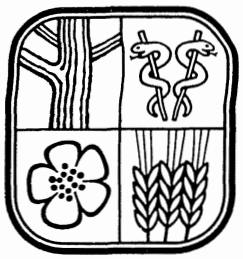

SVERIGES
LANTBRUKSUNIVERSITET

# AN INVENTORY OF A COASTAL FOREST IN KENYA

## at Gedi National Monument including a check-list and a Nature Trail

Report from a Minor Field Study

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ERRATA:

1) Ficus sp. nov.? ska vara Ficus bubu Warb. (s. 10, Appendix 1 s. 3)

2) Haplocoelum trigonocarpum Radlk. ska vara Haplocoelum inoploeum Radlk.
( s. 10, Appendix 1 s. 4, Appendix 4 s. 10, Appendix 6 s. 2)

CONTENTS



APPENDICES

## SUMMARY

The aim of this project was to evaluate the conservation status of Gedi as a Kenyan coastal forest, to transfer valuable knowledge about indigenous plants from old traditional healers to the coming generations and to contribute to the botanical research in Kenya.

The project was carried out on the Kenyan coast, where a forest of 35 ha among the Gedi National Monument was investigated. A check-list of the vascular plants was accomplished and a nature trail with an accompanying booklet was prepared. An attempt to describe and classify the forest is included in the report.

Gedi National Monument is situated 15 km SW of Malindi. It used to be an Afro-Arabic town but was deserted in the beginning of the 17th century. A forest developed, and part of it has probably been left intact since then. Today the area is protected as a national park.

The forest is here classified as a Combretum schumannii - Gyrocarpus americanus lowland semi-deciduous forest on coral rag. It bears little resemblance to the nearest forest, Arabuko-Sokoke (W of Gedi). Gedi forest was probably part of a continuous coral soil vegetation all along the coast. The forest-patches most similar to Gedi are found south of Mombasa, the Jadini and Shimoni forests. These are small and unprotected.

The central part of the forest is older and consists mainly of large trees, with a tree-canopy of about 25 m. The outer younger part was probably cut before the forest was protected in 1948. This part is 10-15 m high and shrubby with more lianas. Because of different species composition the paths, the open grassy areas and the main ruin area are separately described.

211 species, including two probably undescribed species, were found within the forest.

The nature trail presents 37 species. The illustrated booklet includes their local names and uses. Those were obtained from a local traditional healer.

In the appendices are included: 1. A check-list of Gedi forest; 2. A preliminary check-list of Arabuko-Sokoke forest; 3. Preliminary check-lists of Jadini and Shimoni forests; 4. The illustrated Nature Trail booklet; 5. A list of useful plants not mentioned in the Nature Trail booklet; 6. A list of local plant names.

This project was initiated by the National Museums of Kenya and financed by the Swedish International Development Authority (SIDA).



## MUHTASARI

Lengo la Mradi huu lilikuwa ni kupima kiwango cha hifadhi katika msitu wa Gedi ulioko katika mwambao wa pwani ya Kenya, kutoa elimu na maarifa kwa kizazi cha sasa na kizazi kijacho kuhusu umuhimu wa mimea na dawa za kiasili na pia kutoa mchango katika utafiti wa mimea nchini Kenya.

Mradi huu ulifanyika katika msitu wa Gedi ambao uko kwenye mahame. Eneo lenye ukubwa wa hekta 35 lilikaguliwa. Ankara ya mimea iliyopo ilitengenezwa, njia ionyeshayo mazingara ya msitu pamoja na kijitabu kuhusu matumizi ya njia hiyo Vilikamilishwa.

Habari kuhusu msitu huo pamoja na ulivyogawanyika kimimea zimeelezwa katika taarifa hii.

Mahame ya Gedi yako umbali wa kilomita 15 kusini-magharibi ya mji wa Malindi. Gedi ulikuwa ni mji wa Waafrika na Waarabu lakini wakazi wake walihama mwanzoni mwa karne ya 17 kwa sababu zisizoeleweka vizuri. Baada ya muda msitu uliota katika mahame haya na kufuatana na ukaguzi wetu sehemu kadha za msitu huu hazijawahi kuingiliwa na watu tangu wakati huo. Kwa sasa hivi eneo hili la Gedi limehifadhiwa na ni mojawapo ya Hifadhi za Taifa la Kenya.

Aina ya msitu huu ni wa nyanda za chini ukiwa na miti ya aina ya "MGURURE" (kigiriama) na "MBOMBA MAJI" (Combretum schumannii na Gyrocarpus americanus) ambayo hupukutika baadhi ya majani yake wakati wa kiangazi.

Msitu huu umeota kwenye vichuguu vilivyofanywa na mlimbikizo wa makaka ya vinyama vya baharini (coral rag).

Msitu huu unafanana kidogo na ule wa Arabuko-Sokoke ulioko magharibi ya Gedi. Inakisiwa kuwa huenda msitu huu ulikuwa ni sehemu ya mtiririko wa mimea iliyoota katika udongo uliosababishwa na kulundikana kwa vikaka vya vinyama vya baharini kwenye ukanda wa pwani.

Kuna viraka vya misitu vinavyofanana na ule wa Gedi kusini ya Mombasa. Misitu hii ni ile ya Jadini na Shimoni ambayo ni midogo na hailindwi.

Sehemu ya katikati ya msitu wa Gedi ni ya zamani zaidi ikishahidiwa na ukubwa wa miti iliyopo. Sehemu hii ina miti mikubwa iliyofungamana kwa juu yenye urefu wa wastani wa mita 25. Sehemu inayoizunguka miti hii ni ya vichaka ikiwa na miti midogo yenye urefu wa kati ya mita 10 na 15 ikiwa imeambatana na mimea ya aina ya kamba-kamba. Huenda sehemu hii ilivamiwa na watu na kukatwa kabla ya Gedi kuhifadhiwa mwaka wa 1948. Sehemu za njiani, sehemu za wazi na eneo la mahame, zimeelezewa tofauti kwa sababu kila sehemu ina mpangilio na mimea ya aina tofauti.

Jumla ya aina 211 za mimea inayojulikana na aina mbili ambazo labda hazijatambuliwa bado zilipatikana ndani ya msitu huu.

Aina 37 za mimea zimeonyeshwa kando-kando ya njia inayoonyesha mazingara ya msitu. Katika kijita u kilichoandikwa, majina ya mimea hii kwa lugha za kienyeji pamoja na baadhi ya matumizi yake yameelezewa. Habari kuhusu matumizi ya mimea hii pamoja na majina yake yalipatikana kutokana na msaada wa wataalam wa madawa ya kiasili.

Jedwali linaloonyesha: 1. Ankara ya mimea ya msitu wa Gedi; 2. Ankara ya mwanzo ya msitu wa Arabuko-Sokoke; 3. Ankara za misitu ya Jadini na Shimoni; 4. Njia inayoonyesha mazingara ya msitu wa Gedi; 5. Ankara ya mimea muhimu ambayo haikuonyeshwa kando ya njia. 6. Ankara ya majina ya kienyeji kuhusu mimea hiyo, limeambatanishwa na taarifa hii.

Mradi huu ulibuniwa na Idara ya kumbukumbu za Taifa nchini Kenya na kugharamiwa na Shirika la Kimataifa la Maendeleo la Swedeni (Swedish International Development Authority, SIDA).

# INTRODUCTION

All over the world the destruction of forest is increasing. We hear alarming reports on the rapidly decreasing rain forest but we must not forget that the forest is threatened also in other parts of the world. In temperate areas there are the effects of the industrial welfare. Acid rain and pollution contributes to the devastation of the forest. However, the situation is much worse in the developing countries than in the developed simply because even if they have the will to stop the deteriorating process, they do not have the resources. Wherever he lives man is dependent on his natural environment. Therefore it is very important to try to save the natural vegetation left in the world for the survival of coming generations.

Kenya has the highest population rate in the world (4,4 %, Johansson, 1985). If there is no change the population will be doubled in 15 years. Consequently the need of land increases very fast, and without better agricultural methods the situation can become disastrous. The problems are the same as in other developing countries: the people need land, they need charcoal and they need wood for building.

Only 5,2% of Kenya is covered with forest (Ojiambo, 1978, see also Fig. 1). (Sweden, with approximately the same area, has about 52 %, Skogsstyrelsen, 1983.) The area is decreasing all the time. People are getting aware of the problems. Tree plantation projects have been started in the last few years and the schoolchildren learn the slogan: "Plant a new tree for every tree you cut." Even if that is done, there is, however, a risk that the indigenous flora will be extremely depauperated if the trees planted are mainly exotics like Eucalyptus. The field layer under introduced trees is often poor, which leads to an impoverishment of the original flora and an increased erosion. The indigenous trees are often more slow-growing than for example Eucalyptus, but are more adapted to different environments. They also have many uses traditionally and it is very important to keep the knowledge about those trees. One important purpose of our investigation is to clarify the potential uses of the trees and shrubs in the area investigated, and to spread this information. Another purpose is to contribute to the knowledge of the vanishing, little known flora of the East African coast.

The present project was suggested and performed in collaboration with the National Museums of Kenya. The result is a check-list of the vascular plants in Gedi and a nature trail with an accompanying guidebook. The nature trail is mainly intended for schoolchildren, visiting the ruins, in order to increase their knowledge about different trees and shrubs and their uses. The tourists visiting the monument may also aquire some knowledge, which hopefully will increase the understanding between different cultures.

The check-list will probably be published in "East African Natural History Society", printed in Nairobi, the nature trail has been laid out and the guide book is ready for printing.

INFORMATION ON GEDI

Location

Gedi is situated on the Kenyan coast, 5 km from the sea-shore and 15 km SW of Malindi in Kilifi District (see Figs. 1-3).

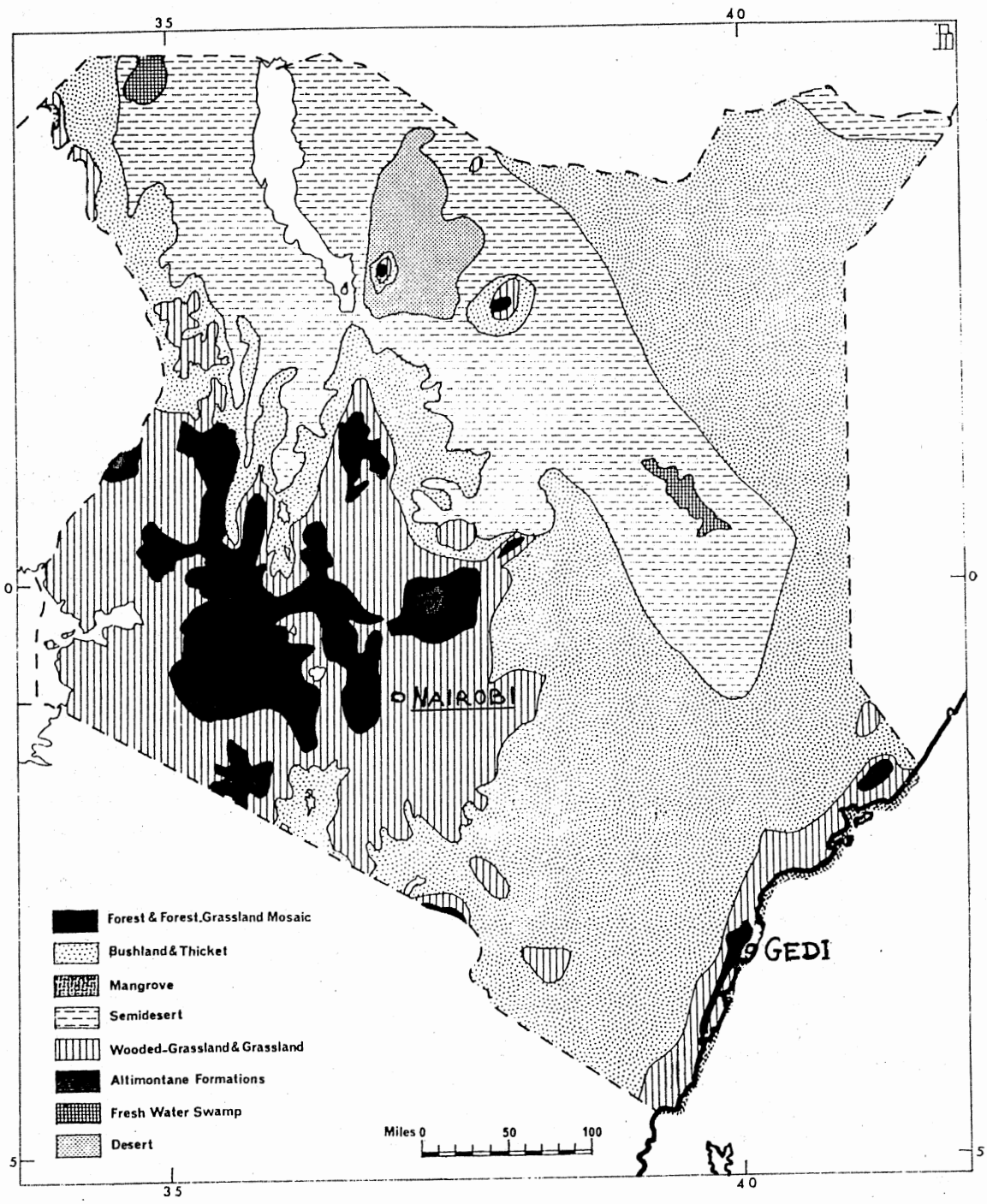


Fig. 1. Vegetation types in Kenya. (From Russell, 1962.)

East of the Mombasa-Malindi road lies the present village of Gedi, and 500 m further SE the old town of Gedi is found. It is today a ruin area open for visitors. The position is 3 18,5' S, 40 01' E. The height above sea level is 15 m.

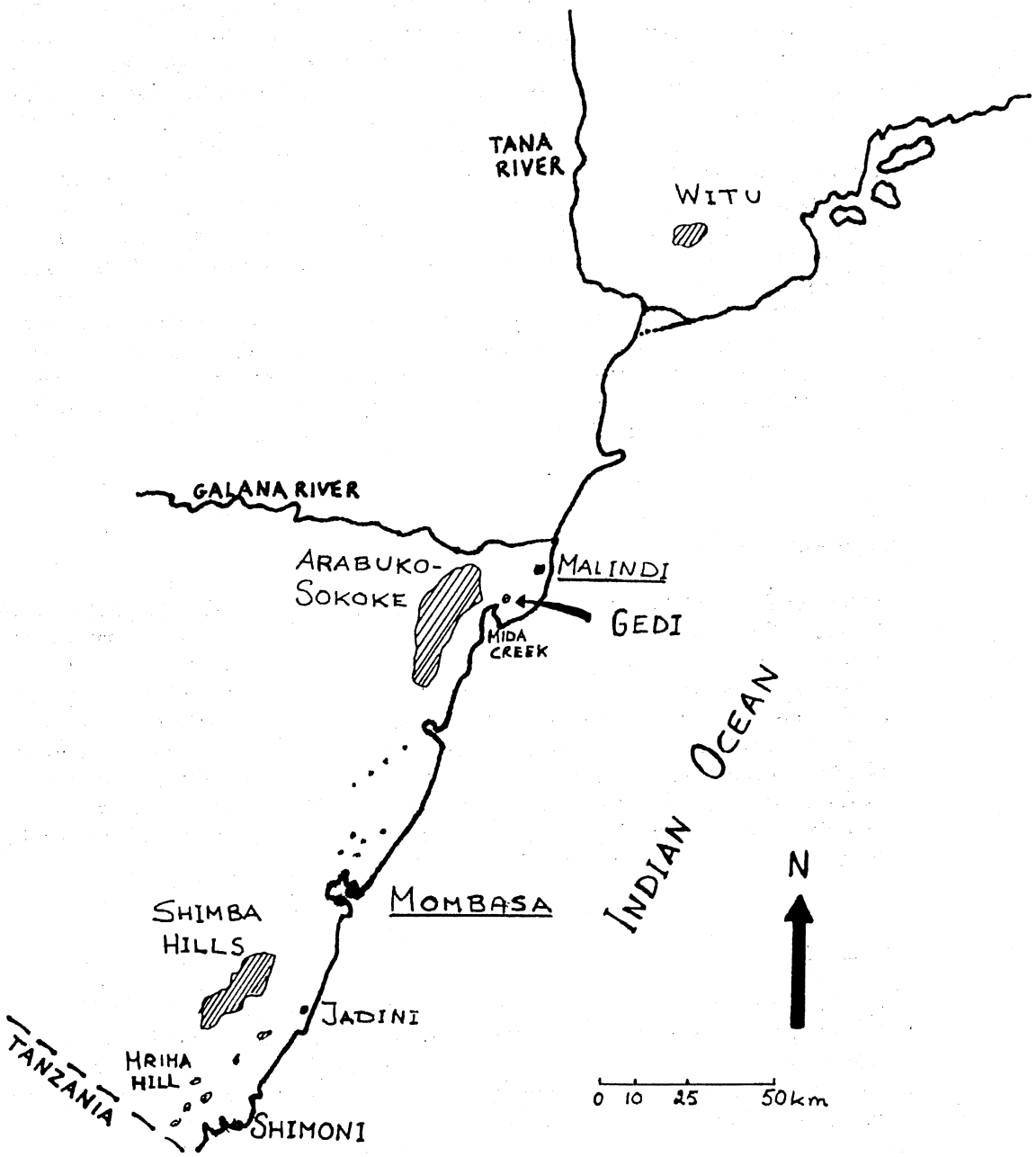


Fig. 2. The remaining forests on the Kenyan coast. The small unnamed dots are sacred forests, kayas. Towns are underlined. (From Robertson, 1984.)

## The History of Gedi National Monument and Forest

Gedi town was founded in the late thirteenth century. Earlier settlements are not known. The Arab-African town was abandonned in the early seventeenth century. It had a large and wealthy population and was center for cross-ocean and inland trading. The location is peculiar since there is no good harbour at the seashore among the coral reefs. However, there is a possibility for ships to go through Mida Creek (Fig. 2), and an unproved theory of a connecting river between Gedi and the Creek could be the solution to the mystery.

The reason why the town was abandonned is very unclear. Was it the result of a dispute, nomads attacking the people, or a decreasing watertable which meant that the wells dried up? There are many theories, but no real answer yet. After the people left, the present forest developed and has as far as is known been left fairly intact since then. People feared the ruins since they believed that bad spirits were living there.

In 1927 Gedi was gazetted as an historical monument, and twelve years later some work was done in cementing the crumbling walls of the more important buildings. It was declared a national park in 1948 and excavations began, which continued for ten years. The responsibility for the administration was taken over by the National Museums in 1969.

## Climate

The rainfall in the Malindi area is recorded to 1040 mm/year (Moomaw, 1960). The weather is controlled by the monsoonal air currents of the Indian Ocean, in combination with the coastal hills and the dry hinterland westwards. There are two rainy seasons, with long rains in april-june, and short rains in october-december. During the long rains usually more than half of the annual precipitation falls. The relative humidity is high all through the year, but highest in the rainy season when the clouds may be very low. The temperature is comparatively high all the year round, with a minimum temperature of 25 C , and a maximum of 30 C .

## Geology

The area forms part of the coastal Pleistocene plain below 65 m.a.s. It consists of flatbedded coral reefs and lagoonal deposits of coral breccia and various sands - lagoonal aeolian or alluvial in origin. The coral ridge is very uneven, which makes the soil depth rather varying. There is a relatively deep soil layer in Gedi.

## Population around Gedi

The area around Gedi village is populated with small family-villages each with their cultivated fields. Most of the people living here belong to the Giriama, which is one of the nine Mijikenda groups. When the Mijikenda settled along the coast they established nine villages - the kayas (Fedders et Salvadori, 1979). A kaya was a political and religious center, situated on a hill-top surrounded by

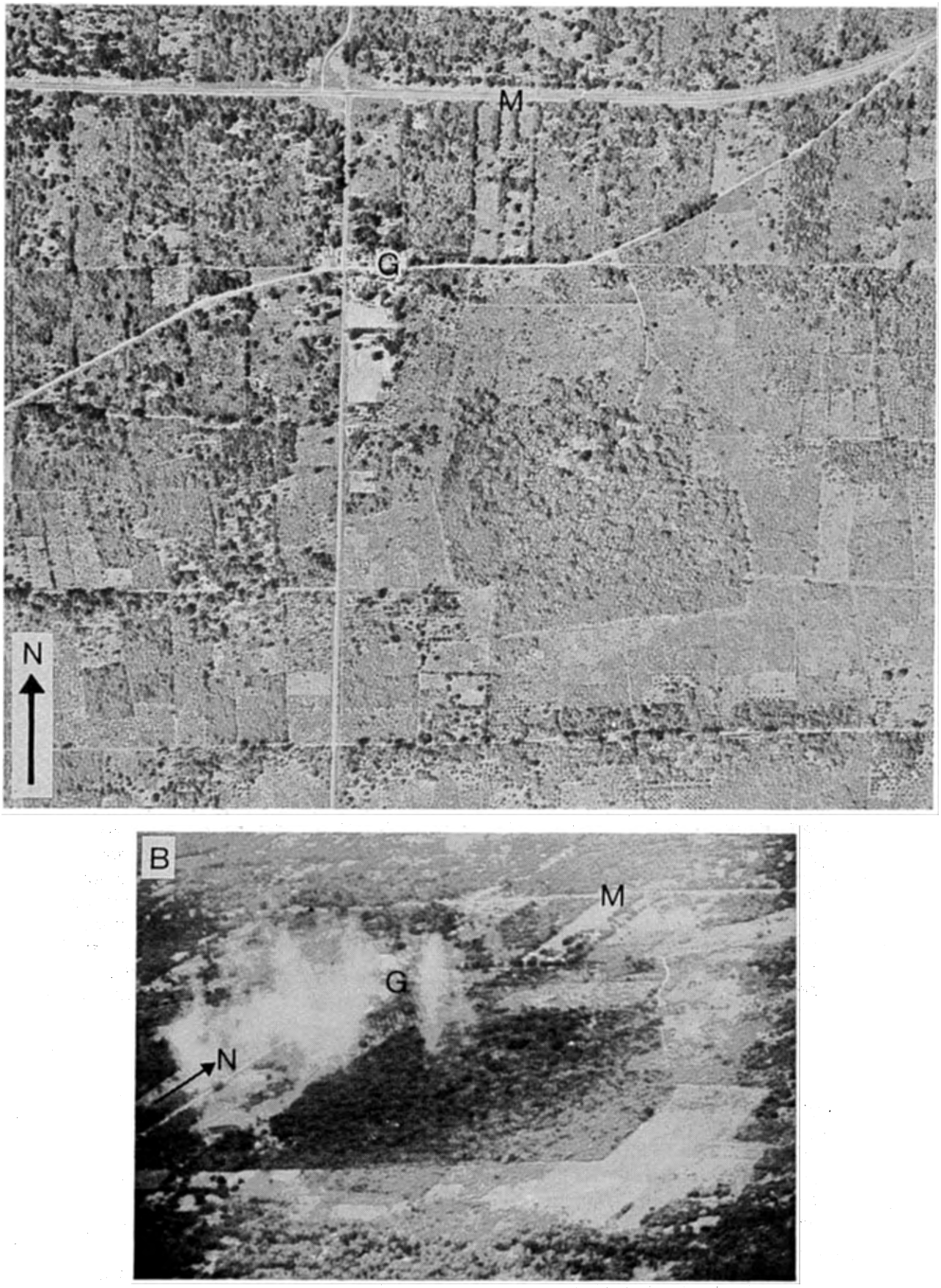


Fig. 3. Aerial photographs of Gedi. G = Gedi village, M = Mombasa-Malindi road. The road west of the forest leads southwards to Watamu. The entrance to the ruins and the main excavated area is situated in the northern part of the forest. A: About 1:10 000. It has not been possible to trace the age of this picture. It is taken in the dry season. B: Photograph by the authors 1985 taken in the rainy season. The outline is about the same, but shrubby areas have developed in the south. The central part of the forest has bigger trees than the outer part. In the upper left corner Arabuko-Sokoke forest can be seen.

thick forest. From an agricultural life in the kayas, the Giriamas engaged in small-scale trade with the Swahili of the coast. In the 17th century they expanded both territorially and economically. From a collective way of living, the economic rise made them more individualistic and independent of their tribe. This lead to an expansion by single villages and more need for land. The people moved out from the kayas, which still had a great importance as sanctuated areas. The forests around the kayas have mostly remained intact up till today.

It is said, though we have not found anything written on it, that Giriamas should have a good knowledge of the plants around them.

## VEGETATION AND FLORA OF GEDI

### Methods used for the inventory

The present inventory was made during the long rains and lasted throughout May 1985. Representatives of all vascular species were collected. The material is to be distributed between the herbaria in Ethiopia (Addis Abeba), Great Britain (Kew, London), Kenya (Nairobi) and Sweden (Uppsala). All identifications were made at East African Herbarium in Nairobi.

The abundance of each species was estimated towards the end of our field-work. Four categories were used: common (C), frequent (F), occasional (O) and rare (R) where the common species occured almost everywhere and the rare species were seen once or twice.

The common way to classify structures and function similarities of the plants is to group them into life forms (Raunkier, 1934), but we had no possibility to make such a classification. We have used the rimitive growth form classification outlined below. The difference between trees and shrubs is dependent on the branching of the trunk. A tree has a trunk with the main branching starting above one meter's height, whereas a shrub has a trunk that is branched below one meter's height. Climbers include both woody and herbaceous species and can be true lianas or high scramblers. Herbs are herbaceous non-climbing species, including the families Poaceae and Cyperaceae. Epiphytes are tree-living non-parasitic species.

### The vegetation of Gedi

Gedi can be classified as a Combretum-Gyrocarpus lowland semi-deciduous forest. It is dominated by Combretum schumannii (Combretac.) and Gyrocarpus americanus (Hernandiac.). The first mentioned species is indigenous and common along the coast, and the latter, although pantropical, is fairly rare.

The main vegetation-structures (illustrated in the vegetation map in Fig. 4) are described below.

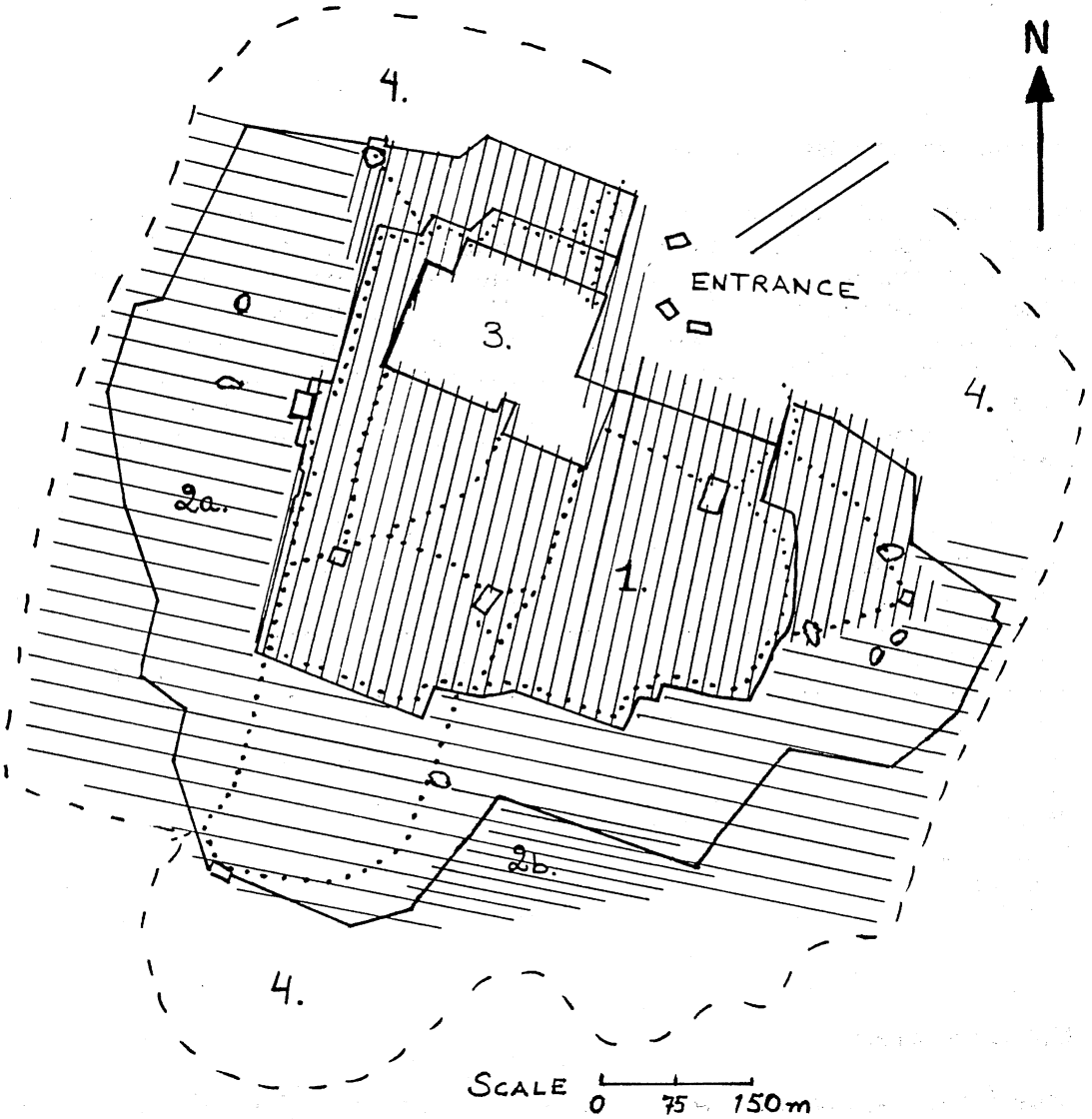


Fig. 4. Map of vegetation structures in Gedi forest.

Legend:

1. Old higher forest
2a. Young lower forest
2b. " " " but with a different species composition
3. Main ruin area
4. Uninvestigated area

Paths
Grassy areas
Walls; The inner wall is about 1 m high The outer wall is today barely visible
Approximate edge of the forest
Minor excavated ruins

## Species composition and growth forms

The species list can be found in Appendix 1. We have counted 211 species including 186 determined to species level, 22 to genus level and 3 to family level. 8 collects remain unidentified. 25% of the species were not found in flower. 22 % of the species were noted as rare. Two new species were found (one Capparis sp. nov.?, Capparaceae, confirmed, see Fig. 13, and one Ficus sp. nov.?, Moraceae, not confirmed).

The distribution of growth forms among the 211 species is shown in Table 1.

Table 1. Distributions of growth forms in Gedi forest. For definitions, see text.

| Growth form | % of 211 species |
|---|---|
| Trees | 28 |
| Shrubs | 33 |
| Climbers | 22 |
| Herbs | 16 |
| Epiphytes | 0,5 |
| Parasites | 0,5 |

## Old high forest

This forest type has two distinguishable treelayers. The canopy of the upper layer is approximately 25 m high, and the dominating trees are Combretum schumannii and Gyrocarpus americanus. Abundant species are Adansonia digitata (Bombacac., Fig. 9), Ficus bussei (Morac., Fig. 11) and Cussonia zimmermannii (Araliac., Fig. 12). The field layer is poor which makes it easy to walk, except where shrubs and climbers are dense. Many canopy trees are clean-boled more than half of their height. The lower layer, about 5-10 m high, consists of the following trees: Lecaniodiscus fraxinifolius (Sapindac.), Haplocoelum trigonocarpum (Sapindac.), Teclea simplicifolia (Rutac.) and Drypetes reticulata (Euphorbiac.). Shrubs like Grewia truncata (Tiliac.) and Tarenna supra-axillaris (Rubiac.) are also common.

Dominating climbers (in May) are Adenia gummifera var. gummifera (Passiflorac., Fig. 14), Tinospora oblongifolia (Menispermac., Fig. 10), Capparis sepiaria var. stuhlmannii (Capparac.) and Dioscorea asteriscus (Dioscoreac.). The climbers may be low and shrublike, but most of them dwindle upwards towards the light. In the closed forest they are sparser, but along the several paths (2-3 m broad, Fig. 5) dividing the forest, climbers are more frequent.

Along the paths there are some low shrubs, such as Pseuderanthemum hildenbrandtii (Acanthac.) and Psilothrichum scleranthum (Amaranthac.), which do only occur there and not within the forest.

## Young low forest

Outside the first wall (see Fig. 4), excluding the south-eastern part, the forest is lower, approximately 15 m. There are few real mature trees here, and the vegetation is mainly composed of thin shrubs. This part has probably been cut before the forest was protected in 1948. Perhaps people did not fear this area which is outside the main ruins. There are some sparsely distributed older trees, mainly Tamarindus and a few Gyrocarpus and Adansonia.

Climbers are more frequent in this younger forest, and the field layer is thin but richer than in the old forest. It consists mostly of grasses and seedlings.

In the south-western part (2b in Fig. 4, Fig. 6) there is a somewhat different species composition. Zanthoxylum chalybeum (Rutac., found only here), Dalbergia melanoxylon (Papilionac.), Terminalia spinosa (Combretac.) and Lannea cf. greenwayii (Anacardiac.) are found here. The trees are shrublike, and no big trees are found.

## Main ruin area

This excavated area is cleared regularly and thus very poor in vegetation. Some annual herbs are found only here like Euphorbia hirta (Euphorbiac.) and Oldenlandia lancifolia (Rubiac.). Few trees are left among the main ruins due to the excavations.

There are also many cultivated trees among the ruins. These trees could have been established during the excavations or at an earlier stage, but it is not likely that they were planted by the Arabs. Most of them are found only here, but some, like e.g. Azadirachta indica (Meliac.) are somewhat spread. Other introduced species found here are Delonix regia (Caesalpiniac.) and Thevetia peruviana (Apocynac.), both of which are described in the Nature Trail (Appendix 4).

## Grassy areas

There are some small patches (100-200 m ), where only grasses and herbs are found (Fig. 7). Those areas could be an indication of disturbances, most likely due to human influence. During the excavations of the ruins the archaeologists needed places for making cement to restore the crumbling walls. We found a hard layer of chalk cement just under the soil-surface in the grassy area at the North West Gate. However, this only explains that particular patch. The others could have been caused by people making charcoal, logging and burning on the spot. The grasses have moved in, and the dense grass mat could have stopped the establishment of trees.

Panicum maximum (Poac.), Justicia flava (Acanthac.) and many herbaceous climbers were found only in the grassy area, together with some shrubs not found elsewhere in the forest.

## The border of the forest

The forest border is quite sharp on the eastern and western sides with an abrupt change from forest to field (Figs. 3 and 8). On the north and south sides the border is diffuse, consisting of a broad or narrow fringe of shrub which was not included in the inventory. Climbers are common all along the border of the forest.

## Species of special interest

One of the species first spread after the town was abandonned was probably Adansonia digitata (Fig. 9). It usually grows in semiarid areas (like in Tsavo East), but it is also a pioneer and may establish itself where the vegetation is sparse. Today the forest in Gedi is dense and little light penetrates the canopy. The Adansonia is unable to regenerate where light is sparse and we have not found any regeneration in the forest. When the old trees are gone this species will probably be extinct in the forest.

There are good hardwood trees in Gedi, such as Tamarindus indica, Afzelia quanzensis (Caesalpiniac.) and Dalbergia melanoxylon. (The latter two are not very common.) The pantropical Gyrocarpus americanus is a useful softwood tree.

The yellow clear-boled Sterculia appendiculata is only recorded from some kayas, Mrima hill and along Tana river (Dale et Greenway 1961). It gives a very clean timber but is not frequently used. Ficus species are not used by either foresters nor local people. However they are known to have the rare property of conserving the soil moisture and possibly increasing the fertility of the soil (according to Dale et Greenway, 1961) The most common Ficus in Gedi is F. bussei. Another species is F. sansibarica, which is not very common along the coast but appears occasionally in Gedi forest. More information about different species is given in Appendices 4 and 5.

There is a high abundance of climbers in Gedi. The herbaceous climbers are found only in the rainy season. Together with the deciduous trees they contribute to the changing character of the forest between the dry and the rainy seasons. Examples are Jateorhiza palmata (Menispermac.) and Dioscorea asteriscus (Dioscoreac.). Other climbers may dominate in other times of the year.

Fig. 5. A path in the older high forest in Gedi. The nearest trunk is Combretum schumannii (Combretaceae), which is a dominating tree in this part. Many shrubs and lianas grow along the paths.

Fig. 6. The SW part of the younger forest in Gedi, where only shrubs are found. The species composition differs from the rest. The thorny trunk belongs to Zanthoxylum chalybeum (Rutaceae), which is found only here.

Fig. 7. A "grassy area" at the NW gate in Gedi. Three species typical for these areas are shown here: Justicia flava (Acanthaceae), Panicum maximum (Poaceae), both on the ground, and Clitoria ternatea (Papilionaceae) climbing to the left with white flowers.

Fig. 8. The eastern border of Gedi forest. It is very sharp here, with no sheltering shrubs between the forest and the fields. There are many lianas growing along the edge.

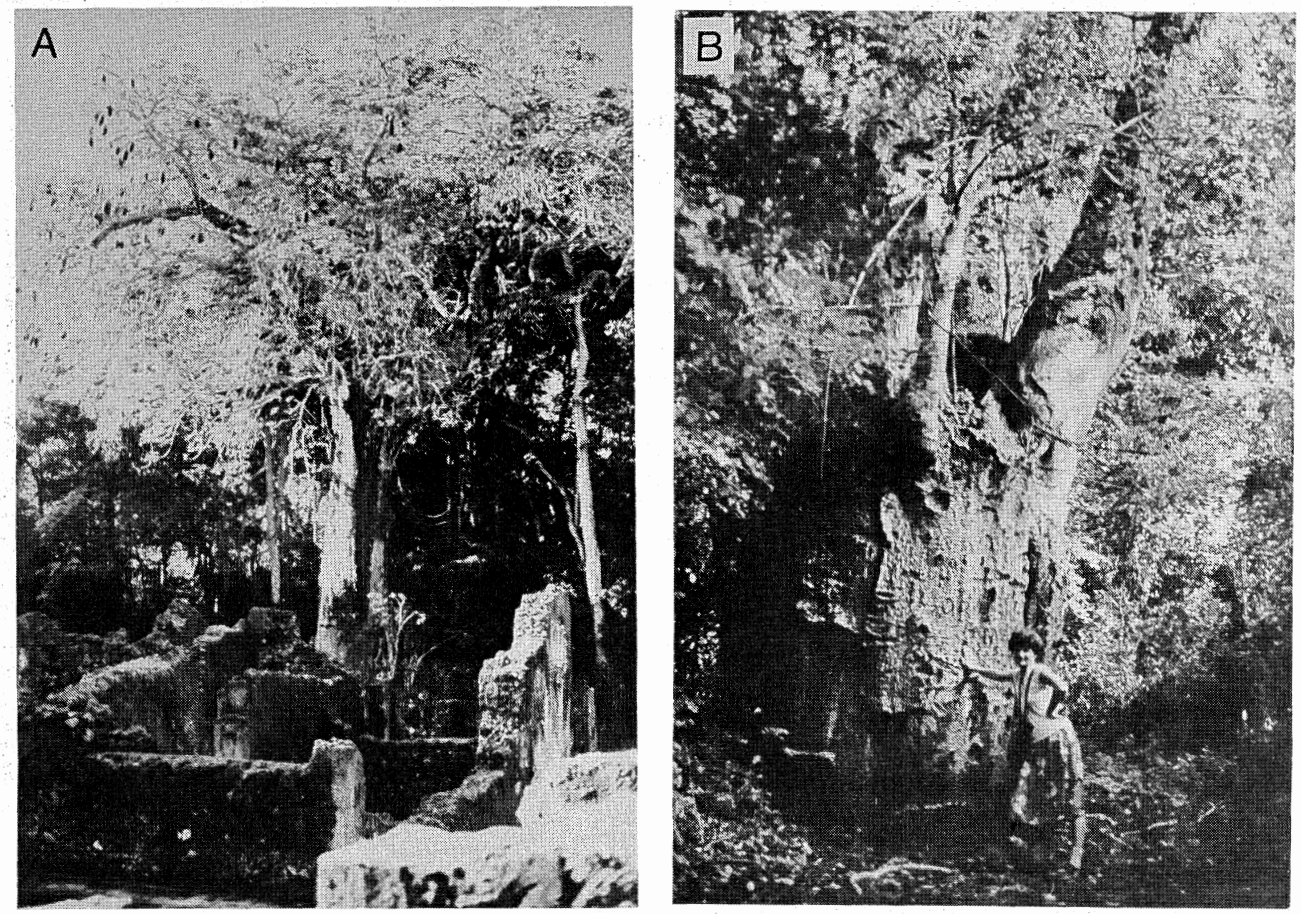


Fig. 9. Adansonia digitata (Bombacaceae). A: A tree left in the main ruin area. An Adenium obesum (Apocynaceae) growing at its base. B: The biggest Adansonia in the forest.

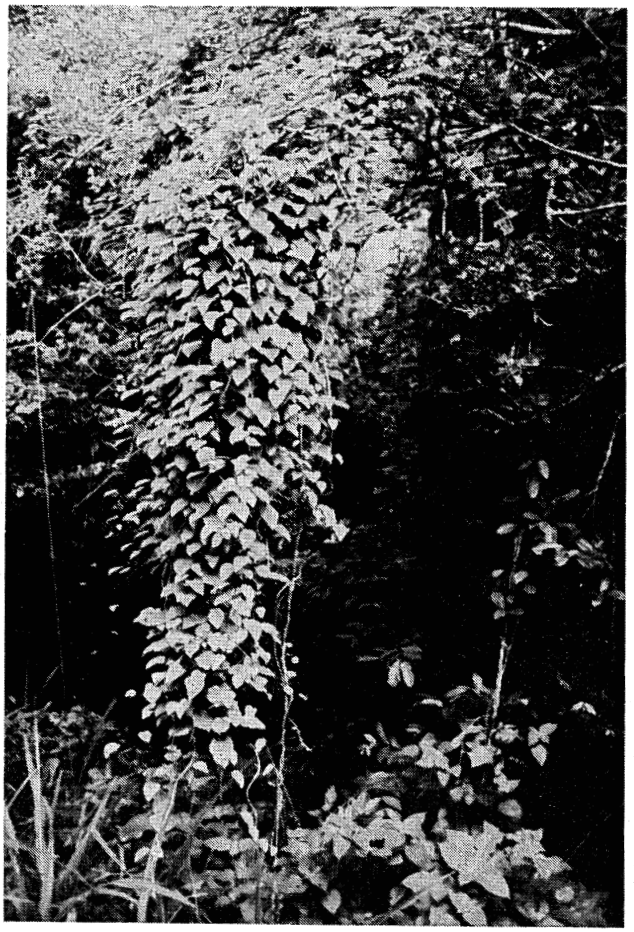

Fig. 10. Tinospora oblongifolia (Menispermaceae), a common liana in Gedi. Here it grows at the edge of an open "grassy area".

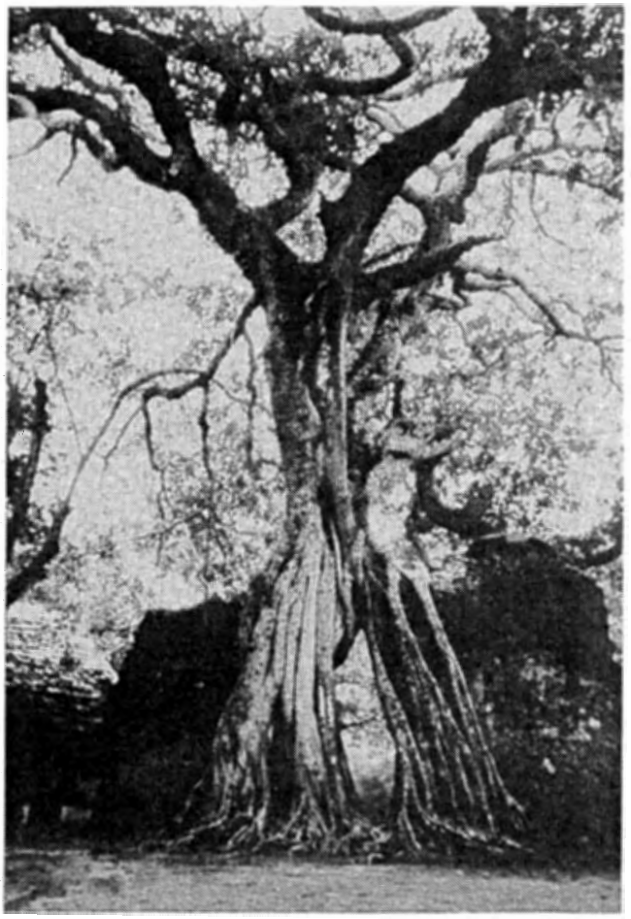

Fig. 11. Ficus bussei (Moraceae) is one of the common trees in Gedi. This spectacular tree is visited by the tourists.

Fig. 12. Cussonia zimmermannii (Araliaceae) as a one meter high sapling growing along a path in Gedi. It is a common tree here.

Fig. 13. Capparis sp. nov? aff. C. sepiaria coll. (Capparaceae), only one specimen found. (Evidence of the inadequately investigated coastal flora.)



Fig. 14. Adenia gummifera var. gummifera (Passifloraceae). A: The liana covering a tree on the edge of the forest (see Fig. 8). B: Fruits (x 0,6).

Fig. 15. Gathering information to the nature trail. The traditional healer (to the right) explains the uses and names of different plants to our interpreter (to the left).

## FOREST TYPES ON THE KENYAN COAST

Different vegetation types in Kenya is shown in Fig. 1. It is assumed that the country has now lost 75% of its original forest. Left today is mostly a mosaic structure of forest remnants and grasslands.

### Classification of coastal forests

Not many scientists have classified the coastal vegetation structures. In 1939 Dale described various forest types, but unfortunately nothing directly applicable to Gedi. Twenty years later Moomaw (1960) made a study of the plant ecology of the coastal region but nothing is written on the forest type in Gedi.

Description of littoral and fossil coral flora was made by Birch (1961). There are some similarities between the forests he described and Gedi even though they are situated south of Mombasa, are closer to the seashore, and have a higher rainfall.

Hawthorne has recently (1984, unpublished) divided coastal species into "major ecogeographic categories", where the ecological distribution of the species can be traced. From these categories some conclusions can be drawn on what foresttype the species in Gedi represent.

Some of the forest-types described by the above authors are listed below (Table 2). The pattern of coastal vegetation has changed drastically due to increased human population pressure since Moomaw's publication in 1960.

Table 2. Different classifications of coastal vegetation in Kenya.

| Forest types | | | Ecogeographic elements |
|---|---|---|---|
| Dale (1939) | Moomaw (1960) | Birch (1961) | Hawthorne (1985) |
| lowland rainforest | lowland rainforest | - | moist forest generalists |
| evergreen dry forest | lowland dry forest | - | dry forest elements |
| savanna woodland | lowland woodland | - | - |
| secondary scrub on coastal sands | lowland dry forest on coral rag | forest on fossil coral rag | - |
| - | - | - | maritime-riverine elements |

## Lowland moist forest

This type is described by Dale and Moomaw as rainforest but is better described as moist forest. With a rainfall of 1000 mm/year and a dry season that is longer than 3 months, it does not qualify as a true rainforest (Richards, 1966). The soils are in general quite infertile. They are classed as yellow-red loomy sands (podzolic soils).

Many subtypes are found here. All are dense, rich in woody species, with a poor field layer. The composition of those forests are complex and many different species compositions are mentioned by Dale and Moomaw. Since the similarities with Gedi are very low we will not present any species lists here.

This type of forest has been greatly reduced in area and is left only in a few forest reserves and in sacred forests (kayas).

Shimba Hills is a hill-valley forest south of Mombasa. It is not completely protected, though some of it has the state of forest-reserve. It has been proposed as national park - mainly because of its faunal elements, but also the vegetation is of great value. Mrima Hill (south of Shimba) is a volcanic complex with scattered patches of moist forest on the slopes. Witu forest is situated in the northern part where rainfall is lower, less than 800 mm/year, but because of an extremely high ground-water table the species composition is the same as in the moist forest. There, as well as in Shimba Hills, the forest department is responsible for the protection of the forest. The kayas are examples of small patches of remnant forests. Some of them have a special flora because they grow on lime- or sandstone.

## Lowland dry forest and lowland woodland

These types have been described by both Dale and Moomaw. There is no clear difference between these types, and they are thus treated under the same heading.

The DRY FOREST is essentially confined to the Magarini sand soils or dark-red loamy soils. The rainfall seldom exceeds 880 mm/year. The tree canopy is not very dense and the field layer is well developed, but grasses are sparse.

The main canopy trees are: Cynometra webberi (Caesalpiniac.), Manilkara sulcata (Sapotac.) and Brachylaena hutchensii (Asterac.). The understorey is dominated by Croton pseudopulchellus (Euphorbiac.), Memecylon verruculosum (Melastomatac.) and Notobuxus obtusifolius (Buxac.).

The LOWLAND WOODLAND (Miombo) developes on freely drained sands and has a broad climatic limit. The rainfall is between 600-1000 mm/year. The forest is open, the field layer is dominated by grasses, and the trees have an acacia-like form. Dominating trees are Afzelia quanzensis, Brachystegia spiciformis and Trachylobium verrucosum (all belonging to Caesalpiniac.)

Arabuko Sokoke, the biggest remaining coastal forest, has a mixture of the two forest types described. This forest once extended hundreds of kilometers along the East African coast. It has now been reduced to 360 km of which only 30 km is protected as a forest reserve (Myers, 1982). Parts of it have been cut down and are planted with softwoods like Eucalyptus and Casuarina.

The forest department is trying to avoid future cutting of natural vegetation in the forest. Logging in the virgin forest for planting softwoods is not prohibited, but pit-sawing is the regular forestry method. Illegal cutting occurs, but to what extent is unclear. All the biggest trees are gone. It is not known if the natural regeneration is sufficient for maintaining the species composition.

Arabuko Sokoke is said to be a possible Pleistocene refuge (Myers, 1982), a hypothesis based on the so called "refuge theory". In the late Pleistocene there seems to have been a number of semiarid and arid phases during which the tropical forests were restricted to a few isolated areas. In these islands of vegetation (refuges) many new species developed as a result of smaller populations. At the time when wetter conditions returned, the forest-cover spread again to stretch right across the African continent. The refuges are recognised today by their great number of endemic species. Because of its richness in species, especially endemic, Arabuko Sokoke might once have been such a refuge.

The forest is proposed as a Biosphere Reserve by UNESCO and different experts (Myers, 1982). A preliminary check-list of Arabuko-Sokoke is found in Appendix 2.

## Forest on coral rag

Most of the vegetation on the coral soil was destroyed a long time ago. Because of its high fertility the land has been cultivated. Moomaw stated that the only area left was approximately 150 km large, situated south of Mida Creek. Dale never recognized this type. He considered that the coral rag carried secondary vegetation. Birch (1961) described some forest patches on coral (see Appendix 3).

The rainfall is between 1100-1400 mm/year. The soil is described as coral rag, which is similar to Terra Rossa and Rendzina.

Birch describes this forest-type: "The general form of these forests is of tall clean-boled trees unbranched until two thirds of the way up. Shrubs are common on the edges and in thinner parts, but rarer where the forest is denser. The sparseness of shrub and floor cover would give an easy walk were it not for the roughness of the coral."

The main canopy trees are Antiaris toxicaria (Morac.), Chlorophora excelsa (Morac.), Combretum schumannii (Combretac.), Cussonia zimmermannii (Araliac.), Lecaniodiscus fraxinifolius (Sapindac.), Sorindeia obtusifoliolata (Anacardiac.) and Trichilia emetica (Meliac.).

The two forests mentioned by Birch are Jadini and Shimoni and nothing is mentioned about their protection.

Ecogeographic elements

W.D.Hawthorne has divided the species on the coast into different ecogeographic elements (1985, unpublished). We have found 68 of the Gedi species defined in that list. The diagram in Fig. 16 shows the distribution among four different main groups: dry forest elements (D), moist forest generalists (M), maritime-riverine elements (LX) and heliophiles (H). The main groups are further divided into smaller groups, but we only present the sub-groups within the maritime-riverine elements. There we find a difference between dry edaphic maritime-riverine elements (LD), moist edaphic maritime-riverine elements (LM) and other maritime-riverine elements (L). According to Hawthorne the first sub-group is characteristic for coral rag.

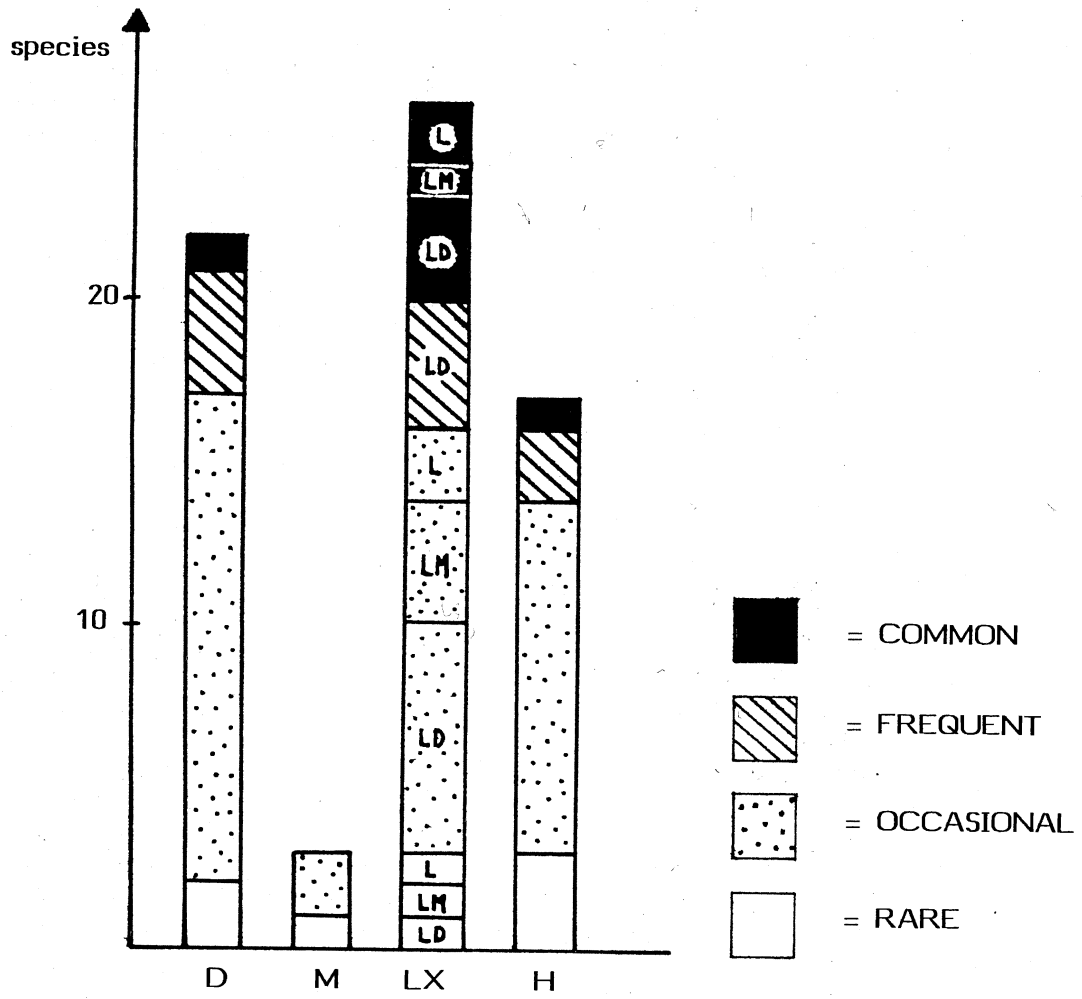


Fig. 16. 68 (out of 211) species in Gedi divided into different ecogeographic groups. D = dry forest elements, M = moist forest generalists, LX = maritime-riverine elements, LD = dry edaphic m.-r. elements, LM = moist edaphic m.-r. elements, L = other m.-r. elements, H = heliophiles. (From Hawthorne, 1984.)

The above concerns only a sample of species from the forest, but there are still some trends to be seen. If we include the division between dry and moist maritime-riverine elements, we find that the vegetation seems to be rather dry. It is also obvious that maritime-riverine elements dominate the forest. The amount of species is highest among these elements, and five of the common species belong to this group. There are many heliophiles in the forest. Heliophiles are light-requiring species which indicate heavy forest disturbances. Most of the heliophiles in Gedi have a low frequency, which could be a sign of the restricted areas of disturbances.

## The state of Gedi forest

The coastal forests are quite heterogenous both in structure and in floristic composition. They are believed to have become isolated as a consequence of climatic changes since Miocene (Hawthorne, 1981). The human influence has had and has bad consequences both on the flora and on the extension of the forests.

The vegetation surrounding Gedi when the town was built is not known. It is not very likely that people would build a town inside a forest so the landscape was probably open woodland or grassland, perhaps grazed. Forest types similar to Arabuko-Sokoke and the present Gedi forest could not have been far away. The development of a forest in the abandonned town was dependent on the distance to those surrounding forests, and also on the population biology (dispersal rate, establishment ability, etc.) of the species in them.

The age of Gedi forest is very difficult to estimate. It is probably not as old as the possible maximum age, 350 years. No stumps from old trees were found, nor any big slow-growing trees. There are many fast growing trees (soft-woods). The oldest trees in Gedi are probably between 100-200 years old and the forest about the same age. The outer, lower forest is much younger, and has probably been cut several times. Left untouched this part will probably develop into a more mature forest.

Gedi has few similarities with true dry forests, like Arabuko-Sokoke. Species dominance, forest structure and soil conditions are quite different, though they have many species in common and both have a low abundance of epiphytes. The moist forests show even less resemblance with Gedi. Most similarities seem to be found in Shimoni and Jadini forests, though they are situated over 250 km away, south of Mombasa. Probably a homogenous forest-type existed all along the coast on the coral.

We think that Gedi has good chances to develop from the present secondary forest to a natural forest if the present protection is maintained. The final appearance of the forest is difficult to predict, mainly because of lack of surrounding original vegetation, but the similarities to the Shimoni and Jadini forests (see description "Forest on coral rag" in this paper and Appendix 3) make the development of Gedi into that kind of forest very probable. Many factors are of importance for the succession: the protection of the forest and population biology and population genetics of the concerned species. No more excavations should be allowed. (There have been discussions about excavating the town totally, but the plans seem to have changed.)

Many further studies should be made on the succession of Gedi forest. The division into one older and one younger part gives an advantage in vegetational studies. The dynamic and changes of these two parts can be observed parallell, both with quantitative and qualitative analyses. The knowledge of the development in secondary forests is especially important today when there are fewer and fewer original forests left.

## USEFUL PLANTS - THE VALUE OF RECORDING THEM

There are plants with medicinal uses all around the world. Today they are being forgotten with the establishment of synthetically produced medicines through companies. In the developed countries Man can perhaps do without the knowledge of different medicinal plants, but in the developing countries the situation is different. Modern medicines are mostly imported and not available for everyone.

In Africa there are certain traditional healers who have a great knowledge of the plants around them. They still play an important role, although modern medicine is more and more established. With the "western influence" this profession is threatened, because less and less younger people want to take over and learn the old uses of plants. This, together with the fact that species are disappearing in the rapid deforestation, makes the registration of medicinal plants and their uses very urgent.

There is a lot of information to gather among different groups of people in the whole of Africa. The discovery of interesting species can hopefully rescue them from extinction. They can perhaps be utilized for producing medicines within the country, which would decrease the dependency of import from other countries. Medicines new for science against different diseases might also be found.

With the investigation of traditionally used plants other aspects than medicinal are important, too. Locally used edible plants could be improved through breeding into new indigenous crops more adapted to their environment. Mentioned elsewhere in this report ("Introduction") is the importance of indigenous trees in plantations, etc.

## THE NATURE TRAIL

Gedi National Monument is visited by about 30 000 people each year because of its historical interest. Teachers often bring their classes there. The statistics from 1982 shows that classes from 24 primary schools, 8 secondary schools and 7 colleges visited Gedi during that year.

Gedi is a nice place for walks and recreation, and it makes an excellent environment for biological education. This is the reason for preparing the nature trail and the booklet. The children living on the coast will get to know trees which they might have heard of from their elders but perhaps never seen. Gedi is one of the few places where a forest with traditionally known trees is left.

## Laying the Nature Trail

Through the management of Gedi National Monument we contacted an old traditional healer living just outside the forest. He is well-known to the people living in the area. His mother-tounge is Kigiriama, but he knows Kiswahili as well. With the manager of the ruins (whose mother-tounge is Kiswahili) as an interpreter we walked through the forest (see Fig. 15). We got the local names and uses of 80 plants and from those we chose the 37 most common or interesting trees and shrubs for the nature trail. To be sure of the correctness we checked these 37 species with another Giriama traditional healer.

After having marked the trees we found a person, Mr Lugogo, who could draw the different species for us. We had the species identified in Nairobi and gathered more information about them from different books.

The preparation of name plates for the trees and the printing of the booklet will be taken care of by the National Museums of Kenya. The staff at Gedi National Monument are informed about the nature trail and will look after it currently.

The Nature Trail booklet is presented in Appendix 4.

## ANIMAL LIFE IN GEDI

Gedi forest is an important environment for different animals. Some investigations have already been made on birds, bush baby and the golden rumped elephant shrew but there are still other interesting animal groups to study.

There are monkeys (Sykes monkey) which are dependent on the forest. Sometimes smaller antilopes are seen, even if they are not always there. Lizards are common, and many different snakes live in the forest. In the ruins burrow-living snakes thrive. It is also an ideal place for many tree-snakes.

We noticed many species of insects and spiders in the forest. As far as we know, nothing is being done on the insect fauna. Probably many new records could be made in this forest as it is a unique environment in the area.

As the forest serves as an isolated refuge for different animal species, it would be of great value to investigate the fauna. That would also give a clue to what forest-patches of this size really can contain.

## IMPORTANCE OF BIOLOGY EDUCATION AND RESEARCH IN KENYA

The problems connected with conservation of the vegetation in Kenya are very complex. One important group which will have influence on the future is the school-children. It is important that they become aware of what is happening in their country. The "green movement" in Kenya today is a good sign. As mentioned in the introduction, it is important not to forget the indigenous flora. The schools play a significant role with their possibilities to inform coming generations about these matters. It is also important that social and global problems connected with deforestation are discussed in the schools.

But as the situation is today this does not seem to be enough. The vanishing vegetation in Kenya is very little known. New species are found all the time. The distribution and ecology of the plants have not been much investigated. Like in all the developing countries, there is a lack of botanists and ecologists in Kenya. Especially the coastal flora is unsufficiently known. There are not enough botanists working there to be able to record it before it may all be gone. The remnant forests would have better chances of being saved, if more resources were given to the biology departments in the country.

An important form of development aid is to educate Kenyan biologists parallell with support to the projects for investigation and conservation of nature. It would be of great value for the developing countries if the foreign experts could be gradually substituted by native ones. But not only scientific training of people is needed, also some form of employment offered after their studies. These are wishes which deserve to become better fullfilled than they are today.

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APPENDIX 1

A CHECK-LIST OF GEDI FOREST

Plants collected by Karin Gerhardt and Mariette Steiner in the forest on Gedi National Monument in May 1985.
The frequency is divided into four categories: C = common, F = frequent, O = occasional and R = rare.

| Species | Frequency |
|---|---|
| ACANTHACEAE | |
| Asystasia gangetica (L.) Anders. | O |
| Ecbolium auriculatum C.B.Cl. | R |
| Justicia flava Vahl | O |
| Pseuderanthemum hildebrandtii Lindau | F |
| AMARANTHACEAE | |
| Celosia schweinfurthiana Schinz. | O |
| Cyathula cf. cylindrica Moq. | O |
| Psilotrichum scleranthum Twaits | F |
| Pupalia lappacea (L.) Juss. var.velutina (Moq.) Hook.f. | R |
| AMARYLLIDACEAE | |
| Scadoxus multiflorus (Martyn) Raf. | O |
| ANACARDIACEAE | |
| Lannea cf. greenwayi Kokwaro | O |
| L. schweinfurthii (Engl.) Engl. var. stuhlmannii (Engl.) Kokwaro | O |
| ANNONACEAE | |
| Asteranthe asterias (S. Moore) Engl. & Diels var. asterias | O |
| Monanthoxis fornicata (Baill.) Verdc. | O |
| Monodora grandidieri Baill. | R |
| Polyceratocarpus sp. nr. schefferi Engl. | O |
| Uvaria cf. acuminata Oliv. | O |
| Uvaria lucida Benth. ssp.lucida | O |
| Uvariodendron kirkii Verdc. | O |
| Xylopia parviflora (A. Rich.) Benth. | O |
| APOCYNACEAE | |
| Adenium obesum (Forssk.) R. & S. | O |
| Ancylobothrys petersiana (Kl.) Pierre | F |
| Hippocratea aff. volkensii Loes. | O |
| Tabernaemontana elegans (Stapf) Stapf | O |
| Thevetia peruviana (Pers.) K. Schum. | O |
| ARACEAE | |
| Gonatopus boivinii (Decne) Engl. | O |
| ARALIACEAE | |
| Cussonia zimmermannii Harms | F |
| ARECACEAE | |
| Hyphaene coriacese Gaertn. | O |
| ASCLEPIADACEAE | |
| Dregea rubicunda K. Schum. | O |
| D. sp. | O |
| D. sp. | O |
| Gymnema sylvestre R. Br. | O |
| Sarcostemma viminale (L.) R. Br. ssp. viminale | O |
| Secamone parviflora (Oliv.) Bullock | O |
| S. punctulata Decne | O |
| Unidentified (sterile) | O |
| ASTERACEAE | |
| Launaea cornuta (Oliv. & Hiern) C. Jeffrey | O |
| Tridax procumbens L. | O |
| BALANITACEAE | |
| Balanites wilsoniana Dawe & Sprague | R |
| cf. B. aegyptiaca (L.) Del. | R |
| BIGNONIACEAE | |
| Kigelia africana (Lam.) Benth. | O |
| BOMBACACEAE | |
| Adansonia digitata L. | C |
| BORAGINACEAE | |
| Cordia ovalis R. Br. ex DC. | R |
| Ehretia bakeri Britt. | R |
| Ehretia petiolaris Lam. | R |
| BURSERACEAE | |
| Commiphora sp. | R |
| CAESALPINIACEAE | |
| Afzelia quanzensis Welw. | O |
| Cassia afrofistula Brenan | O |
| Cordyla africana Lour. | R |
| Delonix regia (Boj. ex Hook.) Raf. | O |
| Tamarindus indica L. | C |
| CAPPARACEAE | |
| Cadaba farinosa Forssk. ssp. adenotricha (Gilg & Ben.) A. Rich. | R |
| Capparis cf. erythrocarpus Isert var. rosea (Klotzsch) De Wolf | R |

| | |
|---|---|
| C. erythrocarpus Isert | |
| cf. var. rosea (Klotzsch) De Wolf | R |
| C. sepiaria L. var. stuhlmannii (Gilg) De Wolf | C |
| C. sp. nov.? aff. C. sepiaria coll | R |
| C. tomentosa Lam. | O |
| Maerua triphylla A. Rich | |
| var. pubescens (Klotzsch) De Wolf | O |
| Thylachium thomasii Gilg | O |
| | |
| CELASTRACEAE | |
| Elaeodendron schlechteranum (Loes.) Loes. | R |
| Hippocratea africana (Willd.) Loes. | O |
| Salacia cf. madagascariensis (Lam.) DC. | O |
| S. elegans Welw. ex Oliv. | R |
| S. stuhlmannia Loes. | O |
| | |
| COMBRETACEAE | |
| Combretum cf schumannii Engl. | R |
| C. schumannii Engl. | C |
| Terminalia spinosa Engl. | O |
| | |
| COMMELINACEAE | |
| Commelina benghalensis L. | O |
| C. sp. | R |
| C. sp. nr. imberbis Hassk. | O |
| | |
| CONVOLVULACEAE | |
| Ipomoea pes-tigridis L. var. pes-tigridis | R |
| Jacquemontia paniculata (Burm.f.) Hall.f. | R |
| | |
| CUCURBITACEAE | |
| Coccinia grandis (L.) Voigt | O |
| Eureiandra "sp. A" F.T.E.A. | R |
| Kedrostis leloja (J.F. Gmel.) C. Jeffrey | R |
| Momordica trifoliata Hook.f. | O |
| Unidentified (sterile) | O |
| | |
| CYPERACEAE | |
| Cyperus rotundus L. | O |
| Mariscus dubius Rottb. | O |
| M. d. Rottb. cf. ssp. macrocephalus (C.B.Cl) K. Lye | O |
| | |
| DIOSCOREACEAE | |
| Dioscorea asteriscus Burkill | C |
| D. dumetorum (Kunth) Pax | O |
| | |
| EBENACEAE | |
| Diospyros abyssinica (Hiern) F. White | O |
| D. squarrosa Klotzsch | O |
| Euclea natalensis A.DC. | O |
| | |
| ERYTHROXYLACEAE | |
| Erythroxylon emarginatum Thonn. | F |

| | |
|---|---|
| EUPHORBIACEAE | |
| Acalypha fruticosa Forssk. | O |
| Alchornea laxiflora (Benth.) Pax & K. Hoffm. | O |
| Bridelia cathartica Bertol.f. | O |
| B. c. Bertol.f. ssp. melanthesoides (KC.) Leonard | O |
| Croton cf. menyhartii Pax | R |
| C. talaeporos A.R. Smith | R |
| Drypetes natalensis (Harv.) Hutch. | O |
| D. n. (Harv.) Hutch. var. leiogyne Brenan | O |
| D. reticulata Pax | C |
| Euphorbia granulata Forssk. | O |
| E. hirta L. | O |
| Phyllanthus aff. amarus Schum. & Thonn. | R |
| Suregada zanzibariensis Baill. | O |
| Tragia furialis Boj. | O |
| | |
| FLACOURTIACEAE | |
| Dovyalis abyssinica (A. Rich.) Warb. | F |
| D. cf. abyssinica (A. Rich.) Warb. | O |
| D. macrocalyx (Oliv.) Warb. | R |
| Ludia mauritiana Gmel. | O |
| Unidentified (sterile) | R |
| | |
| HERNANDIACEAE | |
| Gyrocarpus americanus Jacq. | C |
| | |
| HYPERICACEAE | |
| Vismia orientalis Engl. | R |
| | |
| ICACINACEAE | |
| Pyrenacantha kaurabassana Baill. | R |
| | |
| LAMIACEAE | |
| Hoslundia opposita Vahl | R |
| Plectranthus sp. | R |
| Plectranthus flaccidus Guerke | R |
| | |
| LILIACEAE | |
| Asparagus sp. | R |
| Gloriosa minor Rendle | R |
| G. superba L. | R |
| | |
| LOGANIACEAE | |
| Strychnos madagascariensis Poir. | R |
| | |
| LORANTHACEAE | |
| Tapinanthus sp. = Archer 442, Magogo & Glover 968 | O |
| | |
| MALPHIGIACEAE | |
| Acridocarpus zanzibaricus (Boj. ex Loud.) Juss. | O |
| | |
| MALVACEAE | |
| Abutilon mauritianum (Jacq.) Medic. | O |
| Hibiscus micranthus L.f. | R |
| H. sp. | R |

| | |
|---|---|
| Thespesia danis Oliv. | R |
| MELIACEAE | |
| Azadirachta indica A. Juss. | O |
| Trichilia emetica Vahl | O |
| Turrea sp. | R |
| MENISPERMACEAE | |
| Jateorhiza palmata (Lam.) Miers | F |
| Tinospora oblongifolia (Engl.) Troupin | C |
| MIMOSACEAE | |
| Acacia brevispica Harms | F |
| Dichrostachys sp. | R |
| MORACEAE | |
| Antiaris toxicaria (Rumph. ex Pers.) Lesch. | O |
| Ficus bussei Warb. ex Mildbr. & Burret | F |
| F. sansibarica Warb. | O |
| F. sp. nov.? | O |
| NYCTAGINACEAE | |
| Boerhavia diffusa L. | O |
| OPILIACEAE | |
| Opilia cf. celtidifolia (Guill. & Perr.) Walp. | O |
| ORCHIDACEAE | |
| Angraecum dives Rolfe | O |
| PAPILIONACEAE | |
| Canavalia cathartica Thouars | O |
| cf. C. cathartica Thouars | O |
| Clitoria ternatea L. | O |
| Dalbergia melanoxylon Guill. & Perr. | O |
| Erythrina sacleuxii Hua | R |
| Indigofera trita L.f. | |
| var. subulata (Poir.) Ali | R |
| I. vohemarensis Baill. | O |
| Lonchocarpus bussei Harms | O |
| Lonchocarpus laxiflorus Guill. et Perr. | O |
| Ormocarpum sennoides (Willd.) DC. | |
| ssp. zanzibaricus Brenan & Gillet | O |
| Rynchosia sp. | R |
| Vigna sp. | O |
| V. sp. | O |
| V. sp. | O |
| PASSIFLORACEAE | |
| Adenia cf. gummifera (Harvey) Harms var. gummifera | C |
| POACEAE | |
| Brachiaria deflexa (Schumach.) Robyns | O |
| Digitaria velutina (Forssk.) P. Beauv. | O |
| Echinochloa colona (L.) Link | O |
| Eragrostis aspera (Jacq.) Nees | O |
| Oplismenus sp. | O |
| Panicum deustum Thunb. | O |
| P. maximum Jacq. | O |
| Setaria sagittifolia (A. Rich.) Walp. | R |
| Tragus berteronianus Schult. | O |
| POLYGALACEAE | |
| Carpolobia goetzei Guerke | O |
| POLYGONACEAE | |
| Oxygonum atriplicifolium (Meisn.) Martel. | R |
| RHAMNACEAE | |
| Berchemia discolor (Klotzsch) Hemsl. | R |
| Scutia myrtina (Burm.f.) Kurz | O |
| Ziziphus mucronata Willd. | O |
| RUBIACEAE | |
| Canthium phyllantoideum Baill. | O |
| Feretia apodanthera Del. ssp. keniensis Bridson | F |
| Heinsia crinita (Afzel.) G. Tayl. | O |
| Meyna tetraphylla (Hiern) Robyns | |
| ssp. comorensis (Robyns) Verdc. | O |
| Oldenlandia lancifolia (Schumach.) DC. | O |
| Oxyanthus zanguebaricus (Hiern) Bridson | O |
| Pavetta stenosepala K. Schum. var. stenosepala | O |
| Pentas bussei K. Krause | O |
| Polysphaeria multiflora Hiern | O |
| P. m. Hiern ssp. multiflora | O |
| Psychotria punctata Vatke var. punctata | F |
| Rytigynia bugoyensis (K. Krause) Verdc. ssp. bugoyensis | O |
| Rytigynia sp. nr eickii (K. Sch. & K. Kr.) Bullock | O |
| Tarenna supra-axillaris (Hemsl.) Bremek | O |
| T. s. (Hemsl.) Bremek ssp. supra-axillaris | F |
| Trianolepis africana Hook.f. | |
| ssp. hildebrandtii (Vatke) Verdc. | O |
| Tricalysia ovalifolia Hiern | F |
| T. o. Hiern var. glabrata (Oliv.) Brenan | F |
| Vangueria cf. tomentosa Hochst. | R |
| RUTACEAE | |
| Teclea simplicifolia (Engl.) Verdoorn | O |
| T. trichocarpa (Engl.) Engl. | F |
| Zanthoxylum chalybeum Engl. | O |
| Z. holtzianum (Engl.) Waterm. | O |
| SALVADORACEAE | |
| Azima tetracantha Lam. | F |
| Salvadora persica L. | O |
| S. p. L. var. persica | O |
| SAPINDACEAE | |
| Allophyllus alnifolius (Bak.) Radlk. | R |
| Deinbollia borbonica Scheff. | O |

| | |
|---|---|
| Haplocoelum cf. trigonocarpum Radlk. | F |
| H. trigonocarpum Radlk. | F |
| Lecaniodiscus fraxinifolius Bak. ssp. scassellatii (Chiov.) Fries | C |
| Lepisanthes senegalensis (Poir.) Laenh. | R |
| **SAPOTACEAE** | |
| Manilkara sansibarensis (Engl.) Dubard | R |
| Mimusops fruticosa A.DC. | O |
| Sideroxylon inerme L. ssp. diospyroides (Baker) Hemsley | O |
| **SIMAROUBACEAE** | |
| Harrisonia abyssinica Oliv. | O |
| **STERCULIACEAE** | |
| Sterculia africana (Lour.) Fiori | O |
| S. appendiculata K. Schum. | O |
| S. rhynchocarpa K. Schum. | R |
| **TACCACEAE** | |
| Tacca leontopetaloides (L.) Ktze. | O |
| **THYMELAEACEAE** | |
| Synaptolepis kirkii Oliv. | O |
| **TILIACEAE** | |
| Carpodiptera africana Mast. | O |
| Grewia forbesii Mast. | O |
| G. plagiophylla K. Schum. | O |
| G. sp. | R |
| G. truncata Mast. | F |
| G. vaughanii Exell | O |
| **URTICACEAE** | |
| Pouzolzia fadenii Friis & Jellis | O |
| **VERBENACEAE** | |
| Clerodendron violaceum Guerke | R |
| Lantana camara L. | O |
| Vitex sp. nr. V. radula Pieper = V. de Meester 330 | O |
| V. strickeri Vatke & Hildebr. | O |
| **VITACEAE** | |
| Ampelocissus africana (Lour.) Merr. | O |
| Cissampelos pariera L. var. orbiculata (DC.) Miquel. | R |
| Cissus integrifolia (Bak.) Planch. | F |
| C. rotundifolia (Forssk.) Vahl | R |
| Cyphostemma sp. | O |
| C. sp. | O |
| C. sp. nr. adenocaule (A. Rich.) Wild & Drum. | O |

COMPLEMENT TO THE CHECK-LIST

Source: Faden, (a,b).

Cryptolepis hypoglauca K. Sch. (Asclepiadac.)
Jatropha multifida L. (Euphorbiac.)
Lannea amaniensis Engl. et Krause (Anacardiac.)
Mystroxylon aethiopicum (Thunb.) Loes. (Celastrac.)
Pleurostylia africana Loes. (Celastrac.)
Sorindeia madagascariensis DC. (Anacardiac.)

APPENDIX 2

A PRELIMINARY CHECK-LIST OF ARABUKO-SOKOKE FOREST

Sources: Lucas (1968), Simpson (1984). * indicates species found in Gedi.

ACANTHACEAE
*Asystasia gangetica (L.) T. Anders.
Blepharis maderaspatensis (L.) Roth
Crossandra pungens Lindau
Crossandra stenostachya (Lindau) C.B.Cl.
Hygrophila auriculata (Schum.) Heine
Hypoestes verticillaris (Linn.f.) Roem. et Schult.
Justicia sp. A (in Agnew: Upland Kenya Wild Flowers, London 1974)
Ruellia patula Jacq.
Sclerochiton holstii (Lindau) C.B.Cl.

AIZOACEAE
Gisekia pharnaceoides L.
Gisekia pharnaceoides L. var. pharnaceoides
Glinus oppositifolius (L.) A.DC.

AMARANTHACEAE
Aerva lanata (L.) Schultes
Gomphrena celosioides Mart.
Psilotrichum scleranthum Thw.

ANACARDIACEAE
Lannea schweinfurthii (Engl.) Engl. var. acutifoliolata (Engl.) Kokwaro
*Lannea schweinfurthii (Engl.) Engl. var. stuhlmannii (Engl.) Kokwaro
Ozoroa obovata (Oliv.) R. et A. Fernandes

ANNONACEAE
*Asteranthe asterias (S.Moore) Engl.
*Monodora grandidieri Baill.
*Uvaria acuminata Oliv.
Uvaria dielsii R.E.Fr.
Xylopia arenaria Engl.

APOCYNACEAE
*Adenium obesum (Forssk.) Roem. et Schult.
*Ancylobothrys petersiana (Kl.) Pierre
Carissa tetramera Stapf
Hunteria zeylanica Thw. var. africana (K. Schum.) P.M. Pichon
Landolphia kirkii Dyer
Saba comprensis (DC.) Pichon
Schizozygia coffaeoides Baill.
*Tabernaemontana elegans Stapf

ARACEAE
Amorphophallus sp. nr. A. stuhlmannii Engl. and Gerhm
*Gonatopus boivinii (Decne) Engl.

ASCLEPIADACEAE
Cryptolepis apiculata K. Schum.
Sarcostemma sp.
*Sarcostemma viminale (L.) R. Br.
Secamone sp. = ? Brenan et Gillet 14679
Secamone sp. = Jeffrey 171 et 344, Greenway 10821

ASTERACEAE
Achyrothalamus marginatus O. Hoffm.
Ageratum conyzoides L.
Brachylaena hutchinsii Hutch.
Eclipta prostrata (L.) L.
Gutenbergia cordifolia Benth.
Gutenbergia cordifolia (Oliver) S. Moore
Gutenbergia pembensis S. Moore
*Launea cornuta (Oliv. et Hiern) C. Jeffrey
Notonia abyssinica A. Rich.
Pluchea dioscoridis DC.
Pluchea sordida (Vatke) Oliv. et Hiern
*Tridax procumbens L.
Vernonia hildebrandtii Vatke
Vernonia homilantha S. Moore
Vernonia sp. nr. V. jugalis Oliv. et Hiern
Vernonia zanzibarensis Lees.

BORAGINACEAE
*Ehretia bakeri Britten
Ehretia litoralis Guerke
Heliotropium steudneri Vatke
Heliotropum ? pectinatum Vaupel

BUXACEAE
Notobuxus obtusifolia Mildbr.

CAESALPINIACEAE
*Afzelia quanzensis Welw.
Brachystegia spiciformis Benth.
Cassia abbreviata Oliv.
Cassia mimosoides L.
Cynometra webberi Baker
Dialium orientale Bak.f.
Hymenaea verrucosum (Gaertn.) Oliv.
Jubelnardia magnistipulata (Harms) Troupin
Trachylobium verrucosum (Gaertn.) Oliv.

CAPPARACEAE
Boscia angustifolia A. Rich. var. angustifolia
Cadaba farinosa Forssk. ssp. farinosa
*Capparis sp. nr C. tomentosa Lam.
Cladostemon kirkii (Oliv.) Pax et Ilg
Cleome briquetii Polhill
Cleome usambarica Pax
Maerua kirkii (Oliv.) F. White
Maerua macrantha Gilg
*Maerua triphylla A. Rich. var. pubescens (Kl.) De Wolf

Ritchiea capparoides (Andr.) Britten
Ritchiea capparoides (Andr.) Britten var. capparoides
*Thylachium thomasii Gilg

CELASTRACEAE
Elaeodendron schweinfurthianum (Loes.) Loes.
Maytenus mossambicensis (Klotzsch) Blakelock var. ruber (Harv.) Blakelock
Maytenus undatus (Thunb.) Blakelock
Mystroxylon aethiopica (Thunb.) Loes.
Pleurostylia africana Loes.
Salacia madagascariensis (Lam.) DC.

CLUSIACEAE
Garcinia livingstonei T. Anders.

COMBRETACEAE
Pteliopsis myrtifolia (Laws.) Engl. et Diels
Quisqualis littorea (Engl.) Exell
Terminalia kilimandscharica Engl.

COMMELINACEAE
Aneilema petersii (Hassk.) C.B.Cl.
Aneilema petersii (Hassk.) C.B.Cl. ssp. petersii
Commelina africana L.
*Commelina imberbis Hassk.

CONNARACEAE
Byrsocarpus boivinianus (Baill.) Schellenb.
Byrsocarpus orientalis (Baill.) Bak.
Ellipanthus hemandradenioides Brenan

CONVULVULACEAE
Evolvulus alsinoides (L.) L.
Ipomea aquatica Forssk.
Ipomea cairica (L.) Sweet
Ipomea garckeana Vatke
Ipomea irwinae Verdc.
Jacquemontia ovalifolia (Vahl) Hall.f.
Jacquemontia tamnifolia (L.) Griseb.
Merremia tridentata (L.) Hall.f. ssp. alatipes (Dammer) Vatke

CRASSULACEAE
Kalanchoe lateritia Engl.

CRUCIFERAE
Brassica integrifolia (West) Rupr.

CUCURBITACEAE
?Coccinia trilobata (Cogn.) C. Jeffrey
Momordica boivinii Baill.

CYPERACEAE
Cyperus exaltatus Retz.
Cyperus tenax Boeck.
Mariscus macropus C.B.Cl.
Pycreus polystachyos (Rottb.) Beauv.

DILLENIACEAE
Tetracera litoralis Gilg

EBENACEAE
Diospyros natalensis (Harv.) Brenan
Euclea fruticosa Hiern

EUPHORBIACEAE
*Acalypha fruticosa Forssk.
Antidesma membranaceum Muell. Arg.
Antidesma venosum Tul.
Croton pseudopulchellus Pax
Cyathogyne bussei Pax
*Drypetes natalensis (Harv.) Hutch.
*Drypetes natalensis (Harv.) Hutch. var. leiogyne Brenan
Erythrococca kirkii (Muell. Arg.) Prain
Jatropha prunifolia Pax
Mallotus oppositifolius (Geisler) Muell. Arg.
Oldfieldia somalensis (Chiov.) Milne-Redhead
Phyllanthus kaessneri Hutch. var. kaessneri
Phyllanthus pinnatus (Wt.) Webster
Phyllanthus stolzianus Pax et K. Hoffm.
*Suregada zanzibariensis Baill.

FLACOURTIACEAE
*Ludia mauritiana Gmel.
Ludia sessiliflora Lam.

FLAGELLARIACEAE
Flagellaria guineensis Schum.

HYPERICACEAE
Vismia orientalis Engl.

ICACINACEAE
Apodytes dimidiata E. Mey. ex Arn.
Pyrenacantha kaurabassana Baill.

LAMIACEAE
Becium sp A. of Upland Flora
Endostemon gracilis (Benth.) Ashby
Ocimum basilicum L.
Orthosiphon parvifolius Vatke
Plectranthus tenuifolius Vatke
Tinnea aethiopica Kotschy et Peyr. ssp. litoralis Vollesen

LENTIBULARIACEAE
Utricularia inflexa Forssk.

LILIACEAE
Asparagus falcatus L. var. falcatus
Scilla sp. nr. S. kirkii Baker

LINACEAE
Hugonia castaneifolia Engl.

LOGANIACEAE
Mostuea brunonis Dir. var. brunonis
Strychnos panganensis Gilg
Strychnos spinosa Lam.

LORANTHACEAE
Tapinanthus aurantiacus (Engl.) Danser

LYTHRACEAE
Lawsonia inermis L.

MALPIGHIACEAE
*Acridocarpus zanzibaricus (Loud.) A. Juss.

MALVACEAE
Abutilon sp.
Gossypium kirkii (Mast.) J.B. Hutch.
Hibiscus cannabinus L.
*Hibiscus micranthus L. f.
Hibiscus panduriformis Burm.f.
Sida cordifolia L.
*Thespesia danis Oliv.

MELASTOMATACEAE
Memecylon melindense A. et R. Fernandes
Memecylon mouririifolium Brenan

MELIACEAE
Pseudobersama mossambicensis (Sim) Verdc.

MIMOSACEAE
Acacia adenocalyx Brenan et Exell
Acacia mellifera (Vahl) Benth. ssp. mellifera
Acacia nilotica Del. ssp. subalata (Vatke) Brenan
Mimosa pigra L.

MYRTACEAE
Eugenia sp. nov. aff. E eschersoniana

OCHNACEAE
Ochna mossambicensis Klotzsch
Ochna thomasiana Engl. et Gilg

OLACACEAE
Ximenia ? americana L.
Ximenia caffra Sond.

OLEACEAE
Jasminum meyeri-johannis Engl.
Jasminum parvifolium Knobl.

OPILIACEAE
Rhopalopilia umbellulata (Baill.) Engl.

ORCHIDACEAE
Aerangis sp.

PAPILIONACEAE
Craibia brevicaudata (Vatke) Dunn ssp. brevicaudata
Crotalaria laburnifolia L.
Crotalaria retusa L. var. tunguensis (Lima)
Crotalaria sp.
Indigofera sp.
Indigofera tinctoria L.
*Indigofera trita L.f. var. subalata (Poir.) Ali
Lablab purpureus (L.) Sweet
*Lonchocarpus bussei Harms
Macrotyloma uniflorum (Lam.) Verdc. var. verrucosum Verdc.
Mundulea sericea (Willd.) A. Chev.
Ormocarpum kirkii S. Moore
Rhynchosia velutina Wight et Arn. var. velutina

PASSIFLORACEAE
*Adenia gummifera (Harvey) Harms var. gummifera
Adenia sp.
Schlechterina mitostemmatoides Harms

POACEAE
Brachiaria lindiensis (Pilg.) W.D. Clayton
Cenchrus mitis Anderss.
Cynodon dactylon (L.) Pers.
Digitaria argyrotricha (Anderss.) Chiov.
Echinochloa haploclada (Stapf) Stapf
Eragrostis ciliaris (L.) R. Br.
Eragrostis superba Peyr.
Megastachya mucronata (Poir.) P. Beauv.
Perotis hildebrandtii Mez
Sacciolepsis curvata (L.) Chase

POLYGALACEAE
*Carpolobia goetzei Guerke
Polygala sphenoptera Fresen.

POLYGONACEAE
Polygonum salicifolium Willd.

POLYPODIACEAE
Phymatodes scolopendria (Burm.f.) Ching

RHIZOPHORACEAE
Cassipourea euryoides Alston

RUBIACEAE
Agathisanthemum bojeri Klotzsch
Canthium glaucum Hiern ssp. glaucum
Canthium keniense Bullock

Canthium mombazense Baill.
Canthium ? zanzibaricum Kl. ssp. zanzibaricum
Chassalia parvifolia K. Schum.
Chassalia umbraticola Vatke
*Heinsia crinita (Afzel.) G. Taylor
Kohautia virgata (Willd.) Brem.
Oldenlandia affinis (Roem. et Schult.) DC.
Pavetta uniflora Brem.
*Pentas bussei Krause
Pentodon pentandrus (Schum.) Vatke
Pentodon pentandrus (Schum. et Thonn.) Vatke var. minor Bremek
*Polyshpaeria parvifolia Hiern
Psychotria amboniana K. Schum.
Psychotria amboniana K. Schum. var. amboniana
Rotmannia fischeri (K. Schum.) Bullokc ex. Oberm.
Rotmannia whitfieldii (Lindl.) Dandy
Rytigynia amaniensis (K. Krause) Bullock
Rytigynia oligocantha (K. Schum.) Robyns
Rytigynia parvifolia Verdc.
Rytigynia sp. nr. R. microphylla (K. Schum.) Robyns
Tarenna nigrescens (Hook.f.) Hiern
*Trichalysia ovalifolia Hiern
*Trichalysia ovalifolia Hiern var. glabrata (Oliv.) Brenan

RUTACEAE
*Tecles trichocarpa (Engl.) Engl.
*Zanthoxylum ? chalybeum Engl.
*Zanthoxylum holtzianum (Engl.) Waterm.

SAPINDACEAE
Allophylus pervillei Blume
*Deinbollia borbonica Scheffl.
*Lecaniodiscus fraxinifolius Bak.

SAPOTACEAE
*Manilkara sansibarensis (Engl.) Dubard
Manilkara sulcata (Engl.) Dubard
*Mimusops fruticosa Bojer ex DC.

SCROPHULARIACEAE
Buchnera hispida Buch.-Ham.
Torenia thouarsii Kuntze

SIMAROUBACEAE
*Harrisonia abyssinica Oliv.

SOLANACEAE
Solanum incanum L.

STERCULIACEAE
Hermania exappendiculata (Mast.) K. Schum.
Melochia corchorifolia L.
Nesogordonia parvifolia (M.B. Moss) R. Capuron
Waltheria indica L.

TACCACEAE
*Tacca leontopetaloides (L.) O. Ktze.

THYMELEACEAE
Gnidia latifolia (Oliv.) Gilg
*Synaptolepis kirkii Oliv.

TILIACEAE
Grewia ectasicarpa S. Moore
Grewia holstii Burrett
*Grewia plagiophylla K. Schum.
Grewia stuhlmannii K. Schum.
*Grewia vaughanii Exell
Triumfetta rhomboidea Jacq.

ULMACEAE
Trema orientale (L.) Bl.

VERBENACEAE
Clerodendrum glabrum E. Mey.
*Lantana camara L.
Lantana viburnoides (Forssk.) Vahl
Phyla nodiflora (L.) Greene
Vitex ferruginea Schumach. et Thonn.

VIOLACEAE
Hybanthus enneaspermus L.
Hybanthus enneaspermus (L.) F.V.Muell. var. diversifolius Grey-Wilson

VITACEAE
Cyphostemma hildebrandtii (Gilg) Descoings

APPENDIX 3

PRELIMINARY CHECK-LISTS OF JADINI AND SHIMONI FORESTS -on coral rag (S. Kenya)

Source: Birch (1961). * indicates species found in Gedi.

## CANOPY TREES

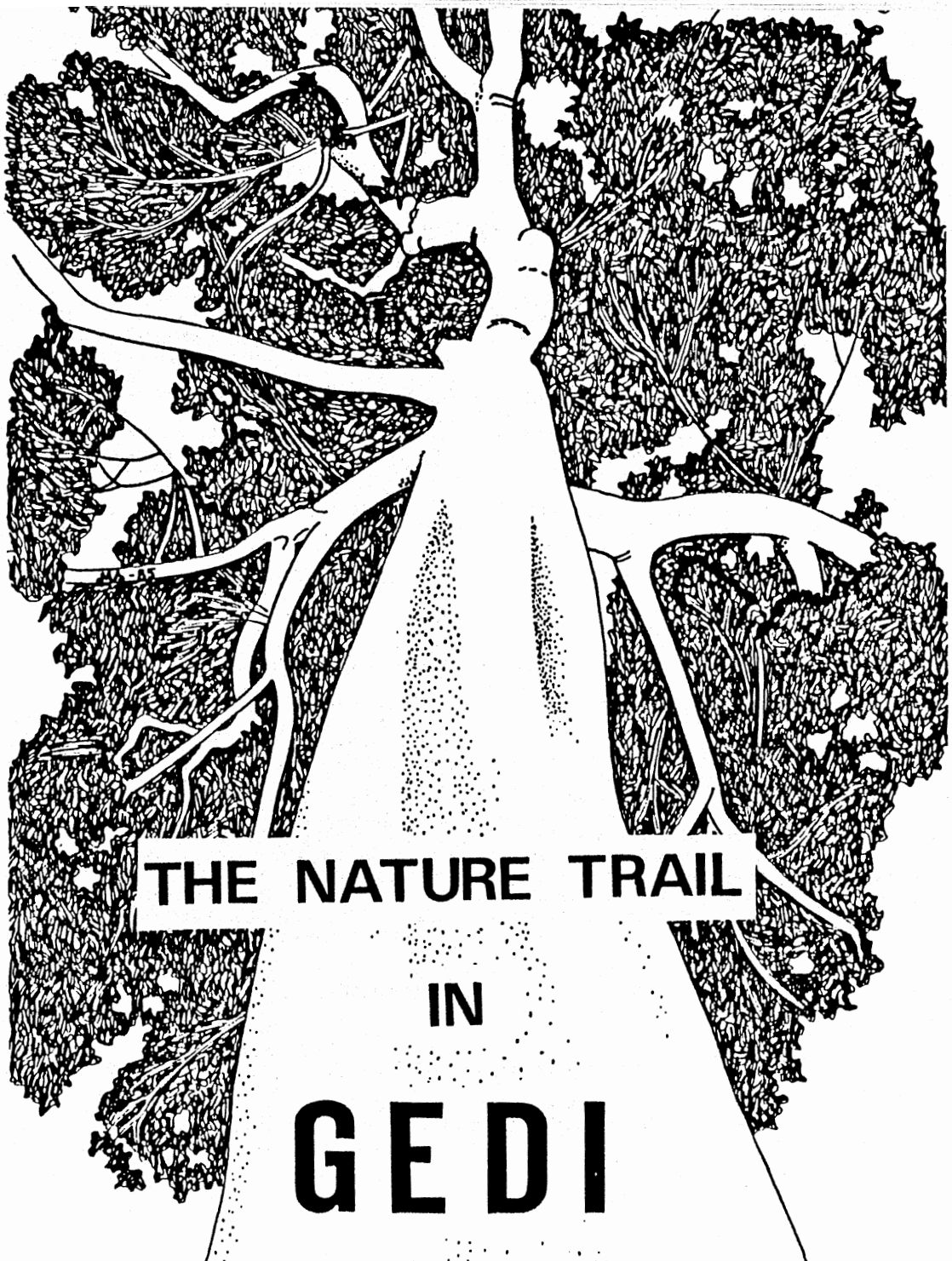
| Shimoni | Jadini |
|---|---|
| *Adansonia digitata L. (Bombac.) | *Antiaris toxicaria (Rumph. ex Pers.) Lesch. (Morac. |
| *Antiaris toxicaria (Rumph. ex Pers.) Lesch. (Morac.) | Chlorophora excelsa (Welw.) Benth. et Hook.f. (Morac.) |
| Chlorophora excelsa (Welw.) Benth. et Hook.f. (Morac.) | *Combretum shumannii Engl. (Combretac.) |
| *Cussonia zimmermannii Harms (Araliac.) | Sorindeia obtusifoliolata Engl. (Anacardiac.) |
| *Erythrina sacleuxii Hua (Papilionac.) | *Trichilia emetica Vahl (Meliac.) |
| *Lecaniodiscus fraxinifolius Bak. (Sapindac.) | |
| Sorindeia obtusifoliolata Engl. (Anacardiac.) | |
| Terminalia kilimandscharica Engl. (Combretac.) | |
| *Trichilia emetica Vahl (Meliac.) | |

## UNDERSTOREY

| Shimoni | Jadini |
|---|---|
| *Alchornea laxiflora (Benth.) Pax et K. Hoffm. (Euphorbiac.) | *Asteranthe asterias (S. Moore) Engl. et Diels (Annonac.) |
| *Cussonia zimmermannii Harms (Araliac.) | Cassipourea euryoides Alston (Rhizophorac.) |
| Chytranthus sp. aff. obliquinervis Radlk. (Sapindac.) | Hunteria zeylanica Gard. ex Thw. var. africana (K. Schum.) M. Pichon (Apocynac.) |
| Hunteria zeylanica Gard. ex Thw. var. africana (K. Schum.) M. Pichon (Apocynac.) | Pleurostylia africana Loes. (Celastrac.) |
| Majidea zanguebarica Kirk. ex Oliv. (Sapindac.) | Sorindeia obtusifoliolata Engl. (Anacardiac.) |
| *Sideroxylon inerme L. ssp. diospyroides (Bak.) (Sapotac.) | Xylopia holtzii Engl. (Annonac.) |
| Sorindeia obtusifoliolata Engl. (Anacardiac.) | |

## SHRUBS

| Shimoni | Jadini |
|---|---|
| *Afzelia quanzensis Welw. (Caesalpiniac.) | Enneastemon fornicatus (Baill.) Exell (Annonac.) |
| Barleria prionitis L. (Acanthac.) | *Feretia apodanthera Del. (Rubiac.) |
| *Bridelia cathartica Bertol. f. ssp. melanthesoides (Klotzsch) J. Leonard (Euphorbiac.) | Ludia sessiliflora Lam. (Flacourtiac.) |
| Caesalpinia volkensii Harms (Caesalpiniac.) | Mallotus oppositifolius (Geisler) Muell. Arg. (Euphorbiac.) |
| Chasalia umbraticola Vatke (Rubiac.) | Markhamia zanzibarica (Boj. ex DC.) K.Schum. ex Engl. (Bignoniac.) |
| *Diospyros squarrosa Klotzsch (Ebenac.) | Mildbraedia carpinifolia (Pax) Hutch. (Euphorbiac.) |
| Enneastemon fornicatus (Baill.) Exell (Annonac.) | Millettia usaramensis Taub. (Papilionac.) |
| *Erythroxylum emarginatum Thonn. (Erythroxylac.) | *Monodora grandidieri Baill. (Annonac.) |
| *Haplocoelum inoploeum Radlk. (Sapindac.) | Ochna thomasiana Engl. (Ochnac.) |
| Ludia sessiliflora Lam. (Flacourtiac.) | Rinorea arborea (Thou.) Baill. (Violac.) |
| Macphersonia hildenbrandtii O. Hoffm. (Sapindac.) | Suregada zanzibariensis Baill. (Euphorbiac.) |
| Mallotus oppositifolius (Geisler) Muell. Arg. (Euphorbiac.) | *Teclea simplicifolia (Engl.) Verdoorn (Rutac.) |
| Markhamia zanzibarica (Boj. ex DC.) K.Schum. ex Engl. (Bignoniac.) | Uvaria leptocladon Oliv. (Annonac.) |
| Maytenus sp. aff. ovatus (Wall. ex Wight et Arn.) Loes. (Celastrac.) | |
| *Polysphaeria multiflora Hiern (Rubiac.) | |
| *Pseuderanthemum hildenbrandtii Lindau (Acanthac.) | |
| Rhus natalensis Bernh. (Anacardiac.) | |
| Rytigynia oligacantha (K. Schum.) Robyns (Rubiac.) | |
| Salacia spp. (Celastrac.) | |
| Scolopoa aff. stuhlmannii Warb. et Gilg (Flacourtiac.) | |
| *Suregada zanzibariensis Baill. (Euphorbiac.) | |
| *Synaptolepis kirkii Oliv. (Thymelaeac.) | |
| Trianolepis hildenbrandtii Vatke (Rubiac.) | |
| Uvaria sp. aff. acuminata Oliv. (Annonac.) | |
| *Ziziphus mucronata Willd. (Rhamnac.) | |



# THE NATURE TRAIL IN GEDI

Front picture: Sterculia appendiculata
(by M. Steiner)

We wish to thank the director and curators of the National Museums of Kenya and everybody working at Gedi National Monument, especially Mr A.A. Mbwana, Mr M.J. Lugogo and Mzee Zimba. We are also grateful to the Botanist in Charge, Ms C.H.S. Kabuye, and everybody working at the E.A. Herbarium in Nairobi; to Dr I. Hedberg and Prof. O. Hedberg at Uppsala University; and to Dr R.B. Faden, Mrs A.J. Faden, Mr N. Rollison, the Swedish International Development Authority and everybody else who has helped us in the work with this booklet.

A guide to

**THE NATURE TRAIL IN GEDI**

**by**
Karin Gerhardt
Mariette Steiner

**Illustrated by**
Mohammed J. Lugogo
Anne J. Faden

# INTRODUCTION

This booklet - "A Guide to the Nature Trail in Gedi" - is mainly intended for school-classes visiting Gedi Ruins but also for other interested persons. A map of the Nature Trail is given on the last page. The most common and widely used trees and shrubs are marked along the path.

This description of the Nature Trail refers to the situation in the rainy season in May. In the dry season the forest changes its character, some trees loose their leaves and many climbers disappear. We have mostly tried to get information from local people and Giriama traditional healers, but some information has been found in books as well.

We hope that this booklet will help to increase your interest in the trees of Kenya and, finally, wish you a pleasant walk in the forest.

**Tunawatakieni safari njema !**

## The forest as a community

Gedi Ruins are visited by many people because of their historical importance. But visitors are also impressed by the high forest growing on the ruins.

The massive trees stand like an island in the surrounding cultivated area and contain an interesting wildlife.

Why is forest important?

The forest shows a complex environment where many different animals and plants can find their own place to live. It prevents erosion and the forming of deserts. It provides man with many useful plants for building, medicine and food. But what will happen to this kind of vegetation in the future? The whole coast of Kenya used to be covered with forest. Today only small patches and some larger reserves remain. The increasing population places greater demands on land, wood and charcoal. If nothing is done today, what do you think Kenya will look like in twenty years time?

**"Plant one tree for every tree you cut!"**

You might have heard these important words. But does it matter what kind of tree we plant? Today many planted trees are foreign, like Pine and the Australian Eucalyptus. In the original forests there are trees which are well-adapted to Kenya´s environment. They also have many traditional uses. These trees will disappear if only foreign trees are planted, and the knowledge of their uses is vanishing with the elders.

**The forest around Gedi Ruins**

Gedi was abandoned for unknown reasons in the early 17th century. People feared the empty town, and forest trees started to grow between the houses. The forest probably remained undisturbed until 1948, when excavations started. Today it may give us a clue as to what the old surrounding forest looked like. There are no other forests in the area with the same species composition. The nearest one is Arabuko-Sokoke (west of the Mombasa-Malindi road) which has a fairly different appearance. Gedi is dominated by Combretum schumannii (no. 29) and Gyrocarpus americanus (no. 27) and is situated on old coral rag. This could be called a lowland semideciduous forest.

Gedi serves as a shelter for many animals. If you walk quietly and observantly you may see monkeys, squirrels, lizards, birds, snakes, insects and perhaps even the rare Golden Rumped Elephant Shrew. But watch out for the Safari Ants ("siafu") on the paths - they can bite!

## Botany

We have tried to avoid complicated botanical terms, but we would like to explain how botanists group the plants.

All plants of the same kind belong to the same **SPECIES**.

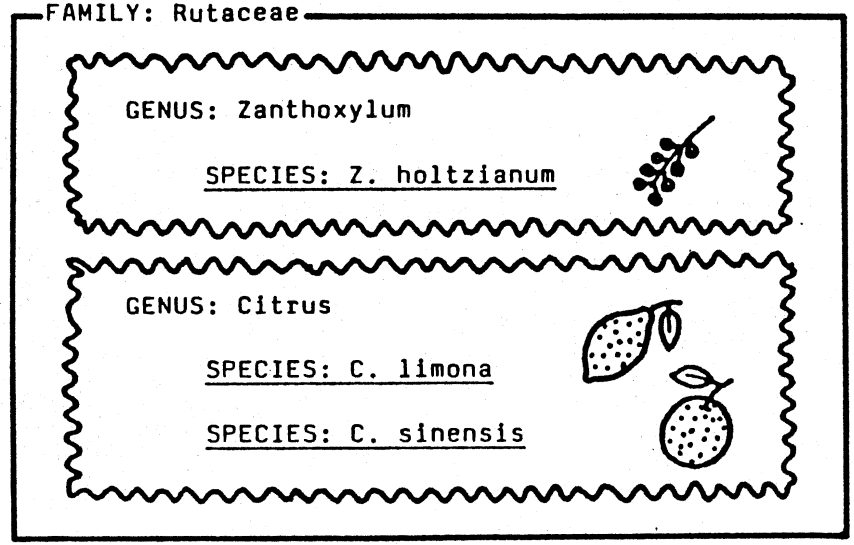
Lemon is one species: Citrus limona.

Another species is Orange: Citrus sinensis.

Because of their great similarity they belong to the same **GENUS**: Citrus.

A tree which smells like lemon but looks different is Zanthoxylum holtzianum (no.3).

The two genera Citrus and Zanthoxylum belong to the same **FAMILY**: Rutaceae - the lemon family.





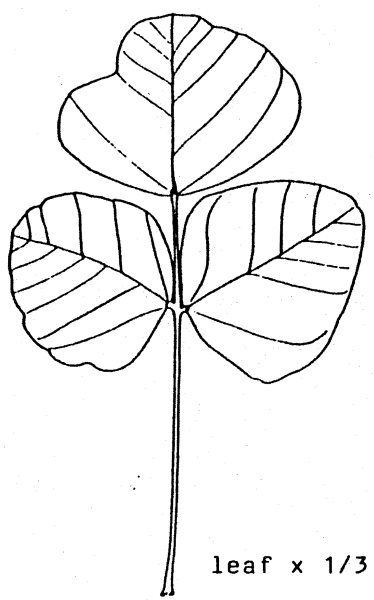



**No.1** **ERYTHRINA SACLEUXII**

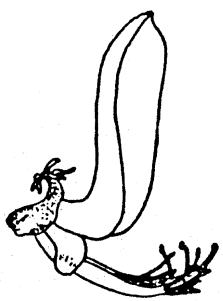
Local names: **Mulungu** (Kigir.), **Mbambangoma** (Kisw.)

Family: Papilionaceae

This tree belongs to the same family as the bean. It has knobs scattered on the trunk and the twigs are spiny. The flowers are big and red and the wood is used for timber and for making dhows (local boats). The traditional healers use the roots for curing coughs. The roots are boiled and the liquid extract is drunk.



leaf x 1/3



flower x 3/4

twig x 3/4

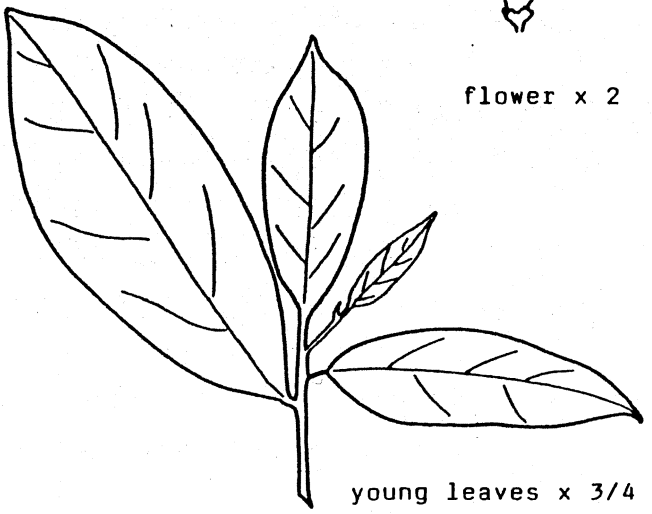
No.2 **DIOSPYROS SQUARROSA**

Local name: **Mpweke** (Kigir.,Kisw.)
Family: Ebenaceae

The tree is recognized by its slender trunk with flaking black bark and the narrow top. The leaves are covered with pink hairs when young and the wood is very supple. Carrying sticks can be made from the branches. The powdered roots can ease swellings such as infected wounds. The fruits are eaten by wild animals. The famous West African Ebony comes from various Diospyros species.

flower x 2

fruit x 2/3

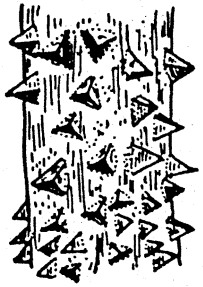


young leaves x 3/4

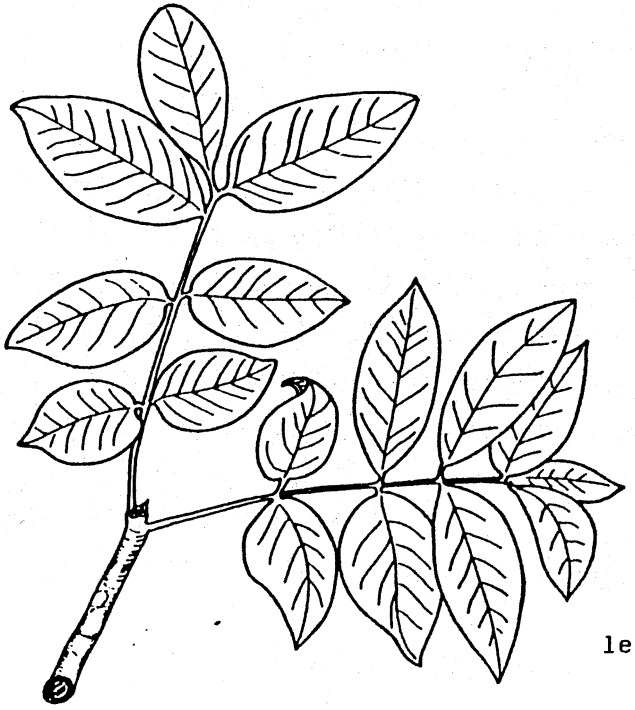
No.3 **ZANTHOXYLUM HOLTZIANUM**

Local names: **Mdungu** (Kigir.), **Mjafari** (Kisw.)
Family: Rutaceae

This is a rather frequent tree in Gedi, which is easily recognized by its conspicuous trunk covered with conical thorns. Its leaves smell strongly of lemon, and it also belongs to the same family. It can be used as a timber tree, and the traditional healers use the roots to cure coughs.



trunk



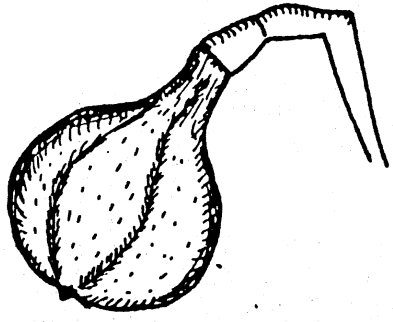
leaves x 3/4

## No.4 TRICHILIA EMETICA

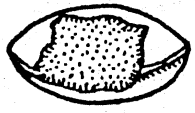
Local names: **Mgalana** (Kigir.), **Mnwamaji** (Kisw.)

Family: Meliaceae

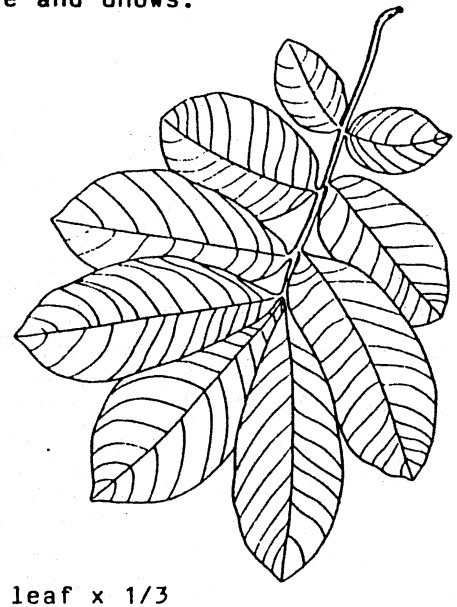
The fruits of this tree are fig-like in shape. When they open up, you can see the black and red seeds inside. The red cover is fleshy and called arillus. The seeds can be used for making soap, cooking oil and skin oil. They are eaten by some tribes in E. Africa. The bark has been used as a medicine, but since some people have died from the treatment one should be careful with this tree. The timber is good for making furniture and dhows.



fruit x 1



seed x 1



leaf x 1/3

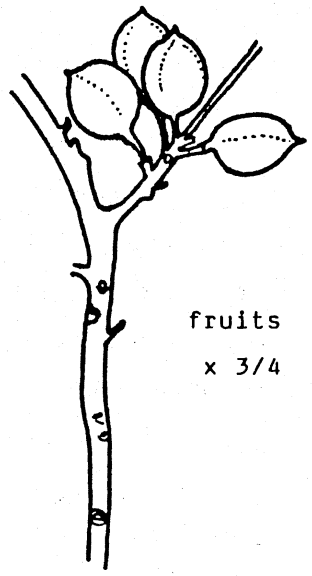


## No.5 HAPLOCOELUM TRIGONOCARPUM

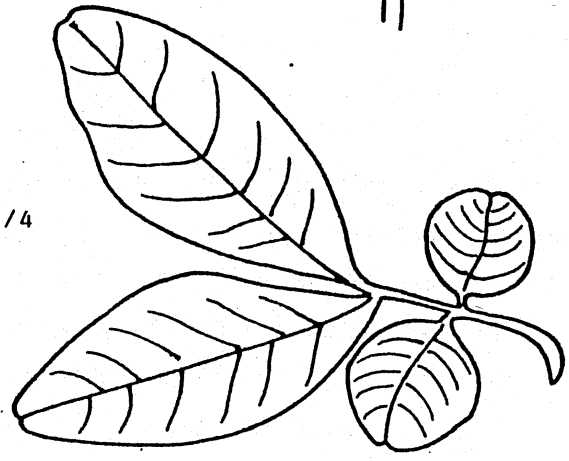
Local names: **Mfunga tsanzu** (Kigir.),
**Mfunga tanzu** (Kisw.)

Family: Sapindaceae

This is a common understorey tree in Gedi. The first pair of leaflets are much smaller than the second pair. That is how you recognize this genus. For separation of the species you must look at the fruits. On this tree they are more or less triangular. They are often eaten by birds and insects.



fruits
x 3/4



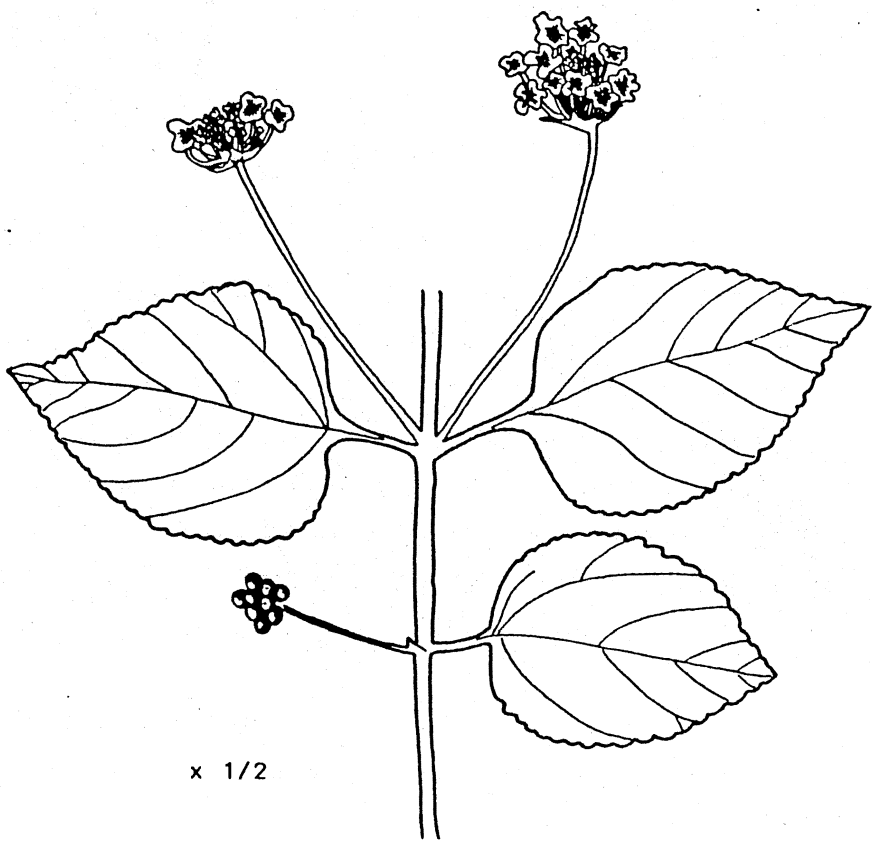
leaf x 3/4

No.6 **LANTANA CAMARA**

Local name: **Mshomoro** (Kigir., Kisw.)

Family: Verbenaceae

A number of plants that are very common throughout the tropics have their origin in a restricted area. When Man started to travel around the world, some plants spread with him, and found new places where they could grow. Sometimes they have won the battle for space and nutrients thus suppressing or killing the original plants.

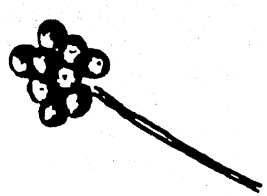


x 1/2

Lantana is one such aggressive plant. Originally it grew in South America. Today you can find it all over the tropics as a troublesome weed. When an area is cleared, the Lantana is one of the first shrubs to appear and start covering the soil. The dense shrub makes it difficult for other species to grow there, and the development of the original vegetation is disturbed. The occurrence of Lantana is a sign of disturbed areas where the original vegetation has been damaged (cleared forest, road-sides, urban areas, etc.)

The flowers are pinkish mauve, and some are tinted in orange and white. The fruits are black and are frequently eaten by children, but should be avoided since there are records of people being poisoned. Sometimes people grow the shrub as a hedge around their houses.

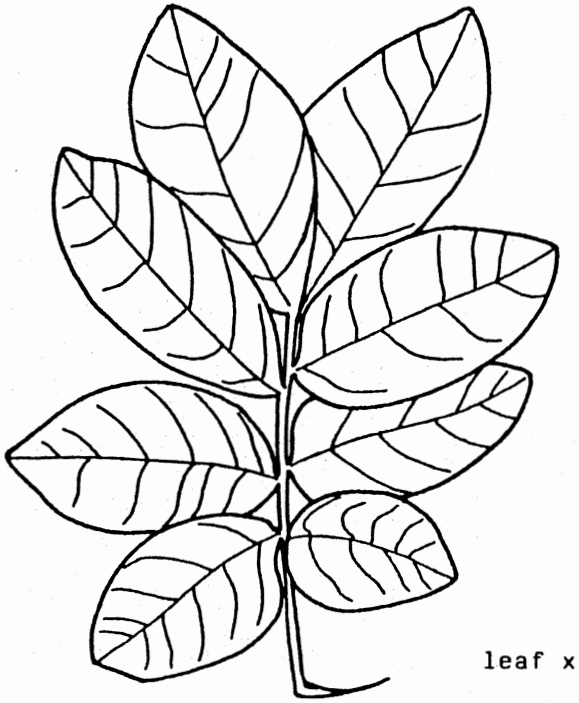
fruit x 1



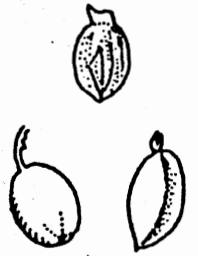
## No.7 LECANIODISCUS FRAXINIFOLIUS

Local names: **Mbelenga** (Kigir.), **Mkunguma** (Kisw.)
Family: Sapindaceae

The monkeys love the small fruits of this common tree here in Gedi. People sometimes call it the "monkey tree". The trunk and the branches are used for making poles. Extracts from boiled roots are sometimes used as medicin to ease ailments in pregnant women.



leaf x 3/4



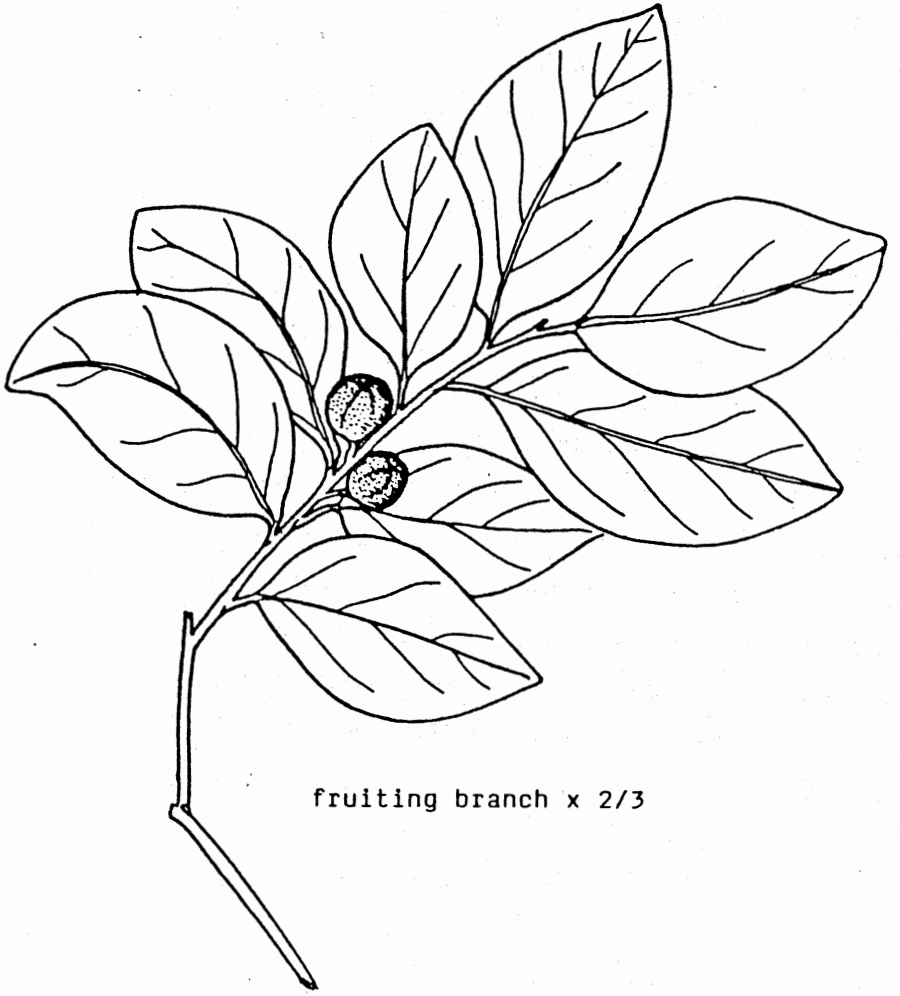
fruits x 3/4



## No.8 DRYPETES RETICULATA

Local name: **Mudhiale** (Kigir., Kisw.)
Family: Euphorbiaceae

This is also a fairly common tree here. It is used for making poles for house-building and charcoal. The fruits are velvety and yellow.



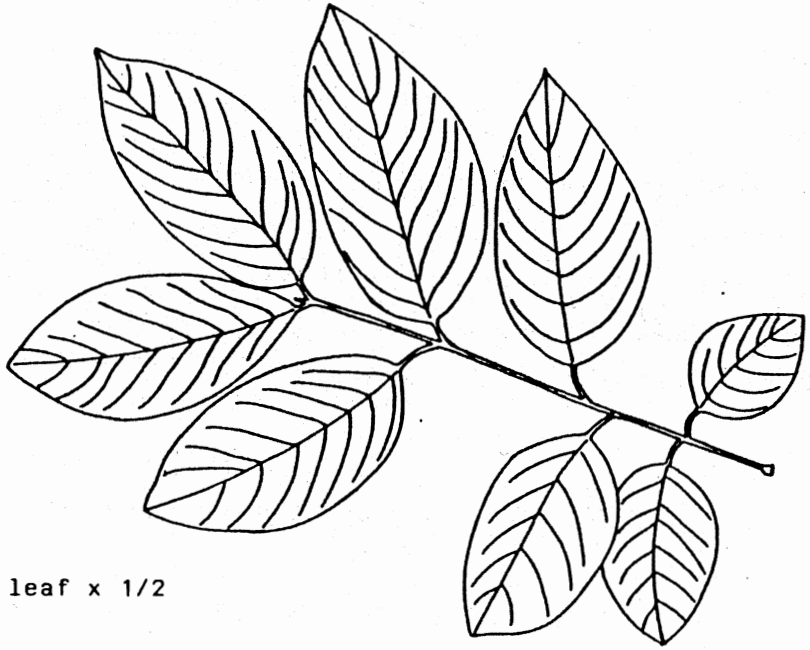
fruiting branch x 2/3

## No.9 BERCHEMIA DISCOLOR

Local name: **Mkulu** (Kigir., Kisw.)
Family: Rhamnaceae

Since this is a very big tree one would expect everything to be big on it. But the flowers are very small, and the easiest way to know if it is in flower or not , is to listen for the sound of the thousands of bees visiting the flowers. You can also find flowers lying on the ground.

The wood is hard and used for constructing doors and window-frames. It can also be used as firewood. The extract of the boiled leaves is used as a medicine for respiration problems.

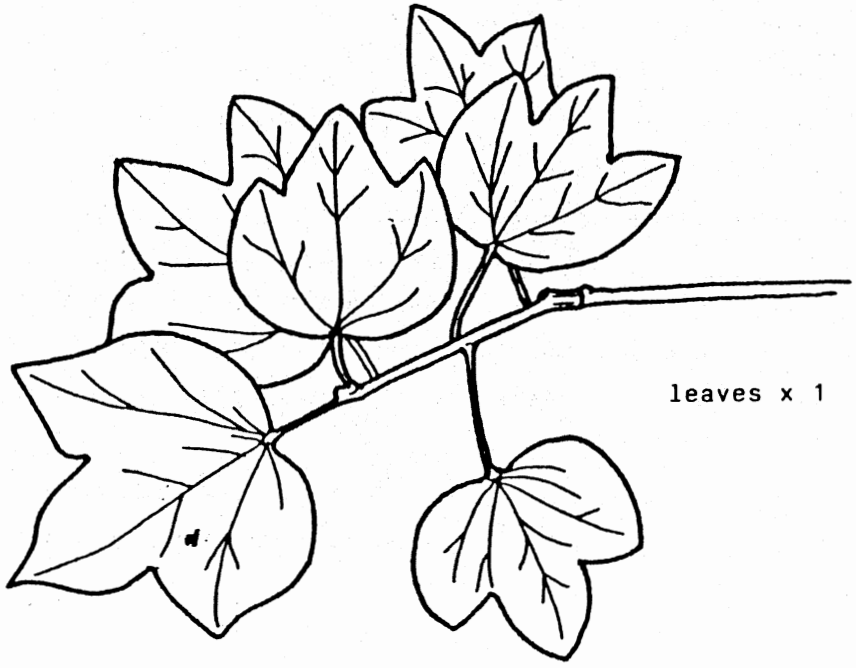


leaf x 1/2

## No.10 STERCULIA AFRICANA

Local names: **Morya** (Kigir.), **Mgoza** (Kisw.)
Family: Sterculiaceae

When a shamba (small cultivated field) is made, the area is cleared by burning. Traditionally the fire is started by rubbing twigs of this tree against each other. The tree has many branches and a flaky bark. The form of the leaves is rather unusual. The fibre of the inner bark is used for twining ropes. Leaves and roots of this species, mixed and boiled together with these of Ficus bussei (no.37) and Sterculia appendiculata (no.31) result in an extract which is a cure for malaria.

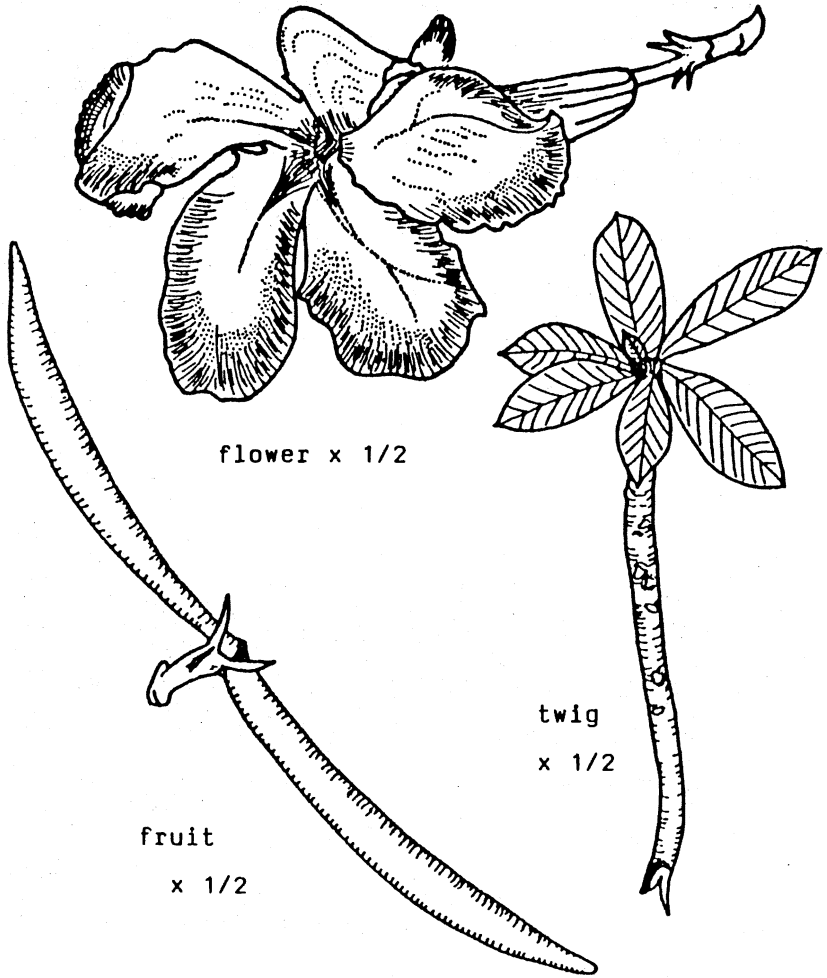


leaves x 1

Local names: **Mwadiga** (Kigir.), **Wanja** (Kisw.),
**Desert Rose** (Engl.)

Family: Apocynaceae

This popular shrub grows in rocky and sandy areas in Central and East Africa and is commonly planted. The





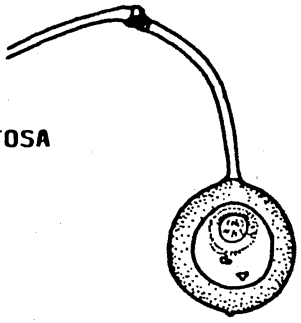

storing tissue, which explains why this plant can grow in places where there is little water.The flowers are beautifully coloured in pink and red. Its milky sap is poisonous. An arrow poison is obtained from the seeds and an extract from the roots is used as a fish poison. Traditional healers use the root to cure a disease in chickens called Kidere (Kigiriama).

**Now return along the Trail towards the North West Gate.**

## No.12 CAPPARIS TOMENTOSA

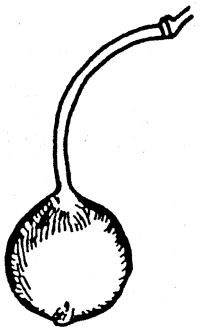
Local name: **Mgwada Paka** (Kigir.)

Family: Capparaceae



cut fruit
x 3/4

Look up along this crooked black trunk. Can you see its leaves on the top of the supporting tree? Capparis is a climber. At the base of every leaf there are two hooks whereby it clings to the nearest tree, following it upwards regardless of how tall it grows. The fruits look like round balls and have an inedible pink pulp inside.



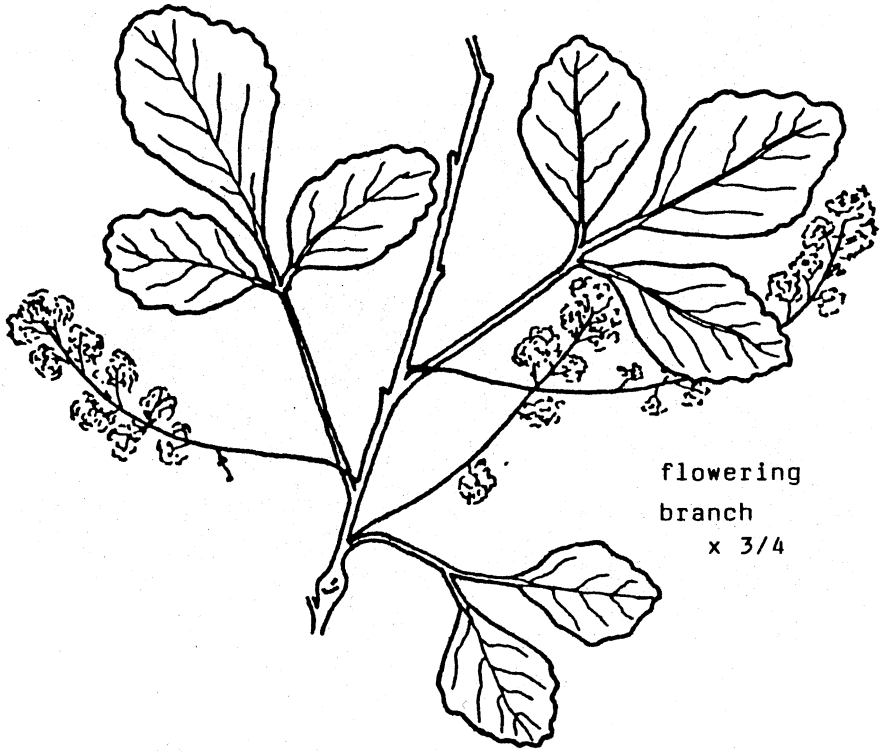
fruit x 3/4

## No.13 ALLOPHYLLUS ALNIFOLIUS

Local name: **Mbanda kondo** (Kigir.)

Family: Sapindaceae

This is an important shrub for the healers. The leaves are crushed, mixed with castor oil and applied on the head to cure headache. The roots are used to cure ailments in pregnant women. The creamy-white small flowers grow in clusters. The leaves are divided into three leaflets.



flowering branch x 3/4



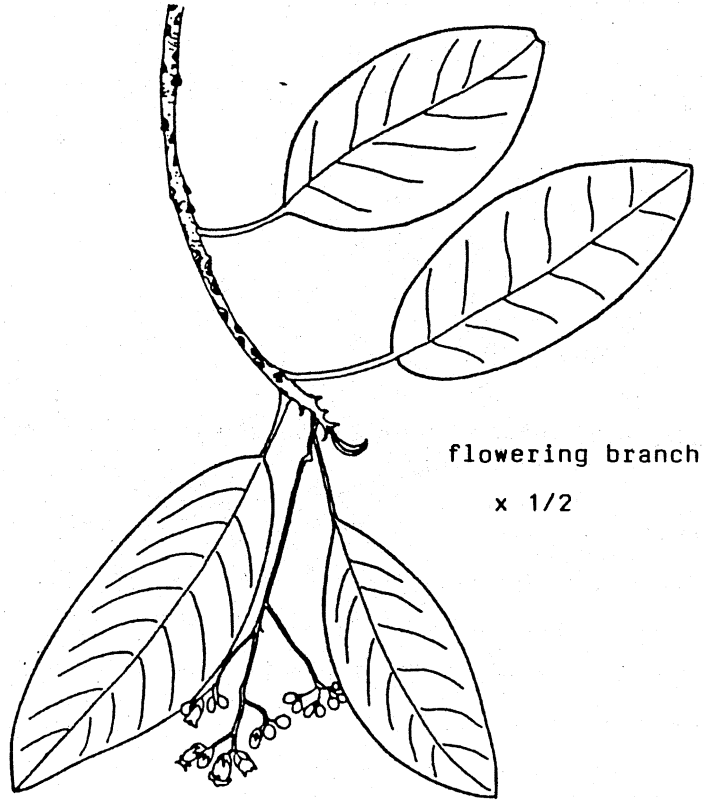
## No.14 EHRETIA PETIOLARIS

Local names: **Mubundukwe** (Kigir.),

**Mpanda-yongoo** (Kisw.)

Family: Boraginaceae

This tree, together with no.13, is not common in the thick forest. They grow only in this little open area. The white bell-shaped flowers are very fragrant. The berries are red and the twigs are usually hollow. People use the branches for making poles and sticks, and also for making charcoal.



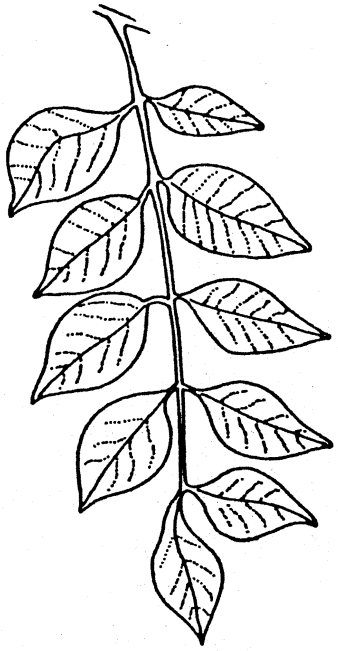
flowering branch x 1/2

No.15 **CASSIA AFROFISTULA**

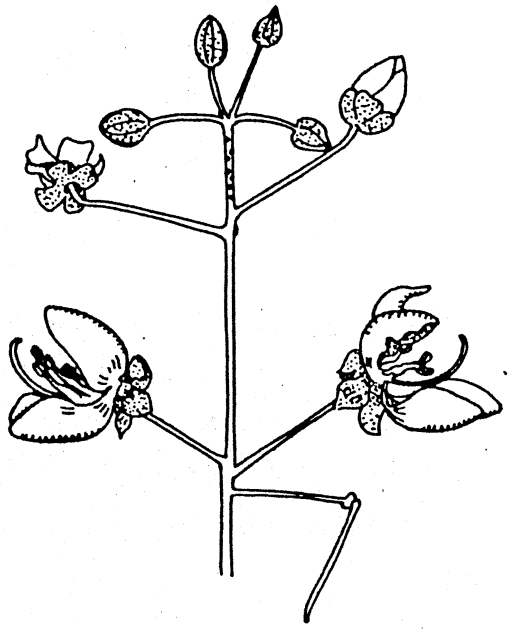
Local names: **Muhumba** (Kigir.), **Mbaraka** (Kisw.)
Family: Caesalpiniaceae

The genus Cassia has many species. They are all rather similar, although the colour of the flowers varies between yellow, orange and pink - in this species they are yellow. There is also a special kind of fruit - a pod. A pod is also the fruit of a bean or a Tamarindus (no.28).

This tree can be used as medicine in many ways. The roots are used to cure stomach problems and swollen genitals in pregnant women. An extract of these and other roots is taken as a cure for many different diseases. The healers mix leaves from Cassia and some other trees and boil the mixture to prepare a bath which cures people who are bewitched.



leaf x 3/4



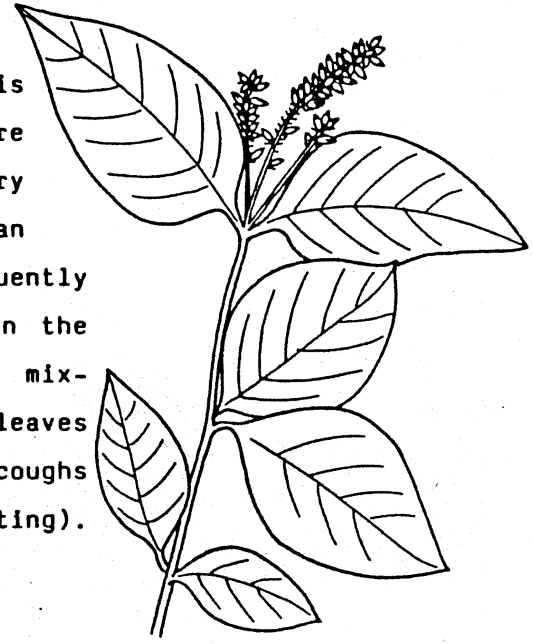
flowers x 3/4



No.16 **PSILOTRICHUM SCLERANTHUM**

Local names: **Kabaruti tsaka** (Kigir.),
**Kabaruti mwitu** (Kisw.)
Family: Amaranthaceae

The flowers of this little shrub are green and not very remarkable. You can see the shrub frequently lining the paths in the forest. The boiled mixture of roots and leaves is used to cure coughs and nausea (vomiting).



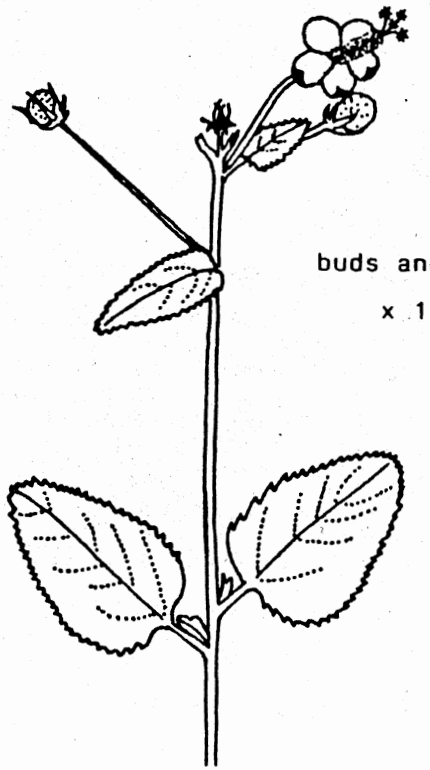
fruiting branch x 1/2

## No.17 HIBISCUS MICRANTHUS

Local names: **Mrembe ganga** (Kigir.), **Mwangati** (Kisw.)
Family: Malvaceae

This plant is never found in the dark forest. It occurs only in open areas. This is also one of the plants used to cure bewitched persons. A bath is prepared from the leaves. The roots mixed with some other roots are used to make a medicine for people with severe asthma.

**Now return along the Trail and turn right at no.12.**



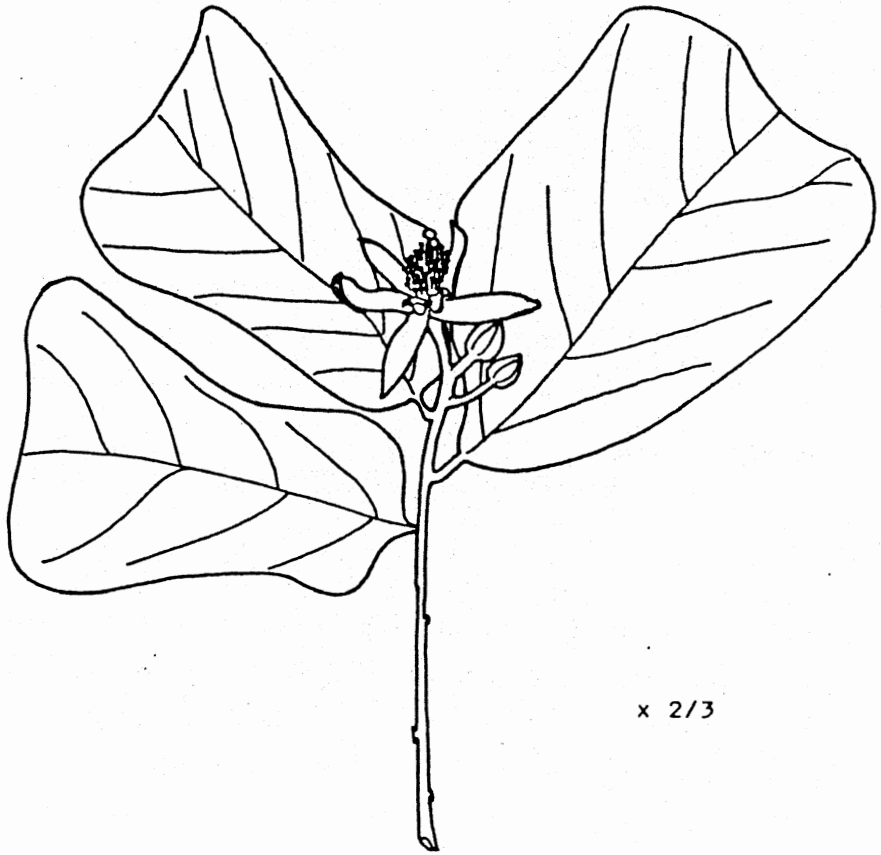
buds and flowers
x 1



## No.18 GREWIA TRUNCATA

Local name: **Mkone kidogo mweruhe** (Kigir.)
Family: Tiliaceae

Grewia is a common genus with many species in Kenya. They are recognized by the typical shape of the leaves and the flowers, which vary in colour. Here in Gedi there are four species, three yellow-flowered and this one with white flowers. The branches from this shrub are used to make arrows.

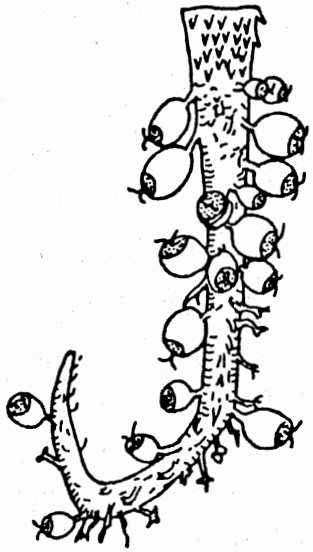


x 2/3

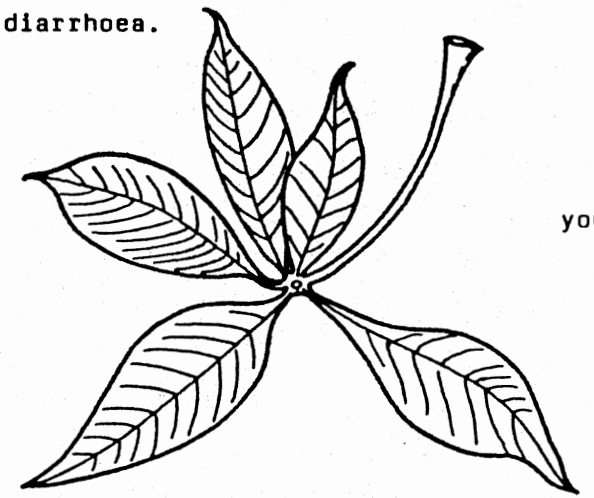
Local names: **Munyala** (Kigir.), **Mpapayi-mwitu** (Kisw.)

Family: Araliaceae

Many species in this family have their leaves divided into five leaflets, like this one - Cussonia. If you look along the paths you will see its seedlings in many places. The fruits (seen in the figure) are very small and purple. People make drums and dhows from the wood. A medicine made from the roots is used to cure coughs and diarrhoea.



fruits x 1



young leaf

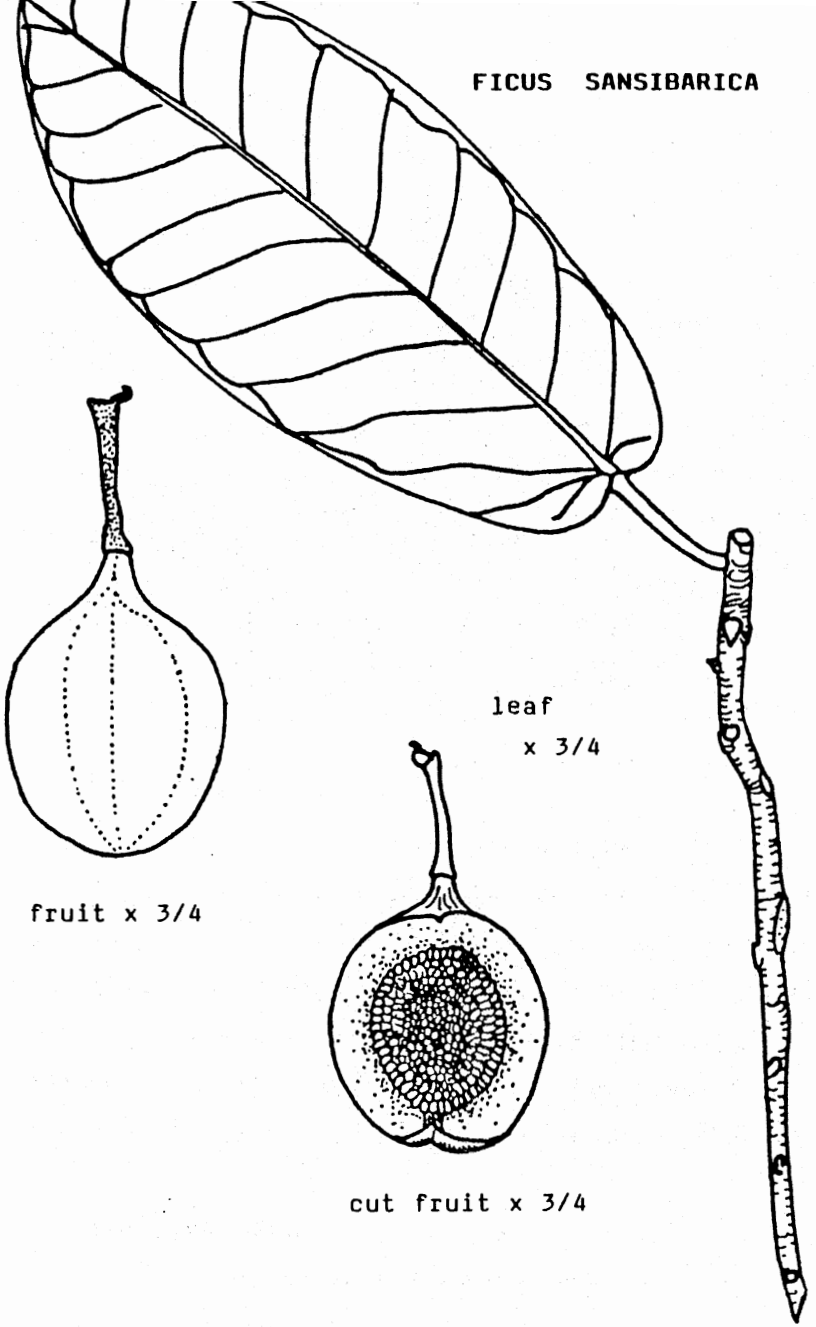
x 3/4



**FICUS SANSIBARICA**



fruit x 3/4



leaf

x 3/4



cut fruit x 3/4

## No.20 FICUS SANSIBARICA

Local names: **Mdiro** (Kigir.), **Mla nyuni** (Kisw.)
**Fig Tree** (Engl.)

Family: Moraceae

The fig tree belongs to the Mulberry family (Moraceae). The peculiar appearance of the "trunk" has its own explanation. Many figs are stranglers. They start their life as a seedling on a branch of another tree. From there the fig sends its roots down to the ground. Eventually the supporting tree is totally surrounded by roots. It can not grow thicker and will soon be strangled to death.

The lower part of the "trunk" you have in front of you consists only of these roots, giving it a gnarled appearance. If you look upwards along the root, you can see the point where the smooth, real trunk begins. That is where the fig once started to grow as a seedling. At fruiting time you can see the fig-fruits growing directly on the trunk. This phenomenon is called cauliflory and is very common in the tropics, but not elsewhere.

There are many species of Ficus. This one is not particularly common. If used at all, it is for making charcoal.

**Now return along the Trail and turn right after no.19.**

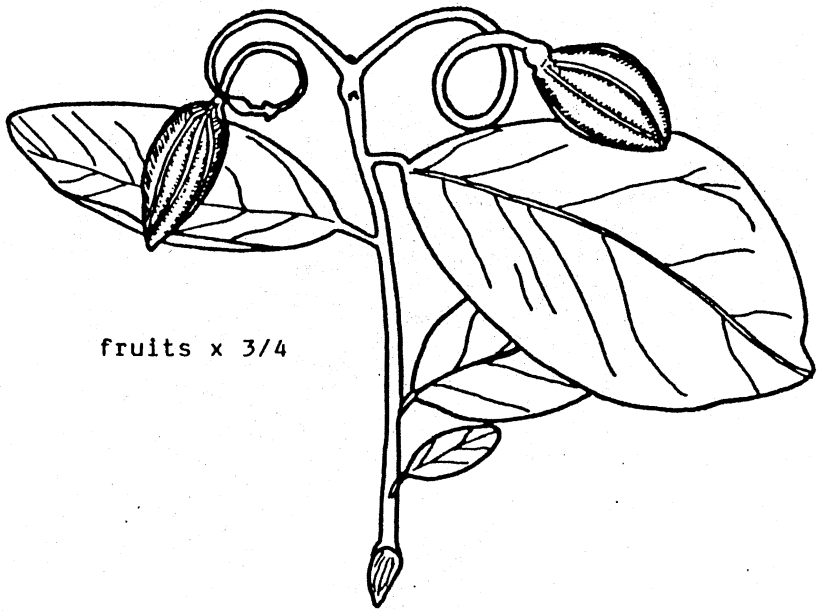


## No.21 THYLACHIUM THOMASII

Local names: **Mutunguru** (Kigir.),
**Muizu wa kirisa** (Kisw.)

Family: Capparaceae

The fruits with their curved stalks and glossy round leaves make this shrub easily recognizable. It is used by healers to cure snake-bites. The thick roots are dried and ground to a powder. This is mixed with saliva and applied to the bite. The roots have been used as food in times of famine, but people have died from eating them since they contain a poisonous substance.



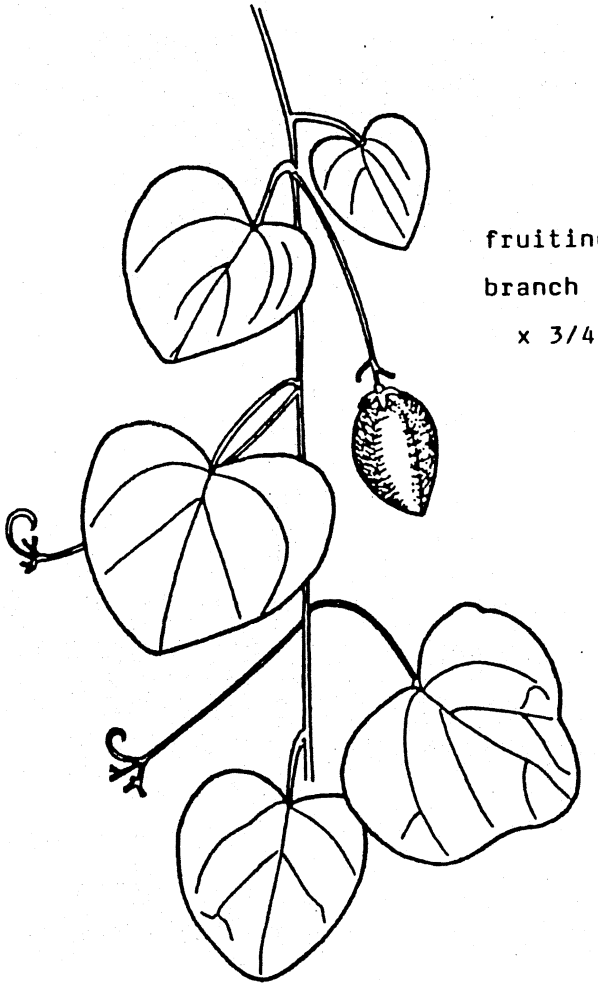
fruits x 3/4

No.22 **ADENIA GUMMIFERA VAR. GUMMIFERA**

Local names: **Mgore** (Kigir.), **Mandali** (Kisw.)

Family: Passifloraceae

A liana is a climbing plant which depends on other plants for mechanical support. It has no supporting



fruiting branch x 3/4

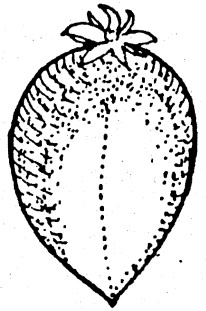


tissue and is unable to stand by itself. Lianas are very common in Gedi. They often grow where a gap has been made in the tree canopy as a result of a fallen tree or human disturbance (logging). Lianas and climbers thus grow mostly along paths and at edges of forest clearings.

The bluegreen smooth liana above your head is an Adenia. The fruits and flowers can be found almost everywhere on the paths during the flowering season. The fruits pop when you walk on them.

A medicine is prepared from the roots for women with a prolonged menstruation period. A leaf mixture with this plant is used to cure people who have been taken by ghosts or people with malaria. It is also used as a fish poison.

**If you are short of time you can take a short cut here back towards no.31 (see map).**



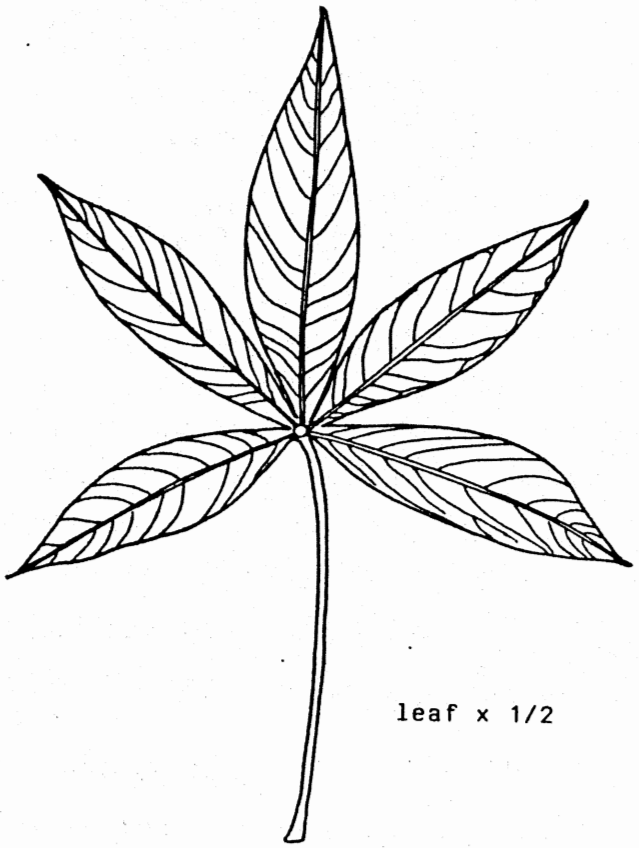
fruit x 1

No.23 **ADANSONIA DIGITATA**

Local names: **Muyu** (Kigir.), **Mbuyu** (Kisw.)
**Baobab** (Engl.)

Family: Bombacaceae

You have probably already noticed this peculiar tree. It is very well known and has many uses. The thick, bottle-shaped trunk is a sign of drought-resistance, and the tree is usually found in drier



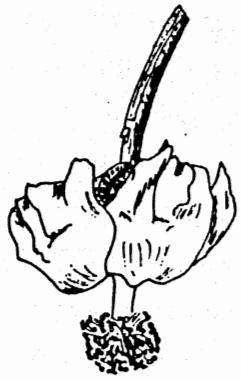
leaf x 1/2



areas. The inner bark is fibrous and yields a useful fibre. The wood can be used for paper pulp. A red dye is obtained from the roots.

The leaves can be eaten as vegetables, or used in a leaf-mixture to cure malaria. The big white flowers open at night and are pollinated by fruit bats. You can cook the sour pulp of the fruit with coconut-milk to get a good relish. If you mix the pulp with water you get a refreshing drink full of vitamin C, which is also used to treat fever. The seeds are also edible with a taste of nuts. The Giriamas use the empty fruits to make mouse-traps.

The Adansonia looses its leaves in the dry season. It is difficult to decide its age, but it might be the oldest tree in Gedi. There are no really young trees in the forest. It is probably to dark for the small seedlings to thrive.



flower x 1/4

fruit x 1/8

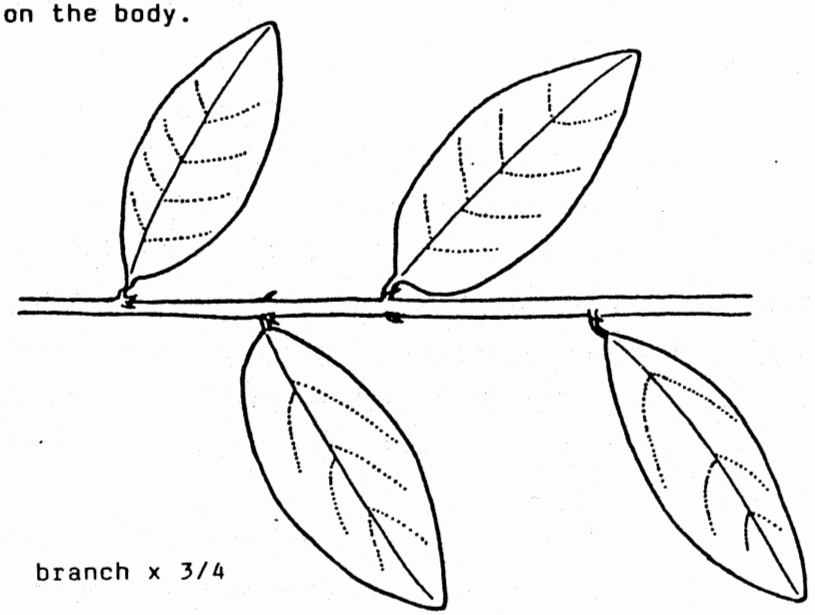
## No.24 CAPPARIS SEPIARIA VAR. STUHLMANNII

Local name: **Mgwada paka** (Kigir.)

Family: Capparaceae

This species is closely related to the earlier Capparis (no.12) and their leaves are almost identical. This is also a climber, but as it has not found any tree to climb it looks quite different, more like a straggling shrub. Here it grows together with a Grewia (Do you recognize the leaves?).

The fruit from this species is different from the other one. They are smaller and egg-shaped. The outside is black, the inside red and soft. The roots are red and can be used to ease swellings on the body.



branch x 3/4



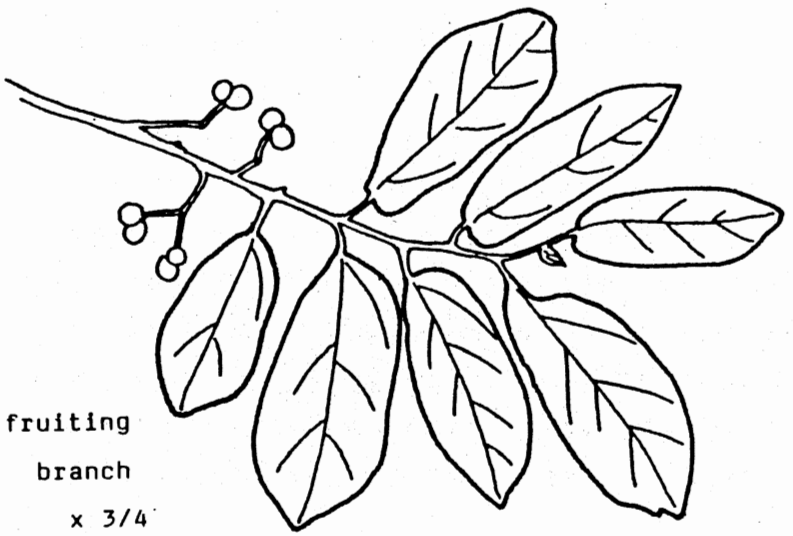
## No.25 GREWIA PLAGIOPHYLLA

Local name: **Mkone** (Kigir.)

Family: Tiliaceae

As an important tree in Giriama culture, the Mkone is well-known to the people of this tribe. Carvings are made from its wood for worshipping of ancestors. Formerly, these carvings were found in every Giriama village. An extract of the roots is taken to cure stomach-ache.

This is a yellow-flowered Grewia species with smaller leaves than no.18. When crushed, the leaves become slippery and can be used as soap.



fruiting branch x 3/4

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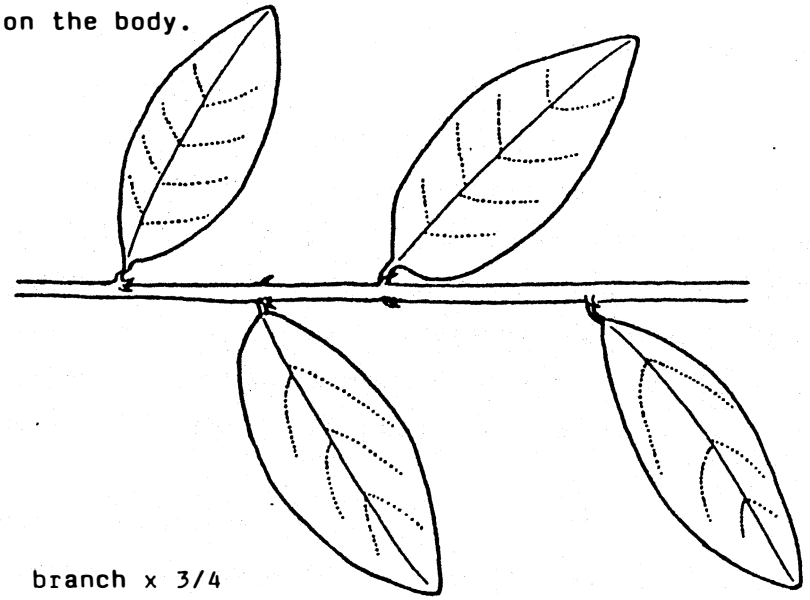

branch x 3/4



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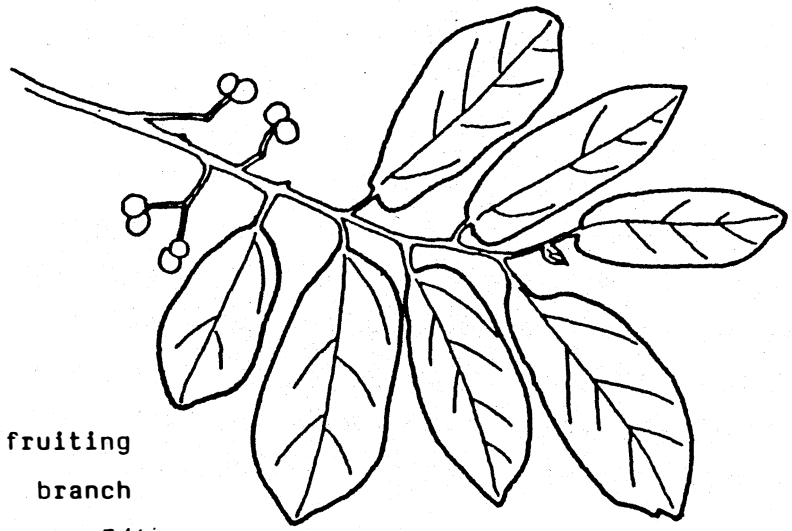


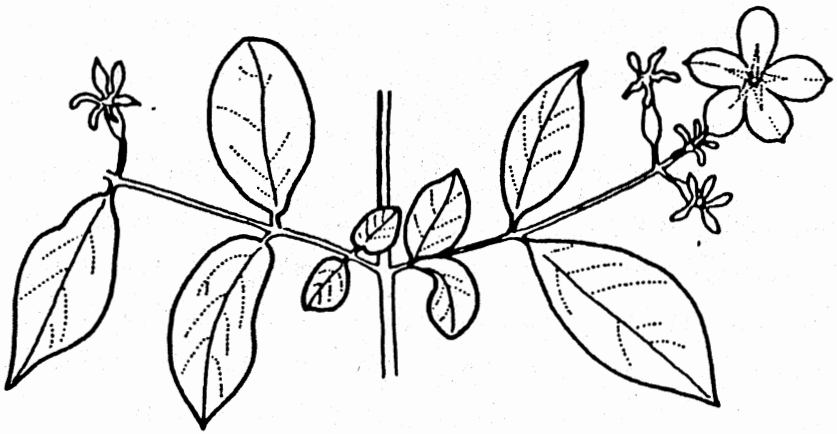
fruiting branch x 3/4

## No.26 HEINSIA CRINITA

Local names: **Mumaua (Kigir.), Mfiyofiyo** (Kisw.)
Family: Rubiaceae

When in blossom this shrub is a real beauty, covered in white fragrant flowers. It has no other uses than for decoration purposes. The Swahili women make hair decorations by threading the flowers on a thin twig. Sometimes flowering branches are put in rooms or wardrobes to give a sweet scent. Loose flowers are also spread on the bed in the evening.

**Now return along the Trail back towards no.27 (in the ruins).**



flowering branch x 3/4



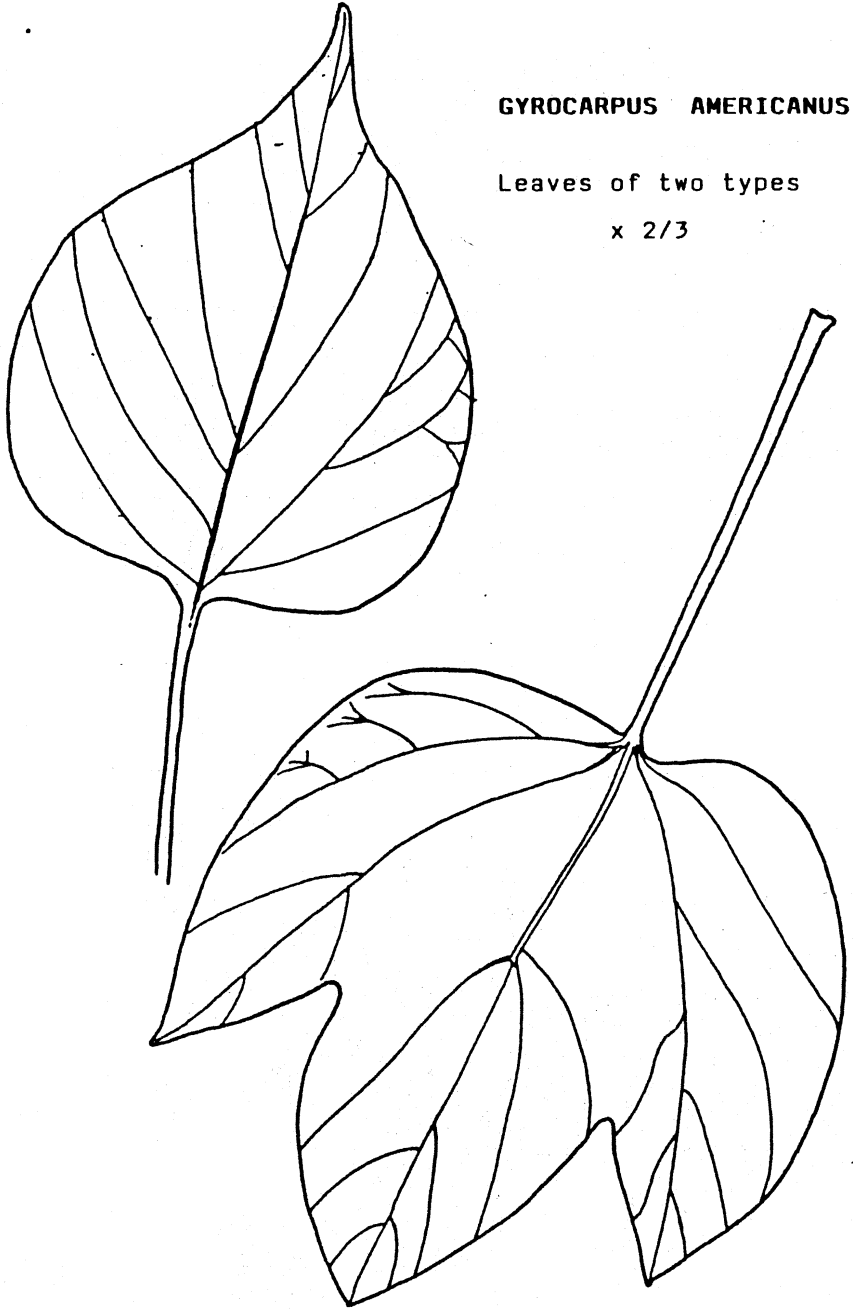
## No.27 GYROCARPUS AMERICANUS

Local name: **Mbomba maji** (Kisw.)
Family: Hernandiaceae

Like the Adansonia (no.23), this tree also sheds its leaves in the dry season. There are two different shapes of the leaves (see figure). With its grey smooth trunk and big leaves the tree is easily recognized. In the dry season you can see the typical fruits hanging on the bare branches. The fruit is wind-dispersed. It has two wings and swirls when falling. The timber is used for making dhows and furniture.

Gyrocarpus is very common in Gedi, but does not occur in the nearby Arabuko-Sokoke forest. It is now being tried in forest plantations as a timber tree.

fruit
x 2/3



**GYROCARPUS AMERICANUS**

Leaves of two types

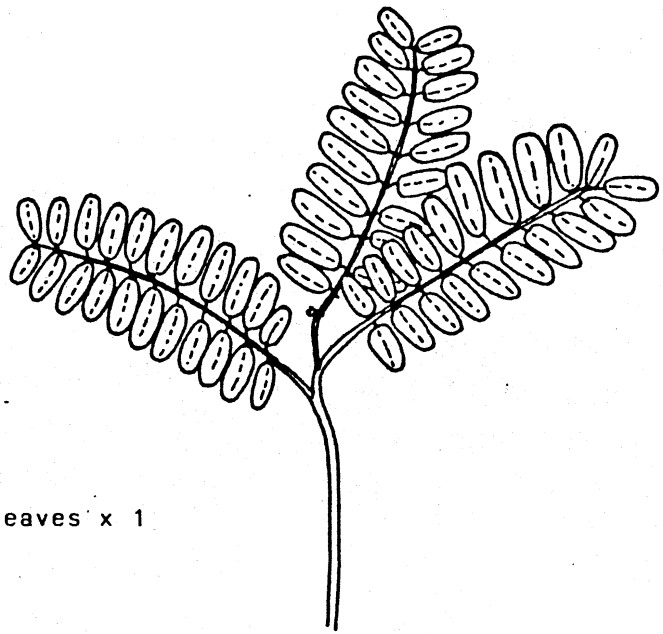
x 2/3



**No.28** **TAMARINDUS INDICA**

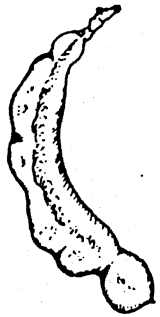
Local names: **Mkwaju** (Kigir.,Kisw.), **Tamarind** (Engl.)
Family: Caesalpiniaceae

This is a useful tree growing throughout the whole of tropical Africa and Asia. It is very common in Gedi. The wood can be used for furniture and gives excellent charcoal. Good walking sticks can be made from the branches. They are also used as frame-timber in dhows. The leaves are used to make an eye lotion for inflamed eyes. The much-used fruit makes a refreshing drink full of vitamin C. It is also a good spice in cooking. As a medicine it is used to cure fever and as a laxative.



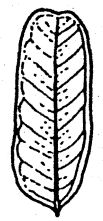
leaves x 1

flower x 1 1/2

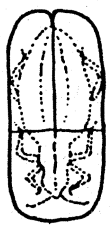


fruit x 1/3

Among the litter on the ground we find a little beetle, Endustomus. It looks exactly like the leaflet of a Tamarindus and thus is very difficult to discover.



leaflet
x 2



beetle
x 2

**ENDUSTOMUS**

side view
x 2

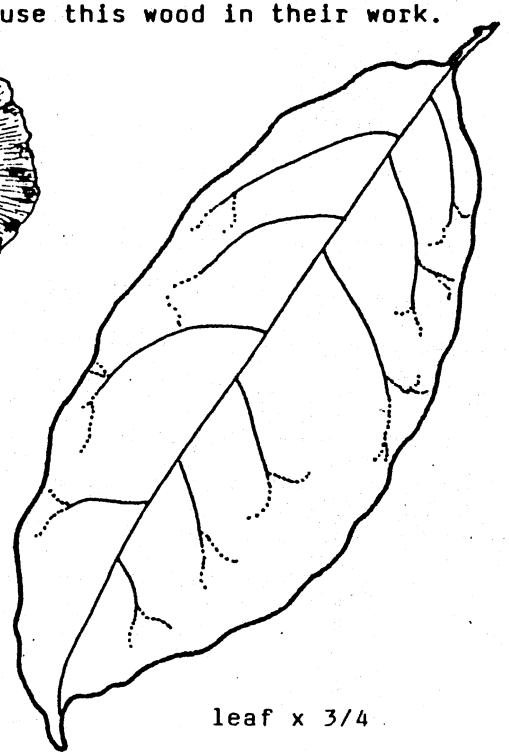


**No.29** **COMBRETUM SCHUMANNII**

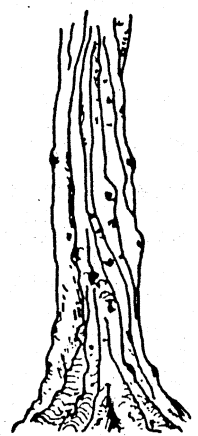
Local name: **Mgurure** (Kigir., Kisw.)
Family: Combretaceae

The knobby, fluted trunk of this tree is easily distinguished in the forest, where it is the dominant tree. The fruits are typical of the whole family. The timber is excellent for building because of its termite resistance. If there are termites on the tree, you will notice that they only use the bark. The trunk can be used for making bridges. Carvers use this wood in their work.

fruit
x 3/4



leaf x 3/4



trunk

## No.30 DOVYALIS ABYSSINICA

Local name: **Mdunga tundu** (Kigir.)
Family: Flacourtiaceae

The leaves are all in one plane, which makes the branches flat. There are spines on the trunk and the branches. These are used to pierce holes in the ears. The roots are used for treating stomach-ache and fever. At fruiting time you can eat the bright orange velvety fruits. They are very sour but tasty.

branch x 3/4



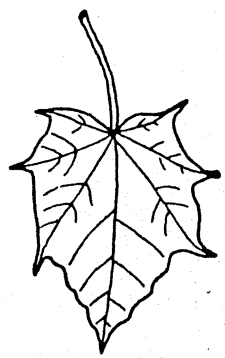
## No.31 STERCULIA APPENDICULATA

Local names: **Mfune** (Kigir.), **Msefu** (Kisw.)
Family: Sterculiaceae

As the proudest tree in the forest, this tree reaches a height of 30 m. The smooth trunk explains why the Giriamas say: "No-one can climb a Mfune."

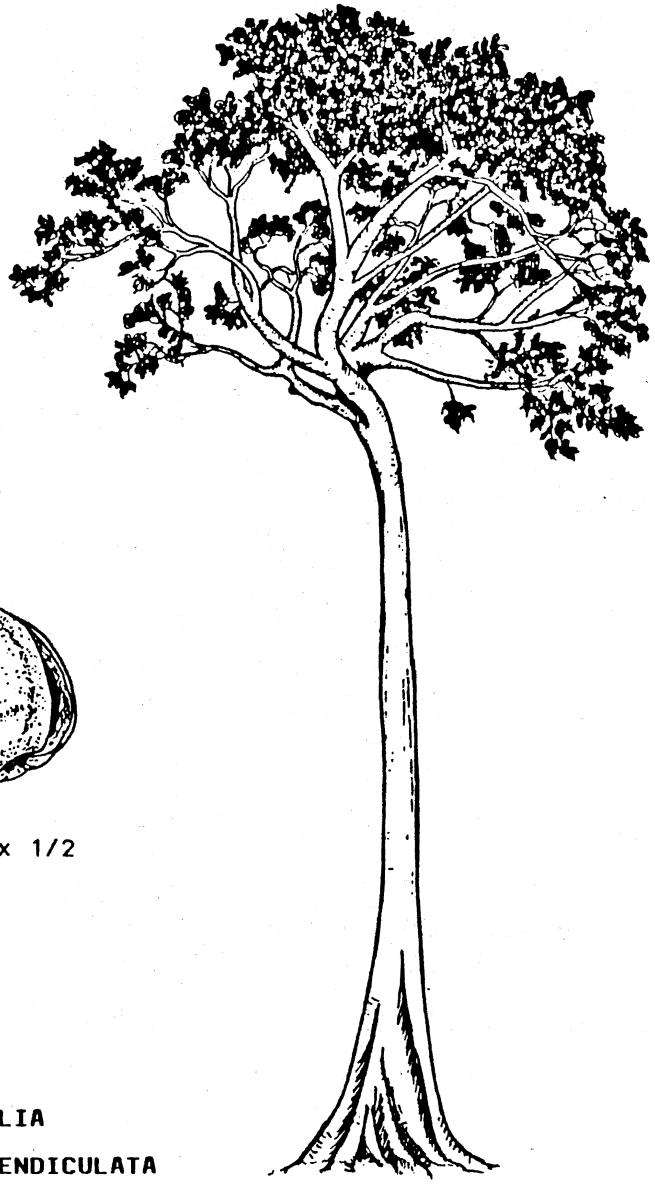
The soft wood from Sterculia is not reputed to be a good timber but is still used for making ceilings, furniture and dhows. The roots and leaves are used together with parts from other trees (no.10 and no.37) as a medicine to relieve malaria. The yellow seeds are eaten by the noisy hornbills.

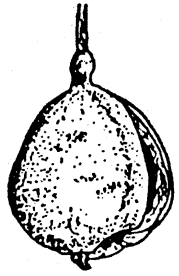
Like the Gyrocarpus (no.27), this tree is completely absent from the Arabuko-Sokoke forest, and it is not very common here in Gedi.



leaf x 1/4

flower x 2/3





fruit x 1/2

**STERCULIA**

**APPENDICULATA**



**No.32** **ACACIA BREVISPICA**

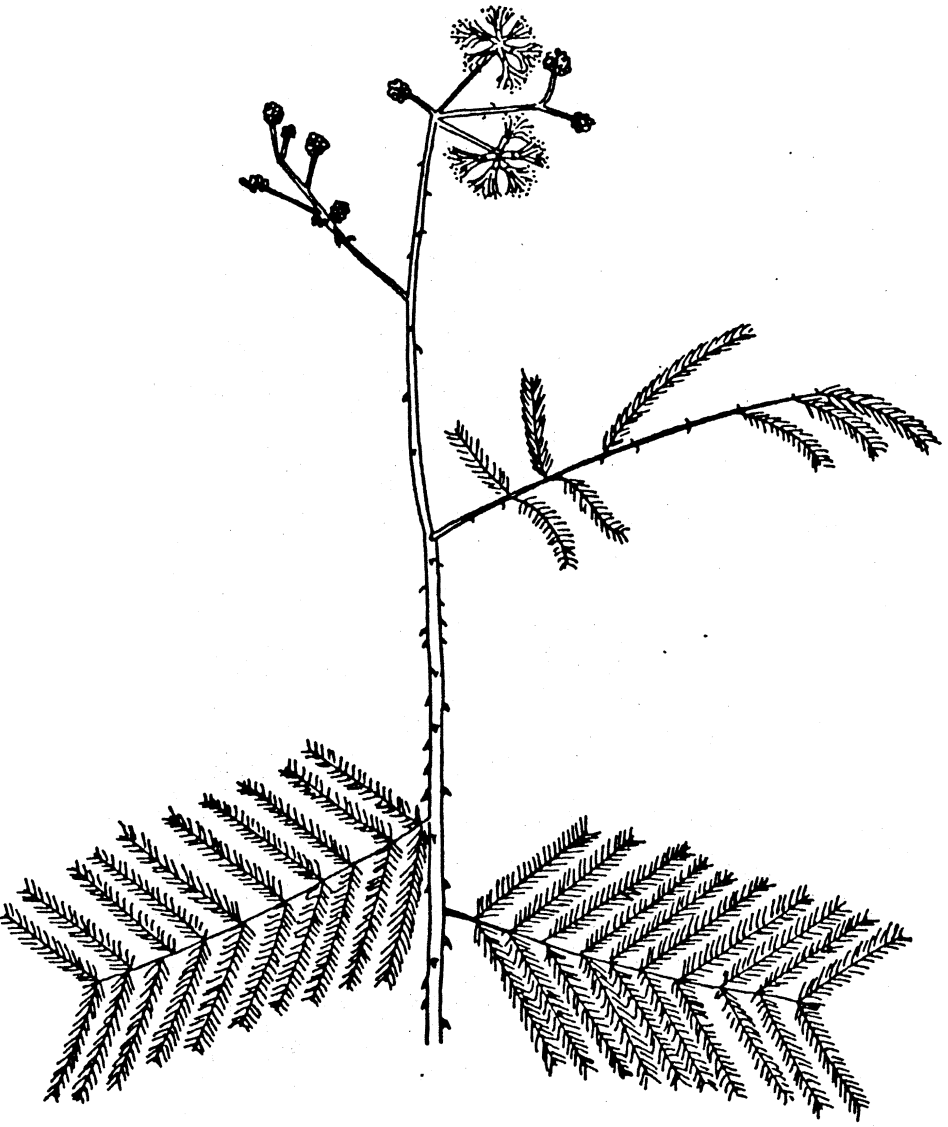
Local names: **Mgwada paka** (Kigir.),
**Mpapura doko** (Kisw.)
**Wait-a-bit** (Engl.)

Family: Mimosaceae

Acacia is a big genus which is widespread in Africa, Asia and Australia. The acacias are mostly trees but this species is a climber. As we saw in Capparis (no.12), its hooks are useful for attachment as it climbs up the tree towards the light. The feather-like leaves and the globose flower-heads are common characters in the big family Mimosaceae.

Most of the acacias grow in savanna and drier areas. They are very important trees in maintaining the soil - thus preventing erosion in drier areas. Other trees, however, such as Eucalyptus, take too much water from the ground. They have the opposite effect to acacias since they lower the water table and reduce the soil nutrients. The wide range of conditions under which acacias thrive makes them very important.

The roots of this particular Acacia is used to cure malaria.



**ACACIA BREVISPICA**

buds and flowers x 1



**No.33** **DELONIX REGIA**

Local name **Msonubari** (Kisw.)

Family: Caesalpiniaceae

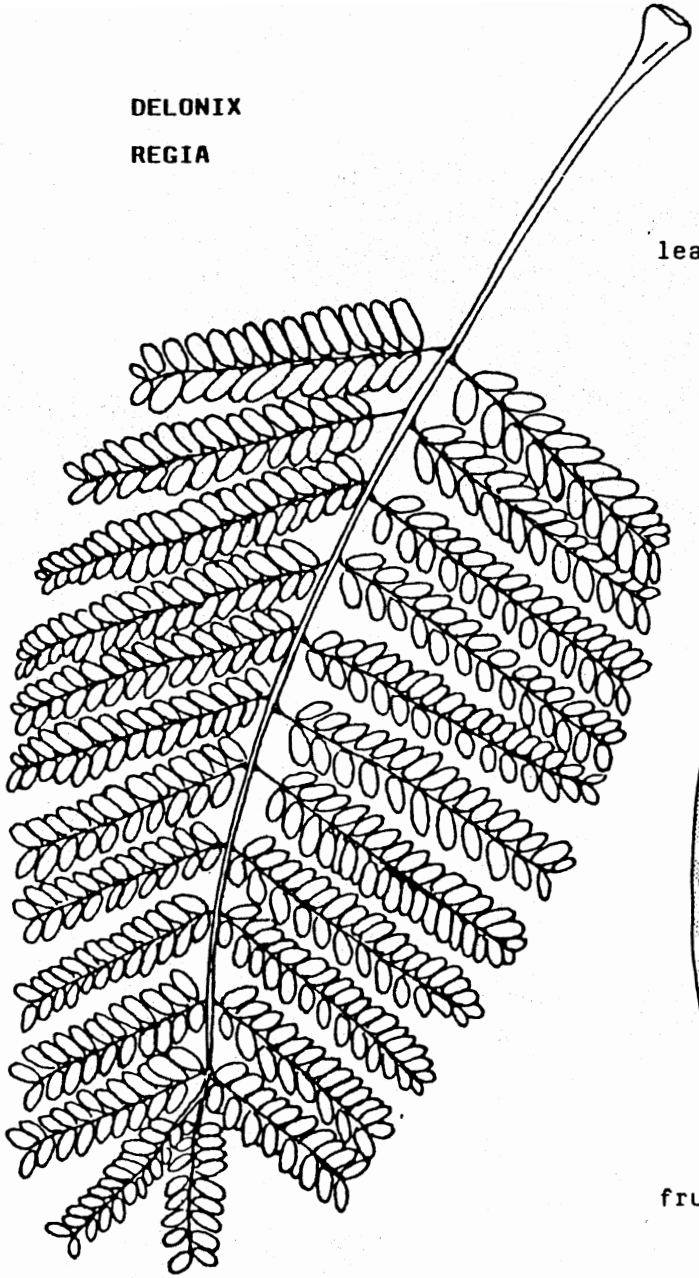
Originally this tree came from Madagascar, but is now found throughout the tropics as an ornamental. In Gedi it grows only among the main ruins, and might have been planted already by the Arabs.

The flowers are big and bright scarlet. They are used for decoration purposes. The fruit is a pod (like that of the Cassia, no.15) and can be used as a kayamba (rhythmic instrument). The wood is fairly resistant to moisture and insects, and is used for making furniture. The stem contains water-soluble gum.

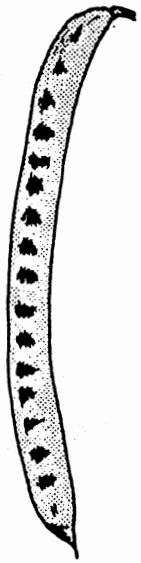
flower x 2/3

**DELONIX**

**REGIA**



leaf x 1/2



fruit x 1/7



**No.34** **THEVETIA PERUVIANA**

Local name: **Mkode** (Kisw.)

Family: Apocynaceae

Thevetia is also an immigrant. It comes from South America, and is now widespread in the tropics. The large funnel-shaped flowers are yellow. The whole tree contains a poisonous milky sap. It is not used by the local people. In Gedi it grows only in the main ruins.

flowering branch

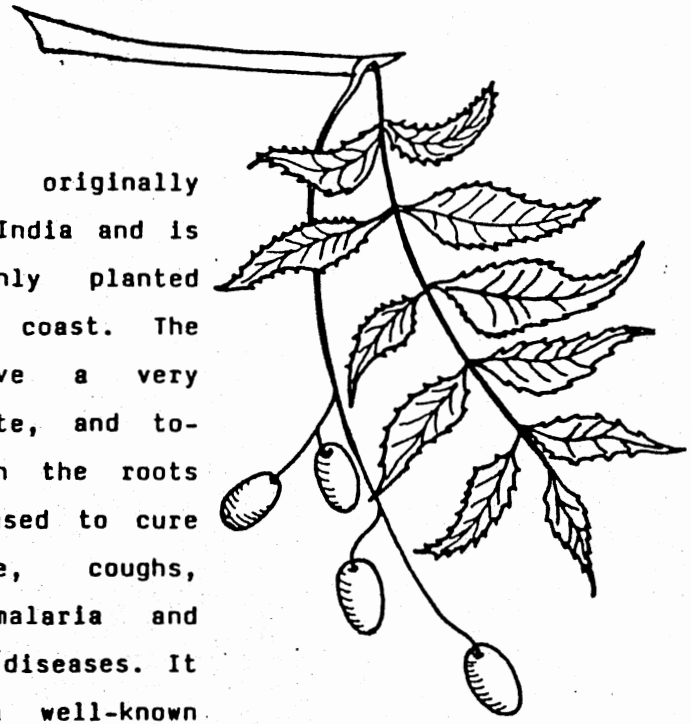
x 2/3

No.35 **AZADIRACHTA INDICA**

Local names: **Mkilifi** (Kigir.),
**Mzerekta** (Kigir., Kisw.)
**Neem** (Engl.)

Family: Meliaceae

fruits x 3/4



This tree originally came from India and is now commonly planted along the coast. The leaves have a very bitter taste, and together with the roots they are used to cure stomach-ache, coughs, cholera, malaria and many other diseases. It is also a well-known timber tree. Its comparatively slow growth results in wood of high quality which is used locally for making furniture. The fruits are eaten by monkeys and birds.



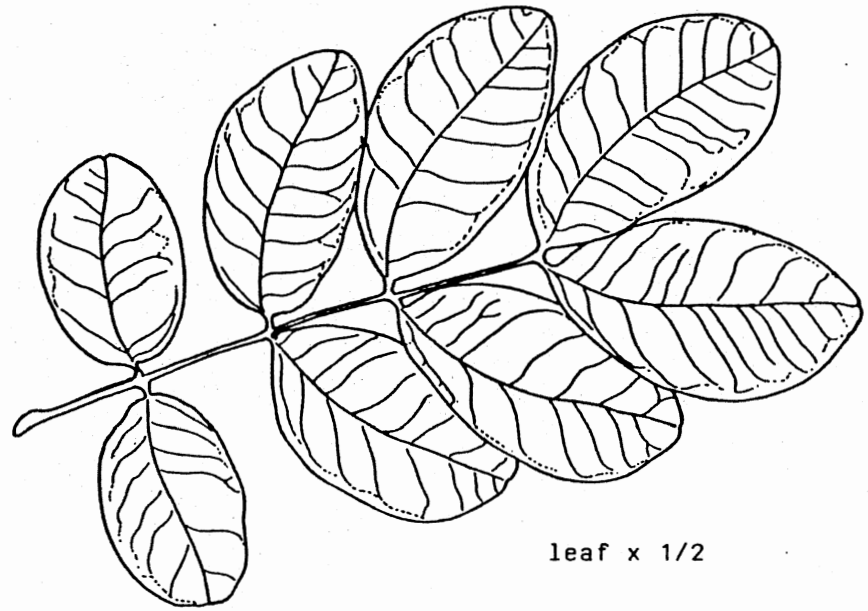
No.36 **AFZELIA QUANZENSIS**

Local names: **Mbambakofi** (Kigir.), **Mkumbakusi** (Kisw.)

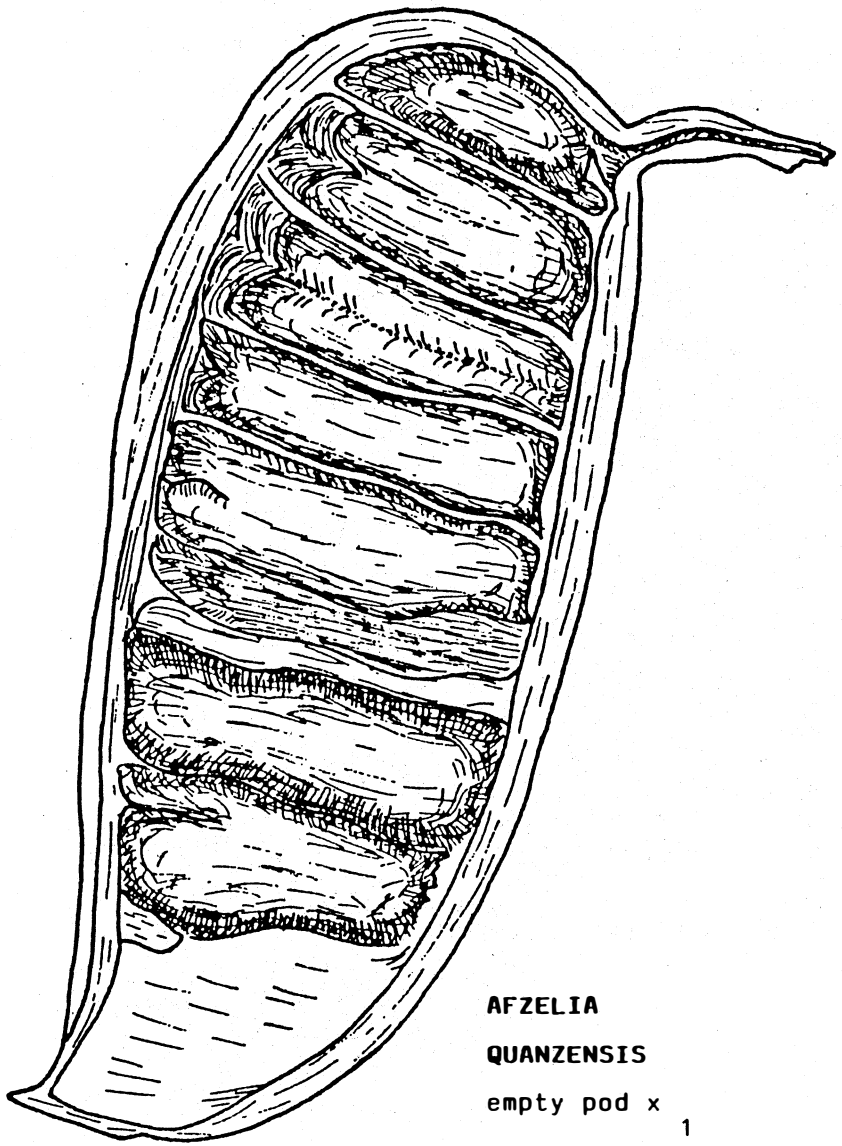
Family: Caesalpiniaceae

Afzelia is a very valuable timber tree. Like Azadirachta (no.35) it grows more slowly than, for example , Eucalyptus. It is therefore not often used in plantations, although it has a noted timber quality, and can become very large - with diameters up to 120 cm. It is used locally for making furniture, houses and dhows.

This tree is not very common in Gedi, but forms part of the Arabuko-Sokoke forest. The pods are used by Swahili women when performing dances. The seeds are black and orange.



leaf x 1/2



**AFZELIA QUANZENSIS**
empty pod x 1

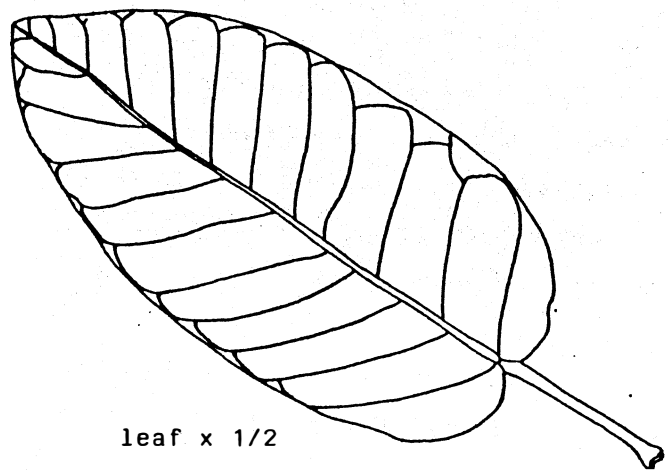


**No.37** **FICUS BUSSEI**

Local names: **Mugandi** (Kigir.), **Fig tree** (Engl.)
Family: Moraceae

There is no numbered lable on this tree, because you simply can not miss it. It is the famous **fig tree** growing outside the main ruins behind the parking place. Like the other Ficus (no.20), it is a strangler. This particular tree seems to be trying to strangle a wall. The leaves and roots are used together with parts from other trees (see no.10 and no.31) to relieve malaria.

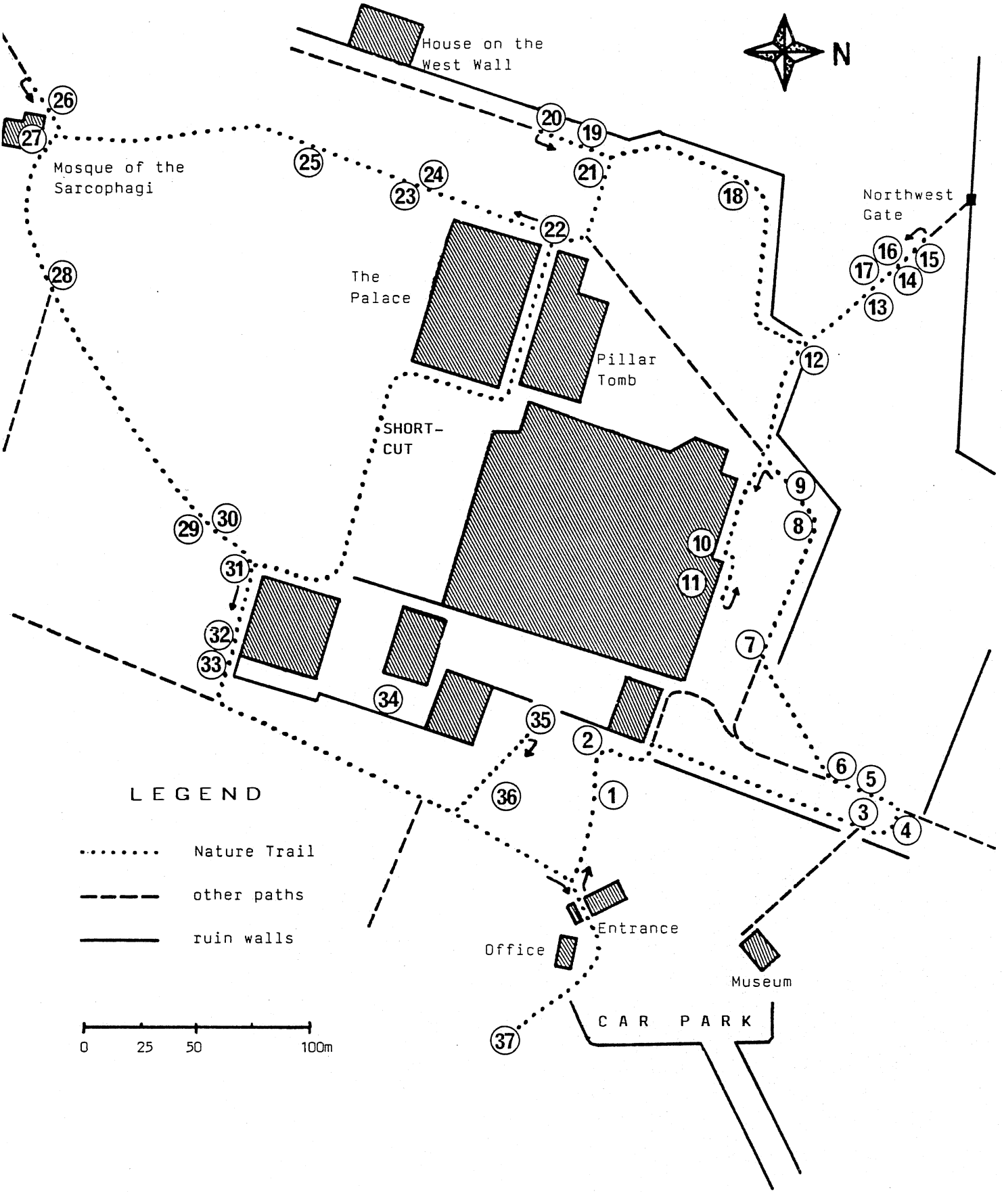
Many Ficus species have the rare property of conserving soil moisture, possibly increasing fertility as well. They can be useful as shade trees and, if planted more often, might help to improve conservation of the soil.



leaf x 1/2

# GEDI

## MAP TO THE NATURE TRAIL



APPENDIX 5

A LIST OF USEFUL PLANTS

Useful plants found in Gedi forest not mentioned in the Nature Trail booklet (Appendix 4). Methods in gathering information see report.

IDENTIFIED PLANTS

Adenia cf. gummifera (Harvey) Harms var. gummifera (Passiflorac.) and Adansonia digitata L. (Bombacac.) - To cure bewitched persons.
Ampelocissus africana (Lour.) Merr. (Vitac.) - An extract from the roots is applied on swellings (infections) to ease them. It can also be drunk against headache.
Ancylobothrys petersiana (Kl.) Pierre (Apocynac.) - The climbing stems are used when mudding walls on a house.
Asparagus sp. (Liliac.) - The extract from the roots is drunk against a sore throat. The leaves are grained and applied on affected throats.
Azima tetracantha Lam. (Salvadorac.) - The roots from this shrub, together with the roots from Erythrina sacleuxii Hua (Papilionac.) and Acacia brevispica Harms (Mimosac.), are used to cure prolonged menstruation period.
Boerhavia diffusa L. (Nyctaginac.) - A weed eaten by cattle.
Bridelia cathartica Bertol.f. ssp. melanthesoides (KC.) Leonard (Euphorbiac.) - This shrub is used for firewood.
Celosia schweinfurthiana Schinz. (Amaranthac.) - It is cooked and eaten as a vegetable.
Cissus integrifolia (Bak.) Planch. (Vitac.) - Water can be obtained from the stem. The leaves, boiled together with the leaves from Sterculia appendiculata K.Schum. (Sterculiac.), Ficus bussei Warb. ex Mildbr. et Burret (Morac.) and Adansonia digitata, give a medicine against general agony or for bewitched people.
Cissus rotundifolius (Forssk.) Vahl (Vitac.) - A bath is prepared from the leaves from this plant to cure bewitched people.
Croton cf. menyhartii Pax (Euphorbiac.) - The leaves are boiled, and the extract is drunk to relieve from bad spirits.
Cyperus rotundus L. (Cyperac.) - It serves as food for domestic animals. The roots are dried, grinded, mixed with oil and used to make the skin smooth.
Deinbollia borbonica Scheff. (Sapindac.) - The roots from this shrub, boiled together with roots from Cissus integrifolia, cure pains connected with the menstruation period.
Dichrostachys sp. (Mimosac.) - The roots, mixed with roots from other plants, are used to cure asthma.
Dioscorea dumentorum (Kunth) Pax (Dioscoreac.) - The root is dried and grinded to make a loose porridge that is drunk. The root-powder, mixed with parts from other plants is used to cure diseases in chickens.
Dregea rubicunda K.Schum. (Asclepiadac.) - The roots are grinded and licked by persons who are bitten by a snake.
Drypetes natalensis (Harv.) Hutch. var. leiogyne Brenan (Euphorbiac.) The boiled roots are used as a medicine against general agony.
Elaeodendron schlechteranum (Loes.) Loes. (Celastrac.) - The roots are used to cure stomach-ache. The wood is used for making bed-frames.
Euclea natalensis A.DC. (Ebenac.) - The roots are boiled with salt and

used as a laxative. The wood is used for building, firewood and making of charcoal.

Feretia apodanthera Del. ssp. keniensis Bridson (Rubiac.) - It is used to make sticks and poles.

Gonatopus boivinii (Decne) Engl. (Arac.) - The root is grained and used as flour during famine. The root is eaten by Porky Pines and pigs.

Harrisonia abyssinica Oliv. (Simaroubac.) - The roots, mixed with the roots from Cassia afrofistula Brenan (Caesalpiniac.), are used to cure ailments of pregnant women. The roots mixed with young pineapple give general relief.

Indigofera vohemarensis Baill. (Papilionac.) - The branches are used for making brooms.

Jateorhiza palmata (Lam.) Miers (Menispermac.) - The dried and grained roots are used to cure stomach pain and swollen cheeks (toothache?). A bath is prepared from the roots to cure people who have been taken by ghosts. The sap is used against pimples.

Justicia flava Vahl (Acanthac.) - It is cooked and eaten as a vegatable.

Kigelia africana (Lam.) Benth. (Bignoniac.) - The bark and roots are used to cure asthma and pains in the chest. The leaves are soaked in water to give a bath against malaria. The wood is used for making Giriama stools, drums and mortles. The fruit is roasted, peeled and cut into slices. The seeds are removed and the rest is boiled and left in water for three days. A strong alcoholic drink is obtained.

Lepisanthes senegalensis (Poir.) Laenh. (Sapindac.) - The wood is used for making doors, windows and beds.

Monodora grandidieri Baill. (Annonac.) - The extract from boiled roots is drunk to free a person from bad spirits. Chopped roots are mixed with incense and the clothes are fumigated to give a nice smell.

Panicum maximum Jacq. (Poac.) - This grass is used for thatching Giriama houses and as food for domestic animals.

Pentas bussei K. Krause (Rubiac.) - The leaves are mixed with water to give a bath to a person who does not feel well. The flowers are used for decorative purposes.

Sarcostemma viminale (L.) R.Br. ssp. viminale (Asclepiadac.) - This plant, mixed with roots from other plants, is used to cure general pains.

Secamone punctulata Decne (Asclepiadac.) - The roots are used against cholera and other diseases. It is mixed with incense and fumigated. It is used as a charm and has the power to fulfill your wishes.

Suregada zanzibariensis Baill. (Euphorbiac.) - The roots are mixed with roots from Cassia afrofistula to make a medicine against prolonged menstruation. Their fruits are eaten. The branches are used to make poles for erecting houses. A temporary necklace is made from the plant.

Synaptolepis kirkii Oliv. (Thymelaeac.) - The root is a laxative.

Tacca leontopetaloides (L.) Ktze. (Taccac.) - The bulb is dried and used as flour to make "sweat meat" ("halwa") and porridge. It is eaten by Porky Pines and pigs.

Teclea trichocarpa (Engl.) Engl. (Rutac.) - The boiled residue from the roots can cure coughs.

Thespesia danis Oliv. (Malvac.) - The roots mixed with roots from Ampelocissus africana are used for the same purposes as that plant. The branches are used to make poles and sticks.

Tinospora oblongifolia (Engl.) Troupin (Menispermac.) - A medicine against cholera is made from the leaves from this tree mixed with sheep dung and leaves from Ficus bussei, Sterculia appendiculata, Adansonia digitata and Combretum shumannii Engl. (Combretac.). The mixture is squeezed, and the extract is taken 3 times a day.

Uvaria cf. acuminata Oliv. (Annonac.) - The boiled roots are used to cure bewitched persons. The leaves are used to prepare a bath for the same purpose.

Uvaria lucida Benth. ssp. lucida (Annonac.) - It has the same uses as the previous Uvaria.

Vigna sp. (Papilionac.) - The leaves are gathered when they have decayed in the dry season. They are kept until the rain season when they are used as a fertilizer.

Xylopia parviflora (A. Rich.) Benth. (Annonac.) - Poles are made from the branches. this is an important plant against bad spirits. Leaves and roots from this plant and from Uvaria cf. acuminata are boiled and prepared for a bath or a drink.

## UNIDENTIFIED PLANTS

KABARU KITSAKA - The roots are used to treat general pains.

MKAPU TSAKA (Teclea, Rutac.?) - The boiled roots cure stomach ache. Mixed with the roots from Cassia afrofistula they are used to cure strong malaria. The branches are used to make poles.

MKIKOMA (Rubiac.) - Young branches are used to make poles for building houses.

MTSATSA - The leaves and roots are boiled and prepared to a bath for children with strong malaria. The plant is a medicine for women with problems in delivering in too a short time.

MUIZU TSAKA - The extract from the boiled roots are used to cure stomach ache.

MUTZERERE - Seasonal plant which occurs in the heavy rains. The roots are used to cure malaria and to ease swellings on the body (infections?)

MUZALA DOWE (Kigir.) (Annonac.) - The roots, mixed with roots from other plants, are used to cure breathing problems in pregnant women due to a big stomach. A bath is prepared from the leaves from this tree and Sterculia appendiculata, Ficus bussei and Adansonia digitata to cure bewitched persons.

MVUMA NYUKI - The leaves, mixed with the leaves from Tinospora oblongifolia and "African chemicals", are used as a medicine against cholera.

MVUMA NYUKI (Rubiac.) - The branches are used to make poles for houses.

MVURE (Kisw., Kigir.) - The wood is used as a general timber and for making dhows (boats) and eating bowls.

APPENDIX 6

A LIST OF LOCAL PLANT NAMES

in Kiswahili and Kigiriama, obtained at Gedi National Monument, Kilifi District, Kenya.

KISWAHILI

KABARUTI MWITU - Psilotrichum scleranthum Twaits (Amaranthac.)
KAUMWA - Jateorhiza palmata (Lam.) Miers (Menispermac.)
MBELENGA - Lecaniodiscus fraxinifolius Bak. ssp. scassellatii (Chiov.) Fries (Sapindac.)
MBOMBA MAJI - Gyrocarpus americanus Jacq. (Hernandiac.)
MBUYU - Adansonia digitata L. (Bombacac.)
MDALA MWAKA - Deinbollia borbonica Scheff. (Sapindac.)
MFUNGA MAMBO - Secamone punctulata Decne (Asclepiacac.)
MGORE - Adenia cf. gummifera (Harvey) Harms var. gummifera (Passiflorac.)
MGOZA - Sterculia africana (Lour.) Fiori (Sterculiac.)
MKAKAMA - Drypetes natalensis (Harv.) Hutch. (Euphorbiac.)
MKULU - Berchemia discolor (Klotzsch) Hemsl. (Rhamnac.)
MKUNA MBAWA - Xylopia parviflora (A. Rich.) Benth. (Annonac.)
MKUNGUNI - Lepisanthes senegalensis (Poir.) Laenh. (Sapindac.)
MNWA MAJI - Cissus integrifolia (Bak.) Planch. (Vitac.)
MPAPURA DOKO - Acacia brevispica Harms (Mimosac.)
MSEFU - Sterculia appendiculata K. Schum. (Sterculiac.)
MSHOMORO - Lantana camara L. (Verbenac.)
MSINDANO - Azima tetracantha Lam. (Salvadorac.)
MSONUBARI - Delonix regia (Boj. ex Hook.) Raf. (Caesalpiniac.)
MTAWATAWA - Boerhavia diffusa L. (Nyctaginac.)
MUDHIALE - Drypetes reticulata Pax (Euphorbiac.)
MUIONDA - Thespesia danis Oliv. (Malvac.)
MUIZU WA KIRISA - Thylachium thomasii Gilg (Capparac.)
NDAGO - Cyperus rotundus L. (Cyperac.)
NYASI - Clitoria ternatea L. (Papilionac.)
UANGA - Tacca leontopetaloides (L.) Ktze. (Taccac.)

KIGIRIAMA

DZADZA - Commelina nr. imberbis Hassk., C. benghalensis L. (Commelinac.)
KABARUTI TSAKA - Psilotrichum scleranthum Twaits (Amaranthac.)
KADZIPO KATITE - Salacia cf. madascariensis (Lam.) DC. (Celastrac.)
KAKIRA KALOMA - Cyphostemma sp. (Vitac.)
KAKWAJU - Ormocarpum sennoides (Willd.) DC. ssp. zanzibaricus Drenan & Gillet (Papilionac.)
KALUMWA - Jateorhiza palmata (Lam.) Miers (Menispermac.)
KAPUPU - Vigna sp. (Papilionac.)
KAYUKAYU - Manilkara sansibarensis (Engl.) Dubard (Sapotac.)
KINDIRI - Oxygonum atriplicifolium (Meisn.) Martel. (Polygonac.)
KONZI - Gonatopus boivinii (Decne) Engl. (Arac.)
LUAVI - Tragia furialis Boj. (Euphorbiac.)
LURAGO - Indigofera vohemarensis Baill. (Papilionac.)

MAIZUGARISA - Drypetes reticulata Pax (Euphorbiac.)
MARANGE - Cordyla africana Lour. (Caesalpiniac.)
MARIGA - Dioscorea dumetorum (Kunth) Pax (Dioscoreac.)
MBAMBAKOFI - Afzelia quanzensis Welw. (Caesalpiniac.)
MBANDA KONDO - Allophyllus alnifolus (Bak.) Radlk. (Sapindac.)
MBELENGA - Lecaniodiscus fraxinifolius Bak. ssp. scassellatii (Chiov.) Fries (Sapindac.)
MBOHOBO - Acridocarpus zanzibarensis Juss. (Malphigiac.)
MBWADA PAKA - Capparis sepiaria L. var. stuhlmannii (Gilg) De Wolf, C. tomentosa Lam. (Capparac.)
MCHALAKUSHE - Justicia flava Vahl (Acanthac.)
MCHENGO - Cissus rotundifolia (Forssk.) Vahl (Vitac.)
MCHUNGA - Launaea cornuta (Oliv. & Hiern) C. Jeffrey (Asterac.)
MDALAMWAKA - Deinbollia borbonica Scheff. (Sapindac.)
MDIMUTSAKA - Teclea trichocarpa (Engl.) Engl. (Rutac.)
MDUNGATUNDU - Dovyalis abyssinica (A. Rich.) Warb. (Flacourtiac.)
MDUNGU - Zanthoxylum holtzianum (Engl.) Waterm. (Rutac.)
MFUNE - Sterculia appendiculata K. Schum. (Sterculiac.)
MFUNGAMAMBO - Secamone punctulata Decne (Asclepiadac.)
MFUNGA TSANZU - Haplocoelum trigonocarpum Radlk. (Sapindac.)
MGALAGALA - Boerhavia diffusa L. (Nyctaginac.)
MGALANA - Trichilia emetica Vahl (Meliac.)
MGANDA SIMBA - Uvaria lucida Benth. ssp. lucida (Annonac.)
MGORE - Adenia cf. gummifera (Harvey) Harms var. gummifera (Passiflorac.)
MGURUMO - Ampelocissus africana (Lour.) Merr. (Vitac.)
MGURURE - Combretum schumannii Engl. (Combretac.)
MGWADA PAKA - Acacia brevispica Harms (Mimosac.), Capparis sepiaria L. var. stuhlmannii (Gilg) De Wolf, C. tomentosa Lam. (Capparac.)
MITZINZI - Tinospora oblongifolia (Engl.) Troupin (Menispermac.)
MJILORE - Carpodiptera africana Mast. (Tiliac.)
MKALAKALA - Bridelia cathartica Bertol. f. ssp. melanthesoides (KC.) Leonard (Euphorbiac.)
MKANGALUNGU - Cyphostemma sp. nr. adenocaule (A. Rich.) Wild & Drum. (Vitac.)
MKAPU TSAKA - Teclea trichocarpa (Engl.) Engl. (Rutac.)
MKIBUDHI - Elaeodendron schlechteranum (Loes.) Loes. (Celastrac.)
MKIDHUNYA - Harrisonia abyssinica Oliv. (Simaroubac.)
MKILIFI - Azadirachta indica A. Juss. (Meliac.)
MKINGILI - Dichrostachys sp. (Mimosac.)
MKIPA - Euclea natalensis A.DC. (Ebenac.)
MKONE - Grewia plagiophylla K. Schum. (Tiliac.)
MKONE KIDOGO MWERUHA - Grewia truncata Mast. (Tiliac.)
MKUINI - Pentas bussei K. Krause (Rubiac.)
MKULU - Berchemia discolor (Klotzsch) Hemsl. (Rhamnac.)
MKUNA MBAWA - Xylopia parviflora (A. Rich.) Benth. (Annonac.)
MKWAJU - Tamarindus indica L. (Caesalpiniac.)
MKWEKE - Diospyros squarrosa Klotzsch (Ebenac.)
MLA NYUNI - Ficus sansibarica Warb. (Morac.)
MOKONE MIRU - Grewia sp. (Tiliac.)
MONDO - Panicum maximum Jacq. (Poac.)
MONG'AMBOKAPEHE - Mimusops fruticosa A. DC. (Sapotac.)
MORYA - Sterculia africana (Lour.) Fiori (Sterculiac.)
MPUPUMITU - Canavalia cathartica Thouars (Papilionac.)
MPWEKE - Diospyros squarrosa Klotzsch (Ebenac.)
MREMBE GANGA - Hibiscus micranthus L.f. (Malvac.)
MSASA - Cordia ovalis Br. ex DC. (Boraginac.)
MSHINDANO - Azima tetracantha Lam. (Salvadorac.)
MSHOMORO - Lantana camara L. (Verbenac.)
MSUMARI BARA - Lonchocarpus bussei Harms (Papilionac.)
MSUNGUJI - Clerodendron violaceum Guerke (Verbenac.)
MTONGAZI - Ancylobotrys petersiana (Kl.) Pierre (Apocynac.)
MTSERERE - Hoslundia opposita Vahl (Lamiac.)
MTSUTSI - Combretum schumannii Engl. (Combretac.)
MUBONO KOMA - Croton talaeporos A.R. Smith (Euphorbiac.)
MUBUNDUKWE - Ehretia petiolaris Lam. (Boraginac.)
MUCHERERE - Monodora grandidieri Baill. (Annonac.)
MUDHIALE - Drypetes reticulata Pax (Euphorbiac)
MUDIRO - Antiaris toxicaria (Rumph. ex Pers.) Lesch. (Morac.)
MUDUNGA TUNDU - Dovyalis abyssinica (A. Rich.) Warb. (Flacourtiac.)
MUGALAGALA - Boerhavia diffusa L. (Nyctaginac.)
MUGANDAMWE - Meyna tetraphylla (Hiern) Robyns ssp. comorensis (Robyns) Verdc. (Rubiac.)
MUGUGUNE - Ziziphus mucronata Willd. (Rhamnac.)
MUHUMBONYOKA - Momordica trifoiata Hook. f. (Cucurbitac.)
MUHOWE - Thespesia danis Oliv. (Malvac.)
MUHUMBA - Cassia afrofistula Brenan (Caesalpiniac.)
MUHUNGO - Dalbergia melanoxylon Guill. & Perr. (Papilionac.)
MUKAMBI - Celosia schweinfurthiana Schinz. (Amaranthac.)
MUKIRUDA - Ehretia bakeri Britt. (Boraginac.)
MUKURO - Teclea trichocarpa (Engl.) Engl. (Rutac.)
MUKWAMBA - Suregada zanzibarensis Baill. (Euphorbiac.)
MULALA - Hyphaene coriacese Gaertn., young plant, (Arecac.)
MULUNGU - Erythrina sacleuxii Hua (Papilionac.)
MUMAUA - Heinsia crinita (Afzel.) G. Tayl. (Rubiac.)
MUMOTO - Azima tetracantha Lam. (Salvadorac.)
MUNENEKANDA - Lonchocarpus laxiflorus Guill. & Perr. (Papilionac.)
MUNWAMADZI - Cissus integrifolia (Bak.) Planch. (Vitac.)
MUNYALA - Cussonia zimmermannii Harms (Araliac.)
MUNYUMBU - Lannea cf. greenwayi Kokwaro (Anacardiac.)
MUPAPURA - fruit from Capparis tomentosa Lam. (Capparac.)
MURORI - Uvaria cf. acuminata Oliv. (Annonac.)
MUTHURITHURI - Phyllanthus aff. amarus Schum. & Thonn. (Euphorbiac.)
MUTONGAZI - Ancylobothrys petersiana (Klotz.) Pierre (Apocynac.)
MUTUMOKO - Vangueria cf. tomentosa Hochst. (Rubiac.)
MUTUNGURU - Thylachium thomasii Gilg (Capparac.)
MUTZAMI - Mimusops fruticosa A. DC. (Sapindac.)
MUYAMA WA NYIKA - Croton cf. menyhartii Pax (Euphorbiac.)
MUYU - Adansonia digitata L. (Bombacac.)
MUZUNGA - Diospyros abyssinica (Hiern) F. White (Ebenac.)
MVUNGUNYA - Kigelia africana (Lam.) Benth. (Bignoniac.)
MWANGA - Terminalia spinosa Engl. (Combretac.)
MWINIKA NZOVU - Asparagus sp. (Liliac.)
MZANGE - Dregea rubicunda K. Schum. (Asclepiadac.)
MZEREKTA - Azadirachta indica A. Juss. (Meliac.)
MUVILA - Sarcostemma viminale (L.) R.Br. ssp. viminale (Asclepiadac.
NGIRA MBIRI - Synaptolepis kirkii Oliv. (Thymelaeac.)
TAMBUUMWITU - Dioscorea asteriscus Burkill (Dioscoreac.)
UBUGU - Clitoria ternatea L. (Papilionac.)
ULANGA - Tacca leontopetaloides (L.) Ktze. (Taccac.)

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