - 8 cm high. The side shoots are then harvested as required. Tender plants need some protection from heavy rain.

Management The plant is either uprooted whole or cut back at a height of 10 - 15 cm to produce side shoots. Cutting low down retards bolting but at least two leaves and buds should be left on the plant. Yields of 30 to 40 tons/ha may be obtained. Wet rot or stem rot is a major problem, favoured by wet conditions and poor soil fertility. Avoid planting too densely. Caterpillars, in particular, but also grasshoppers and stem borer larvae, can be troublesome.

Uses A minor vegetable crop in Umalila, though important at lower altitudes. The green leaves have an average protein content of 4.6 g per 100 g edible portion. The shoots can be picked regularly and make a good spinach. The plant is an important source of vitamins A and C, calcium and iron and also of lysine, an essential amino-acid. Protein concentration is highest before flowering. No more than 200 g of leaves should be eaten per day to avoid oxalate poisoning.

References Martin et al 1998, Schippers 2002, Grubben 2004

Amphicarpaea africana

(Fabaceae)



Synonym *Shuteria africana*

Common names Izanji

Description A perennial climbing herb which may grow from 60 cm to 3.6 m long. The stems are slender and covered with reddish hairs. The leaves are composed of three leaflets, 1.8 - 7 cm long and 1 - 5 cm wide. The leaf stalk is 1.3 - 10.5 cm long. The plant produces a mass of attractive purple flowers at the end of the rains. The seed pod may be from 2.6 to 3.5 cm long and contains a few red brown or purple seeds.

Ecology Grows in upland rain forest, at the forest edges, in bamboo forest and in grassland where there was forest beforehand. Altitude range 1,680 - 2,700 m. The plant is also present in Kenya, Uganda, eastern D.R. Congo, Burundi, Sudan, Ethiopia, Malawi and Zambia.

Uses Bees are reported to visit the flowers.

References FTEA 1974, Blundell 1987, FZ 2000, Burrows & Willis 2005

Pounding wheat at a home in Maendeleo village



Annona cherimola

(Annonaceae)

Common names Inono (Malila), matope tope, mtomoko (Swahili), cherimoya, cherimoyer

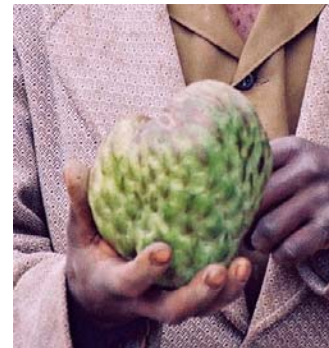


Description A small semi-deciduous tree growing 3 - 10 m high. It is vigorous when young, branching from the base. New buds cannot sprout until the old leaves are shed. Leaves are 10 - 20 cm long, light green and arranged alternately. The under-surface of the leaf has a covering of brown velvety hairs. Flowers are usually solitary and hang down on short hairy stalks. The three outside petals are pale yellow with a purple spot at the base and there are also 3 inner red-purple petals. Flowers are fragrant. Pollination is

normally carried out by beetles, but hand pollination can improve fruit setting. The heart-shaped fruits are from 8 - 15 cm in diameter and the flesh is creamy-white and granular.

Ecology Probably from the highlands of Peru and Ecuador. It requires a mild, dry, sub tropical climate and is killed by excessive heat or frost. It grows well in the southern highlands of Tanzania. It can be grown in a wide range of soil types but prefers sandy soils and clay loam. Rainfall and high humidity are needed during flowering for good fruit production. The tree is susceptible to wind damage.

Propagation The best plants are obtained from budding, or preferably grafting at the start of the growing season. Side-whip grafts or cleft-grafts are the best methods to use. Branches should be defoliated 1 to 2 weeks before scion wood is cut to stimulate bud swelling. T budding and chip budding methods are successful but there are considerable graft incompatibilities among *Annona* species. Rootstocks are grown from seed, which retains its viability for several years if kept dry. Seeds are generally sown in a seed bed and germinate after about 4 weeks. The young plants are transplanted to a nursery when one year old. They should be planted out at 45 cm in the row and 1 m between rows.



Management Cherimoyas are easy to transplant even when 6 - 8 years old but this should be done at the start of the rain season. Normally planting out is done when the plants are 30 - 46 cm high with the union of grafted or budded trees being 15 cm above ground level. Standard planting distance for cherimoya is 5 x 6 m. Best results are obtained if the tree is pruned to form a single stem to about 90 cm. It should then be cut back to produce lateral branches. These should be spaced 15 - 25 cm above each other and be allowed to grow in different directions. After about 2 m they can be left to grow naturally. Pruning is done during the dormant period. Low branches and those that cross should be removed to allow light into the centre of the tree. Little pruning is required to obtain a good crown.

Uses Cherimoya is eaten fresh and considered to be the best of the *Annona* fruits. The fruit contains about 18% sugar and is a good source of vitamin C. The green fruit and seed are used to make up an insecticide and can also be used to control parasitic worms.

References Purseglove 1968, Garner et al. 1988, Mbuya et al.1994, Nakasone & Paull 1998

Aphloia theiformis

(Flacourtiaceae)

Synonym *A. mauritiana*, *A. myrtifolia*

Common names Ipatatiho (Malila), albino berry



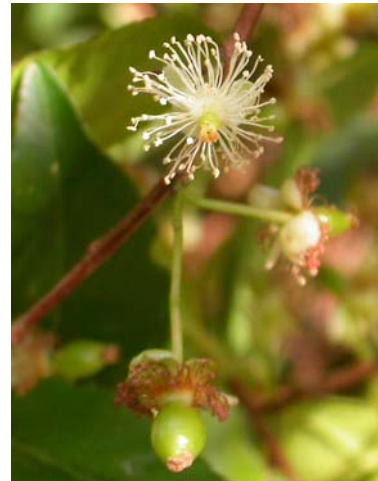
Description A shrub or tree up to 20 m high. Twigs may appear faintly zigzagging. Bark brown, smooth. Leaves are alternate, simple, 3 – 8 cm long and 1.2 – 2.8 cm wide, inclined to droop, glossy and dark-green above. Flowers are white, sweet scented, 10 mm in diameter, and appear in groups of 1 to 3 in the leaf axils. They turn cream then yellow on ageing, and have a conspicuous central mass of yellow stamens. The fruits are white, soft and fleshy and about 0.5 cm in diameter when mature.

Ecology Found in medium to high altitude evergreen forests, forested ravines and at forest

margins. Altitude range 1,250 – 2,450 m. The shrub is also present in Kenya, Malawi, Zambia, Zimbabwe, South Africa, Madagascar and on the Mascarene islands of the Indian Ocean

Uses In Umalila the wood is used to make pestles for pounding maize when preparing ugali (maize porridge). The shrub produces a white edible fruit. Leaves are used as a tea substitute in the Mascarene Islands. A root decoction is drunk by the Hehe people in Tanzania to treat intestinal worms. In Madagascar a tea made from the leaves is used to treat malaria, fever, blood in the urine and to promote urination.

References Uphof 1968, Kokwaro 1976, Coates Palgrave 1983, Mabberley 1997, Neuwinger 2000, White et al. 2001, Burrows & Willis 2005, Lovett et al. 2006



Argemone mexicana

(Papaveraceae)

Common names Mexican poppy, prickly poppy

Description A spiny annual herb, which grows up to 1 m tall. Leaves are green or bluish and deeply lobed. When cut they produce a yellow juice. The margins are sharply toothed. Flowers are pale yellow and up to 5 cm across. Seed capsules are smooth or bristly and 3 – 4 cm long. They explode when dry. Seeds are round, black, have a pitted surface and contain an oil.



Ecology A weed of waste ground, often found in dry places, on roadsides and abandoned cultivation. The plant was introduced from Mexico. Usually the altitude range is from 1 – 1800 m though the above plant was growing near Ilembu town at 2000 m. The plant is present throughout East Africa.

Uses The flowers are known to be an important bee forage in Australia and tropical America, where the yellow pollen is much sought by bees. However there are reports that the honey produced can cause madness. In Malawi the leaves are eaten as a vegetable after being cooked with potashes to soften them. Pounded groundnuts are added. The leaves tend to be bitter if collected from plants growing in dry places. The seed oil can be used for illumination and in Nigeria is applied to preserve timber from termite attack.

Remarks The seeds are known to be poisonous and are sometimes found in badly cleaned wheat or with mustard seed, which it resembles, and which it often grows with in India. Eating them can cause dropsy and cancer of the pharynx and stomach.

References Watt & Breyer-Brandwijk 1962, Morton 1964, Williamson 1975, Kokwaro 1976, Blundell 1987, Burkill 1997, Llamas 2003

Azadirachta indica

(Meliaceae)

Common names Mwarubaini, mkilifi (Swahili), neem



Azadirachta indica growing at an altitude of 2,000 m in Umalila

Description A small to medium sized, deep rooted, evergreen tree up to 15 m tall. The red heart-wood is hard and durable. Leaves are alternate and crowded towards the end of the branches. Fruits, 1 – 2 cm long, ripen from yellow to purple.

Ecology Native to India but grown widely in the tropics. The tree is drought tolerant and grows well on most soils, including dry, stony, clay and shallow soils. However it will not grow in waterlogged soils. It is deep rooted and can extract moisture and nutrients from poor sandy soils.

Propagation Fresh seed (no more than 2 - 3 weeks after harvesting) is planted in a nursery or can be planted direct with crops. Seeds usually germinate well after about one week. No seed treatment is necessary. The tree can also be grown from root or shoot cuttings. It requires careful weeding until established. Light shade assists early growth.

Management The tree coppices freely and young shoots grow fast.

Right : Fruits from the same tree



Uses In Umalila the leaves are used to treat fever, stomach ulcers and malaria. The tree is a fast growing source of good firewood, which can be cut in an 8 year cycle. The wood resists decay and termite damage and is used for house construction and for making furniture. Neem poles are straight and strong. The seeds contain up to 40% of an oil that can be used in lamps. The seeds and leaves contain Azadirachtan, which is effective against a large range of insect pests. They also contain chemicals that repel insects. The fruits must be harvested when yellow, not greenish-yellow or brownish-yellow and should not come into contact with soil to avoid the risk of developing aflatoxins. These reduce the pest control effectiveness and can be harmful to humans. The fruit pulp should be first removed and the seed dried in the sun for one day followed by 3 days in the shade, being stirred regularly so that complete drying takes place. Store in well aerated bags. Seeds between 3 and 10 months old have the highest amount of Azadirachtan. To make up a spray pound the seeds gently and add 50 g to 1 litre of water and allow to stand overnight. Filter and add 1 ml liquid soap to the solution. Leaves can also be used at the rate of 1 kg leaves to 5 litres water. Chop and soak the leaves overnight. Add 1 ml liquid soap to 1 litre solution. In India the flowers are an important source of a light golden honey.

References NAS 1980, Crane et al. 1984, Mbuya et al. 1994, ICRAF 1998, Kihwele et al. 2001, Pousset 2004

Bambusa vulgaris

(Poaceae)



Common names Ilansi (Malila), bamboo

Description A bamboo of medium size with quick growing stems to 10 m high. The stems are very strong.

Ecology Originally from Java but now found and also widely cultivated throughout tropical Africa.

Propagation Divide the clumps, plant out rhizomes or take cuttings from the stems.

Management Bamboo can be cut in a 3 year cycle.

Uses Stems are widely used for construction purposes - houses, huts, bridges and fences. They are also used as irrigation pipes. Split poles can be used for baskets and fences (see below), roofing tiles, and planting tubes for tree seedlings. Stem sheaths are used as covers for beehives. They last longer than banana stem sheaths. Goats browse the leaves. The plant is especially useful for

erosion control e.g. around water sources. The young shoots are edible.

Split bamboo made into a basket called Ishitundu

Remarks Bamboo is very susceptible to borer attack. Soaking the stems in water for 2 - 3 months helps to protect them.

References Purseglove 1972, Burkill 1994



Below : *Bamboo used to make a fence.*



Basella alba

(Basellaceae)

Synonym *B. rubra*, *B. cordifolia*

Common names Nderema (Swahili), vine, Indian or Ceylon spinach.



Basella alba growing over a fence in Ilembu village

Description A soft, twining perennial plant up to 4 m long. Stems are fleshy, green, often tinged brownish-purple. Leaves heart shaped with pointed tip, soft, shiny, dark green, blade up to 10 cm long or more. Flowers are small, fleshy, cream or white and borne on an erect stalk.

Ecology Found in forested areas in Umalila, particularly where partial clearing has taken place. Common in disturbed areas, from 0 – 2,450 m. Often grows in hedges in villages and around homes in Umalila.

Propagation Can be grown from 20 cm long stem cuttings. Alternatively plant the whole fruit in a nursery and then transplant seedlings when 10 – 12 cm high.

Uses Though the leaves are not traditionally used as a vegetable in Umalila they are widely eaten elsewhere. They are sometimes fed to cattle. The plant is used to relieve constipation in animals and humans.



References Tindall 1983, Maundu et al. 1999, Abukutsa-Onyango 2004

Begonia sutherlandii

(Begoniaceae)

Common names Iwozya



Begonia sutherlandii growing on a tree in Ilomba forest.

Description A tuberous perennial herb with fleshy pink stems from 10 to 80 cm long. Leaves are commonly dark green and veined with red and covered with short hairs on the underside. They are asymmetrical in shape and the margin is toothed. Flowers are 2 to 2.6 cm in diameter usually orange or orange-red with yellow anthers.

Ecology The plant is common throughout the Southern Highlands and often found hanging over rocks in damp shady situations or on trees. Also present in D. R. Congo and in South Africa.

Propagation Can be grown easily from cuttings or leaves laid on the soil, or can be grown from seed.



Uses The red stems and the leaves are eaten in Umalila. An infusion of the leaf and stem of the plant is used medicinally by Zulu people in South Africa to treat heartburn and vomiting of blood.

Remarks The leaves of another species, *B. macrocarpa* are eaten in D.R. Congo and Angola.

References Jex-Blake 1957, Watt & Breyer-Brandwijk 1962, Cribb & Leedal 1982, Neuwinger 2000, Lemmens 2004, Burrows & Willis 2005

Berkheya echinacea subsp. polyacantha

(Asteraceae)

Common names Kakato



Description A perennial herb with an erect stem, 60 to 100 cm tall. The plant is covered with soft bristle-like hairs. Lower leaves are up to 13 cm long and 3 cm broad but the upper leaves are smaller. Flower heads are yellow, 5 – 6.5 cm across surrounded by soft hairy bracts about 2 cm long. Flowers are produced in October/November. This sub species differs from the South African species being larger in size and having longer and broader leaves.

Ecology The plant is widespread above 1,600 m in the Southern Highlands and western Tanzania, and also present in Malawi and Zambia. It can be cultivated as an ornamental but

requires full sun and fertile soil.

Propagation Plants can be divided or grown from seed.

Uses Bees are known to collect pollen and nectar from other species, *B. purpurea* in South Africa and *B. spekeana* in Ethiopia. Other species are used medicinally in Africa.

References Kokwaro 1976, Cribb & Leedal 1982, Brickell 1994, Fichtl & Adi 1994, Neuwinger 2000, van der Walt 2005



Bersama abyssinica subsp. abyssinica

(Melianthaceae)



Flowers produced in October at Sheyo

Common names Iswago (Malila), winged bersama.

Description A shrub or medium sized tree up to 20 m high with a straight trunk. The compound leaves are borne at the end of the branches and have 6 – 10 pairs of leaflets, 5 – 13 cm long, and one terminal leaflet. The leaf stalk is winged. Flower heads may be up to 35 cm long and the flowers are scented. Fruit is a capsule with 4 to 5 lobes and a diameter of 2.5 cm.

Ecology Occurs along banks in wooded river valleys, at the edges of evergreen forest and

also in open woodlands. In Tanzania the tree is common in highland forest margins in the Mbeya region. A high altitude tree growing between 2,000 and 2,400 m. *Bersama abyssinica* is widespread over much of Africa though the subspecies does not occur south of Malawi.

Propagation Seeds, root suckers, cuttings and wild seedlings can be used. Seed germination may take from 5 - 10 weeks. The fruit should be collected from the tree and ripened in the shade for 2 to 3 days. Seeds are then removed from the fruit by hand. They remain viable for one month after collection. The seed coat must be removed before sowing.

Management A fast growing tree which can be coppiced, lopped or pollarded. It can be planted around crop fields.



Branch with fruit in June

Uses Wood is soft and not durable and is used mainly for firewood, though it is sometimes used for carving and making utensils (stools, water-pots and beehives) and for medicine. The leaves are crushed and used as a snuff for colds. The roots and bark are used as a purgative and, in stronger doses, against intestinal worms. A decoction of the stem bark is used to treat cancer and rheumatism in Tanzania. The leaves and shoots are pounded together and used to control stalk-borer attack in maize. The roots also have insecticidal properties. Seeds can be used as a substitute for soap. The tree is an important bee forage plant in Umalila and makes a good shade tree.



Remarks The tree should be used as a medicine with great care as most parts are known to be poisonous. Leaves are also poisonous to livestock.

References Kokwaro 1976, Coates Palgrave 1983, Fichtl & Adi 1994, Mbuya et al. 1994, Burkill 1997, Msanga 1998,

Neuwing 2000, Dharani 2002, Lovett et al. 2006

Bidens magnifolia

(Asteraceae)

Synonyms *B. dolosa*, *B. phelloptera*, *B. lynesii*, *Coreopsis frondosa*

Common names Indelengu

Description A perennial herb or shrub, from 60 cm to 3 m high. The plant produces many branches. Leaves are deeply divided, 6 – 20 cm long and 5 – 16 cm wide, with saw toothed edges. Flower stalks 2 – 20 cm long. The seeds are dark brown.



Bidens magnifolia in flower in July

Ecology Found in secondary vegetation after removal of the forest and along forest margins. The plant is only known in Tanzania.

Uses Bees were seen collecting nectar and pollen at midday. The plant is used to attract rats to a trap in Umalila. The leaves are reported to be edible. The roots are used medicinally to treat pneumonia and coughs. The plant fibres are used for string.

References Kokwaro 1976, Cribb & Leedal 1982, Peters et al. 1992, FTEA 2005

Bidens pilosa

(Asteraceae)



Black jack flowers over long periods in Umalila.

poor, exhausted soils from 400 – 2,400 m altitude. A native of South America but now spread throughout Africa.

Uses Bees collect nectar from the flowers. Honey from the plant is pleasantly flavoured and granulates slowly. *B. magnifolia* (Indelengu), *B. pinnatipartita* (Intengu), *B. schimperi* (Lizumba) and *B. stephia* (Mputira) are also visited by bees in Umalila. The leaves of *B. pilosa* are sometimes eaten as a vegetable and in soups. They have a bitter taste, but the young shoots, 2.5 - 5.0 cm long, are a favourite dish throughout southern Africa, eaten fresh or dried and stored for later use. The plant is readily browsed by all domestic stock including poultry and has a high nutritive value. In Umalila the leaves are sometimes used as a tea substitute. They are reported to relieve excessive wind in the stomach. Plant extracts have shown anti-bacterial activity. The leaves are used to treat stomach-ache and intestinal worms in Tanzania. The roots are used to treat constipation and malaria.

References Watt & Breyer-Brandwijk 1962, Goode 1974, Kokwaro 1976, Crane et al. 1984, Burkill 1985, Peters et al. 1992, Blundell 1987, Fichtl & Adi 1994, Ruffo et al. 2002

Common names

Imbunya, masakari, ikapunika (Malila), black jack

Description An erect annual herb up to 1.5 m high, with lower leaves usually made up of 3 leaflets, each 8.5 cm long. The flowers, 1.5 cm across, are composed of yellow disc florets in the centre and white outer florets. The black fruits are tipped with barbed bristles which catch on clothing and animal fur.

Ecology A serious weed common in disturbed and cultivated land. It nearly always grows on



Bidens schimperi

(Asteraceae)

Common names Lizumba

Description An erect or straggling, branched herb growing 50 - 120 cm high. The stems are angled and often reddish. Leaves are broadly ovate, deeply lobed, up to 22 cm long and 1.5 – 10 cm wide, and borne on a hairy stalk. The large flowers are 3 - 5 cm in diameter, and produced at the end of the stems. The brownish-yellow central disc is surrounded by bright yellow ray florets. The plant flowers from March to August in Umalila.

Ecology A common weed in cultivated land and also found on roadsides and in open woodland. Widespread in Tanzania, and found from Ethiopia and Somalia south to Mozambique, Angola and South Africa.

Uses Bees are reported to visit the flowers for pollen and nectar. Leaves are eaten as a vegetable, after chopping and cooking, either alone or with peas, pumpkins or *Solanum nigrum*. Coconut milk, groundnut paste, tomatoes or onions are sometimes added for palatability. In Malawi leaves and young shoots are reported to be very bitter and not much liked. They are only eaten when there is little else. The roots are used medicinally to treat coughs and colds elsewhere in Tanzania. A root decoction is drunk for chest pains and a leaf extract is used as an enema for digestive problems in children.

References Wild et al. 1967, Williamson 1975, Kokwaro 1976, Cribb & Leedal 1982, Neuwinger 2000, Ruffo et al. 2002, Burrows & Willis 2005



Matambo Salima with his family at Izumbwe. The house is roofed with split bamboo poles.

Bidens steppia

(Asteraceae)

Common names Mputira.



Bidens steppia in a maize field near Ilembo

Description An annual herb from 0.7 to 2 m high. Leaves are much divided, up to 35 cm long and 26 cm wide. The yellow to orange flowers are borne either singly or in open groups. Fruits are smooth or with very few hairs and two bristles, not hooked. The plant has a very long flowering period, from March to October. However, as fields in Umalila are normally cultivated in June and July, the actual flowering season may be restricted.



Ecology A common weed of cultivation, especially in maize below 2,000 m in Umalila. It is also commonly found in grassland, on roadsides and at forest edges. It is also present in flood plain vegetation, bush/grassland and open woodland. Present from Cameroon south to Angola and east to Malawi, Mozambique and Zimbabwe.

Uses An important bee forage in Umalila. It is thought to be the main source for the June honey flow. Bees collect pollen and nectar in the early morning and evening.

References Moriarty 1975, FAO 1988, Burrows & Willis 2005

Blepharis grandis

(Acanthaceae)

Common names

Description An erect perennial herb up to 1 m tall. The leaves and bracts are spiny. Flowers are bright blue, set in clusters among prickly bracts. The seed hairs swell up when wet.



Ecology Grows on rocky ground in scattered clumps. The plant is widespread in south western Tanzania and is also present in Malawi where it is found in tall grassland or in forest margins. Also found in north eastern Zambia, Malawi and northern Mozambique.

Remarks There are approximately 80 species of *Blepharis* in the Old World tropics, South Africa and the Mediterranean. Seeds of some species are eaten in Africa. Some species are used for treatment of anthrax. Several species have medicinal uses and a number are

visited by bees.

References Mabberley 1997, Hepburn & Radloff 1998, Neuwinger 2000, Burrows & Willis 2005

Preparing land for planting maize. The soils are mostly deep volcanic and easy to work but very dusty.



Bothriocline longipes

(Asteraceae)



Synonym *B. eupatorioides*

Common names Insongole

Description An erect shrub with stems 1 to 2.5 m high growing from a woody rootstock. Leaves are spear shaped, opposite, 4 – 20 cm long and 1.5 – 9 cm wide, with a petiole up to 4 cm long. The violet coloured flower heads are about 6 mm across.

Left : A butterfly (*Precis octavia*) collecting nectar from a flower head near Ilembo.

Ecology Commonly found on forest edges in Umalila. Also present in highland grassland, usually on rocky outcrops, and in long grass in high rainfall wooded grassland. Often present beside rivers at lower altitudes. The plant grows in

similar sites over much of Kenya at altitudes between 1,300 and 2,440 m and in Sudan, Malawi, Rwanda and Burundi, and into D.R. Congo and Angola.

Uses Bees collect nectar from the flowers. Honeybees collect abundant nectar and pollen from a related species *B. schimperi* in Ethiopia where it is an important bee plant. Locally the leaves are used to clean out pots which have been used for milk. Elsewhere the plant has a number of medicinal uses.



References Blundell 1987, Fichtl & Adi 1994, Neuwinger 2000, White et al. 2001, Burrows & Willis 2005

Brassica carinata

(Brassicaceae)

Synonym *B. integrifolia* var. *carinata*

Common names Igagara (Malila), figile (Swahili), Ethiopian kale, Ethiopian mustard, Abyssinian mustard.



Description An annual herb growing to 50 cm high but plants may reach 120 cm. Leaves are blue-green in colour and have no hairs. Pale yellow flowers are produced as soon as the soil dries out. Seed pods are flat when pods are quite dry. In warm climates seed is readily produced.

Ecology Commonly cultivated in East Africa between altitudes of 1,500 and 2,600 m. Also present in Malawi, Zambia, Zimbabwe and in West Africa but nowhere common. It appears as a weed of cultivation particularly on fertile sites such as abandoned cattle enclosures. It grows best when annual rainfall is between 600 and 1,600 mm.

Propagation Grown from seed which is often mixed with ash to reduce insect damage to emerging seedlings. Seed germinates after about 5 days and seedlings are planted out at 75 x 50 cm (large leaved variety) or 50 by 35 cm (small leaved variety). It is sometimes planted together with *Cleome gynandra*. If manure is available it should be used for this crop.

Management The vegetable is normally grown in kitchen gardens to minimize bird damage. It is much hardier and less prone to disease than *B. juncea*. Plants are often cut back when they

reach 15 cm to encourage the production of larger leaves. Flowering can be delayed by picking the leaves regularly. Leaves should not be eaten for more than a few weeks per year, because of the risk of goitre, but they also have anti-carcinogenic properties and are therefore of value medicinally.

Uses Bees were frequently seen collecting both pollen and nectar from the flowers. Leaves and young shoots are often used as a vegetable in Umalila. Leaves are soft textured and have a mustard-like taste. Sometimes the leaves are mixed with those of *Cleome gynandra* which are then boiled and dried. The cooked vegetable has a sharp odour but is not bitter. The plant is also grown as a fodder for livestock. In Ethiopia the seeds are crushed and the oil is used for cooking or oiling earthenware baking plates. The seeds are also eaten with meat in Ethiopia and contain 30 - 40% oil. The water from boiling the leaves is used to treat diarrhoea.



Bee collecting pollen and nectar

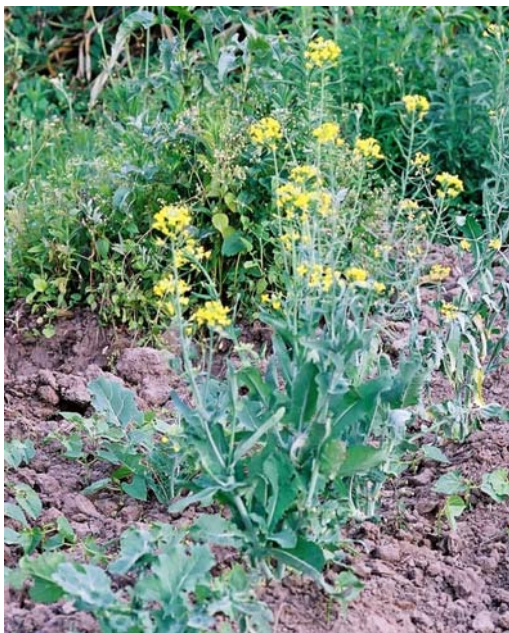
Remarks *B. carinata* is a hybrid formed from crossing *B. nigra* with *B. oleracea*.

References Oomen & Grubben 1978, FTEA 1982, Maundu et al. 1999, Mnaza & Schippers 2004

Brassica oleracea

(Brassicaceae)

Common names Ilepu (Malila), sukuma wiki (Swahili), leaf cabbage, kale,



Description A branching cabbage growing up to 3 m high. Leaves are large 50 x 30 cm and borne on long stalks. They are fleshy and more or less coated with wax. The flower heads may be up to 100 cm long. Bees are the main pollinators.

Ecology Plants require a well drained and manured soil, preferably a sandy loam. They grow best in full sunlight with adequate moisture. Planting is mainly done in March and April though, if water is available, is continued into June. For seed production a cool resting period is required so it is more suited to higher altitudes.

Propagation Normally grown from seed or stem cuttings. Seed cannot be stored for long. 2 - 2.5 kg of seed is required per ha, though if plants are grown in a nursery for transplanting, only 300 – 500 gm is needed. Soak the seeds overnight before planting for best results. Transplant when plants are 7 - 10 cm high, 4 – 6 weeks after sowing. Plant out at 20 – 30 cm between plants with rows spaced 50 – 80 cm apart. Seedlings may be attacked by click beetles, which eat small

holes in the leaves.

Management Harvest tender side shoots before they become too large.

Uses A popular and high yielding green leaf vegetable. Leaves are important nutritionally containing some protein and are a valuable source of several vitamins. Seed extracts have given positive antibiotic tests but these differ with the variety grown. An oil is present in the seeds which has antibacterial and antifungal properties. Flowers secrete nectar freely and are very attractive to pollinating insects, especially bees.

Remarks Plants are generally more resistant to pests and diseases than the headed variety. Club root can however be a major problem. To avoid this plant the crop on ground not planted with *Brassica* species before or apply slaked lime at 170 gm /sq. m. Pest control can sometimes be achieved by using crushed neem tree seed (see *Azadirachta indica*) in water to spray on plants. Alternatively grinding up the pests and spraying them on individual plants has been reported as being effective in keeping pests away!



References Watt & Breyer-Brandwijk 1962, Terra 1966, Purseglove 1968, Williamson 1975, Crane & Walker 1984, Burkill 1985, Macmillan 1991, Martin et al 1998, Schippers 2002, Mvere & van der Werff 2004

Bridelia micrantha

(Euphorbiaceae)

Common names Iliyisia (Kimalila), mwisya (Nyakyusa), mkarati, mtutu (Swahili).



Description A fast growing tree up to 18 m high with a dense spreading crown. The trunk and branches usually bear spines. Leaves are shiny above, elliptic to oblong, simple, alternate, 6 - 15 cm long and 3 - 8 cm wide and have clear veins extending to the leaf edge. The small white to yellow flowers are borne in tight clusters in the leaf axils. Fruit is a green berry, up to 1 cm long, which turns black on ripening.

Ecology Found at the edges of lowland, mountain and riverine forest where it often grows as a pioneer. Present throughout tropical and southern Africa.

Propagation The tree is easily grown from seed or can be grown from cuttings. Pick the ripe fruits when they turn purple or collect them from the ground. Squash and remove the seed. Rinse the seed carefully in water to remove all the flesh and dry for 2 days in the shade. The fruit pulp contains a growth inhibitor so must be removed from the seed. Germination is even and good, reaching 90 -100% after 30 days. Seed must be fresh. Sow the seeds in a river sand compost mix (2:1). Keep moist. Transplant at the 2 leaf stage. Seedlings and young plants transplant easily.

Management The tree is fast growing

and can be coppiced or pollarded. It can also be grown as a hedge or boundary plant

Uses In Umalila the trunk is used for making beehives and the flowers are reported to be visited by bees in March. The wood is greyish to yellowish - white with a dark brown heart, hard, heavy and termite proof. When worked it takes a good polish and large timbers are good for indoor carpentry and furniture. The wood is very durable in contact with the ground and in water. It is resistant to termites and used for hut and fence posts. It makes good firewood and charcoal, giving out an intense heat. The roots are extensive and are useful for binding soil along drainage ditches etc.

The tree is useful as a shade tree and can be planted in seasonally wet areas but should not be planted near buildings as the roots may disturb them.

The fruit is edible and tastes slightly like currants. The leaves can be used as a livestock fodder.

In Tanzania the bark is boiled and drunk to cure stomach-ache and to expel tapeworms. The bark can also be cooked with soup and mixed with milk



and given to children as a tonic. In South Africa the root is used as a purgative and an infusion from the root is taken orally for coughs. The powdered bark is applied to burns to assist healing. Leaf sap is applied to sore eyes.

In the inner bark and outer sapwood there is a sticky substance which is adhesive. Bark can also be pounded to a paste for filling in door cracks.

The twigs and young leaves give a black dye used to blacken pottery. The pounded bark yields a red dye.

The leaves are eaten by several species of African silk worm, *Anaphe infracta*, *Anaphe panda*, and *Anaphe reticulata*. The pupa of these species are eaten by some people. Planting of this tree has been encouraged for the production of silk worms but since the pupae are eaten first there are too few remaining to use for silk production. An edible fungus grows under the tree.

References Irvine 1961, Busson 1965, Uphof 1968, Wild et al 1972, Williamson 1975, Kokwaro 1976, Coates Palgrave 1983, Ambougou 1991, Burkill 1994, Katende et al. 1995, Venter & Venter 1996, Msanga 1998, SEPASAL 1999, Ruffo et al 2002, Lovett et al. 2006



Bamboo pipes are frequently used for channeling water from streams and rivers to villages for domestic water supply and for irrigating vegetable gardens.



Brillantaisia kirungae

(Acanthaceae)



Synonym *B. cicatricosa*, *B. ulugurica*

Common names Inswina

Description A large shrub or small tree up to 4 m high. Leaves are coarsely toothed. Flowers are pollinated by carpenter bees.

Ecology Grows near streams and in moist undergrowth in mid altitude to mountain forest.

Left : *Brillantaisia kirungae* growing beside a stream near Inyala

Uses Bees were seen collecting nectar in June. Honeybees are known to collect nectar and pollen from a related species, *B. madagascarensis* in Ethiopia. The stems are sometimes used for firewood. In Burundi leafy twigs are pounded and used as a dressing for dislocations. Leaf sap is taken for dizziness. A leaf decoction is drunk to treat fever and colds.

References Baerts & Lehmann 1989, Fichtl & Adi 1994, White et al. 2001



Brugmansia suaveolens

(Solanaceae)



Synonym *Datura gardneri*, *Datura suaveolens*

Common names

Intwitwi (Malila), moonflower, white angel's trumpet

Description A shrub growing to 3 m. Leaves large, soft and hairy, 20 – 25 cm long. Flowers white to peach coloured, funnel shaped, up to 25 cm long, hanging down at an angle, with short lobe spurs and mildly scented. Calyx 3 – 5 toothed, loose fitting, the corolla neck extends beyond the end of the calyx.

Moonflower being grown as a hedge at Ilembu

south-eastern Brazil but commonly grown in Umalila. It will grow up to an altitude of 2,400 m.

Ecology Originally from

Propagation The plant grows easily from large cuttings.

Uses Planted as a hedge. The flowers are produced over a long period after the rains. Bees were seen collecting pollen and nectar. The plant has a number of medicinal uses but is also known to be poisonous.

Right : *A Brugmansia hybrid commonly grown in Umalila*

Remarks There are many hybrids of *Brugmansia* and the botanical names of cultivated plants have not been finalized. Some people report that the honey produced from *Brugmansia* species has a similar effect to that of alcohol. The flowers are known to contain Scopolamine, a hallucinogen.



References Watt & Breyer-Brandwijk 1962, Morton 1964, Llamas 2003

Buddleja davidii

(Buddlejaceae)

Synonym *B. variabilis*

Common names Inswina ipete (Malila), butterfly bush, orange-eye, summer-lilac



Description A vigorous evergreen or semi-deciduous arching shrub growing from 1 to 3 m high. There are many varieties. Leaves are 5 - 7 cm long, spear shaped, and dark green with white felted undersides. Dense clusters of fragrant, tubular, dark violet-purple flowers are produced during the rain season in southern Tanzania.

Ecology Introduced from southern China. The plant grows best in a fertile soil in full sunlight.

Propagation Can be grown from seed or cuttings.

Uses Occasionally grown as a hedge plant.

Buddleja flowering in May in Umalila.

Remarks Plants are often attacked by nematodes.

References Hay 1978, Hessayon 1983, Brickell 1994, Llamas 2003



Near Shilanga in the rain season

Photo : David Watson

Buddleja salviifolia

(Buddlejaceae)

Common names Sagewood



Description A straggling shrub or small evergreen tree with whitish branches up to 4 m tall. Many stems often grow up from the base and the branches tend to droop. Leaves are long and narrow, opposite, olive green above and greyish and hairy below, 4 – 17 cm long and 0.8 – 4.5 cm wide. Flowers are white to lilac, sweet scented and in large clusters at the ends of the branches.

Ecology Occurs at the edges of forest, in scrubland beside rivers, on rocky hillsides and mountain grassland. Altitude range 1,200 – 2,500 m. Found from South Africa to Angola and north to Kenya. It is a common pioneer species.

Propagation Can be grown from hardwood cuttings. The shrub can also be grown from seed. If available use a hormone rooting powder for cuttings and plant in river sand, which should be kept moist. Cuttings strike after 2 – 3 weeks. The plant can be grown in shade or full sun.

Management Hardy and fast growing but rather untidy, though it can be grown as a hedge if kept trimmed. It rejuvenates well after fire.

Uses Flowers are attractive to bees and both pollen and nectar are collected. The plant is popular with beekeepers in South Africa. It is useful for stabilizing soil on embankments and dams. The fresh or dried leaves can be used to make a tea. This is best drunk with



honey and without milk. The heartwood is brown, close grained, compact, hard and heavy. In South Africa a decoction of the roots is used to treat coughs and for the relief of colic. An infusion of the leaves is applied as an eye lotion.

Remarks The shrub is often attacked by insects.

References Wild et al. 1972, Coates Palgrave 1983, Venter & Venter 1996, Mutshinyalo 2001, Burrows & Willis 2005

Caesalpinia decapetala

(Caesalpinaceae)

Common names Inyangwa (Malila), Mysore thorn, Mauritius thorn.



Caesalpinia decapetala being grown as a hedge

Description A thorny shrub or creeper which can grow up to 10 m long. It forms an impenetrable barrier. The branches, leaf stalks and flower heads are armed with thorns. Leaves are compound, up to 50 cm long, having 6 – 10 pairs of pinnae each with about 12 pairs of leaflets. Flower heads are up to 30 cm long with individual flowers having protruding orange stamens. Seed-pods are leathery, about 8 cm long and 1 cm wide, and contain 4 – 9 seeds.

Ecology Commonly grown as

a hedge plant in Umalila. Native to tropical and subtropical Asia, but now present in scattered tree and grassland, clearings in lowland rain forest and in medium to high rainfall areas in Africa. It does not thrive on poor soils. Altitude range 880 – 2,130 m.

Propagation Seeds are sown direct on site. Soak seed in cold water for two days before planting. Germination rate is above 60%. Seed can be stored for long periods if kept dry and insect free by mixing it with wood ash.

Management Fairly fast growing. This plant can become a serious weed. Burning in the dry season can be used to control it.

Uses Commonly grown as a hedge plant in Umalila. Bees collect pollen and nectar. In India the bruised leaves are applied to burns. The plant is used as a purgative in South East Asia. In Burundi and Rwanda the plant is used to treat inflammation of the skin, elephantiasis, snakebite and insanity. Tannin for dyeing is present in the stem and root bark.

Right : *Flowering spike in a hedge surrounding farmland at Sasyaka, Umalila.*



References FTEA 1971, Wild et al. 1972, Williamson 1975, Fichtl & Adi 1994, Mbuya et al 1994, Burkill 1995, Katende et al. 2000, Neuwinger 2000, Ibnu Utomo 2001

Callistemon viminalis

(Myrtaceae)

Common names Bottle brush, weeping bottlebrush.



Description An evergreen shrub or tree from 4 - 9 m high with drooping branches. The tough leaves are narrow, up to 8 cm long and aromatic when crushed. The flowers have scarlet or crimson stamens and are borne mainly in the dry season in a cylindrical spike. Leaves continue to be produced beyond the flowers.

Ecology Sometimes planted in gardens and around houses in Umalila. It will grow in damp places or on poor dry soils.

Bees are active throughout the day on bottle brush trees which flower freely over long periods.

Propagation The tree can be grown easily from seed. Germination is uniform after two weeks. No treatment necessary. The seed stores well.

Uses Bees gather nectar and pollen during the dry season in Umalila. The wood can be used for firewood and charcoal. The tree is sometimes planted as an ornamental.

References Morton 1964, Crane et al. 1984,

Fichtl & Adi 1994, Mbuya et al. 1994, Bryant 1996, Llamas 2003



Laiton and Hezron Ulenje, beekeepers near Ilomba with Envoy Ndere (right)

Canarina eminii

(Campanulaceae)

Common names Nanjok

Description A creeper which either climbs into trees or grows along the ground. The plant is covered with a waxy surface. The root is thick, often with a corky surface layer. Stems are erect and climbing, up to several metres in length, usually with a fine purple mottling. Leaf blades are triangular to oval in shape, up to 10 cm long, with a toothed edge. The petiole is short. The flower is funnel shaped, up to 7.5 cm long, orange to orange-red with veins running the length of the flower tube. Fruit is a berry.



Ecology Grows in upland or river forest. It either grows on other plants or among rocks. It has an altitude range of between 1,600 and 3,200 m.

Propagation The plant can be grown from cuttings taken from the base of the plant or by using seed.

Management A trellis is needed to support the vine.

Uses Leaves are crushed, put in water and the liquid given to a cow that does not let down milk. It is sometimes cultivated as an ornamental plant. Bees are likely to visit the plant as they are known to collect nectar and pollen from other species in Ethiopia, e.g. *C. abyssinica*.

References Cribb & Leedal 1982, Blundell 1987, Brickell 1994, Fichtl & Adi 1994



Canna hybrida

(Cannaceae)

Common names Ingaya (Malila), Canna lily



Description A seasonally dormant herb growing up to 3 m high from a rhizome with many round projections. Leaves are paddle-shaped with a large central vein. The flowers may be red, orange or yellow. The fruit capsule has 3 sections and is covered with tubercles. Seeds are black, round and hard.

Left : *Canna lilies being grown as a hedge around a church at Ilembu.*

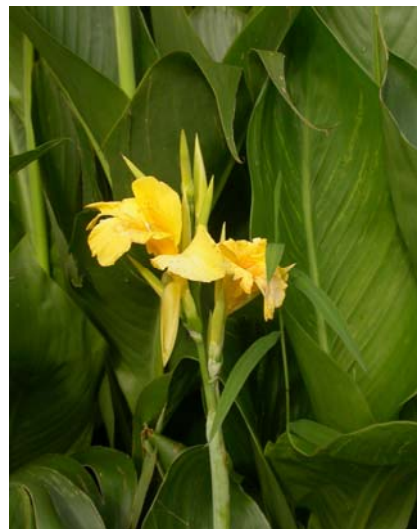
Ecology Originally from central America. Plants require full sunlight and humus rich, moist soil.

Propagation Either the clumps can be divided and planted just before the rains or the seeds can be sown.

Management The rhizomes grow outwards and may need to be dug out to prevent them spreading.

Uses An ornamental plant but also sometimes grown as a hedge in Umalila. In other countries the rhizomes are used medicinally to promote urination.

References Jex-Blake 1957, Uphof 1968, Brickell 1994, Llamas 2003, Bryan 2002



Carica pubescens

(Caricaceae)



Synonym *C. candamarcensis*,
Vasconcellea cundinamarcensis

Common names Mpapai (Swahili),
mountain pawpaw.

Description A semi-herbaceous tree with a crown of large, coarse, palmate leaves, but otherwise smaller and more branched than *Carica papaya*. The oval fruits, 6 - 15 cm long, are borne after 18 months and produced throughout the year. The firm orange-yellow flesh has a pleasant acid and perfumed flavour. The tree is highly resistant to papaya viruses making it useful for breeding work.

Left : *Tree bearing fruit in June*

Ecology Native to the Andean region of South America. Occasionally grown as a hedge plant in Umalila. It only grows at altitudes over 1,500 m in the tropics.

Propagation In Umalila trees are often grown from 1 m long branches taken from fruit bearing trees.

Elsewhere the plant is normally grown from seed but these are reported to produce mostly male plants.

Uses The flesh of the fruits is eaten stewed and sweetened, as a preserve or candied, and seldom eaten raw. It can also be made into a drink and is recommended for dyspeptics. Both pulp and seeds are eaten and the juice is useful for flavouring fruit salads.

References Jex-Blake 1957, Purseglove 1968, Uphof 1968, Macmillan 1991, van Balgooy 1991



Carica pubescens grown as hedge in Hembo village

Caylusea abyssinica

(Resedaceae)



Synonym *Reseda abyssinica*

Common names Ukwipa

Description An erect herb, occasionally bushy, usually an annual plant but sometimes a short-lived perennial. Leaves are long, 2 – 8 cm, and thin. Flowers are small, white and in flowering heads up to 40 cm long. Anthers are pink or orange, turning yellow when mature.

Ecology Grows as a weed in disturbed land and on riversides between altitudes 1,200 and 3,000 m. Present from Sudan and Ethiopia south to Malawi and Rwanda and Burundi. Some people leave wild plants growing in their gardens or may even plant the seed.

Propagation The plant can be easily grown from seed.

Uses In Umalila the young leaves and stems are eaten after being chopped up and cooked with

other vegetables.

The plant is also used to feed rabbits and goats. The boiled leaves are used medicinally to treat stomach pains and for intestinal worms. Bees were seen visiting the flowers in July and are known to collect pollen and nectar over an 8 month period in Ethiopia.

Above and right : *Caylusea abyssinica*
in flower near Ilemba

References FTEA 1958, Peters et al. 1992, Blundell 1987, Fichtl & Adi 1994, Ruffo et al. 2002, Jansen 2004



Chassalia discolor

(Rubiaceae)

Common names Intwati ya misengo



Chassalia discolor in flower in forest near Yalenga in October

Description A shrub 1 – 4 m high with finely ridged stems. Leaves are opposite, 4 – 15.5 cm long and 1.4 – 5 cm wide. The margins are often slightly wavy. The leaf stalk is 0.8 – 4 cm long. Flowers are scented and borne in branched panicles. The corolla tube is waxy, white or white and pink, 12 – 21 mm long. Fruits may be white, reddish or purple black, often translucent, round or two lobed, 5 – 6 mm in diameter.

Ecology Present in evergreen forest and mist forest from 1,300 to 1,950 m.

Uses The flowers are reported to be visited by bees. *C. subochreatea* is known to be a bee forage, and the shrub is also used for firewood, shade and as amenity tree in Tanzania. Other species are used medicinally.



References FTEA 1976, Beentje 1994, Lovett et al. 2006

Chrysanthemum cinerariaefolium

(Asteraceae)

Synonym *Pyrethrum cinerariaefolium*

Common names Amaua (Malila), pyrethrum.

Description A perennial herb 30 – 60 cm tall with a shallow root system. Leaves are alternate 10 – 30 cm long with a long slender petiole. Flowers, 3 – 4 cm in diameter, are borne singly on long stalks. The plant is 99% cross pollinated. The greatest content of pyrethrin is produced in the flowers when two or three rows of disc florets have opened. Pyrethrin content can vary greatly between plants.



Ecology Flushes of flowers are only produced after adequate rainfall. The higher the crop is grown the better the pyrethrin content, an altitude of 1,500 m is the lower limit for production in Tanzania. Fewer flowers are produced during warm periods. Soils should be rich and have good structure to avoid erosion and to allow penetration of rainfall during the three year cropping cycle.

Propagation Vegetative propagation is recommended to ensure that high pyrethrin content clones are used. Avoid taking splits from 'blind' plants, recognised by the lack of dead flower stems at the end of the season. Nurseries should be sited at low levels to encourage rapid growth of plants which also will produce plenty of splits for multiplication. Old woody plants give few splits and the survival rate after splitting is poor. A young vegetative plant breaks up easily to give many splits. Splits can be planted with only two leaves. Trim roots to 10 – 15 cm and plant at the same height and on the same day as the original plants were uprooted. Do not bend the roots and plant firmly.

Management (In the nursery) Weed carefully and remove all flowers from plants in the nursery. Each plant should be able to produce 12 small splits after 3 - 4 months. (In the field) Remove all perennial grasses before planting as deep weeding during cropping must be avoided. Ridging the land along the contour gives a better crop. Allow 75 – 90 cm between ridges. Plant early in the rain season, allowing 30 cm between plants. Weed with small forked jembes not pangas or ordinary jembes and earth the plants up at the same time. Cut back old stems to the level of the top of the foliage during the dry season. This leads to an earlier and better flush of flowers in the following rains and reduces damage done by bud disease. Pick flowers on dry hot days only, when two rows of disc florets are open. Pick with forefinger and thumb, rolling the flower over and breaking it off with no stem attached. Sun dry the flowers on trays turning the flowers 3 times per day. Store the dried flowers in air-tight containers in the dark.

Uses The dried flowers are used as an insecticide, as a repellent and as a contact poison against a wide range of insect pests. Care must be taken when picking drying and transporting to ensure that fermentation and overheating do not take place. An insecticide can be made up as follows:- 500 gm pyrethrum flowers are soaked in 4 litres kerosene for half a day. Strain off the liquid and use on aphids, Colorado beetle, flea beetles, grasshoppers and cabbage worms. Alternatively 20 g pyrethrum powder and 10 litres water are stirred together and sprayed on plants, preferably in the evening. Soap solution can be added to act as a sticker. Greater effectiveness can be obtained using a combination of tobacco and pyrethrum.

Remarks The plant is commonly grown in Umalila, however the area under the crop varies from year to year according to the market.

References Gunn 1953, Purseglove 1968, Acland 1971, Stoll 2000

Chrysophyllum gorungosanum

(Sapotaceae)



Synonym *C. fulvum*

Common names Ipalanyiji (Malila), paranieji (Nyakyusa)

Description A tall evergreen tree 30 – 40 m high with a straight slender trunk fluted at the base. Young branches, buds and leaf stalks are covered with golden brown hairs. Leaves are stiff, 7 to 15 cm long, growing on a stalk up to 2.5 cm long. The lower surface is covered with golden brown hairs. Midrib and veins are prominent. Flowers are cream yellow, very small, in clusters in the leaf axils. Fruit is oval to round, 5 celled, up to 4 cm long, with milky flesh.

Ecology Found in moist upland rainforests in East Africa and also in Malawi and Zimbabwe.

Propagation Seed can often be found below mature trees. Collect the fruit from the ground extract and dry the seed before storage. Add ash to protect it from insect attack. Seed can be sown in pots or wild seedlings can be transplanted. Grow

seedlings in the shade until well established.

Uses The timber is light coloured, of good density, and used for cabinet making and building. It makes good firewood and charcoal. The fruit is edible. Bees are reported to visit the flowers.



References Williamson 1975, Coates Palgrave 1983, Beentje 1994, Katende et al. 2000, Lovett et al. 2006



Cissampelos pareira

(Menispermaceae)

Common names Lusisia (Malila), mlagalaga (Swahili)

Description A herbaceous creeper. Leaves are roughly circular 2 – 12 cm in diameter. The petiole is from 1 – 7 cm long and joins the leaf 1 – 4 mm from the base. Male and female flowers are separate, arising from leaf axils, and may be up to 10 cm long. The fruit is a drupe 4 – 6 mm long and 3 – 4 mm wide.



Ecology Found in upland and lowland rainforest, often persisting on cleared ground and in cultivated land; also grows in secondary vegetation and near rock outcrops between 0 – 2,300 m.

Uses Reported as a bee plant in Umalila. String is made from the stem. The leaves are beaten, water added and the liquid drunk to relieve stomach-ache. Elsewhere in Tanzania the roots are powdered, mixed with water and used as a remedy for sore throats, colds, coughs, and for snake bite. Leaves and roots are chewed for stomach and pregnancy pains. Burnt roots and leaves are used for curing wounds. The plant is also used in Tanzania to treat hookworm, diarrhoea, miscarriage, headache, excessive bleeding during menstruation, fever and hernias. It is also an important medicinal plant in India and Nepal and in Guatemala, Nicaragua, Trinidad and Paraguay.

References FTEA 1956, Watt & Breyer-Brandwijk 1962, Kokwaro 1976, Neuwinger 2000, Taylor 2005.

Clausena anisata

(Rutaceae)

Common names Isyenje



Clausena anisata flowering in October.

Description A shrub or small tree growing to 10 m high. Bark is smooth and grey. All parts of the plant have an unpleasant smell when bruised. Leaves are compound up to 38 cm long composed of 11 - 37 leaflets, densely dotted with glands and more or less hairless. Flowers are small, white, in loose branched clusters and smell of aniseed. Berries are small, up to 0.7 cm in diameter and turn red-purple or blue-black when ripe.

Ecology Grows between 1,500 and 2,300 m altitude in forests particularly along forest edges and in clearings where rainfall exceeds 750 mm per annum. It is often a pioneer plant in secondary bushland on upland sites. Also found at higher altitudes in West Africa and throughout tropical Africa.

Propagation The plant can be grown from seed or cuttings.

Right : *Young fruits forming on a bush at Shilanga*

Uses In Umalila honeybees are reported to visit the flowers. The plant is known as an important bee forage from November to May in Ethiopia, where both nectar and pollen are collected. The plant is sometimes hung in doorways and burnt as a mosquito repellent. In East Africa the wood is burnt to smoke fish. The stems are cut for walking sticks. Twigs are commonly used for cleaning teeth or as chewsticks. There are numerous medicinal uses for the leaves. In Tanzania the leaf sap is rubbed on the body of a child suffering from malaria. Bruised leaves are given to women in labour. The roots are aromatic and reported to relieve wind. They are also used to expel roundworms. The wood is used for firewood. The fruits are reported to be edible.

References De Wildeman 1934, FZ 1963, Fichtl & Adi 1994, Burkill 1997, Burrows & Willis 2005, Lovett et al. 2006



Clematopsis villosa

(Ranunculaceae)

Synonym *C. scabiosifolia*, *Clematis kirkii*

Common names Ikuwi ? (Malila), shock-headed Peter



Description The plant grows from a rhizome and may form a bush up to 1.5 m tall with erect or spreading, hairy stems. Leaves are opposite, up to 12 cm long, also softly hairy and very variable in shape. The drooping flowers are scented, up to 7 cm across, and hairy on their outer surface. The seeds have a tuft of grey hairs at their apex.

Ecology The plant photographed was growing in grassland at the roadside. It also occurs at medium to high altitudes in woodland and wooded grassland. It appears in grassland after fire in northern Nigeria and Cameroon. Also present in East, Central and South Africa.

Uses In Zambia the flowers are crushed and sniffed to relieve flu and headaches. The leaf pulp is inhaled for headaches. In Zimbabwe the root powder is sniffed for headaches. In Burundi smoke from the burning roots is inhaled to calm

the insane and to treat coughing. A root infusion is drunk to stimulate the appetite, as a tonic and to treat female infertility. Leaf pulp is applied to treat toothache. In Sudan the root, after boiling in water, is used to dress sores. The plant is used together with *Hermannia betonicaefolia* to treat chest complaints in South Africa.

References Watt & Breyer-Branwijk 1962, Wild et al 1972, Cribb & Leedal 1983, Burkill 1997, Neuwinger 2000, Hyde & Wurston 2002 – 6

Cleome gynandra

(Capparidaceae)

Synonym *C. pentaphylla*, *Gynandropsis gynandra*, *G. pentaphylla*



Common names Umuzimu (Malila), mgagani, mwangani (Swahili), cat's whiskers, spider plant

Description An erect annual herb up to 1.5 m tall. Leaves are alternate, compound with 3 – 7 leaflets, each 2 – 10 cm long and 1 – 4 cm wide. Flower heads can be up to 30 cm long. Flowers are white or tinged with purple. Fruit is a green or yellow capsule up to 12 cm long. Vegetative growth stops rapidly as soon as flowering starts. Farmers often remove flowers to prevent this.

Ecology A common weed, especially around villages. It can grow up to an altitude of 2,400 m. throughout the tropics, though is less common at high altitudes. Requires full sun and prefers a fertile soil, high in organic matter. It is tolerant to drought.

Propagation Collect seed from late flowering, tall, green stemmed plants with many large leaves. Seeds are best stored for 6 – 12 months to break dormancy prior to sowing. Broadcast seed on well cultivated land in pure stands or mixed with *Brassica* species, *Solanum nigrum* or *Corchorus olitorius* and *tridens*.

Management. After sowing, plants should be thinned out to a spacing of 25 – 30 cm each way. Topping, cutting back to the ground and removing the flowers as soon as they appear are practices that increase leaf production. Green stemmed varieties tend to regenerate better than those with purple stems. The leaves are picked individually or leafy branches are harvested. Whole plants may also be uprooted.

Uses Leaves, often with the flowers, are widely used as a vegetable, eaten cooked or fresh as a spinach or in soup. By themselves the leaves are bitter. They are therefore best boiled, butter added and eaten with ugali made from finger millet. The leaves may also be dried for later use. To remove the bitterness the leaves are allowed to wither, and then are soaked in milk overnight or in several changes of water. Young pods are also eaten. Leaves are rich in calcium and iron. The plant is used widely as a counter irritant to relieve local pain, being rubbed on the part affected or applied as a poultice. The plant is sometimes cultivated for its edible seed oil. Bees collect pollen and nectar and, though flowering may occur all year round, it occurs mostly after the rains. The plants, and especially the seeds, have insecticidal properties and are used against ticks on livestock. The glands on the stem and leaves repel insects. Intercropping cabbages with rows of *Cleome gynandra* can reduce diamond back moth larva (*Plutella xylostella*) damage to the former.



References Watt & Breyer-Brandwijk 1962, FTEA 1964, Terra 1966, Goode 1974, Williamson 1975, Kokwaro 1976, Burkill 1985, Dupriez & De Leener 1989, Fichtl & Adi 1994, Chweya & Mnzava 1997, Schippers & Budd 1997, Maundu et al. 1999, Schippers 2002, Mnzava & Chigumira 2004

Clerodendrum johnstonii

(Verbenaceae)

Common names Nanjoha



Description The plant grows either as a shrub which may reach a height of 1.5 m or as a creeper, up to 20 m long. The bases of the leaf stalks are hooked and spiny, and used to scramble up into the tree canopy. Leaves are opposite or in threes, 6.5 – 19 cm long and 3.5 – 14 cm wide, and may have a rounded base, with the tip being shortly pointed. The lower surface of the leaves has a dense mat of hairs. The scented flowers are white and borne in many flowered terminal heads. The fruit is orange to black, about 1 cm long but often having galls.

Ecology The shrub photographed above was growing in a pine/eucalyptus plantation near Maendeleo. It grows at the edges of moist forests and in secondary forest, sometimes being common. Also present in eastern D.R. Congo, Rwanda, Burundi, and north eastern Zambia.

Propagation Can be grown from cuttings.

Uses Bees are reported to visit the flowers in Umalila. *Clerodendrum* species are known to be important bee forage plants in Africa. Other species, *C. cordifolium* and *C. myricoides* are visited by bees in Ethiopia. The plant is used to treat fever, coughs as an expectorant and for stomach problems in East Africa, Rwanda and South Africa. Juice from pounded or chewed fresh leaves is taken for abdominal pains or stomach problems in East Africa. A root decoction is drunk for painful periods in Kenya. In Burundi the leaf sap is drunk as an emetic and to relieve painful periods. Leaf decoction is drunk for rectal prolapse and as tonic for pregnant women. The stems are used as stakes by farmers in Kenya.



References Kokwaro 1976, FTEA 1992, Beentje 1994, Fichtl & Adi 1994, Hepburn & Radloff 1998, Neuwinger 2000, White et al. 2001

Clutia abyssinica

(Euphorbiaceae)

Synonym *C. pedicellaris*, *C. richardiana*

Common names Smooth fruited Clutia



Clutia abyssinica with fruit growing in a hedge near Sasyaka in April

Description Usually a shrub 1 to 2 m high but it can grow to 6 m. Branches are brittle and the bark is greenish to pale-brown. Leaves are 3 – 11 cm long and 1.3 – 3.5 cm wide, dotted with glands, light green becoming red to golden. Leaf stalk slender, up to 2.5 cm long. Flowers very small, greenish to white. Male flowers in tight clusters along young branches. Female flowers are solitary, occasionally among the male flowers. Fruit is a capsule 4 to 5 mm in diameter.

Ecology Found in dry forest, forest remnants, secondary bush and wooded grassland and in bush on rocky hillsides. Grows from Zimbabwe northwards to Ethiopia at altitudes between 700 – 2,300 m.

Uses In East Africa the roots are boiled in soup and drunk to treat headaches, malaria and stomach-ache. Leaves are boiled and the vapour used to treat malaria. An extract from the root is drunk for influenza, indigestion and, with milk to ease liver pains. In Tanzania women smoke the wood during menstruation. In South Africa the roots are used as a laxative, to expel intestinal worms and to treat fits in children. They are used to flavour food after boiling by the Maasai and Kipsigis. Bees are reported to visit the flowers of some *Clutia* species.

References Watt & Breyer-Brandwijk 1962, Kokwaro 1976, Coates Palgrave 1983, Peters et al. 1992, Beentje 1994, Hepburn & Radloff 1998, Neuwinger 2000, Burrows & Willis 2005

Coffea mufindiensis

(Rubiaceae)

Common names Kahawa mwitu (Swahili), wild coffee

Description An evergreen shrub or small tree, up to 4.5 m tall. Leaves are oval, 2 – 6 cm long and 0.8 – 3 cm wide, crowded together, with crinkly or wavy edges. Stipules are present and are 2 – 7 mm long, triangular with a fine point. One or two white flowers are produced in the leaf axils. Fruits are orange – red oval berries up to 1 cm long.



Coffea mufindiensis in Itare forest in November

Ecology An undershrub growing in moist mountain forests from 1,600 to 2,100 m in central eastern and southern highlands. Also present in Malawi, NE Zambia, Mozambique and Zimbabwe.

Propagation Can be grown from seed.

Uses In Tanzania the sweet tasting berries are collected and eaten raw mostly by children. Seeds are roasted, ground and used as a coffee substitute. The wood is used for poles, firewood, pegs and tool handles. The tree is suitable for growing for shade, as a hedge and as an ornamental shrub. Three other species are present in moist Tanzanian forests and two of them are reported as bee forage.

Remarks The plant has potential for selection and improvement.

References FTEA 1988, White et al. 2001, Ruffo et al. 2002, Burrows & Willis 2005, Lovett et al. 2006

Colocasia esculenta

(Araceae)

Common names Amasimbi (Malila), magimbi (Swahili), taro



Description A perennial herb growing from 1 - 2 m high from a large corm. The latter may be up to 30 cm long and 15 cm. in diameter. Leaf stalks are not attached at the leaf margin but inside, in contrast to *Xanthosoma saggitifolia*.

Ecology Taro is occasionally planted in gardens close to homes in Umalila. It is more usually grown in hot, humid conditions. Best results are from deep, fertile, friable loam soils with a high water table and adequate organic matter. Taro is fairly tolerant to shade. Eddoe types are more resistant to drought and cold conditions than Dasheen types.

Propagation Plant the upper tip of the corm with the lower 15 - 25 cm of the stalk attached. Plant at the start of the rain season.

Management Weeding is most important. Growth time to harvest is 8 - 10 months. The corms are ready for harvest when the leaves turn yellow and begin to wither.

Uses The leaves are used as a vegetable and the corms are eaten in Umalila. The soft, white corms are eaten throughout the tropics. They are rich in starch and can be eaten after removing the sharp crystals. To do this the corms are boiled, baked, roasted or fried in oil. The starch is easily digested, but if large quantities of the corm are eaten, goitre can result. Excessive consumption is also reported to increase the possibility of contracting leprosy. However eating the corm lowers the incidence of tooth decay.

Remarks Yields of between 4 and 10 tons/ha. are normal but, by selecting high yielding planting material and thorough weeding, better yields can be obtained.

References Purseglove 1968, Acland 1971, Kay 1973, Leakey & Wills 1977, Safo Kantanka 2004

Crassocephalum vitellinum

(Asteraceae)

Synonyms *Gynura vitellana*, *G. aurantiaca*

Common names Inzumba



Description A trailing annual or perennial herb, growing from 30 to 150 cm tall. Leaves are stalkless and 3 – 12.5 cm long and 1.5 – 7 cm wide. The solitary orange yellow flower heads are 1.8 cm across on long stalks. Flowers are produced throughout the year but mainly after the rains.

Ecology Common in grassy clearings, upland forest and woodland, and occasionally in swamps. Altitude range is 1,050 – 2,550 m. Also found in Kenya, Uganda, Ethiopia, D. R. Congo, Nigeria and Cameroon.

Uses The leaves are used to treat stomach-ache in Umalila. Bees frequently collect pollen and nectar from the flowers. *Crassocephalum* species flower over long periods and this is helpful for building up the strength of bee colonies. The plant is known as a good honey source in Ethiopia. The leaves of this species and of *C. bojeri* and *C. bumbens* are eaten in R.D. Congo. The plant is browsed by sheep and goats in Kenya. The flower head is sometimes used as a brush to remove objects from the eye. Elsewhere the plant is used medicinally as a remedy for elephantiasis, anemia, rectal prolapse and gonorrhoea.



Papilio echeroides, the White Banded Swallowtail, collecting nectar from a flower in June

References Watt & Breyer-Brandwijk 1962, Kokwaro 1976, Burkill 1985, Blundell 1987, Konda et al. 1992, Fichtl & Adi 1994, Neuwinger 2000, Burrows & Willis 2005

Crotalaria cleomifolia

(Fabaceae)

Common names Isekeseke



Description A shrubby, much branched perennial, 1 - 4 m tall. Leaves are composed of 3 - 5 leaflets each 5 - 11 cm long. Flower heads are 11 - 28 cm long. Flowers usually have reddish-brown veins. Fruit pods are 4 - 5 cm long containing 30 - 40 seeds.

Ecology Grows on the margins and in clearings of upland rain-forest, upland evergreen bushland and grassland, also persisting on roadsides and cultivated ground. Altitude range 1,150 - 2,550 m. Locally common and widespread in tropical Africa.

Propagation Suggested propagation by seed or semi ripe cuttings.

Uses Bees were seen visiting this plant in June. The leaves of *Crotalaria natalitia* are used as a vegetable in Umalila. They are also chewed and spat onto burns or dried and then crushed and applied to burns. *Crotalaria* species have potential as green manure crops. Children use the dried seed-pods as rattles, hence the local name.

Remarks There are over 200 species of *Crotalaria* in East Africa. Some species are responsible for producing serious intoxication in cattle and donkeys. Some are however used medicinally and others are regarded as potential fodder crops.

References Watt & Breyer-Brandwijk 1962, FTEA 1971, Kokwaro 1976, NAS 1979, Blundell 1987, Brickell 1994, Burrow & Willis 2005



Crotalaria natalitia

(Fabaceae)

Common name Ithumba (Malila), marejea (Sw.), rattlepod

Description A perennial woody herb or small shrub with one to several thin upright stems from 1 - 2.6 m tall. Leaves are crowded on short lateral shoots, and made up of tufts of 3 – 5 leaflets. Leaflets are up to 4.2 cm long and hairy on the underside. The yellow flowers turn red in a terminal flower head, up to 22 cm long. Fruit is a cylindrical mottled dark-green and blue-black pod 3.5 - 4.5 cm long, containing 25 - 40 seeds.



Crotalaria natalitia growing in forest

Ecology Found on the margins of upland rain forest, in bushland, wooded or open grassland, deciduous woodland and riverine forest, also present on roadsides and cultivated ground. Altitude range 0 – 3,000 m. Also occurs in the plateau regions of Angola, southern Africa and in Burundi and eastern D.R. Congo.

Propagation Suggested propagation is by seed or semi-ripe cuttings.

Uses In Umalila the tender leaves are eaten as a vegetable. Elsewhere in Tanzania the pounded leaves are also used and may be dried for later use. The leaves are sometimes sold in markets. People add groundnuts and coconut

milk to make the leaves more palatable. In Malawi leaves are cooked with potash giving a mucilaginous product. In Tanzania the plant is also used as a green manure and an ornamental plant. The bark from fresh roots is chewed, and the juice swallowed as a treatment for boils. Bees were seen to be active on this plant in Umalila in June.

Remarks Several *Crotalaria* species are edible but some are known to be poisonous both to man and livestock. Some species are used medicinally.

References Watt & Breyer-Brandwijk 1962, FTEA 1971, Brickell 1994, Bosch 2004, Burrows & Willis 2005

Crotalaria subcapitata, a low growing creeper, found in grassland, is visited by bees in May.



Cucurbita ficifolia

(Cucurbitaceae)



Synonym *C. melanosperma*,
Pepo ficifolia

Common names Dabwidi (fruit), kawiru (leaves) (Malila), mboga ya kimsaai or mboga ya mboga (Swahili), fig leaf gourd, Malabar gourd

Description A short-lived perennial vine up to 30 m long, climbing with long branched tendrils. The tap root may be 2 m long. The stem forms numerous runners which may root at the nodes. Leaves are alternate, and similar to fig leaves, 18 – 25 cm in diameter. Flowers are yellow to pale orange up to 7.5 cm in

diameter. The fruit is large, round or cylindrical, 15 – 50 cm long, green with white stripes and lighter markings, having a smooth, hard skin. The flesh is white, coarse and tough, fibrous and rather dry with many black to pale buff coloured seeds 1.5 – 2 cm long.

Ecology The plant grows best in fertile well drained soils at altitudes over 1,000 m. Originally from the highlands of South America. It occurs in the highlands of Ethiopia and East Africa and is occasionally grown in Angola.

Propagation By seed or vegetatively by using plants rooted at the nodes. Seeds germinate after 5 – 7 days. They may also germinate naturally in cultivated land.

Management Plants are normally grown over a trellis or fence in Umalila. The plant is known to be strongly resistant to pests and diseases. Bees are mainly responsible for pollination. Leaves can be harvested from 2 months after planting and picking can continue for a further 4 months.



Uses In Umalila the young leaves and stalks are stripped of the outer fibre then coarsely chopped and cooked as a vegetable. The leaves and fruit are also fed to pigs. The seeds are pounded, sieved and added to vegetables to provide cooking fat. Elsewhere in Tanzania the leaves are prepared in a mixture with maize, pulses, green bananas or Irish potatoes. In Europe the plant is grown for its ornamental fruits. The plant is also used as a rootstock for growing cucumbers in Europe because of its tolerance to cold and its resistance to soil borne diseases.

References Maundu et al. 1999, Grubben 2004

Left : *Leaves and fruit being carried home near Maendeleo*

Cucurbita maxima

(Cucurbitaceae)

Common names Iliungu (fruit), ipwiza (leaves) (Malila), mtango (Swahili), winter squash, pumpkin.



Description An annual herb, usually trailing on the ground, but occasionally growing as a bush. Some cultivars produce very large fruits. Male or female flowers occur in a ratio of about 20:1 and open for one day only, often early in the morning. Both produce nectar. Bees are the main pollinators and the number and weight of the fruits increase with the amount of pollen deposited on the stigmas. The fruits are orange, green or grey, smooth or ribbed, round or oval. Seeds are large and plump, white or brown. 3 - 6 fruits are produced per plant with fruits weighing from 2 - 5 kg.

Ecology Grown throughout Africa. In Umalila the crop is planted with maize and beans before the rains start. The plant requires full sunlight, a fairly high temperature, above 25 - 27°C, and fairly low humidity. Dry periods encourage growth. It can be grown up to an altitude of 2,000 m and prefers soils with organic matter. The plant also grows well in soils where ashes have been thrown or where burning has taken place.

Propagation Normally 3 - 10 seeds are sown per site, spaced 2 m x 2 m, and then thinned out to 1 - 3 plants. Plant seed 2 - 4 cm deep.

Management Harvest the fruits when the skin starts to harden. When collecting the leaves it is recommended that the third and fourth leaves from the tip are harvested.

Uses The leaves and fruit are eaten in Umalila. The seeds are also pounded, sieved and added to vegetables to provide cooking fat. The flowers are sometimes used as a vegetable in Africa. In Malawi the leaves are dried for later use. Fruit flesh is usually boiled and eaten in pieces or put into stews and soups. In northern Ghana the flesh is sliced and dried for storage. Fruits with hard skin can be stored for later use and will keep well for a long time. The dried fruit shell can be used for making bowls. Many species of Cucurbitaceae are attractive to honey bees.

References Grubben 1977, Tindall 1983, Burkill 1985, Dupriez & De Leener 1989, Fichtl & Adi 1994, Robinson & Decker-Walters 1997, Jones 1999, Chigumira Ngwerume & Grubben 2004

Cupressus lusitanica

(Cupressaceae)

Common names Mkambo kambo, mtarakwa (Swahili), cypress



Description A fast growing evergreen tree, normally conical in shape, up to 35 m high. It has a straight trunk. The bark is red brown with vertical grooves. Leaves are very small in 4 ranks, with spreading pointed tips. Male cones are produced at the ends of branches and produce large amounts of yellow pollen. Female cones, 1.5 cm in diameter, ripen after two years. Trees commence bearing fruit after 6 – 9 years.

Ecology Grows in seasonally moist to permanently moist areas having a dry season of no more than 2 – 3 months. Altitude range 1,000 – 4,000 m. The tree prefers a deep, moist, well-drained, neutral to slightly acid loam. This species represents over 40% of planted trees in Tanzania.

Propagation For rapid, even germination seed should be kept in damp sand for 30 days before sowing. Seed can then be sown in seed beds and the bare rooted seedlings can be transplanted into the field. Alternatively seed can be planted in containers. Wild seedlings can also be

used for planting out. Seed can be stored for up to 6 months.

Management Plant out seedlings at 2 – 3 x 2 – 3 m spacing. Pruning to ensure knot-free timber should commence when trees are 3 years old and be carried out again at 6, 9 and 13 years. Growth is fast on good sites. Weeding is important during early growth. The tree can be grown as a hedge.

Uses Grown for poles which are ready after 10 years or for timber which can be cut after 20 years. Timber can be used for furniture and firewood.

Remarks The cypress aphid was a major pest which limited the planting of this tree. However in Kenya a parasitic wasp, *Pauesia juniperorum*, has been shown to be an effective control agent.

References Mbuya et al. 1994, ICRAF 1998

Cussonia spicata

(Araliaceae)

Common names Ipombo (Malila), pombo (Nyakyusa), umbrella tree, cabbage tree.



An isolated tree left in crop land near Sasyaka.

planted in a shady area, but this method is not always successful.

Uses The flowers are an important honey source in Umalila. Bees were seen visiting in July. Young trees are sometimes uprooted and the roots eaten in Umalila. The large succulent root is also eaten in times of scarcity in South Africa and is used to treat malaria. The bark is used as a fish poison. In Tanzania the leaves are used to treat indigestion and the roots as an emetic and to treat fever, venereal disease and uterine pain. The bark is used as a malarial remedy in Zimbabwe. The powdered wood is a constituent of snuff in South Africa. The wood is whitish, light, soft and coarse and very perishable but used to make mole traps by the Kikuyu in Kenya. Wooden blocks are used as a substitute for brake blocks. The fruits are edible. The leaves are said to provide valuable fodder for stock. The tree is sometimes used for shade.

Remarks A related species *C. holstii* is an important honey source in Ethiopia.

References Watt & Breyer-Brandwijk 1962, Williamson 1975, Kokwaro 1976, Coates Palgrave 1983, Beentje 1994, Fichtl & Adi 1994, Venter & Venter 1996, Neuwinger 2000, Hankey & Sisulu 2004, Lovett et al. 2006

Description An evergreen tree, up to 20 m tall, with long bare branches. The compound leaves are crowded at the ends of the branches and are composed of 6 – 12 leaflets. From 5 to 18 flowering spikes, each 6 – 14 cm long, are borne together at the ends of long stalks which protrude beyond the foliage of the tree. Flowers are greenish-white. Fruits are up to 1.2 cm long. The tree can grow up to 1 m per year.

Ecology Common in forests in Umalila. Normally found on dry upland forest edges, riverine forest, grouped tree grassland and wet upland forest. A pioneer tree growing between altitudes of 1,450 and 2,500 m. Distribution is from Sudan to the Western Cape in South Africa. The tree is drought resistant but does not like cold winds. It may also not be able to withstand frost.

Propagation Fresh seed germinates easily when sown in seedling trays filled with a mixture of river sand and compost (1:1). Germination takes from 15 - 30 days. Most seeds germinate in the third week. It can also be grown from long cuttings



Maturing fruit

Cyathula uncinulata

(Amaranthaceae)



Common names Imbunya (Malila – the name is given to plants which stick to clothing).

Description An erect and bushy, or more commonly, a straggling to climbing perennial herb, 75 cm to 3 m long. Leaves are variable in size and shape, often hairy on both surfaces. Its trailing habit and grey-silver flower heads make it easy to identify.

Ecology Grows profusely along the forest edge around Ilembu. Found in extremely different habitats from moist forest, riverside vegetation, open bush-land and rocky places. Altitude range 1,290 – 2,880 m.

Uses Bees were active on this plant collecting both nectar and pollen in June. The leaves are eaten by livestock. The plant is reported locally to improve soil fertility. Leaves are dipped in hot water and applied to the skin to draw out thorns. They are also used as toilet paper. In Tanzania a root decoction is drunk as an emetic and to treat female sterility and the fruits are eaten to ease abdominal pain. Elsewhere a paste made from the powdered leaves mixed in Vaseline, is used to treat eczema. A decoction of the root is used as an emetic in Kenya. The plant is also used medicinally in Burundi. Beekeepers say that when

livestock return home with the fruits sticking to their coats it is time to harvest honey.

References Kokwaro 1976, FTEA 1985, Blundell 1987, Neuwinger 2000



Rinaga Jangi carrying Cyperus grass (Amanzila) stems for making mats (Ishiri)

Cyphomandra betacea

(Solanaceae)

Synonyms *C. crassicaulis*

Common names Ipana (Kimalila), mgogwe (Swahili), tree tomato, tomatillo.



Description An evergreen semi-woody shrub or small tree, with characteristic umbrella like branching habit, from 2 to 3 m tall. Young stems have shiny bark, older stems bear leaf scar markings. Leaves are alternate, large and heart shaped, 15 – 30 cm long and 10 – 20 cm wide. They have soft hairs and droop in the heat. Flowers are fragrant and borne in clusters on older stems. Each floret is 5 lobed, with white to pink petals and a dark stripe. The egg shaped, smooth skinned fruit, grows 4 to 6 cm long and is at first greenish-purple but becomes shiny orange-red to purple as it ripens. Fruits are produced in great abundance in hanging clusters on long stalks throughout the year. The plant is shallow rooted.

Ecology Native to the forests of the Andes. The plant grows in the highland tropics from 1,200 m upwards in frost free areas. At low elevations the plants do not flower. Plants require full sun, with deep, fertile, well drained soils. Flavour develops best where

warm sunny days are followed by cool nights. Suitable for growing with other crops, as it does not shade out shorter plants.

Propagation The plant is usually grown from seed but can also be grown from stem cuttings. Seed can be stored without problem. Transplant seedlings when 30 cm high.

Management The tree is quick growing and starts to bear fruit after about 18 months. However, as it usually only lives for 3 - 4 years, it needs to be replaced frequently. Alternatively, after 3 years, the tree can be cut down to soil level and one good shoot selected to produce another stem.

Uses The slightly acid, succulent fruits are usually eaten uncooked but can also be prepared like tomatoes, sliced, fried and served as a sauce with the staple food. The juice may be squeezed out to make a refreshing drink. Sugar can be added. Fruits are best picked and eaten direct from the tree. They have a high vitamin content. Levels of free amino acids, potassium and phosphorus are also high compared with other fruits.



Remarks The fruits will keep for 3 - 4 weeks if kept cool.

References Uphof 1968, Dupriez & De Leener 1989, Macmillan 1991, ICRAF 1998, Katende et al. 1999, Katende et al. 2000

Dalbergia lactea

(Fabaceae)

Common names Mulembo, ishuwa (Malila)

Description A small tree or climbing shrub, which may be up to 25 m long, with some coiled branches. Leaves are made up of 6 – 10 leaflets which are elliptic, have a rounded base and apex and are 4 – 9 cm long and 2 – 5.5 cm wide. Flowers are mauve white to purple in large clusters. Fruit pods are 10 – 17 cm long and 3 – 4.5 cm, leathery, flat and hairless and contain a single seed.



Dalbergia lactea flowering in October near Shilanga

Ecology Widespread in mountain and mid-altitude rain forest up to 2,220 m. Also present in the highlands of Cameroon, south east Nigeria, eastern D.R. Congo and from Ethiopia to Zimbabwe and Mozambique.

Propagation *D. nitidula* can be grown from seed or suckers.

Uses The flowers are visited by bees in Umalila. *D. nitidula* is reported as a pollen source in Iringa district. *Dalbergia* species are known as important bee forage plants in other parts of Africa. The leaves and roots are used medicinally to treat abdominal pains. The roots are applied externally to treat rheumatism or boiled up and the liquid used to bathe in for skin diseases. A root decoction is drunk to expel roundworms and, together with *Senna petersiana*, is taken to heal abscesses. The leaves are pounded and used to treat constipation in cattle. In Kenya the bark fibres are used for weaving and to make rope.

References Kokwaro 1976, Beentje 1994, Burkill 1995, Hepburn & Radloff 1998, Kihwele et al. 2001, White et al. 2001, Burrows & Willis 2005, Latham 2005

Desmodium intortum

(Fabaceae)

Synonym *D. aparine*

Common names Izanji (Malila), green leaf desmodium, Kuru vine.



Desmodium intortum in flower in May near Ilemba

Description A perennial, low growing herb with erect, branched reddish-brown stems. Leaves are trifoliate with leaflets 2 – 7 cm long and 1.5 – 5 cm wide, usually brown or red-speckled on the upper surface. The flowers are numerous and the plant flowers over a long period. Seed production is increased by bees.

Ecology Fairly common in grassland in Umalla. Native to central America but now spread widely in the tropics. It requires a long warm growing season and withstands hot weather better than *D. uncinatum*. It tolerates moderately low temperatures. The plant prefers a well distributed rainfall of over 875 mm per year. It is less drought resistant than *Stylosanthes guianensis* in Uganda and has little foliage in the dry season. It will survive temporary water-logging but prefers well drained sites. The plant requires an alkaline more or less neutral soil with a pH of 5.0 or more.

Propagation Seed should be broadcast in a well prepared seed-bed. Stem cuttings can also be used for propagation.

Uses Bees were seen collecting pollen and nectar. A valuable fodder legume both grazed and made into hay. It is an excellent source of protein, riboflavin and vitamin A for livestock. It can be grown with various grasses.

References Bogdan 1977, Skerman 1977, Jones 1999

Desmodium repandum

(Fabaceae)

Common names Asampya



Description A loosely branched perennial herb or slender shrub growing up to 1 m tall. Leaves are composed of three thin leaflets covered with fine hairs. Flowers pink to bright red, arranged in terminal or open panicles. The sticky fruits have 5 segments which break up into one-seeded sections and attach themselves to fur and clothing.

Ecology The plant is common in shade, on the forest floor or at edges of forests, in clearings and along stream banks and paths. It grows throughout tropical and subtropical East Africa between 1,000 and 3,300 m. It is also found in

Madagascar, India and Malaysia.

Uses The plant is used to treat mental disorder in Umalila. In Shambaa, northern Tanzania the root is used to treat large sores and a spoonful of juice is given to babies for abdominal pain. Elsewhere the plant is used to treat anorexia, gastric ulcers, liver inflammation, cardiac problems, sciatic pain, dehydration, diarrhoea, weakness, elephantiasis and wounds. Bees are reported to collect pollen and nectar from the flowers.

References Kokwaro 1976, Blundell 1987, Fichtl & Adi 1994, Hepburn & Radloff 1998, Neuwinger 2000, Burrows & Willis 2005



Dickson Mwahalende with young Hagenia abyssinica (Iliogoti) trees. He also has a nursery of Syzygium cordatum (Ifwomi). Indigenous trees have a wider range of uses and are better adapted to local conditions than many imported species.

Diospyros whyteana

(Ebenaceae)

Common names Ifita (Malila), bladder nut



Description An evergreen shrub or small tree up to 13 m in height, branching low down. Bark is brown and rough. Young shoots are red. Leaves are 2 – 8 cm long and 1 – 3 cm wide, alternate and the margins are fringed with long hairs. Flowers are white or cream to pale orange, fragrant, 5 to 10 mm long, arising from the leaf axils. Flowering occurs from August to October. Male and female flowers are on different trees. The red fruits are distinctive being spherical, up to 2 cm in diameter, and enclosed in a papery calyx.

Ecology Occurs in scrub or forest, on mountain slopes and in rocky places from Ethiopia to the Western Cape in South Africa. The shrub can survive long dry periods. It is most common in high rainfall areas at high altitudes.

Propagation Collect fruit from the tree and dry in the shade. Remove the seeds and soak them in hot water. Leave in water overnight before planting. Alternatively seed can be scratched before planting. Germination takes 3 - 5 weeks and is rather erratic. Transplant seedlings at the two-leaf stage. Plants grow quite rapidly.

Uses Bees were seen gathering nectar in October near Shilanga. Leaves are browsed by livestock. The fruit is edible but has a bitter-sweet taste, and is therefore not popular, but the seeds can be roasted and ground to make a good coffee

substitute. The wood is whitish with brown to purple stripes, dense, even grained and strong. It is used for making furniture and tool handles. The bark is used to ease painful periods in South Africa and the leaf or root extract is rubbed on to treat a burning skin rash. The shrub can be grown as a hedge plant. A related species, *D. mespeliformis*, African ebony, is known to be a very valuable bee forage, particularly for nectar, at lower altitudes in West, East and southern Africa and in Ethiopia.



References Wild et al. 1972, Coates Palgrave 1983, Fichtl & Adi 1994, Mbuya et al. 1994, Venter & Venter 1996, Kihwele et al. 2001, Viljoen 2002, Burrows & Willis 2005, Lovett et al. 2006

Dissotis melleri

(Melastomataceae)

Synonym *D. whytei*

Common names Izolokwale, bumburankwale, nzumbakwale

Description A shrub or small tree up to 6 m tall. Leaves are 4.5 – 16 cm long. The purple flowers are distinctive and produced after the leaves fall.



Dissotis melleri in flower near Yalenga in October

Ecology Occurs in open bushland and at the edges of forests. Also found in exposed places, rocky crevices and mountain slopes in higher grassland. Present in Mozambique, Malawi and Zambia.

Uses Reported to be visited by bees. *Dissotis* species are known to be useful bee forage plants elsewhere in Africa. A related species *D. canescens* is visited occasionally for pollen in Ethiopia. The leaves, flowers and roots of some species are eaten.

References Peters et al. 1992, Fichtl & Adi 1994, Malaisse 1997, Hepburn & Radloff 1998, White et al. 2001, Burrows & Willis 2005

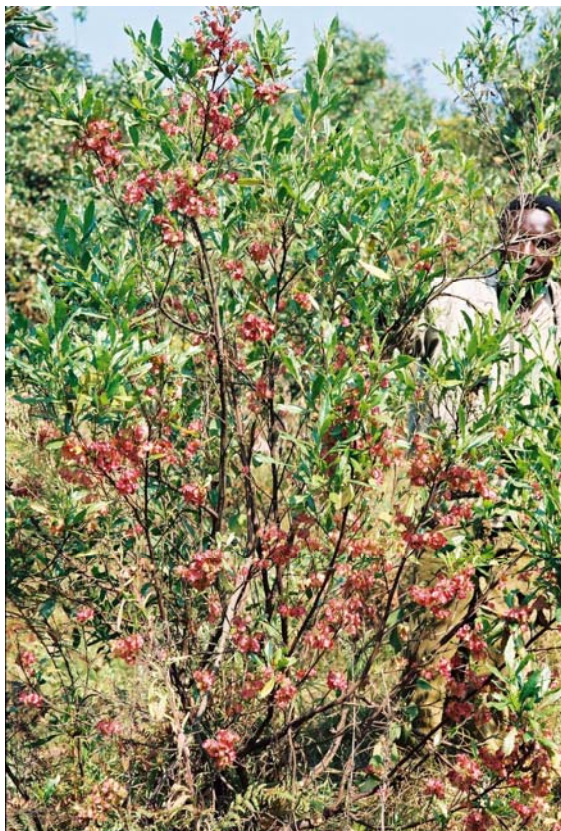


Dodonaea viscosa

(Sapindaceae)

Synonym *D. angustifolia*

Common names Inzigula (Malila), mkaa-pwani (Swahili), Sand olive.



Dodonaea viscosa growing in grassland at Inyala.

Uses Commonly cut for firewood and charcoal. The shrub provides poles and tool handles and is a useful plant for soil conservation measures, for wind breaks and living fences. It is an important bee plant in drier areas, producing good supplies of pollen and some nectar and stimulating brood rearing and strengthening colonies. Twigs are used as toothbrushes and the lower stem and swollen root are used as knob-kerries (rungu) in Umalila. In South Africa it is an important medicinal plant. A decoction of the boiled fresh leaves and tips of the twigs is drunk to treat colds, influenza, stomach troubles, arthritis and measles and used as a gargle for sore throats.

Remarks This species is not browsed by livestock which makes it easy to establish. It can be planted to form a good living fence for dry areas. Though susceptible to fire, it regenerates rapidly after burning and is especially useful for reclaiming poor land.

References Watt & Breyer-Brandwijk 1962, Fichtl & Adi 1994, Mbuya et al. 1994, van Wyk et al. 1997, ICRAF 1998, Burrows & Willis 2005, Lovett et al. 2006

Description A thin stemmed, fast growing, hardy shrub, up to 10 m high. Young leaves are light green, shiny and sticky. Mature leaves are thin, erect and up to 10 cm long. The flowers are small and the sexes are separate. The fruits are distinctive, 2 cm long, bearing 3 greenish to red wings which turn brown.

Ecology Grows from sea level to 2,800 m but is most common on rocky soils and in dry mountain forests in Tanzania. Found throughout Africa from Sierra Leone to Ethiopia and in South Africa.

Propagation Regenerates rapidly after bush fires but can also be planted direct using seed. Wild seedlings can also be used for planting. Seed can be stored for up to a year.



Ripening fruits

Dombeya burgesiae

(Sterculiaceae)

Synonym *D. dawei*

Common names Inkunya

Description A shrub or tree 1 - 6 m high. The leaves, 4 – 17 cm long and 3 – 13 cm wide, are covered with short soft hairs on both sides. Flowers are white or pink, in bunches with long stalks. The petals are 14 - 24 mm long. The dead flowers remain attached to the branches for some time. Fruits are round, about 1 cm in diameter, and very hairy.



Flower head in a forest near Inyala

Ecology Grows from 1,200 – 3,000 m in open forest, on forest margins, beside rivers, on rocky sites or in wooded grassland. Widespread in drier upland forest areas. The tree grows well in light shade.

Propagation Collect dried flower heads and extract seed. Sow in a well-drained seedbed. Germination is good and the seedlings emerge after 3 weeks. Use fresh seed as viability declines after 3 months.

Management The tree is fast growing and can probably be coppiced.

Uses An important bee forage plant in Umalila. *Dombeya* species produce exceptionally

good honey with fine crystallization. Elsewhere in Tanzania a leaf decoction is drunk to treat malaria and leaf pulp is applied to leprosy sores. In South Africa the bark is used to make baskets and in Kenya the bark fibre is used to make rope; the wood is used for bows and building poles; twigs are used as fire-sticks. Various parts are used to make a cough medicine. In Uganda the roots are used to treat stomach pains.

References Smith 1956, Watt & Breyer-Brandwijk 1962, Kokwaro 1976, Coates Palgrave 1983, Blundell 1987, Beentje 1994, Johannsmeier & Allsopp 1995, Mbuya et al. 1994, Neuwinger 2000, Hankey 2001



A clay jar set in a tree to provide water next to a hive at Sasyaka

Dombeya rotundifolia

(Sterculiaceae)

Common names Itanji (Malila), wild pear



Dombeya rotundifolia flowering in October

Management The tree can be coppiced.

Uses In Umalila the tree is sometimes planted as a memorial for an event or person. The blossom is very attractive to bees, producing a light amber honey with pleasant flavour, but the nectar flow is reported to be short. In some areas bees are reported not to visit the flowers. The timber makes good firewood and charcoal, and the leaves are suitable for fodder. In Umalila the bark is used for making a very strong rope, though, as the tree is not very common, sisal is used more often. Bows are made from the strong flexible branches. Wood is tough but often twisted. It is used for tables and chairs and tool handles. It is termite resistant when seasoned. The roots are used medicinally. An edible caterpillar, probably *Anaphe reticulata*, appears from March to May and feeds on the leaves. As is the case elsewhere in Africa, it has the same name as the tree on which it feeds. The caterpillars are tossed with burning charcoal, or placed on a piece of metal over fire, to remove the hairs. They are then cooked with oil, salt, onion and hot peppers. The tree is reported to improve soil fertility through its fallen leaves.

References Smith 1956, Watt & Breyer-Brandwijk 1962, Deschodt 1976, Crane et al. 1984, Beentje 1994, Mbuya et al. 1994, Venter & Venter 1996, van Wyk & Gericke 1997, SEPASAL 1999, Aubrey 2001

Description A fast growing deciduous tree up to 4 - 5 m tall, sometimes reaching 8 m. Bark is dark brown and deeply furrowed. Leaves oval to almost circular, 6 - 18 cm across, rough, often hairy below, edges unevenly toothed and stalked. The leaves dry up very crisp and hard. The whitish-pink flowers are borne in multi-flowered heads and are sweet scented. It is an attractive tree when in flower. Fruits are small, round, hairy capsules.

Ecology Single trees are often left in cropland. It occurs over a wide range of altitudes, from Ethiopia to KwaZulu - Natal in South Africa, usually in wooded and open grassland. Grows best between altitudes of 1,400 and 2,200 m, often near termite mounds. It tolerates some frost and drought. The tree is fire resistant.

Propagation Seed germination is good and seedlings emerge after 3 weeks. Use fresh seed as viability declines after 3 months. Sow seed in a 3:1 mix of river sand and compost. Cover with a thin layer of sand and keep moist. Transplant into pots at the 2 leaf stage. Seedlings and young plants transplant easily. Protect seedlings from heat and sunlight until hardened off.



Itanji caterpillar

Dombeya torrida

(Sterculiaceae)

Synonym *D. goetzenii*

Common names Ikunya

Description A much branched, fast growing, deciduous forest tree which can grow up to 25 m tall. Bark grey and smooth. Leaves are large, up to 28 cm long, hairy and heart shaped with a pointed tip. Young stems and leaf stalks are often red. Flowers are borne in groups on stalks up to 30 cm long and have orange anthers. Petals turn yellow-brown and surround the fruit capsule which contains about 10 seeds.



Ecology Grows between 1,800 and 3,300 m altitude in mountain forests, often growing along forest edges. It also persists in forest patches and gallery forests and is often seen as a single tree in mountain grassland and farmland. Rainfall range is from 1,000 to 2,000 mm per year.

Propagation Can be planted from seed but needs careful attention. The seed is not easy to obtain and it may be easier to plant out wild seedlings.

Management Can be coppiced, lopped or pollarded.

Uses One of the best nectar-producing trees in Africa. Bees collect pollen and nectar throughout the day and, if the trees are numerous, they will provide abundant honey. The leaves are browsed by cattle. The wood is soft and easy to work and therefore suitable for turning and house construction, but is not durable in the ground. It is used for poles and tool handles and is suitable for firewood. The bark fibre is used for making cloth and rope. Fallen leaves produce good mulch, improving the soil. Root bark is used for dressing wounds. The tree is used for soil conservation and as a support for beehives in Rwanda.

References Smith 1956, Egli & Kalinganire 1988, Rochelau et al. 1988, Beentje 1994, Fichtl & Adi 1994, Katende et al. 1995, Lovett et al. 2006

Dovyalis abyssinica

(Flacourtiaceae)

Common names Isogwa



Description A small much branched spiny tree up to 8 m tall having a rounded crown. Trunk may be up to 20 cm across having pale grey-brown bark. The young bark is covered with brown lenticels. Branches sometimes have slender axillary spines 0.5 – 1.5 (rarely up to 2.5 cm) long. Leaves are alternate 4 – 9 cm long and 2 – 3 cm wide. Leaf stalk 2 – 4 cm long. Female flowers solitary. Male flowers in clusters with 40 – 60 stamens, yellow-green or greenish white. Fruit is globular, yellow-red with minute paler dots approximately 2 cm across. Seeds are few and hairy.

Ecology Present in upland rain-forest, beside streams and in dry evergreen forest, sometimes in open wooded grassland from 1,500 to 3,000 m. Present throughout East Africa and in Ethiopia, Somalia and Malawi.

Propagation Can be grown from seed. Soak fruits in water for 24 hours, break them up and collect seeds. The seeds store well.

Management The tree can be grown as a hedge and can be trimmed and coppiced.

Uses The flowers are reported to be visited by bees in Umalila. Fruits are edible and may be sour or sweet. Wood is hard and used for firewood, tool handles, and beds. The leaves are pounded, soaked in water and taken for indigestion. The roots are used to treat venereal diseases.

References FTEA 1975, Bekele-Tesemma 1993, Beentje 1994, Hepburn & Radloff 1998, Najma Dharani 2002, Lovett et al. 2006



Photo : Najma Dharani

Dracaena steudneri

(Dracaenaceae)

Synonyme *D. papau*

Common names Iteti (Malila), dragon tree



Dracaena steudneri flowering in October

Description A shrub or small tree growing up to 18 m tall. The trunk is swollen and is often branched from the base. Leaves are crowded at the end of the branches, each up to 60 cm long. Inner leaves are erect, outer ones droop. Flowers are white or pale yellow-green, fragrant and produced in a large flowering heads. The fruits are red, orange or yellow and about 12 – 14 mm in diameter, juicy and eaten by birds.

Ecology Grows in moist or dry evergreen forest. Plants are sometimes left in gardens or grow in hedges in Umalila. Altitude range 1,250 – 2,100 m. Also present in Mozambique and Zimbabwe and north to Ethiopia and Sudan.

Propagation Grows well from cuttings. Seed of other species germinates quickly and well but cannot be stored for long periods.

Management Other species are fast growing and coppice well.

Uses Sometimes planted as a boundary hedge in Umalila. Beehives are

often placed in this tree. Elsewhere it is grown as a windbreak and as a boundary marker. The leaves are used for wrapping certain foods. Bees collect nectar and pollen and, because it flowers after the main honey flow, it is a valuable plant for strengthening colonies. The root is used as a remedy for rheumatism in Tanzania and for the relief of wind in East Africa. The root is used in baking in Ethiopia.

References Watt & Breyer-Brandwijk 1962, Coates Palgrave 1983, Bekele-Tesemma et al. 1993, Beentje 1994, Fichtl & Adi 1994, Mbuya et al. 1994, Lovett et al. 2006, White et al. 2001, Burrows & Willis 2005

Duhaldea stuhlmannii

(Asteraceae)

Common name Uwutupwa, isasami, ikusa



Description A vigorous creeper which scrambles over other plants. Flowers are produced in October in Umalila.

Ecology Grows at the forest edge at around 2,000m. A rare plant previously known only from the Usambara and Uluguru mountains (Personal communication - Vollesen 2001).

Uses Reported as a good bee forage though the honey produced is said to be rather bitter. The plant is also used as a fish poison.

Soil erosion is a serious problem in some parts of Umalila. Planting crops or fodder grasses, such as Napier or Guatemala grass, along the contour can reduce soil erosion considerably.



Ehretia cymosa

(Boraginaceae)

Synonym *E. sylvatica*

Common names Itundumusi



Description A much branched, crooked, fast growing tree or shrub, very variable in size. It may grow up to 20 m high. Bark is pale brown with prominent lenticels. Leaves are simple and alternate on short petioles 1.2 – 3.5 cm long. The tree is often covered with the small, white, sweet scented flowers. The plant was seen in flower in October.

Ecology Common between altitudes 500 and 2,700 m in high rainfall areas of Tanzania. It occurs often in secondary medium-altitude evergreen bush in Ethiopia. Found in West and Central Africa and south to Zimbabwe.

Propagation Easily grown from seed.

Uses Bees collect nectar and pollen throughout the day from the flowers. The tree is known to be a valuable bee plant with a long flowering period. It provides valuable timber for furniture and farm tools. The leaves are browsed by livestock. Branches are used for firewood. In Ghana the small stems are used as chewsticks. The plant has various medicinal uses. In East Africa the leaf sap is sprinkled on wounds to stop excessive loss of blood. In Ethiopia the tree is planted around dwellings to attract bees to the hives.

References Bally 1937, Burkill 1985, Blundell 1987, Fichtl & Adi 1994, Hepburn & Radloff 1998, White et al. 2001, Lovett et al. 2006

Ekebergia capensis

(Meliaceae)

Common names Ihoho (Malila), Cape ash, dog plum.



Description An evergreen, or semi-evergreen tree, up to 30 m in height. The stem is swollen at the base and may be buttressed. Leaves are glossy, compound, 10 – 35 cm long with usually 6 - 14 leaflets and one terminal leaflet. Male and female flowers are produced on different trees, often in great abundance. The flowers are small, greenish yellow or white, and sweetly scented. Fruits are round, 1 – 2 cm in diameter, turning pink to yellow-red when ripe. The tree is reasonably fast growing.

Ecology Found from Ethiopia to Western Cape in South Africa and from sea level to 3,000 m. In Tanzania it is found in lowland scrub, and in riverine and highland forest. It is sometimes planted as an ornamental tree in towns. The tree grows well in deep sandy soils.

Propagation Germination of fresh seed is good but slow (37% after 4 weeks and 60% after 6 weeks). Fruit is best collected from the tree. Flesh must be removed from the seed by soaking in water and squashing by hand. The seeds are then washed in water. They do not store well and should be sown within 4 weeks of harvest. Plant no deeper than 5 mm in river sand. Seedlings can also be collected from the wild. Cuttings can be taken from the tips or from older wood and

planted in sand. Alternatively large cuttings (truncheons) can be planted direct at the permanent site.

Management The tree grows fast and can be interplanted with bananas and coffee without affecting yields. Young trees should be protected from livestock for the first two years.

Uses In Umalila the tree is reported to be a valuable bee forage in November. Bees are known to be strongly attracted to the flowers for nectar and pollen in South Africa and Ethiopia. In Ethiopia the bark is burnt in traditional hives to attract bees to enter. The wood is light, soft and straw-coloured with an even grain; it works easily and makes attractive furniture but is not very durable. The wood is suitable for poles, tool handles and light construction work and also for firewood and charcoal. Leaves can be fed to stock. Various parts of the tree have medicinal uses and the tree can also be grown for shade.



Ekebergia capensis with a few flowers in July.

References Deschodt 1976, Coates Palgrave 1983, Fichtl & Adi 1994, Mbuya et al. 1994, Venter & Venter 1996, ICRAF 1998, Msanga 1998, van Wyk & Gericke 2000, Dlamini & Sisulu 2004, Lovett et al. 2006

Eleusine coracana

(Poaceae)

Common names Uwulezi (Malila), mwimbi, mbege, ulezi (Swahili), finger millet.

Description A tufted annual grass, growing 40 – 170 cm tall, and taking between two and a half and six months to mature. It has narrow grass like leaves and many tillers and branches. The head consists of a group of finger like spikes.



Ecology A traditional food crop in Umalila but probably grown less frequently now. It is often planted on land cleared from *Kotschyia recurvifolia*. Certain varieties are suited to upland areas, growing between 1,000 and 2,000 m. The plants require a well distributed rainfall throughout the growing season with the absence of long drought periods. It will grow under a wide variety of soil conditions but prefers well drained, fertile sandy loams. It will not tolerate water-logging. Heavy rain at flowering can affect grain

setting and reduce crop yield.

Propagation Either the bush is cut and burnt before sowing with the first rains or grassland is dug and the sods turned over and placed in heaps and burnt. Seed is usually broadcast in November. It would reduce the labour needed for weeding, as well as the risk of erosion, if seed was planted in lines across the slope. A fine seedbed is required. Two crops a year can be grown if early maturing varieties are used. Seed germination drops to 50% after 2 years. There is no dormancy period. If sown in lines, rows should be spaced 20 – 35 cm apart and plants thinned to a spacing of between 5 and 10 cm in the rows.

Management Individual heads are cut with a knife together with some stalk. The heads are then usually dried out above the kitchen fire. Alternatively the heads can be piled in heaps for a few days. This encourages fermentation and the heating makes the seed easier to thresh.

Uses Finger millet is one of the world's most nutritious crops. The protein content is from 6.7 to 8% being especially rich in Methionine. The stored crop is not attacked by insects though mice are a major problem in Umalila. The grain is made into flour and used in the preparation of uji (liquid porridge) or ugali (stiff porridge). Sour milk and melted butter may be added to finger millet ugali. The flour can also be made into bread. Milling can be simplified using the "mini millet mill". The porridge tends to be gritty and is often eaten with a slippery vegetable like *Corchorus olitorius* L. The seeds may also be germinated and made into malt, an easily digested food for infants and elderly people. Much of the crop is used for beer making in Umalila. Finger millet straw makes good fodder containing up to 61 % total digestible nutrients.

Remarks The main problem with finger millet is the time taken for weeding, harvesting and threshing. A wild relative of finger millet is hard to differentiate in the field making weeding particularly difficult. The crop is subject to quelea and other bird attack and can sometimes be attacked by a serious fungal disease.

References Acland 1971, Purseglove 1972, BOSTID 1996, Maundu 1999, de Wet 2006

Emilia sp.

(Asteraceae)

Common names Enzumba



Ecology A common plant in cultivated land and beside paths.

Uses Bees were seen visiting the flowers in June. Bees are known to collect nectar and pollen from *E. discifolia* in Ethiopia.

Remarks There are 38 species of *Emilia* in East Africa. This is probably *E. basifolia* (Personal communication - Vollesen).

References Blundell 1987, Fichtl & Adii 1994



Yalenga village from Isaho forest

Ensete ventricosum

(Musaceae)



Ensete ventricosum in forest in Umalila

forests. Rainfall range 900 – 2,250 mm. The plant can be found growing wild in many parts of sub-Saharan Africa. It thrives in the cool tropics between 1,700 – 2,450 m and grows well on deep, well drained soils of volcanic origin with a pH of between 5.6 and 7.3. The plant can grow in wet and weed infested soils.



Propagation

Can be grown from seed or suckers.



Squeezing out liquid from a section of stem. This can be drunk

Management In Ethiopia where the plants are grown for food the stems are normally harvested just before flowering, which occurs 3 - 9 years after planting, depending on altitude, system of growing, number of times transplanted, soil and rainfall.

Left : *Seed being used to play the game of bao or bao la mtaji*

Synonym *E. edule*

Common names Igawo (Malila), mabangala (Nyakyusa), ndizi mwitu (Swahili), false banana

Description A giant herb arising from a short upright rhizome. Plants are usually from 4 to 12 m tall. The edible pseudostem is formed from the overlapping bases of leaves. Leaf blades are erect or spreading, forming a large rosette. The mid-rib is red or green. The flower appears from the centre of the rosette and hangs down when mature. The fruits resemble small bananas, and are arranged in clusters. The hard black seeds, 15 - 20 mm in diameter, are embedded in orange pulp. Once the seeds become ripe the whole plant dies.

Ecology Common in forests in Umalila. Found in disturbed places in upland forest, often in ravines and on steep slopes, or in swamps and on river banks, but also sometimes in drier lowland



Ensete ventricosum in flower

pseudo-stem and corm. Occasionally the young flowers are cooked and eaten. The corms can also be cooked unfermented. The young plants produce leaves which are used as a vegetable and mature leaves are used for thatching in Kenya. Pieces of stem are boiled and the liquid is drunk for the treatment of liver problems. Juice from the stem is drunk by Meru women to protect them from childbirth problems. A white powder is made from the seeds and used to treat wounds. In Malawi the fibre from the outside of the leaf stalk is used to make a strong string.

References Watt & Breyer-Brandwijk 1962, Williamson 1975, Kokwaro 1976, Peters et al. 1992, FTEA 1993, Beentje 1994, Raemaekers 2001, Ruffo et al. 2002, Schippers 2002, Lovett et al. 2006, NRC 2006

Uses In Umalila the leaves, slightly wilted, are used for wrapping foods. The stem and leaves are used as a cattle fodder during the dry season and the stem produces a brown dye. The liquid squeezed from sections of the stem is drunk for refreshment when no water is available (see above). It is also splashed into a beehive, apparently to encourage bees to build comb. Bees visit the flowers for nectar. The fruit is occasionally eaten in Umalila but elsewhere is used only as a famine food. Leaf strips are used for binding material. The leaves are also used to make up bee smokers for harvesting honey (see below). The black seeds are used for making necklaces and in the game of bao (see above). The plant is grown for shade and as an ornamental. In Ethiopia it is an important traditional food being cultivated for the flour obtained from the fermented



Ripe fruits (Imbidio) have poor taste and contain large seeds



Left : Making up a smoker from split bamboo stems wrapped in leaves from Ensete ventricosum, for use when harvesting honey.

Entandrophragma excelsum

(Meliaceae)

Common names Ihale (Malila), mahogany



Description A deciduous forest tree with a clear trunk up to about 24 m and having a large crown. The base of the trunk is buttressed up to 4 – 5 m. Bark thick grey and smooth when young, becoming brown with pale pink-orange patches. Leaves, up to 60 cm long, or more, are compound with 5 – 7 pairs of leaflets. Each leaflet is 18 cm long and 8 cm wide. Flowers are tiny, white in stiff heads about 30 cm long and 10 cm across. Fruit is a cylindrical woody capsule, dark brown black, 12 – 20 cm long, pointed and breaking open into 5 parts, starting at the base but falling

together. Winged seeds are about 7 cm long. Seed is produced every 2 years.

Ecology Grows in mountain rainforest between altitudes of 1,500 and 2,000 m. Also present in Uganda, D.R.Congo and Malawi.

Propagation Can be grown from seed or wild seedlings. Soak the seed in cold water for 12 hours. Seeds should be stored in wood-ash but no longer than for 2 months. Germination of fresh seed can reach 95%.

Right : *Seeds and fruit in Ilomba forest.*

Management Shade seedlings until well established. Seedlings can be planted out as an avenue or in pure stands. In Rwanda the tree is planted around buildings, in fields and banana plantations and along water courses.



Uses An important timber tree, though the timber warps and twists unless well seasoned. The wood is used for heavy construction, carpentry, tools, firewood and charcoal. The tree is used for soil stabilization and to provide shade. The fallen leaves produce a good mulch and are used medicinally in Rwanda. Root bark ash is rubbed into scarifications made when a person coughs up blood. At Ilomba the flowers are reported to be visited by bees.

References Williamson 1975, Egli & Kananganire 1988, Katende et al. 1995, Neuwinger 2000, White et al. 2001, Vande weghe 2004, Burrows & Willis 2005, Lovett et al. 2006

Eriobotrya japonica

(Rosaceae)



Common names Insongwa (Malila), loquat

Description A compact tree growing up to 7 m high and branching close to the ground. The bark is grey and rough, young stems are hairy. Leaves, up to 35 cm long, have no stalks, are dark green and shiny above, but have woolly hairs on the under surface. The tip is pointed and the edge slightly toothed. Young leaves are paler. Foliage is borne in upward pointing tufts towards the end of the branches. Flowers are cream to white, scented, in pyramid like tufts also at the ends of branches, flower buds being covered with golden-brown hairs. The

tree flowers profusely after rains. Fruit is yellow, egg shaped to 3.5 - 6 cm with brown-black seeds The flesh is acid-sweet.

Ecology Originally from China, Japan and northern India. It is grown occasionally in home gardens in Umalila. The tree does well in the Tanzanian highlands from 1,500 – 2,400 m. It is drought resistant once established, but prefers a moderate to high rainfall range of between 900 and 1,200 mm. It produces the best fruit in sheltered areas. Soil should preferably be acid and well drained.

Propagation This is normally done by direct sowing, or by transplanting seedlings or wild seedlings. No treatment is necessary but the seed does not store well and should therefore be sown as soon as possible. Improved varieties are propagated by layering or grafting.



Management Fairly fast growing. Trees start producing 2 – 3 years after planting but should be pruned to increase the size of fruit as they tend to overbear. Pruning should be done immediately after harvest. Normal yield of fruit per tree is between 16 and 20 kg per annum.

Uses The fruit is normally eaten fresh but can be made into an excellent jelly. It is rich in vitamin A, having a high carotene content, but the quality of the fruit is very variable. The fruit is a good source of acid and pectin. The wood is used for firewood, poles and carving, and the tree is planted as a boundary marker in Arusha and Kilimanjaro areas. The tree provides shade, mulch and makes a good windbreak. Because of the long flowering period it is a valuable bee forage. Bees collect both pollen and nectar. Nectar secretion is moderate to good but is reduced during dry periods, especially if dust is carried onto the flowers. Sugar concentration of nectar is high, from 30.5 to 65% and pollen yield is also good. Honeybees are the main pollinators.

Remarks If improved grafted trees are available, they make stronger growth, remain smaller, and mature and produce fruit faster. Always remove seeds before cooking as they are poisonous.

References FAO 1982, Crane et al 1984, Macmillan 1991, Nguyen Tien Hiep & Verheij 1991, Fichtl & Adi 1994, Mbuya et al 1994, ICRAF 1998

Erythrina abyssinica

(Fabaceae)



Synonym *E. tomentosa*

Common names Iseve, esebe (Malila), mwamba ngoma (Swahili), red-hot poker tree, lucky bean tree

Description A small deciduous tree with deeply grooved bark from 5 to 15 m high. Leaves are compound with 3 alternate leaflets, each 5.5 – 15 cm long and 6 – 14 cm wide. The terminal leaflet is the largest. Flower heads, up to 5 cm long, appear before the leaves during the dry season. Seeds are shiny red.

Ecology Normally found in warm temperate and tropical areas of Africa. It grows best in well-drained soils at altitudes between 1,250 and 2,400 m. Trees can be planted near the home and around field boundaries without affecting crop yields. The tree tolerates fire and is fairly termite resistant.

Propagation Grows easily from cuttings, after removal of the leaves. Plant 50 cm cuttings at the start of the rain season or just before flowering. Germination rate of seed is low, though this can be improved by rubbing seed on sandpaper. Alternatively seed can be soaked in water for several hours before planting.

Management Trees are slow-growing

and can be coppiced or pollarded.

Uses The tree produces flowers over a long period and is a valuable source of nectar and pollen for bees at the end of the dry season. Wood is used for carved items (kitchen utensils mortars, stools, guitars and drums) and sometimes for firewood. Though it does not split when being nailed it does not hold nails well. The bark and leaves are used medicinally. In Umalila the leaves were sometimes used instead of spoons. The leaves provide fodder for sheep and goats, and also make good mulching. The tree is nitrogen fixing and therefore useful for soil improvement. Cut branches are used for making hedges. A brown dye is extracted from the bark. The tree can provide good shade.



Erythrina abyssinica flowering in October

References Egli & Kalinganire 1988, Pauwels 1993, Mbuya et al. 1994, Van Wyk et al. 1997, ICRAF 1998

Eucalyptus saligna

(Myrtaceae)

Common names Ilongoti (Malila), mkaratusi, mtimbao (Swahili), Sydney blue gum, saligna gum



Description The tree can grow from 30 to 50 m high. The straight trunk may be clear of side branches from half to 2/3 of the total height. Bark is rough, brown, peeling in strips near the base, but smooth, green-white on branches. Young leaves are at first opposite then alternate. Adult leaves are curved, 9 – 17 cm long and 2 – 3 cm wide. 7 to 11 flower buds are produced in the leaf axils.

Ecology This is the dominant gum tree grown in the highlands of Tanzania. It is widely planted throughout Africa, though see 'Remarks' below. It will grow on all sites other than those infested with termites. It grows best on sandy loams which are moist and well drained.

Propagation Seed should be planted in nurseries and then

transferred to plastic sleeves before planting out. The young plants should be grown in full sunlight and kept clean weeded for the first two years. Seed remains viable for a long time if kept dry. Trees start bearing seed from 7 – 8 years of age.

Management The tree is fast growing and can be coppiced.

Uses The flowers of various *Eucalyptus* species are an important source of nectar. A fine extra light amber honey is produced from *Eucalyptus* in combination with *Olea* sp. The tree is often planted for firewood. The timber is used for making furniture and in general construction work, for veneers, plywood, poles and posts. It is also used for charcoal, medicine, shade and windbreaks.

Remarks In Africa many of the early plantations were actually of *E. grandis* not *E. saligna* as the former was not named until 1918. Before that seed of both species were exported under the name of *E. saligna*. Hybrids of the two species are also present.

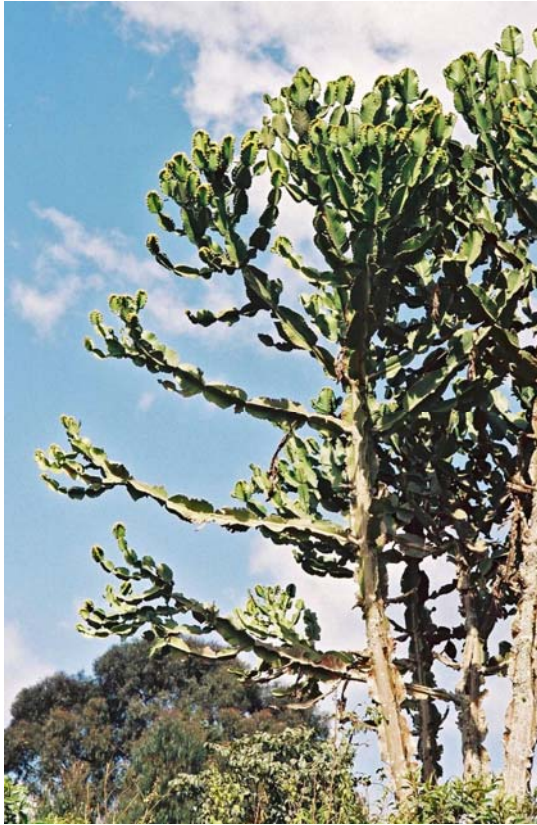


References Smith 1960, Crane et al. 1984, Mbuya et al 1994, Brooker & Kleinig 1996, ICRAF 1998

Euphorbia nyikae

(Euphorbiaceae)

Common names Ilangali, irangari



Description Shrub or more often a tree from 3 to 12 m high. Branches are succulent, in segments and are winged with 2 - 4 spiny wings. The spines are 0.3 - 3 cm long. Leaves are deciduous. Flowers and fruit are yellow-green.

Ecology Grows in bushland and woodland on rocky hills and outcrops between altitudes of 550 and 2,000 m.

Propagation Cuttings root easily when the soil is dry, but great care should be taken not to get sap into the eyes.

Uses Bees visit the flowers in Umalila but the honey produced is reported to be bitter. *E. abyssinica* and *E. candelabrum* are also visited by bees for the abundant nectar and some pollen. These trees are very helpful in strengthening colonies and maintaining brood rearing in the dry season. However the yellow honey produced from *E. abyssinica* is said to be poisonous, though this is not normally a problem, as bees collect nectar from other sources at the same time. The wood is used for construction work and the trunk for making beehives in Umalila. It is also sometimes grown as a hedge (see below). The root or fresh latex is used medicinally in eastern Tanzania to treat epilepsy, inflammation of the urinary tract and blood in the urine.

References Beentje 1994, Fichtl & Adi 1994, Neuwinger 2000



Euphorbia nyikae planted as a hedge

Faurea saligna

(Proteaceae)

Synonym *F. speciosa*

Common names Vunda vunda (Malila), beechwood, red beech.

Description A deciduous shrub or slender forest tree growing up to 17 m high with a dense crown. The trunk is often twisted. Leaves are up to 16 cm long and 3 – 3.5 cm wide. Flowers are 12 - 15 cm long and 2 - 3 cm wide, greenish-creamy white, and smell of coconut or honey. The tree resembles a Eucalyptus. It sprouts from an underground stem. Seed is dispersed by wind.



Photo : Braam van Wyk

Ecology. Found in both low and high altitude forest from Nigeria to Sudan and in southern Africa. Common around forest edges in Tanzania. Trees are often left standing in crop-land. It is common in savannah bush in north-eastern South Africa, Mozambique and Zimbabwe with an altitude range of 2,100 to 3,000m. The tree is often associated with poor, sandy or rocky soils.

Propagation Use fresh seed but trees are not easy to grow. Seed viability is lost after 1 month.

Management The tree grows rather slowly. It can withstand some fire damage but not fierce grass fires. Trees are sometimes left in cropland.

Uses An excellent bee forage producing plenty of nectar. Sometimes however, although the tree may flower, little nectar is produced. There is normally a heavy flow every 5 years. Honey flavour is strong and malty. The honey is black, solidifies fairly quickly and tastes aromatic, similar to toffee. The timber is used for furniture and construction work. The hard, yellow-brown heartwood has an attractive, net-like patterned grain, and is valued for panelling, ornaments, utensils and furniture. Stems are used for poles and posts. The wood is also used for firewood or charcoal. The roots and bark are used medicinally. The leaf and root are used for ear troubles in Zimbabwe and the root to treat diarrhoea and indigestion in East Africa. The leaves make good mulching. The tree is grown as a windbreak. The bark can be used for tanning and dyeing. The wood is resistant to termites and borers.

References Watt & Breyer-Brandwijk 1962, Wild et al. 1972, Williamson 1975, Coates Palgrave 1983, Crane et al. 1984, FTEA 1993, Mbuya et al. 1994, Burkill 1997, ICRAF 1998, SEPASAL 1999, van Wyk & Gericke 2000, Kihwele et al. 2001

Ficus lutea

(Moraceae)

Synonym *F. vogelii*

Common names Indolo or Indola (Malila), mkuyu (Swahili), giant leaved fig.



Description A large spreading, buttressed tree, often having a short trunk, but which may grow up to 30 m high. The tree may have aerial roots and is sometimes epiphytic. Bark is dark brown to grey and smooth. Cuts in the bark produce latex freely. Leaves have clear yellow veining and are 7 – 25 cm long and 3 – 12 cm wide, simple, alternate and in a spiral. The petiole is 1.3 - 13 cm long. Flowers are produced in leaf axils or just below. Fruit is stalk less, round, 1 – 2.5 cm, yellow orange or brown when ripe.

Ecology Although this tree normally grows beside rivers in the lowland tropics, it is also present in some highland situations. Present in Eastern and Southern Africa and in Angola and D.R. Congo.

Propagation Short branches up to 60 cm long strike easily and grow fast in warm moist conditions. It can also be grown from seed. The ripe figs should be opened and dried for a day or two. Cover seed lightly and keep moist and in sunlight. Germination takes place from 10 days to one month.

Right : *Cuts made in the trunk to extract latex for bird lime.*

Uses In Umalila the stakes are used for cattle bomas and the latex for trapping birds. The tree makes a good shade tree. The bark was formerly used for making bark cloth in Tanzania. This is still done in Mozambique. In Tanzania the latex is used to stop blood loss and to dress wounds. Fruit is sometimes eaten by children. In southern Africa the wood ash is used to make soap. Leaves can be used for fodder.



References Watt & Breyer-Brandwijk 1962, Coates Palgrave 1983, Burkill 1997, Dharani 2002, Burring 2004, Lovett et al. 2006

Ficus thonningii

(Moraceae)



Synonyms *F. hochstetteri*, *F. persicifolia*

Common name Ivum (Malila), mumbapori (Swahili).

Description An evergreen tree up to 30 m high, with a dense crown. The tree sometimes grows as an epiphyte and may strangle the host tree. Bark is smooth, pale brown or grey. When cut it produces a white latex, which often turns pinkish. Figs, enclosing many small flowers, are borne in the leaf axils. These are pollinated by a small wasp living inside.

Ecology The tree is widespread in tropical Africa and South Africa. It grows on a variety of soils but favours rich, deep loamy soils and is relatively drought resistant.

Propagation Stem cuttings, 20 cm long, root easily, sprouting after 7 - 9 days. Remove most of the leaves, leaving only a few at the top. Larger cuttings, 2 m long, can also be planted for hedges, but should be left in the shade for a few days before planting. Root cuttings can

also be used.

Management Protect the tree from browsing when young. It should not be planted near buildings as the roots may damage the foundations.

Uses Stems are used for livestock enclosures, boundary markers and as a goat fodder. Livestock eat the dry leaves in particular. A decoction of the leaves is used to treat mental disorders, stomach-ache, coughs and abscesses. A wash is made from the pounded leaves to treat haemorrhoids. The bark is pounded, soaked in water and used to treat rheumatism. A good jam can be made from the fruit. The latex can be used as a glue and bird-lime.



References Cobbina & Reynolds 1988, Keay 1989, Mbuya et al. 1994, Venter & Venter 1996, ICRAF 1998, Maundu et al. 1999, Neuwinger 2000, Lovett et al. 2006

Flacourtia indica

(Flacourtiaceae)

Common names Isugwa (Malila), governor's plum, Indian plum, Madagascar plum

Description A deciduous shrub or small tree, up to 10 m tall. The trunk bears straight or sometimes branched spines, up to 12 cm long. Branches may also have large spines. Bark is rough, powdery, pale yellow-grey. Leaves, red or pink when young, are variable in size, up to 12 cm long with toothed edges. The tree bears small, cream, fragrant male and female flowers. Fruits are reddish-purple to black, round and juicy but rather acid, up to 2.5 cm diameter, containing up to 10 seeds. The fruits remain on the bare tree after the leaves turn bright red-purple and fall.



Branch from a tree growing near Yalenga

Ecology The tree is fairly common and grows well in mountain woodland and at forest edges, on a variety of soils, from sea level to 2,400 m. Present throughout Tanzania and sometimes left on farms or cultivated. It is sometimes grown as a hedge. It is widespread in tropical Africa, Madagascar, Seychelles and Malaysia.

Propagation The tree cannot be vegetatively propagated but is grown from seed, which however needs to be cracked, nicked or pierced before planting. Germination may take up to 9 weeks. Wild

seedlings can also be used.

Management The tree is slow growing. It can be grown as a hedge, tolerating frequent trimming. It can also be coppiced.

Uses In Tanzania the fruit is eaten raw and has a pleasant flavour. It is also used to make jam and jelly. It is sometimes sold in markets. Fruits are sometimes dried for later use and then soaked in water before eating. The branches can be cut for livestock fodder. The leaves are used medicinally to relieve wind and are astringent, causing contraction of the body tissue and blood vessels. They are also used to treat asthma and as a tonic for anaemia. The roots are used to treat indigestion and stomach pains, snakebite and infertility. Roots are used to treat sore throats and coughs. The wood is white and tough and used for firewood, charcoal, spoons, beds and for building. The tree can be grown as a windbreak. Bees are reported to visit the flowers.



Photo : Ken Love, University of Hawaii

References Macmillan 1991, Verheij & Coronel 1991, Burkill 1994, Leakey & Newton 1994, Mbuya et al. 1994, Maundu et al. 1999, SEPASAL 1999, van Wyk & Gericke 2000, Ruffo et al. 2002, Lovett et al. 2006

Fuchsia magellanica

(Onagraceae)

Synonym *F. macrostemma*, *F. gracilis*

Common names Fuchsia



Fuchsia hedge round a home in Ilembu town

Description A shrub growing from 2 to 3 m high. The leaves are in opposite pairs or whorls of 3. Flowers are produced in large numbers over a long period. They are 4 – 5 cm long and borne on stalks which arise in the axils. They have a crimson tube and sepals and purple petals with protruding stamens.

Ecology Best grown in well drained soil. The plant will tolerate some shade.

Propagation Use 5 - 10 cm long softwood cuttings from the tips without flowers. These should be planted early in the rain season. Space 90 – 120 cm apart.

Management The plants should be trimmed back to form a thick hedge.

Uses Sometimes used as a hedge plant around homes in Umalila. Flowers have a high nectar content, the nectar being protected from rain by the drooping nature of the flower. The honey is of light colour and has little flavour. Another species, *F. excorticata*, is an important honey source in New Zealand.



References Jex-Blake 1957, Hay 1978, Howes 1979, Crane et al. 1984

Galiniera saxifraga

(Rubiaceae)

Synonym *Galiniera coffeoides* Del.

Common names Illepwa



Description A shrub or small tree up to 14 m tall with smooth grey bark, and often having long down-curved branches. Leaves are simple, opposite, on short petioles, 8 – 18 cm long and 3 – 7 cm wide, often with reddish veins. Triangular stipules are present between the petioles. Flowers are fragrant and white with pink-tips. The fruits are red and round, 7.5 – 9 mm across.

Ecology The tree grows in moist forest, often near water, between altitudes 1,850 and 2,400 m. It is present from Sudan and Ethiopia through eastern D.R. Congo and Rwanda and into Malawi and Zambia.

Uses In Umalila and in Ethiopia bees forage for both pollen and nectar. The tree is grown to provide shade and as an ornamental tree. The wood is used for firewood, tool handles, spoons, walking sticks and stirring sticks. The fruits are used medicinally in Ethiopia.

References Beentje 1994, Fichtl & Adi 1994, White et al. 2001, Burrows & Willis 2005, Lovett et al. 2006

Galinsoga parviflora

(Asteraceae)

Common names Ikuvengwa (Malila), Kew weed, gallant soldier

Description A small annual herb up to 20 cm high but it may grow to 60 cm in fertile soils. Much branched, almost hairless. Leaves are opposite and simple, up to 6 cm long with a pointed tip. The tiny flowers are produced all the year round in heads, up to 1.8 cm in diameter, and have many yellow tubular florets in the centre. There are 5 outer female florets composed of small white petals which have 3 lobes.



Ecology A notorious weed, originally from South America. Often present in vegetable gardens in Umalila. It thrives in well drained sites and is difficult to eradicate because uprooted plants tend to re-establish themselves easily.

Uses Bees collect nectar and pollen. The young stems and leaves are used as a vegetable in several countries in central Africa. In Kenya and Uganda the young leaves are chopped

up and cooked as a vegetable with simsim or groundnut paste. They are also eaten in Indonesia and can be fed to chickens, rabbits and pigs. 100 g fresh plant contains 3.2 g protein. The herb has strong cardio-vascular properties and is used occasionally for dressing wounds. Stems and leaves are chewed to cure colds or sores.



Reference Uphof 1968, Kokwaro 1976, Burkill 1985, Goode 1989, Fichtl & Adi 1994, Katende et al. 1999, Maundu et al. 1999, Neuwinger 2000, Schippers 2004



Khatanta forest near Maendeleo village

Garcinia kingaensis

(Clusiaceae)



to have antibiotic properties. Wood is used for general purpose carpentry but is difficult to saw. An aqueous extract from the roots is drunk to relieve chest pains in Malawi.

Remarks Reported as a bee forage. Bees are known to collect nectar from *G. livingstonia* in Tanzania.

References Williamson 1975, Coates Palgrave 1983, Ruffo et al. 2002, Lovett et al. 2006

Synonym *G. mlanjiensis*

Common names Penausiku, mpukuso (Malila), mpekesho (Swahili), northern forest Garcinia, African mangosteen.

Description A small to medium, often slender, tree up to 15 m high. It has numerous, regular, horizontal branches. Bark is brown and smooth. Young branches are grooved and square in section. The dark green, thick leaves are 6 – 16 cm long, with a prominent tip. Orange-yellow fruits are up to 2.5 cm in diameter.

Ecology The tree is common and often grows as an under-storey shrub in evergreen forest, beside rivers and in open woodland. It is also present in Malawi, Zambia, Zimbabwe and Mozambique.

Uses Fruits are edible and have a refreshing acid-sweet taste. Extracts of the leaves and flowers have been found



Garcinia kingaensis in flower at Sheyo in October

Geniosporum rotundifolium

(Lamiaceae)



Coarse form flowering in July

Uses A very useful bee forage in Umalila. Bees collect both nectar and pollen over a long period during the dry season. An extract from the aerial parts of the plant is used to treat liver inflammation and an extract from the leaves and twigs is drunk to treat epilepsy in Rwanda. The plant is used in a variety of ways in Burundi, for example, the leaf ash is eaten to treat vomiting, nausea and coughs and a decoction of leafy twigs is made into a vapour bath to treat general weakness and also used as an enema to treat diarrhoea.

References Blundell 1987, Neuwinger 2000

Synonym *G. paludosum*

Common names Ishumwa

Description A very variable, erect perennial herb, growing from a woody rootstock, up to 1.2 m high. The plant flowers at the end of the rains, from May to July in Umalila.

Ecology Widespread in the Southern Highlands of Tanzania, often beside tracks and roads, especially at the base of hedges. The coarse form is found in rocky sites while the more slender form is found in seasonally wet areas. Also found on grazed hilltops, riverine forest and arable land; altitude range 1,150 – 2,775 m. Widespread in tropical Africa.



Slender form flowering in May

Gladiolus dalenii

(Iridaceae)

Synonym *G. psittacinus*, *G. natalensis*

Common names Ishirungu



Description A robust plant, 50 to 150 cm tall, growing from a corm, 3.5 cm in diameter, with leaves 40 to 120 cm long and 0.7 to 3 cm broad. Flowers 3 - 9, very variable in size and colour, 3.5 to 6 cm long, white, yellowish-green, orange, pink, red or brown often flecked with red or brown. Flowers are produced throughout the rainy season.

Ecology The plant is common in grassland above 2,000 m in the Southern Highlands. It is widespread throughout tropical and southern Africa and prefers a well drained, fertile soil.

Propagation Small corms can be separated from the parent plant and should be planted out 12 cm deep, spaced at 12 cm. Deep planting helps the plants stay upright.

Management Porcupines may dig up and eat the corms.

Uses The corm is used as a soap substitute in Umalila. Children suck the base of the flowers for the nectar. In South Africa a decoction of the corm is used to treat colds and dysentery. The powdered corm is often taken for dysentery. Smoke from burning the corm is inhaled to treat a cold. The plant is also used medicinally in Sudan, eastern Congo, Benin, Togo, Rwanda, Ethiopia. Also grown as an ornamental.

References Jex-Blake 1957, Watt & Breyer-Brandwijk 1962, Cribb & Leedal 1982, Hessayon 1984, Philips & Rix 1997, Neuwinger 2000



Gnidia glauca

(Thymelaeaceae)

Common names Suwaji, isuwaji (Malila), balsam tree

Description A shrub up to 3.5 m tall or, less commonly, a small tree with a spreading crown and up to 13 m tall with a woody stem and fibrous bark. Leaves are alternate, but appear as a rosette, 3 – 6.5 cm long and 0.8 - 1.6 cm wide towards the ends of the branches. The flower head is 3.5 - 5 cm across with between 20 and 50 yellow or orange slightly fragrant flowers surrounded by bracts.



Ecology Common throughout the southern highlands above 2000 m and often associated with *Hagenia* and *Kotschy* species. Widespread in tropical Africa from Sudan and Ethiopia to Malawi and Zambia.

Management The plant regenerates quickly after fire.

Uses The bark produces a strong fibre which is used for making thread and ropes. In Umalila the flowers, produced from June to October, are reported as a bee forage. The roots are boiled and the liquid drunk to treat indigestion.

Remarks *G. involucreta* is also called Suwaji (Malila).

References Kokwaro 1976, FTEA 1978, Cribb & Leedal 1982, Beentje 1994, Burkill 2000, White et al. 2001, Burrows & Willis 2005

Gnidia involucrata

(Thymelaeaceae)

Common names Suwaji

Description An erect perennial herb with green to reddish stems, growing from a creeping, woody rhizome. Stems are sometimes brown. A very variable species, especially in the degree of branching, which appears to be related to variations in the weather and the intensity of burning. The hairless and commonly un-branched stems are up to 40 cm tall, but may branch and reach 2 m in plants growing at lower altitudes. Leaves are 1.2 to 1.5 cm long and 1.5 to 4 mm wide. Flowers are yellow or creamy-yellow, (sometimes orange-red or pinkish to red), about 1.5 cm long and have large reddish or brown bracts, 8 – 10 mm long. The plant flowers from September to January though this photo was taken near Yalenga in April.



Ecology The plant is common in the seasonally burnt grasslands above 1,500 m in the Southern Highlands. Also found in open and wooded grassland and in deciduous bushland and woodland between 1,000 – 2,700 m altitude, in Ethiopia, Sudan, Uganda, and south to Mozambique.

Uses Bees were reported to visit the flowers near Yalenga. In Marakwet, Kenya the stalk is chewed to help clear mucous from the respiratory system. In Zimbabwe root powder is used to contract the vaginal canal.

References Cribb & Leedal 1982, Blundell 1987, Neuwinger 2000

Gouania longispicata

(Rhamnaceae)

Common names Lihambako



Description A creeper up to 20 m long which climbs by means of coiled tendrils with reddish hairs. Leaves are simple, alternate, 8.5 cm long and 7 cm wide, with toothed margins. Flowers are small, greenish or yellowish white in long racemes. The plant flowers after the rain season. Fruits are light brown and have three wings.

Ecology Grows in gaps in the forest and on forest margins in mountain areas between 1,100 and 2050 m altitude. Also present in southern Nigeria and widely

distributed in eastern Africa from Sudan to Mozambique.

Propagation Can probably be grown from seed.



Uses Reported as an important bee forage in Umalila. Bees are known to collect nectar and pollen in Ethiopia from this plant. *Gouania* species are known as bee forage in equatorial and dry savannah areas of Africa. *G. lupuloides* and *G. polygama* are reported to be important honey sources in tropical Central America. The leaves are eaten in Morogoro district. A root decoction is taken to treat hard pussy abscesses. Stems are used for tying in Tanzania.

References FZ 1966, Crane et al. 1984, Beentje 1994, Fichtl & Adi 1994, Burkill 1997, Hepburn & Radloff 1998, White et al. 2001, Burrows & Willis 2005

Grevillea robusta

(Proteaceae)

Common names Grevillea, silk oak, silver oak.



Description A fast growing, deep rooted tree reaching 20 m in 15 - 20 years on good sites.

Ecology Originally from Australia but now grown throughout the subtropics. Mature trees can withstand occasional light frost but not young plants. It grows at a wide range of altitudes, from sea level to above 2,300 m. Can be grown where annual rainfall is only 400 - 600 mm, with 6 - 8 dry months. It will grow in many types of soil, including sandy soils, loams of medium fertility and mildly acid soils but deep soils are preferred. It does not tolerate water logging. The roots are able to extract phosphorus from soils very low in this mineral. The tree is sometimes grown as a coffee shade tree in the Mbeya region.

Propagation Use seed or cuttings. Seed is difficult to collect as there are only 2 - 3 days between seed maturity and dispersal by wind. Only mature seed can be used which remains viable for up to 3 months. Germination rate is between 30 and 90%. Seed should be put out in sunlight for a few hours before sowing. Natural seeding is fairly

common in cultivated land. The seedlings can be transplanted when 60 cm tall.

Management Moderate to fast growing. Young, but not mature trees, can be coppiced. The tree can be pollarded. When grown with food crops, branches are pruned and pollarded and lateral roots may also be pruned to reduce competition with the crop.

Uses A valuable timber tree, suitable for cabinet making, as well as for firewood and charcoal. The tree can be planted in farm land, generally around fields, as it has little effect on shallow rooted crops. The flowers are a valuable pollen and nectar source for bees. The nectar secretion is abundant with high sugar concentration and the pollen yield is heavy. Bees forage all day and, when flowering is heavy, a surplus of honey is produced from areas with many trees. The honey is reddish black, has a strong flavour and granulates rapidly.



Remarks Although this tree is not grown widely in Umalila farmers are interested in it and it is likely to become widely planted in future. ADP Isangati have a small plantation at Santiliya.

References Leloup 1956, NAS 1980, Egli & Kalinganire 1988, Fichtl & Adi 1994, Mbuya et al. 1994, Skene et al 1996

Guizotia scabra

(Asteraceae)

Common names Inzumba

Description A very variable, erect, usually rough, perennial herb which can grow up to 2 m high. It has a wiry rootstock. Leaves are opposite, simple, have no stalk and clasp the stem. They are often toothed, 5.5 – 10.5 long and 1 – 3 cm wide. The yellow flowers are borne in terminal heads and are produced throughout the year but most abundantly after the rains.



Ecology Fairly common in upland grassland in Umalila. Also found in abandoned fields. It is widespread in Tanzania between the altitudes of 1,520 and 2,780 m in all regions except Tanga and Morogoro. Also present in Nigeria, Cameroon, D.R. Congo, Zambia, Malawi and Zimbabwe.

Uses The young leaves are eaten as a vegetable in Tanzania. Bees were seen gathering nectar in Umalila. In Ethiopia bees gather significant amounts of pollen and nectar from the subspecies *scabra*, and the subspecies *schimperi* is a very important honey source. *G. abyssinica*, which is grown to produce Niger oil, is one of the most important honey sources in that country. In Uganda the stalks with ripe seeds are also harvested and put on a platform until dry and the seeds are shed. These are then roasted, ground up and made into a simsim like paste, which has a mildly bitter taste. This is eaten with vegetables, beans or peas and is an important source of protein and oil. The plant is widely used medicinally in a number of countries in Africa.

References Goode 1974, Crane et al 1984, Blundell 1987, Fichtl & Adi 1994, Katende et al. 1999, Ruffo et al. 2002, Bosch 2004

Gynura scandens

(Asteraceae)

Common names Iwozya



Description A weak creeper which may grow to 12 m long. The plant has an unpleasant smell. Leaves are fleshy and toothed, 2.5 – 12 cm long and 1.5 to 8 cm wide. The flower heads are composed of many orange-red flowers, 11 mm across. In Umalila flowers are produced in October.

Ecology Grows in hedges, at forest margins and in clearings, often near water, up to an altitude of 2,100 m in Tanzania, Kenya, Uganda, Rwanda, Burundi, R.D. Congo, Malawi and Zambia.

Uses Reported to be visited by bees. The plant is used by the Haya people in Tanzania to treat high fever in both babies and adults. Leaves are crushed, mixed with butter and rubbed on the whole body which causes perspiration. The body may alternatively be washed with hot water in which the leaves have been soaked. A hot decoction is used for indigestion. Leaves are also used for fever in eastern DR Congo. An extract of leaves is drunk and rubbed in for sciatic pain in Rwanda. In Umalila it is believed that growing the plant in the compound protects the home from thieves.



References Kokwaro 1976, Blundell 1987, Neuwinger 2000, Burrows & Willis 2005

Hagenia abyssinica

(Rosaceae)

Common names Iliogoti (Malila), mtulanya, mturunga, nturunga (Nyakyusa)



Description A slender tree up to 20 m high with a short trunk and thick branches. The twigs are covered with silky brown hairs and ringed with leaf scars. Leaves are compound, 40 cm long, composed of 6 – 8 pairs of leaflets, each up to 15 cm long. The male and female flowers are produced on different trees in large hanging bunches, up to 60 cm long and 30 cm wide. Female flowers are pinkish-red, male flowers are orange-white and more feathery in appearance. Flowers may be produced throughout the year, other than in the coldest months.

Ecology Grows in East Africa and Ethiopia. Common in the mist belt, often above the bamboo zone, in mountain areas, from 1,850 – 3,700 m where mean annual rainfall is between 1,000 and 1,500 mm. Adapted to most soils as long as they are well drained.

Propagation Can be grown from seed or transplanted wild seedlings. Seed can be stored for up to 6 months. No treatment is necessary before planting.

Uses Bees collect pollen from the male and nectar from the female flowers and the tree is an important honey source. It is valued

for its leaf litter being associated with greater crop production and faster fallow recovery. The timber makes good firewood and charcoal. It is dark red and hard and widely used for furniture, flooring, beehives and carving but may be attacked by borers. The tree can be used for soil conservation planted at 2 to 3 m intervals along the contours. It does not compete with crops if managed to prevent shading. The dry female flowers are used as a de-worming treatment.

References Fichtl & Adi 1994, Mbuya et al. 1994, ICRAF 1998, East & Thurow 1999, Lovett et al. 2006



Hagenia abyssinica with male flowers in October at Shilanga

Halleria lucida

(Scrophulariaceae)

Common names Tree fuschia

Description A small tree growing up to 15 m tall with a crooked and branched trunk. Bark pale grey. Leaves simple, opposite, and 4.5 – 10 cm long and 2 – 6.2 cm wide, on a petiole from 0.4 – 1.2 cm long. Flowers are often borne in clusters on the trunk or branches and are orange-yellow with a curved tube. The fruit is a dark purple berry with sweet gelatinous flesh.



Halleria lucida in flower in the Southern Highlands in October

Ecology Grows in dry mountain forest, on forest margins and in secondary forest growth and riverine forest at altitudes between 1,400 – 2,450 m. Found from South Africa to Angola, Ethiopia and Yemen.

Propagation Easily propagated by layering but can also be grown from seed. Dry the seed in the shade after extracting them from the fruits. Seed germinates after 4 – 8 weeks. 10 cm cuttings can be planted in sandy soil at the beginning of the rains.

Uses The wood is yellow, hard and tough and is used for firewood and tool handles. The flowers are rich in nectar and visited by bees. An infusion is made from moistened dry leaves and roots and poured into the ear to relieve ear ache. Thin sticks can be used as fire-sticks. The fruit is edible but has a sickly sweet taste and tends to dry out the mouth. It is usually only eaten in times of food shortage. Unripe fruits can be ripened by burying them in sand. The plant is sometimes grown as an ornamental bush.

References Watt & Breyer-Brandwijk 1962, Deschodt 1976, Coates Palgrave 1983, Beentje 1994, Johannsmeier & Allsopp 1995, Venter & Venter 1996, Hepburn & Radloff 1998, White et al. 2001, Burrows & Willis 2005, Lovett et al. 2006

Haumaniastrum venosum

(Lamiaceae)



Inuha growing in bush on Mt. Mbogo

References Agnew 1974, Cribb & Leedal 1982, Paton 1997

Common names Inuha, inuka (smelling strongly - Malila), African mint.

Description An erect herb or shrub having simple leaves. The purple or blue flowers are produced in terminal heads.

Ecology A normally infrequent herb found in high altitude bush/grassland flowering in June and July. In some localities, for example around Itundu, it is fairly common. Found from West Africa to Zimbabwe and in Mozambique.

Uses Bees were seen collecting nectar in July at Itundu.

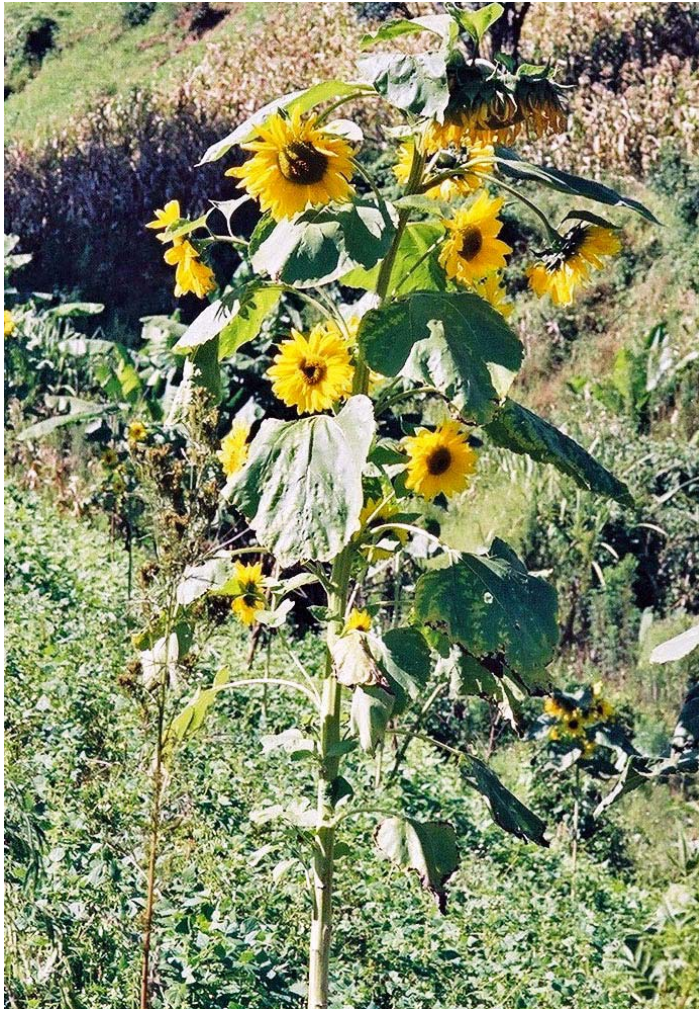


A large clay jar used for water storage, cooking or beer making

Helianthus annuus

(Asteraceae)

Common names Amabangayeye (Malila), alizeti (Swahili), sunflower



Sunflower growing near Izumbwe

Description An annual plant with large flowers. The common large sunflower can grow to 150 - 240 cm tall with flower heads up to 35 cm across. Dwarf varieties grow to 120 cm high. Sunflowers are deep rooted.

Ecology An extremely adaptable plant. It thrives in the tropics at medium and high elevations. In East Africa it is grown from sea level to 2,590 m provided rainfall is more than 750 mm annually. A dry period is necessary during the later stages of ripening. Dwarf varieties are hardier and give reasonable yields under less than 25 cm rain per annum but rainfall should be evenly distributed during the growing season. Sunflower grows on many soil types of moderate fertility. Does well on light, rich, calcareous soils with pH range from 6 - 7.5. The crop requires fertile soil and is best planted with fertilizers if available.

Propagation and management Seed is planted 2 - 3 cm deep in November. Birds can cause considerable damage to the maturing crop. To avoid loss of seed the flower heads can be cut before the seeds are quite ripe and

exposed face up to dry.

Uses Sunflowers are an important bee forage and worth planting for this reason. The honey tends to granulate rapidly and has a mild but characteristic taste, similar to butter. Bees are important for pollination and have been found to increase yields of seed. Seed set is often poor where the number of bees is low. It is recommended that there should be 1 - 2 hives per ha. Dried green stems and leaves make good bee smoker fuel. The large seeds can be roasted, salted and eaten. They are also used as poultry food. The crop is grown mainly to produce seed for edible oil extraction. Oil content may be 40 - 52% of shelled seed. Poor grades are used for making soap. The petals yield a yellow dye.

References Smith 1960, Watt & Breyer- Brandwijk 1962, Morton 1964, Godin & Spensley 1971, Acland 1977, Howes 1979, Crane et al 1984, Crane & Walker 1984, Fichtl & Adi 1994, Jones 1999, Raemaekers 2001

Helichrysum foetidum

(Asteraceae)

Common names Inzumba (Malila), straw flower.



Description An erect, hairy biennial having a strong smell and growing from 30 cm to 1 m tall. Stem may be single or having a few branches. Leaves are spear shaped to oblong 4 - 9 cm long and 1 – 2.5 cm wide. The plant bears golden yellow flowering heads with glossy papery flowers. Heads are saucer shaped and 10 mm across. Growth is rapid.

Ecology Common in open grassland in Umalila. Also present in disturbed places in dry upland forest, on forest margins and in damp sites along streams from South Africa to East Africa, Sudan, Ethiopia, Congo and Nigeria. Also present in Spain and Arabia.

Propagation *Helichrysum* species can be grown from seed or shoot cuttings, 7 cm long, preferably with a heel.

Uses Reported to be visited by bees in Umalila. Bees collect pollen and nectar from other *Helichrysum* species. Elsewhere in Tanzania the roots are used to treat eye troubles and the leaves are used to treat

influenza. In South Africa the leaves are applied to circumcision and septic wounds.

References Watt & Breyer-Brandwijk 1962, Kokwaro 1976, Blundell 1994, Fichtl & Adi 1994, van Wyk & Gericke 2000, Kihwele et al. 2001, Burrows & Willis 2005, Nonkululeko 2005



Children carting un-burnt building bricks in Ilembo

Heteromorpha arborescens

(Apiaceae)

Synonym *H. abyssinica*, *H. trifoliata*

Common names Ilelengu (Malila), parsley tree, parsnip tree

Description A straggling, open-branched shrub or small tree up to 7 m high. Bark is reddish brown to purplish brown, smooth, waxy in appearance, peeling in papery flakes. Leaves are alternate, compound, glossy, light green or grey green, becoming yellow to red, having 3 – 9 leaflets arranged in an unusual and variable manner. Flowers are small, greenish white or yellowish, often strong smelling in dense round heads, up to 5 cm in diameter. Fruits are formed in two parts which split away from each other. These are flattened, rather heart shaped, 5 – 7 mm long, drying to creamy brown.



Ecology Occurs at medium to high altitudes and frequently found at the edges of evergreen forest, wooded ravines, on hillsides and rocky outcrops from Sudan and Ethiopia to southern Africa and into Angola and Namibia. It grows to a tree in high rainfall areas. Found in moist plateau or mountain grassland in Malawi.

Uses Bees were active at midday on a tree near Maendeleo during April. The plant is used in Tanzania to expel intestinal worms. An infusion of the root mixed with other plants is drunk to cure colds and also to treat venereal disease in Malawi. In South Africa an infusion of the leaves is prepared as an enema to treat abdominal disorders and given as a remedy for mental and nervous conditions. A leaf preparation is given to children for intestinal worms. The smoke from burning wood is inhaled to relieve headaches. A decoction of the peeled root is used to treat breathlessness, coughs and dysentery. The fruits contain a volatile oil. This has shown definite anti-bacterial and anti-fungal activity.

References Watt & Breyer-Brandwijk 1962, Wild et al. 1972, Williamson 1975, Coates Palgrave 1983, Blundell 1987, Van Wyk et al. 1997, Neuwinger 2000, Van Wyk & Gericke 2000, White et al. 2001

Hibiscus diversifolius

(Malvaceae)

Common names Iwawa



Hibiscus diversifolius flowering in June

Uses The flower petals are used as a vegetable, called Ukurugwa in Umalila. They are eaten with beans, after the black base has been removed. The plant is sometimes grown as a hedge. The stem is a source of hemp or jute fibre for mat making. Bees collect nectar and are known to forage for pollen and nectar from the flowers of many species of *Hibiscus*. The woody parts are used as fire sticks in Malawi.



Hibiscus diversifolius grown as a hedge

Description A shrub up to 3 m high covered with short red thorns. Flowers may be deep purple or yellow with a red or purple centre and about 5 cm in diameter, flowering in June and July. The woody, shrubby habit distinguishes this plant from *Hibiscus cannabifolius*.

Ecology Found in field margins and roadsides in Umalila. Grows in scrub or forest in West Africa and is widely dispersed throughout Africa. *Hibiscus* species grow best between altitudes of 1,800 and 2,100 m.

Propagation Cultivated ornamental species grow easily from cuttings. For shrubby species take 10 cm cuttings having a heel.



Bruised leaves are used to ease the pain from stings. A tea made from leaves and twigs is taken for bronchitis and chronic coughing. The sap of leafy twigs is drunk for yaws. The Swati people use a decoction of the root and flower for pneumonia. Sheep and goats eat the leaves.

References Jex - Blake 1957, Watt & Breyer-Brandwijk 1962, Wilson 1967, Agnew 1974, Williamson 1975, Hay 1978, Wilson 1978, Fichtl & Adi 1994, Burkill 1997, Neuwinger 2000

Hibiscus ludwigii

(Malvaceae)

Synonym *H. macranthus*

Common names Iwawa

Description Usually a small shrub up to 3 m high, with erect branches but sometimes grows larger producing trailing branches. The plant is covered with sharp irritating hairs that break off in the skin. Leaves are alternate. The pale yellow flowers are large and usually borne singly. They have a purple base. The flowers droop and sometimes never open fully. The closed flower is about 6 cm long. Flowers are produced in April.

Ecology Common between altitudes of 1,520 and 2,440 m in cleared forest grassland throughout Tanzania, except Songea, and also present in Kenya, Uganda, Rwanda, Ethiopia, Malawi, Zimbabwe and in the highlands of Cameroon.



Uses Bees are reported to visit the flowers in Umalila. Bees collect pollen and nectar from this plant in Ethiopia. The stem fibre is used in Uganda. A preparation of the root is used in Rwanda to treat anthrax.

References Blundell 1987, Fichtl & Adi 1994, Burkill 1997, Neuwinger 2000

Hypericum quartinianum

(Clusiaceae)

Common names Tandankwari



Description A shrub growing to 4.5 m tall. The lower stems are woody and tawny brown while the young shoots are 4 angled. Leaves are opposite, up to 8 cm long by 2.2 cm wide and when young are tinged with red. They have black dots on the edges and glands on their upper surface. The yellow flowers are borne in a cluster and are 5 – 8 cm across. Flowers are produced from May to September. Leaves, glossy green.

Ecology Usually found in rocky places, gulleys and on river banks in deciduous woodland or in upland grassland. Grows up to an altitude 2,800 m. Present from Ethiopia to northern Malawi.

Propagation Can be grown from root suckers and 12 cm cuttings. Seed germination is poor.

Uses Reported as a bee forage in Umalila. In the upland forests of Kenya and in Ethiopia *Hypericum* species are important bee forage plants, especially for pollen as they flower over a long period. Branches are used for fuel in some areas.

References Smith 1956, Cribb & Leedal 1983, Fichtl & Adi 1994, Hepburn & Radloff 1998

Hypericum revolutum subsp. revolutum

(Clusiaceae)

Synonym *H. lanceolatum*

Common names Giant St. John's wort, curry bush



Description Much branched shrub or small tree 1 – 6 m tall. The plant has an open crown and the branches often droop. Bark is dark brown and corky and often fissured. Leaves are opposite, pale green, narrowly elliptic to lance shaped up to 20 - 30 mm long and 2.5 - 6 mm wide, produced in dense clusters on short shoots, with many scattered, transparent oil-glands. Leaves

have a curry-like smell after rain or when crushed. Flowers are solitary, terminal, up to 4 - 5 cm in diameter with petals 25 – 30 mm long. Fruits are woody 5 valved capsules, containing many small black seeds. Flowers are produced all year round.

Ecology A characteristic tree of the Afromontane rain forests and evergreen bushland, found from 1800 – 2900 m, especially along the upper tree limit and often associated with Hageni-Schefflera forest. Present from Cameroon to Ethiopia and to South Africa and also in Saudi Arabia, Comoro islands and Madagascar. It is an early invader of fire protected grassland in Malawi.

Propagation Can be grown from root suckers and 12 cm cuttings. Seed germination is poor.

Uses Wood is dark red-brown, fairly hard but flexible and popular for making house poles and yokes for ox-ploughs in Ethiopia. The flowers are an important bee forage. Bees collect both pollen and nectar and the honey produced is of good quality. The tree is recommended for planting for bees. Powdered dried leaves and stems are used to treat diarrhoea and rheumatism in East Africa. The plant has a number of medicinal uses in Burundi and in Ethiopia the leaves are cooked and eaten with meat to safeguard against stomach upsets. The shrub is sometimes planted as an ornamental. It has also been used as a source of balsam.

References Smith 1956, FZ 1961, Wild 1972, Brummitt 1973, Blundell 1987, Burkill 1994, Fichtl & Adi 1994, Bryant 1996, Hepburn & Radloff 1998, Neuwinger 2000, White et al. 2001, Dharani 2002, Burrows & Willis 2005

Hypoestes triflora

(Acanthaceae)



Common names Inswina ilinsi

Description A straggling annual plant, very variable in size, but often growing to a height of 50 cm. Leaves are borne on short stalks. The pale mauve or white flowers are produced in groups of three and are 2.5 cm. long; each flower has two stamens. Seen flowering in October and November in Umalila.

Ecology Grows in forest shade and beside footpaths and waterways at altitudes between 1,200 and 3,050 m in East Africa, Rwanda, Ethiopia and Malawi.

Uses Reported as a good bee plant at Yalenga. Bees frequently collect pollen and large quantities of nectar in Ethiopia. Used as a wound dressing for livestock in Ethiopia. A leaf extract is drunk to treat jaundice in Rwanda.

References Blundell 1987, Fichtl & Adi 1994, Neuwinger 2000



Pitsawers at work near Maendeleo

Iboza riparia

(Lamiaceae)

Common names Ivuguvugu (Malila), ginger bush.



Description A shrub or small tree normally growing to 3 m high. Bark is light grey to brown, smooth and sometimes peels when old. The soft leaves have a strong smell, are opposite, 7 cm long and 6 cm wide, and covered with fine dense hairs on both surfaces. The leaf margin is toothed. Leaves have stalks up to 2 mm long. Flowers are very small, mauve, pink to white, in large dense, much branched heads up to 20 cm long. Male and female flowers are borne on different plants. The shrub grows rapidly.

Ecology Often planted as a hedge around compounds in Umalila. It is found on rocky outcrops and at the margins of evergreen forest, often near water. It grows between altitudes of 1,400 and 2,400 m. Requires 800 mm or more rain per annum. The plant prefers deep well-drained soils. It is

also planted around fields and along roadsides and river courses as a hedge in Rwanda.

Propagation Planted by cuttings 20 - 50 cm long.

Uses Bees were seen collecting nectar from this plant in July, though it is said that the quality of the honey is poor. The leaves are used as an insecticide and for mulching. In Rwanda the plant is sometimes grown as a wind break and on contour banks to check erosion. In Malawi the plant is said to be a powerful remedy for intestinal worms. In Kenya the crushed leaf is used against cataracts by the Pokot. The plant has many other medicinal uses in Africa.



References Watt & Breyer - Brandwijk 1962, Williamson 1975, Coates Palgrave 1983, Egli & Kalinganire 1988, Beentje 1994

Ilex mitis

(Aquifoliaceae)



Common names Isangati (Malila), African holly, Cape holly.

Description An evergreen shrub or more usually a tree growing up to 30 m or higher. Bark is grey and fairly smooth with dark spots. Leaves are simple and alternate, the edges saw toothed, shiny dark green, 3 – 14 cm long and 1 – 5 cm wide, borne on dark red stalks. Flowers are white to cream coloured, fragrant and arise in the leaf axils. Fruit is a round fleshy berry, glossy red when ripe.

Ecology Common in forest reserves and beside water in Umalla. Found in moist to dry upland forests and thickets, also in woodland beside streams between altitudes of 900 and 3,000 m. Present from Ethiopia to South Africa.

Propagation Grows easily from seed. Collect fresh seed and dry in the shade. Sow in a seedbed in a mixture of 1:1 river sand and compost and cover lightly. Seed germinates after 8 - 20 days.

Management Transplant seedlings into plastic sleeves when they have two leaves. Seedlings grow easily and fairly fast. Plant out, preferably beside running water, and protect from fire and livestock.

Uses The timber is used for making good quality, lasting furniture. The wood darkens with age, after many years of oiling. It is also used for tool handles and for firewood and charcoal. The flowers are an important source of honey. Beekeepers recommend that honey should be collected after flowering has finished or that the honey should be stored for some time to improve the flavour. In Umalla the trunk is used to make beehives. An edible mushroom grows on the rotten trunks of this tree



during the rains. Leaves form a lather when rubbed in water. The fruits are eaten and can vary from being slightly sweet to bitter. The boiled roots are also reported to be edible. The bark is used as a mild purgative in South Africa

References Watt & Breyer-Brandwijk 1962, FTEA 1968, Wild et al. 1972, Bekele-Tessema 1993, Beentje 1994, Venter & Venter 1996, Hepburn & Radloff 1998, Forrester 2004, Lovett et al. 2006

Impatiens gomphophylla

(Balsaminaceae)

Common names Imbogwa




Description An erect herb, 1 m tall occasionally up to 1.5 m. Stems are usually unbranched or have few branches. Leaves spirally arranged, often rather dense. Flowers are borne in clusters in the leaf axils and vary in colour from pale yellowish-green to greenish-orange. Flowers with a yellowish spur and orange or reddish petals are most common. In the Southern Highlands the plant flowers all year round

Ecology The most widespread and common *Impatiens* species in the Southern Highlands. It often grows in large clumps in grassland. The specimen photographed was growing in an old maize field. It grows in moist, open or semi shaded places in grassland or scrub between 1,200 and 2,650 m. Widely distributed in Malawi, Zambia and southern D.R. Congo.

Left : *Impatiens gomphophylla* near Illembo in May.

Uses Bees like this plant and were seen collecting nectar in June. The honey produced is reported to be of good quality. Other species e.g. *I. glandulifera* are useful bee plants elsewhere.

References Moriarty 1975, Howes 1979, Cribb & Leedal 1982, FTEA 1982, Fichtl & Adi 1994, Burrows & Willis 2005

<p>Pure Shukrani Honey</p>  <p>Produced by Umalila beekeepers - Mbeya</p> <p>350 ml</p>	<p>Profits from the sale of this honey will help students of Shukrani International College, P.O. Box 535, Mbeya.</p> <p>Shukrani College is run by The Salvation Army, Tanzania. It is a Christian college that seeks to educate the poor, disabled and orphans with diploma level training in secretarial and business studies.</p>
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Honey labels used to sell honey from Umalila beekeepers

Ipomoea batatas

(Convolvulaceae)

Common names Imbatata (Malila), sweet potato



Description A perennial, creeping plant, up to 4 m long, which is usually grown as an annual.

Ecology In Umalila plants are usually grown on hill slopes rather than in valley bottoms. Planting is done in June and December. Growth is restricted by cool weather. Low humidity is needed as the crop nears maturity. Though the plant is drought tolerant there must be sufficient moisture for 50 - 60 days after planting for tuber development. Sweet potatoes grow best in sandy loams, reasonably high in organic matter.

Propagation It is best to use cuttings taken from the growing tip of the vines as they grow faster and give a higher yield than cuttings taken from the base or middle. Cuttings should be 20 - 45 cm long and have 7 nodes. They should be left to wilt for 24 - 48 hours and then 10 - 20 cm of the cutting should be planted below the soil level at an angle. Space at 23 - 30 cm in the rows, and 60 - 75 cm between rows.

Management Harvest the crop when the leaves turn yellow and the tuber can be cut without the sap rapidly turning black. Tubers cannot be stored so are best dug when required.

Uses Tubers are baked, boiled or fried. Chips may be dried in the sun and then ground into flour. There are three main types 1) Dry and mealy when cooked. 2) Soft and watery. 3) Coarse fleshed. The young shoots and leaves of the last two are eaten as vegetables. Vines can also be used as a livestock feed. Bees sometimes collect nectar from the flowers.



Reference Kay 1973

Ipomoea cairica

(Convolvulaceae)

Common names Kiazi pori (Swahili), railway creeper, ipomée du Caire (Fr.)

Description A perennial herb which grows up to 5 m long from a tuberous rootstock. Stems twine up other plants or grow along the ground. Leaves are divided into 5 – 7 lobes, 3 – 10 cm long on a petiole 2 – 6 cm long. The leaf lobes are narrow and are up to 4 cm long. Outer lobes often split again. Flowers are funnel shaped, usually pale pink to mauve but can be white with a darker throat. Fruit is a round capsule up to 1.2 cm across, papery brown, containing several black, hairy seeds.



Ecology The plant was present in hedgerows at Izumbwe village. It also grows in clearings in forests, swampy grassland and on lake shores and waste or cultivated land from 750 – 1,890 m. It is found throughout East Africa and from Ethiopia to Zimbabwe. It is present in many countries throughout the tropics and is an invasive plant.

Propagation Can be grown from seed or rooting stems.

Management Can be trained on a trellis and used as a screen.

Uses Bees were seen collecting nectar and pollen in Umalila. *Ipomoea* species are known to produce important amounts of nectar and pollen. Elsewhere in Tanzania the leaves are collected, partially dried in the sun, and then cooked alone or mixed with other vegetables and served with the staple food. The leaves can be fed to pigs, guinea pigs, cows, goats and rabbits. The dried leaves can be stored. In Ghana stem fibres are used to make sponges. The tubers and stems are used as food in Hawaii but are both slightly cyanogenic. Seeds are used as a strong purgative in Nigeria and India. The plant has considerable antibiotic action though this varies between plants. In India an essential oil, extracted from the plant, was found effective in controlling several species of mosquito. The plant can be grown as an ornamental.

References Watt & Breyer-Brandwijk 1962, Crane et al. 1984, Burkill 1985, Blundell 1987, Phillips & Rix 1997, Ruffo et al. 2002, Llamas 2003, Thomas et al. 2004

Ipomoea involucrata

(Convolvulaceae)

Common names Isindu



Description A slender but vigorous, sprawling or twining annual or perennial herb. The slender stems grow to 8 m long. Leaves are up to 9 cm long, occasionally 11 cm, and 7 cm wide, hairy on both surfaces. Flowers are funnel shaped with a purple, rose, white or white-pink throat.

Ecology Found in grassland, woodland and in abandoned cultivation; altitude range 100 – 2,700 m in East Africa, Zambia and Zimbabwe.

Ipomoea involucrata in cleared forest at Songwe

Propagation Soak seeds for 24 hours before planting. The plant can also be grown from softwood or semi-ripe cuttings.

Uses In Umalila a fibre from the stems is used to make string and the bitter root is used to relieve wind. The plant has a number of other medicinal uses. Bees were seen collecting pollen and nectar from this plant and from *I. wightii*. Some *Ipomoea* species flower nearly all the year round. These produce pearly white honey of a delicate flavour. Leaves of this and some related species are edible. In Nigeria the plant is used as a ground cover and can be grown as a screen over a suitable frame.



References Watt & Breyer-Brandwijk 1962, FTEA 1963, Hay 1978, Crane et al. 1984, Burkill 1985, Blundell 1987, Brickell 1994, Fichtl & Adi 1994, Martin et al. 1998, Neuwinger 2000

Left : A basket made from bamboo strips tied together with fibre from *Ipomoea involucrata*.

Ipomoea tricolor

(Convolvulaceae)

Common names Lusisia (Malila), morning glory.



Description A stout, perennial, twining plant growing up to 2.4 m or more. The thin stems carry pale green, heart shaped leaves. This species flowers freely, the flowers opening in the morning and then fading in the afternoon.

Ecology Often grows in recently cleared forest land and in hedgerows in Umalila. The plant originates in Mexico. This is the most commonly cultivated Morning glory in many countries.

Propagation As for *Ipomoea involucrata*.

Uses A useful bee forage and widely grown as an ornamental. The stems are used for tying.

References Hay 1978, Burkill 1985

Isoglossa eliasbandae

(Acanthaceae)

Common names Inswina ipete



Description A robust herb with markedly ribbed leaves growing up to 2 m tall. Flowers have two lips. It is an uncommon plant.

Ecology An under-storey shrub in woodland. Also present in Malawi.

Left : *Isoglossa eliasbandae* in flower in July near Ilembu.

Uses Reported as a bee forage plant in Umalila producing good quality honey. A related species, *I. deliculata*, produces a heavy nectar flow over a short period of time in South Africa. Honey produced is mild but has a characteristic flavour. Two other species yield nectar and pollen in Ethiopia.



References Agnew 1974, Crane et al. 1984, Fichtl. & Adi 1994

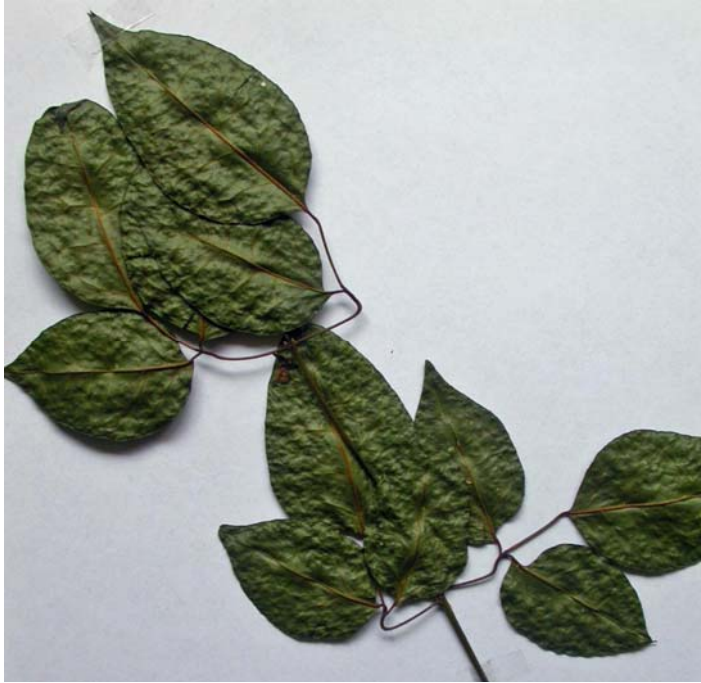


Tabia and Mwaji collecting leaves of Cleome gynandra in a garden at Ilembu

Jasminum abyssinicum

(Oleaceae)

Common names Isanzo



Description A climbing shrub with stems growing up to 7 m long. Leaves are opposite, dark green and shiny and composed of 3 leaflets. The terminal leaflet is larger than the other two, being 2 – 7.5 cm long and 1.5 – 5.5 cm wide. Flowers are produced in large numbers and are white or yellow white, sometimes pink on the outside. They are borne at the ends of branches or on lateral shoots, solitary or in clusters of a few flowers, and have a strong sweet smell.

Ecology Found at the edges of upland evergreen forest and in mountain bushland, especially near flowing water. The plant sometimes grows over fences around compounds.

Propagation *Jasminum* species can be grown from seed or semi-ripe cuttings. Plants can also be grown by layering.

Uses Stems are used in Umalila for tying the frame in hut construction. The Maasai use the roots to make soup and the stems as string in building huts. In Umalila bees have been reported to visit the flowers. In Ethiopia bees are reported to visit occasionally. The roots are used to dress wounds in animals in Ethiopia. In Rwanda the leaf extract is drunk for constipation. In Burundi a leaf decoction is used to wash with for dizziness and a decoction of leafy twigs is drunk for insanity or possession. In East Africa the roots or leaves are steeped in water and the liquid drunk to treat snake-bite.

References Hessayon 1993, Beentje 1994, Fichtl & Adi 1994, Bown 1995, Hepburn & Radloff 1998, Neuwinger 2000

Grain stores on a farm at Izumbwe. The store on the left was for maize and that on the right for finger millet.



Jasminum goetzeanum

(Oleaceae)

Common names Iwovi, impyuyu



Description A much branched, usually evergreen shrub at the edges of forest, though becoming a strong woody climber inside the forest, 2 – 6 m tall. Leaves are spirally arranged, compound, being composed of 5 leaflets. The flowers are borne terminally and are composed of up to 12 yellow, scented flowers.

Ecology Found in upland grassland and in mountain forest between 1,440 – 2,430 m. Also present in Kenya, D. R. Congo, Zambia and Malawi.

Uses Bees are reported to visit the flowers. Jasmine species are known to be visited by bees in some dry areas.

Jasminum goetzeanum growing at the edge of Isoho forest

References FTEA 1952, Hepburn & Radloff 1998, White et al. 2001

Nyasalandi Nayomo climbing to inspect one of his 13 hives.



Justicia diclipteroides

(Acanthaceae)



Common names Inswina

Description A trailing herb which roots at the nodes. It has scattered purple to pink flowers about 8 mm across in the upper leaf axils.

Ecology Common in evergreen forest edges between altitudes of 1,220 and 2,130 m.

Uses Bees were active on the flowers collecting nectar in the early morning. *Justicia* species are known to be important bee forage plants in several climatic zones in Africa. The plant is eaten by livestock.

Left : *Justicia diclipteroides* flowering in May near Maendeleo.

Remarks Three species of *Justicia* are useful bee plants in Ethiopia. The young leaves of a further three species are used as vegetables in Malawi.

References Agnew 1974, Williamson 1975, Blundell 1994, Fichtl & Adi 1994, Hepburn & Radloff 1998

Neema Yisambi with her favourite heifer Samboya. If stall fed with Napier or Guatemala grass in the dry season, when grazing is hard to find, improved dairy cattle could provide the family with much more milk. If fodder grasses were planted on the contours this could reduce the amount of soil lost through erosion. Cattle manure appears to be seldom used in Umalila but could improve yields of vegetables and fruit trees around the home.



Kalanchoe lateritia

(Crassulaceae)

Common names Ivata

Description A succulent perennial, from 20 cm to 1.5 m high. Leaves are simple and borne on short stalks on the main stem. They are up to 16 cm long and 8 cm wide. Flowers are borne in small terminal heads and may be red, reddish orange, salmon pink or pale yellow. Each flower is about 15 mm across.



Ecology Plants were seen growing beside a track and in woodland near Shilanga. Present in deciduous and semi deciduous bushland, thicket and scrub, on sandy soil, rocky ground or on rocks up to an altitude of 2,000 m throughout Tanzania and in bush-grassland in western Kenya, D.R. Congo, Rwanda, Malawi, Zimbabwe and Mozambique.

Propagation Stem cuttings, offsets or leaf cuttings root easily.

Left : *Plant in flower at the end of October near Shilanga.*

Uses The leaves are heated and placed on painful swellings. The juice is squeezed from the dried leaves of *Kalanchoe* species and applied to septic wounds. In Ethiopia other *Kalanchoe* species are occasionally visited by bees.

Remarks Another species *K. densiflora*, known as Itivwa (Malila) is widespread above 1,800 m in the Southern Highlands. It is found in flower between August and November.



Right : *Kalanchoe densiflora growing in forest*

References Kokwaro 1976, Cribb & Leedal 1983, Blundell 1987, FTEA 1987, Fichtl & Adi 1994

Keetia gueinzii

(Rubiaceae)

Synonym *Canthium gueinzii*, *C. hispidum*

Common names Nyongampembe (Malila), climbing Canthium



Description A scrambling shrub or climber, from 3 to 25 m tall. Bark is dark to almost black and the branches are long and trailing. Young branches may be densely covered with golden to rust covered hairs. Leaves are opposite entire, oblong 5.5 – 13.5 cm long by 3.5 – 6.0 mm wide, slightly hairy above and more densely below. Flowers are sweet smelling, creamy white, and borne in dense clusters of 20 to 50 flowers. Fruit is black when ripe and has one seed.

Ecology Grows in forest and woodland often on swampy ground. Altitude range 90 – 2,450 m. Found from Cameroon to Ethiopia and south to

eastern Cape. The plant is widespread in Malawi. In Kenya it is found at the coast on moist forest margins, secondary bushland and in riverine forest.

Right : *The unripe fruit on a bush growing beside the road.*

Uses Fruit is edible but rather sour. Bees are reported to visit the flowers.

References Coates Palgrave 1983, FTEA 1991, Beentje 1994, White et al. 2001, Burrows & Willis 2005



Kniphofia princeae

(Liliaceae)



Common names Isusumba (Malila), red hot poker.

Description An evergreen plant, from 1.3 to 3 m tall, growing from a rhizome. It forms clumps of tough, narrow, tapering leaves, which are 1.8 – 2 m long. The flower head is borne on an erect stem, up to 2.5 m tall, above the leaves. The small tubular flowers are orange and long lasting.

Left : Kniphofia princeae flowering beside a stream in May

Ecology Grows in grassland or mountain scrub, on forest margins and in damp areas often beside running water. Altitude range is from 1,800 to 2,300 m. The plant often grows in partial shade. Also present in northern Malawi.

Propagation By seed or more usually by division at the start of the rains. Divided

plants come into flower much more quickly.

Uses Bees visit the flowers. In Ethiopia bees collect only pollen from several *Kniphofia* species. In Umalila the leaves are formed into a cushion for carrying head loads. In Malawi the leaf fibres are used to make a strong cord. Other species are used medicinally in South Africa. The flowers are sucked for sweetness by children.

References Watt & Breyer-Brandwijk 1962, Williamson 1975, Brickell 1987, Fichtl & Adi 1994, Johannsmeier & Allsopp 1995, Stern 2002, Burrows & Willis 2005



Brassica oleracea in a plot of Solanum umalilaense in flower

Kotschya recurvifolia

(Fabaceae)

Common names Intenga



Kotschya recurvifolia is often found in dense clumps in grassland. Photo taken near Inyala.

Description A very variable, erect, much branched, aromatic shrub up to 4 m tall. The plant is covered with yellow to whitish sticky, hairs. Leaves are compound with 8 – 18 leaflets which are curved at the tips. Flowers are borne in dense masses, are golden yellow and covered with golden bristly hairs. The pods are hairy and the seeds greenish to dark red-brown.

Ecology It is one of the dominant plants of upland grassland above 1,800 m in Umalila. Also present in moorland, bamboo forest, forest glades, at forest edges and in secondary thickets. Present in Ethiopia and south to Malawi and Zambia.

Uses A valuable bee forage, yielding nectar throughout the day during May and June. The stems make good firewood which does not produce much smoke. Finger millet is commonly planted on land cleared from *Kotschya recurvifolia* as it is reported to improve soil fertility.



References Cribb & Leedal 1982, Beentje 1994, FZ 2000, Burrows & Willis 2005

Lagenaria sphaerica

(Cucurbitaceae)

Synonym *L. mascarena*, *Luffa sphaerica*



Common names

Itungururu (Malila), wild calabash.

Description A perennial herb with a woody rootstock and annual climbing or trailing stems, up to 10 m long or longer, sometimes completely leafless when fruiting. Leaves are rather rigid, shaped like a hand, margins toothed, 5 - 18 cm long, both surfaces have rough, short hairs. Leaf stalks are 2 - 8 cm long. The tendrils split in two. Flowers are fragrant, opening in the evenings. They are velvety-white or creamy-white coloured with green veins

and rounded petals, 2.2 - 6 cm long; male and female flowers are on separate plants. Male flowers are in groups of 2 - 10. Female flowers are solitary and stalked. The flowers are large and open in the evening. The fruits, which are found throughout the year, hang from a stout stalk and are 6 -10 cm across, deep-green with pale-green or yellowish, slightly raised patches. They have a hard shell and whitish flesh and have a foul smell when ripe. Seeds are white to yellowish, oblong-triangular in outline, flattened, 1 - 1.5 cm long.

Ecology Grows over hedges in villages in Umalila. Found naturally in tropical and southern Africa from Somalia down to the Western Cape; it also grows in Madagascar. The plant grows in full sun and semi-shade in forest margins, on river banks and in dry river beds. It is usually found in well-drained loam and stony soils. The flowers are produced throughout the year, but mainly from December to May. In southern Africa it grows from about sea level to an altitude of 915 m, in both dry and wet areas with an annual rainfall of 200 - 1,200 mm. The flowers are visited by bees, ants and flies.

Propagation The wild calabash can be grown from seed.

Management The plant requires support often growing over trees, shrubs or fences.

Uses In Umalila the fruit is skinned, cut up and used as a soap substitute for washing clothes. In Malawi the leaves are sometimes cooked and eaten as a vegetable. The plant has various medicinal uses. In South Africa an infusion of the leaves or roots, together with those of *Bidens pilosa*, is either drunk or administered as an enema for stomach-ache. The fruit is used to treat glandular swellings. A decoction of the pounded root is used for treating swellings thought to be caused by blood disorders.



References Watt & Breyer- Brandwijk 1962, Williamson 1975, Neuwinger 2000, Welman 2004

Landolphia buchananii

(Apocynaceae)



Synonym *L. swynnertonii*, *L. kilimanjarica*

Common names Ilonji (Malila), mbungo (Swahili), rubber vine

Description A woody shrub or climber, 6 - 20 m long, the stem being deeply furrowed and dark brown. Hooked tendrils may be present, which branch at the tip. Leaves are glossy green above, opposite, 5 - 12 cm long and narrow, with an elongated blunt tip. Flowers are fragrant, yellow to white with touches of red or orange in terminal heads of 5 - 10 flowers. Petals overlap to the left. Fruit is a round green berry, 4 - 10 cm in diameter with a hard white spotted skin. Ten or more seeds are embedded in the juicy pulp.

Left : *Plant flowering in November near Sasyaka village.*

Ecology Common in rainforest, normally at medium altitudes up to 1,600 m. Plants produce more fruits on the forest edges. Present in West Africa, Congo basin to Kenya,

Uganda and Ethiopia and south to Zimbabwe.

Propagation Can be grown from seed or cuttings.

Uses In Umalila the fruits are collected from the tree or from the ground, cut open and the seeds and pulp eaten. Bees are reported to visit the flowers. Young stems are used for tying, particularly when constructing the roof of a house.

References Beentje 1994, White et al. 2001, Ruffo et al. 2002, Burrows & Willis 2005



Lantana viburnoides

(Verbenaceae)

Common names Isawi

Description A lemon scented shrub or woody herb up to 1 m high.



Ecology The plant was growing beside the road at approximately 2,000 m. but is most commonly found in the drier parts of tropical and sub-tropical Africa and also present in Arabia and India.

Uses Bees were collecting nectar in April. Other *Lantana* species are visited by bees in Ethiopia. Fruit and leaves are edible. In Tanzania the leaves are soaked in water which is then taken to relieve coughing. Leaves are also pounded to a paste and rubbed on the stomach to relieve stomach-ache. Cooked leaves, after cooling, are applied to sores on the legs. In Kenya the presence of this plant is thought to indicate a good millet growing site.

References Peters et al 1992, Burkill 2000, Neuwinger 2000,



Lantana camara
growing as a hedge
at Shilanga.

Leonotis ocymifolia

(Lamiaceae)

Common names Ifipa



Description An erect plant, commonly growing 2 – 3 m high, in large clumps. The stems are covered with short hairs and the leaves, up to 14 cm long, are densely felted underneath. The flowers are in compact heads, 6 - 8 cm across, and produced in the upper nodes of the stem. The flowers are reddish or orange-red and pale-cream. Each flower has 4 stamens, the uppermost being the longest and arching under the upper lip of the flower. The plant flowers from June onwards in southern Tanzania.

Ecology Commonly grows in bush-land or in open areas in woodland above 1,950 m. Also found in eastern Uganda, Zambia, Malawi, Zimbabwe and Mozambique.

Uses *Leonotis* species are known to be a source of nectar and pollen. The flowers are often sucked for their nectar by children or, in Uganda, are cooked as a vegetable. A leaf tea is used medicinally in Namibia to treat coughing and to purify the blood. In South Africa the leaf tea is used to relieve hypertension and to treat

colds and headache. In Sudan a warmed decoction of the leaves is drunk to relieve fever and gastrointestinal pain. Pounded roots and leaves are added to the drinking water of cattle and poultry to treat gall bladder problems and general sickness.

References Watt & Breyer-Bradwijk 1962, Goode 1974, Cribb & Leedal 1982, Blundell 1987, Fichtl & Adi 1994, Neuwinger 2000, van Wyk & Gericke 2000, White et al. 2001, Burrows & Willis 2005

Left : *L. myricifolia* is also present and bees were seen collecting nectar on a windy day in July.



Lobelia gibberoa

(Campanulaceae)

Common names Iwoti, piriti, idudwi (Malila), cardinal flower.

Description A perennial herb growing up to 9 m tall, when in flower, with erect, usually unbranched stems, though they are sometimes branched near the base. A white latex is present in the stem which has an unpleasant smell. Leaves are narrow, spear shaped with a pointed tip, 25 – 90 cm long and 4 – 19 cm wide. Flowers are greenish with a purple or blue tinge on stalks up to 2 m long. The plant flowers after several years' growth.

Ecology Grows on the margin of primary and secondary forest, in swamp or riverside forest, and at the edges of bamboo thicket. It prefers partial shade and adequate moisture. Also present on Mt. Kilimanjaro and in Kenya, Burundi and Rwanda.



Lobelia gibberoa growing in Itega forest near Ilomba



Propagation Can be grown from seed.

Uses Bees collect nectar from the flowers. In Rwanda the leaf extract is gargled for angina. In Burundi a leaf infusion is used as a purgative enema. A leaf decoction or leaf sap is drunk for intestinal parasites but this is known to be very dangerous. A leaf decoction is used as an enema for tapeworms. A root decoction is drunk as a tonic for pregnant women and to expel the placenta.

Remarks The honey produced from this plant is known to be poisonous. The latex has a sharp nauseating smell and eating a minute amount causes violent vomiting.

References Watt & Breyer-Brandwijk 1962, Cribb & Leedal 1982, Beentje 1994, Neuwinger 2000, Burrows & Willis 2005

Left : *Lobelia gibberoa* in flower

Lopholaena dolichopappa

(Asteraceae)

Common names Popoti ndongo



Lopholaena dolichopappa in flower in grassland near Shilanga

Description A low growing, semi-succulent, shrubby herb from 30 to 60 cm high arising from a perennial woody rootstock. The stems are trailing to erect, becoming woody with age. The narrow leaves are sessile, 1.5 – 6.0 cm long and 0.3 – 1.5 cm wide. The solitary flowers are 1.2 – 7 cm long and borne in the leaf axils or terminally on lateral branches. They have 3 – 6 white florets, sometimes tinged lilac, which have purple anthers.

Ecology Widespread in the Southern Highlands. Found in rocky grassland where it may be common after burning. Also in bushland with *Protea* sp. Present in Malawi and Zambia.

Uses In Umalila the roots are used to reduce temperature. The leaves are also put in water and the liquid drunk for the same purpose. Kinga people use the plant as a cure for snake bite.

References Cribb & Leedal 1982, Burrows & Willis 2005, FTEA 2005

Maerua decumbens

(Capparaceae)

Synonym *M. subcordata*, *M. edulis*, *Courbania glauca*

Common names Utupa



Description A bushy shrub growing to 2.4 m, occasionally to 3 m high. Often several stems arise from the tuberous rootstock. Leaves are stalked, greyish-green, leathery, alternate, oval or round, approximately 3 cm long. The solitary yellow or whitish flowers have a wavy, feathery appearance and arise in the axils of the upper leaves. They often close slightly during the heat of the day and are 20 mm across, on stalks as long as the leaves. The fruit is up to 3 cm long borne on a long stalk. Ripe fruits are yellow or orange, 20 mm in diameter.

Ecology Found at altitudes up to 1,850 m throughout East Africa. Also present in Sudan, Ethiopia, Somalia and Zimbabwe. Found in dry bush-land and open areas in vegetation beside water. Common in sandy areas, on light clay soils and rocky sites in Kenya.

Uses The fruit pulp and seeds are edible, as is the root, which is chewed as a stimulant. The root is also used to control insect pests being washed, peeled, chopped and dried in the sun before being ground to powder. A pinch of powder is then put in the funnel of the maize plant to control stalk-borer. The dried root powder is also used to control maize pests in store. A decoction of the roots is drunk as a treatment for syphilis and gonorrhoea, the leaf pulp is used as a dressing for rheumatism and a decoction of the roots and bark is used to treat eye diseases in East Africa. The roots are boiled and mixed with broth to promote health and strength in Kenya. Freshly sliced pieces of root thrown into muddy water will make it clear. The plant can be used as a fodder for goats in the dry season, if eaten sparingly. In Ethiopia bees forage on a related species, *M. angolensis*.

References Glover et al. 1966, Wild et al. 1972, Kokwaro 1976, Blundell 1987, Peters et al. 1992, Fichtl & Adi 1994, Maundu et al. 1999

Maesa lanceolata

(Myrcinaceae)

Common names Inkuti



Maesa lanceolata bearing fruit in November

southern Africa and in Madagascar and the Arabian peninsula.

Propagation It is reported that the tree can be grown from seed.

Uses The scented flowers are reported to be visited by bees. In Tanzania the white, soft wood is used for firewood, charcoal and tool handles and in Kenya and Malawi as hut poles. The fruits or seeds are used as a medicine for stomach worms. Roots are used to treat stomach-ache, jaundice and sore throat. A decoction of boiled roots is taken for convulsions in children by the Hehe people. Fruits are used to treat guinea worm in Malawi. In Uganda the shrub is sometimes grown as a hedge in damp places. The bark has a sharp

taste and is used in Kenya to make a stimulating drink. Fruits are reported to be sweet. In South Africa slightly warmed leaves are rubbed on wounds and sprains. A decoction of the decorticated root is used as an emetic to treat biliousness and the powdered fruit or seeds are used to prepare a remedy for intestinal worms in humans and livestock.

References Williamson 1975, Kokwaro 1976, Coates Palgrave 1983, Beentje 1994, Burkill 1997, Glen & Ngwenya 2005, Lovett et al. 2006

Description A straggling shrub or tree growing to over 20 m high. The leaves are simple and alternate and sometimes produce an orange-red resin when broken. The petiole is 1.4 – 4 cm long. Leaves are from 6 to 22 cm long and 2 to 11 cm wide. Flowers are very small, white to pale yellow, sweet scented in branched axillary panicles. Fruit is a yellow-brown to red berry 0.3 – 0.6 cm in diameter.

Ecology Grows in mountainous forested areas and at the edges of forest. Present in much of tropical and



Photo : Hugh Glen

Maytenus undata

(Celastraceae)

Common names Izorote, mpwagili (Malila), koko tree.

Description A shrub or well branched tree up to 10 m high. Bark is grey-brown, smooth but later finely grooved. Branches have no spines or hairs. Leaves are alternate, often shiny above, oval to circular, 3.2 – 13 cm long and 1.2 – 7.5 cm wide with toothed edges. Fruits are yellow to red and 4 - 7 mm long.



Maytenus undata in flower near Izumbwe in July

Ecology Found in lowland and mountain savannah areas in East and West Africa and in dry upland forest, often associated with Cedar or Olive. It is also be found in degraded forests, in bush-land or in clumps of woodland in grassland.

Propagation Grows easily from seed. No treatment is necessary. The tree can also be grown from cuttings.

Uses The fruit is eaten in Umalila and also in Mozambique. Bees were very active collecting pollen and nectar at midday. Related plants are known to be visited by bees in Ethiopia. Timber is red, hard and heavy, used for tool handles, hut building and for firewood. The leafy branches are used as a livestock feed in times of drought. The bark is eaten as a relish in Kenya and a decoction of the bark is used as a tonic. When pounded and steeped in cold water it is used as a drink. The plant can be grown as a hedge.

References Coates Palgrave 1983, Burkill 1985, Bekele-Tesemma et al. 1993, Beentje 1994, Fichtl & Adi 1994, Hepburn & Radloff 1998, Lovett et al. 2006

Mikaniopsis tanganyikensis

(Asteraceae)

Common names Izeru



Description A scrambling shrub or creeper. *Mikaniopsis* species resemble those of *Senecio*.

Ecology The plant was growing at the forest edge.

Uses Bees were seen collecting nectar in October near Shilanga. A related species, *M. clematoides* provides pollen and nectar to honey bees in Ethiopia.

Remarks A rare plant, only the second collection from Tanzania (Vollesen – personal communication)

References Agnew 1974, Fichtl & Adi 1994

Major Pepete with two women from Mbagara. Older people generally know the names and uses of many different plants and it is vital for future generations that this knowledge is kept.



Momordica foetida

(Cucurbitaceae)

Common names Inyole (Malila), Mnukia muuma (Swahili)



Description A hairy climber or creeping herb growing from a perennial rootstock. Tendrils arise from opposite the leaves and are simple or forked. Young stems are spotted dark green. The plant has an unpleasant smell. Leaves are alternate, 8 – 12 cm across. Male and female flowers are on separate plants. Female flowers are borne on long stalks arising from the axils. They are pale yellow and have a black centre. 4 – 8 male flowers are borne together. Fruit pale yellow to bright orange, up to 6.5 cm long covered with soft orange bristles. The fruit bursts when ripe revealing the seeds in a red pulp.

Ecology Found at forest edges and clearings, and on disturbed ground up to an altitude of 2,400 m. Widespread in tropical Africa and also in South Africa.

Management The plant can become a troublesome weed.

Uses In Umalila the roots are used to treat women with heavy periods. Leaves and roots are pounded, water added and the liquid drunk for stomach-ache. The leaves are gathered from the wild and eaten in times of hunger as a vegetable elsewhere in Tanzania and in Gabon, Sudan and Uganda. The pulp of the ripe fruits is also eaten in these countries and in Ghana and Kenya. Plants are reported to be grazed by cattle in Sudan, though other reports say that the plant is poisonous to stock. The leaves are fed to rabbits in Kenya.

References Blundell 1987, Ruffo et al. 2002, Bosch 2004



Morus alba

(Moraceae)

Common names Mforsadi, mfurusadi (Swahili), mulberry.



Description A small deciduous tree, fast growing, up to 35 m tall. The bark is pale-brown or pink-grey, smooth and yields a white or yellowish-white latex. Leaves are very variable, oval to heart shaped with 3 nerves from the base, 5 -15 cm long, but usually small and coarsely toothed. The small, green, male and female flowers are borne on different plants. Fruit is up to 2 cm long. pink to dark maroon, sweet and juicy.

Ecology Grows in subtropical to mild temperate areas. The plant prefers a moist climate, up to an altitude of 2,000 m and tolerates shade. It grows best on a deep alluvial soil with adequate moisture. It does not withstand drought. The tree is widely grown in Tanzania.

Propagation Grown from seedlings or cuttings but seed germinates poorly. The tree can also be grown by layering.

Management Fast growing when planted from cuttings. Fruit is produced after 3 years. The tree will require pruning to maintain its shape and to allow new shoots to develop. It should be protected from livestock.

Uses The sweet, juicy fruit is rather tasteless when eaten fresh

but can be made into juice, jam or chutney. The tree can be used as a hedge or planted close together along the contours to stabilize steep slopes. Wood is suitable for house building, furniture, tool handles and makes a medium quality fuel. Leaves can be fed to livestock and are highly nutritious. In some countries the leaves are eaten as a vegetable or used to raise silkworms.

References Mbuya et al. 1994, ICRAF 1998, Dharani 2002



Musa spp.

(Musaceae)

Common names Indoki (Malila), banana.



Ecology Commonly grown around homes in Umalila. Deep friable loams and soils which are not compacted are preferred. High organic matter and fertility assure good yields. Bananas require an adequate supply of water but high rainfall tends to encourage disease problems.

Propagation By sucker. Remove old roots and diseased parts and place suckers in a sack and dip in boiling water for 30 seconds to control nematodes and borers. The best method of planting is to dig out a hole 60 x 60 x 60 cm, add 5 debes (20 litre tins) of manure and mix with top soil in the base of the hole. Plant the sucker in the pit at the beginning of the rains and add household waste and

manure from time to time.

Management Remove all dead leaves. There should be 6 to 8 healthy leaves remaining on the plant for adequate fruit development. Remove excess suckers. Cut out old stems below ground level after harvest and cover the exposed surface with soil to reduce borer/weevil infestation. Chop up the stems to encourage them to dry out or rot down quickly.

Uses The main use is for edible fruit. Bees forage for nectar and pollen from the flowers throughout the day, though not all nectar is available to them. Nectar secretion is increased by rain and damp soil. The flavour of the honey produced is sharp, similar to tamarind.

References Crane et al. 1984, Nakasone & Paull 1998



The small dessert bananas known as 'Kambani' are commonly eaten as a snack. 'Isiya' is a larger type which can be eaten fresh or cooked.

Myrianthus holstii

(Cecropiaceae)

Common names Itwiza, iswizya (Malila), mswiza (Nyakyusa), giant yellow mulberry



Description A tree up to 20 m high, but often less, with a short trunk and large branches. Bark is grey-brown producing a watery sap, which turns black on exposure. Leaves are 25 – 60 cm across, compound and palm shaped made up of 5 – 7 leaflets, the largest central leaflet being 20 – 30 cm long. Outer leaflets are smaller. Leaf edge toothed, the upper surface being smooth and dark green. Lower side is grey-green and hairy, with clearly marked veins. Leaves are borne on a hairy stalk 7 – 35 cm long. Male and female flowers are present on separate trees. Male flowers are greenish with orange anthers. Female flowers are in a stalked yellow head 2 cm in diameter. Fruit is usually round, 5 - 8 cm in diameter, hard and yellow when ripe with sections like a pineapple. In Umalila a second species, *M. arboreus*, with fruits 6 - 10 cm in diameter (see below), is also present. The seeds are surrounded by an acid yellow pulp.

Ecology Present in rain forest, and in mountain forests, sometimes at the edges or in forest regrowth and along rivers between altitudes of 900 and 2,100 m. Occurs from Mozambique and Zimbabwe northwards to Zambia, and in D.R. Congo, Uganda and Kenya.

Propagation The tree can be grown from seed, wild seedlings or root suckers. Crush the fruit to extract the seeds. Store in a cool dry place.

Management The tree can be coppiced or pollarded.

Uses Fresh fruits are collected and eaten, sometimes being sold in local markets. Timber is white and soft and used for firewood, torches and cups in Tanzania. Leaves make a good mulch, and the tree is useful for soil and water conservation. In Umalila bees are reported to visit the flowers.



References FZ 1991, Katende et al. 1995, White et al. 2001, Ruffo et al. 2002, Burrows & Willis 2005, Lovett et al. 2006

Myrica humilis

(Myricaceae)

Synonym *M. salicifolia*, *Morella salicifolia*,

Common names Isiwiziwe



Description An evergreen shrub or small to medium tree up to 15 m high with a wide spreading crown and having large branches. Bark is thick, corky, pale-grey and deeply fissured. Leaves are simple, alternate, dark green above and pale green beneath, 1.5 – 17 cm long and 0.6 – 6 cm wide. There are small yellow glands on the undersurface of the leaves and the leaves have a spicy aromatic smell when crushed. The small yellow flowers are fragrant and produced in catkins. Young twigs are glandular and hairy. Male and female flowers are separate. Fruit is a very small purple berry, having white waxy dots on the surface.

Ecology Grows at the edges of dry mountain forests and in forest regrowth in Tanzania, often on rocky, shallow soils. Also present in Kenya, Malawi, Zambia, Ethiopia and in the Arabian peninsular. Altitude range 1,600 – 3,300 m.

Propagation Can be grown from seed or root suckers. Germination rate is fast but few seeds germinate. Only fresh seed should be used.

Management The tree can be coppiced but is slow growing. It is fire resistant.

Uses. In Umalila the flowers are reported to be visited by bees. *Myrica* species are recorded as being good bee forage in the Sahel. The leaves are eaten by an edible caterpillar variously called lungu, Sambenze or Isiwiziwe which is collected in March (see page 191). The gut is not removed. The caterpillar also feeds on Izenya (*Agarista salicifolia*) and Mshesheru (unidentified). The wood is moderately hard but is of poor quality and used for local carpentry only and for firewood and charcoal. The tree makes a good shade. The bark is chewed for toothache and bark extracts are used to treat body pains and fatigue. Seeds and roots are used as an anthelmintic and to treat coughs. Roots are used as a slow acting medicine for stomach-ache and headaches. Roots are pounded and soaked in water or boiled and the infusion drunk for indigestion. A decoction of bark together with milk is given to children as a tonic. Pounded young leaves with ghee are rubbed on to treat skin infections. The tree is also reported to be used for making a dye and for basket work.



References Kokwaro 1976, Mbuya et al. 1994, Hepburn & Radloff 1998, White et al. 2001, Burrows & Willis 2005, Lovett et al. 2006

Mystroxydon aethiopicum

(Celastraceae)

Synonym *Cassine aethiopica*, *C. velutinum*

Common names Itobero, insambwa (Malila), kooboo berry.



Photo : Braam van Wyk

the bark as a drench for worm infestation in calves. Root bark is used to treat diarrhoea and dysentery. Bark tea is drunk by children for stomach pain. The bark is used for tanning leather.

References Coates Palgrave 1983, Peters et al 1992, Venter & Venter 1996, Neuwinger 2000, Burrows & Willis 2005, Lovett et al. 2006

*Mama Sampamba Mwakawasira
making an axe shaft*



Description A shrub or small evergreen tree up to 18 m high. Bark is black to dark brown and rough. Leaves 1.6 – 12 cm long and 0.8 – 5.6 wide, leathery, ovate to oblong, apex rounded, margins entire or finely toothed. Flowers are pale green/yellow. Fruit is a smooth red berry from 0.8 to 2 cm in diameter.

Ecology Found in mountain and riverine forests between 0 and 2,450 m altitude. Also common in woodland and on termite mounds. Present from Ethiopia to the western Cape in South Africa, Madagascar and the Indian Ocean islands. The shrub is drought hardy.

Propagation Remove flesh from the berry and plant seeds in an equal mixture of sand and compost in a warm site. Keep soil moist. The seed takes 2 – 3 weeks to germinate. Keep seedlings in shade and then gradually expose them to more sunlight. Plant out in the following rain season.

Uses The flowers are reported to be visited by bees. The fruit is edible and sweet and ripens in March and April. The thin sticks are used to sew up sacks as the wood is very hard and strong. In South Africa the Xhosa people use the wood to make tool handles and as firewood. Zulus prepare a milk infusion from

Neoboutonia macrocalyx

(Euphorbiaceae)

Common names Ipapama



Description A fast growing tree up to 25 m tall with a short trunk. Bark thin, fairly smooth, grey-brown. The under bark is green. Young leaves and shoots are covered with pale brown hairs. Leaves are large and rounded, 6 – 35 cm in diameter with prominent veins and on stalks 10 – 20 cm long. The yellow-green flowers are in terminal heads 50 x 30 cm. Fruit is a grey, three lobed capsule 12 - 13 mm in diameter.

Ecology Grows in upland forest, mostly on the edges and in clearings. A quick growing pioneer tree where moist forest has been disturbed or cleared.

Left : *Neoboutonia macrocalyx* in flower in June beside a forest track near Ilembu

Propagation Can be grown from seed or wild seedlings. Harvest the capsules just before they open. Spread out on polythene sheeting and collect the seeds when the capsules open. Seed can be stored in sealed containers in a cool place but must be sown within two months.

Uses The wood is soft, white and fibrous and suitable for firewood, carving and paper pulp. The tree can be planted along contours to conserve soil. Bees were seen collecting nectar in June. The root, bark and leaves are used medicinally in Burundi and eastern Congo.

References Beentje 1994, Katende et al. 1995, Neuwinger 2000, Lovett et al. 2006



Neorautanenia mitis

(Fabaceae)



Synonyms *N. pseudopachyrhiza*

Common names Ihole

Description A shrubby herb, very variable, erect, climbing and scrambling, with stems up to 2 m long, or more, arising from a large tuberous rootstock which may weigh 12 kg or more. Leaves are alternate, trifoliate and on stalks. Individual leaflets are round and 3 lobed, 5 – 19 cm long and 4 – 19 cm wide. The mauve, purple or sometimes whitish flowers are in dense racemes 10 - 50 cm long. Fruit pods are 10 – 13 cm long and 1.5 - 1.8 cm wide, leathery, releasing black or blackish-red seeds.

Ecology Found in grassland, bushland, open woodland, sometimes in rocky places with an altitude range between 1,200 and 1,450m. The plant is widespread across tropical Africa from Sudan to south western Africa.

Uses In Umalila the root is washed, peeled, chopped and dried in the sun before being ground to powder. A pinch of powder is then put in the funnel of the maize plant to control stalk-borer. However this should be done during the rain season to avoid the risk of burning the plants. The dried root is sometimes used for firewood. The flowers are

reported to be visited by honeybees in Umalila. The powdered root is sometimes sprinkled on to bees to make them quiet while harvesting honey. However as the root powder is used by the Wahehe and Sukuma people as an effective protection for stored maize against insect attack, this practice is not recommended. The root powder is also widely used in Tanzania, Malawi, Zimbabwe and D. R. Congo as a fish poison. The cooked leaves are used medicinally, bound onto areas affected by scabies or pounded and applied as a repellent for sand fleas. In Rwanda the powdered root, mixed with butter, is used to treat calves with mange. The root is poisonous and reported to contain the chemical Rolvarine. It can be used to rub on furniture to protect against borers. However the root serves as an emergency source of fluid for people in the deserts of south western Africa. They slice off the top and pound the flesh. The sap separates and is then removed for use. The fruit, though used as a fish poison, is also used as a food by the Sukuma people in times of famine. The plant is effective in killing bilharzia carrying fresh water snails. Sap is used as a soap substitute in Zimbabwe.



References Watt & Breyer-Brandwijk 1962, Wild et al. 1972, Williamson 1975, Kokwaro 1976, Burkill 1995, van Wyk & Gericke 2000, Raemaekers 2001

Nicandra physaloides

(Solanaceae)

Common names Ifuate, ifoti (Malila), apple of Peru.



Description A much branched, erect annual herb growing to 1.2 m high. Leaves are alternate with irregularly and deeply toothed margins. Flowers pale blue to purplish with white centres. Stamens 1.5 to 2.5 cm long. The plant can be found flowering when only a few cm tall. Widespread and flowering during most of the year.

Left : Nicandra physaloides in cropland near Sasyaka

Ecology An introduced weed from Peru and Central America. Grows in arable land up to an altitude of 2,400 m. Now present in

Kenya, Tanzania, Zimbabwe and South Africa. It is sometimes the dominant weed in maize.

Propagation The plant spreads by seed.

Uses Young tender leaves are collected in the rain season and used as a vegetable in Tanzania. They are sometimes sold commercially. Flowering takes place nearly all year round and bees are reported to collect pollen and some nectar.

References Agnew 1974, Moriarty 1975, Fichtl & Adi 1994, Ruffo et al. 2002



Nicotiana tabacum

(Solanaceae)

Common names Intumba (Malila), tumbako (Swahili), tobacco

Description An annual or short lived perennial herb growing 1 – 3 m high.



Ecology Tobacco thrives in a warm climate and needs sufficient rainfall while the plants are young. It does not grow well on water-logged soils or soils with a high salt content.

Propagation Seed is long lived and should be sown thinly in a fine seedbed. One teaspoon is sufficient for 30 sq. m. Sowing is best carried out using a watering can. Place the seed in the can, add water, stir and then use a fine spray.

Uses The plant can be used as a spray to control insects. The highest concentration of nicotine is in the stalks and leaf ribs. Sprays are most effective when the temperature is above 30°C. Food crops should not be eaten until 4 days after spraying. The plant also acts as an insect repellent and a fungicide. Nicotine spray is effective against aphids, cabbage worms, caterpillars, flea beetles, grain weevils, leaf miners, mites, stem borers, thrips and rust disease in beans. Soak 1 kg crushed tobacco stalks and leaves in 15 litres water for one day. Add some grated soap (this will help the liquid stick to the

sprayed plants). Filter out the solid material. Spray immediately using a fine nozzle. Clean out all utensils carefully after use. **Nicotine is a very toxic organic poison. It is important not to allow the spray to come in contact with the skin during application.** Tobacco is also a useful bee plant providing both pollen and nectar. Though the honey from tobacco is unpalatable by itself it is normally brought in with nectar from other plants, which masks the unpleasant taste.

References Purseglove 1968, Crane et al. 1984, Stoll 2000

Nuxia congesta

(Loganiaceae)

Synonym *N. sambesina*, *N. viscosa*

Common names Imbaza (Malila), brittlewood, common wild elder



Description A shrub or small tree often with many stems, up to 10 m high or 25 m in closed forest. The trunk is often twisted, corrugated, and the lower branches often hang down. Bark is grey to brown, flaking lengthwise in long strips. Young branches are 3 – 6 sided with thicker nodes where the leaves arise. Leaves are 7 - 11 cm long and 2 - 5 cm wide, leathery, dull green, in groups of 3 at the ends of branches. They have short stalks, sometimes with a few coarse teeth near the apex, or with a rounded or notched tip. Flowers are heavily scented, small, white, cream or mauve, in dense terminal flat or

rounded heads.

Ecology Grows in the lower storey vegetation in forest edges and in drier evergreen highland forests. Altitude range is from 1,500 to 3,100 m. Present in West, Central and East Africa, north to Eritrea and in southern Africa.

Propagation Can be grown from seed or wild seedlings. Collect the fruits when mature. Seed can be stored.

Management The tree is slow growing and can be coppiced or pollarded.

Uses A good bee forage. Bees collect abundant nectar and pollen throughout the day. The flowers are known to be a valuable source of honey at higher altitudes. Other *Nuxia* species are reported to be good honey producers. The bark or leaves are chewed or boiled in water and the liquid drunk to cure indigestion in East Africa. Bark is used in Uganda to treat toothache and impotence.



References Wild et al 1972, Kokwaro 1976, FZ 1983, Fichtl & Adi 1994, Bekele-Tesemma et al. 1993, Katende et al. 1995, Hepburn & Radloff 1998, Hyde & Wursten 2002-6, Lovett et al. 2006

Ocimum gratissimum

(Lamiaceae)

Synonyms *O. viride*, *O. suave*



Common names Isongwa, ishiomwe (Malila), East Indian basil, tea bush, tree basil, fever plant

Description An erect, branched, woody shrub from 30 to 250 cm tall.

Ecology Widespread in open sites in Central and East Africa and in tropical Asia. Common in disturbed ground in upland forest areas, with an altitude range of 600 – 2,400 m.

Left : *Ocimum gratissimum* in grassland at Itundu in July.

Uses The plant is widely known as an aromatic, antiseptic herb and as a stimulant. It is an important medicinal plant, particularly in West and Central Africa. In eastern Tanzania a root decoction is drunk and leaf pulp is rubbed on the body to treat convulsions and epilepsy. The leaves can be infused to make a tea and the oil is used in perfumery. The plant is burnt as a mosquito repellent in

southern Africa. The strongly scented leaves are rubbed between the palms and snuffed as a treatment for blocked nostrils. The leaves and oil are used to treat fevers, headaches, impotence, diarrhoea, dysentery and worms in children. They are also rubbed on to the skin to treat rheumatism and lumbago. This and other species of *Ocimum* are frequently rubbed onto hives, especially around the entrance, to attract bees. Other species are known to be important bee forage plants which flower over long periods.

References Watt & Breyer - Brandwijk 1962. Kokwaro 1976, Howes 1979, Blundell 1987, Fichtl & Adi 1994, Bown 1995, Burkill 1995, Hepburn & Radloff 1998, Neuwinger 2000, Paterson 2006

Ocimum lamiifolium

(Lamiaceae)



Common names Isawi

Description An erect, robust, branching shrub up to 3 m high. Leaves are opposite and covered with fine hairs. Flowers are white or very pale purple in compound or simple terminal flower heads.

Ecology Sometimes grown as a hedge plant in Umalila. Locally common on mountain forest edges and in disturbed ground. Altitude range 1,500 – 2,700 m. Present in Maasai, Tabora, Mbeya and Iringa regions in Tanzania and also in Kenya, Uganda, Rwanda, eastern D.R.Congo and Ethiopia.

Left : *Ocimum lamiifolium* growing in wasteland near Yalenga.

Propagation Can be grown from seed.

Uses A hedge plant. Bees were collecting pollen and nectar in April. The plant has a long flowering period. *Ocimum* species are known to be important bee forage plants. In Ethiopia the leaves are reported to have value in reducing fever.

References Blundell 1987, Fichtl & Adi 1994, Hepburn & Radloff 1998



Olinia rochetiana

(Oliniaceae)

Synonym *O. usambarensis*

Common names Iwobe



Olinia rochetiana with young fruit in April

Description A shrub or tree up to 20 m tall. Bark is light grey-brown, flaking in thin yellow-brown flakes. When cut the branches have a characteristic unpleasant burnt smell. Small branches are square in cross section. Leaves are bright red when young, opposite, up to 7 cm long and are wider towards the tip which is blunt or notched and has toothed edges. The leaf stalk is grooved and often pinkish. Flowers are cream-white fading to pink-red, strong smelling, very small and in dense round heads up to 7.5 cm diameter. Fruit is in heavy bunches, red-brown when ripe, and 0.5 - 1 cm in diameter.

Ecology The tree was growing in grass/bush land in Umalila. It is also found on the margins of evergreen forest, near streams, in gallery forests and rocky outcrops on the Nyika plateau in Malawi. In Uganda the tree grows in dry upland forests between 1,600 and 2,900 m. It is especially found in secondary forests and on forest edges. In Ethiopia it grows between altitudes of 1,300 and 3,200 m in various types of forest: mountain, evergreen, riverine and frequently on forest edges. It also grows in evergreen bushland and is sometimes left as a single tree in grassland and farmland derived from forest. The tree is present in D.R. Congo, Rwanda, Kenya, Angola, Zambia, Malawi, Zimbabwe and South Africa.

Propagation Can be grown from seed or transplanted small wild seedlings. Soaking the seed in cold water for 24 hours may hasten germination.

Management The tree can be coppiced or pollarded.

Uses The tree is reported to be visited by bees in Umalila and is known to be an important bee forage being worked for pollen and nectar in Ethiopia. The tree is commonly used for firewood though, in Umalila, it is reported to make poor firewood and is better made into charcoal. The stems are used for house building, farm tools and walking sticks. The leaves are eaten by goats and cattle. In Uganda the tree is planted for soil conservation, the timber is used for firewood and charcoal and the roots and bark are used as medicine. The roots, bark and young leaves are used medicinally in Kenya to treat fevers, tapeworms, rheumatism, bronchitis and indigestion and as a stimulant. The tree can also be planted for ornamental purposes.



Photo : Reinhard Fichtl

References Kokwaro 1976, FZ 1978, Coates Palgrave 1983, Fichtl & Adi 1994, Hepburn & Radloff 1998, Katende et al. 2000, Neuwinger 2000, Burrows & Willis 2005, Lovett et al. 2006

Oreosyce africana

(Cucurbitaceae)

Common names Inyuli



Oreosyce africana growing in a hedge at Shilanga village

Description A climbing or trailing plant, 3 – 4 m long, having tendrils. Stems are rough and covered with brown hairs. Leaf blade is hairy, slightly 3 – 5 lobed and may be roughly triangular in outline, 22 – 98 mm long and 30 – 79 mm wide. Lobes are triangular with central lobe the largest. Leaf stalk has brown hairs and is 24 – 115 mm long. Male flowers are in groups of 2 – 5, having pale yellow or cream petals, which are rounded and united at the base. Female flowers are solitary on 3.5 – 9 mm stalks. The green to greenish white fruit is borne on a stalk 8 – 20 mm long, is roughly oval, 15 – 27 mm long and 13 – 21 mm wide, bearing tubercles of different lengths.

Ecology Found in upland grassland, also on the edges and in clearings in forest and bamboo thicket. Altitude range 900 – 3,000 m. Also present in Uganda, Kenya, Malawi, Angola, Cameroon, eastern DR Congo, Ethiopia and Madagascar.

Uses Bees were seen collecting nectar near Shilanga village. The plant is cooked with *Justicia heterocarpa* and the soup taken to accelerate childbirth in Tanzania. The leaf is rubbed on areas affected by ringworm.



References FTEA 1967, Burkill 1985, Burrows & Willis 2005

Osyris quadripartita

(Santalaceae)

Synonym *O. lanceolata*, *O. compressa*, *Colpoon compressum*

Common names Iweya (Malila), mbula (Nyakyusa), African or East African sandalwood.



Description An evergreen shrub or small tree from 1 to 6 m tall. Bark is smooth and grey later becoming thick and rough. Leaves are simple and alternate, crowded along the stems, grey, blue or yellow-green, slightly fleshy, becoming tough and leathery 1 – 7 cm long with a sharp tip, edges are tightly rolled under, the 2 mm stalk runs down the stem forming a ridge. Male and female flowers separate but on the same plant. Male flowers are short and greenish in short loose, few flowered clusters. The female flowers are usually solitary. Fruits are waxy, oval to round berries about 1 cm long, green-yellow ripening to shiny red, fleshy and edible, containing one seed.

Ecology Grows on well drained soils as an under-storey shrub in highland forests and forest remnants and on rocky ridges and mountain slopes from 1,500 to 2,500 m altitude. Found in Kenya, Ethiopia, Burundi and South Africa. Also present in southern Europe and Asia.

Propagation Can be grown from fresh seed or suckers. It is best to nick the base of the seed to increase germination speed which is normally 60% after 6 weeks.

Management Very slow growing and requires shade in the early stages.

Uses Reported to be used as a salt substitute in Umalila. Elsewhere in

Tanzania the leaf, roots and bark infusions are drunk as a tea and as a tonic. The fruit is found from July to December and is eaten raw. The roots and bark are sold locally and also exported to make perfume. The wood is very hard, strong and heavy and used for carvings, mortars, firewood, pestles, pegs, beds and building poles. The roots are used to make a red dye. The shrub can be planted as an ornamental and for soil conservation. Flowers are produced throughout the year and bees collect pollen and nectar. Root fibres are used to make baskets.

Remarks The tree is endangered in Tanzania due to over-exploitation for cosmetics. In South Africa *O. compressa* is regarded as a separate species and grows as a partial parasite on other trees. It is restricted to coastal dunes.

References Watt & Breyer - Brandwijk 1962, Wild et al.1972, Coates Palgrave 1983, Peters et al. 1992, Beentje 1994, Fichtl & Adi 1994, Mbuya et al. 1994, Neuwinger 2000, van Wyk & Gericke 2000, White et al. 2001, Ruffo et al. 2002, Burrows & Willis 2005, Lovett et al. 2006

Parinari curatellifolia

(Chrysobalanaceae)



Parinari curatellifolia near Shilanga

land. The tree is also present in Uganda, Kenya, Zimbabwe and South Africa and from Senegal to Cameroon.

Synonym *P. mobola*

Common names Iyula, iwula, ihula (Malila), mbula, mbura (Swahili), mobola plum

Description An evergreen shrub or small tree with a dense rounded crown. Bark rough, dark grey-brown. Young shoots have yellowish woolly hairs. Leaves oval and alternate, with clear parallel veins, leathery, 3 to 8 cm long. Flowers are small, white-pink and scented. In Tanzania flowering occurs over a long period between August and November. Fruit oval, up to 5 cm long, containing one seed with two fatty kernels. The fibrous yellow flesh is sweet but sharp.

Ecology Grows in most areas of Tanzania, from 0 to 2,100 m in grassland often persisting in secondary bushland and cultivated

Propagation Grow from seed or use wild seedlings or root suckers. Collect fresh seed from fruit on the tree. Clean the flesh away and dry the seed in the shade. Immerse in boiling water for 15 minutes, allow to cool, then soak for 24 hours. Sow in sandy soil and cover with a thin layer of sand. Take care not to damage the tap-root when transplanting, which should be done at the 3 leaf stage. Plant out after 2 years. The young trees grow quite fast. Germination of seed may be poor and very slow, taking up to 6 months. It should also be possible to use root suckers, which are produced after cutting or damaging the root.

Management The tree is often protected in Tanzania.

Uses The flowers are a valuable bee forage, providing abundant nectar and pollen. The sweet fruit is usually eaten fresh. The taste is improved if fruits are stored for several days until completely ripe. They are sometimes dried for later use. A tasty syrup can be made by peeling the ripe fruits and soaking them in warm water or boiling the fruit in water. This is then diluted. The fruits can also be made into jam or cooked and eaten with porridge. Cooking oil can be extracted from the seeds. Fruit flesh is rich in vitamin C and the seed kernel is rich in oil. The seeds may be dried, roasted and crushed. The wood is used for charcoal, poles and tool handles. The timber is hard and heavy and used for building rafters and for furniture. It tends to blunt saws quickly. The tree makes an attractive shady tree. The leaves and fruit can be used as livestock fodder. Bark can be used for tanning. A bark extract is used to bathe a person suffering from pneumonia. The mouth is rinsed with a root infusion to ease toothache. Young shoots are used as toothbrushes in Zanzibar and Pemba.



References Williamson 1975, Coates Palgrave 1983, FAO 1983, Burkill 1985, Mbuya et al. 1994, Venter & Venter 1996, ICRAF 1998, Msanga 1998, van Wyk & Gericke 2000, Kihwele et al. 2001, Ruffo et al. 2002

Passiflora edulis

(Passifloraceae)

Common names Ipokhola (Malila), passion fruit, granadilla.



Description A vigorous woody perennial vine, up to 15 m long. The stems remain green. Tendrils arise from the leaf axils and are spirally coiled. Leaves are borne on stalks and are 3 lobed, 10 – 15 cm long and 12 - 25 cm wide, but are often undivided on young plants. Flowers are solitary, fragrant and 7.5 - 10 cm in diameter. Fruits become deep purple when ripe. Seeds are black and surrounded by yellowish, juicy pulp which has a sharp but pleasant flavour.

Ecology The plant is native to southern Brazil. In Malila it is widely grown over hedges, fences and on trees. It prefers a cool highland climate and, between altitudes of 1,200 and 1,500 m, plants produce for up to 8 years. The plant requires a well distributed rainfall but rain should be minimal during the flowering period.

Propagation Seeds should be washed to remove the pulp and then dried in the sun. They can be stored at room temperature for up to 3 months. Sow in a seed-bed. Germination takes approximately 2 weeks. Young plants are usually transplanted into polythene tubes and grown in semi-shade until they are 25 - 50 cm high. They should be hardened off in full sun for 1 or 2 months before planting out.

Management Pinch out the top shoot and allow 2 - 4 leaders to grow. Tie the new shoots to the fence or trellis. Pruning should be light and carried out after the crop has been harvested. It encourages new growth and maintains high yields. Remove all vines that touch the ground. Always cut growth a few nodes away from the main stem. Do not throw long vines over the fence. Thin out some vines growing on top of the fence and leave them there to dry out and fall naturally.

Uses Grown for its edible fruit which can be used fresh or made into a juice. The juice is highly nutritious and has good mineral content. It is a digestive stimulant and has been used as a remedy for gastric tumours. Seeds are oily and have potential for soap making. Bees collect pollen and nectar and, together with carpenter bees, are the most important pollinators for the plant.

Preparation of juice. Fruit is washed and diseased or damaged fruit is removed.

Remove stalk and cut fruit in half. Remove flesh. Seeds are separated from pulp with a centrifugal extractor or can be sieved out. Water and sugar are then added to taste. Filter again. Sterilize and bottle after cooling. Juice can be stored for 3 months at 25 - 28°C. Consume within 24 hrs. of opening the bottle.



References Purseglove 1968, Fichtl & Adi 1994, Burkill 1997, Nakasone & Paul 1998

Passiflora ligularis

(Passifloraceae)

Common names Sweet passion fruit, sweet granadilla



Immature fruit and foliage

America, where it is also cultivated. Elsewhere it is occasionally cultivated, particularly in Hawaii, New Zealand and New Guinea.

Propagation The plant can be grown from seed or cuttings.

Management The plant needs to be supported off the ground and can be grown over a tree or trellis.



Uses In Umalila pulp from the fruits is eaten fresh. Elsewhere it is made into drinks and ice creams.



References Purseglove 1968, Verheij & Coronel 1991, Nakasone & Paull 1998, van Wyk 2005

Description A vigorous woody climber with entire leaves, 10 – 20 cm long and greenish-white flowers, 7 – 10 cm in diameter. Fruit is an oval berry, 7 – 8 cm in diameter, orange-brown when ripe and having a hard shell. The fruit pulp is white with black, flat, pitted seeds. Leaves are large and undivided. Immature fruits are green with a slight purple sheen at first but then turn orange. Pulp is clear and sweet.

Ecology Grows in mountainous regions, 900 – 2,700 m altitude in the tropics or at lower altitudes in the sub tropics. The plant originates in tropical

Pavetta sp. probably abyssinica

(Rubiaceae)

Common names Izenya zenya



Description *Pavetta abyssinica* is a forest under-shrub or tree 2 – 8 m tall. Leaves are opposite, glabrous, 4 – 16 cm long and 1.5 – 6 cm wide, often drying black. Leaves of *Pavetta* species often have bacterial nitrogen fixing nodules, visible as black or pale dots or stripes. Flowers are borne terminally on leafy branches or short leafless shoots. Fruits are black and up to 1 cm across.

Ecology Present in highland forests, between 1,050 and 2,500 m altitudes. Also present in Kenya, Uganda and Malawi.

Propagation *P. lanceolata* can be grown from seed. Seedlings prefer being grown in some shade. They can be transplanted fairly easily. Seedlings and young plants require adequate water but once established can be grown in the sun and tolerate dry conditions. The plant grows slowly at first.

Management *P. lanceolata* can be grown as a hedge or screen.

Uses Many bees were seen visiting the flowers in October. *Pavetta* species are known to be important honey plants.

Remarks There are known to be 70 species of *Pavetta* in East Africa. The identity of this species, determined from the photographs, is likely to be *P. abyssinica* (H. Beentje – personal communication).

References Blundell 1987, FTEA 1988, Beentje 1994, Mabberely 1997, Hepburn & Radloff 1998, White et al. 2001, Herman 2006, Lovett et al. 2006



Pavonia urens

(Malvaceae)

Common names Iwawa



Pavonia urens in flower near Ilemba in June

Description A very variable erect shrub, 1.5 to 3 m tall. Usually the stems and leaves are covered with dense golden-brown hairs that may cause a slight skin irritation. Leaves are also variable in size, the lowermost up to 15 cm long, but the upper much smaller, borne on stalks 2.5 to 11 cm long. The flowers, 3 - 5 cm in diameter, are bright rose pink to mauve with a darker base, and have a central pink column of stamens 1.5 to 2.5 cm long. Flowers are produced in southern Tanzania from April - July.

Ecology Common in forest margins, secondary forest and scrub from 600 to 2,000 m altitude. Widespread in tropical Africa but

most common in the drier regions.

Uses Bees were seen collecting nectar in the early morning. Bees frequently collect pollen and abundant nectar in Ethiopia. The flowers may be cooked as a vegetable. String, made from the stems, is used widely. The leaves are browsed by sheep and goats. They are sometimes used for cleaning the hands and utensils in Kenya. A decoction of the root is drunk to treat abdominal disorders in Pare, Tanzania.

References Agnew 1974, Williamson 1975, Kokwaro 1976, Cribb & Leedal 1982, Fichtl & Adi 1994, Burkill 1997

Peddiea polyantha

(Thymelaeaceae)

Common names Gamboruguga

Description A shrub or small tree 2 – 6 m high. Branches are light-brown and smooth. Leaf stalks are 3 – 6 mm long. Leaves are alternate, spear shaped, 9 – 14 cm long, and 2.5 – 4 cm wide. They are often clustered at the ends of the branches. The flower head has 10 – 18 yellowish green flowers with a slight violet tinge on the outside.

Ecology The tree was photographed in Khatanta forest. It is found in upland rainforest, from 1,500 to 2,200 m in Tanzania.

Uses Bees are reported to visit flowers in Umalila though, with the long corolla tube, they may have difficulty getting to the nectar. Other species of *Peddiea* are known to have useful fibres.



References FTEA 1978



Jelimaya Kanini lighting up a smoker at Yalenga. Only 30 of his 60 hives had bees.

Pennisetum purpureum

(Poaceae)

Common names Isale (Malila), elephant grass, napier grass

Description A robust, erect, deep rooted perennial grass with stems growing 2 – 6 m high and forming large clumps. Leaves 30 - 120 cm long by 1 - 5 cm wide with a prominent midrib. The leaf sheath is hairy.



Ecology Napier grass will grow up to an altitude of 2,000 m and can withstand periods of drought. It prefers a deep soil though it will grow in a wide variety of soils. It does not however stand waterlogging.

Propagation Most easily planted using stem cuttings having at least 3 nodes. Cuttings are planted diagonally or vertically with 2 nodes below the ground. For good soil conservation, plant at a close spacing along the contour. Otherwise for fodder production, plant at a spacing of 50 – 90 cm. After cutting back top growth to ground level clumps can be divided and planted out.

Management To obtain the best food value cut regularly when leaves reach 100 – 120 cm. The plant responds well to nitrogen fertilizer if available. Alternatively *Desmodium intortum* can be planted in combination to improve the supply of nitrogen.

Uses Napier is a useful forage grass for stall feeding, though it can also be grazed. Its feed value however depends on the ratio of stem to leaf and on age. Young leaves have a much better digestibility than older leaves, particularly if stems are present with the latter. The plant is valuable for erosion control when planted in a continuous line along the contour at 2 m vertical intervals.

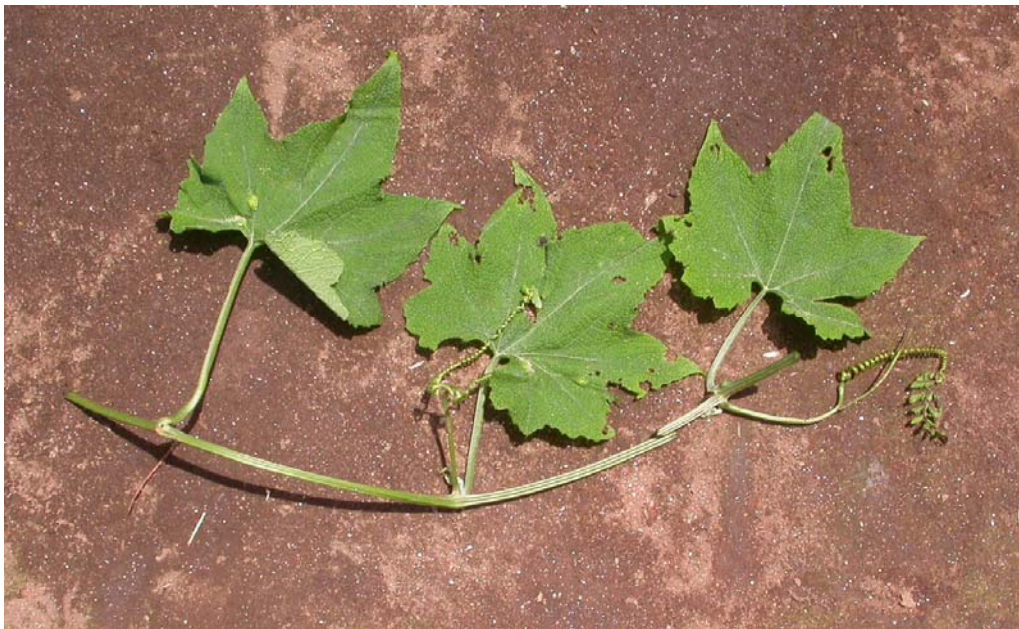
References Bogdan 1977, 't Mannetje 1992

Peponium vogelii

(Cucurbitaceae)

Common names Ilomba

Description A creeper up to 8 m long, normally possessing rough hairs. The tendrils divide into two. Leaves are 5 – 18 cm long and 7 – 26 cm wide and are 5 lobed. The leaf edge has sharp pointed teeth. Flowers are bright yellow, opening at night and only seen in the early morning. The fruit is bright red, hairy, thin-skinned, 15 cm long, and borne on a stalk 7 cm long. The fruit has a beak and contains small dark seeds in fleshy pulp.



Ecology Found in upland and lowland rainforest, particularly at the edges and where there is a high water table, in upland bamboo thicket, woodland and in bush near open water. Also present in rocky places. Altitude range is from 100 to 2,400 m. Also present in West and Central Africa and south from Ethiopia to Mozambique and in the Seychelles.

Uses The ripe fruit pulp is sweet and eaten raw. The unripe fruits are very bitter. The fruits are also fed to pigs and rabbits. The dried powdered leaves are rubbed into scratches made in the skin to treat leprosy in Tanzania. In Kenya the leaves are used as a medicine for menstrual problems. The pulped leaves are used to mature abscesses and furuncles in D.R. Congo. The ripe fruits are eaten for stomach-ache in Ethiopia. In Burundi the leaf ash is sniffed for chest pains and the leaf ash is eaten for pain in the side. A leaf decoction is drunk or given by enema as a purgative. To mature boils, leaf pulp is applied as a dressing.

Remarks The plant can become a problem weed in cultivated land.

References Kokwaro 1976, Burkill 1985, Peters et al. 1992, Neuwinger 2000, Ruffo et al. 2002

Periploca linearifolia

(Asclepiadaceae)

Common names Ingururusi



Description A climbing herb or woody creeper up to 10 m long. A white latex is produced from the cut stems. Leaves are narrow and pointed, 4 – 9 cm long and 0.2 – 1.2 cm wide. The flowers are cream or greenish yellow, in bunches up to 15 cm long. Fruits are cylindrical up to 15 cm long and contain many seeds with numerous white hairs attached at one end.

Ecology Grows in hedges, on forest margins, in riverine forest and secondary bushland derived from forest, where it scrambles over other plants. Altitude range is from 1,700 to 2,400 m. Also present in Kenya, Uganda, Burundi, Malawi, Zimbabwe and Ethiopia.

Uses In Umalila the stems are used for tying. In Marakwet, Kenya the latex is applied to skin diseases and ulcers. In Burundi the leaf sap is drunk by pregnant women to stop vomiting. A leaf decoction is drunk for diarrhoea and insanity. A root bark infusion or decoction is drunk or administered as an enema for tapeworm. A leaf or root decoction is drunk or used

for bathing for skin diseases. Leaves are soaked in water and used as a dressing for the treatment of mastitis.

References Brummitt 1973, Beentje 1994, Neuwinger 2000, Burrows & Willis 2005



Near Itebera

Persea americana

(Lauraceae)

Common names Itakapera (Malila), avocado pear



Ecology Originally from Central America but now grown throughout the tropics and subtropics. It is fairly common in Umaliia. Mexican and Guatemalan x Mexican hybrids are most resistant to cool climates. Avocados can be grown in a wide range of soils but are sensitive to poor drainage and water-logging. In areas subject to high winds the trees should be protected by being grown in mixed stands with other trees.

Left : *Avocado flowering in May near Mbawi*

Propagation Young, vigorously growing

seedlings, are used for rootstocks and the ends of leafy shoots for scion material. Guatemalan and West Indian races produce the best rootstocks but Mexican rootstocks have the best resistance to cold. However they are not compatible with West Indian scions. Seed remains viable for 2 - 3 weeks and seed coats should be removed for better germination. Plant in a nursery with seeds 35 cm apart and cover with no more than 1 cm of soil. Young plants should be side grafted with terminal tips 6 cm long, older stocks may be shield budded. Budded and grafted plants can be transplanted with a ball of earth round the roots after about 18 months. They start yielding fruit after 2 or 3 years compared with 8 - 10 years for trees grown from seed.

Uses Mainly grown for its edible fruit which is rich in fat, protein and vitamins. It is the most nutritious of all fruits. It is reported that satisfactory crops of fruit are set only if honeybees are present in sufficient numbers throughout the flowering period. As a bee forage nectar secretion is affected by climate and soil conditions. It is abundant when humidity is high. Honey produced is dark with a strong flavour. Though not common in Umaliia it is said to be an important honey source locally. The wood is brittle and attacked by termites. The tree has various medicinal and antibiotic uses. Extracts of leaves and fresh shoots have shown anti-cancerous activity. The seed can be ground up and made into an ointment to treat various skin problems such as scabies, infected wounds and dandruff.



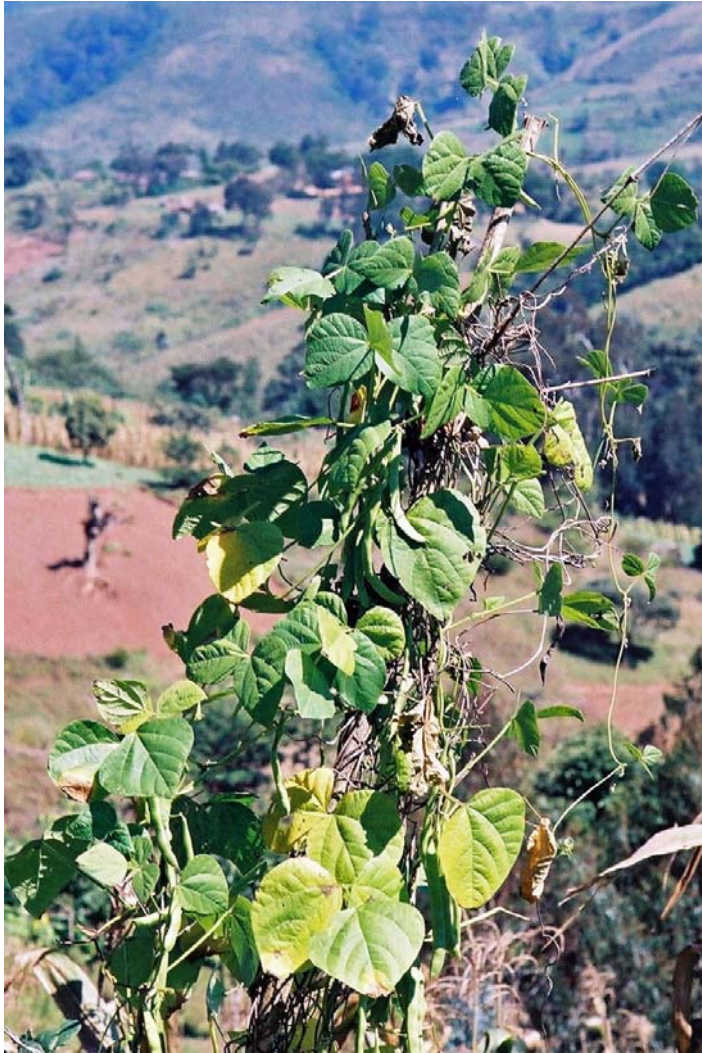
References Purseglove 1968, McGregor 1976, Crane et al. 1984, Burkill 1995, ICRAF 1998

Phaseolus coccineus

(Fabaceae)

Synonym *P. multiflorus*

Common names Tandawala (Malila), multiflora bean, runner bean, scarlet runner bean



Description A climbing and branching, slightly hairy perennial up to 4 m tall, which is frequently grown as an annual. It has thick, fleshy, branched tuberous roots. The stems twist and are slightly ribbed. Leaves are trifoliate with ovate leaflets, 7 – 12 cm long. Flowering starts 40 – 60 days after planting with flowers opening at sunrise and closing at sunset. Flowers are normally scarlet but white forms also exist. Pods are 10 – 30 cm long, often slightly curved and plump.

Ecology Runner beans are grown widely in temperate areas. They require deep, well prepared, well drained loamy soils of a light to medium structure with a pH of 6.0 to 7.0. Acid soils should be avoided as they reduce the activity of the *Rhizobium* nitrogen fixing bacteria. It can only be grown at altitudes between 1,950 and 2,550 m in the tropics because the flowers, which are insect pollinated, are not fertilized at lower altitudes.

Propagation Grown from seed. These germinate after

10 – 14 days

Management In Umalila runner beans are normally grown with the maize crop so that maize acts as the support and no stakes or trellises are required. The beans can be grown without support if the leading shoots are pinched out. This encourages a bushy growth. Pollination and seed production can be increased up to 5 times by honeybees.

Uses Grown for dried seeds in Umalila. The fleshy fibrous roots are eaten in Central America though these may contain toxic chemicals. Runner beans are grown for green pods in Europe. Bees visit the flowers for nectar. A good flow of honey is obtained when there is adequate soil and air moisture during flowering. The plant fixes nitrogen which benefits the accompanying maize crop.

References Johannesmeier 1975, Kay 1979, Tindall 1983, Fichtl & Adi 1994, Brink 2006

Phaseolus vulgaris

(Fabaceae)

Common names Imbonzo (Malila), mharagwe (Swahili), French bean, snap bean



Description Dwarf or bush types are grown in Umalila. These are early maturing and 20 - 60 cm in height. The taproot is well developed. Leaves are alternate on stalks 15 cm long, comprising 3 ovate leaflets 7.5 – 14 long and 5 – 10 cm wide. Flower heads are up to 15 cm long. A number of varieties are grown.

Left : *Maize is often inter-planted with beans.*

Ecology Beans are frequently planted in March and April. Some varieties do better than others if rain is very heavy. Beans are sometimes planted between lines of maize in August. The plant has a wide range of tolerance. Most varieties are adapted to growing up to 2,000 m in soils with a pH range between 5.5 and 6.5. Acid soils should be avoided as they reduce the activity of the *Rhizobium* nitrogen-fixing bacteria. Moderately heavy loam soils are suitable. Pole beans give better results than dwarf varieties in the rain season.

Propagation The seed is planted direct, 3 - 4 cm deep with 4 - 5 seeds per site, spaced 20 – 25 cm in the row and 80 - 100 cm between rows. Rows should run across the slope to limit erosion. Fertilizers are rarely used in Umalila.

Mrs Mwampamba with mixed beans (left), Maini (centre) and Masusu (right). Varieties in mixed group include Sunga wa pene, Inyangwa, Magwargwanje (has very good taste), Injeru, Kambani, Kigoma, Ndirema and Kabarengete.



Leaves being dried for later use as vegetables



Management Weeding is important until the plant flowers. Beans can be harvested from 70 - 90 days after planting and should be picked before the pods split open. Aphids are an important problem and can be controlled either by treating the seed prior to planting with a systemic insecticide or with a tobacco

solution spray (see p 157).

Uses Grown mainly for dried seeds though the young leaves are eaten as a vegetable. The leaves are also dried and stored for later use. Bees are reported to visit the flowers.

References Tindall 1983, Stoll 2000, Raemaekers 2001, Messiaen & Seif 2004

Phragmanthera usuiensis

(Loranthaceae)



Common names Ulimbo



Description and Ecology A parasitic plant growing on many cultivated and indigenous trees. This specimen was seen on *Dodonea angustifolia* in Ilomba forest, Umalila.

Uses The sticky latex from the fruits is used as a bird lime. The fruits are opened and smeared round a long stick which is then set up and watched to trap birds (see left). Kumbikumbi (termites) are fixed on the top to attract birds. Heated stems are applied to treat diarrhoea in D.R. Congo. Heated stems are applied to

The ash of burnt twigs is licked with salt to treat pneumonia and general pain by the Maasai.

Remarks Loranthaceae depend on birds for pollination and have rather firm, often red or orange flowers. There are 98 species of Loranthaceae in East Africa. Loranthaceae are not pollinated by insects and often flower in the dry season.

References Blundell 1987, Fichtl and Adi 1994, Neuwinger 2000, Vande weghe 2005



Physalis peruviana

(Solanaceae)

Synonyms *Physalis maxima*

Common names Inzungu (Malila), Cape gooseberry, Peruvian cherry.



Description An annual or perennial trailing to erect herb up to 80 cm tall. Leaves are alternate and entire. Flowers are small, yellow and borne in the leaf axils. Fruits are round orange berries, 1 – 2 cm, enclosed in a papery calyx.

Ecology Originally from Peru but is now widely grown, particularly in South Africa. It grows in waste areas, at forest edges at altitudes between 2,000 and 2,600 m. It can be inter-cropped with maize. It thrives in full sun and is fairly drought resistant. It does not like waterlogged conditions. It should not be grown in ground previously used for tomatoes or potatoes. Prefers a sandy, well drained soil with a pH of about 6.5 but will grow in a wide range of fertile soils.

Propagation The berry is crushed, dried out in the sun and the seeds extracted. Seeds should be stored in a cool place. Sow seeds 0.5 cm deep in a seed-bed choosing seed from strong plants with large fruits. This is normally done at the beginning of the dry season. Germination takes 10 - 15 days. Transplant seedlings to 10 cm apart in the nursery when they have developed 2 - 3 leaves. Cuttings also take very easily. Transplant into the field after 2 - 3 months, with a ball of soil around the roots.



Management Plant out 80 - 100 cm apart and if possible provide support stakes 1 m tall. If the plants have not produced flowers by the time they are 30 cm tall pinch out the growing point to induce branching. The fruits are ready to pick when they turn golden yellow and the calyx has a papery texture. Ripe fruits can be left on the plants for 2 - 3 weeks. This improves the flavour. Fruits can be stored unwrapped in their husks for several months. The plants should be well weeded. Cut them down at the beginning of the rain season as rain causes the fruit to rot. Plants can be grown for 2 - 3 seasons. It is useful to provide mulch to avoid rain splash damage to the lower fruits.

Uses The fruit has a sweet, slightly acid distinctive taste and has a high vitamin C content. It can be eaten raw, cooked or preserved. In Umalila it is often eaten with ugali (maize porridge). Each plant will produce 500 gm - 1 kg fruit. The fruit makes a very good jam. Bees collect pollen and small amounts of nectar during the long flowering period. Flowers are produced from February to April. Leaves are used fresh as a vegetable and are not normally dried for storage. The plant has several medicinal uses.

References Watt & Breyer Brandwijk 1962, Martin et al. 1975, Moriarty 1975, FAO 1982, Baker 1986, Dupriez & De Leener 1989, Fichtl & Adi 1994, Katende et al. 1995, Raemaekers 2001

Phytolacca dodecandra

(Phytolaccaceae)

Common names Ibozya

Description A fast growing shrubby or woody climber to 7 m high or 15 m long. Nodes are up to 10 cm apart and stems can be 9 mm in diameter. Leaves are usually hairless, 4 – 15 cm long and 2 – 10 cm wide, oval to elliptic and have slender stalks, 1 – 5 cm long. The central flower stalk may grow 40 cm long with the scented flowers being red, white, yellow or green.



Phytolacca dodecandra growing beside a footpath near Shilanga

Ecology Frequently found on waste ground and in hedges. Also present in closed forest, wooded savannah and on cultivated land up to an altitude of 2,000 m. Originally from tropical America but now widespread from Guinea to East Africa and present in South Africa.

Propagation Can be grown from seedlings or from cuttings.

Uses Where the plant is common, both pollen and nectar are collected by bees. The plant is reported as a bee forage in Ethiopia and Gabon. Young leaves are coarsely cut, cooked and used as a vegetable in D.R. Congo, though elsewhere they are regarded as being highly poisonous. The fresh leaves have a protein content of up to 6%. Leaves are also reported to be poisonous to livestock but are used to treat scabies in D.R. Congo. Dried leaves are applied to cuts and swellings. The fruits are a good soap substitute and are especially used for this purpose in northern Kenya and Ethiopia. They can be collected when still unripe and dried for later use. They produce a good lather containing Saponin, which acts as a poison to snails. It has been noticed that water snails carrying bilharzia are reduced downstream from where people wash their clothes with these berries. The juice can also be used for killing mosquito larvae in ponds. Leaves are the source of a yellow dye. The roots are used in small quantities as a remedy for round- and tape-worms.

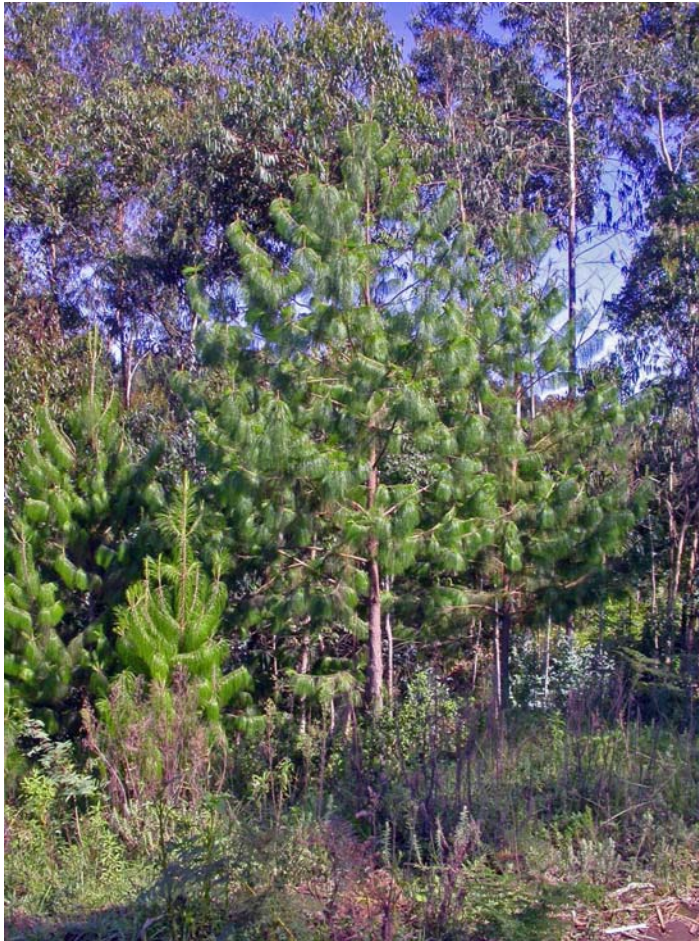
Remarks The older leaves and berries are very poisonous.

References FAC 1951, Watt & Breyer-Brandwijk 1962, Wild et al. 1972, Kokwaro 1976, Blundell 1987, Konda et al 1992, Ambougou 1991, Mbemba & Remacle 1992, Bekele-Tesemma et al 1993, Fichtl & Adi 1994, Burkill 1997, Latham 2004

Pinus patula

(Pinaceae)

Common names Pine (name used in Umalila), msindano (Swahili), Mexican weeping pine, patula pine



Description An evergreen tree growing to 35 m with light green foliage. It normally has a straight trunk producing horizontal branches with the ends turned upwards, but may be forked. Bark grey to dark brown, papery red-brown on young branches. Leaves are long slender needles 15 - 23 cm long in groups of 3. Trees begin to bear fruit after 5 years. Female cones, in clusters of 2 – 5, mature in two years to a shiny brown and are 10 cm long, with an oblique base. The yellow male catkins are formed on the same tree at the end of branches and produce clouds of pollen. Seeds develop below the cone scales and are released over a long period.

Ecology Originally from Mexico, it is the most commonly planted tree in Umalila. It is grown in large commercial plantations in Mbeya and other regions. Suitable for high altitude areas with moderate to high rainfall. It grows well when planted in grassland and on deep soils and even where the rainfall is

only 700 mm per annum. Rainfall however should normally be 1,000 mm per annum for good growth. Altitude range 1,000 – 3,000 m.

Propagation Collect seeds by shaking the mature cones into a basket, rub off the wings with wet hands and sieve out the debris. Seed can be stored for 6 months. Dry the seeds in the sun. Seeds germinate between 35 and 60 days after planting. Seed should be planted in trays in fertile soil and then planted out after 8 to 10 months. Growth stops if nursery techniques are not good and once checked plants take a long time to recover. Many seedlings grow after felling, particularly after burning the cut branches.

Management Space at 2.4 to 2.75 m, though wider spacing should be used on poorer sites. The tree is fast growing and will produce mature timber in 30 – 40 years.

Uses Timber is soft, easily worked, fairly light, and pale brown in colour. It can be used for rough carpentry, firewood and posts if treated with wood preservative. It is suitable for paper manufacture. A good ornamental and shade tree.

Remarks Susceptible to *Diplodia* disease, especially if damaged. More susceptible to *Armillaria* than cypress.

References Leloup 1956, Mbuya et al 1994, ICRAF 1998, Dharani 2002

Piper capense

(Piperaceae)

Common names Umupapa, mafundo

Description An evergreen shrub or tall herb up to 3 m high. The stems are soft, green and often trailing. Stem nodes may be swollen. Leaves broadly ovate, glossy, deep green, with the upper surface distinctly marked and the lower surface more or less hairless. Flowers are borne on a single whitish spike 3 cm long. Leaves and fruit are strongly spicy-aromatic when crushed, with a peppery taste if chewed.



Ecology A common plant of forest undergrowth in the wetter highland forests. Present throughout Tanzania between altitudes of 1,500 and 2,750 m. Also present in Kenya, Uganda, Ethiopia, D.R. Congo, West Africa and south to the Cape.

Uses In Umalila the plant is grazed by cattle and used to treat swollen feet in livestock. The fruit is used as a substitute for pepper and to stimulate digestion. It is sometimes eaten raw but can also be cooked. It is reported to cause sleepiness. In Kenya the seeds are used as a cough medicine and a decoction of the roots as an intestinal worm remedy.

References Kokwaro 1976, Blundell 1987, Peters et al. 1992, Burkill 1997, FZ 1997, Neuwinger 2000, van Wyk & Gericke 2000, Burrows & Willis 2005

Pisum sativum

(Fabaceae)

Common names Isyababa (Malila), njegere (Swahili), pea

Description An annual, climbing herbaceous plant, growing from 20 to 30 cm tall, showing very considerable variation in form and habit. The tap root is well developed and can grow to a depth of 100 cm. Leaves are alternate having 1 – 3 pairs of leaflets and ending in a branched tendrils. The flowers are white to purple, usually self-pollinated. Fruit is an oblong pod 3.5 – 15 cm long.



Ecology In Umalila peas are planted from April to June, after the rains. A cool but not cold climate is required. Best growing conditions range from 13 - 21° C. An evenly distributed rainfall of 800 – 1,000 mm is required. Soils should be free draining with a pH of from 5.5 – 7.0.

Propagation Seed remains viable for 1 - 2 years and if possible it should be treated with a fungicide before planting. Peas should not be grown on the same land more than once in 3 - 5 years. In Umalila they are planted direct after burning the residue from the previous crop. Because of their soil improving qualities they are often planted before a cereal crop such as wheat. However they are also planted after a fallow period. They require a firm, weed free soil. Plant 5 - 7.5 cm deep. Seeds are usually broadcast but better erosion control is achieved by planting double rows 10 cm across the slope allowing 60 cm between the double rows. Allow 3 to 5 cm between plants. Seed rate is 60 – 200 kg/ha depending on variety.

Left : *Peas growing with sweet potatoes near Khatanta forest.*

virus diseases. Some varieties are resistant but effective control can be obtained using nicotine spray (see page 157). The crop may also be affected by fungi if grown on wet, poorly drained soil. 2,000 kg/ha is a good yield.

Uses Mainly grown for dry seed but young shoots are also eaten in Umalila. They are generally cooked separately. Peas are a nutritious food crop with a protein content of approximately 21%. They are best picked while still soft and green and cooked, or they can be harvested when dry, soaked in water and then cooked. There are at least two local varieties - Mbagayeye (takes 3 months to maturity) and Ihaya (2 months to harvest). Some varieties can take several hours to cook

References Hadfield 1960, Kay 1979, Messiaen et al. 2004

Pittosporum viridiflorum

(Pittosporaceae)

Common names Iliova (Malilla), cheesewood



Pittosporum viridiflorum in Isoho forest

covered and kept moist. They take 8 – 12 weeks to germinate. Seedlings transplant easily. The tree will grow in full sun or light shade and is fairly tolerant to drought.

Management The tree can be pollarded, lopped or pruned and can also be grown as a hedge.

Uses Bees are reported to visit the flowers. The wood is soft and mainly used for firewood, spoons etc., though in South Africa it is used for kitchen furniture and shelving. Cattle, sheep and goats browse the

leaves. The bark is used as a dye and as a medicine for anaemia and for preventing abortion. A fibre, used to make baskets, is extracted from the roots. In South African an infusion of the roots is taken for chest complaints and as an enema to treat dizziness. A decoction or an infusion of the bark is used as an emetic or as an enema for treating stomach and abdominal pain, malaria and fevers.

References Watt & Breyer-Brandwijk 1962, Wild et al. 1972, Deschodt 1976, Coates Palgrave 1983, Bekele-Tesemma et al. 1993, Fichtl & Adi 1994, Venter & Venter 1996, Van Wyk et al. 1997, White et al. 2001, Mutshinyalo & Reynolds 2002, Lovett et al. 2006

Description A shrub or small tree to 20 m in evergreen forest. It has a dense rounded crown. Bark is grey and smooth, seamed crosswise on older branches. It has a faint smell of liquorice. Leaves are shiny above, alternate, usually crowded at the ends of the branches. They are 5 – 18 cm long and 2 – 4.5 cm wide, the tip being rounded, the base narrows to a grooved stalk. Flowers are small greenish white, sweet smelling, in terminal heads. Fruit is a yellow capsule less than 10 mm in diameter opening out to reveal a sticky resin surrounding the red seeds.

Ecology Grows in well drained upland areas in forests and wooded grassland, and along stream banks. Found throughout Africa from Guinea to Sudan and Somalia and south to South Africa. Also present in Madagascar and India.

Propagation The tree is most easily grown from seed. Seeds should be lightly



Photo : Ben-Erik van Wyk,
Medicinal Plants of South Africa, Briza Publications

Plectranthus esculentus

(Lamiaceae)



Plectranthus esculentus growing in a home garden at Ilembu

Synonyms *Coleus dazo*,
Coleus esculentus

Common names Inumbu, ivumbu (Malila), viazi maji (Swahili), Livingstone potato, scrambled eggs, wild potato.

Description A perennial plant with stems up to 90 cm tall growing from a tuberous root. Stems are square, hairy and have pairs of opposite almost stalk-less, toothed leaves. Yellow flowers appear in erect clusters before the rains and before the leaves. The tubers which grow in a cluster at the base of the stem, are soft, hairy and sometimes

branched. They measure about 10 cm long and 2 cm across.

Ecology Native to tropical Africa. The plant is highly adaptable, able to grow in any climatic zone, provided the rain is evenly distributed over the growing season and the soil is well drained. Minimum rainfall requirement is 1,000 mm.

Propagation is normally by stem cuttings 10 - 20 cm long using sprouted tubers. Seeds can also be used but they develop slowly. Small tubers are stored in a cool place until they sprout and then planted flat on mounds or ridges or in rows 50 - 100 cm apart allowing 30 - 100 cm between plants and 5 - 10 cm deep. Normally planted in October in Umalila.

Management The plants are earthed up, once they are growing, to avoid greening of the tubers. The crop takes 180 - 200 days from planting to harvest. Yields vary from 2 - 25 t/ha. Tubers can be briefly dried and stored for winter use

Uses The fresh tubers are eaten and contain approximately 30% carbohydrate and 7.5% crude protein. In Umalila the variety in the top photo is normally eaten raw whereas a second variety is cooked in stews or fried. Some people cook the tubers with wood ash to reduce the bitterness. In the past boiled and very soft tubers were given to children at weaning and they are appreciated by people too ill to eat any other food. The tubers can be pickled or dried for later use. They are scraped, washed and boiled or roasted and have a rather watery taste.



Remarks Cultivation of this crop is declining in spite of potential yields of between 13 - 25 tonnes /ha. Nematodes can be a problem. Harvesting takes place from March onwards.

References Watt & Breyer-Brandwijk 1962, Harlan et al 1976, Tindall 1983, Crane et al. 1984, Tredgold 1986, Fichtl & Adi 1994, Burkill 1995, van Wyk & Gericke 2000, Dhliwayo 2002, Schippers 2002

Plectranthus spp.

(Lamiaceae)

Common names Ikwitwa

Description Evergreen, trailing or bushy perennials. Leaves are fleshy, simple, with soft to coarse hairs, aromatic when crushed, and often patterned. Flowers tubular, 2 lipped, the upper lip being 3 – 4 lobed. There are 53 species of *Plectranthus* in East Africa.



Plectranthus masukensis (above) and *Plectranthus defoliatu* (Ivuguvugu)(right)



Ecology Commonly found growing in grassland and on roadsides. Some species have a very limited range. Some, e.g. *P. defoliatu*, grow well in semi shade and cool conditions. Though shallow rooted, they are drought resistant being able to store water in their leaves.

Propagation Use stem cuttings or plants can be divided. Remove lower leaves of cuttings which should have at least two nodes.

Left : *Plectranthus caninus*, grown as an ornamental

Uses Bees were seen collecting nectar from *P. masukensis* from March to May and from *P. punctatus* in March and April. *Plectranthus* species are also known to be important sources of both nectar and pollen in Ethiopia. Other species are important honey sources in Pakistan. *Plectranthus* species have fly repelling properties. The leaves of *P. caninus* are chewed to relieve toothache in Pare, Tanzania. In Burundi a leaf infusion of *P. defoliatu* is used to treat diarrhoea and the dried pulverized root bark is used to remove internal

parasites. A number of species are grown as ornamentals.

References Watt & Breyer-Brandwijk 1962, Kokwaro 1976, Crane et al. 1984, Fichtl & Adi 1994, Hankey 2001, Llamas 2003, Burrows & Willis 2005

Plumbago zeylanica

(Plumbaginaceae)

Common names Naluhalo (Malila), white plumbago, Ceylon leadwort, white flowered leadwort.

Description A straggling shrub from 1 – 2 m high, occasionally climbing to 4 m. Leaves alternate, widest about or below the middle, 70 x 25 mm. White flowers are borne at the ends of the branches. The flower calyx is cylindrical, over 10 mm long, and covered with long glandular hairs. When the fruit is ripe the glands become very sticky, the calyx breaks off easily and clings to fur, clothing and even skin.



Ecology The plant in the above photograph was growing in a home compound at Yalenga. It is normally found in dry bushland throughout East Africa up to 2,000 m, where rainfall is below 400 mm per annum. The plant is widespread throughout the tropics.

Propagation Can be grown from seed, cuttings or division.

Uses Sometimes grown as a medicinal plant and also as an ornamental. The active chemical is plumbagin, an antispasmodic. It contains vitamin K and has antibiotic properties. It is sometimes used to treat tuberculosis and leprosy, but its high toxicity makes it difficult to use. Reported as a bee forage in Umalila.

References Watt & Breyer-Brandwijk 1962, Wild et al. 1972, Kokwaro 1976, Blundell 1987, Burkill 1997, van Wyk et al. 1997, Neuwinger 2000



Photo : Cal Lemke, University of Oklahoma

Polygala virgata

(Polygalaceae)

Common names Baziwanga (Malila), pride of Manicaland.



Polygala virgata flowering in October

Description A fast growing hardy shrub, 1 – 3 m high, with a short life-span. This is the largest and most attractive species of the genus found in the Southern Highlands. The stems are slender and without hairs. The alternate, bluish-green narrow leaves are up to 5 cm long and 0.6 – 1.5 cm wide. Young leaves are hairy. The flowers, which resemble those of the pea family, are borne in a terminal inflorescence 10 to 20 cm long, and are bright purple with a dark purple tuft on top. The corolla is usually reduced to 3 petals with the lowermost often saucer shaped. Flowers are produced from March to November.

Ecology Widespread in tropical Africa and in South Africa. The plant grows on the lower slopes of bushy hillsides and along stream banks. Common at most altitudes in high

rainfall areas of Zimbabwe among scrub and on forest margins. It is sometimes grown as an ornamental.

Propagation Can be planted from seed or using cuttings with a heel. Seedlings often appear below an existing plant and can be transplanted.

Uses In Umalila the plant is reputed to give strength for work. Bees are reported to visit the flowers in South Africa. Other *Polygala* species are known to provide both pollen and nectar to honeybees in Ethiopia, though the honey flow may not be significant. An aqueous extract of the green parts is reported to be effective against infections caused by *Staphylococcus aureus*.

References Jex-Blake 1957, Watt & Breyer-Brandwijk 1962, Wild et al. 1972, Howes 1979, Cribb & Leedal 1983, Fichtl & Adi 1994, van Wyk et al. 1997, Hepburn & Radloff 1998, White et al. 2001, Jodamus 2004, Burrows & Willis 2005

Polyscias fulva

(Araliaceae)



Synonym *P. ferruginea*

Common names Impembati

Description A fast growing deciduous tree to 30 m, often with a straight slender trunk to about 9 m before developing branches, like spokes of an umbrella. The tree has a flat topped crown. Bark is grey and smooth and the leaf scars are prominent. Leaves are compound, up to 1 m long, with 6 - 12 pairs of leaflets plus one at the tip, each leaflet oval and leathery, 9 - 20 cm long, base rounded, covered with cream-yellow hairs below. Flowers are green-yellow, honey scented, very small, in loose heads up to 60 cm long. The main stalks have red

brown hairs. Fruit is small, black, more or less oval and often ribbed.

Ecology Found in the wetter highland forests and in the bamboo zone in Tanzania. Widely distributed throughout sub-Saharan Africa. Altitude range 1,180 – 2,500 m, with an annual rainfall of 1,500 – 2,000 mm.

Propagation Most commonly grown from wild seedlings, though in Umalila the tree is also planted using large cuttings. Seed can also be used. Collect fruits immediately they turn purple-black on the tree. Allow them to mature in shade for 1 - 2 days then extract the seed by soaking in cold water for 4 - 6 hours. Squeeze out the seeds which will float in the water, then dry in the shade. Seed can be stored for up to 2 years. 75% of seed normally germinates after 35 - 45 days.



Uses In Umalila bees visit the flowers from April to July. The abundance of nectar and pollen make the tree very attractive to them. Beekeepers use the regular and wide branching habit of the tree for placing beehives. Firewood is of poor quality. Timber is light and soft, pale in colour, but is tough and odourless so is used for food containers. Also used for making mole traps and beehives. Leaves make a good mulch. The bark from small roots is pounded in water and drunk to relieve stomach-ache in Umalila. The tree can be grown to provide shade.

Remarks The tree can be grown with crops as the high crown lets in sunlight and the leaves produce a good mulch. This species is becoming rare in its natural habitat.

References FTEA 1968, Egli & Kalinganire 1988, Fichtl & Adi 1994, Mbuya et al. 1994, ICRAF 1998, Lovett et al. 2006

Protea gaguedii

(Proteaceae)

Synonym *P. abyssinica*

Common names Insega (Malila), sugar bush



Description A shrub or tree from 2 to 8 m tall. Young branches are thick, hairy and orange-yellowish. Older branches expose a rusty inner surface. Leaves are narrow and spear shaped, 10 – 15 cm long and up to 2 cm wide. The tip of the leaf is blunt or rounded, the base tapers slightly. Flower heads are up to 10 cm diameter. Flowers are white with pinkish stamens and styles.

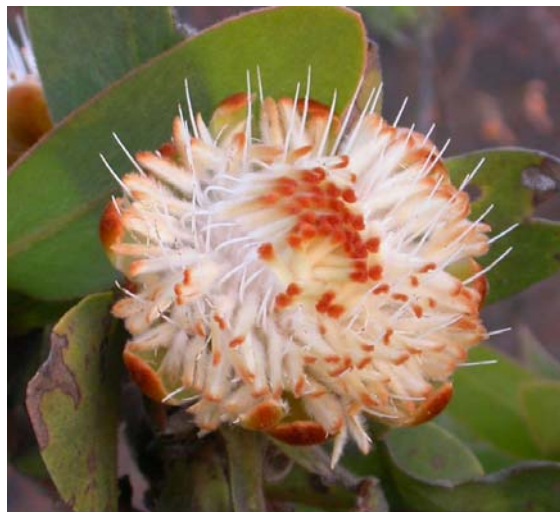
Ecology Widespread and often grows in colonies on stony, infertile soil. Altitude range 2,150 – 3,350 m. Also present from Ethiopia to Mozambique and in Zimbabwe. *Protea* species prefer a light neutral to acid soil. They do not grow well in red soils.

Propagation Use seed or semi-ripe cuttings taken from thin branches from the previous years growth.

Uses Bees are reported to visit the flowers in Umalila during May and June. Proteas are known to be important nectar producers in South Africa. The plant has a number of medicinal uses elsewhere in Africa.

Remarks *P. welwitschii* and *P. heckmanniana* also grow in the Umalila area.

Right : *A Protea species in flower in November*



References Jex-Blake 1957, Wild et al. 1972, Cribb & Leedal 1982, Blundell 1987, FTEA 1993, Hepburn & Radloff 1998

Prunus persica

(Rosaceae)



Peaches growing in farmland at Izumbwe

wide range of freely draining soils. The variety grown in Umalila, which is also common in Malawi, is very hardy.

Propagation Grown either from seed or large cuttings. The latter should be transplanted in the dormant season. Mulch young trees if possible and feed with liquid manure during the growing season.

Management Once the tree starts to produce fruit the aim is to encourage plenty of strong new growth each year to carry fruit the following year. Prune only when the sap is rising, just as the young shoots appear, and before the onset of the rains. It is sometimes necessary to cut back older wood which has become bare to young healthy replacements. Avoid making large wounds because these encourage disease. Several branches can be left in the centre of the tree. 10 – 45 kg. fruit can be produced per year from a tree. Trees start to bear after 3 - 4 years. Fruit ripens in November in Umalila.



Uses the small hard fruits are eaten raw or cooked and are rich in carotene. Fruits are sometimes sold in local markets. This variety is used as a stock on which to graft or bud other varieties (eg Mwera Hill - Malawi), (Waldo, Shackleford etc - Kenya). The flowers are visited by bees. The tree is a source of both nectar and pollen and bees are important for pollination. The timber can be used for firewood. Bark is a source of a rich golden dye. The leaf is said to be purgative. It is also used in various countries for whooping cough. The fruits can be fed to pigs.

Remarks Trees can be affected by peach leaf curl. This can be prevented by spraying plants with a liquid copper fungicide (e.g. Dithane) or by removing affected leaves and applying manure to stimulate new growth.

References Jex-Blake 1957, Williamson 1975, Howes 1979, Baker 1980, Mbuya et al. 1994, Burkill 1997

Psychotria mahonii

(Rubiaceae)

Common names Kirusiku (Malila), large psychotria



Description Usually a small tree, with arching branches, growing from 5 – 10 m high, but it may occasionally reach 24 m. The bark is black with a pale purple slash having black edges. Leaves are leathery, simple and opposite, with a short petiole 0.2 – 3.5 cm long. The leaf blade is from 3 – 23 cm long and 1.5 – 10 cm wide. Leaves are sometimes irregularly dotted with bacterial nodules. Flowers are greenish-yellow, or cream to white, about 5 mm in diameter, faintly scented in terminal heads about 6 cm in diameter, on a

slender stalk up to 6 cm long. Fruits are oval 5 – 6 mm wide, yellow turning red when mature.

Ecology An understory tree in evergreen forest, forested ravines and river fringes and in open grassland, often on termite mounds in eastern, central and south eastern tropical Africa. Also present in eastern D.R. Congo, Rwanda, Uganda and from Kenya to Zimbabwe.

Uses Reported as a bee forage flowering in October in Umalila. The timber is used for firewood and tool handles. A decoction of the stems and roots is used as a gargle for sore throats in Kenya.



References Kokwaro 1976, Coates Palgrave 1983, White et al. 2001, Burrows & Willis 2005, Lovett et al. 2006

Pteleopsis myrtifolia

(Combretaceae)

Common names Infitia

Description A bushy, densely leafy shrub or tree from 3 - 12 m high, though, in closed forest it may grow to 25 m. Bark grey to dark grey, rather smooth in smaller specimens becoming rougher with age. Leaves are opposite, rarely alternate, approximately 9.5 cm long and 3 cm wide. They are usually shiny



Imbrasia lucida feeding on the leaves

green above with short soft hairs when young, tending to retain these hairs on the under surface. Apex tapers, but sometimes may be rather rounded. Leaf edges tend to roll under. Leaf stalk is up to 10 mm long, rather slender. Conspicuous leaf buds are sometimes present in the axils of the leaves or on fallen leaves. Flowers white or cream to yellow about 5 mm in diameter, strongly and rather unpleasantly scented and in short, few-flowered heads arising from axils. Fruit is greenish-yellow drying to light brown, usually 2 or 3 winged and 1.5 cm long.

Ecology The shrub photographed was growing at the edge of a planted pine forest. Usually found at medium altitudes in mixed woodland, thickets and in fringe forest beside rivers. Also grows on rocky hillsides and stony outcrops. In Zimbabwe it is locally common at low to medium altitudes in high rainfall woodland and in wooded grassland, evergreen forest and river fringes.

Uses In Umalila the leaves are eaten by an edible caterpillar = *Imbrasia lucida* (lungu) which is also reported to feed on *Myrica humilis* (Isiwiziwe) and on *Agarista salicifolia* (Izenya). The species can appear in large numbers. The caterpillars are starved for one day and then washed and fried with oil and onions. They can also be cooked and dried for later use. Elsewhere in Tanzania the Hehe people boil the roots of this plant in water and drink the decoction 3 times per day for venereal disease. The roots are also cooked with chicken and the soup is drunk to cure sterility. In eastern Tanzania a root decoction is drunk to treat dysentery, sores and excessive bleeding during menstruation. The flowers of *Pteleopsis* species are visited by bees in savannah regions.

References Wild et al 1972, Kokwaro 1976, Coates Palgrave 1983, Hepburn & Radloff 1998, Neuwinger 2000, Lovett et al. 2006

Pycnostachys spp.

(Lamiaceae)

Common names Isale



Pycnostachys ruandensis

Description Woody stemmed perennials or soft wood shrubs with evergreen, narrow, hooked leaves up to 30 cm long. Flowers are dense spikes up to 12 cm long.

Ecology *P. ruandensis* grows beside paths and in cultivated land, at the edges of forests and in grazed land from 1,900 to 2,460 m. In Umalila the presence of this plant is said to indicate a fertile soil.



Pycnostachys orthodonta

Propagation Stem cuttings strike easily. Seed can also be used.

Uses Bees were active on *P. ruandensis*. *P. orthodonta* is also reported to be visited by bees in Umalila. Bees are known to forage for pollen and nectar on related species in Ethiopia.

References Wild et al. 1972, Troupin & Ayobangira 1985, Fichtl & Adi 1994, Brickell 1994, Bryant 1996

Nkwakwa Kailoni, a traditional healer with a wide knowledge of medicinal plants, near Ilemba



Ranunculus multifidus

(Ranunculaceae)

Common names Kowenga or izumba (Malila), African buttercup

Description A perennial herb usually having erect stems up to 12 cm tall, but less frequently the stems grow along the ground and root at some of the nodes. Leaves vary in shape, the final segments being coarsely and irregularly toothed. Lower leaves have long stalks but upper leaves become smaller and are eventually sessile. Flowering stems are much branched in the upper part with numerous relatively small typically buttercup-like flowers borne at the ends of the branches. Petals 5, shiny-yellow, 3 – 7 mm long. and deeply cut.



Ecology Also found in Uganda, Kenya and from Ethiopia to Cape Province in S. Africa and west to Nigeria and Angola. Grows in wet ground near rivers, ditches and streams, on moist slopes in bushland, grassland or on the margins of forest at altitudes between 1170 – 3450 m. It is the most common buttercup in tropical Africa.

Uses Bees were seen collecting nectar and pollen in October. Because the plant grows beside water it is often in flower throughout the year. Bees are also known to collect pollen and nectar in Ethiopia. Sap together with soot is rubbed into heal wounds in Tanzania. It is recorded that leaves are sometimes used as a vegetable in Tanzania. Roots are pounded and boiled in water and the decoction drunk 2 – 3 times per day as an emetic by the Shambaa people. Leaves are also occasionally cooked as a vegetable and the roots are eaten by young people in Malawi. The plant is however reported to be poisonous to livestock.

References FTEA 1952, Watt & Breyer- Brandwijk 1962, Wild et al. 1972, Williamson 1975, Kokwaro 1976, Blundell 1987, Peters et al. 1992, Fichtl & Adi 1994, Neuwinger 2000, Burrows & Willis 2005

Rauvolfia caffra

(Apocynaceae)

Common names Isiongoti (Malila), mpugupugu (Nyakyusa), mkufi, mwembemwitu (Swahili), quinine tree



Description A much branched evergreen tree from 6 to 40 m high with a leafy spreading crown. The tree resembles a mango in shape but is not so dense. Bark is light brown or greyish-white with irregular fissures. All parts produce bitter, white latex. Leaves are shiny and dark green above, slightly leathery and arranged in whorls of 3 – 5 towards the end of the branches. They are 2 – 50 cm long and 2 – 15 cm wide. Flowers are in large dense clusters up to 20 cm across with each flower being small, white and sweet scented. The spherical fruit is in paired fleshy lobes, each being about 1.3 cm in diameter, green at first, with whitish spots, changing to blackish – purple and wrinkled when ripe. It has 1 or 2 seeds. Water drips from the tree at certain times of the year.

Ecology Grows in mountain forests but is also widespread in lowland forests in eastern and southern Africa between altitudes 500 and 2,100 m. It is often associated with ground water.

Propagation Grows easily from seed and wild seedlings. Seed can only be stored for one month. Germination is fast and reaches 80% after 2 weeks.

Management The seedlings transplant well and the tree grows fast and can be pollarded.

Uses In Umalila the tree is sometimes used as a shade for coffee, the bark is used as a medicine and the tree is reported to improve soil fertility. Beehives are hung in the tree and the flowers are visited by bees. Wood is light, soft and pale white. It is used for firewood, timber, grain mortars, beehives and for flavouring beer. The wood is also used for doors, boxes, water troughs and drums. It nails well. In Kenya the poles are used for hut building. Latex can be used as a bird lime. The bark is used for treating high blood pressure and intestinal worms. A decoction of the bark is drunk for general body swellings, rheumatism and pneumonia. Though the bitter latex has been used to treat malaria it is ineffective. Root bark is used as a tranquilliser for high blood pressure.

References Watt & Breyer-Brandwijk 1962, Wild 1972, Williamson 1975, Kokwaro 1976, Coates Palgrave 1983, Burkill 1985, Keay 1989, Beentje 1994, Mbuya et al. 1994, Hepburn & Radloff 1998, Neuwinger 2000, ADP Isangati 2003, Lovett et al. 2006

Rhus natalensis

(Anacardiaceae)

Synonym *R. glaucescens*

Common names Isanyantwa, ishesheru (Malila), mkono chuma, mkumba (Swahili).



Description A much branched shrub or tree, often scrambling, up to 8 m high. Branches are angular. Bark is grey, often almost white and rough. The young branches are pale and dotted with breathing pores. Leaves are trifoliate with the central leaflet being largest, up to 9 cm long and 1 – 3.5 cm wide. Lateral leaflets are about two thirds the size of the central leaflet. Leaflets are wider towards the tip and the apex is broadly tapering to rounded. Young leaves are red. The leaf stalk is 2 – 4 cm long. The small greenish-yellow flowers are borne in loose heads, up to 15 cm long. The

fruits are red when ripe, round, with a thin flesh and a waxy covering, 5 to 6 mm in diameter.

Ecology Grows in bushland and woodland, in riverine vegetation and especially on forest edges, often on well drained sites, from 1 – 3000 m. It tolerates a wide variety of soils. Present throughout Tanzania and from Guinea to Somalia and the Arabian peninsular and south to D.R. Congo and South Africa. It can grow on a variety of soil types but prefers clay soils.

Propagation The tree can be grown from seed. These should be fresh and not older than 3 months.

Management Slow growing and can be coppiced.

Uses In Umalila both green and ripe fruits are eaten. They taste acid but are refreshing. The fruits are also used in brewing local beers. Roots are pounded and boiled and used to treat gonorrhoea, colds, abdominal pain and hookworm. The leaves are crushed and put in a bath for women with prolapsed uterus. Leaves are also pounded, soaked in hot water and the resulting liquid used to treat coughs. Wood is used for firewood, tool handles and charcoal. Leaves and fruits are used for goat and cattle fodder. Bark is made into a tea in Kenya. Poles are used in hut building in Kenya and twigs for toothbrushes in Somalia. The tender leaves and shoots can be chewed. Root bark is a source of dye. *Rhus* species are reported as important bee forage in savannah and mountain zones in Africa.

References Goode 1974, Williamson 1975, Kokwaro 1976, Coates Palgrave 1983, Burkill 1985, Peters et al. 1992, Mbuya et al. 1994, Hepburn & Radloff 1998, Maundu et al. 1999, Neuwinger 2000, Dharani 2002, Ruffo et al. 2002, Simons et al. 2005

Rhus pyroides var. **pyroides**

(Anacardiaceae)

Synonym *R. vulgaris*

Common names Ishesheru (Malila), mkono chuma, mlama mwitu (Swahili), fire-thorned rhus



Description A variable, hairy, branched tree from 1 to 9 m high. Bark smooth brown with yellow red-brown branches, often densely hairy. Leaves are composed of 3 leaflets, with the central leaflet larger, 4 – 11 cm long and 2 – 6.5 cm wide, dull green and softly hairy. Flowers are small, cream to green-yellow, in loose terminal heads, 5 – 20 cm long, all densely hairy. Fruits are red-brown drupes with thin flesh, 3 – 5 mm across.

Ecology Common in upland evergreen bush, forest edges, river banks and savannah woodland often in thickets and associated with termite mounds on hill slopes and valleys between altitudes 800 and 2,700 m. Found throughout East Africa and from Cameroon to Ethiopia and south to Mozambique, Malawi, Zambia and Zimbabwe.

Propagation Can be grown from fresh seed.

Uses Both ripe and unripe fruits, called Isanyantwa, are edible. Wood is used for firewood and charcoal. Stems are used for toothbrushes. In South Africa the branches are valued for tool handles and fencing poles. The plant is an important medicinal plant in East Africa. Fruits are pounded, boiled and the liquid drunk to treat diarrhoea. The roots are pounded and the powder cooked with porridge, which is then drunk to treat gonorrhoea. The bark is boiled and the decoction used to wash wounds. The leaves are pounded and used as a treatment for piles. Stems are boiled and the liquid applied to wounds. Roots mixed with other plants are used to make a drink for expectant mothers to ease delivery. Leaves are used to treat haemorrhoids. The body is washed with a leaf infusion to treat delirium in Zimbabwe. *Rhus* species are known to be important bee forage plants in the Afrotropical climatic zone. Goats browse the leaves.

Remarks A scratch from the bush may sting for some time.

References Watt & Breyer-Brandwijk 1962, FZ 1966, Wild et al 1972, Kokwaro 1976, Coates Palgrave 1983, Hepburn & Radloff 1998, Neuwinger 2000, Ruffo et al. 2002

Ricinus communis

(Euphorbiaceae)

Common names Imbono (Malila), mbono (Swahili), castor oil



Description A much branched evergreen shrub growing to 6 m high, often branching at the base. Stems are often red, hollow with age with well marked leaf nodes and scars. Leaves are large, palmate, up to 50 cm across with 5 to 11 lobes and have toothed edges. They are dark green or red along the leaf stalks. Young leaves are shiny, soft and dark red-green. Flowers are produced on upright spikes up to 60 cm long. Male and female flowers are borne separately. The fruit is a spiny capsule containing 3 seeds.

Ecology Indigenous to the tropics and grows wild in East

Africa. Castor oil plants prefer humus rich soil and often grow in disturbed ground. They are sometimes cultivated. They require a warm climate and are killed by frost. They can be grown over a wide area in both high and low rainfall areas. The plant is drought and termite resistant.

Propagation It is best to grow varieties that do not shatter on ripening. Seed is viable for up to one year. Even germination is obtained by pouring boiling water over the seeds and leaving them to soak for 24 hours. Germination is normally 90% in 3 weeks. Sow 3 seeds per hole and thin out to one.

Uses Occasionally grown for oil which is extracted from the seeds. Oil content may be up to 50%. This burns with a clear light. It can also be used as a safe purgative. The oil is used commercially for paints and varnishes and in lubricants and greases, hydraulic fluids, soap, printing ink and various chemicals. After extraction the residual cake can be used as a fertilizer. The oil can also be used in insecticides and for wood preservation, in anti-malarial sprays and to treat lice and fleas and parasitic skin diseases. It also has anti-bacterial uses. For medicinal use the oil is heated to neutralise the highly poisonous Ricin. A decoction of the leaves is held in the mouth to relieve dental caries. The same decoction can also be used externally placed on sores, rheumatism and abscesses. The plant is sometimes used as a quick growing hedge. Bees were seen occasionally collecting nectar in Umalila during October. The extra floral nectaries on the leaves produce much nectar. Large amounts of pollen are obtained from male flowers. In Umalila an edible caterpillar, Imbono, feeds on the leaves. All leaves are stripped. The caterpillar is gregarious and the gut must be cleaned out before cooking. It is grilled until brittle, not cooked with water or oil.



Remarks Tanzania has been a major producer of castor seed. The leaves, seed coat and the oil residue are poisonous to humans and livestock. Even a few seeds can kill a child who eats them.

References Purseglove 1968, Nair 1980, Crane & Walker 1984, Iwu 1993, Burkill 1994, Fichtl & Adi 1994, Mbuya et al 1994, van Wyk & Oudtshoorn 1997

Rubia cordifolia

(Rubiaceae)

Common names Ibambula (Malila), kifundo, ukakaka (Swahili), Indian madder.

Description A climbing or creeping perennial, up to 10 m long. Stems are thin, green, square and rough on account of short bristles. Leaves are in groups of 4, and are 2.5 cm long and 1.5 cm wide borne on short stalks. Flowers are small and greenish yellow. The fruit is a black berry 3 mm in diameter. **Ecology** The plant is commonly found growing in hedges. It is common in the Southern Highlands between altitudes of 1,100 and 2,600 m, on forest margins, in clearings in the forest and in scrub and grassland. Widely distributed in Africa.



Rubia cordifolia growing over a bush near Yalenga

Propagation Seed should be sown as soon as it is ripe. Cuttings can also be planted. Plants should be grown in light shade.

Uses The flowers are reported to be visited by bees. Indian madder was formerly a major dye plant. In Umalila the roots are boiled in water and the liquid drunk to treat diarrhoea. Elsewhere in Tanzania the boiled root decoction is drunk for stomach disorders, and also used as an antidote for general poisoning. Leaves and stems are pounded and the extract administered for diarrhoea. Roots and fruit are used in South Africa and Tanzania as an orange or reddish brown dye and for staining floor-boards. In Tanzania the ash is used as a vegetable salt to soften vegetables when cooking. A wound dressing is made up in Kenya and Tanzania by rubbing leaves into a ball and applying it to the skin, both to stop bleeding and as an antiseptic.



References Watt & Breyer-Brandwijk 1962, Wild et al. 1972, Kokwaro 1976, Cribb & Leedal 1982, van Wyk & Gericke 2000, Zimudzi 2005

Rubus species

(Rosaceae)

Common names Ngondora (plant), itonongwa (fruit)(Malila), blackberry, bramble

Description Prickly scrambling bushes with hooked prickles growing up to 4 m long. A very variable and complex group of species.



Blackberry growing over a fence at Ilemba.

Ecology Sometimes found in hedgerows in Umalila. Also found at the edges of forest, in clearings, secondary bush, often forming thickets. The various species grow between altitudes of 1,400 and 2,700 m.

Propagation & Management The plant reproduces by seed but can also be grown from suckers. It can be trained to grow over a fence or hedge to form a barrier.

Uses Many species produce edible fruit which is collected during the rain season. An infusion from the leaves is used to treat diabetes in Ethiopia and Tanzania. Bees collect nectar and pollen from

several species. Honey produced is white and has a delicate flavour.

Remarks There is confusion between the different species as many are variable in form. There are at least 18 species in East Africa, including two introduced species, *R. niveus* and *R. ellipticus*, the latter being common in the Mbeya area. *R. pinnatus* has up to 9 leaflets, white to pinkish flowers and produces reddish black fruit. *R. volkensii* has up to 7 leaflets, yellowish-white flowers and orange to red fruit when ripe. Stems are covered with brown sticky hairs. *R. scheffleri* has densely hairy red to black fruit. *R. niveus* has leaves with a white undersurface. *R. apetalus* (*R. adolfi-friedericii*) is from 1 – 3 m long, has hairy stems with scattered hooked prickles, leaves with 3 – 7 leaflets. These are oval and pointed, hairy green above and dull white and hairy below. The pinkish-white flowers produce red to purplish-black fruits. *R. rigidus*, *R. steudneri*, *R. inganus* and *R. porotoensis* are also present in the Southern Highlands. *R. steudneri* has deeply furrowed stems up to 4 m long, 3 – 5 leaflets and pink flowers in large panicles and orange to dark red fruits.



References Williamson 1975, Cribb & Leedal 1982, Crane et al. 1984, Blundell 1987, Peters et al. 1992, Fichtl & Adi 1994, Maundu et al. 1999, Ruffo et al. 2002

Rumex nepalensis

(Polygonaceae)

Synonym *R. steudelii*, *R. bequaertii*, *R. quarrei*

Common names Isyamo (Malilla), dock, sorrel



Description An erect perennial herb growing up to 1 m tall. Leaves are alternate and up to 33 cm long, strap like with a clearly marked central vein. Flowers are borne close along the branched stems. Fruit is a glossy brown nut.

Ecology A weed of cultivated land, but also found in grassland and bush up to 3,000 m. The plant is found throughout Africa and is also present in the Mediterranean area and into eastern Asia.

Rumex nepalensis growing at the forest edge.

Uses In Umalila the leaves are eaten to treat kwashiorkor. Elsewhere in Tanzania the roasted root is put on the area around an abscess and the root juice is drunk for abdominal pain caused by parasites. The crushed leaf is sometimes sniffed for the relief of headaches and colds. In South Africa a strong decoction of the leaf is reported to be effective in treating bilharzia. The leaves are used to

dress wounds and to treat rheumatism and stomach-ache in Ethiopia. Bees collect pollen and nectar from the flowers. In Rwanda, Kenya, and Malawi, during times of food shortage, the leaves are collected from the wild and used as a vegetable, usually mixed with other vegetable leaves.

References Watt & Breyer-Brandwijk 1962, Fichtl & Adi 1994, van Wyk & Gericke 2000, Jansen 2004

Saccharum officinarum

(Poaceae)

Common names Iowa (Malila), muwa (Swahili), sugar cane



Ecology A few plants are frequently grown around homes though some farmers grow larger plots. Sugar cane prefers high temperatures, fertile, and if possible heavy soils, with a high rainfall. Adequate manure is required.

Propagation Stem cuttings, from immature canes 8 - 12 months old, are used for planting. For best production the canes should be topped a week before cuttings are taken and only the top third of the cane used. They should have 3 buds. Space plants at 1.5 - 1.8 m x 60 cm planting at an angle of 45° or flat in the base of a furrow. Planting should be done early in the rain season.

Left : *Sugar cane being grown at Dickson Mwachalende's farm*

Management Sugar cane is a perennial crop. The first crop takes 15 - 16 months to mature. After harvest the stumps are left to produce two to four further crops, each taking about a year to mature.

Uses Mainly grown for chewing which promotes salivation with a cleansing action, as with a chew-stick. Elsewhere Sucrose is extracted for sugar and molasses for local use or commercial sale. Industrial alcohol is made from molasses and can be used as a motor fuel. Molasses is also used to make yeast and as a stock food. Under certain conditions the treatment of molasses with urea converts sugars into a protein substitute which can be eaten by ruminants. The fibrous residue, bagasse, is used as a stock feed, often with molasses, but can also be used to make paper, cardboard and fibre board. Bees forage for sap exuding from cut stems and from the burnt canes.

References Purseglove 1972, Crane et al. 1984, Burkill 1994

Right : *A few plants of sorghum are occasionally grown by farmers in Umalila.*



Salvia coccinea

(Lamiaceae)



Common names Ifipa

Description An erect perennial growing up to 2 m tall with soft woody stems and ovate leaves.

Ecology Commonly grown as a hedge plant and for erosion control around compounds. The plant originally escaped from gardens and can sometimes be found growing wild in disturbed land.

Propagation Can be grown from cuttings, layering or seed.

Uses Bees collect nectar and pollen from the flowers on the plant and also after they have fallen. However they have difficulty getting to the nectaries, and may use holes made by other insects. A number of other Salvias produce good honey flows, particularly after rainfall, e.g. *S. apiana*, *S. leucophylla*, *S. mellifera*. *S. merjamie* and *S. officianalis*.

References Jex-Blake 1957, Howes 1979, Crane et al. 1984, Fichtl & Adi 1994

Salvia leucantha

(Lamiaceae)

Common names Mexican bush sage.

Description A small weak stemmed shrub growing to 80 cm with stems and leaves densely covered with whitish hairs. Leaves are spear shaped and often whitish beneath. Flowers are hairy, white or violet, arranged in long one-sided racemes.



Ecology Introduced from Mexico and cultivated in home gardens. The plant is also found in waste ground and beside roads. It is common around villages. It prefers a sandy well drained soil in full sunlight.

Uses Bees visit the flowers for nectar which they collect from around the base. Flowers are produced all year round. The flowers are showy and the plant is sometimes grown as an ornamental.

References Fichtl & Adi 1994, Llamas 2003

Satyrium shirense

(Orchidaceae)

Common names Shigogo



Description A slender terrestrial herb, 13 – 45 cm tall. The plant has 6 or 7 leaves, the lowermost being sheath-like. The next 2 leaves spread out and are 5 – 14.5 cm long and 2 – 6 cm wide, being broadly spear shaped and light green. The upper leaves are spaced along the stem. The flower head is 3 – 15 cm long and composed of many creamy-white flowers.

Ecology Found in mountain grassland and bushland, rocky hillsides and moist slopes from 1,750 – 2,500 m. Also present on the Nyika plateau in Malawi and Zambia.

Propagation Can be grown from tubers once the aerial part has died down.

Uses In Umalila the tubers are washed, cooked and pounded with groundnuts and salt and eaten with eggs. They may also be fried. Elsewhere in Tanzania other species, e.g. *S. macrophyllum* and *S. neglectum* var. *neglectum*, are dug up during and after the rain season, peeled, cooked and eaten like potatoes. They may also be peeled, pounded and the flour baked into cakes to be eaten with tea. The tubers can be stored for several weeks if kept dry and cool. In Malawi the tubers of several species of *Satyrium* may be mixed. They are washed and pounded to remove the skin and pounded again. They are then boiled in a solution of potashes and the surplus liquid is squeezed out and the product left to dry. It forms a very firm jelly, reddish in colour and is often sold like this. The jelly is then cut into strips and boiled with salt. When it is cooked, pounded groundnuts are added. The dish is very well liked because it resembles meat, being red and having a texture like gristle. There is considerable trade from the hills to the plains in Malawi. The flowers are known to be attractive to

bees.

Remarks The tubers and cakes are sold in markets in the Southern Highlands. The plants are becoming increasingly rare though they can easily be propagated.

References Williamson 1975, FZ 1995, Ruffo et al. 2002



Scadoxus puniceus

(Amaryllidaceae)

Synonym *Haemanthus puniceus* & *H. goetzei*

Common names Itindi (Malila), royal paintbrush, red paintbrush



Scadoxus puniceus in flower near Sasyaka in November

Description A herb from 30 to 40 cm tall with the inflorescence borne on a stalk 1 – 2 cm in diameter. The flower head is an umbel of up to 100 tubular red flowers and is 8 -10 cm across and surrounded by up to 8 large red bracts. Individual flowers are 6 – 7 cm long, including their stalks. The petals are 3 cm long, red inside, white outside with a green ovary. The large narrow leaves have wavy margins and appear in a cluster arising from the bulb, which is 7 cm in diameter, after the flowers have died. There are numerous purple spots on the leaf stalks.

Ecology Normally found in forests and woodlands between 1500 and 2300 m altitude. The plant usually grows in shade though the above photo was taken in the open near Sasyaka. It grows best in humus rich, well drained soils.

Propagation By seed or offsets before growth commences.

Management Plants do not like being moved.

Uses Bees are reported to visit the flowers and are known to collect pollen from a related species *S. multiflorus* in Ethiopia. A decoction of roots and bulbs, which are sliced and steeped in vinegar, is drunk to treat coughs, stomach complaints and used as an emetic in South Africa.

Remarks The bulb is poisonous and has been known to cause several deaths in South Africa.

References Watt & Breyer-Brandwijk 1962, FTEA 1982, Cribb & Leedal 1983, Brickell 1994, Fichtl & Adi 1994, van Wyk et al. 1997, Neuwinger 2000, Llamas 2003

Schefflera volkensis

(Araliaceae)



Schefflera volkensis growing as an epiphyte near Inyala

Common names Imogoro

Description A creeper or tree which is sometimes much branched and spreading up to 24 - 30 m tall. It may grow as an epiphyte on other trees. Leaves are composed of 4 to 7 leaflets, each up to 15 cm long by 7 cm wide. The leaf stalk is up to 13 cm long.

Ecology Found in wet or dry upland forest, sometimes in *Hagenia* woodland or in the bamboo zone 1,550 – 2,900 m.

Propagation Can be grown from cuttings, wild seedlings or from seed. Ripe fruit should be collected from the ground and gradually dried. Seed is then stored in sealed containers in a dry place. No

treatment is required before sowing.

Management The plant requires supporting when young in order to grow straight.

Uses The flowers are an important bee forage. Bees were seen collecting nectar from *S. volkensis* in June. A related species, *S. abyssinica*, is an important source of honey in Ethiopia having abundant pollen and nectar. Honey is pure white and granulation fine. Another related species, *S. wallichiana* is an important honey plant in tropical Asia producing up to 60% of the total honey crop. The wood is used for firewood and charcoal. It can also be grown as a living fence. The latex from this plant, sometimes mixed with honey, is used medicinally to treat colds and coughs. The tree can be grown for shade.



A Schefflera species, probably S. goetzenii, growing in forest near Izumbwe

References Watt & Breyer-Brandwijk 1962, FTEA 1968, Kokwaro 1976, Crane et al. 1984, Beentje 1994, Fichtl & Adi 1994, Katende et al. 1995, Neuwinger 2000, Burrows & Willis 2005 Lovett et al. 2006

Sechium edule

(Cucurbitaceae)

Common names Imenyi, ikatawila (Malila), chayote, vegetable pear.

Description A vigorous, climbing perennial herb with a large tuberous root. The plant may grow from 10 - 15 m in one season. Tendrils are large and branched. Leaves simple and spirally arranged, 7 - 25 cm in diameter. Male and female flowers are separate but on the same plant. Fruit is a one seeded fleshy berry, commonly pear shaped, furrowed, yellow green, 7 - 20 cm long. Fruits exposed to sun are light yellow but in shade are dark green. They contain a single white seed.



Ecology Grown throughout the tropics but not very popular in Africa, though it grows well in Umalila. The plant requires high relative humidity with between 1,500 – 2,000 mm rainfall at an altitude of between 300 and 2,000 m. It does best in rich well drained soil and is not tolerant to water-logging. It is susceptible to frost, drought and high wind. Tolerates high temperatures, though relatively cool nights appear to encourage fruit development. Produces well in light shade.

Propagation A mature fruit, containing a germinating seed, is planted at a depth of two thirds of its length in a prepared planting hole, with the widest end downwards or on its side. Plant rows at 100 - 120 cm with plants at 60 - 75 cm. It can also be grown from stem cuttings 15 - 20 cm long. These must be shaded and kept moist. Plants require supporting with poles or a trellis. Tubers do not develop until the second year.

Management First fruits are ready for harvest at 100 - 120 days from planting and the harvesting period continues over a long period. Replace plants after 3 years because of disease problems. If tubers are dug up individually the plant will continue to grow and produce more tubers.

Uses In Umalila the leaves are eaten as a vegetable. They are cut up and either boiled or cooked with oil. Young leaves are rich in vitamins A and C, the B vitamins, calcium and iron. Elsewhere the immature fruits and tuberous roots are also eaten. Fruits vary in flavour from bland to sweet or starchy. The tuberous roots can be cooked as a staple food. They are a good source of easily digestible starch. The fruits, shoots and tubers can be fed to pigs, goats, poultry and cattle. The plant has a number of potential medicinal uses. Leaves are reported to lower blood pressure and to be able to dissolve kidney stones. The flowers are reported to be very attractive to honey bees and are produced throughout the year. In East Africa fibre is obtained from the stem.

Remarks Chayote is worth growing for its edible leaves.

References Grubben 1977, Tindall 1983, Crane et al. 1984, Dupriez & De Leener 1989, Engels & Jeffrey 1993, Robinson & Decker-Walters 1997, SEPASAL 1999, Engels 2004

Senecio deltoides

(Asteraceae)

Common names Umuwula



Description A scrambling perennial herb or creeper, 2 – 7 m long. Leaves are partially triangular, 4.3 – 12 cm long and 2 – 6.5 cm wide, base truncate to cordate, with the margins coarsely toothed. Flowers are numerous in branched terminal heads. Disc florets pale creamy yellow to yellow, corolla 3 – 5 mm long, with the tube expanded above the middle.

Left : *Plant in flower in the forest margin of Ishoho forest near Yalenga in October.*

Ecology The plant is a weed of cultivation. Found in moist or dry forest or forest margins, secondary bushland in the forest zone, at altitudes between 700 and 2200 m in Malawi, Mozambique, Zimbabwe, Swaziland and South Africa.

Uses The flowers are reported to be visited by bees in Umalila. *Senecio apiifolius* is an important bee forage in South Africa particularly for building up colony strength. Bees collect pollen and nectar from three other *Senecio* species in Ethiopia and several species are also visited by bees for nectar and pollen in the United Kingdom. *Senecio* species are known to have long flowering periods. The plant has minor medicinal use as an emetic in East Africa. A paste made from the leaves is used by the Xhosa people in South Africa to treat sore eyes.

Remarks There are over 70 species of *Senecio* in East Africa.

References Watt & Breyer-Brandwijk 1962, Johannsmeier 1971, Howes 1979, Blundell 1987, Fichtl & Adi 1994, FTEA 2005

Senna didymobotrya

(Caesalpinaceae)

Synonym *Cassia didymobotrya*, *C. nairobiensis*



Common names Inuha (Malila), peanut cassia, popcorn senna

Description A fast growing shrub or small tree to 3 m high, branching from the base. The leaves are alternate, up to 30 cm long with 8 - 16 pairs of leaflets each 3 x 1 cm. Dense flower heads appear from the upper leaf axils. Flowers are golden yellow, cupped and 2 cm across. Unopened flowers are covered by dark-brown or bronze bracts. Fruit pod is flat 6 x 2 cm.

Ecology Common throughout East Africa up to 2,100 m, especially beside ditches and on roadsides. Also found in Ethiopia, Sudan, Zambia, Zimbabwe, Malawi, South Africa and Mozambique.

Left : *Senna didymobotrya* in flower near Ilembo in October

Propagation Can be grown from seed.

Uses In Umalila the leaves are reported to be soaked in water and used to wash the face in order to

treat fits. A decoction of the leaves, stems and roots is widely used in East Africa as a purgative. A decoction of the roots is used to treat mental illness in Tanzania. The roots provide an antidote to poisoning caused by the stem and leaves. The leaves have a strong smell, like that of peanut butter, which repels bees. This is used in Tanzania to smoke out bees when collecting honey. *Senna* species fix nitrogen and can also be used for green manure.

Remarks All parts of the plant are known to be highly poisonous.

References Watt & Breyer-Brandwijk 1962, Wild et al. 1972, Kokwaro 1976, Coates Palgrave 1983, Blundell 1987, Neuwinger 2000, Llamas 2003



Shirakiopsis elliptica

(Euphorbiaceae)

Synonym *Shirakia elliptica*, *Sapium ellipticum*

Common names Igambo



Description A tree which normally grows up to 12 m high, though sometimes to 25 m. The bark is rough and produces a milky sap when cut. The branches droop down. Leaves are alternate, with short petioles, dark green, leathery, and widest below or about the middle, up to 13 cm long and 2.5 cm wide. The leaf margin has shallow rounded teeth. The yellow female flowers are borne below the male flowers on catkin like spikes up to 14 cm long. Fruit is a lobed, red to dark-brown capsule 1 cm in diameter.

Ecology Most common in clearings and riverine forest and also in mountain evergreen bushland with annual rainfall between 1,200 and 2,000 mm. Present throughout tropical Africa and in South Africa. It is common in savanna thickets in Uganda.

Propagation The tree can be grown from seed extracted from the capsules and also using wild seedlings. The seeds are often attacked by insects so should be collected as soon as they are ripe.

Management The tree can be coppiced and pollarded.

Uses Bees collect pollen and nectar and the flowers are very attractive to bees. The wood is moderately tough and strong but coarse and fibrous and does not last in the ground. It is liable to borer attack. Used for making tools and furniture. In Malawi it is used for making maize stores and mortars. In Tanzania a leaf preparation is used to relieve pains in the head, chest, back and shoulders, for sore eyes and abdominal swelling. The root is eaten with leaves and water to expel worms. In Kenya a decoction of the roots is used to cure coughs and in Uganda leaves and roots are used to treat mumps

References Wild et al 1972, Kokwaro 1976, Coates Palgrave 1983, Pauwels 1993, Burkill 1994, Fichtl & Adi 1994, ICRAF 1998, Katende et al. 2000, Neuwinger 2000

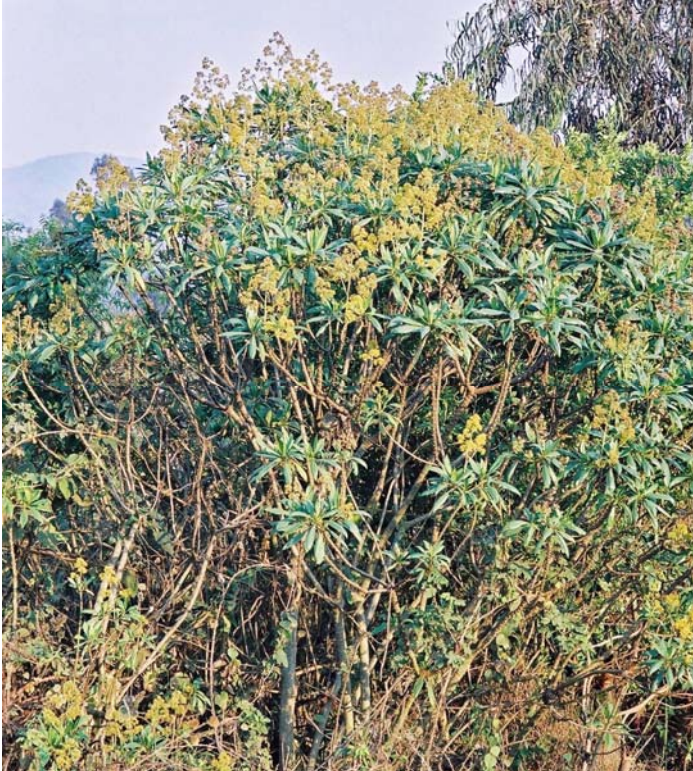


Solanecio mannii

(Asteraceae)

Synonym *Senecio manni*, *Crassocephalum mannii*

Common names Intwitwi



Description A shrub or much branched soft-wooded tree, up to 7 m tall. Bark green to grey green. Small branches are marked with pale leaf scars. Leaves are crowded at the ends of the branches, and are 15 – 20 cm long by 3.5 cm wide. The leaf margins are toothed and the leaf stalk is up to 2 cm long clasping the stem. The flowers are borne in dense terminal heads and emit a powerful, unpleasant smell from dusk onwards.

Ecology Grows at high altitudes in dry or evergreen forest edges, degraded or secondary forest, also near water and on rocky slopes in bush-land. Frequently planted as a hedge in Umalila and in Ethiopia.

Propagation Cuttings take easily and the plant grows quickly.

form a loose hedge.

Management Can be grown to

Uses Frequently grown as a hedge plant in Umalila. Bees were seen collecting pollen and some nectar. In Umalila people push the stems into mole runs to clear them out. Sometimes the stems are used to support bananas bearing fruit. The plant has a number of medicinal uses, for example the roots are used as a purgative, and to treat intestinal worms, dysentery and indigestion in East Africa.

Right : *Solanecio mannii* in flower near Izumbwe in August

Remarks The leaves of some related species are eaten as vegetables.

References Wild et al. 1972, Kokwaro 1976, Coates Palgrave 1983, Burkill 1985, Blundell 1987, Beentje 1994, Fichtl & Adi 1994, Hepburn & Radloff 1998, Neuwinger 2000, Schippers 2002



Solanum scabrum

(Solanaceae)

Synonym *S. guineense*, *S. melanocerasum*

Common names Insungwe kali (name used in Umalila), mnavu (Swahili), African nightshade, black nightshade

Description A woody annual or short lived perennial herb with strong green or purple stems which are either round or winged. Plants are usually about 60 cm high but can grow to 120 cm or more. There are both small and large leaved cultivars with different leaf shapes and the leaf colour can be either green or dark-purple. Flowers are either white or have a purple tinge. Fruits are 10 – 16 mm in diameter. The dark purple fruits have a distinct bloom when young and become glossy when they get older. It is the only species whose berries remain on the plant at maturity.



Ecology Occasionally found in forested areas in Umalila. It is more common in West Africa and many different varieties can be seen, often of local importance only. It is cultivated in several locations in Africa's humid highlands but less in the lowlands. It prefers fertile sandy loams with a pH of 6 – 6.5 and adequate organic matter. The plant is also present in Europe, India, China, the Philippines, Australia, New Zealand, North America and the Caribbean.

Propagation Grown from seed or cuttings. Seed can be sown either direct or in a nursery and transplanted. Mix the seed with sand or dry soil so that it is spread more evenly. Manure or ashes should be added to the soil for good growth. Seed can be sown in lines 20 – 30 cm apart or broadcast and then covered with a thin layer of soil. Transplant seedlings when 6 – 8 cm tall. Space in the field at 40 cm by 40 – 60 cm. Seed can be stored for several years if kept dry and cool. If cuttings are used these should be taken from the main stem and be 20 – 30 cm long. Lower leaves should be removed.

Uses In Umalila the leaves and shoots are occasionally cooked and eaten as a vegetable though *Solanum umalilaense* is preferred. Elsewhere in Africa they are more commonly eaten as a vegetable. The leaves have a bitter taste which can be partially removed by changing the cooking water. Dried leaves can be stored and added to soup. If dried in the shade nutrient loss will be minimal. The plants are also used medicinally in East Africa. The fruits are eaten to treat stomach ulcers and stomach-ache.

References Martin et al. 1998, Burkill 2000, Fontem & Schippers 2004

Solanum tuberosum

(Solanaceae)

Common names Intafwanya (Malila), kiazzi cha kizungu (Swahili), potato



Two local varieties. Nalwinji (left) and Sasamuka (right)

Description Several local varieties are popular in Umalila:- Kagiri (for chips) and Sasamuka, Arik and Lot (for boiling). Kenya Akiba and Atzimba have good resistance to late blight disease. Tuber growth often continues after flowering in East Africa providing there is sufficient moisture in the soil.

Ecology Altitude range from 1,200 - 2,900m. Potatoes require fertile soils. Soil must be free draining. Heavy soils restrict tuber growth and make harvesting difficult. Bacterial wilt, which causes plants to

wilt even when there is adequate moisture, can only be controlled by using clean seed and uninfected land. Resistant varieties are being developed.

Propagation Potatoes are normally planted from April to July in Umalila. They are ridged up some time after planting. "Seed" potatoes for planting should be 3 – 6 cm in diameter. They should not be cut as this makes them prone to disease and pest damage. Soft, flabby seed should also not be used. Sprouting normally takes place at the "rose" or broad end and all but the two strongest sprouts should be rubbed off. It is important to chit seed before planting. Spread the potato seed on trays no more than 2 to 3 tubers deep, away from sunlight. This encourages the development of strong, short, green healthy sprouts after several weeks. Planting with chitted seed ensures that the crop starts growing immediately it is planted. Plant, with sprouts pointing upwards, in rows 90 cm apart, to allow sufficient soil for earthing up. Plant seed 10 cm deep with plants spaced 23 – 30 cm apart in the row. Careful earthing up avoids greening of the tubers and tuber moth damage. It also conserves water and soil and gives ideal conditions for tuber growth. Only when the stem nodes are covered with soil will they form tubers.

Management Late blight is an important disease and in Umalila potatoes are planted after the main rain season to minimize damage. The disease can be controlled by regular chemical spraying using Dithane or a copper based solution. When the crop is ready, cut off the tops 2 - 3 weeks before harvesting. This allows the skin to harden making the crop easier to transport and store without rotting.

Uses An important root crop at higher altitudes in Njombe and Mbeya Districts, having a greater yield potential than maize.

Remarks Moles can be a problem and are trapped or poisoned. It is said that Inuha (*Tagetes minuta*) or Intwitwi (*Solanecio manni*) stems can be pushed into their holes to get them to move away. Stored potatoes are attacked by tuber moth. This can be controlled using a pyrethrum spray. Potatoes cannot be stored for long in East Africa because the high temperatures encourage sprouting. They are best stored in the soil though there is the risk of nematode damage if they are left in dry soil for more than 4 - 6 weeks. Average yield is 5 - 7 tons per ha. With good blight control this could be increased to 15 - 20 tons per ha.

References Hadfield 1960, Acland 1977, Raemaekers 2001

Solanum umalilaense

(Solanaceae)

Common names Insungwe



Description Leaves small, up to 3 cm long, on a leaf stalk up to 1.5 cm long. The plant branches low down producing a small bush. Each branch produces a large number of flowers in a simple or complex inflorescence, which turn the whole bush white during flowering. The numerous fruits which are never more than 4 mm in diameter are bitter and not eaten. They turn yellow-brown when mature.

Left : *Plant in flower in a vegetable garden*

Ecology Cultivated in Mbeya region - Mbeya, Mbozi and Rungwe districts (Malila, Safwa, Nyhia and Nyakyusa).

Propagation Planted from seed. Branches are first heaped over the seed-bed and set on fire so that the soil is partially sterilized. Manure is added and the seeds are then sown.

Management Seedlings are transplanted to stand 40 cm between rows and 20 cm in the row. The leaves can be picked 3 to 4 weeks after planting out and picking continues for about two months until flowering commences. The leaves then become bitter.

Uses An important vegetable in Umalila. Leaves are commonly eaten with maize porridge or Irish potatoes. They are available in November and December and then from February to May.

Right : *Leaves being sold in Ilembo village*



Remarks This is a new species whose identity was determined at the university of Nijmegen (Pays-Bas).

References Schippers 2004

Sparrmannia ricinocarpa

(Tiliaceae)

Common names Insabi, ingwayuzi



Description A woody herb or scrambling shrub 0.5 to 3 m tall. Older twigs have network markings. Leaves are densely hairy, have 3 – 7 lobes, and are 3 – 13 cm long and 2 – 12 cm wide. The pink to mauve flowers are produced over a long period. Fruit is brown and covered in 2 – 3 cm long bristles which catch on clothing and animal fur.

Ecology Grows on wasteland on roadside and forest margins or in forest clearings, riverine forest and secondary bushland where forest has disappeared. Occurs from the Cape in South Africa north to Ethiopia.

Uses Bees were seen collecting pollen in April. Bees are also known to collect pollen and nectar in Ethiopia. Other *Sparrmannia* species are reported to be visited by bees elsewhere. The stem yields a good fibre which the Maasai use for making rope.



References Coates Palgrave 1983, Beentje 1994, Fichtl & Adi 1994, Hepburn & Radloff 1998

Spermacoce dibrachiata

(Rubiaceae)

Synonym *Borreria dibrachiata*

Common names Ikuwi

Description An annual or biennial herb up to 75 cm tall with single or branching stems, sparsely to densely covered with hairs. The leaves are 4.5 – 12 cm long by 2.8 cm broad. Blue to violet-blue flowers are borne in heads 2.5 cm long.



Ecology One of the commonest species of *Spermacoce* in the Southern Highlands. It is found throughout Tanzania and from Rwanda to D.R. Congo and from Zimbabwe to Angola up to an altitude of 2,250 m. It grows in a variety of habitats from woodland to grassland and even in cultivated areas. The plant photographed was seen growing beside the road.

Uses Bees were collecting pollen in the morning in April. Bees are known to collect pollen and nectar from *S. sphaerostigma* in Ethiopia and other species of this family. A root infusion is used medicinally in Zimbabwe to treat dizziness, coughing and hepatitis.

Remarks 12 species of *Spermacoce* are present in the Southern Highlands.

References Kokwaro 1976, Cribb & Leedal 1982, Fichtl & Adi 1994, Hepburn & Radloff 1998



Steganotaenia araliacea

(Apiaceae)

Common names Nyongampembe (Malila), pop-gun tree, carrot tree



Steganotaenia araliacea in a home garden near Ilembu

Description A shrub or small tree from 5 to 8 m high. The trunk is crooked and the branches are thick. The bark is thick and corky. Leaves are borne on a common stalk, 15 - 40 cm long, which is swollen at the base and clasping the stem. The leaves are crowded at the end of the branches, each having 5 - 9 leaflets. The white flowers are produced in compound heads before the leaves appear.

Ecology Found in woody savannah throughout tropical Africa, especially at low altitudes and on rocky outcrops.

Propagation Wild seedlings or cuttings are used for propagation. Seeds are difficult to collect.

Management The tree is fast-growing and can be coppiced and pollarded.

Uses Wood is soft and brittle and mainly used for firewood, carving and farm tools. The whole plant is aromatic, resembling fennel or carrot, and is used to perfume garments. The plant is known to be strongly emetic. The roots are used to relieve sore throats, asthma and infertility in southern Africa. Bees are reported to collect pollen and nectar in Ethiopia. Children use the hollowed-out stems as pea-shooters.

References Wild et al. 1972, Coates Palgrave 1983, Keay 1989, Bentje 1994, Fichtl & Adi 1994, Katende et al. 2000, Neuwinger 2000, van Wyk & Gericke 2000

Swertia usambarensis

(Gentianaceae)

Common names

Description An erect, hairless herb up to 50 cm tall, with a stem that branches near the base or near the top. The spirally arranged basal leaves widen towards the tip. Stem leaves are long and narrow. The white to pale blue flowers are borne in loose heads. Flowers may have short or long petals and have two nectar producing pits at the base of each petal.



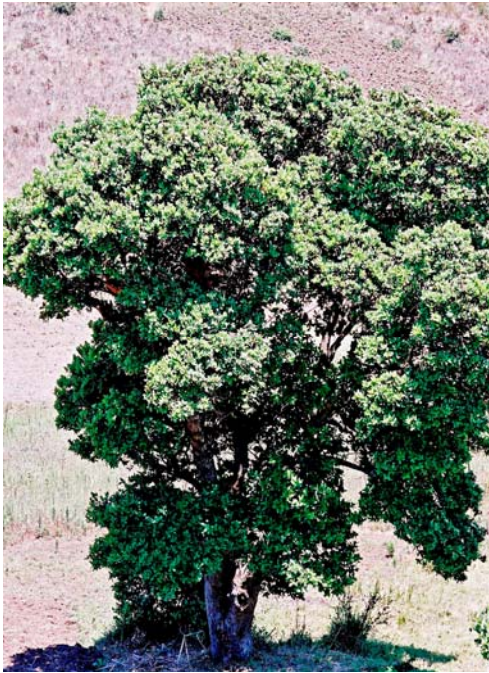
Ecology Found in short, dry grassland at altitudes from 1,800 to 2,500 m. Common on shallow soils and short mountain grassland in Kenya and Tanzania and also present in Zimbabwe, Mozambique and Ethiopia.

Uses In Umalila the roots are used to treat stomach-ache. Bees collect pollen and nectar from *S. abyssinica* in Ethiopia.

References Blundell 1987, Fichtl & Adi 1994, Mabberley 1997, Burrows & Willis 2005

Syzygium cordatum

(Myrtaceae)



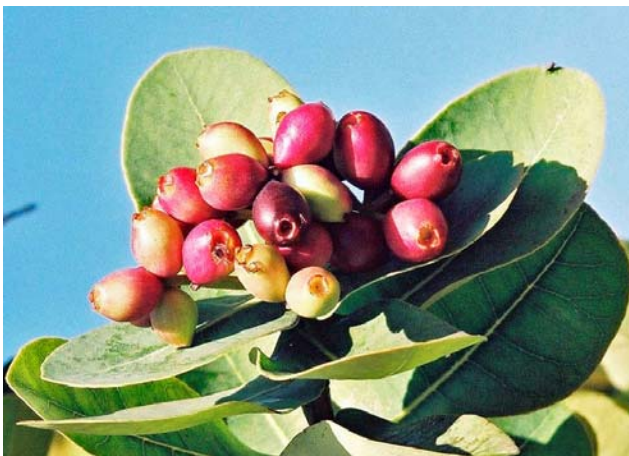
Common names Ifwomi (Malila), mpegele (Nyakyusa), msambarau (Swahili), water-berry tree, water boom.

Description A fairly fast growing evergreen tree up to 20 m high with a rounded crown. Trunk short and sometimes buttressed. Twigs are square in cross section with winged edges. The leaves are borne at the end of branches and clasp the stem in opposite pairs. They are oblong to circular, up to 13.5 cm long, bluish green above, paler below. Flowers are fragrant and produce large amounts of nectar. The fruit is up to 1.5 cm long.

Ecology The tree is found beside fresh water in East, Central and southern Africa. It occurs at medium to higher altitudes, along water-courses, often in thickets and forests. It is fire resistant.

Propagation Remove the flesh from the seed and sow before it dries. Germination is very good and uniform up to 100% after 7 to 20 days, but seed is only viable for one day. Seedlings are hardy and transplant well.

Uses Bees are important for pollination and, as flowering often takes place over long periods, with abundant nectar secretion, a good honey flow results. Timber is used for construction and furniture. The wood is medium hard and heavy



and works well but should be water seasoned. It is particularly good for boat building, as it is resistant to borer attack and does not rot in water. It makes a good fuel-wood. The tree is planted for erosion control and to stabilize river-banks. The fruit is edible, slightly acid and made into jam or a drink by being broken open and left to stand in water for some hours. A dye is produced from the bark. The root or a decoction of the bark is drunk to ease indigestion. The wood smoke has a pleasant smell and is sometimes used to season gourds.

References Watt & Breyer - Brandwijk 1962, Kokwaro 1976, Coates Palgrave 1983, Crane et al. 1984, Tredgold 1986, Beentje 1994, Mbuya et al. 1994, Venter & Venter 1996, van Wyk 1997, ICRAF 1998, Maundu et al. 1999, Carolus 2004, Lovett et al. 2006

Tagetes minuta

(Asteraceae)

Common names Inuha (Malila), khaki weed, Mexican marigold.

Description An erect, strong smelling annual herb, 1 – 2 m tall, very variable in habit, having deeply divided leaves and 4 to 6 pairs of toothed leaflets. The under surface of the leaves bear a number of small glands which exude a strong, unpleasant aroma when crushed. The creamy-yellow flowers, 5 mm across, are grouped in terminal heads. Seed is black, spindle shaped, with 4 short but sharp awns at the apex.



Tagetes minuta in flower on roadside

Ecology A common plant in grass and crop land in Umalila. Originally from South America. A troublesome weed at altitudes from 760 to 2,210 m.

Uses In Umalila this plant is put on the floor and around houses to keep ants away. Also used in Tanzania and Zimbabwe to keep weevils out of grain stores. Place a layer of crushed plants below grain and another on top to keep pests away. Alternatively pound the dried leaves and seeds to a powder and mix 20 litres of grain with 0.25 litre powder. An essential oil, obtained by distilling plants as

they produce seed, is suggested as a fly and vermin repellent. It is reported to be effective for killing maggots in wounds and can be rubbed into the fleece of sheep to prevent blow-fly infection. *Tagetes* species have fungicidal, insecticidal, nematicidal and insect repellent properties. Place large quantities of crushed flowers (roots and leaves can also be added), in a bucket of water. Leave to stand for 5 - 7 days and stir each day. When decayed, strain through a cloth and keep the liquid. Dilute with equal amounts of soapy water. Use potash based soft soap that is used for washing dishes, not modern washing powders that contain caustic soda, as they will harm plants. Spray once per week on plants to repel aphids, caterpillars, diamond back moths, ants, termites. The liquid is reported to help potatoes, beans, tomatoes, and peas resist blight, mildew and other fungal diseases. If a sprayer is not available the liquid can be shaken onto plants with a whisk made from branches or grass. Mexican marigold, in combination with chillies, garlic and onions can be used to deter most insects. Decayed flowers, leaves and stalks can be used as a mulch around the base of plants to deter pests. A rotation of *Tagetes minuta* will kill off root-knot nematodes in the soil as the roots give off a substance which poisons them. Effective treatment occurs over a period from 42 to 70 days.

Remarks Beekeepers should take care that clothes and hands do not smell of this plant as it can make bees aggressive.

References Uphof 1968, Wild et al. 1972, Blundell 1987, HDRA 1998, HDRA 2000, Stoll 2000

Tecomaria nyassae

(Bignoniaceae)

Synonyms *T. capensis* subsp. *nyassae*

Common names Intwati (Malila), Cape honeysuckle



Description An evergreen multi-stemmed shrub, climber or small tree, growing to 4 m high. Bark pale brown spotted with lenticels. Branches root where they touch the ground. The leaves are opposite, compound, glossy, 15 cm long, composed of 2 - 5 oval leaflets with a larger terminal leaflet having toothed edges. Flower heads are composed of red trumpet shaped flowers, 5 cm long, produced most commonly after the rains. Fruit is an oblong capsule up to 10 cm long.

Left : *Tecomaria capensis* growing beside a track near Ilembo

Ecology A shrub of forest or grassland from Tanzania

to South Africa. Sometimes left on field boundaries in Umalila. It is also found along drainage lines in dense woodland. Grows in full sun or semi-shade.

Propagation Most easily grown from cuttings taken from hardwood after flowering. Cuttings should be 10 cm long and all but the top two leaves should be removed. Suckers are frequently produced and can be removed and planted out during the growth period. The plant can also be layered very easily. It can be grown from seed.

Management Suitable for growing as an ornamental bush, hedge or as a single stemmed tree. Pruning is known to encourage flowering.

Uses Honeybees frequently collect pollen and nectar from this plant which often flowers over a long period. In Umalila the young shoots are chewed to relieve stomach-ache. In Tanzania timber is used for hut poles and making doors. In South Africa the powdered bark is used to treat fever, pneumonia, bleeding gums and stomach pain. *T. capensis* is browsed by livestock.



References Jex-Blake 1957, Watt & Breyer-Brandwijk 1962, Fichtl & Adi 1994, Bryant 1996, Venter & Venter 1996, Mutshinyalo 2001, Dharani 2002

Telfairia pedata

(Cucurbitaceae)

Synonyms *Ampeloscycos scandens*

Common names Itandu (Malila), mkweme (Swahili) oyster nut, Zanzibar oil vine



A single oyster nut plant growing over a bamboo trellis near Yalenga



White flowered variety

Description A perennial climbing vine up to 30 m long having stout woody stems and branched tendrils. Male and female flowers are normally borne on different plants though in Umalila monoecious plants may be present and flowers may be pink or white. Fruit is large, 45 – 60 cm long, 20 cm diameter, weighing up to 15 kg. It has 10 - 12 deep ridges longitudinally and the fruit stalk is sometimes constricted near to the fruit. Each fruit bears 80 – 170



Red flowered variety

seeds. Seeds are circular, flattened, up to 4.5 cm in diameter, yellow or brown, with no obvious rim, and are covered with a network of fibrous material. The plant is hardy, deep rooted and drought resistant. It can produce for 20 years or more. Two crops may be produced each year.

Ecology Indigenous to tropical Africa, probably originating in East Africa. Fairly commonly cultivated in Umalila at 2,000 m. Sometimes grows wild in lowland rain forest and riverine forest. Indigenous to Usambara mountain forests in Tanzania. Also grows in Rwanda, Mozambique, Zanzibar, Pemba and Uganda. Though it grows fast at low altitudes, the plant lives longer at higher altitudes. It does well on

medium loams with good drainage and an annual rainfall of 900 mm. It does not grow well in areas affected by strong winds.

Propagation Can be grown from seed or cuttings. The seed should not be older than 3 months, preferably plant within one month of harvest. Up to 75% germination takes place after 3 - 4 weeks. It is best to soak seeds in water for up to 5 days before planting. Plant in containers and then plant out in the field as soon as the seedlings reach 45 cm. If possible provide adequate manure when planting out. In Umalila normally one plant is grown near the home, often next to the livestock enclosure, on a trellis 2 m high or over a tree, a wild fig for example. The plant is fast growing attaining 6 m in the first 6 months.

Management Plants were grown in Kenya using a double wire trellis arch of similar height to that for passion fruit. The fruits then hang down and seeds can be collected from the ground when the fruits break off and drop. However the plant seems to prefer growing over trees, which it does almost smothering them. Sexes are normally separate and must be grown together to get fruit. Fruits take 4 months to mature. The nut stores fairly well. To open cut round edge to separate fibrous coat then lightly tap edge or continue to cut until two halves separate.



Maturing fruit at Yalenga



Uses Traditionally the kernels were the main source of cooking oil in Umalila. The kernel is edible fresh but is also pounded and added to vegetables (*Brassica oleracea* and/or *Vigna unguiculata* in Umalila). The Chagga people use the seed as a tonic after childbirth. The kernel can be roasted, makes a good pickle and can be used in soup. The thin seed coat is bitter, but this can be removed fairly easily. The kernel contains 26% protein and yields up to 66% of a sticky oil known as Castanha oil. The oil is suitable for making soap and candles and is used as a medicine for stomach troubles and rheumatism in East Africa.

Remarks The production of oyster nuts has never become very popular because a) the problem of providing adequate support. b) the difficulty of mechanizing the removal of seed coat. However the nuts are a traditional and valuable source of protein and have a ready sale in local markets.

References Poppleton 1939, Greenway 1945, FTEA 1967, Williamson 1975, Kokwaro 1976, Tindall 1983, Mamillan 1991



Many houses have a hole in the wall to allow chickens to come and go. The hole can be blocked off with a brick as necessary, to keep hens in until they have laid or to prevent snakes from entering.

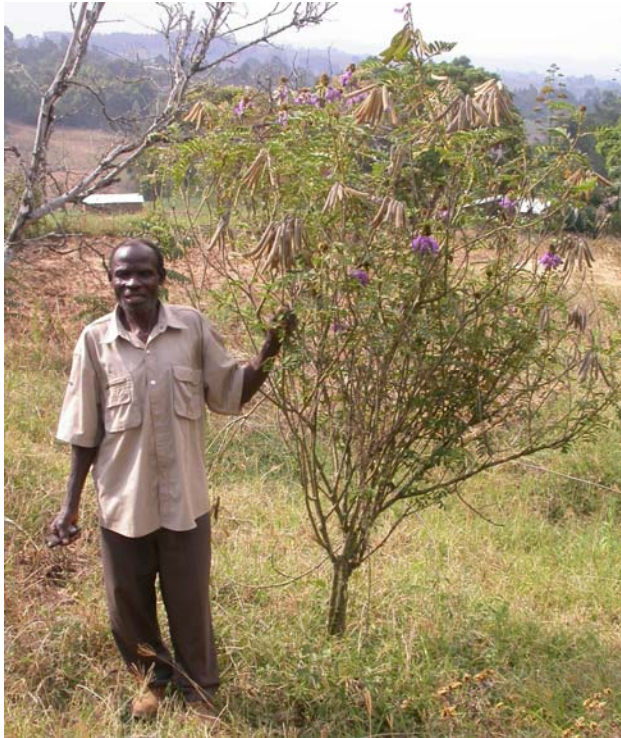


A beehive probably damaged by a black spotted genet

Tephrosia vogelii

(Fabaceae)

Common names Utupa (Malila), kibazi, mtupa (Swahili), fish poison bean



Dickson Mwalende with a Tephrosia bush

Description A much branched shrub from 0.5 to 4 m high. Plants are normally self-pollinating though large carpenter bees have been reported as the principal pollinators. Honey bees collect pollen and nectar from plants and contribute to pollination.

Ecology The plant is native to tropical Africa. It is found in a wide variety of habitats including savannah and forest margins. It will grow on poor soils, but is slower growing and more prone to disease under such conditions. In acid soils it grows much better than *Leucaena leucocephala*, forming root nodules and fixing atmospheric nitrogen where the latter does not. It will grow up to an altitude of 2,100 m, preferring a well drained soil. It is well adapted to sandy soils and can be planted in and around crop fields.

Propagation Seed should be stored for 2 months and then planted direct after soaking in hot water at 45°C. This treatment should result in 80% germination after one week. Seed can be stored without loss of

germination for 2 - 3 years.

Management The plant should be cut back every so often to encourage branching. It coppices well and tolerates repeated pruning. It also tolerates drought, grazing and strong wind. It recovers well after burning.

Uses In Umalila the leaves are used to control maize stalk borer. It is recommended that 1 kg leaves are put in 15 litres of water and 25 gm soap is added. Stir and leave the mixture to stand for one day. The liquid is then strained off and a small amount shaken down the funnel of the maize plant from a stick or sponge when the plant reaches knee height. The application is repeated twice a week. The leaves as well as the seeds are effective against aphids and thrips. They can also be used successfully as a dried powder to control grubs, lice and ticks on cattle and fleas and ticks on dogs. The plant is sometimes inter-cropped with maize in Southern Tanzania. The plant can also be used as a green manure, having a high nitrogen content. It is usually grown in the rain season and ploughed in before seed set. It has been used for alley cropping with maize at 90 cm spacing with 2 - 3 seeds per hole. The plant is allowed to grow until the following planting season when it is cut to ground level. It may be grown on contour ridges for soil conservation. Sticks cut from plants can be used for staking beans, for poles, firewood and making brooms. *Tephrosia vogelii* is sometimes planted as a hedge. The pulped leaves are commonly used to poison fish which can then be safely eaten.

Remarks Tephrosine, contained in the leaves, is an effective insecticide and only mildly toxic to mammals. However browsing animals avoid it. Tephrosine is known to resist attack by termites.

References Watt & Breyer - Brandwijk 1962, Egli & Kalinganire 1988, Beentje 1994, Isangati 2006, ICRAF 1998, Msanga 1998, Rutunga et al. 1999, Stoll 2000

Thunbergia alata

(Acanthaceae)

Common names Nantembe, rusiki (Malila), black-eyed Susan

Description A perennial climbing or trailing plant up to 2 m long. Leaves are opposite and slightly hairy. The flowers are often numerous, 4 cm in diameter, usually orange but can be white, red or yellow, having a brown to purple throat. Flowers are produced over a long period. Fruit is round, woody, and topped with a beak. When ripe it explodes releasing the seeds.



Ecology Present in bush and grassland in East Africa. Often found in partial shade at the forest edge and in river fringes. It grows up to an altitude of 2,400 m, particularly in the wetter, higher areas. It is sometimes planted as an ornamental.

Propagation Can be grown from seed.

Uses In Umalila the leaves are pounded and put in water and drunk to treat a swollen stomach. The leaves are reported to be eaten as a vegetable by some people in Kenya. It is also reported to be readily grazed by livestock in Kenya. In Tanzania the leaf sap is dripped into the eyes to treat inflammation and, together with *Hyptis pectinata*, is drunk for piles or early rectal cancer. In Malawi a *Thunbergia* species is used as a cure for skin disease. The plant is also used medicinally in Rwanda, Burundi, Kenya, Uganda and eastern Tanzania.



References Jex-Blake 1957, Wild et al. 1972, Williamson 1975, Burkill 1985, Blundell 1987, Peters et al. 1992, Neuwinger 2000, Llamas 2003

Trichilia emetica

(Meliaceae)

Common names Ilatushila (Malila), msanguti (Nyakyusa), mkungwina, mtimaji, mtimai (Swahili), Cape mahogany

Description A small to medium tree up to 20 m tall with hanging foliage. Bark is red brown and smooth. Leaves are compound with 4 – 5 pairs of alternate leaflets, each 12 – 15 cm long and 5 cm wide. Leaflets increase in size from the base to the largest terminal leaflet. Flowers are creamy-green and fragrant. They have 5 thick petals about 2 cm long around a hairy cluster of stamens. Fruit is a creamy-brown to red round capsule, 1.8 to 2.5 cm across and burst open when mature to reveal black and red seeds in bright red pulp.



Ecology A widespread and important tree of high forest areas. It prefers a well drained rich soil and high water table. Altitude range 0 – 2,100 m. The tree is found from Senegal to the Red Sea and in the Arabian peninsula.

Propagation Use fresh seed which normally germinates after 10 – 20 days. Collect seeds when capsules start to open, dry in the shade, shake out the seed when dry and sow immediately. Seeds are often attacked by a borer weevil. Seeds that float in

water should be rejected. The tree can also be grown from cuttings. These should be taken from layered branches or one year old coppice growth. Cuttings are sometimes eaten by termites.

Management Transplant after 6 – 8 months. The tree is fairly fast growing.

Uses The timber is used for firewood, poles and tool handles. Wood is straight grained and easily planed and, though attacked by borers, is used to produce attractive furniture and shelving. A sweet milky, edible liquid is obtained from the fruit arils which is used in cooking. The aril must be removed from the seed, the coat of which is extremely poisonous, and crushed in water. The seeds can also be skinned and eaten or soaked in water and the contents squeezed out and ground and the liquid produced is mixed with vegetable leaves. The leaves can be used as fodder. The flowers are reported to be visited by bees both in Umalila and in South Africa. Oil content of kernel is 55 – 65%. The oil can also be used as a hair conditioner, to nourish and revitalize skin and as a furniture polish. The bark is used to treat pneumonia and as an emetic or enema. Oil from the seeds is used for making soap and to treat cuts and bruises and a decoction of the root is taken for fever and as a purgative. Leaf and fruit poultices are applied to bruises, cuts and eczema. Pieces of bark or powdered bark are soaked in warm water and used as an enema or as an emetic for intestinal complaints. A bitter medicinal oil is obtained by boiling the ground seed in water which is taken for rheumatism. The tree produces good shade and has a non-aggressive root system.

References Deschodt 1976, Peters et al. 1992, Mbuya et al. 1994, Venter & Venter 1996, Dharani 2002, Ruffo et al. 2002, Lovett et al. 2006

Tripsacum andersonii

(Poaceae)



Synonym *T. fasciculatum*

Common names Isale (Malila), Guatemala grass

Description A tufted or spreading perennial grass, with leaves growing up to 120 cm. Flower stems are rarely produced.

Ecology Origin probably Central America but now grown in Ghana, Ivory Coast, Kenya, Rwanda and Madagascar. Grows vigorously even at high altitudes, in partial shade and on a wide range of soils, as long as there is sufficient soil moisture.

Propagation By division of the plant or using the rhizomes. It is rather slow to establish. It can be planted out along the contours for soil conservation and fodder production.

Management Leaves should be cut for fodder at a height of 10 – 15

cm, when they reach 100 cm, or at 6 week intervals.

Uses The plant has good potential as a stock feed and can be grown to control soil erosion. It is possible to harvest up to 195 tons fresh fodder (40 tons dry fodder) per ha in 13 months. Fresh young leaves may contain up to 9% digestible protein, making it a valuable livestock forage.

Remarks Few farmers grow this grass in Umalila at present but it is useful for erosion control when planted close together along the contour.

References Bogdan 1977, Chen 1992

Tristemma mauritianum

(Melastomataceae)

Synonym *T. virsanum*, *T. incompletum*

Common names Isalakwale

Description An erect herb or shrub up to 2 m high, usually short lived with thick square stems and covered with bristles. Leaves are borne on stalks 1 – 4 cm long, and are opposite, oval and up to 12 cm long with 5 – 7 conspicuous parallel veins. Flowers are pale-pink mauve in terminal heads. Fruits contain soft, white sections which are sweet.



Ecology Usually found in marshy places, but occasionally among rocks. Found from Senegal to Uganda and from Sudan south to Angola. This plant was growing on rocky soil at the forest edge near Yalenga.

Uses Ripe fruits are eaten by children in Pemba. Fruits and young shoots are also eaten in Uganda. The plant has a number of medicinal uses. Bees are reported to visit the flowers in Umalila.

References Burkill 1997, Katende et al. 1999, Neuwinger 2000, Konda et al. 2006

Triticum aestivum

(Poaceae)



Synonym *T. vulgare*

Common names Ihiya (Malila), ngano (Swahili), bread wheat.

Description An annual cereal crop. Depending on the variety, it grows from 0.9 to 1.5 m high. Most varieties grown in Umalila are awned. Spring bread wheat is the most important variety produced. There is a local brown flour variety and a new white variety called Uyahudi, which is quicker maturing than the others.

Ecology Most wheat is produced at altitudes over 1,500 m in tropical Africa and is therefore concentrated in Ethiopia, Kenya and Tanzania. Wheat is grown between altitudes of 1,200 and 2,600 m in Tanzania. Dry conditions can cause stress whereas excessive rain can result in diseased plants. Wheat requires a fertile, well drained soil. Though the plant is fairly drought resistant it requires adequate moisture, especially when it begins to tiller. Drought during flowering results in narrow, misshapen grains.

Propagation Wheat is usually planted from February to March towards the end of the rain season, so that weeds can be dug in prior to planting. Seed rates of 90 kg/ha are normal for

broadcast wheat. A fine seedbed is needed. Use improved, disease resistant seed wherever possible.

Management Weed control is important. The most important diseases and pests are:- Yellow or stripe rust, particularly at altitudes over 2,400 m. Use a resistant variety though resistance breakdown is fairly rapid. Septaria leaf blotch is also a problem. Nematodes, aphids and Quelea birds can also be serious pests. The crop matures after approximately four and a half months in Tanzania.

Uses Wheat is used locally for making bread, chapatis and scones. Approximately 82,000 tonnes per annum are produced in Tanzania from 60,000 ha. The straw is used for thatching.



Nemedia Josefu threshing wheat near Yalenga

Remarks Wheat is a labour intensive crop in Umalila where plants are grown in small fields, often under 1 ha, and on steep sloping ground. A disease resulting in shrivelled grain has recently appeared.

References Gunn 1953, Acland 1971, Raemaekers 2001, Belay 2006

Triumfetta annua

(Tiliaceae)

Common names Izumba (Malila), mulenda (Swahili), burweed



Description Erect annual or short lived perennial up to 1 m tall. Leaves alternate, 3 – 9.5 cm long and 2 – 6 cm wide, sometimes almost rounded, with a pointed tip. The leaf margin is lightly toothed. Flowers are small, yellow, and produced in the leaf axils. Fruit is round, 10 mm, and has many hooked bristles.

Ecology The plant occurs from Nigeria to Ethiopia and into South Africa. It is widespread at medium altitudes up to 2,150 m and in shady places and is also a common weed of cultivation. In Umalila it is sometimes cultivated in home gardens.

Propagation Planted from seed or cuttings. Cuttings should be 15 – 20 cm long and be taken from the top of the stems. These should be planted in the shade at a spacing of 10 – 15 cm.

Uses New shoots are produced as soon as the rain starts and these are harvested throughout the rain season. The leaves are edible and contain 4.2% protein. They are occasionally cooked with potashes to soften them.

References Wild et al. 1972, Goode 1974, Williamson 1975, Malaisse 1997, Schippers 2002, Schippers 2004



Triumfetta rhomboidea

(Tiliaceae)

Common names Imbunya (Malila), burweed

Description An erect, hairy, woody plant up to 1 m high. Stems are grooved along their length. Leaves are simple, alternate and lobed. The red/yellow flowers are in small crowded clusters. Fruits have hooked prickles 1 mm long.



Triumfetta rhomboidea growing beside the road near Ilemba

Ecology Commonly occurs along paths and roadsides in upland forests, dry country and grassland; altitude range up to 2,280 m. Often a weed of cultivation and recorded throughout tropical and southern Africa.

Uses Bees were seen on this plant collecting both pollen and nectar. In Zimbabwe the leaves are eaten as a relish. The roots are also eaten after being crushed and cooked. Stem fibres are occasionally used for making string in Malawi and have potential as a substitute for jute. The leaves are crushed with water and used to treat burns. The roots are used to treat toothache and for circumcision wounds in East Africa.

References Watt & Breyer-Brandwijk 1962, Wild et al 1972, Williamson 1975, Kokwaro 1976, Tredgold 1986, Blundell 1987, Fichtl & Adi 1994, Neuwinger 2000, Kihwele et al. 2001



Turraea floribunda

(Meliaceae)

Synonym *T. kaessneri*

Common names Ilyilu (Malila), mlangilangi-mwitu, mtamagoa (Swahili), wild honeysuckle tree.



Description A shrub or tree, sometimes a creeper, up to 10 m tall. Leaves are 9 - 20 cm long and 4 - 10 cm wide, elliptic with a wedge shaped base, densely hairy when young and also on the veins of older leaves. Flowers white. Fruit about 2 cm in diameter.

Ecology In Umalila single trees are preserved in or around home compounds. Locally common in low-lying evergreen rainforest in Malawi. Present in moist forest in Kenya.

Propagation *Turraea robusta* is sown from seed without pretreatment. The flesh surrounding the seed must be removed before sowing.

Uses In Umalila the bitter leaves are pounded and put in water which is drunk to relieve coughing. The bark is used as an emetic, and the root and bark as a purgative in Tanzania and Malawi. These are boiled and the decoction is drunk twice a day. Large doses are poisonous. The plant is used as an emetic, and to treat rheumatism, dropsy and heart disease by the Zulu people in South Africa. The leaves are not eaten by insects. The wood is pale white and moderately hard. It is used for making domestic utensils and implements, firewood and charcoal.



References Watt & Breyer-Brandwijk 1962, Williamson 1975, Kokwaro 1976, Beentje 1994, Msanga 1998, van Wyk & Gericke 2000, Neuwinger 2000, Lovett et al. 2006

Vernonia adoensis

(Asteraceae)

Synonym *V. shirensis*

Common names Ipasapasa



Vernonia adoensis flowering near Mt. Mbogo

Description An erect woody herb or shrub 0.3 – 3 m high, which branches from near the base. Leaves are greyish on the undersides and the plant has a large root. The dense flower heads are mauve to pale-pink.

Ecology Grows in open woodland and wooded grassland at medium to high altitudes. Often found near streams. Present from Nigeria to Ethiopia and south to D.R. Congo and Zimbabwe.

Uses Bees were seen collecting nectar from this plant in July. *Vernonia* species are known to be important sources of nectar and pollen. In Malawi pollen was often found in honey samples. In Tanzania a root infusion is taken for stomach pains and to treat tuberculosis and the fresh roots are sliced and cooked

with milk and flour to treat gonorrhoea. In Nigeria the roots and pounded leaves are boiled in water and the liquid drunk to relieve indigestion. In Kenya the Maasai crush the leaves in cold water and apply to cattle sores caused by ticks.

Remarks There are about 25 species of *Vernonia* in the Southern Highlands of Tanzania.

References Morton 1964, Wild et al. 1972, Williamson 1975, Cribb & Leedal 1982, Crane et al. 1984, Burkill 1985, Persano Oddo et al. 1988, FZ 1992, Fichtl & Adi 1994, Hepburn & Radloff 1998, Burrows & Willis 2005

Vernonia myriantha

(Asteraceae)

Common names Iporoto



Description A shrub 3 - 4 m tall, but may reach 6 m, with stout stems. Flowers are borne in large, loose heads of pale mauve, white or pink flowers and are up to 60 cm across.

Ecology Found in open areas of moist and dry mountain forests. It may form thickets and is a colonizer of disturbed land and abandoned cultivation. It grows between 1,600 and 2,400 m in Tanzania and is a good indicator of soil fertility.

Left : *Vernonia myriantha* growing at the forest edge in Umalila

Propagation Can be grown from cuttings or seed. The seed remains viable for up to a year.



Management A fast growing shrub which coppices well and can be planted along contour ridges and grass strips.

Uses An important bee forage and sometimes used as a hedge plant in Umalila. The plant is cut for mulching and green manure. Stems can be used for firewood. The leaves are used to wrap foods. They do not dry out and break up easily.

References Beentje 1994, Mbuya et al. 1994

Zea mays

(Poaceae)



Common names Amangagu (Malila), mahindi (Swahili), maize

Description A stout annual reaching 4 m with a root system of adventitious roots growing from the lower nodes.

Ecology Grown in a wide range of conditions though it is essentially a crop of warm regions with adequate moisture. However the crop yields well at 2,000 m in Umalila. Grows best on well drained, well aerated, deep, fertile loam soils.

Propagation Seed is normally planted in August or September, before the rains. It is spaced at 75 – 90 between rows and 25 – 50 cm between plants. 3 seeds are sown per hole. Beans are often inter-planted. Runner beans are also inter-planted and use the maize stems for support (see page 174).

Left : *Mama Mlaga shelling maize*

Management Weed control is very important. Stalk or stem borers are a major pest in Umalila. They can be controlled by tobacco, or *Tephrosia vogelii* leaf solution which is poured down the centre funnel into the plant (see pages 224). The powdered roots of *Maerua decumbens* and *Neorautanenia mitis* may also be used.

However care should be taken when using the latter (see pages 144 & 155). Cut worms, cob borer and bollworm may also be troublesome.

Uses Maize is the staple food in Umalila, used for making ugali and uji while the immature cobs are roasted. White maize, compared with yellow maize, has a harder grain and produces a more palatable food. In Umalila the crop is often planted on the same land year after year. It is estimated that 2.6 million tonnes are produced from 1.6 million ha each year in Tanzania and that average yield in Africa is only 1.25 t/ha. Potentially maize can yield over 6 t/ha. Bees frequently collect pollen from the male flowers during the rains and sometimes honeydew from the leaves. The latter may be gathered in sufficient quantities to give a honey flow.

Right : *Maize provides with bees with large quantities of pollen, vital for rearing brood.*

References Purseglove 1972, Howes 1979, Crane et al. 1984, Villières 1987, Stoll 2000, Badu-Apraku & Fakorede 2006



Bee Forage Chart	Southern Tanzania												
	Scientific name	Malila	Months when bees collect pollen and nectar										
		1	2	3	4	5	6	7	8	9	10	11	12
Acacia mearnsii	Naluyami												
Agarista salicifolia	Izenya										R		
Albizia gummifera	(Mkenge)										R		
Albizia schimperiana	Intanga										F		
Amphicarpa africana	Izanji				R								
Argemone mexicana											F		
Bersama abyssinica	Iswago										NP	N	
Bidens magnifolia	Indelengu							NP					
Bidens pilosa	Masikari				R	NP	NP	F			F		
Bidens pinnatifidata	Intengu							NP					
Bidens schimperi	Lizumba						N						
Bidens stephia	Mputira		R	R	NP	NP							
Bothriocline longipes	Insongole					F	*	F					
Brassica carinata	Igagara						NP	F			F		
Brassica oleracea	Ilepu							F					
Bridelia micrantha	Iliyisia			R									
Brillantaisia kirungae	Inswina						*	*					
Brugmansia suaveolens	Intwiti					N	N	F			F	N	
Buddleja salviifolia											F		
Caesalpinia decapetala	Inyangwa		R	R	F	*	F				F		
Callistemon viminalis	"Bottle brush"								NP		N	N	
Cassia floribunda	Inuha					F	F						
Caylusea abyssinica	Ukwipa						F	F					
Chassalia discolor	Intwati ya misengo										F		
Chrysophyllum gorungosanum	Ipalanyiji												
Cissampelos pariera	Lusisia										F		
Clausena anisata	Isyenje										R		
Cleome gynandra	Umuzima					F	F	F					
Clerodendrum johnstonii	Nanjoha				F								
Crassocephalum vitellinum	Inzumba					F	F	F			F		
Crotalaria cleomifolia	Isekeseke						N						
Crotalaria natalitia	Ithumba						*						
Crotalaria subcapitata						*		F					
Cucurbita ficifolia	Dabwidi												
Cucurbita maxima	Ipwiza					F	F	F					
Cussonia spicata	Ipombo						*				F		
Cyathula uncinulata	Imbunya						*	N					
Dalbergia lactea	Ishuwa										F		
Desmodium intortum	Izanzi					N							
Desmodium repandum	Asampya				F								
Diospyros whyteana	Ifita										N		
Dissotis melleri	Izolakwale										F		
Dodonaea angustifolia	Inzigula						R	R					
Dombeya burgessiae	Inkunya						NP	NP			F		
Dombeya rotundifolia	Itanji										F		
Dombeya torrida	Ikunya						NP	R	R				
Dovyalis abyssinica	Isogwa												
Dracaena steudneri	Iteti										F	R	
Duhaldea stuhlmannii	Isasami										R		
Ehretia cymosa	Itundumusi										NP		
Ekbergia capensis	Ihoho											R	
Emilia sp.	Enzumba					F	*	F			F		

Glossary

Aflatoxin	Poisonous chemical produced by a mould on various foods.
Anthelmintic	A remedy for expelling intestinal worms.
Anti-carcinogenic	A substance which acts against cancer forming cells.
Aqueous extract	Liquid obtained from soaking plants or the leaves in water.
Astringent	Causing contraction of the soft tissues.
Asymmetrical	Irregular in shape.
Awn	Long spine or bristle arising from the end of a seed of wheat or barley.
Axil	Junction of leaf stalk and stem or branch.
Bee forage	Plant visited by bees for nectar or pollen.
Blind plant	A plant which has no growth point.
Bole	Swollen stem of a tree.
Bolting	A plant producing flowers often when under stress.
Bracts	A leaf-like organ usually with a flower growing from its base.
Brood	Eggs and larvae of bees present in brood comb.
Bulbil	A bulb-like organ formed on the leaves or flower stalk which can grow to form a new plant.
Calyx	The outer, normally green, case composed of sepals surrounding the flower.
Capsule	Outer shell or case surrounding seeds of the fruit.
Cardio-vascular properties	Substances that reduce high blood pressure or the likelihood of strokes.
Chip budding	A slice of stem, with bud, from the improved variety is inserted to replace a bud on the stem of the rootstock.
Chit	Small tubers (usually potatoes) are placed in a light but not sunny position to encourage the growth of green shoots so that, when planted out, they will commence growing immediately.
Cholesterol	The most common fat like substance in the human body. High levels can cause heart problems.
Cleft graft	A twig from an improved variety is sharpened and inserted into a slit in the top of the main stem of the rootstock, after the latter has been cut back.
Clone	Plants reproduced vegetatively from the same plant.
Cloves	Small bulblets which together make up one large bulb, as for garlic.
Comb	Cells in which young bees are raised. Comb is also used to store honey and pollen. See photo on page 11.
Coppice	Sprouts arising from a tree stump after being cut down.
Corm	A bulb-like underground swollen stem.
Corolla	The flower petals, especially when these are joined together.
Counter irritant	Something which causes irritation in one part of the body to relieve pain elsewhere.
Deciduous	A tree that sheds its leaves annually.
Decoction	Extraction of essence by boiling liquid to a concentrate.
Disc floret	Florets, which are often tubular, formed near the centre of the flower head.
Dormancy	Period when plants do not grow.
Dry matter	Percentage content of plant without moisture.
Dyspepsia	Indigestion
Earthing up	Earth is drawn up into ridges over the sprouting shoots of potatoes to allow for tuber development and to prevent greening of the tubers.
Elephantiasis	Swelling of the legs, arms or genitals caused by long thread like worms.
Emetic	A substance that makes people vomit. Used when poison has been swallowed.
Enema	A substance, usually in water, inserted into the anus to cause bowel movement.
Epiphyte	A plant which attaches itself to another, often to reach the light, but which does not feed on or harm the host.
Expectorant	A substance that helps a person cough up mucous.
Extra floral nectary	Nectary on the leaf or leaf stalk.
Fix nitrogen	Certain leguminous plants (e.g. <i>Tephrosia vogelii</i>) have a symbiotic relationship with rhizobia bacteria in their roots which are able to extract nitrogen from the air and make it available to the plant.
Furuncle	A painful area of the skin containing pus.
Goitre	Swelling on the front of the neck caused by lack of iodine in the food.
Gonorrhoea	A sexually transmitted disease.
Greening	Tubers become green on exposure to light. Eating these can be dangerous because of the Solanin present.

ha	Abbreviation for hectare.
Hallucinogen	A substance causing illusions.
Harden off	Gradually reduce artificial conditions to adapt a plant to field conditions.
Hardy	Able to withstand a variety of weather conditions e.g. drought or cold.
Heel	The base of a cutting is separated from the main stem by being torn off together with the axillary bud.
Honey flow	Season when bees produce large quantities of honey.
Humus	Decomposed vegetable matter in the soil.
Hypertension	High blood pressure.
Insecticide	Substance used to control insects.
Latex	Milky, sticky fluid produced when some plants are cut or damaged.
Lenticels	Breathing pores on the bark.
Lopping	Removing branches from the top of a tree.
Mange	A skin disease of animals.
Methionine	An amino acid lacking in the diet of people whose main diet is cassava or plantain.
Nectary	Organ, usually inside the flower supplying nectar to insects.
Nematacide	Substance used to control nematodes.
Nematodes	Also known as eelworms. Tiny worms that invade the plant roots causing a loss of vigour and often producing swellings in the roots.
Nodes	A joint on a stem or branch.
Organic matter	Material derived from plants e.g. compost, mulch.
Ovate	Egg shaped in outline.
Palmate	Shaped like the fingers of a hand.
Perennial	A plant that lives for more than two years.
Petiole	Leaf stalk
pH	A measure of the acidity or alkalinity of the soil.
Pinnae	The individual leaves growing on each side of a stem. They may themselves be compound with a central stalk and leaflets on either side.
Pollard	The tree is cut at about 2 – 3 m height and sprouts to form a mass of foliage which can then be cut for livestock fodder etc.
Poultice	Heated material applied to the skin to relieve infected swelling.
Purgative	(Laxative) Stimulates the bowel evacuation.
Raceme	An unbranched stem bearing flowers on short stalks. The flowers commence opening from the base.
Ray floret	Florets, which are often strap-like, on the margin of the flower head.
Rectal prolapse	The bowel bulges out of the anus.
Rhizome	A thickened stem, which may branch, and grow on or just below the surface of the soil. Roots go down into the soil while stems and leaves sprout upwards from it.
Riverine	Beside flowing water.
Rootstock	A plant grown to produce the root system of a grafted plant.
Rosette	A dense round cluster of leaves of equal shape.
Scion	A shoot or bud cut from an improved plant variety to be grafted onto another.
Seed potatoes	Potatoes between 3 and 6 cm in diameter used for planting.
Seed viability	The length of time seed retains the capacity to germinate.
Semi-ripe cutting	Cuttings taken from young branches which are no longer soft and do not wilt so easily.
Sepals	Bracts which open to reveal the flower petals and which may remain below the flower.
Shield budding	(also called T budding). A T is cut in the stem of the rootstock and an oval piece of bark with a bud from an improved variety is inserted and bound in with a strip of plastic.
Side graft	Similar to cleft grafting but the notch is made on the side of the stem rather on the top.
Side-whip grafts	A shoot from the scion is cut diagonally across and a similar cut is made on the top of the rootstock and the two surfaces bound together.
Split	An individual plant divided from a clump of plants.
Stall feeding	Feeding cut fodder to enclosed livestock.
Succulent	Thickened, fleshy (used when describing leaves).
Sucker	A shoot arising from the root or from below the ground.
Systemic insecticide	A pesticide or insecticide, sprayed on the plant or soil, which is taken up and circulated throughout the plant.

T budding	See Shield budding.
Tendrils	A thin thread-like projection used by the plant to climb or attach itself to a support.
Tiller	A shoot arising from the axil of a lower leaf usually of a member of the grass family e.g. wheat. Generally the greater the tillering the better the yield.
Trifoliate	Composed of three leaflets.
Tubercles	Small rounded swelling on a plant.
Vegetative propagation	Increasing the number of plants by taking cuttings or layers instead of seed.
Vertical interval	The vertical distance between contour lines or strips.
Viable	Used to describe the length of time seed can be kept and still be planted.
Woodlots	Small areas of trees planted mainly for firewood.

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A beekeeper prepares a smoker prior to inspecting his hives at Shilanga in Umalila.

Bees are important both for the production of honey and wax and particularly for their role in the pollination of plants, including some important economic crops. Bees have been shown to increase the yields of sunflower, passion fruit, peaches, pumpkins and runner beans. This book provides information on 188 plants in Umalila in Mbeya district. A forage chart indicates the months when bees collect pollen and/or nectar. The plants are listed alphabetically and in addition to photographs, details of their botanical, vernacular and common names are given, together with brief descriptions. The distribution, uses and the propagation and management of selected plants is also provided where appropriate.

About the Author

Paul Latham is a retired Salvation Army officer, who has worked in Africa for over 20 years, much of this time having been spent on farmer training in Kenya. On retirement, and during the past 10 years, he has made a number of visits to Umalila in Mbeya district where he has photographed and recorded the various uses of plants, with particular emphasis on those visited by honeybees. He has also been involved in the development of a beekeeping project in Bas-Congo province in the Democratic Republic of the Congo. He and his wife now live in Scotland.

