TREES OF SOMALIA

A Fieldguide for Development Workers

Desmond Mahony

OXFAM

HENRY DOUBLEDAY RESEARCH ASSOCIATION

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TREES OF SOMALIA

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Titles of Somalia.

Figure 1. **Climatic zones (based on altitude and rainfall)**

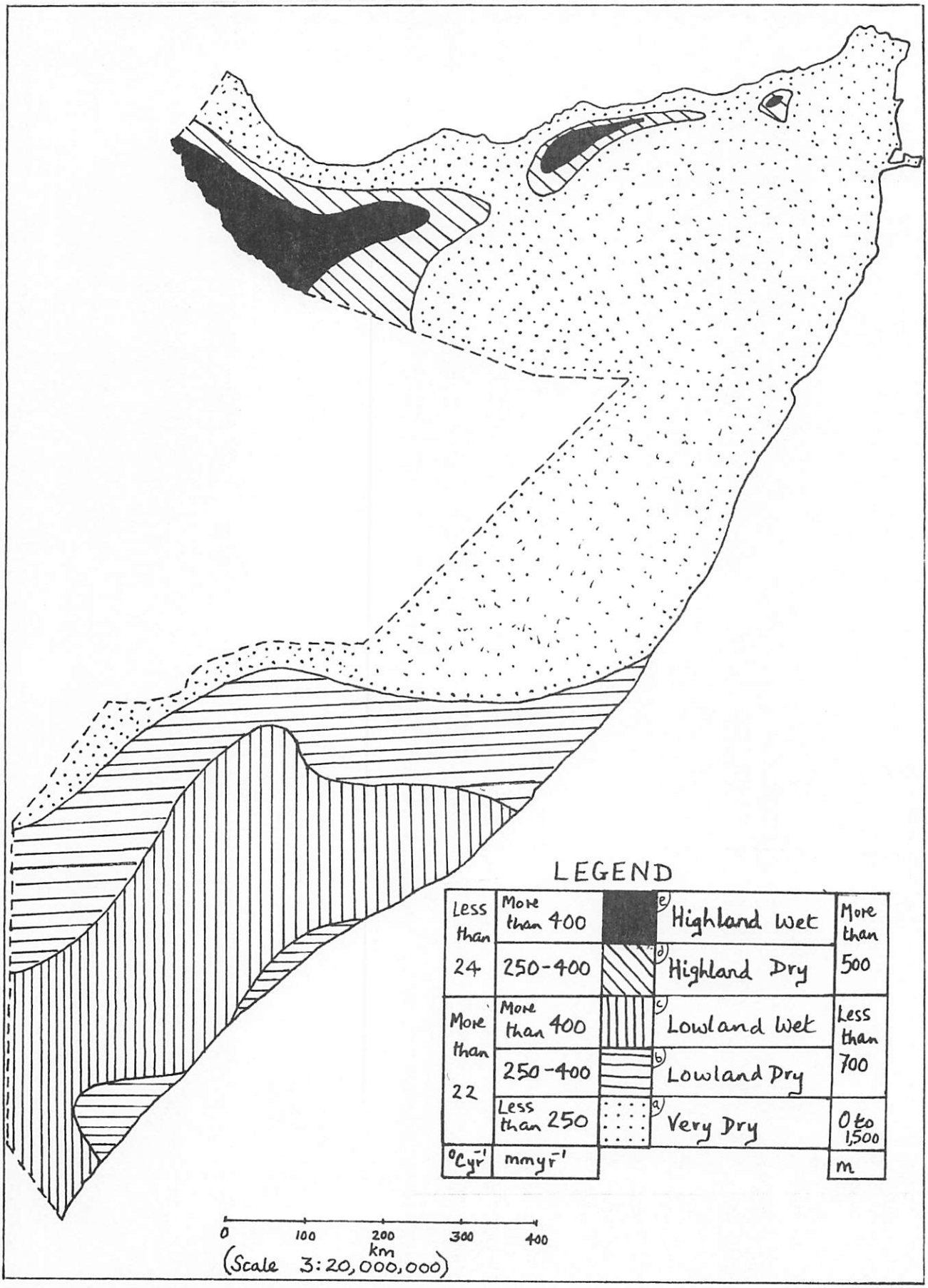

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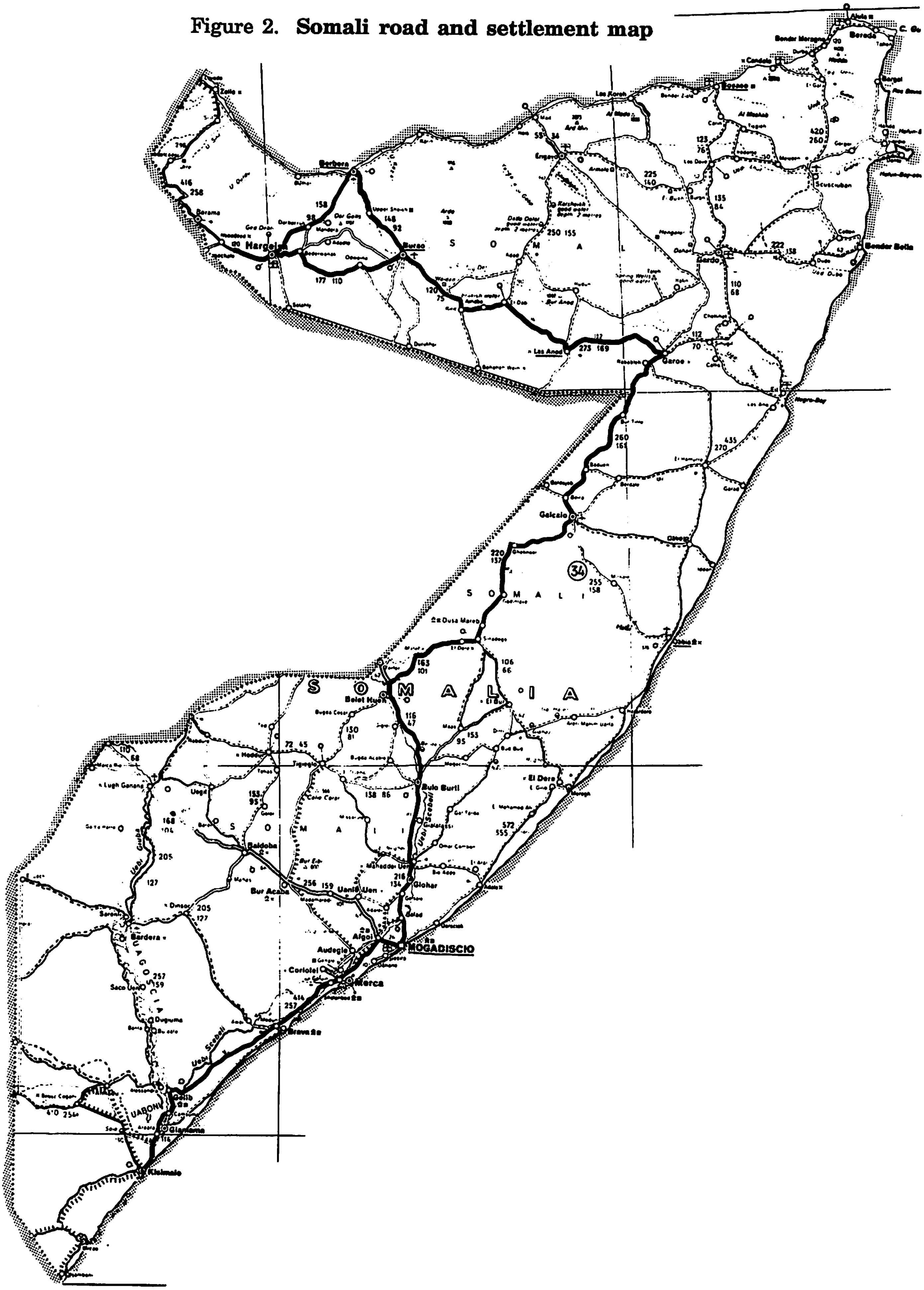
Figure 2. Somali road and settlement map



Introduction

This book is derived from various sources and my observations while in Somalia. The information should be regarded as guidelines only. Exact information on Somali trees is scarce, and what is available often conflicts. I hope that individuals and agencies involved in Somali forestry (Somali and expatriate) will co-operate in refining and improving this set of notes, in the years to come. If this happens then this book will perform the function of being a foundation on which improved sets of information can be built.

The pages are laid out in such a way as to facilitate easy addition and/or deletion of information.

In Somalia there are many hundreds of native trees. Also there are thousands of foreign trees which could be grown. This folder only includes 44 woody perennials selected because they are regarded by the author as being particularly useful.

The purpose of this book is to help identify and explain the uses of important trees. It is hoped that it will be useful to forestry and agricultural extension workers, National Range Agency and Ministry of Agriculture personnel and NGOs or International Agencies interested in Somali forestry.

It is hoped that it will enable the Somali public to become more involved in forestry. For without their participation the deterioration of the Somali environment cannot be prevented.

In Chapter 1 the tree names, climatic requirements and uses are discussed. Chapter 2 gives the uses, identification, description and growing instructions for each tree. Chapter 3 is a list of references. The trees are presented in three groups: A - Somali trees, B - Foreign trees, C - Foreign fruit trees. Chapter 4 provides information on the propagation of fruit trees.

WHEN INFORMATION IS NOT KNOWN A BLANK SPACE IS LEFT. FILL IN THE MISSING INFORMATION IF YOU CAN.

Chapter 1.
Names, climate zones and uses

1.1 Tree names

Much confusion occurs over the names of trees in Somalia because many different names are used for the same trees. Therefore in this book the international botanical name is taken as the standard. In the Tables below, Somali names are listed against botanical names to clarify which tree is which. Sources for these names are derived from the Somali teachers at the NRA forestry school, Peter Kuchar and Michael Madany.

Table 1: Botanical tree names

Botanical	Somali	Arabic	English
A. Somali trees			
Acacia albida	Garabi	Haraz	Apple ring acacia
Acacia bussei	Galool		
Acacia nilotica	Tugaar	Sunt	Egyptian thorn
Acacia senegal	Adad	Hashab, Alloba	Gum arabic
Acacia tortilis	Qurac	Seyal	Umbrella thorn
Balanites aegyptiaca	Quud	Heglig (Lalob)	Soapberry tree
Boswellia frereana	Yegaar		Frankin-cense tree
Commiphora myrrha	Diddin	Balsam	Myrrh tree
Conocarpus lancifolius	Dhamas		Common tug tree
Cordeauxia edulis	Yehib		Yihib nut tree
Cordia sinensis	Mareer		
Dobera glabra	Garass	Mikah	
Hyphaene compressa	Khone	El Dom	Doum palm
Juniperus excelsa	Dayib	Ar Ar	Pencil cedar
Phoenix dactylifera	Timir	Nakl-el-Balah	Date palm
Salvadora persica	Adei	Araq	Toothbrush tree
Tamarindus indica	Raqay	Abal	Tamarind
Tamarix aphylla	Dhuur	Atel, Tarfah	Tamarisk
Terminalia prunioides	Harayri		
Terminalia spinosa	Hara		Spiny desert tree
Ziziphus mauritiana	Gobb	Nabk	Chinese date
B. Foreign trees			
Albizia lebbeck		Dakn-el-Bashna	Siris tree
Azadirachta indica	Geed hindi		Neem
Cassia siamea	Boordi		Ironwood
Casuarina equisetifolia	Shawri		Whistling pine
Eucalyptus camaldulensis	Baxarasaaf	Kafur	Red river gum
Khaya senegalensis	Mahogany	Kaya	African mahogany
Leucaena leucocephala			Ipil-ipil tree
Parkinsonia aculeata	Geed walaayo		Hardbean
Prosopis chilensis			Mesquite
Prosopis cineraria		Ghaf	Ghaf
Prosopis juliflora	Lebi		Algaroba
Schinus molle	Mirimiri	Filfilrafie	Pepper tree
Sesbania grandiflora		Sisaban	Corkwood tree

Table 1: (continued)

Botanical	Somali	Arabic	English
C. Foreign fruit trees			
Anacardium occidentale	Bibbo		Cashew nut
Annona muricata	Anuune (weyn)		Soursop
Annona squamosa	Anuune (yare)		Sweetsop, sugarapple
Carica papaya	Babay		Papaya
Citrus aurantifolia	Liin	Mawaleh	Lime
Citrus paradisi	Bombelmo	Mawaleh	Grapefruit
Cocos nucifera	Qumbe	Bondog	Coconut
Mangifera indica	Cambe	Mango	Mango
Psidium guajava	Seytuun	Guwafa	Guava
Terminalia catappa	Beydaan	Luze	Indian almond

Table 2: Somali tree names

Somali	Botanical
A. Somali trees	
Adad	*Acacia senegal*
Adei	*Salvadora persica*
Dayib	*Juniperus procera*
Dhamas	*Conocarpus lancifolius*
Dhuur	*Tamarix aphylla*
Diddin	*Commiphora myrrha*
Galool	*Acacia bussei*
Garabi	*Acacia albida*
Garass	*Dobera glabra*
Gobb	*Ziziphus mauritiana*
Hara	*Terminalia spinosa*
Harayri	*Terminalia prunioides*
Khone	*Hyphaene compressa*
Mareer	*Cordia sinensis*
Qurac	*Acacia tortilis*
Quud	*Balanites aegyptiaca*
Raqay	*Tamarindus indica*
Timir	*Phoenix dactylifera*
Tugaar	*Acacia nilotica*
Yegaar	*Boswellia frereana*
Yehib	*Cordeauxia edulis*
B. Foreign trees	
Baxarasaaf	*Eucalyptus camaldulensis*
Boordi	*Cassia siamea*
Geed hindi	*Azadirachta indica*
Geed walaayo	*Parkinsonia aculeata*
Lebi	*Prosopis juliflora*
Mahogany	*Khaya senegalensis*
Mirimiri	*Schinus molle*
Shawri	*Casuarina equisetifolia*
	Albizia lebbeck
	Leucaena lencocephala
	Prosopis chilensis
	Prosopis cineraria
	Sesbania grandiflora

Table 2: (continued)

Somali	Botanical
C. Foreign fruit trees	
Anuune (weyn)	*Annona muricata*
Anuune (yare)	*Annona squamosa*
Babay	*Carica papaya*
Beydaan	*Terminalia catappa*
Bibbo	*Anacardium occidentale*
Bombelmo	*Citrus paradisi*
Cambe	*Mangifera indica*
Liin	*Citrus aurantifolia*
Qumbe	*Cocos nucifera*
Seytuun	*Psidium guajava*

Table 3: Somali tree names with regional variations

A. Somali trees

Adad:	Jiiq, Caddad cad, Cadaad geri, Edad, Idad, Adat, Adad Geri, Adad Jerri, Jalegan, Cadad, Adad, Gansax (Gum:Abach,Habec,Adad)
Adei:	Caday, Rumay, Addai, Ade, Adi, Arak, Rak, Rummi, Adai,Adaj,Hadai,Hadi,Aie,Aras (Toothstick:Rummei,Rummi)
Dayib:	Dayeb, Deyib, Daiyib, Deid, Sigib, Taiid, Tajib, Zerida
Dhamas:	Hadeti, Damas, Sammas, Hodeti, Damask (Wood: Shalman, Rawakib, Tassasi)
Dhuur:	Gol
Diddin:	Dhiddin, Gowlalla, Xagar, Xoday, Haggar, Golelu, Hotai, Surut, Wedu Dedin (Myrre: Malmol)
Galool:	Galol, Galoll, Sarmaan, Dhaadheer, Surrmann
Garabi:	
Garass:	Geras, Kharas
Gobb:	Gop, Gub, Gob, Ghebb
Hara:	Xarar, Harar, Hareeri, Hareri, Buga, Leby, Areri
Harayri:	Hareeri, Hareri, Tiyes, Ti-e, Areri, Careri, Cordoba, Ordoba
Khone:	Qone, Ari
Mareer:	Madheedh, Modheedh, Marerh, Marer, Do-ol, Madheedh, Maded, Mared, Maret, Marir, Bared, Morette, Maded-Goli, Mared-Daol
Qurac:	Qora, Qudhac, Gurah, Gurha, Tim-ad, Abak, Abqo, Abac, Obac, Acab
Quud:	Koolan, Guud, Kullan, Shillan, Collum, Kullum, Ghot, Goa, Goah, God, Gut, Ader, Kidi, Kidthi, Koulan, Kulan, Schilling, Quwaax, (Resin: Hanji-Kidthi)
Raqay:	Rogo, Ragaay, Racai, Rakhi, Roco, Xamar, Harmar, Timir hindi
Timir:	Kharif
Tugaar:	Tugare, Turaar, Twer, Tuwer, Tugaal, Maraa, Marah, Dughir,Dugar
Yegaar:	Yagar, Yagcar, Yehar, Moxoh, Cad, Mohor, Gegar, Gehar, Gekar, Mohor-ad (Gum-resin Mayddi, Luban)
Yehib:	Gud, Guda, Gude, Gut, Yicib, Jicib, Jiic, Ye-eb, Yeheb, Jieheb.

Table 3: (continued)

B. Foreign trees

Baxarasaaf:	Baharasaaf
Boordi:	
Geed hindi:	Mirimiri
Geed waalaayo	
Lebi:	
Mahogany:	
Mirimiri:	
Shawri:	

C. Foreign fruit trees

Anuune (weyn):	
Anuune (yare):	
Babay:	Magfafai
Beydaan:	Bidan
Bibbo:	Kashew
Bombelmo:	
Cambe:	Ambo, Amba
Liin:	
Qumbe:	Qunbe, Naarajiin
Seytuun:	Zeitum

Table 4: Climatic zones

Code	Climatic zone	Rainfall (mm/yr)	Altitude (m)	Temperature (°C/yr)
A	Very dry	<250	0-1500	>22
B	Lowland dry	250-400	<700	>22
C	Highland dry	250-400	>500	<24
D	Lowland wet	>400	<700	>22
E	Highland wet	>400	>500	<24

Note: < = less than, > = more than.

Table 5: Trees in order of drought tolerance

(in order of *minimum* rainfall requirement)

			Climate zone
Between 50-250 mm/yr			
	50	*Salvadora persica*	A B D
	100	*Acacia tortilis*	A B C D E
		Tamarix Aphylla	A B D
		Acacia bussei	A B C D E
	150	*Ziziphus mauritiana*	A B D
		Cordeauxia edulis	A B C
		Prosopis juliflora	A B C D E
	200	*Acacia senegal*	A B D
		Prosopis chilensis	B D
		Acacia albida	B C D E
		Acacia nilotica	B D
		Commiphora myrrha	B C D E
		Conocarpus lancifolius	B C D
Between 250-400 mm/yr			
	250	*Terminalia spinosa*	B C D
		Parkinsonia aculeata	B C D E
	300	*Cordia sinensis*	B
		Casuarina equisetifolia	D
		Eucalyptus camaldulensis	B C D E
	350	*Balamites aegyptiaca*	D
		Boswellia frereana	C E
		Dobera glabra	B D
Between 400-500 mm/yr			
	400	*Terminalia prunioides*	B D
		Khaya senegalensis	D E
		Prosopis cineraria	D
	450	*Azadirachta indica*	B C D
More than 500 mm/yr			
	500	*Juniperus excelsa*	E
		Albizia lebbeck	D
		Cassia siamea	D
		Schinus molle	E
		Anacardium occidentale	D
	600	*Tamarindus indica*	D
		Leuceana leucocephala	D
Irrigated:			
		Hyphaene compressa	A B D
		Phoenix dactylifera	A B D
		Mangifera indica	A B C D E
		Citrus aurantifolia	A B C D E
		Citrus paradisi	A B C D E
		Sesbania grandiflora	A B D
		Terminalia catappa	A B D
		Annona muricata	A B C D
		Annona squamosa	C E
		Psidium guajava	A B C D E
		Cocos nucifera	A B D

Table 6: Tree uses (*=useful, **=very useful)

A. Somali trees	Toothbrushes	Toolhandles	Timber	Tannins	Soil improvement	Shelterbelt	Sandune fixation	Poles	People shade	Nitrogen fixation	Medicine	Livestock shade	Live fencing	Intercropping	Insecticide	Honey	Hedge	Gums	Fuel	Fruit	Fodder	Edible leaves	Dyes	Dead fencing	Charcoal	Carving	Amenity
Acacia albida			*	**	**			*		*	*	*		**		*	*	*	*		**	*			*	*	
Acacia bussei				*					*		*	*				*		*	**		**				**		
Acacia nilotica		*	*	*				*			*					*		*	*		*		*		*	*	
Acacia senegal		*		*	*		**	*		*	*	*	*			*		**	**	*	*				**		
Acacia tortilis		*					**	*		*	*	*	*			*			**		**			*	**		
Balanites aegyptiaca		*	*								*		*						**	**	*	*		*	**	**	
Boswellia frereana																		**									
Commiphora myrrha				*							*		**					**									
Conacarpus lancifolius			*		*	**		**	**		*								*						**		**
Cordeauxia edulis																			*	**	**		*				
Cordia sinensis		**									*								*	**	**					*	
Dobera glabra									**			**		**						**	**					**	
Hyphaene compressa			*					*			*								*			*	*			*	
Juniperus excelsa			**		*			**											*							*	
Phoenix dactylifera			*			*		*	**			*							*	**	*	*					
Salvadora persica	**	*	*			*					*					*				*	**						
Tamarindus indica		*	*	*					*		*	*	*			*			*	**	*		*		**	**	*
Tamarix aphylla		*	*	*	*	*		*	*		*						*		*		*		*		*	*	*
Terminalia prunioides		*			*		*	**	*		*	*		**				*	*	*	*		*		**	*	
Terminalia spinosa			*																*						**		
Ziziphus mauritiana		*	*	*		*		*			*		**						**	**	**		*		*	*	
B. Foreign trees																											
Albizia lebbeck			*	*	**		*		*		*			**		*	*		*		**				*	*	*
Azadirachta indica	*		*	*	*	*		*	**		*	*			**	*			*						*	*	*
Cassia siamea		*		*	*	*		**	**		*					*			*						*	*	**
Casuarina equisetifolia				*	*	**	**	*		**	*						*		**				*		**		*
Eucalyptus camaldulensis			*	*		*		*	**		*					**			*						*		*
Khaya senegalensis			**						**		*			*		*			*							**	**
Leucaena leucocephala			*		**	**		**		**	*			**			**	*	*		*	*	*		*		*
Parkinsonia aculeata					*	*	**		*		*	*	**			*			*	*	*				*	*	**
Prosopis chilensis				*					*	*						*			*	*	*					**	*
Prosopis cineraria		*	*	*	**	*	*	*		*	*			**		*	**	*	**	*	**				*	*	
Prosopis juliflora				*	*		**	*	*		*	*				*		*	**	*	*		*		**	*	*
Schinus molle				*		*		*	**							*	*		*						*		**
Sesbania grandiflora				*	**	*			*	**	*			**			*	*			**	*					*
C. Foreign fruit trees																											
Anacardium occidentale			*	*	*	*	*	*			*			*	*	*		*	*	**	*	*			*		
Annona muricata											*									**							
Annona squamosa											*				*					**							
Carica papaya				*																**							
Citrus aurantifolia																			*	**							
Citrus paradisi																				**							
Cocos nucifera							*	*	**		*								*	**						*	*
Manifera indica			*	*				*	**		*					*			*	**	*	*			*	*	**
Psidium guajara		*		*				*			*								**	**			*		*		
Terminalia catappa			*	*			*		**		*								**	**			*			*	**

1.2. Climatic zones

Drought hardiness is usually the most important feature of any tree species considered for planting in Somalia. The tree must be able to survive even if the rains fail; to make it worth planting it is important to stress that:

- Foreign fruit trees all require permanent irrigation
- There are Somali trees which do produce fruit, even though usually thorny.
- Protection of existing trees is usually more worthwhile than planting new ones.

The climatic conditions of an area dictate what plant species can survive within it. Somalia is a hot dry country with highlands in the north, a very long coastline and two rivers in the south. Scientists have been measuring rainfall and temperature in Somalia for over fifty years and now have a picture of its climate. They know roughly how much rain is likely to fall and how hot it is likely to be in each part of the country.

Some general points about Somalia's weather are as follows:

(a) Rainfall is always very unpredictable as to where and when it will fall. Nomadic pastoralism is a way of life adapted to this fact.

(b) The rainfall is more in the south than in the centre and north, except on the highlands of the north.

(c) The temperature is cooler in the highlands of the north than anywhere else.

(d) Water evaporates from the sea and is deposited on the land close to the sea, in the early morning, causing the sandunes close to the sea to be able to support tree growth.

(e) Where rainfall is more than 400mm per year, (or where irrigation is possible from rivers, tugs or wells), dryland farming can take place.

The climate and availability of water affects the trees which can grow in a place. For example the cool wet climate of Dalo in the northern highlands support the Dayib (*Juniperus excelsa*) forests. The hot dry plains of Galgadud support the Yehib (*Cordeauxia edulis*) shrub. On the hot wet banks of the Shabelle river at Afgoi the Cambe (*Mangifera indica*) is carefully planted and grown by the farmers. You cannot take these trees away and grow them outside their climate zone. For Dayib it must be cool and wet, for Yehib it must be hot and dry and for Cambe it must be hot and wet; otherwise they die. Therefore it is important we learn which trees are suited to grow in each zone. Some, like Dayib, are very particular as to where they will grow. Others, like Qurac (*Acacia tortilis*) can grow in a variety of climate zones.

It must be stressed that the climate information is only rough and there may be some errors in the lists. The Somali climatic map shown on page v is divided into five climatic zones according to rainfall and altitude. Generally the higher the altitude the cooler the climate.

Chapter 2.
Tree descriptions

These tree descriptions are derived from information scattered in various books and botanical collections. Please take into account that tree shapes and forms vary and that the drawings in this book may not look exactly like the same species of tree growing in Somalia. It is hoped that the drawings and information are accurate enough to aid identification and associate tree uses to each species.

The four sided format for each species is designed so that:

- More tree species can be added to the book if you so wish (Photocopy the blank sheets at the back of the folder).
- Information concerning species can be easily compared because all trees are described on identical forms. This makes it easy to compare the pods of the Acacia species for example.
- More information can be added against the species either in the spaces available on the forms, or by adding extra pages into the book.

Concerning the "tree drawings" section the pictures of fruit, flower, leaf, seed and foliage are all life size, unless otherwise stated on the drawings. In the case of tree shape the pictures are obviously smaller than life and include a representation of an adult man between the height of 1.5-2 metres tall.

Concerning the "tree details" section,"(mm/yr)" of rainfall represents the average rainfall in millimetres per year required by the species. Likewise "(°C)" represents the average temperature range in degrees centigrade favoured by species. "(m)" of altitude represents the height above sea level in metres where the species is able to grow. Concerning the uses section an asterisk "*" suggests the species is useful for that purpose. Two askerisks "**" means very useful.

Concerning the "tree descriptions" section, this is primarily based on size and colour which are the two most easily recognised features of a plant. Numbers in brackets usually represent the maximum or minimum metric lengths. Sometimes information is in brackets if it is additional information, or derived from a different source.

Concerning the "tree growing" section much information is still to be filled in. This information can be derived from (and of use to) the various tree nurseries scattered around Somalia.

The books and publications from which the species descriptions were compiled are listed in Chapter 3, at the end of the book. Those marked "§" were the main sources of information and are recommended reading.

Tree details

1. Names: Garabi *Acacia albida*

Arabic	Haraz
English	Apple ring, Goa, Winter thorn.
Species	Acacia albida Del.
Family	Leguminosae - Mimosoideae
Synonyms	Faidherbia albida (Del.) A.Chev

2. Natural distribution:

Middle East (Israel and Syria) and Africa. Within Africa from Egypt to South Africa and eastward from Senegal to Mozambique. Not rainforest. A common and famous African tree, only growing where there is groundwater less than 15m depth.

3. Where found in Somalia:

North-West Somalia: Tugside at Dile on Boroma-Hargeisa Rd. Planted in Forestry Projects. eg. Brava. Possibly existing naturally in other parts of Somalia but not widely recorded.

4. Climate requirements:

Rainfall (mm/yr)	250 - 1000
Temperature(°C)	18 - 30. Not frost tolerant
Altitude (m)	0 - 2000
Groundwater	Saline tolerant. Must be less than 7m from surface. Not waterlogged.

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	**	Fruit	(*)
Charcoal		Livestock shade	*	Edible leaves	*
Poles	*	Intercropping	**	Honey	*
Toolhandles		Nitrogen fixation	*	People shade	
Carving	*	Shelterbelt		Amenity	
Timber	*	Hedge	*	Medicine	*
Insecticide		Soil improvement	**	Gums (Edible)	*
Sandune fixation		Tannins	**		

Soap, edible boiled seeds. Furniture. Pestles and mortars. Dry season browse: can double livestock carrying capacity of land. Famine fruit: Pod boiled.

6. Recommendations and notes:

Suitable for intercropping in farmland because leaves fertilise soil and are available as fodder during the dry season. Could be tried on rainfed farmland in Southern Somalia or North West Somalia where water table is high.Important point is leaves drop and fertilise soil just when crops are sown. Then crops grow under tree and get light because tree is leafless during rainy season. Crop production is greater under tree than away from tree. Leaves then grow being available as late-dry season fodder for livestock.

7. References: Anon., Baumer, Brenan, Carlovitz, NAS, Ross, SEPESAL, Teel, Webb *et al.*, Weber, Wickens.

Tree description

1. Summary:

Only Acacia to lose its leaves during rains and keep them during the dry season. Has an orange curled pod. Blue-grey coloured leaves. Thorns straight, paired and strong. Deciduous.

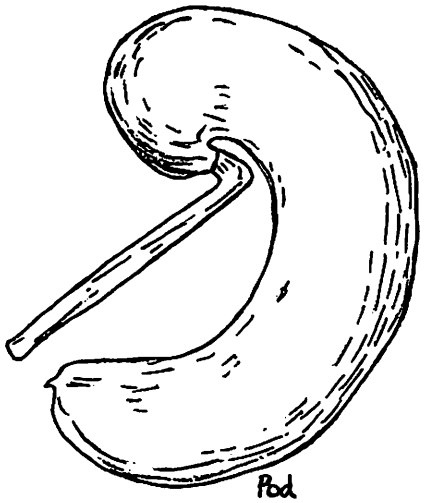
2. Detailed:

TREE SHAPE	Pyramid-like when young, rounded when older.	
Height	Up to 30 metres, usually much less.	
Trunk and	Usually solitary, thickening at base (1m dbh) Up to 6m high.	
Bark	Rough, cork like, deeply fissured scales losening and becoming detached.	(Colour:)Brown to dull grey (Slash:pale brown).
Branches	Ascending and spreading	(Colour:)White when young, later red-brown
FOLIAGE	May bear leaves all year round if there is no waterlogging	
Twigs	Smooth and zig-zag pattern	(Colour:)Crumbly,fissured and white
Thorns	Paired, strong, thick, straight. Often pointed slightly downwards.	
Size:	Up to 1.5-(2.3)cm long	(Colour:)Brown base,grey middle orange tips.
LEAF	Many leaflets in each leaf (Bipinnate) 3-10 pairs of pinnae	
Size	10cm long	(Colour:)Blue-grey-green
Leaflet	2-10(12) pairs per pinnae. Oblong and slightly hairy	
Size	2.5-14mm X 0.7-5mm	
FLOWERS	Sweet smelling. Sessile in dense axillary bunches	
Size	7-10cm long inflorescence	(Colour:)Yellow-Cream-White
FRUIT	Pods curled, twisted, brittle, thick and indehiscent.	
Size	(6)8-12(35)X(1.4)2-3(6)cm	(Colour:)Bright orange-brown-red-yellow
SEED	Shiny waxy cuticle.11-29 per pod. Elliptic lenticullar.Areole.	
Size	6-12X4-8mm	(Colour:)Dark shiny brown
ROOTS	Stout tap root with a spreading system of knee jointed laterals. Because it is deep rooted it does not compete for surface water.	
WOOD	Fairly softwood.	(Colour:)Sapwood dirty white (Colour:)Heartwood yellow-white
	Vulnerable to attack from termites. Not good for timber or firewood. Can be treated by soaking in water for several months. Timber tends to 'spring' after sawing.	

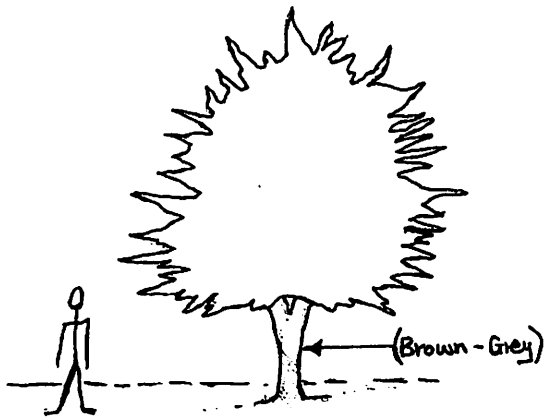
SOMALI NAME: GARABI

LATIN NAME: ACACIA ALBIDA

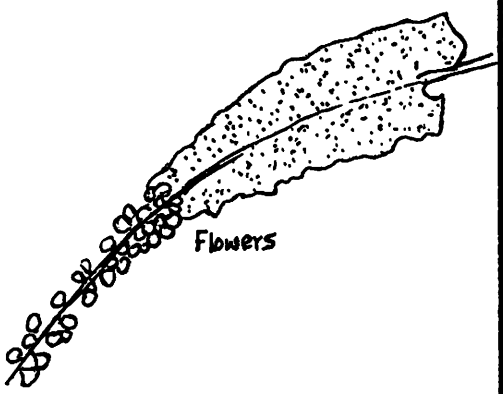
FRUIT (Orange)



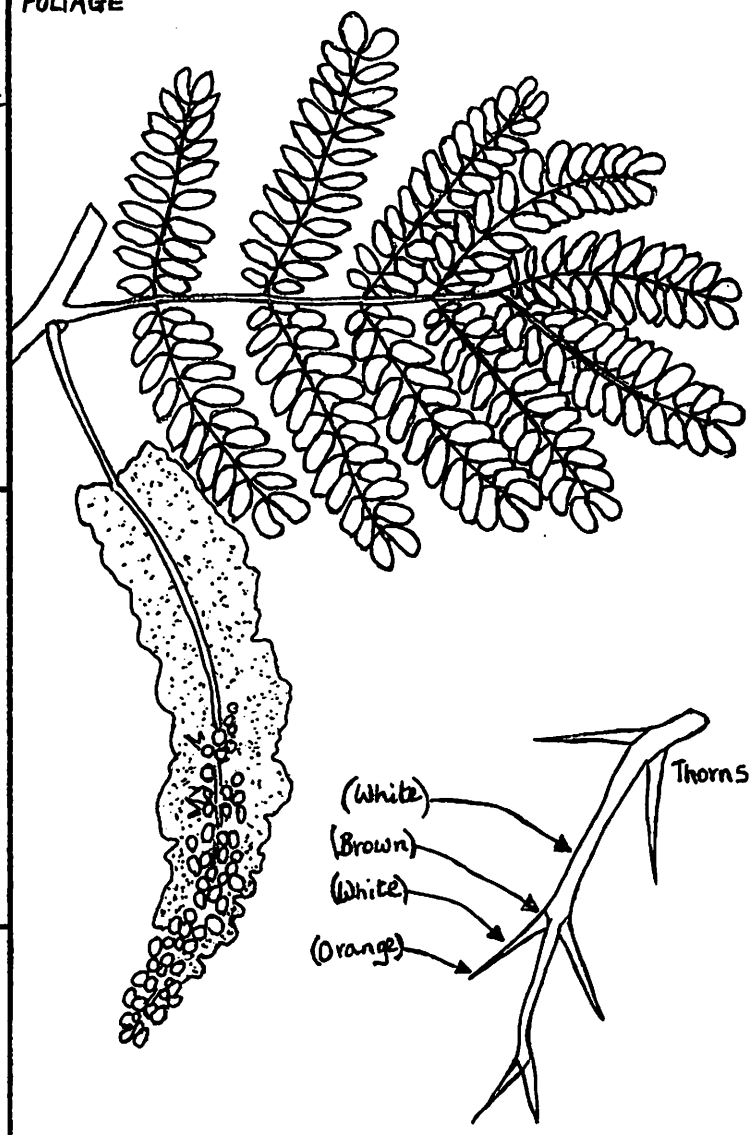
TREE SHAPE



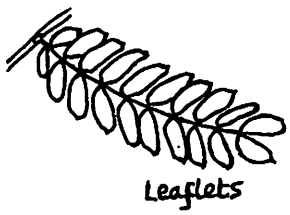
FLOWER (Yellow-White)



FOLIAGE



LEAF (Blue-Grey-Green)



SEED (Dark Brown)

Tree growing

Names: Garabi *Acacia albida*

1. Methods of propagation:

Possible to direct sow pretreated seed at the beginning of the rains on a protected site. As seed is difficult to collect better to raise nursery stock. Suckers have been recorded to grow from wounded roots.

2. Seed:

Number per kilogram	9,000 (3,500 trees per kilogram of seed).
Collection	Directly under mother trees. Notably from Senegal.
Extraction	Mortar and wind separation
Storage	Keep dry and cool and free from insects. Will store for several years
Pretreatment	Soak in tepid water for 24 hours.

3. Nursery:

Soil mixture	
Potsize	30cm X 10cm when flat
Sowing	2-3 per pot
Germination Percentage	40-60% in 6-30 days
Pricking out	After one month
Shade and watering	No shade needed. Daily watering needed.
Growth time	5-6 months till ready for outplanting 10-15cm height after 4 months
Other notes	Frequent root pruning required due to long taproot. Best to spray with insecticide.

4. Pests and diseases:

Seeds vulnerable to insect attack.

5. Planting:

Soils	Prefers sandy soils though can withstand heavier soils and occasional flooding. Well drained loamy soils ideal.
Method and Spacement	Large pits - deep and wide water catchment. Spacement of between 5 X 5m and 10 X 10m recommended. Best to inter-crop with agricultural crops such as sorghum, cowpeas or millet (100 trees/ha)
Fertilizers and insecticides	150 grams of NPK in bottom of each planting hole plus 10 grams of ammonium sulphate is desirable.

6. Aftercare:

Irrigation needed in dry sites for first 3 years until taproot reaches water table. Weeding necessary but care needed because roots very sensitive to disturbance. Prune off lower branches to stop horizontal growth shading out crops.

Growth and yields	80-100 years lifespan. Growth initially slow, but shoot growth accelerates once taproot reaches groundwater. Pods dropped late in dry season when needed by livestock.

7. Other notes:

Necessary to protect young trees from browsing livestock for 5-8 years.

Tree details

1. Names: Galool *Acacia bussei*

Arabic
English
Species Acacia bussei (Harms ex.) Sjostolt
Family Leguminosae - Mimosoideae
Synonyms Acacia benadirensis

2.Natural distribution:

Ethiopia, Kenya, Somalia, Tanzania.

3.Where found in Somalia:

Especially Bay region. Also north and central regions.

4.Climate requirements:

Rainfall (mm/yr) 130-500
Temperature (°C)
Altitude (m) 300-1800 (Higher altitudes of dry East Africa)
Groundwater

5. Uses: (In other countries and/or Somalia)

Fuel	**	Fodder	**	Fruit	
Charcoal	**	Livestock shade	*	Edible leaves	
Poles		Intercropping		Honey	*
Toolhandles		Nitrogen fixation		People shade	*
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	*
Insecticide		Soil Improvement		Gums (Edible)	*
Sandune fixation		Tannins	*		

It is the favourite tree species for charcoal use in Somalia fetching a high price in the market. Bark is fibrous and provides mats and ropes. Roots are used as framework of nomadic huts.

6. Recommendations and notes:

Refer to British Forestry Project, Mogadishu.

7. References: British Forestry Project, IBPGR, Kazmi, Ross, SEPESAL.

Tree description

1. Summary:

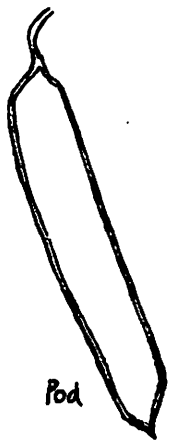
Fairly small brown pods and paired thorns. Thorns frequently swollen in middle and constricted at base.

2. Detailed:

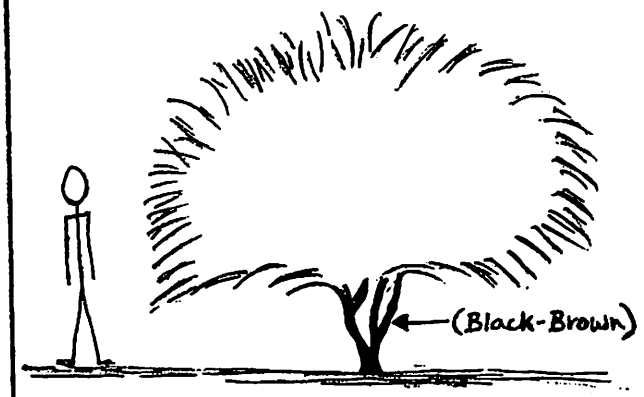
TREE SHAPE	Flattened crown	
Height	up to 10m	
Trunk and Bark	Frequently branching at base. Bark is rough and vertically fissured.	(Colour:) Black or brown
Branches		(Colour:)
FOLIAGE		
Twigs	Often long and straight	(Colour:) Grey-brown-purple-black
Thorns	Paired. Frequently swollen in middle and constricted at base	
Size	Up to 3cm long	(Colour:)
LEAF	Bipinnately compound with 2-8 pairs per pinnae	
Size	1.2-4.3cm long	(Colour:)
Leaflet	Linear or linear-lanceolate (pubescent). 7-18 pairs per pinna	
Size	1.5-5 X 0.5-1.5mm	
FLOWERS	Sessile	
Size	Spike: 1.8-6cm long	(Colour:) White (Yellowish)
FRUIT	Pod:flat, narrow, straight, oblong, dehiscent.	
Size	2 - 6.5 X 0.8 - 1.5cm	(Colour:) Brown (slightly darker around edges)
SEED	Flattened,obovate,compressed. Areole present.	
Size	5 X 4 - 4.5mm	(Colour:) Brown
ROOTS	Extensive shallow root system.	
WOOD	Very dense.	(Colour:) Dark brown heartwood (Colour:) Pale yellow sapwood

SOMALI NAME	GALOOL	LATIN NAME	ACACIA BUSSEI

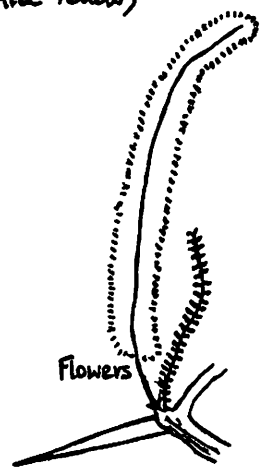
FRUIT (Brown)



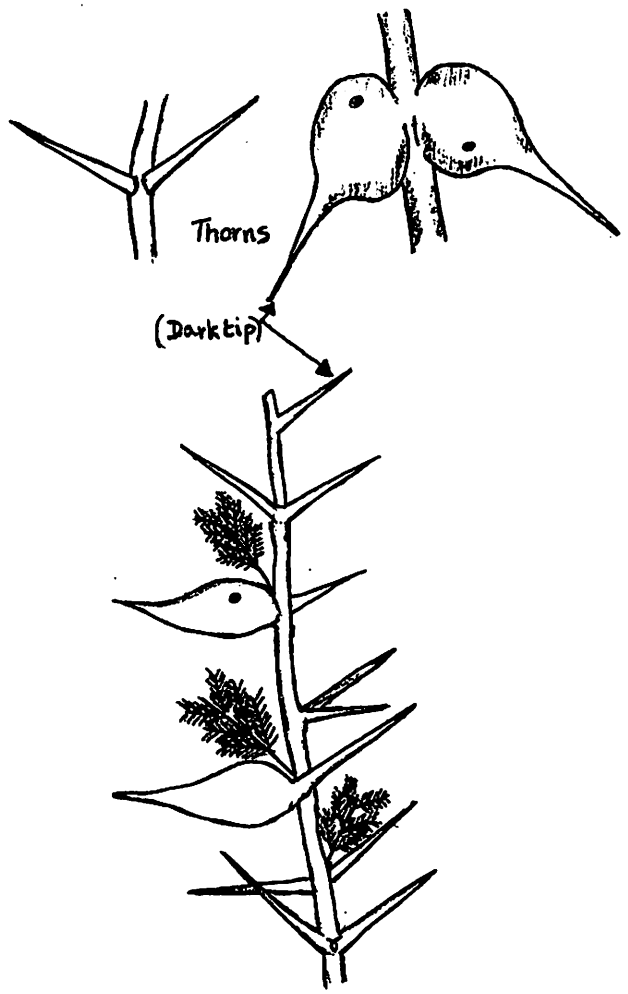
TREE SHAPE



FLOWER (White-Yellow)



FOLIAGE



LEAF

SEED

Tree growing

Names: Galool *Acacia bussei*

1. Methods of propagation:

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth time

Other notes

4. Pests and diseases:

5. Planting:

Soils

Method and spacement

Fertilizers and insecticides

6. Aftercare:

Growth and yields

7. Other notes:

Tree details

1. Names: Tugaar *Acacia nilotica*

Arabic	Sunt, Sunut (Garad)
English	Egyptian thorn, Prickly acacia (Babul)
Species	Acacia nilotica (adstringens) and Acacia nilotica (leiocarpa)
Family	Leguminosae - Mimosoideae
Synonyms	Acacia adansonii, Acacia scorpioides,Acacia arabica

2. Natural distribution:

Sahelian Africa: Burkina Faso, Cameroon, Chad, Gambia, Ghana, Guinea, Guinee-Bissau, Mali, Niger, Nigeria, Senegal, Somalia, Sudan, Togo. Other subspecies of Acacia nilotica native to India and Arabia.

3. Where found in Somalia:

Riverine areas. North, central and southern Somalia. Specifically on non-cultivated sites close to the Shabelle river. Growns in Las Anod and various villages down to Dusa Mareeb cultivated as a shade tree and receiving supplementary irrigation.

4. Climate requirements: Arid areas with groundwater.

Rainfall (mm/yr)	250-750
Temperature(°C)	High. Up to 50°C in shade tolerated. Frost not tolerated. Prefers 24-28°C.
Altitude (m)	0-500m
Groundwater	Tolerates seasonal flooding. Can withstand drought

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	*	Fruit	
Charcoal	*	Livestock shade		Edible leaves	
Poles	*	Intercropping		Honey	*
Toolhandles	*	Nitrogen fixation		People shade	
Carving	*	Shelterbelt		Amenity	
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement		Gums (Edible)	*
Sandune fixation		Tannins	*	Dyes	*

Useful for construction. Burning charcoal reportedly emits sparks. A fine- textured hardwood. Twigs can be used as tooth brushes. Can be used for making carts, boats, furniture, roof supports.

6. Recommendations and notes:

There is some confusion over the subspecies names of *Acacia nilotica* among botanists, it is a common species. It often grows around seasonal lakes. It can be managed (or planted) for erosion control or shelter. Possibly suitable for agroforestry. Could be tried as a shelterbelt multipurpose tree around rainfed farmland on heavier soils. Natural stands are a valuable source of fuel and timber and should be managed and protected in a more systematic way than they are at present. Already proven to be a valued shade tree in settlements in arid central regions.

7. References: Baumer, Brenan, Dale and Greenway, Little, Shani, SEPESAL, Teel, Webb, Weber.

Tree description

1. Summary:

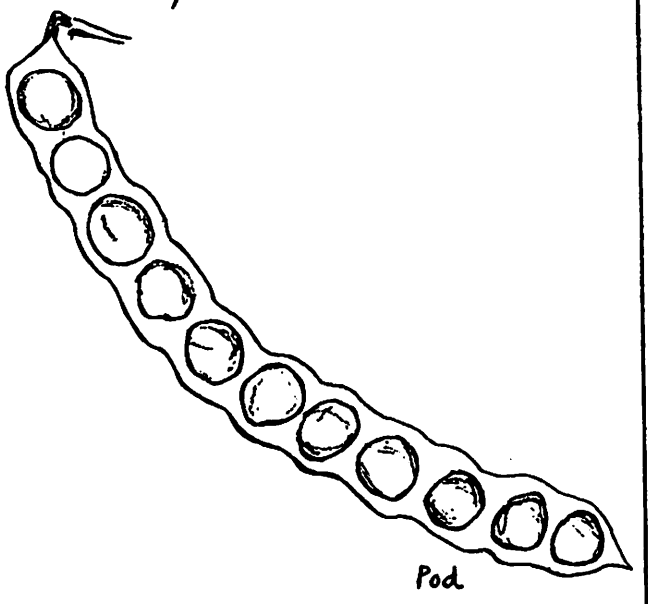
Spiny shrub or small tree. Many spines though sometimes absent in older trees. Foliage is blue-grey-green colour. Open crown.

2. Detailed:

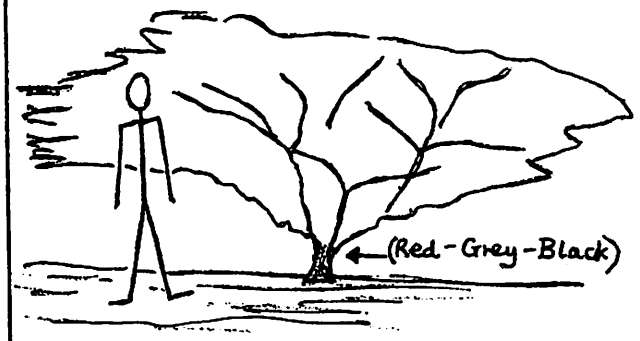
TREE SHAPE	Rounded and spreading or flattened umbrella crown.	
Height	3-5m (Up to 14m). Stem usually short and twisted.	
Trunk and	Main stem usually distinct and up to 4m high (15-60cm dbh)	
Bark	Deeply cracked,furrowed often exuding a red gum.	(Colour:)Red-dark brown-grey-black
Branches	Ascending and spreading	(Colour:)
FOLIAGE	Feathery	
Twigs	Cracking,slender. Underlying rust-red layer.	(Colour:) Grey to dark brown
Thorns	Paired, sharp, straight, slender, directed slightly downward.	
Size	1-8cm long	(Colour:) Light grey-white
LEAF	Bipinnately compound.2-14 pairs pinnae. Alternate.	
Size	5-15cm long	(Colour:) Blue-grey-green
Leaflet	7-25 pairs per pinnae. Small and narrowly oblong, blunt at ends.	
Size	(3.6mm long) 1-7 X 0.5-1.5mm (Pinnae are 1-4cm long)	
FLOWERS	Round fluffy heads (Globular) Sweetly scented	
Size	6-15mm diameter	(Colour:) Bright golden yellow
FRUIT	Pod: hemmed margins, indehiscent, thick.	
Size	4- cm long	(Colour:) Black to grey, whitish edges.
SEED	Rounded and flattened. 6-16 per pod	
Size	7-9mm diameter	(Colour:) Black-purple-brown
ROOTS	Long tap-root	
WOOD	Tough and durable when mature. Termite resistant and water repellent. Narrow to wide whitish sapwood and pinkish heartwood turning reddish brown with age, (specific gravity = 0.8). Difficult to saw. A fine textured hardwood.	(Colour:) Reddish brown

SOMALI NAME	TUGAAR	LATIN NAME	ACACIA NILOTICA

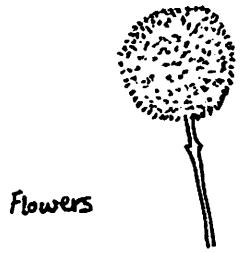
FRUIT (Black-Grey-Brown)



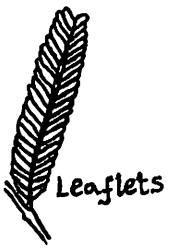
TREE SHAPE



FLOWER (Yellow)

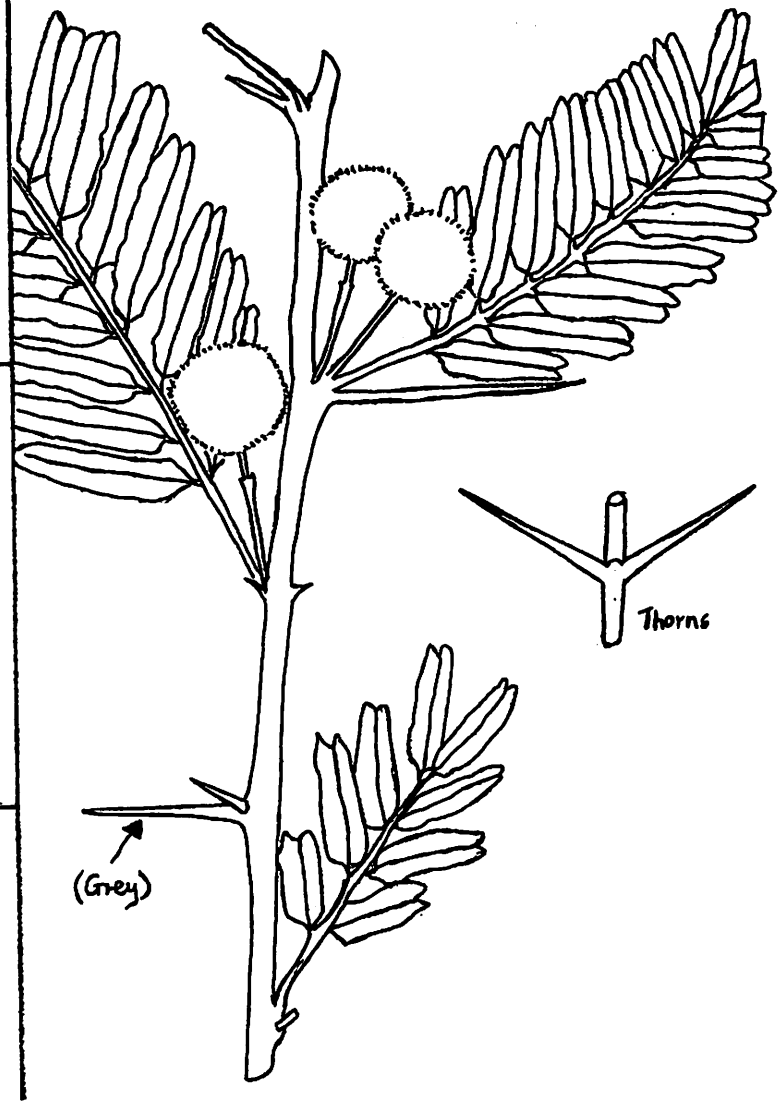


LEAF (Blue-Grey-Green)



SEED (Purple)

FOLIAGE



Tree growing

Names: Tugaar *Acacia nilotica*

1. Methods of propagation:

Direct sowing, cuttings or nursery stock all possible.

2. Seed:

Number/kilogram	7000 - 11,000
Collection	Strong and healthy trees
Extraction	By hand or pestle and mortar. Winnowing.
Storage	Room temperature for 1-2 years.
Pretreatment	None if fresh. Soaking in hot water, allow to cool and leave in water for 12 hours.

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	Within 7 days
Percentage	60-90%
Pricking out	
Shade and watering	
Growth time	3-4 months
Other notes	Rootpruning of taproot regularly required

4. Pests and diseases:

Bruchidius beetles attack seed. Tree liable to attack byvarious wood borers. Root boring beetle is also a pest.

5. Planting:

Soils	Prefers fine textured soils such as alluvial river soils. Can grow on heavy black cotton soils, heavy clays or poor rocky sites. Growth is however limited by presence of hardpans.
Method and Spacement	2-3 X 2-3m spacement. If direct sowing put 3 seeds per pit and thin out when 60cm high. A good species to establish crops between when young (Tuangya).
Fertilizers and insecticides	

6. Aftercare:

Weeding needed for two years. Thrives on seasonal waterlogging.

Growth and yields	Short-lived

7. Other notes:

Tree is an aggresive coloniser and strong light demander.

Tree details

1. Names: Adad *Acacia senegal*

Arabic	Hashab, Alloba
English	Gum Arabic, Three thorned Acacia, (Gommier)
Species	Acacia senegal (L) Willd
Family	Leguminosae - Mimosoideae
Synonyms	Acacia verek Guill and Perr

2. Natural distribution:

Sahel zone of Africa from Mauretania to Sudan and Somalia. (Arabia, west India, Kenya, Uganda, Tanzania, South Africa, Mozambique, Iran, Pakistan - introduced and naturalized)

3. Where found in Somalia:

Sandunes close to Mogadishu. Native to north, central and southern Somalia. There is more than one variety in Somalia.

4. Climate requirements:

Dry soils	
Rainfall (mm/yr)	200-500
Temperature(°C)	(16 -) 22-32 (-40) Frost sensitive
Altitude (m)	0 - 500
Groundwater	Requires free draining soils

5. Uses: (In other countries and/or Somalia)

Fuel	**	Fodder	*	Fruit	*
Charcoal	**	Livestock shade	*	Edible leaves	
Poles	*	Intercropping		Honey	*
Toolhandles	*	Nitrogen fixation	*	People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	*
Insecticide		Soil improvement	*	Gums (Edible)	**
Sandune fixation	**	Tannins	*	Live fence	*

Adhesives, fruit and seed edible to humans if boiled. Dead fencing, erosion control. Not a good timber. Gum arabic is produced between the ages of 4 and 18. When the bark is wounded a secretion takes place forming a ball which becomes larger as time goes by. It can be removed by hand - this is gum arabic. Roots can be used as twine to make ropes or fishing nets.

6. Recommendations and notes:

Dune fixation, anti-erosion, agroforestry. It may be more feasible to protect and encourage natural regeneration than to start extensive planting efforts. *Acacia senegal* used to be part of a crop rotation in Sudan: 25 ha holdings of which 1/4 were crops, 1/4 fallow under gum trees of 0-5 yrs old and 1/2 in fallow under productive gum orchards aged 6-15 yrs, with a density of 600 trees per ha. Livestock used to graze under the gum trees. After 15-20 years of age the trees were cut and the land cultivated, then left fallow to regenerate, then put into gum production. This was a balanced agrosilvipastoral system. Today this system is in decline due to short-term pressures to produce food.

7. References:

Baumer, Brenan, Carlovitz (von), IBPGR, Little, Sahni, SEPESAL, Teel, Webb, Weber.

Tree description

1. Summary:

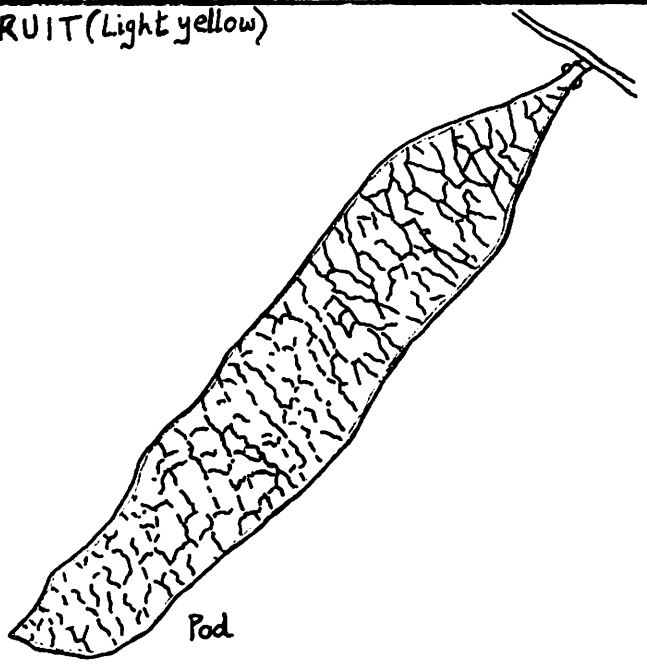
Bark is slightly scaly and creviced in old trees. Smooth, papery and peeling yellow in young trees. Spiny open crowned trees. Thorns mostly in 3's.

2. Detailed:

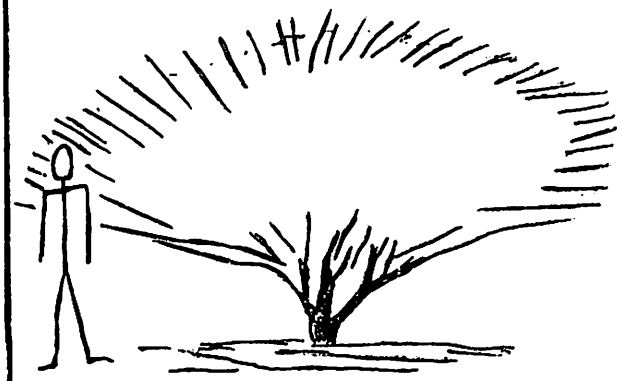
TREE SHAPE	Low and widely branched. Crown becomming flattened with age.	
Height	2-6 (-9)m	
Trunk and	Short and usually branched at base. Up to 40cm diameter	
Bark	Papery and peeling	(Colour:) Black if old, grey-yellow if young.
Branches	Entangled and difficult to penetrate.	(Colour:) Slash mottled red and white
FOLIAGE		
Twigs	Peeling	(Colour:) Yellow-grey/brown-purple/black
Thorns	Grouped in 3's at base of leaf. Short and curved. Central one hooked downwards.	
Size	3-7mm long	(Colour:)
LEAF	Bipinnately compound in clusters of 3-5. Alternate. 1-5 pinnae pairs.	
Size	2-6cm long (small)	(Colour:) Greyish-green (Bluish)
Leaflet	8-18 pairs per pinnae	
Size	1-7 X 0.5-2mm	
FLOWERS	Arranged in narrow cylindrical clusters.	
Size	5-8cm long	(Colour:) Yellow-white
FRUIT	Very dry-like brittle paper with many veins. A flattened oblong pod.	
Size	8-10 X 2cm	(Colour:)Pale straw-yellow or brown
SEED	Roundish, flattened (1) 3-5 (-8) seeds per pod.	
Size	6-10mm.d.	(Colour:) Brown-green
ROOTS	Tap root and lateral roots are well developed.	
WOOD	Hard and heavy	(Colour:) Whitish

SOMALI NAME	ADAD	LATIN NAME	ACACIA SENEGAL

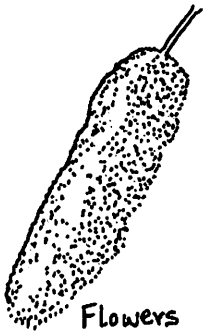
FRUIT (Light yellow)



TREE SHAPE



FLOWER (Yellow-White)



FOLIAGE

LEAF (Grey-Green)

SEED (Brown-Green)

Tree growing

Names: Adad *Acacia senegal*

1. Methods of propagation:

Potted or direct sown. Not cuttings.

2. Seed:

Number/kilogram	7000-12000
Collection	From strong healthy parents
Extraction	
Storage	Shortlived viability
Pretreatment	Soak in tepid water for two days. Fresh seeds need no pretreatment.

3. Nursery:

Soil mixture	Light and moist. It is not advisable to add manure which may kill seedlings due to fermenting.
Potsize	30 X 10cm (when flat) and 50-80 microns thick
Sowing	At 1cm depth. 3 seeds per pot
Germination	
Percentage	70-100%
Pricking out	After 4-6 weeks
Shade and watering	No shade needed
Growth time	4-5 months

Other notes

4. Pests and diseases:

Weevils may infest seeds even before pods open. Caterpillars can be a pest. Roots can be attacked by termites when young.

5. Planting:

Soils	Neutral to acid free draining such as sandy dry savanna, abandoned fields, sand dunes stabilized by grasses. Can grow on clays but prefer sands.
Method and spacement	Requires wide-spacing 4 X 4m spacing and 30cm depth pits. 5-8 seeds per pit if direct sowing.
Fertilizers and insecticides	150 grammes of NPK per pit Antitermite treatment at time of establishment.

6. Aftercare:

Cannot withstand waterlogging or excessive watering. Weeding is essential straight after establishment for two years, also protection from livestock.

Growth and yield	30-35 years (shortlived). In Sudan trees produce between a few grams to 10 kilograms of Gum per tree per year. Thorns cause gum harvesting to be difficult and tedious. Usually cut down when 20-25 years old.

7. Other notes:

Strongly light demanding. Aggressive coloniser.

Tree details

1. Names: Qurac *Acacia tortilis*

Arabic	Seyal, Sumreh
English	Umbrella thorn, Karamoja, Israel babool
Species	Acacia tortilis (Forsskal) Hayne (subsp. spirocarpa; tortilis; raddiana)
Family	Leguminosae - Mimosoideae
Synonyms	Mimosa tortilis, Acacia fasciculata. A.spirocarpa, A.radiana

2. Natural distribution:

Middle East (Israel, Saudi Arabia and Yemen). Africa from Egypt to South Africa, from Senegal to Somalia and Kenya. Successfully introduced to North-West India. A pioneer tree of arid desert fringe.

3. Where found in Somalia:

North, central rangelands and southern Somalia. Grows in northern cities such as Hargeisa, Berbera and Burao.

4. Climate requirements:

Arid, hot and dry with long irregular dry season.

Rainfall (mm/yr)	100-800 (Prefers over 500). Very drought tolerant.
Temperature(°C)	(2-) 20-28 (-45) Frost tender
Altitude (m)	Lowland. 0-1000
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	**	Fodder	**	Fruit	
Charcoal	**	Livestock shade	*	Edible leaves	
Poles	*	Intercropping		Honey	*
Toolhandles	*	Nitrogen fixation	*	People shade	(*)
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	*
Insecticides		Soil improvement		Dead fencing	*
Sandune fixation	**	Tannins		Live fencing	*

A shade tree for people except the disadvantage of thorns. Gum said to be edible. Not suitable for intercropping due to wide lateral root growth. Not suitable to grow near farmland. Ideal for Silvipastoral agroforestry in arid areas, pods ready for livestock at end of dry season. Gum is not useful though sometimes fraudulently mixed with gum arabic. Flexible roots (along with 'Fulay' or Acacia seyal) used for hut construction.

6. Recommendations and notes:

Ideal for fuelwood production on sandy soils. The forests of *Acacia tortilis* on the sandunes south from Mogadishu could be managed systematically for charcoal and fodder production. Minor construction material and honey also can be obtained from this species. Because it is a prolific native species on arid sandy sites, natural management is more sensible than plantation establishment. Already proven to be a valued shade/amenity tree in northern cities.

7. References: Anon., Baumer, Carlovitz, IBPGR, Kuchar, Little, Sahni, SEPESAL, Teel, Webb, Weber.

Tree description

1. Summary:

Often has distinctly flattened crown, like an umbrella. Pods contorted or spirally twisted. Whitish flower and paired thorns of two types either long and straight or short and hooked.

2. Detailed: Nearly evergreen medium sized spiny tree.

TREE SHAPE	Rounded crown in young trees becoming umbrella shaped in older ones.	
Height	1.5-18m. Trunk sometimes 20cm or more in diameter.	
Trunk and Bark	Well developed, sometimes divided close to the ground. Bark is fissured, rough, furrowed and scaly.	(Colour:) Dark brown-grey-black,reddish.
Branches	Spreading off at a low angle giving an open crown. Gum exuded from bark is white or reddish.	
FOLIAGE	Dense fine feathery	
Twigs	Mostly hairy	(Colour:) Grey-green to red-brown
Thorns	Paired. Two types: (Short and hooked). (Long and straight).	
Size	(Up to 5mm) and (1.2-8 (-10) cm)	(Colour:) Grey and brown tip (whitish)
LEAF	Bipinnately compound. Pinnae 2-10(14) pairs. Finely hairy.	
Size	0.2-6.2cm long	(Colour:) Bluish-grey-green
Leaflet Size	6-20 pairs per pinna 0.5-2.5 (-6) X 0.2-1 (-1.5)mm	
FLOWERS	Arranged in scented balls all over tree. Occurs in rainy season.	
Size	Balls: 0.5-1.1cm.d.	(Colour:) White-yellow-cream
FRUIT	Contorted or spirally twisted pod. Narrow, flattened, hard.	
Size	8-10cm X 5-15mm	(Colour:) Yellow-brown (Green when young)
SEED	Elliptic, compressed, beanlike.	
Size	7 X 4.5-6mm	(Colour:) Red-brown-light brown.
ROOTS	Extensive, long lateral roots.	
WOOD	Heartwood heavy. Warps upon drying and often riddled with borers.	(Colour:) Sapwood: yellow-white Heartwood: dark red-brown.

Tree details

1. Names: Quud *Balanities aegyptiaca*

Arabic	Heglig, (Lalob)
English	Soapberry tree. Desert date. Jericho Balsam.
Species	Balanites aegyptiaca (L.) Del.
Family	Balanitaceae
Synonyms	Ximenia aegyptiaca L.

2. Natural distribution:

Djibouti, Guinea-Bissau, Israel, Kenya, Mauritania, Niger, Senegal, Somalia, Sudan, Zambia, Zimbabwe, Jordan.

3. Where found in Somalia:

North, Central and Southern Somalia. Especially in Afgooye and Bay regions.

4. Climate requirements: Drought-resistant

Rainfall (mm/yr)	100-1000 (150-800) (350-500)
Temperature(°C)	- 40
Altitude (m)	0 - 1500
Groundwater	

5. Uses: (In other countries and/or Somalia) Multipurpose

Fuel	**	Fodder	*	Fruit	**
Charcoal	**	Livestock shade		Edible leaves	*
Poles		Intercropping		Honey	
Toolhandles	*	Nitrogen fixation		People shade	
Carving	**	Shelterbelt		Amenity	
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement		Dead fencing	*
Sandune fixation		Tannins		Live fencing	*

Fuelwood producing almost no smoke. Root cuttings strike readily to form live fencing. Domestic wooden items. Soap making from fruit, bark and roots. Produces fruit even in very dry years. Fibres, resins, cooking oil from crushed inner core of seed.

6. Recommendations and notes:

Individual trees have been planted extensively in African villages. Suitable to plant along banks of irrigation channels because extracts from bark and fruit kills the snails which carry schistosomiasis and bilharzia. It is highly valued and could be planted as an amenity tree beside Mosques. It is also suitable to be planted as cuttings as a boundary marker or live fence. Especially suited to dry sandy soils.

7. References: Kuchar, NAS, Sahni, SEPESAL, Teel, Weber.

Tree description

1. Summary:

Almost evergreen thorny tree. Straight long green thorns, oval shaped leaves and egg shaped green-yellow fruit resembling a date.

2. Detailed:

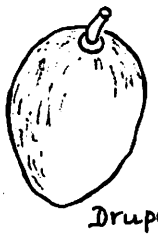
TREE SHAPE

Height	Up to 10m	
Trunk and	Often fluted	
Bark	Very fissured and scaly	Colour: Greyish green to brown Slash is pale yellow
Branches	Slender drooping	Colour:
FOLIAGE		
Twigs		Colour:
Thorns	Long, straight and stout situated on young branches	
Size	Up to 8cm long	Colour: Green
LEAF	2 leaflets per leaf, arranged alternately along shoot.	
Size		Colour: Grey-green
Leaflet	Small, oval	
Size	0.7-5 X 0.4-4.5cm	
FLOWERS	In clusters	
Size	Up to 1.3 cm.d.	Colour: Yellow-green
FRUIT	Resembles a date. Edible flesh. Oblong-ellipsoid, leathery skin.	
Size	3-4cm long	Colour: Green at first turning yellow.
SEED	Large	
Size	Up to 4 X 2cm	Colour:
ROOTS	Shallow, widespreading lateral roots and a deep taproot.	
WOOD	Hard and heavy. Fine textured (specific gravity 0.65). Calorific value is 4,600 K.cal per kg. The wood is easily worked, durable and resistant to insects.	Colour: Pale yellow - yellow brown.

SOMALI NAME: QUUD

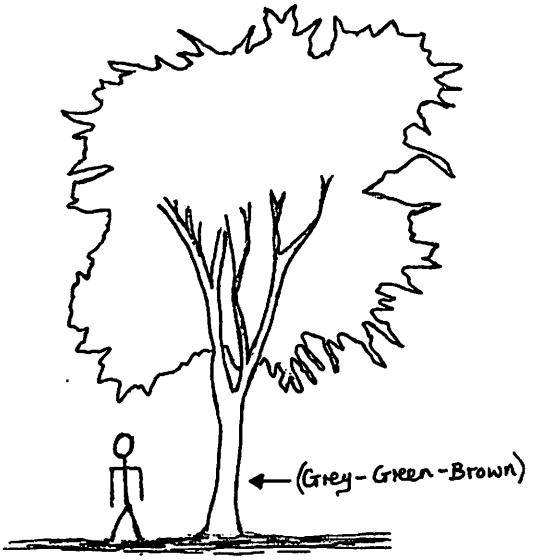
LATIN NAME: BALANITES AEGYPTIACA

FRUIT (Green-Yellow) – (Like a date)

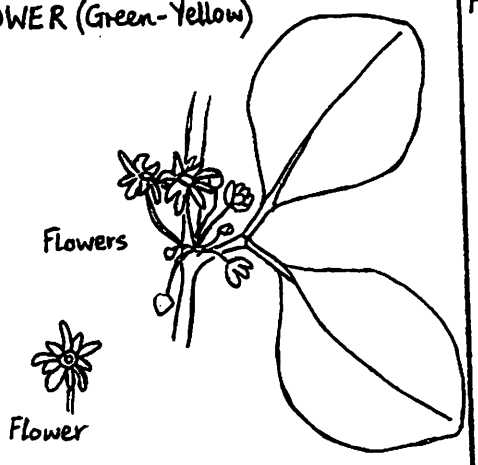


Drupe

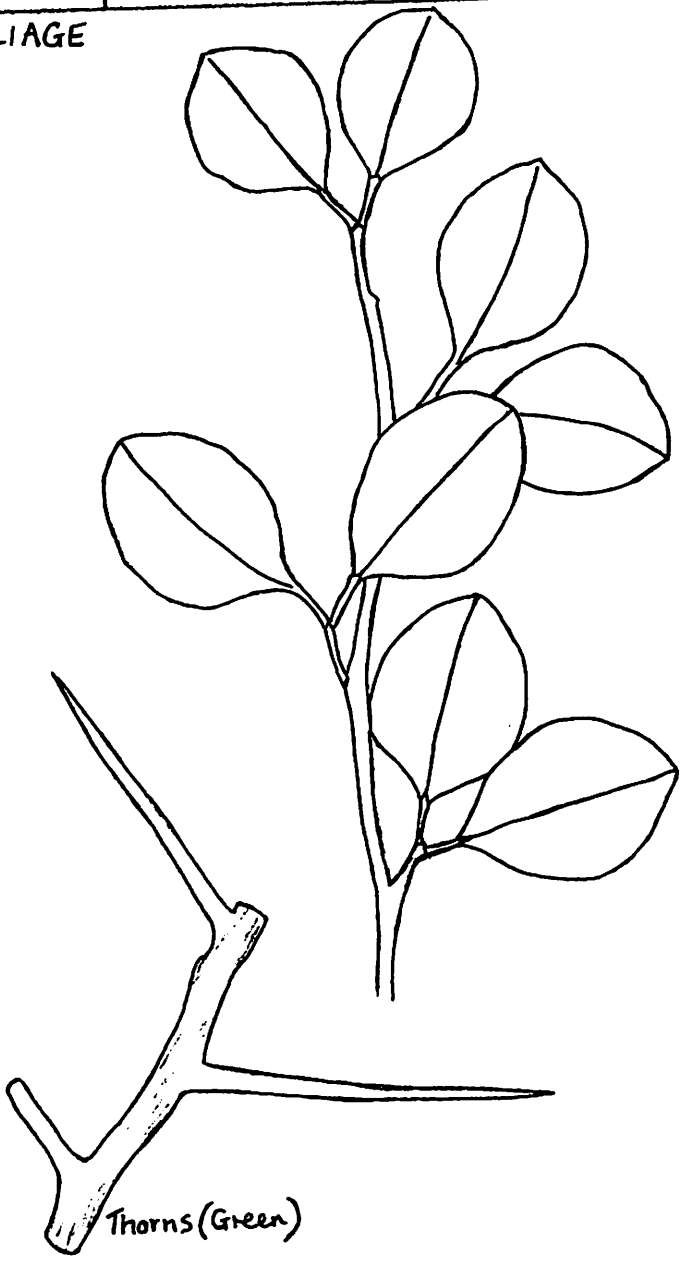
TREE SHAPE



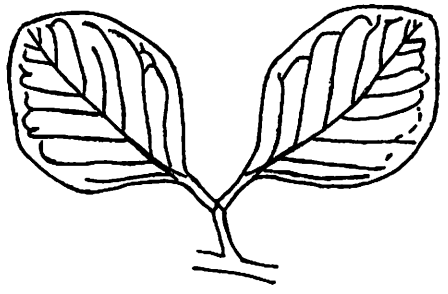
FLOWER (Green-Yellow)



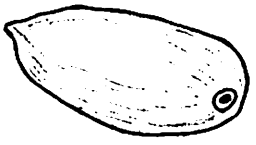
FOLIAGE



LEAF (Grey-Green)



SEED



Tree growing

Names: Quud *Balanites aegyptiaca*

1. Methods of propagation:

Direct sowing, cuttings or potted stock all possible.

2. Seed:

Number/kilogram	1,000
Collection	From heavy fruiting trees
Extraction	Soak fruit in water to extract seed or eat pulp!
Storage	Up to one year if clean, dry and away from insects
Pretreatment	Soak in water for 24 hours at room temperature

3. Nursery:

Soil mixture	
Potsize	
Sowing	2 seeds per pot. Sow vertically with rounded end downwards.
Germination	1-4 weeks
Percentage	High (61%)
Pricking out	
Shade and watering	
Growth time	12 weeks (or 18-34 weeks)

Other notes

4. Pests and diseases:

Seeds often attacked by borers.

5. Planting:

Soils	Prefers dry sandy sites which occasionally flood. Tolerates a wide range of soil types even heavy clays. Sensitive to salinity.
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Cannot tolerate prolonged waterlogging. Weeding is very important due to slow growth. Protect from browsing for at least 3 years after planting.

Growth and yields	Slow growing. In Israel 2-3 years old coppice shoots have reached 1-3m height.

7. Other notes:

Withstands fire. Coppices vigorously. Seed is used to obtain steriods by pharmaceutical companies.

Tree details

1. Names: Yegaar (Luban) *Boswellia frereana*

Arabic	
English	Frankinscense tree
Species	Boswellia frereana Birdw
Family	Burseraceae
Synonyms	Boswellia hildebrandtii sensu Chiov

2. Natural distribution:

northern Somalia, Kenya. Introduced to S.Yemen.

3. Where found in Somalia:

northern Somalia. native to Bosaso mountains of Barre region. Specifically 40km south-west of Alula: 11'42'n.50'30'E.

4. Climate requirements:

Rainfall (mm/yr)	
Temperature(°C)	
Altitude (m)	High
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel		Fodder		Fruit	
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	
Insecticide		Soil improvement		Gums	**
Sandune fixation		Tannins			

Gum resin extracted to be sold as Frankincense.

6. Recommendations and notes:

Refer to Beletweyne GTZ Project or Murray Watson and Dr. Warfer. This tree is highly valuable for its gum resin extracted from its bark.
Might be commercially viable to establish plantations. Its native habitat is the northern Somali mountains where rain falls in winter (January-February).
It is possible it will only thrive in its native altitude and climate.

7. References:

Sahni, SEPESAL (Murray Watson, Kew Gardens).

Tree description

1. Summary:

Small tree with peeling bark. Very sticky and aromatic.

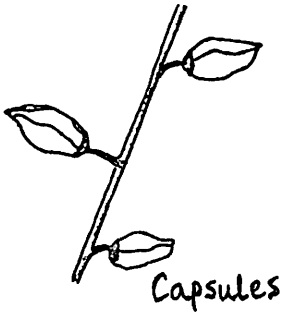
2. Detailed:

TREE SHAPE

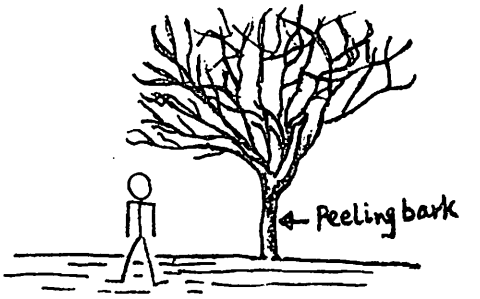
Height		
Trunk and Bark		Colour:
Branches		Colour:
FOLIAGE		
Twigs		Colour:
Thorns		
Size		Colour:
LEAF	Compound:Imparipinnate	
Size		Colour: Green-purple
Leaflet Size		
FLOWERS	5 petals	
Size		Colour:
FRUIT	Capsule	
Size		Colour: Brown
SEED	Inside a nutet	
Size		Colour: Brown
ROOTS		
WOOD		Colour:

SOMALI NAME	YEGAAR	LATIN NAME	BOSWELLIA FREREANA

FRUIT (Brown)

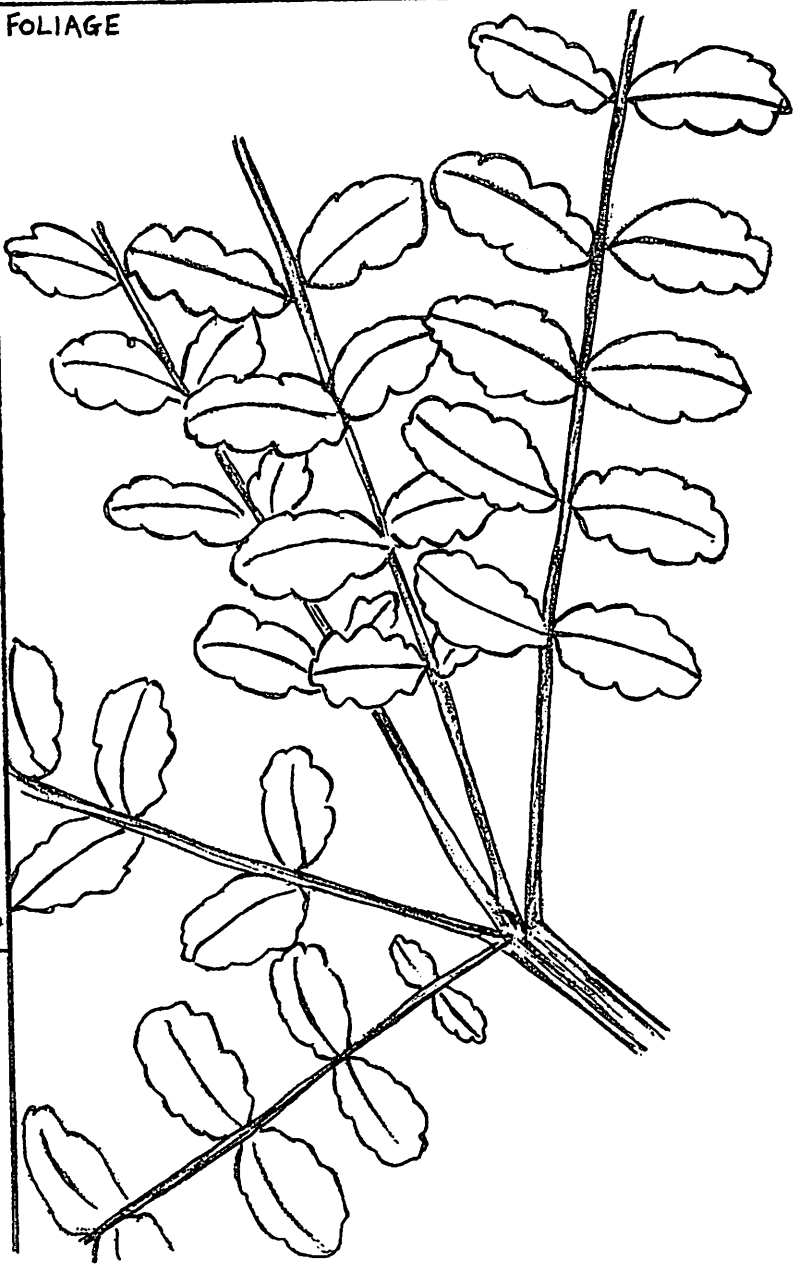


TREE SHAPE

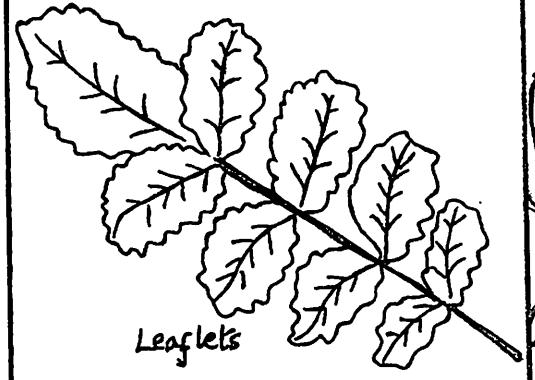


FLOWER

FOLIAGE



LEAF (Green – Purple)



SEED (Brown)

Tree growing

Names: YEGAAR *Boswellia frerana*

1. Methods of propagation:

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth timee

Other notes

4. Pests and diseases:

5. Planting:

Soils Dry and alkaline

Method and spacement

Fertilizers and insecticides

6. Aftercare:

Growth and yields

7. Other notes:

Frankincense is pale topaz-yellow colour. Grows from cuttings.

Tree Details

1. Names: Diddin (Malmol) *Commiphora myrrha*

Arabic	Balsam
English	Myrrh tree
Species	Commiphora myrrha (Nees) Engl.Sens.lat.
Family	Burseraceae
Synonyms	Commiphora coriacea Engl, C.Cuspidata, C.Molmol, C.playfairii

2. Natural distribution:

Djibouti, Ethiopia, Northern Kenya, North Yemen, South Yemen, Saudi Arabia, Somalia.

3. Where found in Somalia:

North, Central and Southern Somalia

4. Climate requirements:

Rainfall (mm/yr)
Temperature(°C)
Altitude (m)
Groundwater

5. Uses: (In other countries and/or Somalia)

Fuel		Fodder		Fruit	
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	*
Insecticide		Soil improvement		Live fencing	**
Sandune fixation		Tannins	*	Gums	**

Aromatic perfume. Gum-resins. The myrrh of the Christian bible is from the gum of this tree.

6. Recommendations and notes:

Might be commercially viable to establish plantations.
Due to the economic value of the myrrh gum it is sensible for this species to be widely planted as a live fence. Refer to the G.T.Z. funded Belet Weyne forestry project for propagation details.

7. References: Kuchar, Sahni, SEPESAL.

Tree description

1. Summary:

Small bushy thorny tree with peeling bark. Decidious

2. Detailed:

TREE SHAPE	Shrub or tree	
Height	Up to 4m	
Trunk and Bark	Peeling and smooth	(Colour:) Silvery or white to blue-grey
Branches		(Colour):
FOLIAGE		
Twigs		(Colour):
Thorns	Long	
Size		(Colour):
LEAF	1 - foliage	
Size		(Colour): Grey-green
Leaflet Size	Ovate or elliptic to obovate	
FLOWERS	Very small trumpet like	
Size	Petals are 3-4mm	(Colour): Dull purple (Yellow-Green)
FRUIT	Ovoid to ellipsoid drupe. Fleshy outer layer	
Size	12-16x6-8mm	(Colour):
SEED	Stone is ovoid to ellipsoid	
Size	Stone: 6-9x4-6x3-4mm	(Colour):
ROOTS		
WOOD	(Colour):	

SOMALI NAME: DIDDIN

LATIN NAME: COMMIPHORA MYRRHA

FRUIT (Green)

Drupe

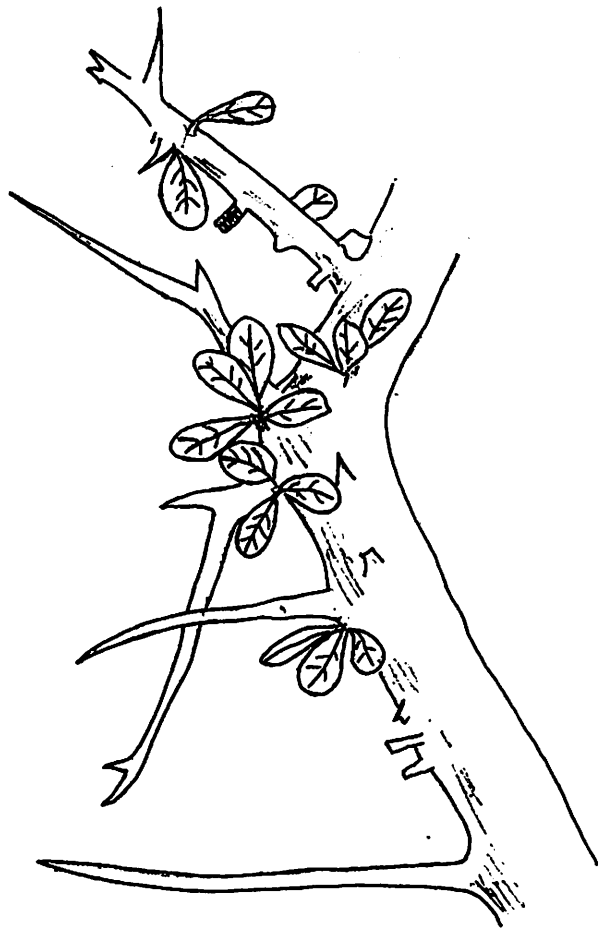
TREE SHAPE

FLOWER (Dull purple) - (Yellow-Green)
(Very small)

Flowers

Larger than life

FOLIAGE



LEAF (Grey-Green)

Leaflet

SEED (Orange/Brown)

Tree growing

Names: Diddin (Malmol) *Commiphora myrrha*

1. Methods of propagation:

Cuttings. Should be left to dry for a few days before being planted. (Should be planted 2 weeks before the Gu rains?) Cuttings should be from young branches - one third of the stem cut: 30cm of 100cm - should be planted upright. (Refer to GTZ Beletweyne Forestry Project.)

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth time

Other notes

4. Pests and diseases:

5. Planting:

Soils

Method and
spacement

Fertilizers and
insecticides

6. Aftercare:

Growth and
yields

Gum is collected during the hot summer months, when the tree is leafless.

7. Other notes:

Tree leaves in September and fruits in January.

Tree details

1. Names: Dhamas *Conocarpus lancifolius*

Arabic	
English	Common tug tree
Species	Conocarpus lancifolius Engl.
Family	Combretaceae
Synonyms	Anogeissus lancifolius

2. Natural distribution:

Southern Yemen, Somalia, Introduced to Sudan, India, Syria, Yemen, Djibouti, Northern Kenya, Pakistan.

3. Where found in Somalia:

Originates from the Northern Coastal plain. Now widely planted especially the streets of major cities such as Mogadishu, Luug, Belet weyne, Hargeisa and Berbera.

4. Climate requirements: Drought tolerant.

Rainfall (mm/yr)	250-600 (55-1200)
Temperature(°C)	24-30 (10-45) Not frost tolerant
Altitude (m)	0-800 (0-1220)
Groundwater	Required close to surface. Less than 7m

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	(*)	Fruit	
Charcoal	**	Livestock shade		Edible leaves	
Poles	**	Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	**
Carving		Shelterbelt	**	Amenity	**
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement	*	Gums (edible)	
Sandune fixation		Tannins			

Browse only in times of need. Shipbuilding, eg. Arab dhows - used to be exported to Arabia for this purpose. Now other wood replaced it except for the specially shaped pieces for the knees. Resin used for chest and bowel complaints by Arabs.

6. Recommendations and notes:

Tolerates a hot, dry atmosphere. Well suited for street tree planting and/or shelterbelt planting wherever a high watertable of less than 7m from surface exists. It is native to dry river beds (Tugs) in the northern Somali plains. It has been suggested that planting be done high up the water courses in N. Somalia so that when trees shed seed they will float and revegetate the water courses downstream.

7. References: Baumer, NAS, SEPESAL, Teel, Webb, Wickens.

Tree description

1. Summary:

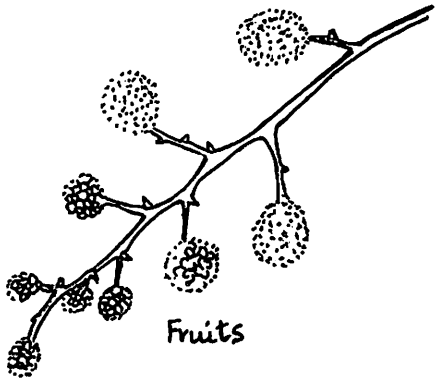
Straight stemmed upright evergreen non-thorny tree.

2. Detailed:

TREE SHAPE	Crown spreading and columnar	
Height	20 (-30)m	
Trunk and	2 (-5m) diameter	
Bark	Fissured	(Colour): Grey
Branches	Often long and straight	(Colour):
FOLIAGE		
Twigs		(Colour):
Thorns		
Size		(Colour):
LEAF	Spirally arranged. Simple petiolate. Narrowly lanceolate blades	
Size	Up to 12 X 2cm	(Colour:)
Leaflet		
Size		
FLOWERS	Tight round fluffy heads. Strongly scented. Flowers in August onwards	
Size	5-6mm diameter	(Colour): Green-yellow-cream
FRUIT	Cone-like	
Size	6mm diameter	(Colour):
SEED	Obovate, scale like, curved.	
Size	2mm	(Colour):
ROOTS		
WOOD	Medium-heavy density	(Colour): Light
	Specific gravity: 0.81. Wood is durable. Sowing is easy.	
	Interlocking grain giving wood strength.	

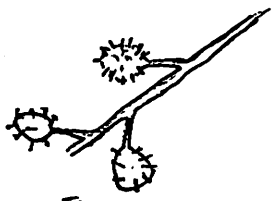
SOMALI NAME	DHAMAS	LATIN NAME	CONOCARPUS LANCIFOLIUS

FRUIT

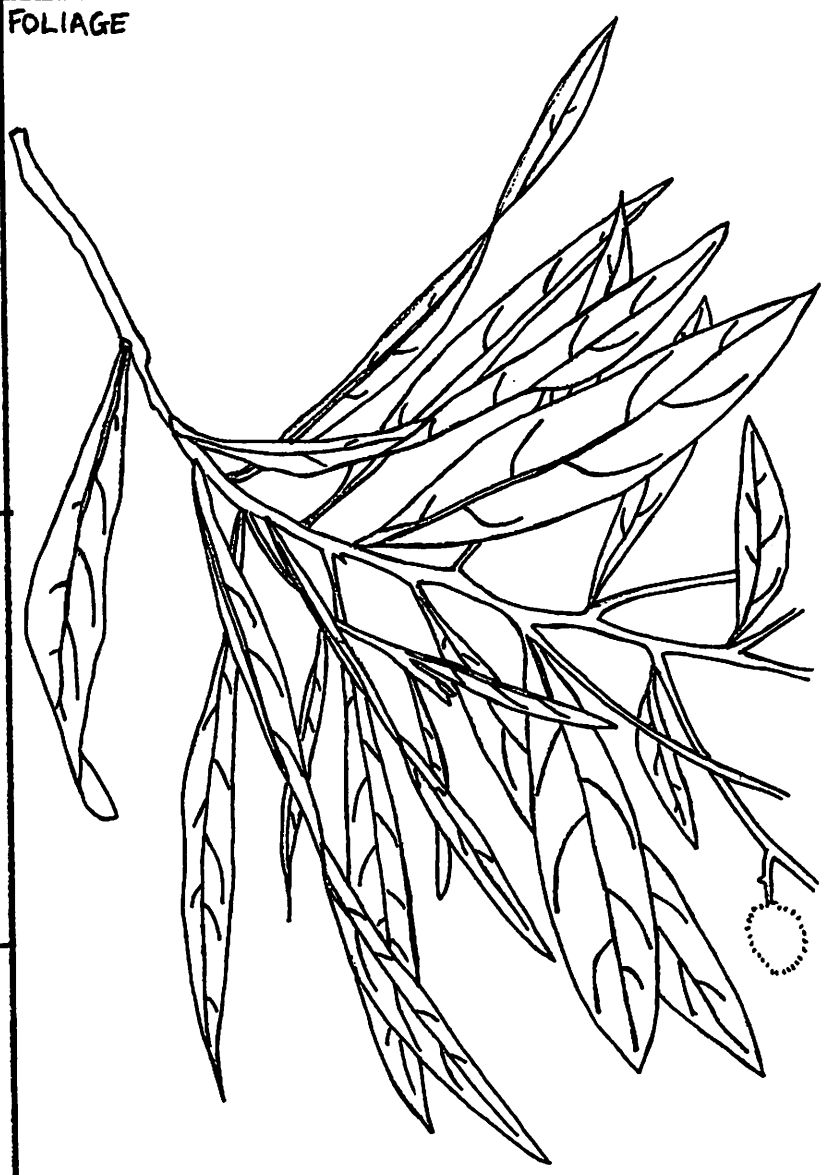


TREE SHAPE

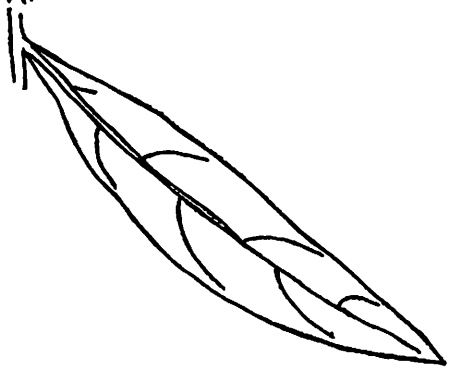
FLOWER (Green-Yellow)



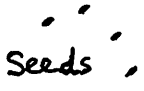
FOLIAGE



LEAF



SEED



Tree growing

Names: Dhamas *Conocarpus lancifolius*

1. Methods of propagation:

Potted, striplings, stumps. Can also be raised by cuttings.

2. Seed:

Number/kilogram	1,000,000 - 2,000,000 (1700 per gram)
Collection	Major cities directly from tree in January or February
Extraction	Rub between hands to separate from stalks
Storage	
Pretreatment	None

3. Nursery:

Soil mixture	Dung may be added
Potsize	
Sowing	Sow uncovered onto soil surface which is moist
Germination	18-25 days
Percentage	Low 25%
Pricking out	
Shade and watering	
Growth time	12-18 months

Other notes

4. Pests and diseases:

Susceptible to damping off

5. Planting:

Soils	High (alkaline) pH; Saline tolerant; dry soils. Light texture eg. sand. Prefers seasonal waterlogging. Alluvial annually flooded soils. Can grow on old coral soils.
Method and Spacement	May be necessary to dig through a gypsum pan to allow roots through to watertable. Possibly dig 1m deep for planting pit. 5m X 5m espacement.
Fertilizers and insecticides	

6. Aftercare:

Requires watering until roots reach groundwater. At least six months: 2 times/day to begin with. Young branches often fork and unwanted leaders should be cut back. Protect from browsing livestock.

Growth and yields: A plantation in Yemen (1970-1976) showed following results:
Height 11.7 +/- 3.4m and diameter 15.3 +/- 3.5cm. Rapid early growth.
In Berbera trees 10-12 yr old measured 15-18m in 1951.
Small plantations still exist in Somalia, especially the North.

7. Other notes:

Strongly light demanding. Frequently used in irrigated plantations.

Tree details

1. Names: Yehib *Cordeauxia edulis*

Arabic	
English	Yihib nut tree
Species	Cordeauxia edulis Hemsley
Family	Leguminosae - Caesalpinioideae
Synonyms	

2. Natural distribution:

Somalia (Central) Ethiopia (Ogaden)

3. Where found in Somalia:

Central Somalia. Specifically on red soils 100 Km north of Beletweyne on the main road. Near Mataban, Galkayo, Adawilif and Hobio.

4. Climate requirements: Extremely drought tolerant.

Rainfall (mm/yr)	150-400 (100-200)
Temperature(°C)	30 (15-40) Not frost tolerant.
Altitude (m)	300-1000 (not below 100)
Groundwater	Will not tolerate waterlogging

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	**	Fruit	**
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	
Insecticide		Soil improvement		Dyes (red)	*
Sandune fixation		Tannins			

Edible nuts raw, boiled or roasted, tastes similar to cashew nut. Dye can be extracted from leaves.

6. Recommendations and notes:

An endangered species. Reported that in 1929 constituted up to half of woody vegetation in many areas of Somalia but now much reduced and existence threatened by drought, over grazing. Heavy harvesting of seed and browsing pressure severely reduces the chances of natural regeneration. Need for selection of high yielding strains. Research into techniques of transporting seedlings without damaging taproots. Attempt propagation agriculturally in its habitat. Encourage planting around homesteads and mosques in Central Rangelands is recommended.

7. References: Baumer, IBPGR, SEPESAL, Wickens.

Tree description

1. Summary:

Much stemmed and much branched evergreen shrub. No thorns.

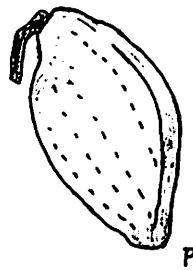
2. Detailed:

TREE SHAPE

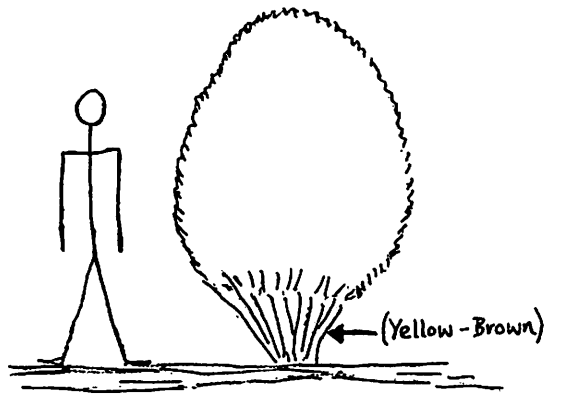
Height	Up to 3m (1.6m)	
Trunk and Bark		(Colour): Yellow-brown
Branches		(Colour):
FOLIAGE		
Twigs	Numerous scale like glands	(Colour): Red-purple glands on twigs
Thorns		
Size		(Colour):
LEAF	Spirally arranged. Leathery	(Colour): Lower surface having red glands
Size	Pinnate	(Colour): Upper surface olive green
Leaflet	Asymmetrical (1-3) 4(-6) pairs per pinna	
Size	3-4.5 X 1-1.5 (-3)cm	
FLOWERS	5 petals, small.	
Size	Petals are 17 X 6 - 10mm	(Colour): Bright yellow
FRUIT	Pod: Oblong-ovoid dehiscent. Numerous scales on surface.	
Size	4-6 X 2cm	(Colour): Red-brown
SEED	1-2 (-4) per pod. Ovoid	
Size	3.5-5cm long	(Colour):
ROOTS	Deep tap root to 3m	
WOOD		(Colour):

SOMALI NAME	YEHIB	LATIN NAME	CORDEAUXIA EDULIS

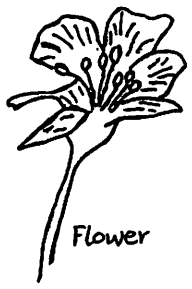
FRUIT (Red-Brown)



TREE SHAPE

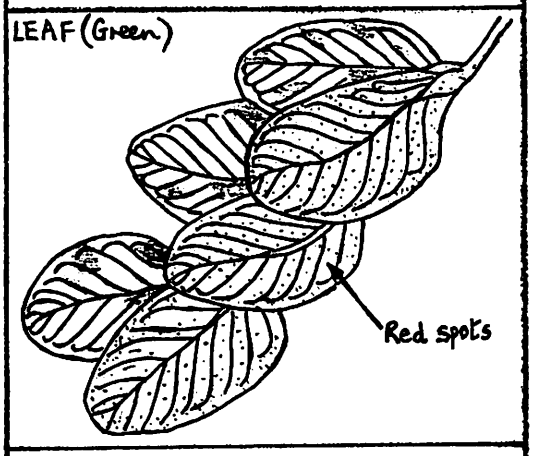


FLOWER (Yellow)

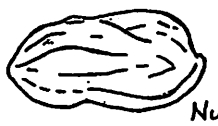


FOLIAGE (Thorns absent)

LEAF (Green)



SEED



Names: Yehib *Cordeauxia edulis*

1. Methods of propagation:

Cuttings or direct sowing possible. Must be planted in-situ as cannot be transferred once taproot starts growing.

2. Seed:

Number/kilogram	
Collection	From high fruiting trees
Extraction	
Storage	Coat in weed ash and store in dry sack: Viable for one year.
Pretreatment	None

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	A few days only
Percentage:	(80%?)
Pricking out	
Shade and watering	
Growth time	Seedling will not tolerate having taproot pruned.

Other notes

4. Pests and diseases:

Weevils and moth larvae attack nuts

5. Planting:

Soils	Dry alkaline soils. Very poor lacking in nitrogen. Red (due to iron oxide) sandy soil known as 'Haud'. Fine to coarse sand or grit and loamy sand.
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Must be protected from browsing livestock and people stealing fruits. Protect from waterlogging.

Growth and yields	Very slow shoot growth due to fast growth of taproot. Fruiting after 4 years. Can yield 5 kilo of seed/tree. Very slow growth. A limited amount of nuts are collected and sold in markets.

7. Other notes:

Fruit takes 10-14 days to mature after rains. Will flower and fruit twice if rain is abundant. Nut ready to eat in June. An area of 50ha was protected in Mudug region by NRA. 25ha protected at Sahah Dhadhaad between Belet-wein and Dusa-Mareb in 1977 but later abandoned.

Tree details

1. Names: Mareer *Cordia sinensis*

Arabic
English Sandpaper tree
Species Cordia rothii Roemer and Schultes, C.gharaf Ehrenb.ex Aschers.
Family Boraginaceae
Synonyms Cordia rothii, C.rebiculata, C.angustifolia, C.Subopposita, C.gharag

2. Natural distribution:

Chad, Ethiopia, Ghana, India, Israel, Kenya, Mali, N. Yemen, Niger, Nigeria, Oman, S. Yemen, Saudi Arabia, Senegal, Somalia, Sri Lanka, Sudan, Togo.

3. Where found in Somalia:

Bay region

4. Climate requirements: Very drought tolerant.

Rainfall (mm/yr)
Temperature(°C)
Altitude (m) Low
Groundwater

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	**	Fruit	**
Charcoal		Livestock shade		Edible leaves	
Poles	(*)	Intercropping		Honey	
Toolhandles	**	Nitrogen fixation		People shade	
Carving	*	Shelterbelt		Amenity	
Timber	(*)	Hedge		Medicine	*
Insecticide		Soil improvement		Gums (Edible)	
Sandune fixation		Tannins			

Bark can be used as fibre. Fruit eaten by children. Straight sticks used by nomads as herding sticks. Sticks also used as tool handles, eg. axes. Can be used as a windbreak. Fruit is bitter-sweet with a sticky pulp. An important dry season fodder for camels.

6. Recommendations and notes:

A very useful small tree because the branches are strong and flexible and easy to make tool handles from. The fruits are a favourite of the children. Should be tried as a hedge/windbreak planting along boundaries in villages. Branches can be regularly cut from it, because it readily coppices.

7. References: SEPESAL, Vogt.

Tree description

1. Summary:

Shrub or small tree

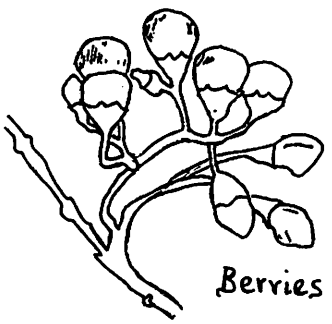
2. Detailed:

TREE SHAPE

Height	Up to 5m	
Trunk and Bark	Smooth	(Colour:) Brown-pale cream
Branches	Bendy and often straight	(Colour:)
FOLIAGE	Slender branches tending to droop.	
Twigs		(Colour:)
Thorns		
Size		(Colour:)
LEAF	Opposite or sub-opposite. Oblong - oblanceolate. Pubescent lower leaf	
Size	3-11.5 X 2-4cm	(Colour:) Greyish-green
	Upper side of leaf has texture of sandpaper. Oval or egg shaped	
FLOWERS	Fragrant. Urn-shaped. In short dense sprays	
Size	0.7cm long	(Colour:) White
FRUIT	Round, sticky, edible - with small wispy point	
Size	+/- 7mm	(Colour:) Calyx is bright orange-red
SEED	Round	
Size		(Colour:) Brown
ROOTS		
WOOD	Tough	(Colour:)

SOMALI NAME	MAREER	LATIN NAME	CORDIA SINENSIS

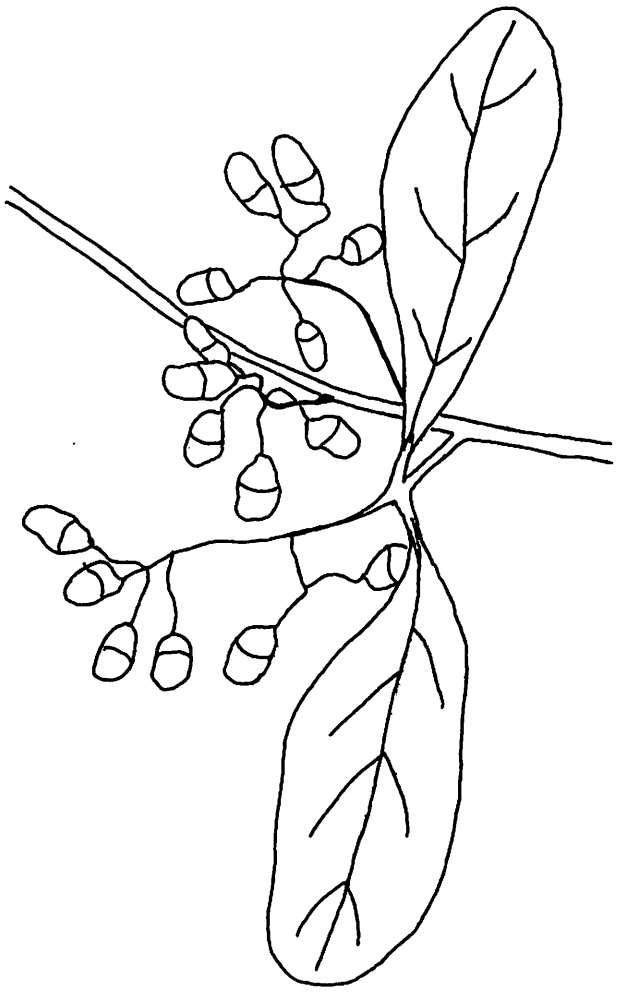
FRUIT (Brown-Yellow)



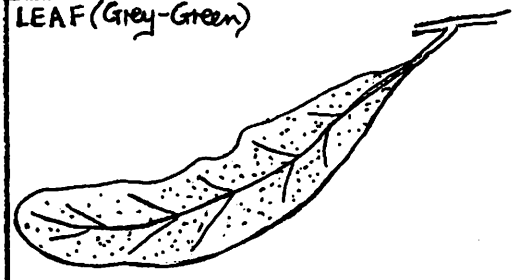
TREE SHAPE

FLOWER (White)

FOLIAGE



LEAF (Grey-Green)



SEED (Yellow-Brown)

Tree growing

Names: Mareer *Cordia sinensis*

1. Methods of Propagation:

2. Seed:

Number/kilogram	
Collection	Available in December in Bay region.
Extraction	Soak in water to separate pulp from stones
Storage	
Pretreatment	

3. Nursery:

Soil mixture
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth time

Other notes

4. Pests and diseases:

5. Planting:

Soils	Dry. Sandy and clay
Methodand spacement	
Fertilizers and insecticides	

6. Aftercare:

Growth and yields

7. Other notes:

Frequently occurs on riverbanks and/or termite mounds. Has been planted as an avenue in Merca township.

Tree details

1. Names: Garass *Dobera glabra*

Arabic	Mikah
English	
Species	Dobera glabra (Forsskal) A.L.Juss. ex Poiret
Family	Salvadoraceae
Synonyms	Dobera roxburghii, Dobera Loranthifolia

2. Natural distribution:

Ethiopia, India, Kenya, Saudi Arabia, Somalia, Sudan, Uganda.

3. Where found in Somalia:

North, Central and Southern regions. From Afgooye to Shalambood or Afgooye to Bay region it can be seen in great numbers, left by farmers in rainfed farmland.

4. Climate requirements: Very drought tolerant.

Rainfall (mm/yr)
Temperature(°C)
Altitude (m)
Groundwater

5. Uses: (In other countries and/or Somalia)

Fuel		Fodder	**	Fruit	**
Charcoal		Livestock shade	**	Edible leaves	
Poles	(*)	Intercropping	**	Honey	
Toolhandles	(*)	Nitrogen fixation		People shade	**
Carving	**	Shelterbelt		Amenity	
Timber		Hedge		Medicine	
Insecticide		Soil improvement		Gums (Edible)	
Sandune fixation		Tannins			

Fruit edible and seed edible - usually cooked. Wood is used to make pestles and mortars, stools (gambar), beds (jimbar) spoons, storage containers and other kitchen and domastic items. Wood very easy to carve. Kept as a shade tree because it is thornless.

6. Recommendations and notes:

The value of Garass is recognised by rainfed farmers in that they leave it on the land when it is cleared for agricultural production. The value of the wood, the all season shade, the dry season fodder and the fruit makes it an important agroforestry multipurpose Somali tree. Unfortunately it grows very slowly and is rarely propagated from seed. It does survive heavy lopping and coppices readily. In the long term its survival is threatened because it is not regenerating due to collection of its fruits and livestock browsing.

7. References: Dale and Greenway, SEPESAL, Vogt.

Tree description

1. Summary:

Easily recognised by its large evergreen leaves, thick trunk and underside of crown being parallel to ground due to regular camel browsing in the late dry season. No thorns.

2. Detailed:

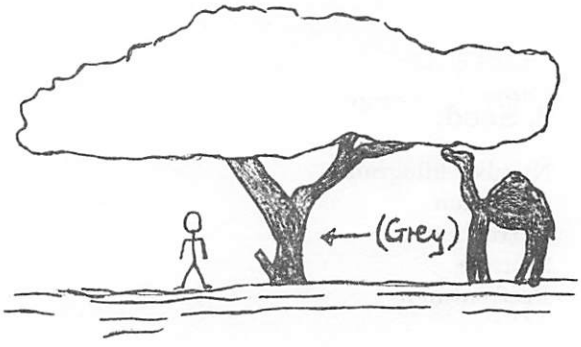
TREE SHAPE	Rounded crown - distinct camel browse line on underside of crown	
Height		
Trunk and	Single stem	
Bark	Smooth	(Colour:) Grey
Branches	Finely pubescent	(Colour:)
FOLIAGE		
Twigs		(Colour:)
Thorns		
Size		(Colour:)
LEAF	Large and leathery. Opposite, simple, elliptic, ovate or obovate, margin entire.	
Size	Up to 7.5cm length	(Colour:) Green
Size		
FLOWERS	Small in axillary and terminal panicles. Petals 4-5	
Size		(Colour:) White
FRUIT	An ellipsoid drupe	
Size	Up to 2cm long	(Colour:) Red pulp
SEED		
Size		(Colour:)
ROOTS		
WOOD	Light and easy to work	(Colour:) White-yellow

SOMALI NAME	GARASS	LATIN NAME	DOBERA GLABRA

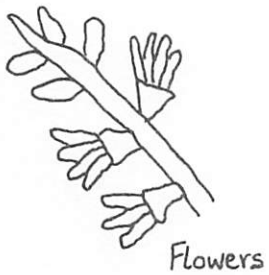
FRUIT

Drupe

TREE SHAPE



FLOWER (White)



Flowers

FOLIAGE

LEAF (Green)

SEED

Names: Garass *Dobera glabra*

1. Methods of Propagation:

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth time

Other notes

4. Pests and diseases:

5. Planting:

Soils	Saline tolerant. Sands or clays tolerated
Method and spacement	10m X 10m in rainfed farmland
Fertilizers and insecticides	

6. Aftercare: Protect from browsing when young

Growth and yields	Slow growing

7. Other notes:

Need for research into propagation methods although protection of existing trees and natural regeneration should be the priority.

Tree details

1. Names: Khone *Hyphaene compressa*

Arabic	El Dom
English	Doum Palm
Species	Hyphaene compressa
Family	Palmae
Synonyms	Hyphaene thebarca (L). C.Martins

2. Natural distribution:

Africa from Mozambique to Somalia. Found on coastal lowlands and extending inland along watercourses.

3. Where found in Somalia:

River banks of Juba and Shabelle on land which has been previously cleared. Shabelle river: Beletweyne. Southern Somalia

4. Climate requirements: Riverine sites. Hot temperature

Rainfall (mm/yr)	100-600
Temperature(°C)	
Altitude (m)	0-1400
Groundwater	Only grows close to groundwater

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder		Fruit	(*)
Charcoal		Livestock shade		Edible leaves	*
Poles	*	Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving	*	Shelterbelt		Amenity	
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement		Dyes (black)	*
Sandune fixation		Tannins			

Roots used for netting. Leaves used to make basket and matting. Seeds can be used as buttons. Fruit used as medicine or dye.

6. Recommendations and notes:

There are approximately 5 species of *Hyphaene* in Somalia. The taxonomy of the Doum Palms of Somalia is still uncertain, but the large regularly branching palm of the riversides matches *Hyphaene compressa* of East Africa.
Due to its usefulness as a construction timber and food source its propagation on river banks should be encouraged, especially as it is hardy and well adapted to growing beside the Somali rivers.

7. References: Kew Gardens Bulletin, Kuchar, SEPESAL, Vogt.

Tree description

1. Summary:

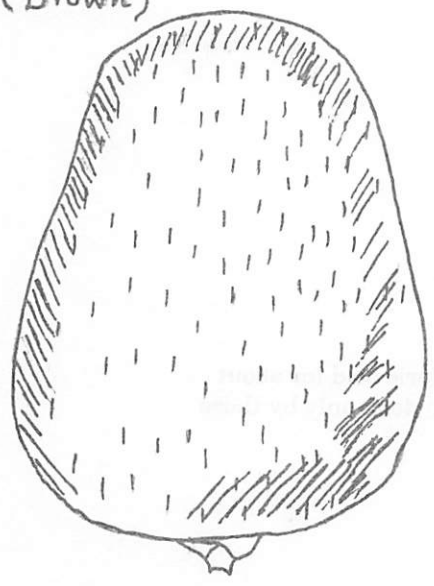
Only palm which regularly branches. Often the tallest tree beside cleared riverbanks.

2. Detailed:

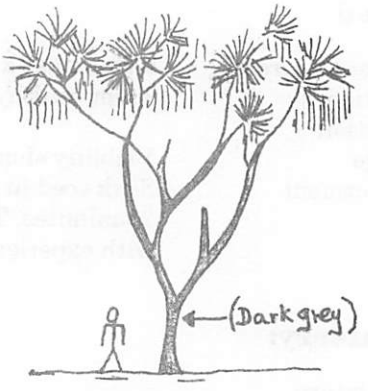
TREE SHAPE	Long slender stem and V-branching pattern	
Height	Up to 16m	
Trunk and Bark	Long and slender	(Colour:) Dark grey
Branches	As many as 4 times	(Colour:)
FOLIAGE		
Twigs		(Colour:)
Thorns		
Size		(Colour:)
LEAF	Palmate, set closely together with shiny petioles. Fan shaped.	
Size	51-76.5cm (very large)	(Colour:)
Leaflet Size	Petiole approx. 1m. Lobes linear lanceolate	
FLOWERS	Male and female flowers usually on different trees.	
Size		(Colour:)
FRUIT	Large obliquely ovoid. Smooth and shining. 1-celled.	
Size	8 x 6cm	(Colour:) Brown
SEED	One seed per fruit. Truncate at base, apex obtuse	
Size	3.5 x 3cm	(Colour:)
ROOTS		
WOOD	(Colour:)	

SOMALI NAME	KHONE	LATIN NAME	HYPHAENE COMPRESSA

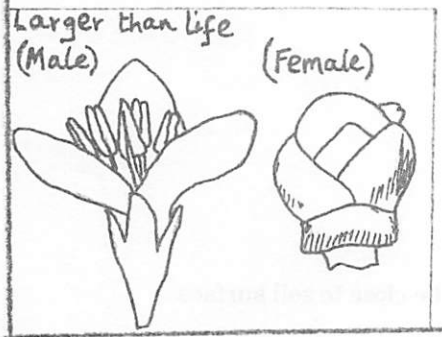
FRUIT (Brown)



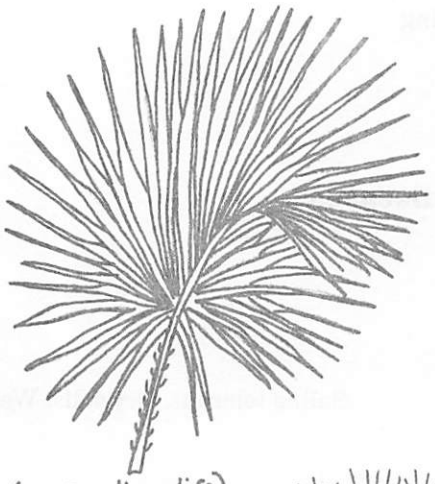
TREE SHAPE



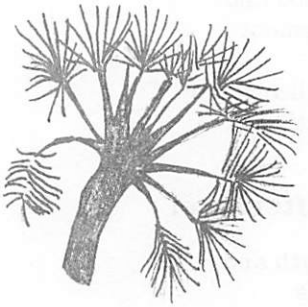
FLOWER



FOLIAGE



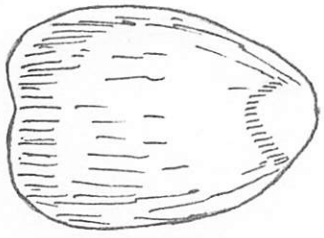
Leaf (smaller than life)



Crown (smaller than life)

LEAF

SEED



Names: Khone *Hyphaene compressa*

1. Methods of propagation:

Must be sown direct. Nursery stock not possible.

2. Seed:

Number/kilogram	5 fruits per kilogram.
Collection	From healthy mother trees
Extraction	
Storage	Viability short
Pretreatment	Soak seed in a bath of weak hydrochloric acid for about 20 minutes. This procedure should be done only by those with experience.

3. Nursery:

Soil mixture
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth time

Other notes

4. Pests and diseases:

5. Planting:

Soils	Saline tolerant. Dry soils. Water table must be close to soil surface.
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Growth and yields

7. Other notes:

Tree details

1. Names: Dayib *Juniperus excelsa*

Arabic	Ar Ar
English	African pencil cedar
Species	Juniperus excelsa
Family	Cupressaceae
Synonyms	Juniperus procera

2. Natural distribution:

Sudan, Ethiopia, Somalia, Kenya.

3. Where found in Somalia:

Northern mountain zone.

4. Climate requirements: High altitude with dry climate supplemented by sea mists.

Rainfall (mm/yr)	Over 500
Temperature(°C)	
Altitude (m)	1800-2900
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder		Fruit	
Charcoal		Livestock shade		Edible leaves	
Poles	**	Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving	*	Shelterbelt	*	Amenity	
Timber	**	Hedge		Medicine	
Insecticide		Soil improvement	*	Gums (Edible)	
Sandune fixation		Tannins			

Pencil wood, matches, fence posts, light utility wood. Not suitable for intercropping due to acid leaf fall. Can however be used as a windbreak or shelterbelt.

6. Recommendations and notes:

Natural stands of Dayib should be protected in the high mountains of Northern Somalia in order to slow down water run off during rains, and consequential soil erosion.
A vigorous extension campaign in Northern Somalia is required to educate the people into the relationship between mountainside deforestation and later soil erosion. It will always be impossible to protect the mountain forests, until Somalis convince other Somalis of the need to do so. International agencies should support an extension and protection project of the mountain forests, which should be implemented by the NRA, and must have gaining co-operation of the local people as the first priority.

7. References: Dale and Greenway, Sahni, SEPESAL, Teel.

Tree description

1. Summary:

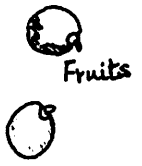
Large evergreen tree

2. Detailed:

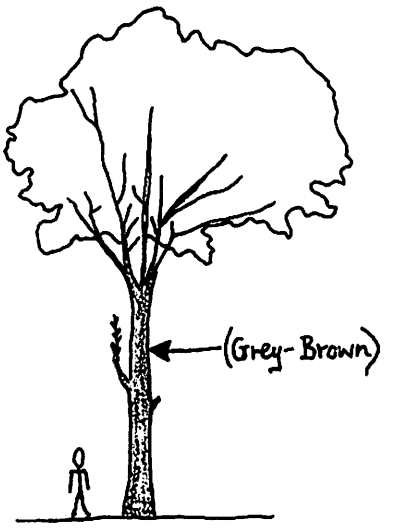
TREE SHAPE	Pyramidal in young trees, spreading in mature trees.	
Height	Up to 40m though usually less	
Trunk and Bark	Tall and straight Thin with shallow longtitudinal fissures. Exfoliating in thin papery strips	(Colour:) Grey-brown
Branches		(Colour:)
FOLIAGE		
Twigs		(Colour:)
Thorns		
Size		(Colour:)
LEAF	Adult: scale-like,acute. Juvenile: in 3's linear,spine tipped.	
Size	Adult: 10mm length	(Colour:)
Juvenile:	Up to 26mm length	
FLOWERS	Dioecious: Male: cones ellipsoid to subglobose. Female: cones subglobose	
Size	Male: 2-3mm Female: 4-8mm	(Colour:) M: Yellow F: Red-brown-purple-black
FRUIT	Berry like produced towards end of branches	
Size	4mm diameter	(Colour:) Blue-grey-brown (Pulp:greenish)
SEED	2-3 seeds per fruit. Flattened or triangular. Hard and woody.	
Size		(Colour:)
ROOTS		
WOOD	Splits easily. It is highly termite resistant.	(Colour:) Red heartwood

SOMALI NAME	DAYIB	LATIN NAME	JUNIPERUS EXCELSA

FRUIT (Blue-Grey-Brown)



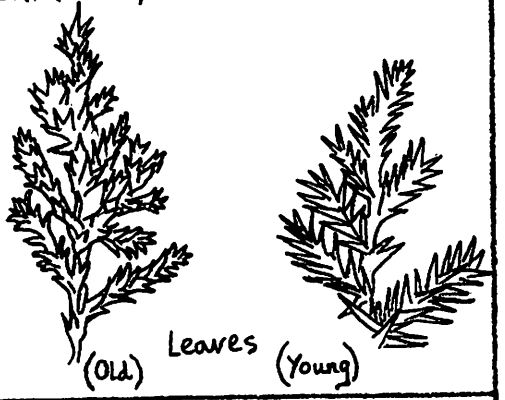
TREE SHAPE



FLOWER (Yellow) or (Red-Black)

FOLIAGE

LEAF (Green)



SEED

Tree growing

Names: Dayib *Juniperus excelsa*

1. Methods of propagation:

2. Seed:

Number/kilogram	11,000 -55,000
Collection	
Extraction	
Storage	Store in cool, dry place
Pretreatment	None

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	
Percentage	30-70
Pricking out	
Shade and watering	
Growth time	

Other notes

4. Pests and diseases:

5. Planting:

Soils

Method and spacement

Fertilizers and insecticides

6. Aftercare:

Growth and yields	Very slow growing

7. Other notes:

Tree details

1. Names: Timir *Phoenix dactylifera*

Arabic	Nakl-el-Balah (Kharif)
English	Date palm
Species	Phoenix dactylifera L.
Family	Palmae
Synonyms	

2. Natural distribution:

Tropical Africa, Iran, Israel, Somalia, Saudi Arabia, Iraq, Saharan Oases, N-W India, Syria, Cyprus.

3. Where found in Somalia:

North and South of Somalia: Cultivated. Possibly originally introduced from Arabia over a 1000 years ago. The French Government have been assisting in planting date palms in the northern coastal Barre Region.

4. Climate requirements: Prefers hot dry air: Summer of 6 months at over 48°C.

Rainfall (mm/yr)	Prefers low rainfall
Temperature(°C)	Frost tolerant. Prefers high temperatures.
Altitude (m)	
Groundwater	High watertable required or irrigation. Very salt tolerant.

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	*	Fruit	**
Charcoal		Livestock shade	*	Edible leaves	*
Poles	*	Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	**
Carving		Shelterbelt	*	Amenity	
Timber	*	Hedge		Medicine	
Insecticide		Soil improvement			
Sandune fixation		Tannins			

Fibres, ropes. Larger trees must be climbed to collect date clusters which can weigh many Kgs and nets should be placed under tree to protect from damage if dates fall. Fruit can be stored a long time as 'date bread'. Nuts if softened can be used for animal fodder. Wood used for house construction. Leaves woven into baskets, fences and nets. Fruit is of considerable commercial value.

6. Recommendations and notes:

An Arab proverb states Timir likes to have its feet in the water and its head in a furnace. Timir has been cultivated in the Middle East for over 6,000 years. Its cultivation has been closely associated with Arab Islamic expansion. It is said Timir will grow on any site where *Hyphaene compressa* (Khone) will grow. The key to successful cultivation is the technique of hand pollination. The Date Palm is often mentioned in the Koran, hence forestry extension efforts could logically be directed through Mosques and Sheiks in community forestry efforts.

7. References: Dowson, Maydel (von), Nabil *et al.*, SEPESAL, Smead, Teel.

Tree description

1. Summary:

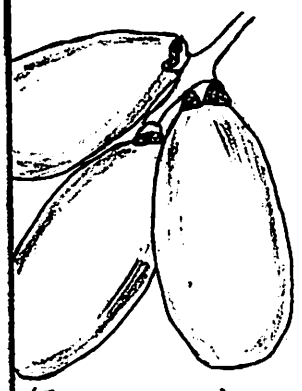
Feather Palm. Brown ovoid fruits. Enormous leaves. Trunk having many root suckers at base and a 'ladder' of leaf scars up its dull brown length.

2. Detailed:

TREE SHAPE	Crown consists of up to 120 leaves	
Height	Up to 15-20m high and 60-100cm trunk diameter	
Trunk and Bark	Erect and often surrounded at base by root suckers. Leaf scars from a 'ladder' up the trunk. Each leaf scar is approx 25-30 x 10cm	Colour: Dull brown
Branches		Colour:
FOLIAGE		
Twigs		Colour:
Thorns	Low leaves resemble long sharp spines	
Size		Colour: Green
LEAF	Pinnate: Glaucous and stiff. 10-12 new leaves formed each year.	
Size	3-7m long	Colour: Green
Leaflet Size	Glaucous and stiff. Approximately 80 pairs per leaf. 20-40cm long x 2cm wide	
FLOWERS	Dioecious: Male flower clusters of up to 12,000. Female clusters of up to 200.	
Size	Inflorescence is 60cm length	Colour: Female: Green/brown Male: White/yellow
FRUIT	Single seeded berry. Ovoid. Soft thick edible flesh	
Size	4-8cm x 2-3cm	Colour: Yellow-brown-black
SEED	Cylindrical with longitudinal seaming	
Size	Approx 20 x 6-8mm	Colour: Brown-yellow
ROOTS	Reach down as far as 6m which gives it a high resistance to wind	
WOOD	Termite resistant. Of average hardness. Although light and soft, timber lasts for centuries.	

SOMALI NAME	TIMIR	LATIN NAME	PHOENIX DACTILIFERA

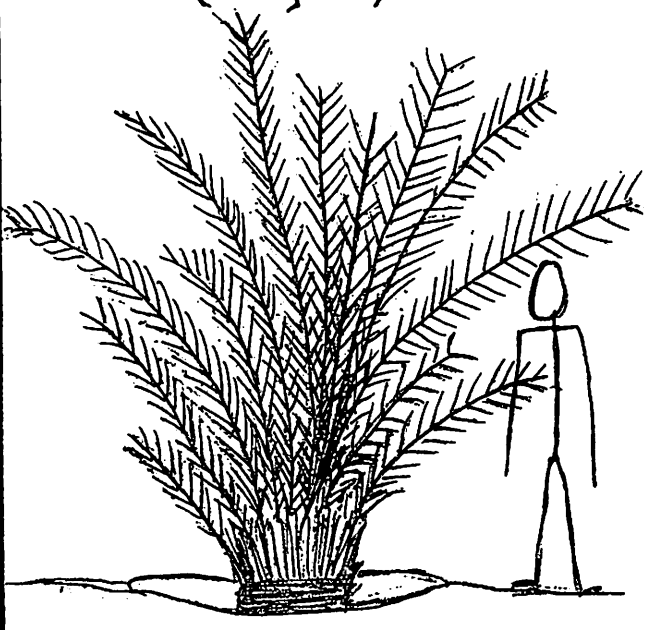
FRUIT (Green – Brown)



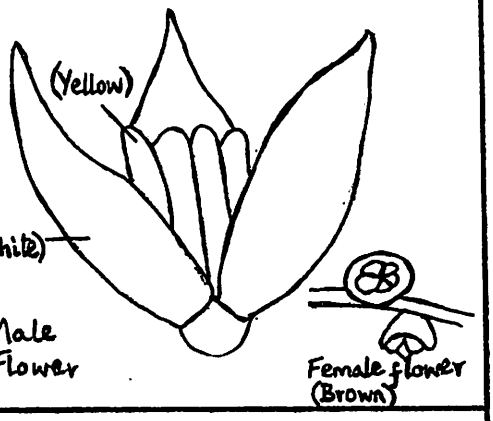
(Fresh: Green)

(Dry fruit: Shiny Brown)

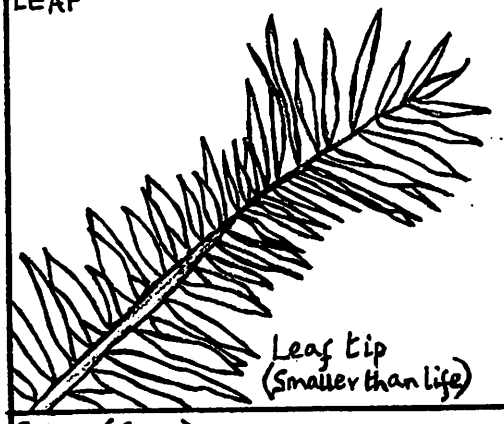
TREE SHAPE (Young tree)



FLOWER (White or Brown)



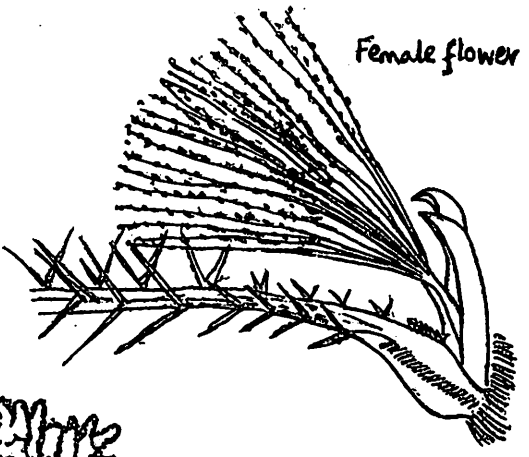
LEAF

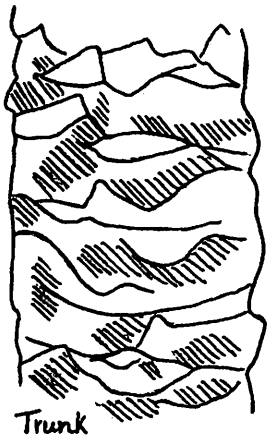


SEED (Grey)

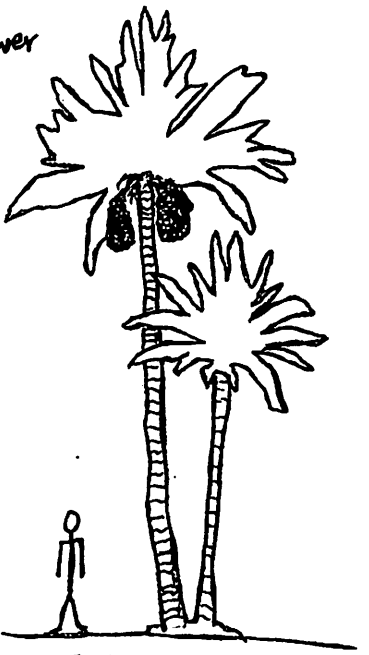
Seed

FOLIAGE (Smaller than life)





Trunk



Old tree shape

Tree growing

Names: Timir *Phoenix dactylifera*

1. Methods of propagation:

Cuttings: Transplanting offshoots dug up from base of trunk. Rap in wet sacking for transport. Offshoots (or root suckers) should already be 3 years old. Not advisable to grow from seed because neither sex nor productivity would be known and will take longer to mature.

2. Seed:

Number/kilogram	750
Collection	Rootsuckers should be cut direct from high fruiting mother trees
Extraction	
Storage	
Pretreatment	None

3. Nursery:

Soil mixture	Well manured and well watered sandy soil.
Potsize	
Sowing	At 1cm depth for seed. Rootsuckers at 20cm depth.
Germination	
Percentage	70-100
Pricking out	
Shade and watering	
Growth time	
Other notes:	From Beletweyne north along the Shabelle and from Luug north along the Juba MIGHT be suitable due to high temperatures, low rainfall and high watertables.

4. Pests and diseases:

Insects and fungae can attack fruit.

5. Planting:

Soils	Salt tolerant. Prefers sand with a humid subsoil. Tolerates subsoil water salt content of 20 grams/litre. Alkaline tolerant. Red alluvial soils near rivers are very suitable.
Method and spacement	Dig pits to more then 1m depth. Density of 125 trees per hectare or spacement of approx 9m x 9m. Plant one male to every 30-50 females.
Fertilizers and insecticides	Enrich pits with fertilizer at time of planting also thoroughly water.

6. Aftercare:

Growth and yields	Fruits take 5 months to mature. Fruiting starts in 5 years after planting. In plantations well cared for productivity does not decline till over 100 years old. It is best between 30th and 40th years. A good tree in full fruit can yield 100Kg dates/yr. A good plantation 8-12 tons/ha.

7. Other notes:

There are a large number of clones which differ in fruit production and ecological requirements. Offshoots with a base of 15cm diameter and a weight of 6-7 kilograms are ideal. Offshoots normally trimmed back, before being cut from main trunk, to between 1/2 and 1/3 length.

Tree details

1. Names: Adie (Rummei) *Salvadora persica*

Arabic	Araq, Arrak
English	Toothbrush tree
Species	Salvadora persica.L
Family	Salvadoraceae
Synonyms	Galenia asiatica Burm.f.Salvadora indica Wight, S. cyclophylla Chiov.

2. Natural distribution:

Egypt, Libya, Algeria, Mauritania, Senegal, Mali, Niger, Nigeria, Cameroon, Chad, Sudan, Ethiopia, Somalia, Uganda, Kenya, Tanzania, Mozambique, Zambia, Malawi, Zimbabwe, Angola, Namibia, also Arabia and India.

3. Where found in Somalia:

North, central rangelands and south. Occurs in seasonally wet sites, usually clay rich, eg. riverbanks.

4. Climate requirements:

Rainfall (mm/yr)	50-600
Temperature(°C)	
Altitude (m)	
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	(*)	Fodder	**	Fruit	*
Charcoal	(*)	Livestock shade		Edible leaves	
Poles		Intercropping		Honey	*
Toolhandles	*	Nitrogen fixation		People shade	
Carving		Shelterbelt	*	Amenity	
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement		Toothbrush sticks	**
Sandune fixation		Tannins			

Shoots can be eaten as uncooked vegetables, fruit can be eaten cooked. Browse is important in dry season because Adei is evergreen. Toothbrush sticks from small twigs of about 5mm in diameter are cut.

6. Recommendations and notes:

Due to its economic value as a toothbrush this species could be considered for plantation establishment, or hedge establishment in villages. Possibly suitable as an income generating species for women's community forestry projects. Research required to find out yields and rotation of coppice.

7. References:

Dale and Greenway, Kuchar, SEPESAL, Teel.

Tree description

1. Summary:

Evergreen small tree or bush forming tangled thickets.

2. Detailed:

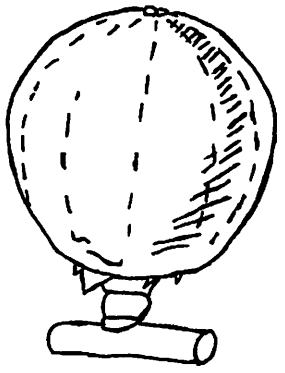
TREE SHAPE

Height	Up to 6m	
Trunk and Bark	Fairly smooth	Colour: Whitish-grey
Branches	Many drooping smooth and hairless.	Colour: Light grey-green
FOLIAGE		
Twigs	Used as toothbrushes	Colour:
Thorns		
Size		Colour:
LEAF	Opposite, coriaceous, simple, lanceolate to elliptic, slightly fleshy, leathery	
Size	3-7 x 1.5-3cm	Colour: Green
Leaflet Size		
FLOWERS	Axillary and terminal panicles. Many flowers in clusters hanging downwards	
Size	Small: Petals of 1.5mm length.	Colour: Green-white
FRUIT	Drupe: Small pea shaped, fleshy.	
Size	Pea size: 6mm diameter	Colour: Red-dark purple
SEED	One seed per pod	
Size		Colour:
ROOTS		
WOOD	Anamalous	Colour:

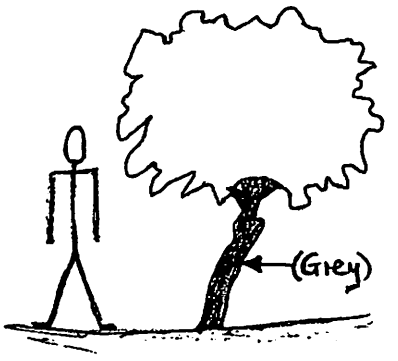
SOMALI NAME	ADEI	LATIN NAME	SALVADORA PERSICA

FRUIT (Red-Purple)

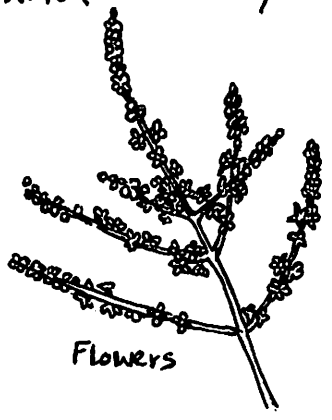
Larger than life-size



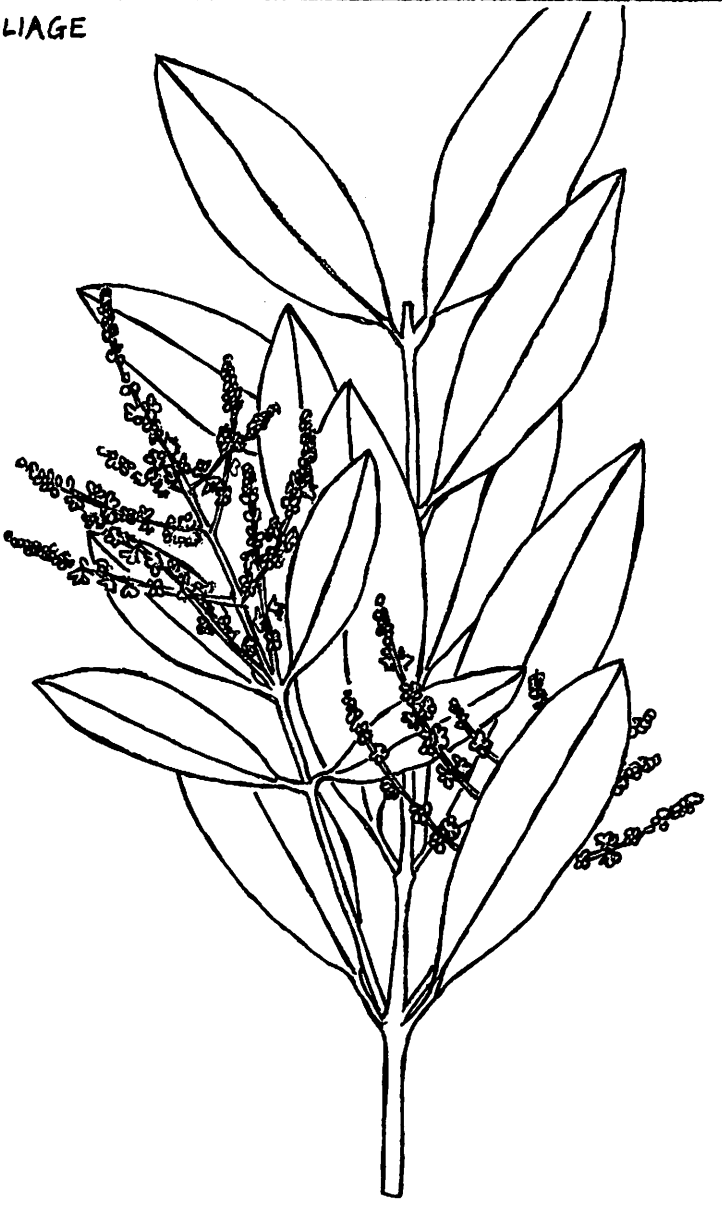
TREE SHAPE



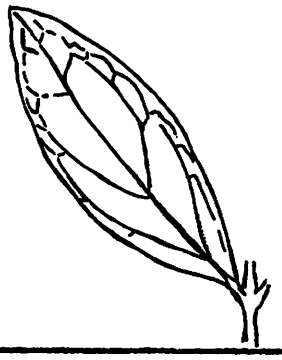
FLOWER (Green-White)



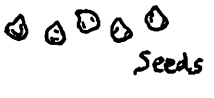
FOLIAGE



LEAF (Green)



SEED



Tree growing

Names: Adei *Salvadora persica*

1. Methods of propagation:

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth time

Other notes

4. Pests and diseases:

5. Planting:

Soils — Saline tolerant dry soils. Sandy and alluvial soils.

Method and spacement

Fertilizers and insecticides

6. Aftercare:

Growth and yields

7. Other notes:

Tree details

1. Names: Raqay *Tamarindus indica*

Arabic	Tamar al hind, Abal
English	Tamarind, Indian date
Species	Tamarindus indica.L.
Family	Leguminosae - Caesalpinioideae
Synonyms	

2. Natural distribution:

Senegal, Niger, Guinea-Bissau, Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Benin, Niger, Nigeria, Cameroon, Chad, Sudan, Uganda, Kenya, Tanzania. Also present (introduced to) tropical Asia.

3. Where found in Somalia:

Middle Juba. Cultivated on farmland, eg. Afgooye. Grown in villages as a street tree between Galkayo and Dusa Mareeb (Central Region) where supplementary watering is given.

4. Climate requirements: Semi-arid tropics. Long dry season.

Rainfall (mm/yr)	600-1000
Temperature(°C)	Over 20°C Frost sensitive
Altitude (m)	Lowlands usually below 1000m
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	*	Fruit	**
Charcoal	**	Livestock shade	*	Edible leaves	*
Poles		Intercropping		Honey	*
Toolhandles	*	Nitrogen fixation		People shade	*
Carving	**	Shelterbelt		Amenity	*
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement		Dyes (yellow)	*
Sandune fixation		Tannins	*	Livefencing	*

Edible uncooked fruit. Non-alcoholic beverages. Flour/meal from seeds. Edible raw or roasted seed. Soap or soap substitute. Boats. Furniture. Pestles and mortars. Wheels. Living fence posts. Fruit rich in Vitamin C. Casts a dense shade and drops acid leaves hence not suitable for intercropping. The tart brown pulp mixed with sugar makes a sweetmeat used for seasoning other food. Testa should be removed from seed before eating.

6. Recommendations and notes:

Over-ripe fruits can be used to clean copper and brass. Can be found growing on termite mounds. Cuttings or seed should be selected from small profusely fruiting varieties for easier and better fruit harvest. It is often planted as a village shade tree in the Sahel.

7. References: Anon., Baumer, Purseglove, Sahni, SEPESAL, Teel, Weber, Williams.

Tree description

1. Summary:

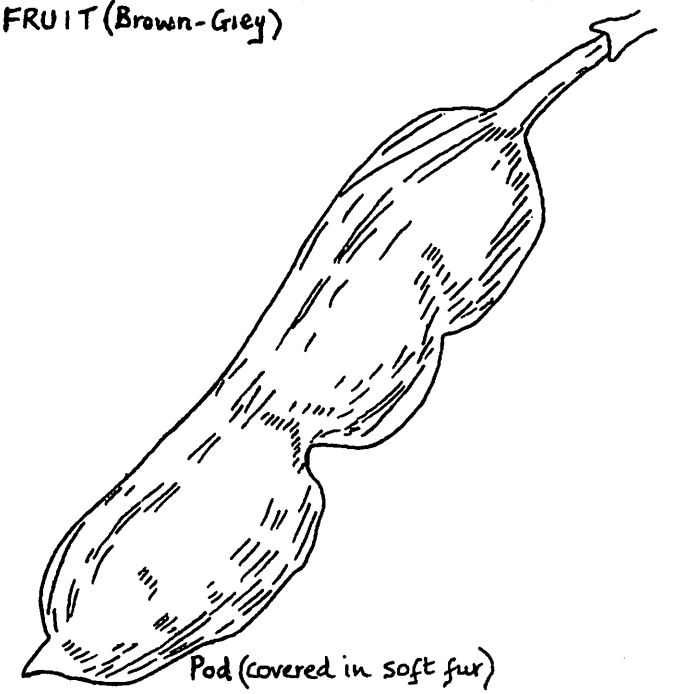
Longlived evergreen tree. Deciduous in arid areas. Unarmed. Usually flowers at end of dry season. Fruits mature 8 months later.

2. Detailed:

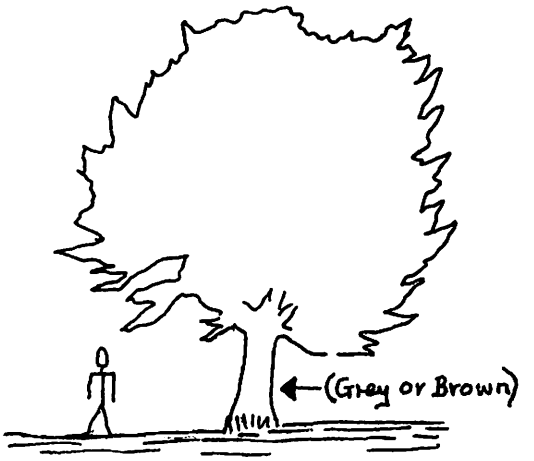
TREE SHAPE	Dense often rounded crown resembling cupola shape.	
Height	Up to 25m	
Trunk and Bark	Often splitting into a number of stems at base. Up to 1 m dbh and 3m height. Fissured vertically and horizontally.	Colour: Light grey or brown to red or black.
Branches	Repeatedly branching and drooping	*Colour:
FOLIAGE		
Twigs		Colour:
Thorns		
Size		Colour:
LEAF	Alternate parapinnate. Compound.	
Size	7-15cm	Colour: Light green when young Dull dusty green when old.
Leaflet	10-12 pairs per pinna, opposite and entire	
Size	1-2.5 x 0.5-1cm	
FLOWERS	Arranged in drooping racemes which are up to 20cm long. Abundant	
Size	2.5cm diameter	Colour: Pale yellow with pink veins
FRUIT	Long, rounded, curved pods.Hard, obovate, flattened. Brittle shell.	
Size	5-10 x 2cm	Colour: Rusty brown-grey
SEED	Several per pod immersed in fibrous pulp. 1-10 per pod.	
Size	11-17 x 10-12mm	Colour: Brown
ROOTS	Deep roots	
WOOD	Hard and heavy. Hard to work but easy to polish. Regular grain.Termite resistant.	Colour: Dark purple-brown heartwood Pale yellow sapwood

SOMALI NAME	RAQAY	LATIN NAME	TAMARINDUS INDICA

FRUIT (Brown-Grey)

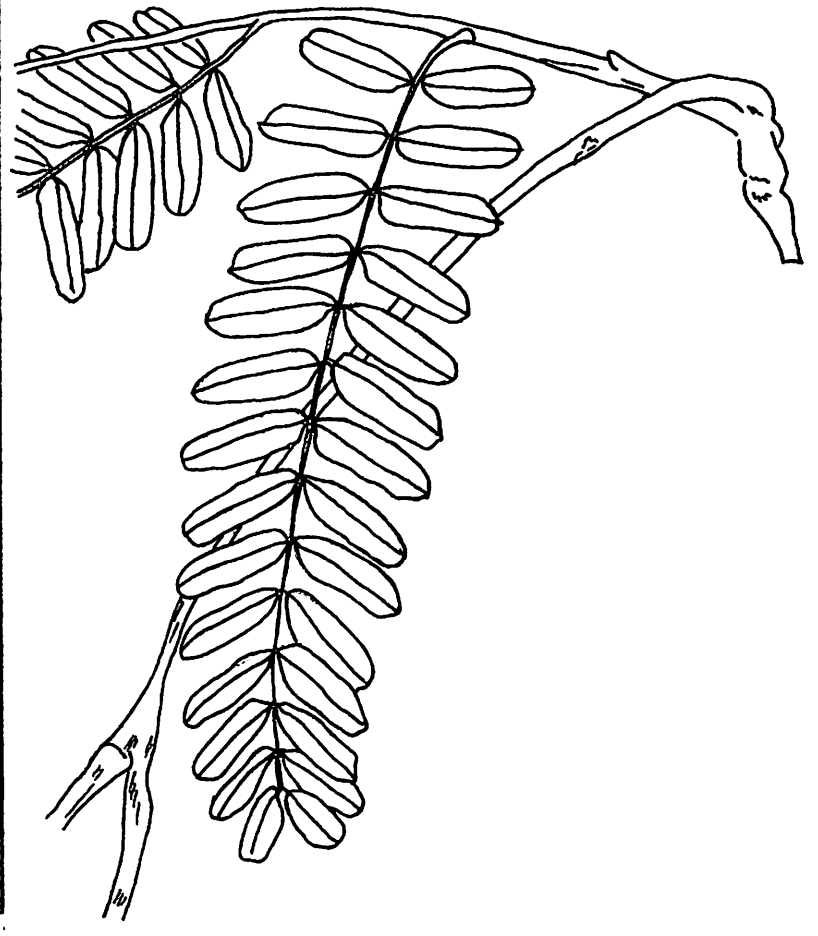


TREE SHAPE

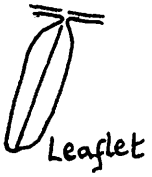


FLOWER (Yellow-Pink)

FOLIAGE



LEAF



SEED (Brown)

Tree growing

Names: Raqay *Tamarindus indica*

1. Methods of propagation:

Usually from seed, sometimes from budding or cuttings

2. Seed:

Number/kilogram:	1000 -3000
Collection	
Extraction	Soak fruit to remove pulp and dry seed.
Storage	Protect from insects: viable for two years.
Pretreatment	None required. Sometimes soak in cold water for 24 hours

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	10 days - 2 months
Percentage	30-70
Pricking out	
Shade and watering	
Growth time	12 weeks needed in nursery (18-24 weeks)(9-12 months)
Other notes	Dry collected pods in sun. Then crack by hammering lightly.

4. Pests and diseases:

Pods often attacked by insects. No protection from termites is necessary.

5. Planting:

Soils:	Dry soils: well drained sandy soils. Not seasonally flooded or waterlogged sites.
Methodand spacement	Seldom grown in plantations.
Fertilizers and insecticides	

6. Aftercare:

Circle weeding required. Needs protection when young.

Growth and yields	Can be more than 200 years. Slow growing. Trees begin fruiting when 8-12 years old. Can develop root suckers from damaged roots: useful for increasing wood production. For timber production a rotation of 50-60 years has been suggested.

7. Other notes:

Indian varieties are more productive (domesticated) than African varieties even though Botanists consider species was introduced to India from Africa! Often found growing in association with *Adansonia digitata* (Baobab) in the natural state.

Tree details

1. Names: Dhuur *Tamarix aphylla*

Arabic	Atel, Tarfah
English	(Tarfa, Athl, Bigm, Fareq, Ubal) Tamarisk
Species	Tamarix aphylla (L.) Karsten
Family	Tamaricaceae
Synonyms	Tamarix orientalis, Tamarix articulata, Thuja aphylla

2. Natural distribution:

Afghanistan, Algeria, Bahrain, Chad, Egypt, Ethiopia, Eritrea, India, Iran, Iraq, Israel, Jordan, Kenya, Kuwait, Libya, Mauretania, Morocco, N. Yemen, Niger, Oman, Pakistan, Saudi Arabia, Senegal, Somalia, Sudan, Tanzania, Tunisia.

3. Where found in Somalia:

North, Central and South. A line of Dhuur grow around the bus station in Afgooye, which were planted by the Italians. Similarly they can be seen as a shelterbelt beside farmland on the road from Koryoli south to Brava.

4. Climate requirements:

Rainfall (mm/yr)	100-500
Temperature(°C)	
Altitude (m)	
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	*	Fruit	
Charcoal	*	Livestock shade		Edible leaves	
Poles	*	Intercropping		Honey	
Toolhandles	*	Nitrogen fixation		People shade	*
Carving	*	Shelterbelt	*	Amenity	*
Timber	*	Hedge	*	Medicine	*
Insecticide		Soil improvement	*	Dyes	*
Sandune fixation		Tannins	*		

Boats, furniture, domestic utensils, wheels.

6. Recommendations and notes:

Grows in wadis, sandy plains and salty deserts. It has already proven to be a useful shelterbelt species in Southern Somalia. Propagation techniques are probably familiar to the Italian community.

7. References:

Kuchar, Nabil *et al.*, Sahni, SEPESAL.

Tree description

1. Summary:

Unarmed evergreen high shrub of riverine habitat.

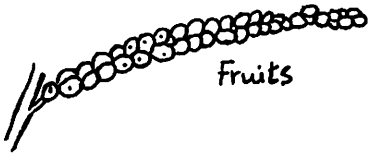
2. Detailed:

TREE SHAPE

Height	Up to 16m	
Trunk and	2.4m diameter.	
Bark	Longitudinally fissured	Colour: Red-brown-grey
Branches		Colour:
FOLIAGE		
Twigs	Branchlets joined	Colour: Green
Thorns		
Size		Colour:
LEAF	Minute triangular toothed. Glaucous and short pointed.	
Size	2 mm long	Colour: Light grey-green.
Leaflet		
Size		
FLOWERS	Arranged in racemes. Petals 5.	
Size	4-6cm x 4-5mm	Colour: Greenish or pinkish
FRUIT	Valves of ripe capsules. Pyriform	
Size	4-5mm long	Colour:
SEED	Terete, minute	
Size	0.5mm long	Colour: Brown
ROOTS		
WOOD		Colour:

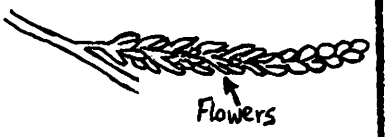
SOMALI NAME	DHUUR	LATIN NAME	TAMARIX APHYLLA

FRUIT



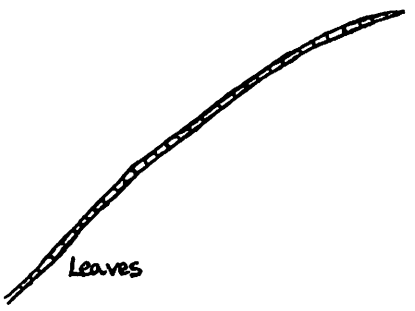
TREE SHAPE

FLOWER (Green-Pink)



FOLIAGE

LEAF (Grey-Green)



SEED (Brown-Very small)

Tree growing

Names: Dhuur *Tamarix aphylla*

1. Methods of propagation:

Easily propagated from cuttings.

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture:
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth time

Other notes

4. Pests and diseases:

5. Planting:

Soils — Saline tolerant, dry soils. Sandy plains, wadis, salty deserts.
Method and spacement

Fertilizers and insecticides

6. Aftercare:

Growth and yields

7. Other notes:

Italian community should have knowledge of detailed propagation techniques.

Tree details

1. Names: Harayri *Terminalia prunioides*

Arabic
English
Species Terminalia prunioides. Lawson
Family Combretaceae
Synonyms T. holstii. Engl. T. petersii. Engl. T. polycarpa

2. Natural distribution:

Angola, Botswana, Kenya, Mozambique, Namibia, South Africa, Tanzania, Zambia, Zimbabwe.

3. Where found in Somalia:

Sandy soils, e.g. North of Mogadishu intercropped in fields by farmers. Seems to prefer the sand dunes receiving supplementary moisture from the coast. Southern region including Bay region (and north according to Kuchar).

4. Climate requirements:

Rainfall (mm/yr)
Temperature (°C)
Altitude (m) Low altitude open woodland.
Groundwater

5. Uses: (In other countries &/or Somalia)

Fuel	*	Fodder	*	Fruit	*
Charcoal	**	Livestock shade	*	Edible leaves	
Poles	**	Intercropping	**	Honey	
Toolhandles	*	Nitrogen fixation		People shade	*
Carving	*	Shelterbelt		Amenity	
Timber		Hedge		Medicine	*
Insecticide		Soil improvement	*	Dye (roots)	*
Sandune fixation	*	Tannins		Gums (edible)	*

Roots used to cure dysentery. Edible fruit. Turnery and carving. Intercrops well possibly because leaves are good mulch on soil. Hararyi is said to be the second best charcoal in Somalia, after Galool, and a faster growing tree, especially if receiving adequate amounts of water.

6. Recommendations and notes:

It is reported Harayri is intercropped with farm crops north from Mogadishu (100km). This is very interesting and should be encouraged by the NRA and forestry projects. Apparently farmers are both leaving existing Harayri trees when land is cleared and also purposefully planting seedlings and protecting them in their land. Benefits to the farmer are multipurpose: shade for farmworkers (tree is almost thornless), shade and dry season fodder for livestock, soil improvement beneath tree from leaf fall, wind-break, and last but not least a supply of poles and/or charcoal on felling.

7. References: Griffiths, Kuchar, SEPESAL, Teel.

Tree description

1. Summary:

Grows quite tall, having horizontal table-like branches giving it a distinctive, layered appearance. Often unarmed. Reddish seed.

2. Detailed:

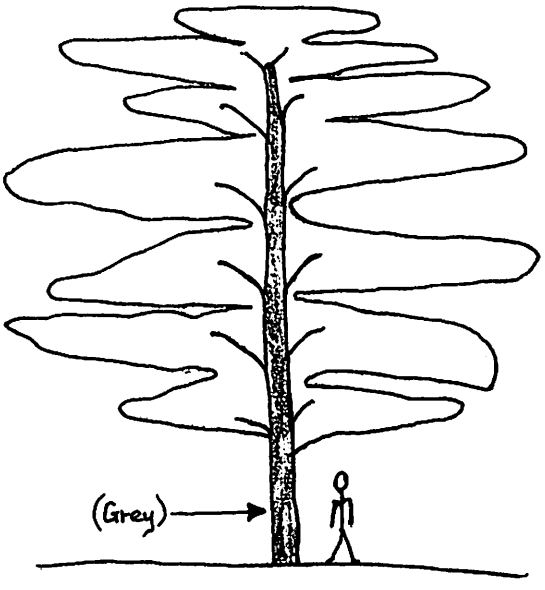
Branches like 'Cedar-of-Lebanon'.

TREE SHAPE	Crown of moderate density	
Height	7-15m tree or 2-4m shrub	
Trunk and Bark	Fissured longitudinally Rough	Colour: Grey (Slash-yellow)
Branches	Horizontal table-like pattern	Colour: Purplish brown-grey
FOLIAGE		
Twigs	Long shoots straight with approx. regularly arranged lateral shoots (4-6cm. length). Diverging almost at right angles.	Colour:
Thorns	Only occasionally present on long shoots.	
Size		Colour:
LEAF	In fascicles on short spur shoots. Usually arranged spirally.	
Size	Up to 7.5 x 3cm.	Colour:
	Broadly obovate to elliptic-obovate shaped leaves.	
Leaflet Size		
FLOWERS	Inflorescences on lateral spikes. Petals absent. Usually 10 stamens.	
Size	5-8cm long spikes	Colour: Cream-White
FRUIT	2-winged. Eliptic-oblong. Wings sometimes puckered at margins.	
Size	4-6.5 x 2-3cm	Colour: Light red to red-purple
SEED	One per fruit surrounded by wings.	
Size	2.5 x 2cm	Colour:
ROOTS		
WOOD	Hard and heavy. Termite resistant.	Colour: Yellow

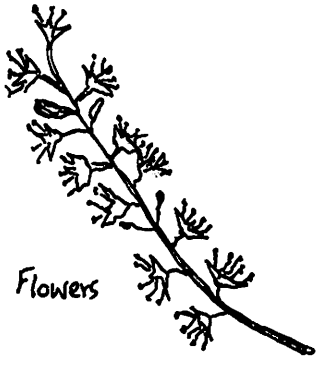
SOMALI NAME	HARAYRI	LATIN NAME	TERMINALIA PRUNIOIDES

FRUIT (Red - Purple) - (Same as seed)

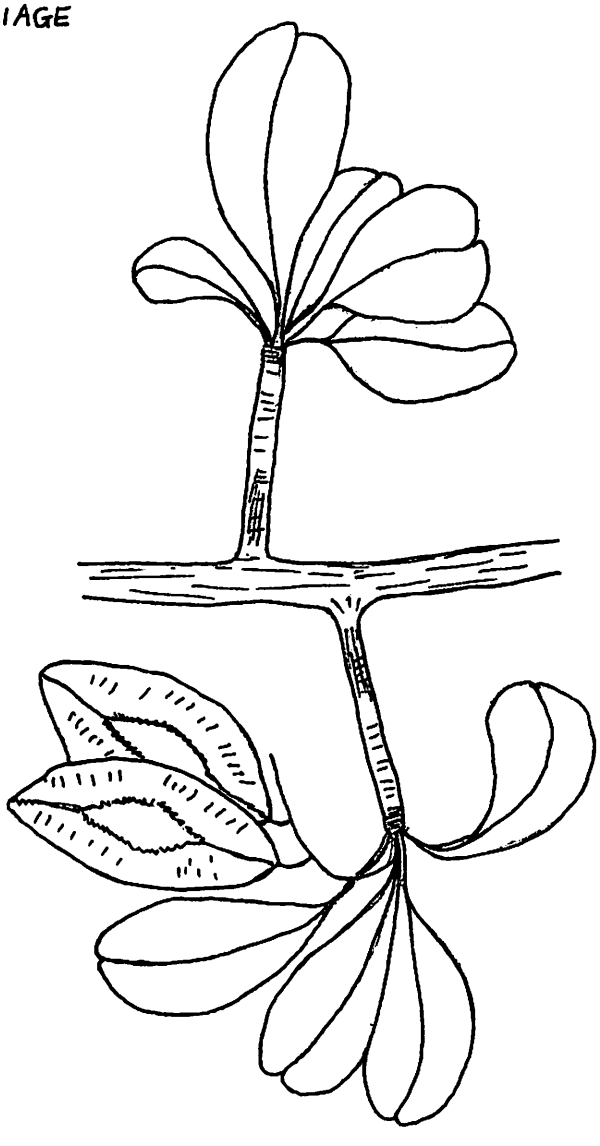
TREE SHAPE



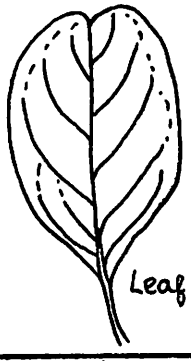
FLOWER



FOLIAGE



LEAF (Dullgreen)



SEED (Red-Purple)

Names: Harayri *Terminalia prunioides*

1. Methods of propagation:

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	Difficult. Burning suggested.
Percentage	Low
Pricking out	
Shade and watering	
Growth time	

Other notes

4. Pests and diseases:

5. Planting:

Soils	Dry soils. Prefers sandy soils. (Rocky hill slopes and on deep alluvial soils of low altitude rivers)
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Slow growth unless irrigated.

Growth and yields

7. Other notes:

ICRAF or KENGO in Nairobi, Kenya may have information on propagation.

Tree details

1. Names: Hara *Terminalia spinosa*

Arabic
English Spiny desert tree
Species Terminalia spinosa. Engl.
Family
Synonyms

2. Natural distribution:

3. Where found in Somalia:

Sandy and clay alluvial soils in Southern Somalia. Sandunes south from Mogadishu and the Shabelle Alluvial plains. The clay plains of the Juba. Southern and Central regions.

4. Climate requirements:

Rainfall (mm/yr)
Temperature(°C)
Altitude (m)
Groundwater

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder		Fruit	
Charcoal	**	Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber	*	Hedge		Medicine	
Insecticide		Soil improvement		Gums (Edible)	
Sandune fixation		Tannins			

Regarded as the best wood for bomas, movable houses and semi-permanent structures. Not browsed. Potentially useful for live fencing.

6. Recommendations and notes:

Tolerates a wider range of soil types than *T. prunioides*. Both *Terminalia's* are good charcoal and timber trees adapted to low rainfall conditions and should be protected.

7. References: Griffiths, Teel.

Tree description

1. Summary:

Deciduous armed tree with distinctive zig-zag branchlet pattern. 'Hara' always has thorns while 'Harayri' often does not, this being a distinctive feature. The other difference is that 'Hara' has a zig-zag twig pattern while 'Harayri' has straight growing twigs.

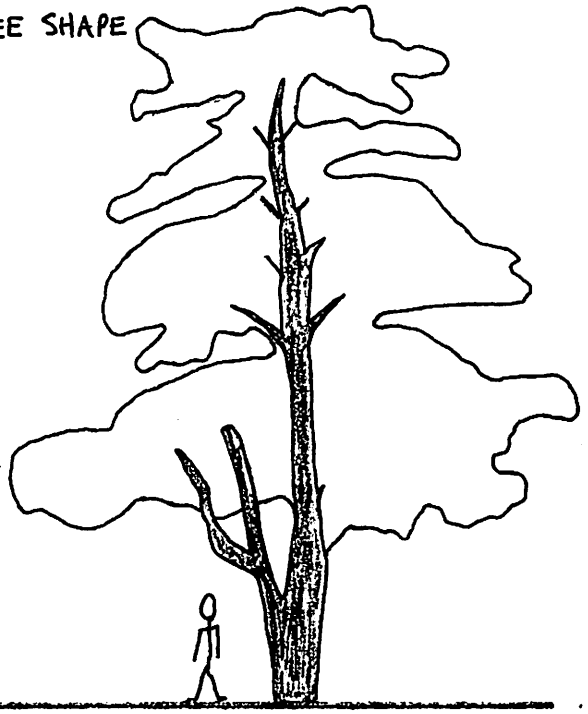
2. Detailed:

TREE SHAPE	Probably a more distinct table like pattern of branches than Terminalia prunioides.	
Height	Growing to 15m	
Trunk and	Straight	
Bark	Longitudinally fissured	Colour: Grey
Branches	Whorled, horizontal	Colour:
FOLIAGE	Irregularly arranged lateral shoots	
Twigs	Zig-zag form	Colour: Grey or Red-brown
Thorns	Present at base of spur shoots. 2(-3) in number. Sharp, straight, paired.	
Size	Less than 1.5(-2)cm	Colour:
LEAF	Broadly obovate. Scarcely longer than broad. Shape constant, size varies.	
Size	Up to 4 x 3cm	Colour: Light green. Red petiole.
Leaflet Size		
FLOWERS	Petals absent. Stamens usually 10. Arranged in inflorescence.	
Size	5-6cm long inflorescence	Colour: White or Purple
FRUIT	2-winged glabrous oblong elliptic.	
Size	2-3 x 1-2cm	Colour: Red-Purple-Straw coloured
SEED	One per fruit	
Size	2 x 1cm	Colour: Red-Purple-Straw coloured
ROOTS		
WOOD	Hard, heavy. Very durable and almost termite proof.	Colour: Dark brown

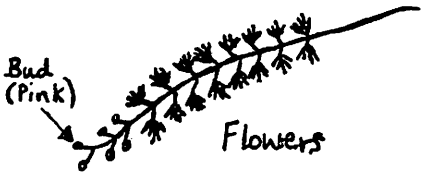
SOMALI NAME	HARA	LATIN NAME	TERMINALIA SPINOSA

FRUIT (Yellow-Brown) -(Same as seed)

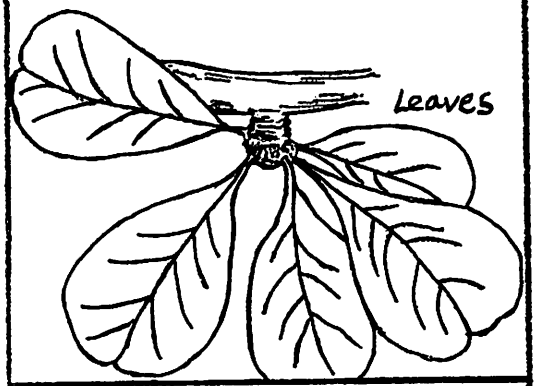
TREE SHAPE



FLOWER(White-Yellow)

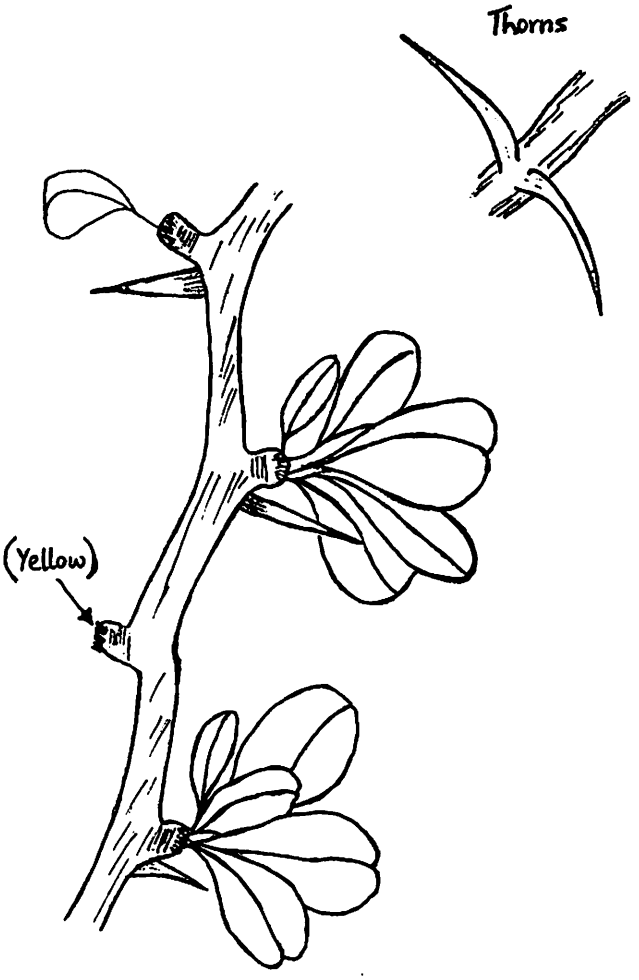


LEAF (Light Green& pink veins)



SEED (Yellow-Brown)

FOLIAGE



Tree growing

Names: Hara *Terminalia spinosa*

1. Methods of propagation:

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	Difficult, better than *T. prunioides.*
Percentage	Low
Pricking out	
Shade and watering	
Growth time	

Other notes

4. Pests and diseases:

5. Planting:

Soils	Tolerates sands and clays or rocky sites.
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Growth and yields

7. Other notes:

Tree details

1. Names: Gobb *Ziziphus mauritiana*

Arabic	Nabk
English	Chinese date, Jujube, Indian plum, Indian cherry.
Species	Ziziphus mauritiana Lam
Family	Rhamnaceae
Synonyms	Ziziphus jujuba (L.) Lam, Z. orthacantha DC.

2. Natural distribution:

Very common in the whole Sahelian zone, also found in all the dry parts of Asia. Cultivated in many tropical countries. Some say native to Southern Himalayas and introduced to Africa over 2,000 years ago.

3. Where found in Somalia:

Widespread in north. Grown as a street tree in Rabableh just south of Garoe on the Chinese Road. Also grown in Dusa Mareeb.

4. Climate requirements: Very drought hardy.

Rainfall (mm/yr)	150-500
Temperature(°C)	
Altitude (m)	0-600
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	**	Fodder	**	Fruit	**
Charcoal	*	Livestock shade		Edible leaves	
Poles	*	Intercropping		Honey	
Toolhandles	*	Nitrogen fixation		People shade	
Carving	*	Shelterbelt	*	Amenity	
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement		Live fencing	**
Sandune fixation		Tannins	*	Dyes (Red)	*

Famine food; live fencing posts; fruit edible uncooked; jellies, jams, chutneys, pickles can be made from fruits. Seed can be ground into flour/meal. Furniture and small timber. Dead fencing.

6. Recommendations and notes:

Gobb is well known by northerners and favoured especially for its fruits. Southerners do not value it so highly. Some say the fruit of the northern Gobb is sweeter than that native to the South. Planting Gobb as a live fence along boundaries in poorer districts of cities and settlements is to be encouraged because of its multipurpose uses, not least the food value of the fruits. Its management should be included in rangeland and/or natural forest management. In the arid central region it is planted as a street tree. This should be encouraged and research should go into finding the best fruiting varieties from which cuttings might be tried.

7. References: Baumer, Kuchar, Lely, Little, Nair, SEPESAL, Teel.

Tree description

1. Summary:

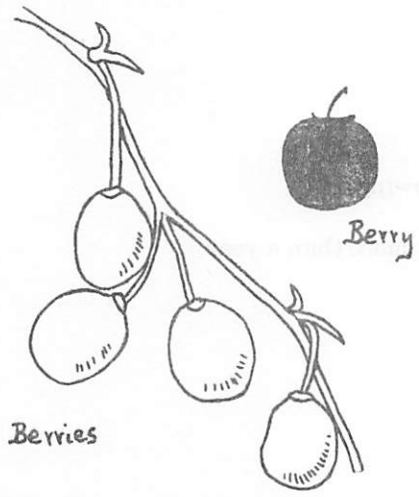
An almost evergreen shrub with thorns. Sometimes deciduous in drought. Often forming impenetrable thickets in natural stands.

2. Detailed:

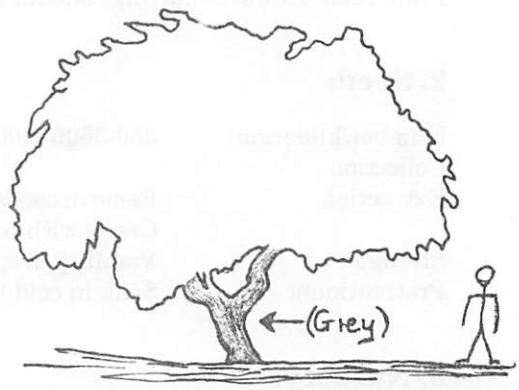
TREE SHAPE	Rounded crown and moderately dense.	
Height	3-8(-16)m	
Trunk and	Much branched from the ground. 40cm or more dbh.	
Bark	Thick. Fissured irregularly and shallowly. Slash is pink.	
		Colour: Grey or blackish-brown tinge
Branches	Dense tangle often drooping at ends. Many twigs drooping, pubescent when young.	
		Colour:
FOLIAGE		
Twigs	Zig-zag pattern. Slender	Colour: Pink
Thorns	1 hooked and 1 straight. Usually paired at leaf bases.	
Size	3-6mm long	Colour: Brownish - Pale orange
LEAF	Coriaceous. Eliptic to ovate to nearly orbicular. Margin minutely serrated.	
Size	Usually 4.5 x 1.5cm	Colour: Shiny green upper surface
Leaflet		Colour: Densely white hairy lower surface
Size		
FLOWERS	Petals clawed, stamens x 5. Petals x 5.	
Size	4mm across	Colour Orange-brown-yellow-green
FRUIT	Berry. Orbical. Edible. Sweet. Juicy.	
Size	2-2.5cm	Colour: Yellow-brown-red
SEED	One stone per fruit. 2 celled round stone: 2 elliptic flattened seeds.	
Size	Stone up to 1cm.	Colour: Brown
	Seed approx. 6mm long.	
ROOTS		
WOOD	Hard without distinct heartwood. Heavy. Wood works fairly easily and polishes well. Specific gravity is 0.57-0.66. Medium textured with uneven interlocking grain. Requires care when planing.	
		Colour: Pink sapwood.
		Red-brown centre.

SOMALI NAME	GOBB	LATIN NAME	ZIZIPHUS MAURITIANA

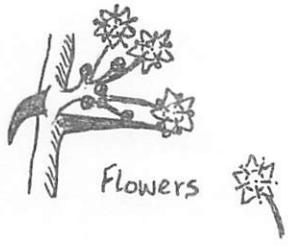
FRUIT (Brown)



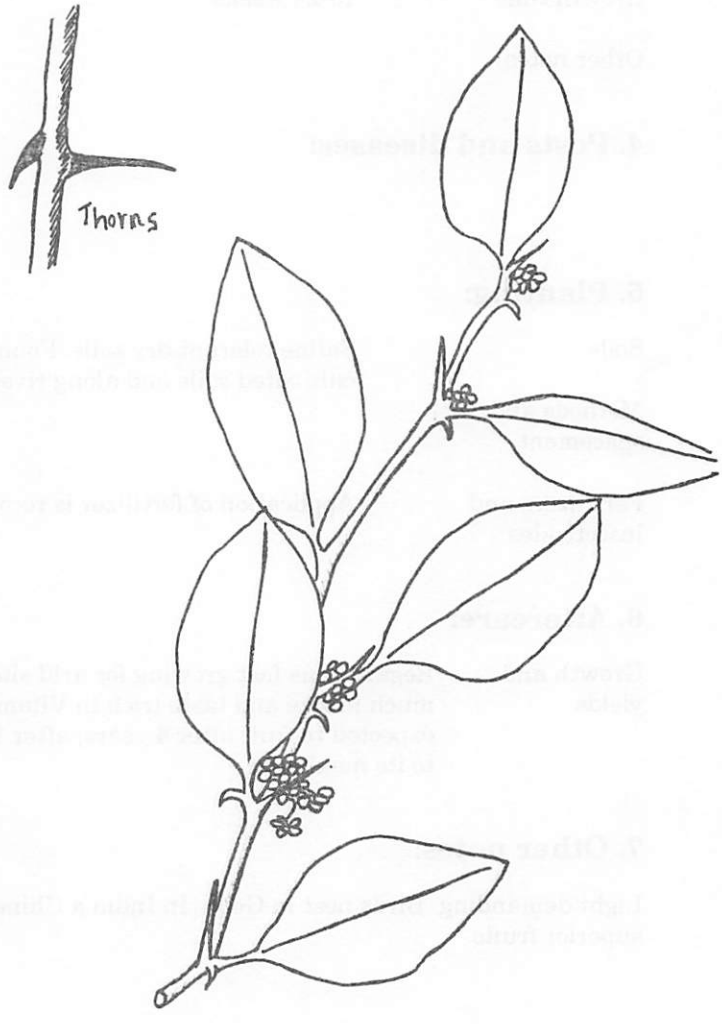
TREE SHAPE



FLOWER (Orange)



FOLIAGE



LEAF (Shiny green)

SEED (Brown)

Tree growing

Names: Gobb *Ziziphus mauritiana*

1. Methods of propagation:

From seed. However cuttings should be tried to ensure good fruits are produced. Grafting is also possible.

2. Seed:

Number/kilogram:	650-3500 (4000-7000)
Collection	
Extraction	Remove seeds from stones just before sowing. Crack with hammer.
Storage	Viability drops slowly with storage. Not more than a year.
Pretreatment	Soak in cold/tepid water for 48 hours.

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	
Percentage	30-70
Pricking out	
Shade and watering	
Growth time	18-24 weeks

Other notes

4. Pests and diseases:

5. Planting:

Soils	Saline tolerant dry soils. Found on sands, rocky soils, cultivated soils and along rivers and wadis.
Methods and spacement	
Fertilizers and insecticides	Application of fertilizer is recommended.

6. Aftercare:

Growth and yields	Regarded as fast growing for arid sites. Fruit varies much in size and taste (rich in Vitamin C). Can be expected to fruit after 4 years, after 10 years is fruiting to its maximum.

7. Other notes:

Light demanding. Birds nest in Gobb. In India a Chinese variety of *Ziziphus* is cultivated which produced superior fruits.

Tree details

1. Names: *Albizia lebbeck*

Arabic	Dakn-el-Bashna
English	Siris tree, East Indian Walnut, Woman's tongue tree, Kokko.
Species	Albizia lebbeck (L.) Benth.
Family	Leguminosae - Mimosoideae
Synonyms	Mimosa lebbeck L., Mimosa sirissa Roxb.

2. Natural distribution:

Bangladesh, Burma, India, Indonesia, Malaysia, Nepal, Pakistan, Sikkim, Sri Lanka, Thailand.

3. Where found in Somalia:

Beside rivers in South, e.g. Koryoli, Afgooye. Planted as a shade tree and a shelterbelt species.

4. Climate requirements: Long dry season of 2-6 months

Rainfall (mm/yr)	500-2,500
Temperature(°C)	(5) 20-28 (46)
Altitude (m)	0-1500
Groundwater	Required close to surface

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	**	Fruit	
Charcoal	*	Livestock shade		Edible leaves	
Poles		Intercropping	**	Honey	*
Toolhandles		Nitrogen fixation		People shade	*
Carving	*	Shelterbelt		Amenity	*
Timber	*	Hedge	*	Medicine	*
Insecticide		Soil improvement	**		
Sandune fixation	*	Tannins	*		

Soap and soap substitute from bark, furniture, pestles and mortars.

6. Recommendations and notes:

Could be tried as a hedge "alley-cropping" species as is practised with *Leuceana* in much of Asia now. Needs irrigation. Shallow rooting and therefore not windfirm.

7. References: Anon., Little, SEPESAL, Webb *et al.*

Tree description

1. Summary:

Unarmed medium sized tree. Easily recognised by its large papery yellow pods which hang profusely from the tree for much of the year and rattle in the wind.

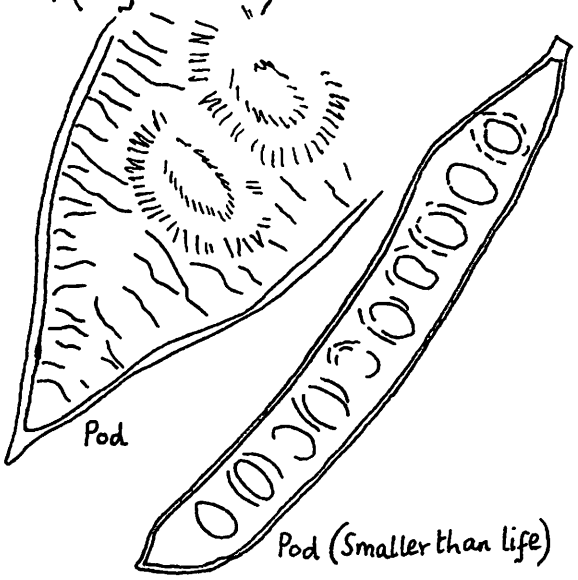
2. Detailed:

TREE SHAPE	Umbrella crown. Deciduous open crown.	
Height	Up to 15m (6-12m)	
Trunk and	50cm diameter	
Bark	Fissured and rough	Colour: (Inner bark is pink) Grey
Branches	Heavy and spreading	Colour:
FOLIAGE		
Twigs	Finely hairy when young	Colour: Greenish becoming grey or brown.
Thorns		
Size		Colour:
LEAF	Large bipinnately compound and alternative	
Size	15-40cm	Colour: Dull green
Leaflet	Large oblong and rounded at both ends. 4-10 pairs per pinna.	
Size	2-3 x 1-1.5cm	
FLOWERS	Grouped into heads. Fragrant. 1-4 rounded masses at end of stalks.	
Size		Colour: White-Yellow
FRUIT	Pod: flat and papery, oblong, broad, flat. Swollen around seeds	
Size	10-25(30) x 2.4-4(6)cm	Colour: Straw yellow
SEED	4-12 per pod. Flattened	
Size	7-12 x 7-9mm	Colour: Brown
ROOTS	Shallow	
WOOD	Heavy and hard. Termite resistant. Interlocking grain. Light construction wood. Specific gravity of 0.55-0.6. Seasons well, difficult to saw and machine.	
		Colour: Sapwood: Yellow-White
		Heartwood: Light brown streaked.

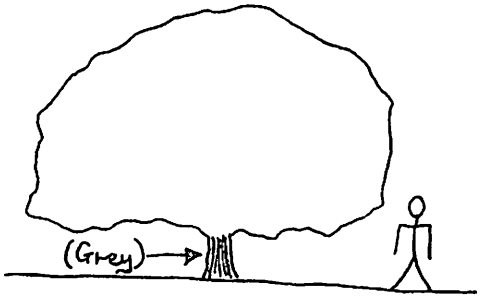
SOMALI NAME

LATIN NAME ALBIZIA LEBBECK

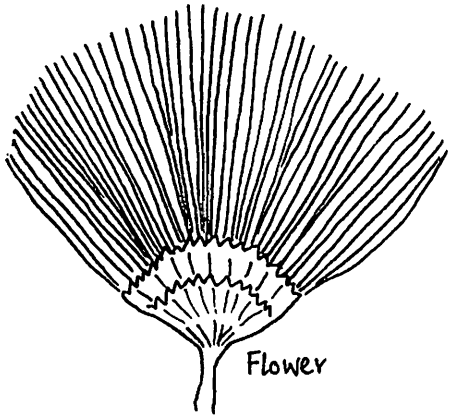
FRUIT (Light Yellow)



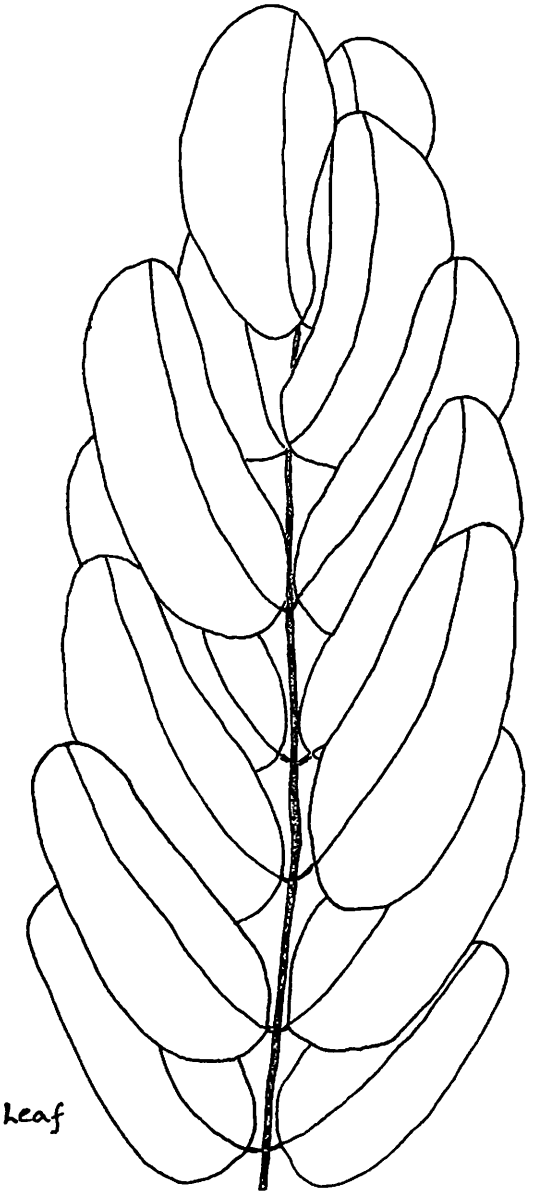
TREE SHAPE



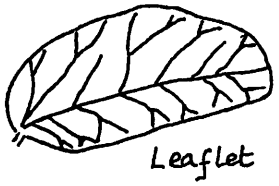
FLOWER (White)



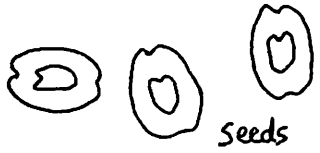
FOLIAGE



LEAF (Dull Green)



SEED (Brown)



Tree growing

Names: *Albizia lebbeck*

1. Methods of propagation:

Vegetative propagation using stem cuttings or potted stock. Root suckers vigorously, hence root damage could be used as a form of coppicing and reproduction.

2. Seed:

Number/kilogram	
Collection	From good mother trees
Extraction	
Storage	Viable for 5 years at ambient temperatures
Pretreatment	

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	1-2 months
Percentage	60-90
Pricking out	
Shade and watering	
Growth time	4-7 months

Other notes

4. Pests and diseases:

5. Planting:

Soils: Saline tolerant dry soils. Well drained loam.

Method and spacement

Fertilizers and insecticides

6. Aftercare:

Must be protected from browsing damage. Most probably requires irrigation.

Growth and Yields	Shortlived

7. Other notes:

Moderately light demanding. Foliage is salt spray tolerant.

Tree details

1. Names: Geed Hindi *Azadirachta indica*

Arabic	Azadira Hindi
English	Neem, Nim
Species	Azadirachta indica Adr. Juss.
Family	Meliaceae
Synonyms	Melia azadirachta L, Melia indica (Adr.Juss) Brand, Antelaee azadirachta.

2. Natural distribution:

Bangladesh, Burma, India, Thailand and Cambodia. Introduced into North-West Africa last century since when its spread has been dramatic across the Sahel - always planted by man, primarily as a shade tree.

3. Where found in Somalia:

In virtually every settlement in the country except where rainfall and/or water from wells is in very short suply. It covers Mogadishu, especially in poorer districts, and makes it a man-made green city.

4. Climate requirements: 5-7 months dry season

Rainfall (mm/yr)	450-1200
Temperature(°C)	(14)21-32(38) Tolerates very high temperature but but not frost.
Altitude (m)	0-1000
Groundwater	Within 9-12m from surface

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	(*)	Fruit	
Charcoal	*	Livestock shade	*	Edible leaves	
Poles	*	Intercropping		Honey	*
Toolhandles		Nitrogen fixation		People shade	**
Carving	*	Shelterbelt	*	Amenity	*
Timber	*	Hedge		Medicine	*
Insecticide	**	Soil improvement	*	Toothbrushes	*
Sandune fixation		Tannins	*		

Insecticide derived from leaves. Edible buds and flowers if cooked. Edible gum. Medicine from roots and fruits. Lubrication oil from seed. Soap from seed. Fuel (c.v.= 20,895 Kj/Kg)
Shelterbelt with *Salvadora persica* understorey is possible.

6. Recommendations and notes:

It is the most widely planted tree in Somalia. In terms of public participation it is the No.1 tree in Somalia in that every year thousands of Somalis take cuttings (or obtain potted stock), plant, irrigate and protect this tree. Only *Mangifera indica* rates as more popular across the whole Sahel zone. The favourite shade tree and the best advert for the success and potential of public participation in afforestation.

7. References: Anon., Baumer, Little, Pandey, SEPSAL, Teel, Webb *et al.*, Weber.

Tree description

1. Summary:

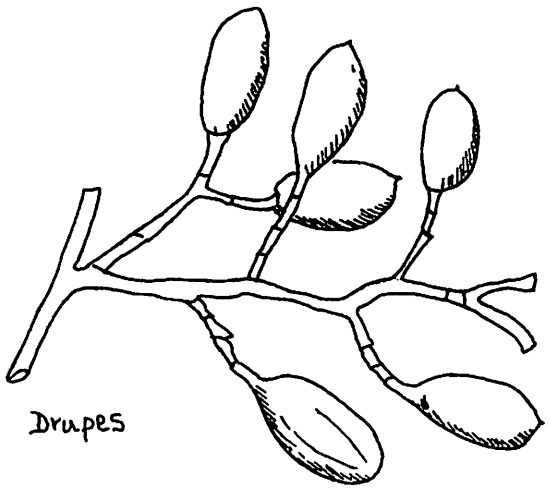
Evergreen. Crushed foliage with slight odor of garlic. Unarmed. Dark green wide spreading crown.

2. Detailed:

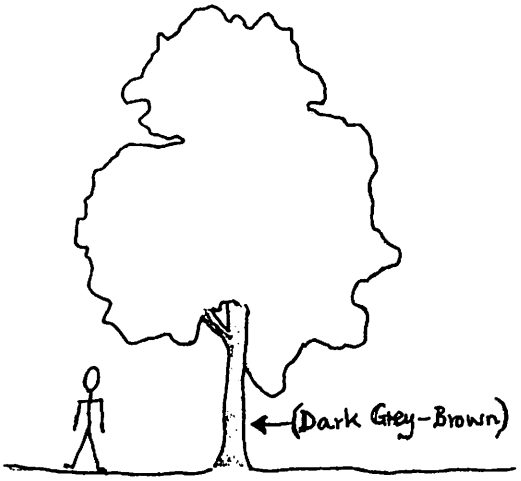
TREE SHAPE	Dense rounded crown. Oval shaped crown.	
Height	20-25m	
Trunk and Bark	Diameter of 100-150cm. Height of less than 4m. Thick, rough, wide, shallow vertical fissures separating flat ridges. Often attacked by termites.	Colour: Dark grey-brown
Branches	Widely spreading	Colour:
FOLIAGE		
Twigs	Stout and glabrous	Colour: Brown
Thorns		
Size		Colour:
LEAF	Unequally pinnate and alternate. 9-17 leaflets per pinnae. Paired.	
Size	Up to 35cm long	Colour: Pale green when young
Leaflet	Curved lance-shape. Ovate	Colour: Dark glossy green when adult
Size	4-8 x 1.2-2.2cm	
FLOWERS	Arranged in panicles. Fragrant. Panicles up to 20cm long.	
Size	6mm diameter	Colour: White
FRUIT	Small ellipsoid drupe	
Size	2cm long	Colour: Yellow-green
SEED	One stone per drupe. One or two seeds per stone.	
Size	1-2cm long	Colour:
ROOTS	Long tap root. Deep and extensive. House foundation damage has been attributed to roots which lift up the floors when tree is planted too close to house.	
WOOD	Specific gravity = 0.6-0.7. Resistant to termite and insect attack. Interlocking grain. Wood is moderately durable, difficult to preserve, easy to season and saw. Heartwood is red, hard, fragrant, mahogany-like grain.	
		Colour: Sapwood grey/white

SOMALI NAME	GEED HINDI	LATIN NAME	AZADIRACHTA INDICA

FRUIT (Yellow-Green)

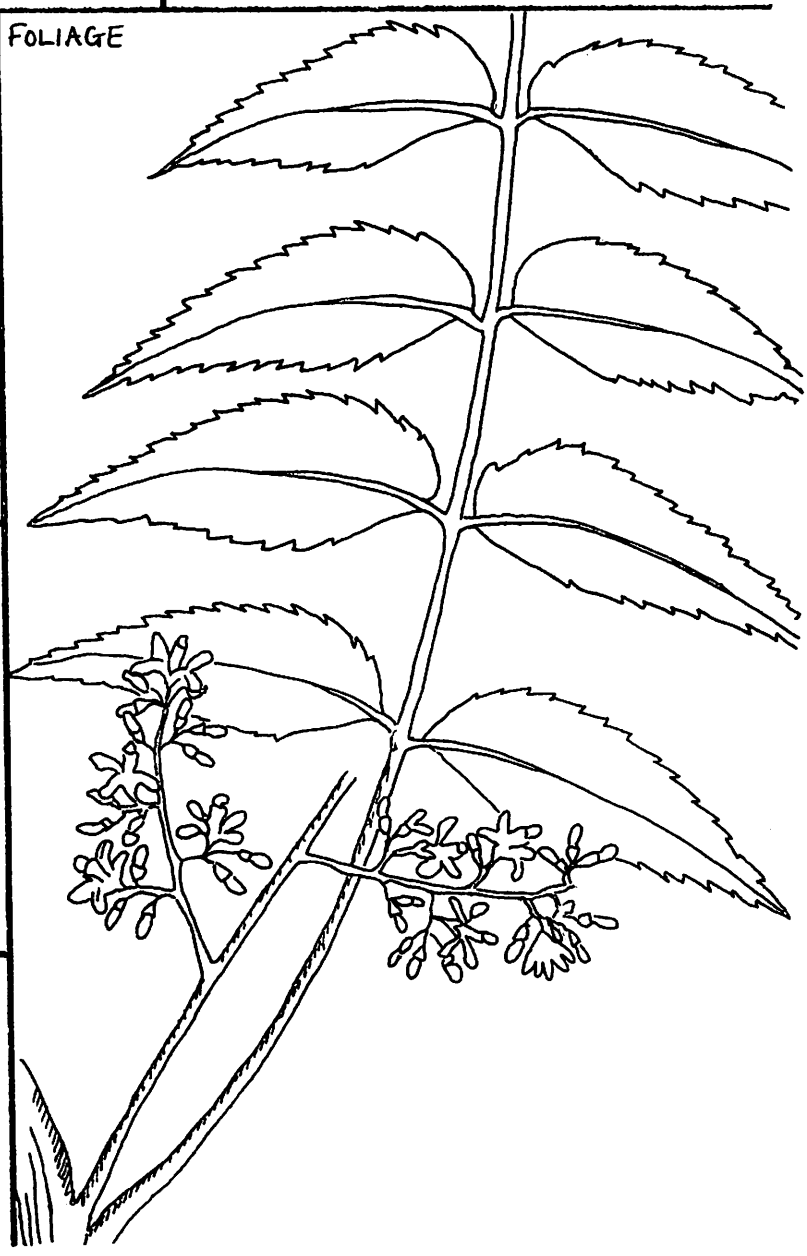


TREE SHAPE

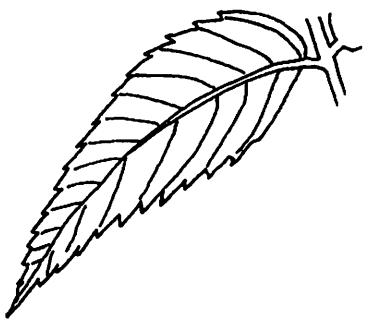


FLOWER (White)

FOLIAGE



LEAF (Green)



SEED

Tree growing

Names: Geed Hindi *Azadirachta indica*

1. Methods of propagation:

Potted stock. Wildings and rootsuckers cut or dug up during Gu rains and planted with protection of sticks around it. Direct sowing of seed and stumps are also possible as are striplings. Wildings usually 1m high (keep roots covered and moist).

2. Seed:

Number/kilogram	4,400 - 6,300
Collection	January in Mogadishu. Put tarpaulin under tree.
Extraction	Soak in water. Spread out to dry.
Storage	Only viable for 2-3 weeks (maximum of 2 months). Store in dry sack
Pretreatment	None, or soak in cold water for one to two days.

3. Nursery:

Soil mixture	Bury seeds in moist sand, leave for a week, only sow swollen seeds in pots.
Potsize	
Sowing	3 depulped stones per pot to 0.5-1cm depth. Horizontal position.
Germination	10-12 days (if seed fresh)
Percentage	35-65
Pricking out	
Shade and watering	light shading required
Growth time	14-18 weeks. Cut stems back before transporting to outplanting
Other notes	Regular root pruning essential. A danger of root curling and strangling within the pot.

4. Pests and diseases:

Termites attack trees of all ages (though do not damage wood). Porcupines kill trees by chewing bark at base of stem.

5. Planting:

Soils	Free draining: Better growth on deep soils. Can survive dry soils, mainly sandy soils, will tolerate clay.
Method and Spacement	Dig pits at 8 x 8m espacement (3 x 3m for fuelwood plantation) Regular weeding essential in 1st year.
Fertilizers and insecticides	

6. Aftercare:

Careful weeding. Protect from waterlogging and hot dry winds. Requires irrigation to aid establishment.

Growth and yields	Seedlings reach 10-20cm in first year of growth; rapid root growth though. Growth really starts in 2nd year.

7. Other notes:

Tree tends to throw out and produce suckers, especially under dry conditions.

Tree details

1. Names: Boordi *Cassia siamea*

Arabic	
English	Ironwood, Yellow Cassia, Bombay blackwood
Species	Cassia siamea Lam
Family	Leguminosae - Caesalpinioideae
Synonyms	Cassis florida. Vahl

2. Natural distribution:

South East Asia, India, Sri Lanka, Malaya, Burma, Indonesia, Thailand. Now widely planted in Africa.

3. Where found in Somalia:

Shabelle River alluvial deposits. Boordi is the favourite shade tree in Afgooye town. Does better on clay soils than on sandy soils.

4. Climate requirements: 4-6 month dry season.

Rainfall (mm/yr)	650-1,500 (500-700)
Temperature(°C)	(13) 21-28 (35)
Altitude (m)	0-1,000. Lowlands.
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder		Fruit	
Charcoal	*	Livestock shade		Edible leaves	
Poles	**	Intercropping		Honey	*
Toolhandles	*	Nitrogen fixation		People shade	**
Carving	*	Shelterbelt	*	Amenity	**
Timber		Hedge		Medicine	*
Insecticide		Soil improvement	*	Gums (Edible)	
Sandune fixation		Tannins	*		

Makes good furniture, good but smoky fuelwood, provides a dense shade, roots probably too competitive for intercropping with agricultural crops.

6. Recommendations and notes:

The water needs of Boordi make it a species which can only thrive in riverine sites, or where there is ground water close to the surface. Otherwise it needs regular watering. It is therefore only worth considering in the South of Somalia as it is a lowland species needing over 500mm rainfall. Beside the banks of the Juba and Shebelle it has become naturalised and competes very successfully with indigenous vegetation. Its most important use is as a shade tree and pole producing coppice species in Southern riverine villages. Close to Koryoli villagers have established it in closely spaced rows (by direct sowing) as an amenity/barrier strip around their houses. The villages I visited managed the single line of trees as a pole production coppice rotation.

7. References: Anon., Little, Pandey, SEPESAL, Teel, Webb et al., Weber.

Tree description

1. Summary:

Evergreen, irregular spreading unarmed yellow flowering densely crowned tree. Flowers and fruits for much of the year.

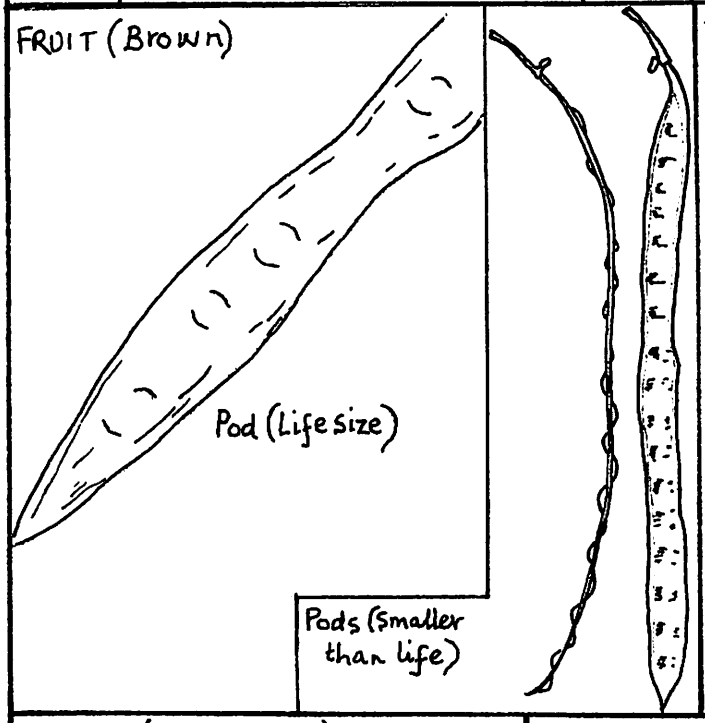
2. Detailed:

TREE SHAPE	Dense narrow upright irregularly spreading rounded crown	
Height	8-10 (up to 20)m	
Trunk and	30cm d.b.h. Less than 2-3m high	
Bark	Smoothish becoming slightly fissured with age	Colour: Grey or light brown
Branches	Irregular spreading and ascending	Colour: Grey or light brown
FOLIAGE		
Twigs		Colour: Greenish turning brown
Thorns		
Size		Colour:
LEAF	Alternate and pinnately compound. Finely pubescent underneath.	
Size	23-33cm long	Colour: Grey-Green
Leaflet	6-12 pairs per leaf, oblong, rounded both ends not serrated.	
Size	30-70 x 12-20mm	
FLOWERS	Numerous. Upright at end of twigs. Panicles are 20-30 x 13cm	
Size	3cm diameter	Colour: Bright Yellow
FRUIT	Long narrow pods. Numerous in number.	
Size	5-25 x 1.2 - 2cm	Colour: Dark brown
SEED	Small warped discs, flat, less than 25 per pod.	
Size	8mm diameter	Colour: Shiny dark brown
ROOTS	Penetrate deeply	
WOOD	Termite resistant. Durable. Specific gravity = 0.6-0.8. Makes fine furniture. Hard and heavy.	Colour:

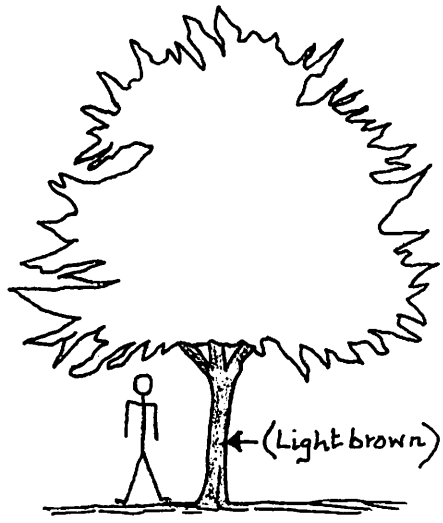
SOMALI NAME: BOORDI

LATIN NAME: CASSIA SIAMEA

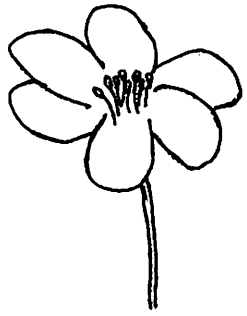
FRUIT (Brown)



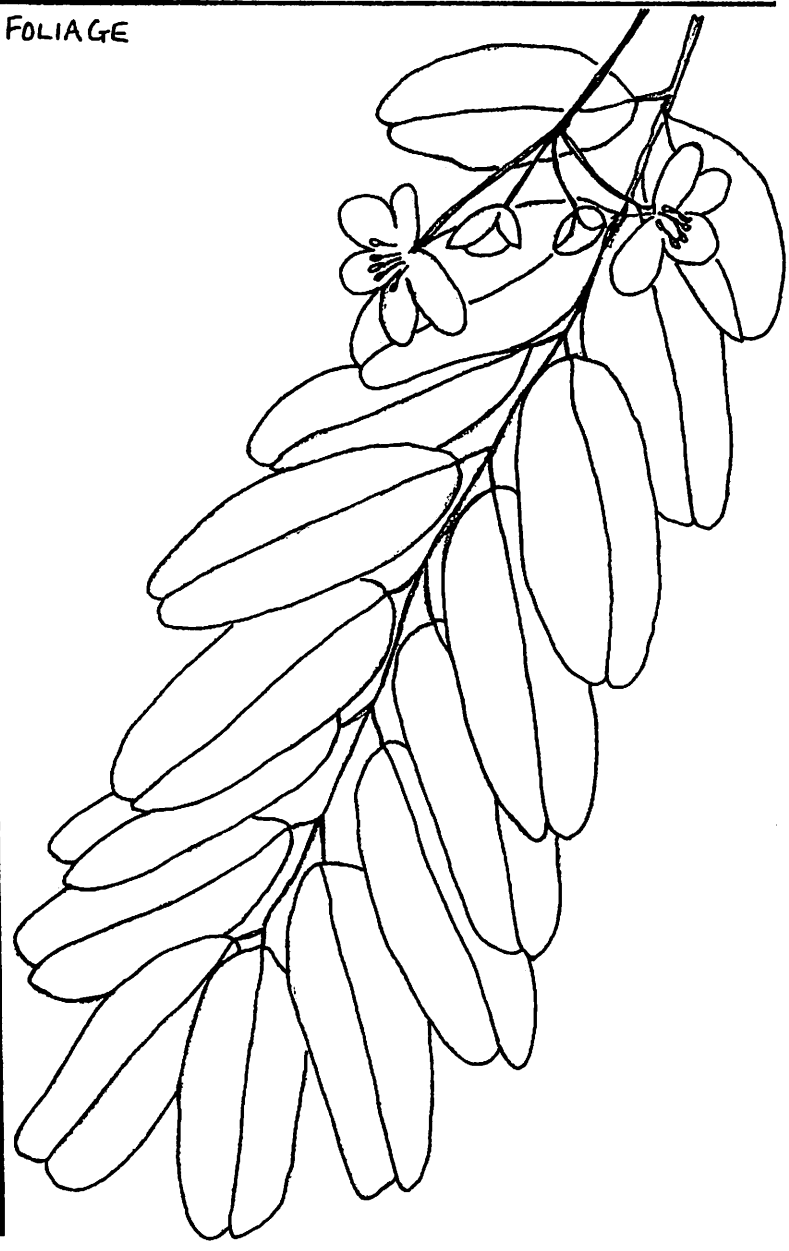
TREE SHAPE



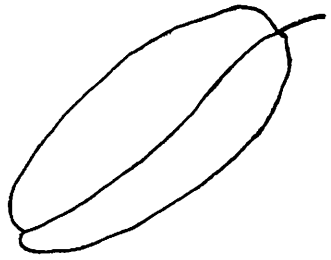
FLOWER (Bright Yellow)



FOLIAGE



LEAF (Grey-Green)



SEED (Shiny dark brown)

Tree growing

Names: Boordi *Cassia siamea*

1. Methods of propagation:

Potted stock, stumps, direct sowing. Suitable for stump planting with 10cm root below ground and 20cm shoot above ground.

2. Seed:

Number/kilogram	34000-40000
Collection	Strong healthy trees. Collect unopened pods. Dry pods in
Extraction	the sun and beat with sticks to separate seed. Mortar and pestle.
Storage	Dry room temperature for several years.
Pretreatment	Immerse in water which has just finished boiling and leave to soak for 24 hours. No pretreatment necessary for fresh seed.

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	After 7 days (40 days)
Percentage	90 (50-85)
Pricking out	
Shade and watering	No shade
Growth time	12-24 weeks (4-5 months)
Other notes	Weeding essential

4. Pests and diseases:

In other countries a serious disease is *Phaelous marichotis* which kills roots causing dieback. Also susceptible to attack by scale insects and vulnerable to browsing damage.

5. Planting:

Soils:	Better growth in deep free draining, neutral to acid PH, Light to medium textured.
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Protect from browsing animals. Careful weeding for 2 years. A year after coppicing, singling of multistemmed plants is necessary for pole production.

Growth and yields

7. Other notes:

Strongly light demanding. Tolerates salt wind. Root suckers vigorously. Refer to Nuur (forest extension worker) of Koryoli forestry project, for information concerning villagers use of this species.

Tree details

1. Names: Shawri *Casuarina equisetifolia*

Arabic	
English	Whistling pine, She-oak, Horsetail casuarina, Beefwood tree
Species	Casuarina equisetifolia, L.
Family	Casuarinaceae
Synonyms	Casuarina littoralis Salisb

2. Natural distribution:

Australia and Pacific Islands to India. Coastal zones

3. Where found in Somalia:

Lido area of Mogadishu. Shalambood Sandune plantations. Brava sandune fixation. Farm shelterbelts especially around the Banana plantations of the Shebelle. Adale fishing settlement.

4. Climate requirements: Drought tolerant. 4 month dry season.

Rainfall (mm/yr)	750-2500 (Slow growth possible at 200-300)
Temperature(°C)	(10) 18-25 (35) Frost sensitive
Altitude (m)	0-1,400 (Grows in Nairobi, Kenya)
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	**	Fodder		Fruit	
Charcoal	**	Livestock shade		Edible leaves	
Poles	*	Intercropping		Honey	
Toolhandles		Nitrogen fixation	**	People shade	
Carving		Shelterbelt	**	Amenity	*
Timber		Hedge	*	Medicine	*
Insecticide		Soil improvement	*	Dye (red)	*
Sandune fixation	**	Tannins	*		

Hard but not durable construction material. Fuel (cv. 19,580-20,560 KJ/kg). If lopped at 1m height makes an attractive hedge.

6. Recommendations and notes:

Tolerates salt winds. A good tree to reclaim coastal sandunes and ameliorate the conditions, making it possible to plant other trees later on. Not suitable for intercropping, due to its tendency to lower the water table. It can be considered for shelterbelts for sandy seaside settlements and is preferred as a farm windreak partly because birds do NOT nest in it. Poles reported to be a favourite for canal bridge construction in Koryoli area, however other reports suggest wood is not termite resistant?

7. References: Anon., Baumer, Little, Pandey, SEPESAL, Teel, Webb *et al.*

Tree description

1. Summary:

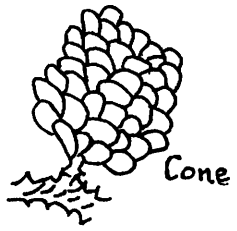
Unarmed evergreen light crowned. Branches look somewhat like feathers. Confusion as to if Shawri is monoecious or dioecious.

2. Detailed:

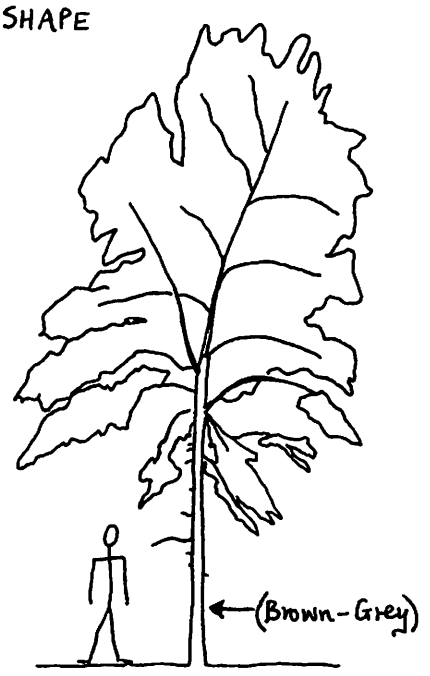
TREE SHAPE	Narrow crown	
Height	Up to 20m	
Trunk and Bark	Straight and tall. Low spreading buttresses. Up to 40cm dbh. Rough, longitudinally, flaking fissured. Smooth when young. Inner bark red (hence Colour: Dark brown, grey brown 'beefwood' name)	
Branches	Horizontal or descending	Colour:
FOLIAGE	Twigs and leaves are one and same, both photosynthesise!	
Twigs	Like leaves, wiry and drooping	Colour: Green
Thorns	1mm d. x 25cm length	
Size		Colour:
LEAF	Very small. Tooth like scale leaves 6-8 scale leaves in a ring	
Size	Less than 1mm length	Colour: Green
Leaflet Size		
FLOWERS	Separate:(M)Cylindrical spikes. (F)Ball shaped heads.	
Size	(M)1.5-3.75cm x 3mm	Colour: (M)Brown (F)Reddish (F)6-12 x 3mm
FRUIT	Hard. Short stalked glabrous globose cone like structure.	
Size	13-20mm.d.	Colour: Light brown (green at first)
SEED	Many winged	
Size	6mm. length	Colour: Light brown
ROOTS	Extensive and nitrogen fixing	
WOOD	Difficult to work. Very hard. Specific gravity = 0.8-1.2. Difficult to saw, season and difficult to preserve. Splits easily and twists. Straight-grained, fine textured. Attacked by termites: not durable.	Colour: Pink-Dark brown

SOMALI NAME	SHAWRI	LATIN NAME	CASUARINA EQUISETIFOLIA

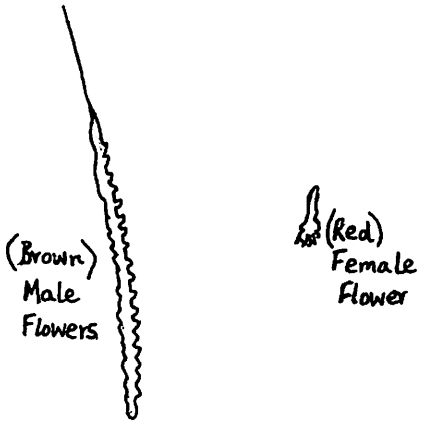
FRUIT (Light Brown)



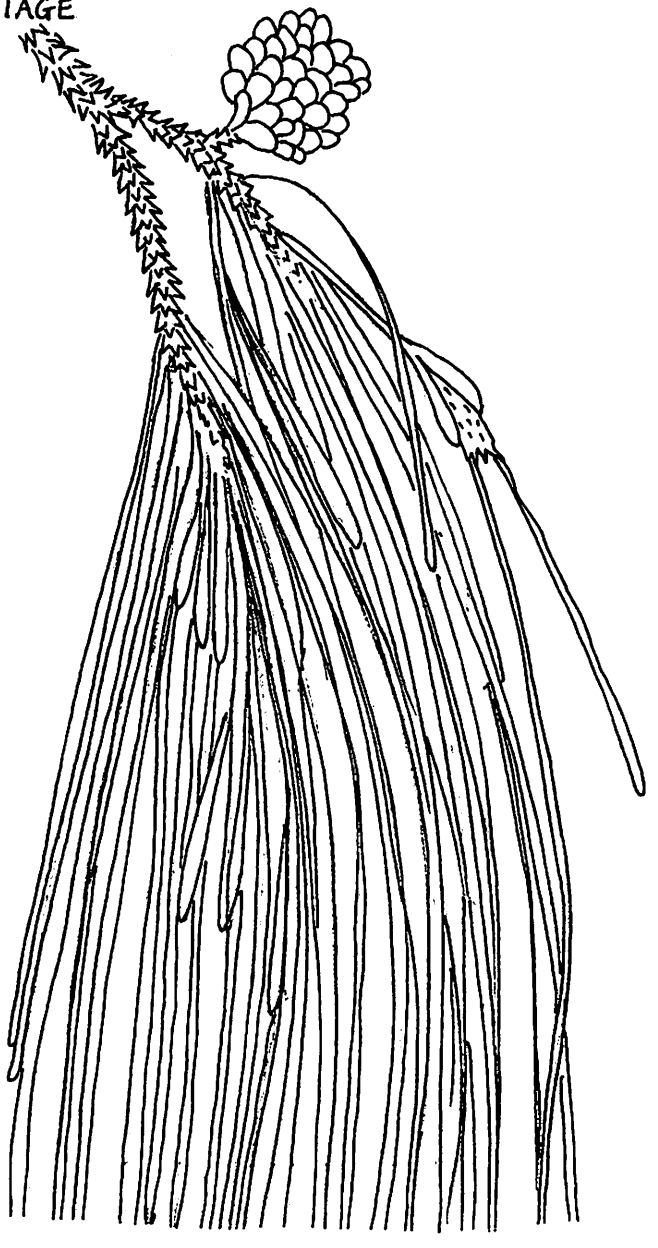
TREE SHAPE



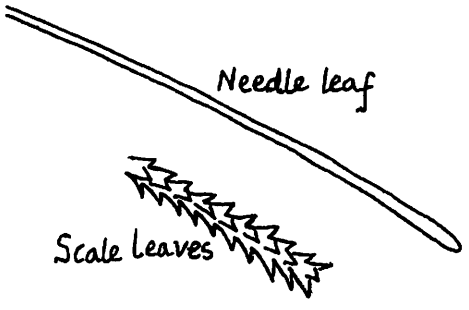
FLOWER (Brown or Red)



FOLIAGE



LEAF (Green)



SEED (Light Brown)

Tree growing

Names: Shawri *Casuarina equisetifolia*

1. Methods of propagation:

Potted or cuttings.

2. Seed:

Number/kilogram	700,000-800,000 (200,000-1,000,000)
Collection	Green and allow to dry in the sun (Pluck from trees)
Extraction	Nutlets shaken out of cone after drying
Storage	Viable for at least one year (up to 6 months). Keep cool
Pretreatment	None

3. Nursery:

Soil mixture	Sandy
Potsize	
Sowing	Sow in a seedbed and prick out into pots
Germination	20-40 days
Percentage	60-70 if fresh, 5-25 if 12 months old
Pricking out	
Shade and watering	Shade needed in nursery. 30 litres of water/plant/annum
Growth and time	4-8 months

Other notes

4. Pests and diseases:

Old trees suffer from a fungal infection. Seedlings vulnerable to attack by insects.

5. Planting:

Soils	Very salt tolerant. Light sandy alkaline seasonally waterlogged, dry poor soils. Prefers sand to clay.
Method and spacement	Requires wide spacing. 3m x 3m for fuelwood production
Fertilizers and insecticides	Inoculate soil of new plantation sites with crushed root nodules

6. Aftercare:

Watering and weeding needed for 2 years. Very sensitive to grass competition when young.

Growth and yields	20-40 years

7. Other notes:

Strongly light demanding. Shawri can exhaust the moisture in soil, lower the water table and prevent understorey growth; this may explain sporadic Shawri deaths in Shalambood dune plantation site.

Tree details

1. Names: Baxarasaaf *Eucalyptus camaldulensis*

Arabic	Kafur
English	River red gum, Long beak eucalyptus, Murray red gum
Species	Eucalyptus amaldulensis Dehnh
Family	Myrtaceae
Synonyms	Eucalyptus rostrata Schldl

2. Natural distribution:

Australia: The most widely planted Eucalyptus outside Australia introduced to many countries

3. Where found in Somalia:

A favourite street tree in Hargeisa and Burao, introduced by the British Colonial Forest Service but now planted by Somalis every rainy season in the northern cities.

4. Climate requirements: Drought hardy. Needs a distinct dry season.

Rainfall (mm/yr)	250-1250 (at least 800mm)
Temperature(°C)	(10) 19-26 (36)
Altitude (m)	0-1,500 (Better below 1000m)
Groundwater	Necessary for good growth

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder		Fruit	
Charcoal	**	Livestock shade		Edible leaves	
Poles	*	Intercropping		Honey	**
Toolhandles		Nitrogen fixation		People shade	**
Carving		Shelterbelt	*	Amenity	*
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement			
Sandune fixation		Tannins (bark)	*		

Fuel (c.v. = 19,737 KJ/kg) wood burns fast and smokes heavily. Leaves NOT eaten by livestock. Poles big enough for transmission lines.

6. Recommendations and notes:

Baxarasaaf seems to grow much bigger in Hargeisa than in the South, suggesting a different sub-species grows there to the one found in the South. An outstanding provenance for arid climates is said to be Broken Hill (New South Wales) Australia. Baxarasaaf kills other plants around it, and is therefore not suitable for agroforestry - only as a windbreak on the edge of fields. Crops can be grown amongst it during establishment only (Tuangya). For many parts of Somalia Baxarasaaf is too waterdemanding and susceptible to termite attack or windstress. It is not recommended as a fuelwood plantation species. It is recommended as a street tree or a windbreak tree if groundwater is available.

7. References: Anon., Little, NAS, Pandey, SEPESAL, Teel, Webb *et al.*, Weber.

Tree description

1. Summary:

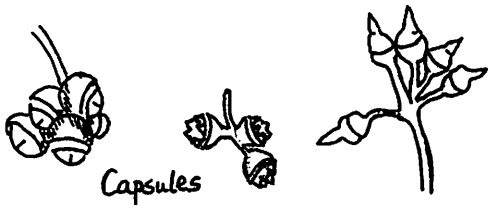
Evergreen, profusely flowering unarmed.

2. Detailed:

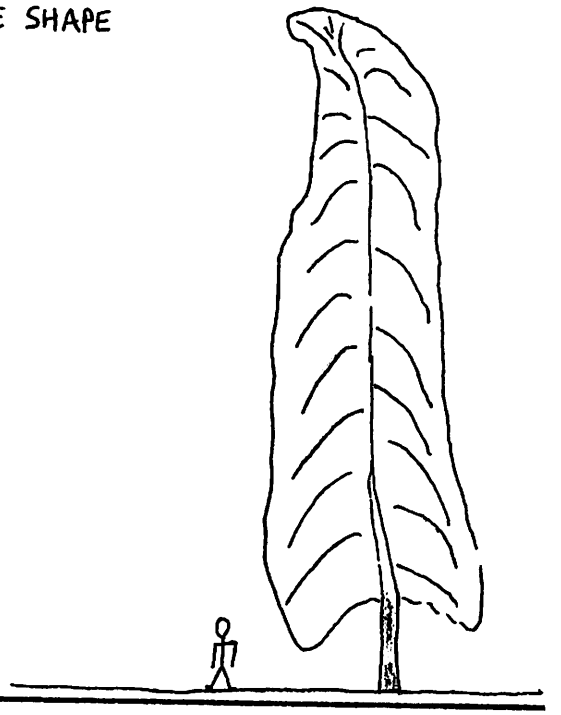
TREE SHAPE	Open narrow and somewhat irregular crown. Thin.	
Height	Up to 30m	
Trunk and	Up to 30cm dbh. Up to 10m height	
Bark	Rough at base, smooth, pale and peeling higher up.	Colour: Blackish at base, white-light grey higher up. Light pink in older trees.
Branches	Light and spreading	Colour:
FOLIAGE		
Twigs	Long, very slender, drooping	Colour: Reddish
Thorns		
Size		Colour:
LEAF	Alternate, drooping, narrowly lanceshaped, not serrated, often curved	
Size	8-22 x 1-2cm	Colour: Dull green-grey
Leaflet		
Size		
FLOWERS	Scented. Axillary umbels of 3cm long. Starts at 2yrs old	
Size	15mm.d. Small flower clusters at leaf base	Colour: White
FRUIT	Capsule. Several clustered at end of stalk. 1/2 round, opening by 4 teeth. Claw-like.	
Size	7 x 7mm	Colour: Light brown
SEED		
Size	Very small: 1.5mm.l.	Colour: Light brown
ROOTS	Deep and wide spreading	
WOOD	Heavy, dense, termite resistant. Wood twists. Specific gravity = 0.75-1.0. Timber is durable, easy to saw, difficult to preserve. Tough inter-locking grain. Tends to warp on drying - takes a fine finish.	Colour: Reddish heartwood

SOMALI NAME	BAXARASAAF	LATIN NAME	EUCALYPTUS CAMALDULENSIS

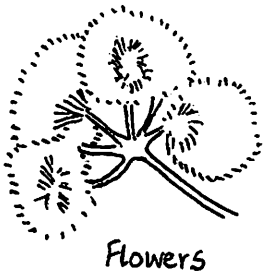
FRUIT (Light Brown)



TREE SHAPE

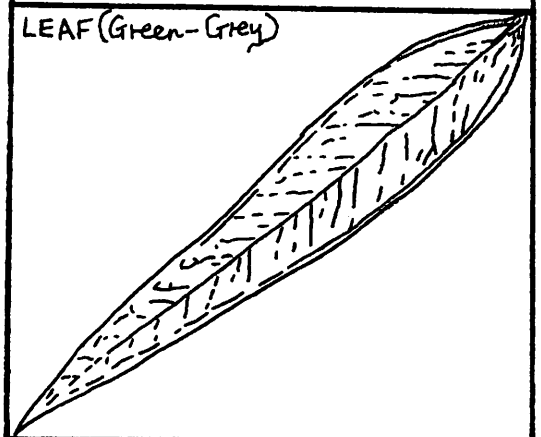


FLOWER (White)



FOLIAGE

LEAF (Green-Grey)



SEED

Tree growing

Names: Baxarasaaf *Eucalyptus camaldulensis*

1. Methods of propagation:

Cuttings are possible.

2. Seed:

Number/kilogram	700,000-800,000 plus chaff, (or 190,000 trees/kg)
Collection	Seed produced in abundance every 2nd or 3rd year only.
Extraction	Dry in the sun. Shake capsules and seed falls out.
Storage	Dry, cold, airtight, several years.
Pretreatment	None

3. Nursery:

Soil mixture	
Potsize	
Sowing	In pits or trays. Use wet sliver of wood to sow seed
Germination	4-15 days
Percentage	55-90
Pricking out	After 4 weeks at height of 2.5-5cm, having 3 or 4 leaves, transfer to pots.
Shade and watering	
Growth time	4 months (18 weeks): 30-40cm tall
Other notes	

4. Pests and diseases:

Young plants liable to termite attack. Susceptible to attack by Gonipterus beetle, moth larvae, borers.

5. Planting:

Soils:	Alkaline seasonally waterlogged. Tolerates moderate salinity and poor soils. Prefers light soils. Rocky soils tolerated.
Method and spacement	2 x 2m for fuelwood plantations. 4 x 4m in dry sites. 5 x 5m if intercropping is planned for establishment period.
Fertilizers and insecticides	

6. Aftercare:

Extensive weeding is essential. More important to thoroughly weed than worry about damage to roots.

Growth and yields	In other countries records of 2-11 m^3/ha yields on dry sites on rotations of 14-15 years have been reported.

7. Other notes:

Strongly light demanding. There is much variation in the provenance. Best to get seed from Northern Australian provenance as this is more drought resistant.

Tree details

1. Names: Mahogany *Khaya senegalensis*

Arabic	Khaya
English	African Mahogany, Khaya wood, Senegal mahogany
Species	Khaya senegalensis (Desr.) A. Juss
Family	Meliaceae
Synonyms	Swietenia senegalensis Desr.

2. Natural distribution:

Benin, Burkino Faso, Chad, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Mali, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda, Zaire, (West and Central Africa)

3. Where found in Somalia:

Southern and Central Somalia. It has been planted in Mogadishu at K4 opposite the Ministry of Agriculture. In Afgoye it makes a tidier street tree than do *Cassis siamea* and *Azadirachta indica*. A street tree in Dusamareb and in many southern riverine villages.

4. Climate requirements: Dry season tolerated

Rainfall (mm/yr)	400-1530
Temperature(°C)	(11) 19-29 (40)
Altitude (m)	0-1800
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder		Fruit	
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping	*	Honey	*
Toolhandles		Nitrogen fixation		People shade	**
Carving	**	Shelterbelt		Amenity	**
Timber	**	Hedge		Medicine	*
Insecticide		Soil improvement			
Sandune fixation		Tannins			

Drought browse, fuelwood is c.v. = 19,988 KJ/kg. Furniture timber.

6. Recommendations and notes:

An attractive street (shade) tree and valuable timber. Should be more widely encouraged for street tree planting where there is enough water to support it. Not to be confused with *Swietenia mahogany*, the much more valuable tropical timber species to which *Khaya senegalsnsis* is a drought resistant relative.

7. References: Nabil *et al.*, Sahni, SEPESAL, Webb *et al.*

Tree description

1. Summary:

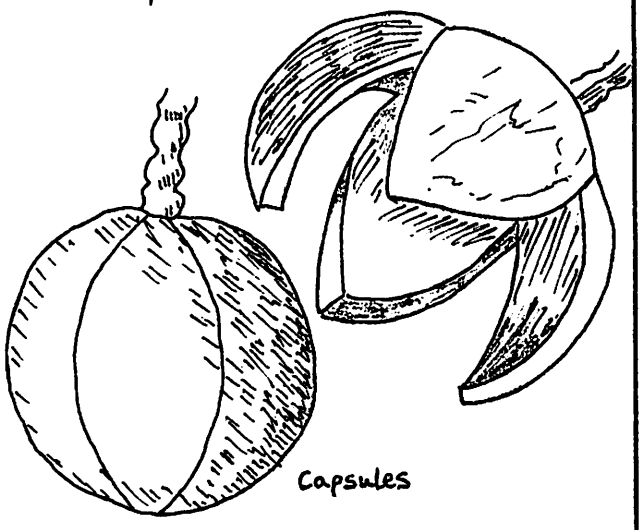
Semi evergreen unarmed small tree with large leaves.

2. Detailed:

TREE SHAPE	Wide and dense crown	
Height	Up to 20m	
Trunk and	Thick and clean. Up to 10m	
Bark	Small thin scales	Colour: Dark grey
	Inner bark bright crimson colour	
Branches		Colour:
FOLIAGE		
Twigs		Colour:
Thorns		
Size		Colour:
LEAF	Compound, pinnate, glabrous	
Size	15-44cm long	Colour: Pale green
Leaflet	3-4 (-7) pairs per pinna. Oblong. Twice as long as wide. Rounded	
Size	6-12 x 2-5cm	
FLOWERS	In axillary panicles	
Size		Colour: Cream-Orange/Red - Stigma Yellow
FRUIT	Capsular, Globose, woody dehiscing 4 valved	
Size	4-6cm.diameter	Colour: Brown
SEED	Flat and disk like	
Size	2-2.8 x 1.5-2cm including the wing	Colour:
ROOTS		
WOOD	Specific gravity: 0.6-0.85	
	Moderately durable. Difficult to preserve. Fair to saw, easy to season. Interlocking grain, slightly aromatic, termite resistant.	
		Colour:

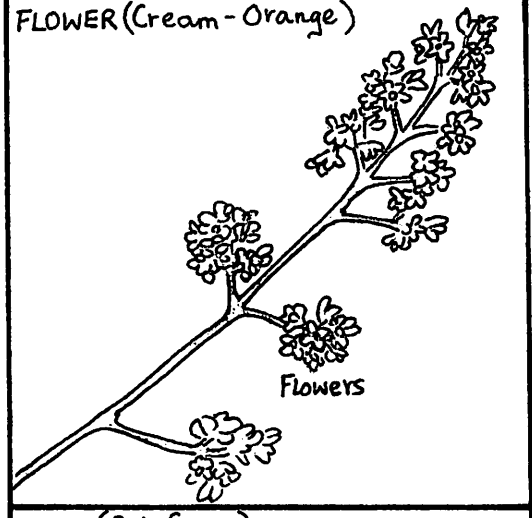
SOMALI NAME	MAHOGANY	LATIN NAME	KHAYA SENEGALENSIS

FRUIT (Brown)



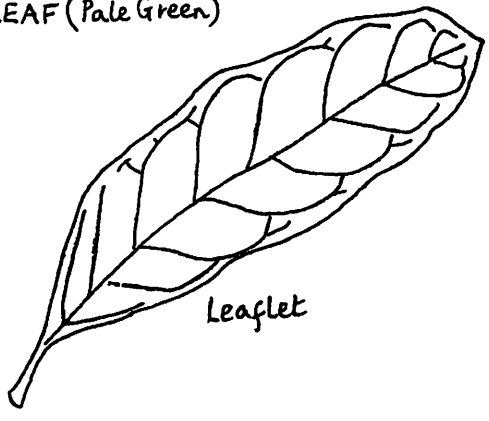
TREE SHAPE

FLOWER (Cream - Orange)



FOLIAGE

LEAF (Pale Green)



SEED

Names: Mahogany *Khaya senegalensis*

1. Methods of propagation:

Potted or stumps

2. Seed:

Number/kilogram	3200-18000
Collection	
Extraction	
Storage	Up to 3 months
Pretreatment	None

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	Best with fresh seed
Percentage	70-100
Pricking out	
Shade and watering	
Growth time	

Other notes

4. Pests and diseases:

In other countries *Hypsipyla robusta* shoot borer is reported to be a problem.

5. Planting:

Soils	Medium-heavy, neutral to acid. Better growth on deep fertile soils, tolerates dry 6 lateritic soils
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Careful weeding necessary

Growth and yields

7. Other notes:

Shade bearing when young. Light demanding when older.

Tree details

1. Names: *Leucaena leucocephala*

Arabic	
English	Ipil-ipil tree, Horse tamarind, Tantan, White popinac, Lead tree.
Species	Leucaena leucocephala (Lam.) de Wit
Family	Leguminosae - Mimosoideae
Synonyms	Mimosa leucocephala Lam, Leucaena glauca sensu Benth.

2. Natural distribution:

Guyana, Mexico, Panama, Suriname, Salvador. Widely introduced to other tropical countries.

3. Where found in Somalia:

Widely planted in Koryoli area, Afgooye and many garden compounds.

4. Climate requirements: Tolerates long dry season.

Rainfall (mm/yr)	600-1000
Temperature(°C)	(16)20-26(32) Frost sensitive.
Altitude (m)	0-800
Groundwater	Required unless irrigation is available.

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	*?	Fruit	
Charcoal	*	Livestock shade		Edible leaves	*
Poles	**	Intercropping	**	Honey	
Toolhandles		Nitrogen fixation	**	People shade	
Carving		Shelterbelt	**	Amenity	*
Timber	*	Hedge	**	Medicine	*
Insecticide		Soil improvement	**	Dyes	*
Sandune fixation		Tannins		Gums	*

Pods edible when green if cooked. Seeds edible raw. Fuel(c.v.= 19,492 KJ/kg). Fodder can be toxic unless mixed with other feeds: not more than 5% should go into chicken feed. Alley cropping agroforestry is its greatest potential with fuelwood from trimmings. Unlikely to be successful on non-irrigated sites.

6. Recommendations and notes:

Extremely easy to propagate because seed is very easy to collect. However *Leuceana* has mistakenly been planted in forestry projects in Somalia partly because it is easy to propagate and also due to misinformation concerning its water requirements. *Leuceana* does not grow well without irrigation anywhere in Somalia. Therefore it is effectively only suited to irrigated sites, where it has great potential as a species for intercropping. Money, time and people's participation was wasted on this tree when it was planted in fuelwood plantations in Beletweyne, Koryoli, and Jalalaaxi and as a street tree in Brava. It has been successfully planted as a windbreak tree in Luug irrigated farm-land, and in agroforestry systems (intercropping) in Koryoli. It should be tried for alley cropping at the Afgooye Agricultural Research Station.

7. References: Anon., Little, SEPESAL, Teel, Webb *et al.*

Tree description

1. Summary:

Evergreen if permanent water available. Fruiting brown pods most of the year. Unarmed.

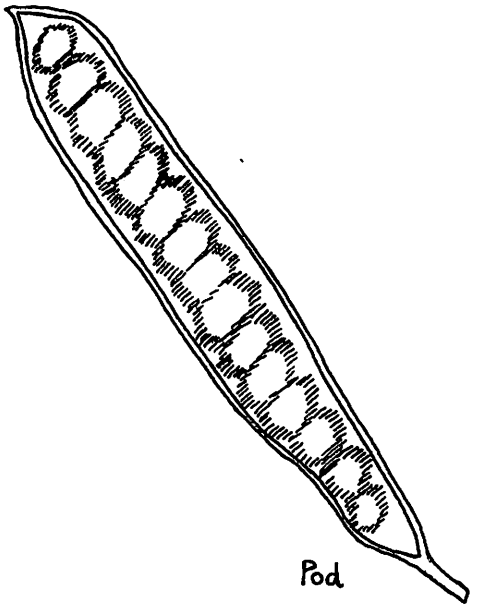
2. Detailed:

TREE SHAPE	Irregularly spreading crown - open crown.	
Height	5-10m (3-5m)	
Trunk and	Up to 40cm dbh. Up to 5m high.	
Bark	Smooth with many dots.	Colour: Grey-brown
	Inner bark is light green-light brown	
Branches	Irregularly spreading	Colour:
FOLIAGE		
Twigs		Colour: Green-Grey-Brown
Thorns		
Size		Colour:
LEAF	Alternate bipinnately compound	
Size	10-20cm long	Colour: Grey-green
Leaflet	10-20 pairs per pinna. Narrowly oblong or lance-shaped. Pointed at tip.	
Size	8-15 x 2mm	
FLOWERS	Many "powder puff" balls	
Size	2-2.5 diameter	Colour: White or creamy
FRUIT	Pods. Many, clustered, narrow, flat, thin, dehiscent.	
Size	10-15 x 1.5-2cm	Colour: Dark brown
SEED	Many, bean like, oblong, flattened	
Size	8mm long	Colour: Shiny brown
ROOTS	Deep tap root	
WOOD	Heavy and hard. Specific gravity = 0.5-0.59	
		Colour: Sapwood: Light yellow-brown.
		Heartwood: Yellow-brown - dark brown.

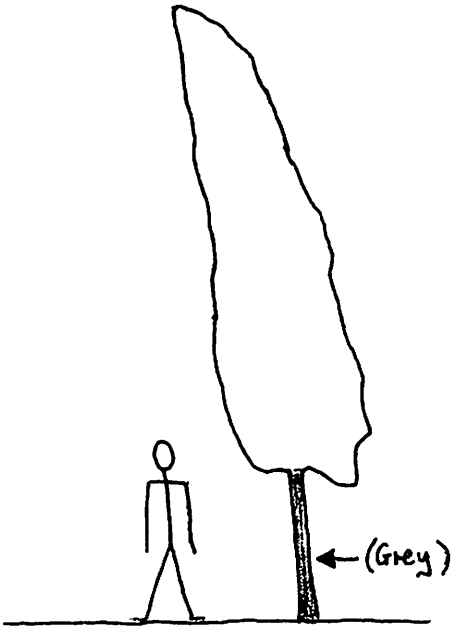
SOMALI NAME

LATIN NAME LEUCAENA LEUCOCEPHALA

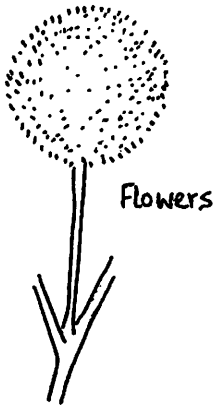
FRUIT (Dark brown)



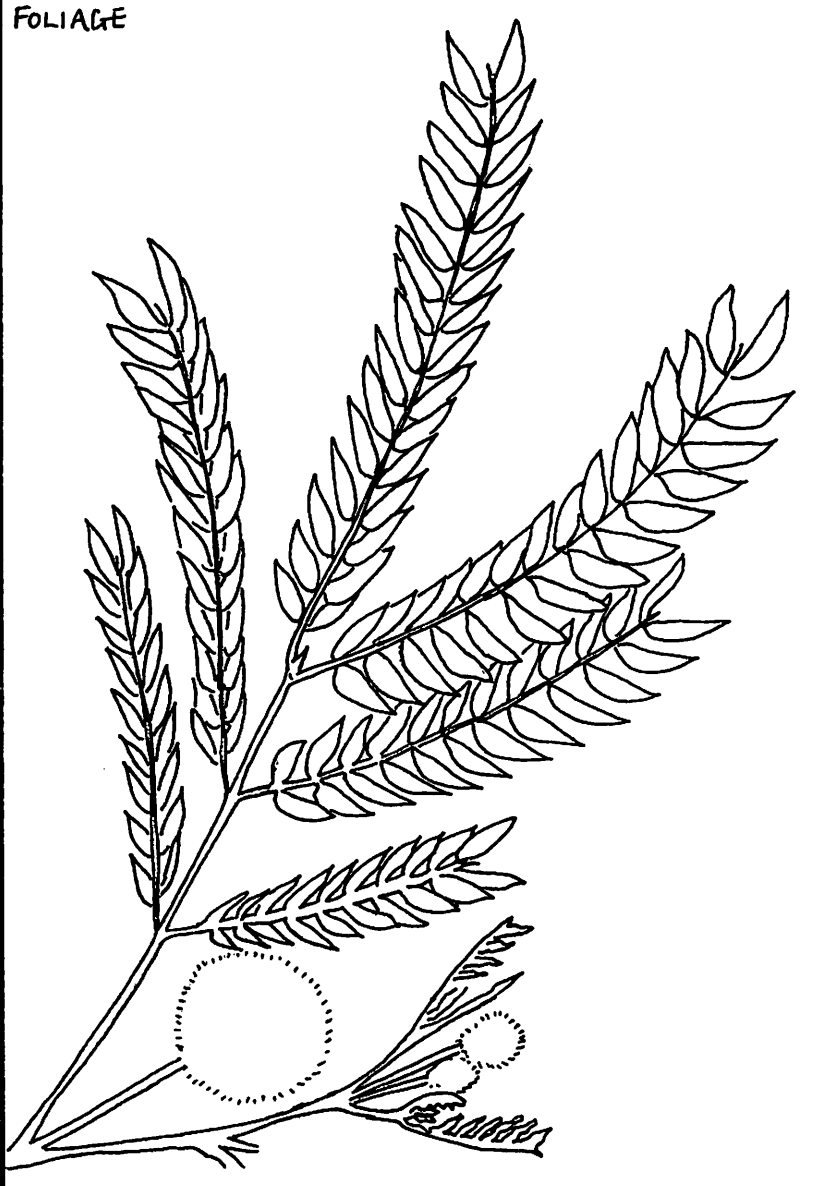
TREE SHAPE



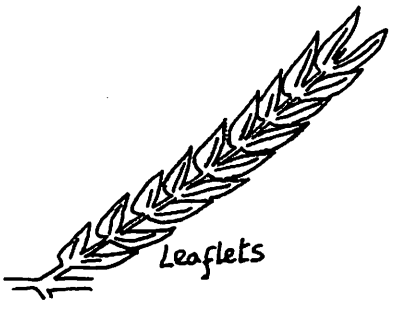
FLOWER (White)



FOLIAGE



LEAF (Dark Green)



SEED (Brown-Black)

Tree growing

Names: *Leucaena leucocephala*

1. Methods of propagation:

Potted and cuttings

2. Seed:

Number/kilogram	27000-30000
Collection	Very easy to collect. Available almost all year round.
Extraction	Shake out of pods
Storage	Room temperature for several years
Pretreatment	Place in water heated to 80'C for two minutes and soak for 12 hours.

3. Nursery:

Soil mixture	Soil may require inoculation with a Rhizobium strain to to encourage nitrogen fixation to occur in roots.
Potsize	
Sowing	0.5cm depth. 3 per pot
Germination	8-10 days
Percentage	50-85
Pricking out	
Shade and watering	Daily watering
Growth time	10 weeks (Very fast)
Other notes	Root pruning required

4. Pests and diseases:

High resistance to pests

5. Planting:

Soils	Alkaline/neutral. Moderately free draining. Tolerates shallow soils. Clay or sand tolerated.
Method and spacement	3m x 3m
Fertilizers and insecticides	

6. Aftercare:

Needs protection from browsing animals. Weeding needed for first 6 months at least.

Growth and yields	Fast growing

7. Other notes:

Light demanding, though shade tolerant when young. An aggressive coloniser, sometimes spreading as a weed. Recovers quickly from dieback or browsing.

Tree details

1. Names: Geed Walaayo *Parkinsonia aculeata*

Arabic	
English	Horsebean, Jerusalem thorn, Barbados flower fence, Takataka tree
Species	Parkinsonia aculeata
Family	Leguminosae - Caesalpinioideae
Synonyms	

2. Natural distribution:

Central and South America, from Texas to Peru: Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Mexico, Panama, Paraguay, Peru, USA (Arizona, Louisiana, New Mexico, S. Carolina, Texas), Venezuela. Widely introduced to dry tropics.

3. Where found in Somalia:

Shalambood Sandunes, K4 roundabout centre in Mogadishu, roadside from Mogadishu to Afgooye, Jalalaxi and Beletweyne refugee camps. Luug refugee camps as a shade tree, Arabsyo fuel plantation. Las Anod street tree, Burao, villages throughout Somalia where water is scarce.

4. Climate requirements: Very drought tolerant.

Rainfall (mm/yr)	250-800
Temperature(°C)	(18)20-28(32) Frost tolerant
Altitude (m)	0-1400
Groundwater	Not needed close to surface

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	*	Fruit	*
Charcoal	*	Livestock shade	*	Edible leaves	
Poles		Intercropping		Honey	*
Toolhandles		Nitrogen fixation		People shade	*
Carving	*	Shelterbelt	*	Amenity	**
Timber		Hedge		Medicine	*
Insecticide		Soil improvement	*	Livefencing	**
Sandune fixation	**	Tannins			

Fibre pulp paper, edible fruit and seeds.

6. Recommendations and notes:

A shade tree for the driest sites - to serve this purpose it needs to be crown lifted. Suitable for 0.3m spacing live fencing. Prunings suitable as: fodder, dead fencing, mulch and/or fuelwood. Ideal tree for improving the conditions of the refugee camps.

7. References: Anon., Hargreaves, Little, NAS, SEPESAL, Teel, Webb *et al.*, Weber.

Tree description

1. Summary:

Smooth yellow bark, spine like leaves and yellow flowers. Evergreen although leaflets drop in dry season. Thorny.

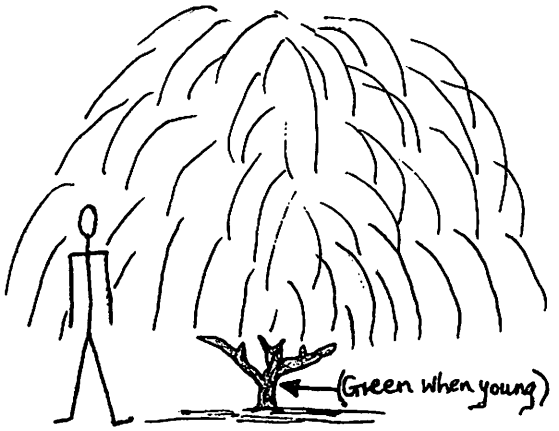
2. Detailed:

TREE SHAPE	Open, spreading, often branching out very low	
Height	4-10m	
Trunk and	Up to 40cm d. in older individuals. Not thorny. Less than 1m high.	
Bark	Smooth (fissured when old)	
		Colour: Green-Yellow becoming brown
Branches	Long, crooked, thorny. Major ones upright and drooping at ends.	
		Colour: Green
FOLIAGE	Thin drooping foliage	
Twigs	Slender, slight zig zag	Colour: Green
Thorns	Drooping on twigs	
Size	3cm long	Colour: Green-Brown
LEAF	Specialised, alternate, bipinnately compound. Strips or streamers.	
Size	20-30 x 0.3cm	Colour: Green
Leaflet	20-30 pairs per pinna. Thin, oblong.	
Size	3-5mm long	
FLOWERS	Arranged in pendulous racemes. Individually peashaped and fragrant.	
Size	2.5cm diameter	Colour: Bright yellow-golden
FRUIT	Indehiscent pointed pods. Nearly cylindrical.	
Size	5-10cm x 0.6mm	Colour:Brown-Yellow
SEED	1-5 per pod. Beanlike. Oblong. Very hard and pointed.	
Size	1cm long	Colour: Dark brown
ROOTS		
WOOD	Moderately hard and heavy. Specific gravity = 0.6. Close-grained and brittle.	
		Colour: Sapwood: Yellow
		Heartwood: Light red-brown

SOMALI NAME	GEED WALAAYO	LATIN NAME	PARKINSONIA ACULEATA

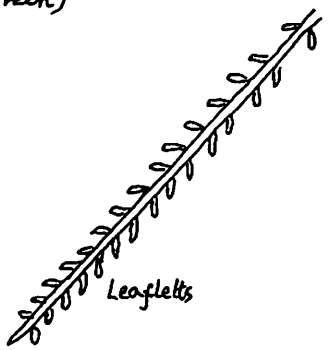
FRUIT (Brown-Yellow)

TREE SHAPE



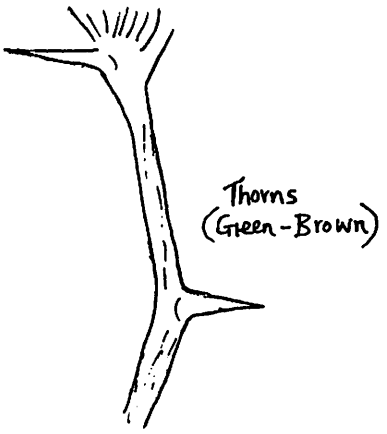
FLOWER (Yellow)

LEAF (Green)



SEED (Dark brown)

FOLIAGE



Tree growing

Names: Geed Walaayo *Parkinsonia aculeata*

1. Methods of propagation:

Direct sowing can be seriously considered on favourable sites. Root or shoot cuttings take. Potted stock.

2. Seed:

Number/kilogram	7500-13000(12000)
Collection	Pick dry pods only
Extraction	Shell by hand
Storage	Room temperature for up to one year (2 years)
Pretreatment	(Soak in hot water overnight) (Soak in cold water for three days) (Germinates readily after nicking)

3. Nursery:

Soil mixture	
Potsize	
Sowing	2 seeds per pot
Germination	10-14 days
Percentage	30-70
Pricking out	
Shade and watering	
Growth time	6-12 weeks

Other notes Root pruning is needed. Easy to raise in nursery. Fungal die back is a problem if overwatered (damping off).

4. Pests and diseases:

Termites when young. Can be attacked by twig bores.

5. Planting:

Soils	Alkaline, saline tolerant, dry, free draining. Does not tolerate waterlogging. Prefers sandy soils to clay e.g. gravelly sandy alluvial soils. Eroded sites.
Method and spacement	5 x 5m in fuelwood plantations in refugee camps. A closer spacing of 0.3 or 0.5m in striplines for livefencing is recommended.
Fertilizers and insecticides	Responds positively to fertilisers.

6. Aftercare:

Very little needed. Tree can virtually compete with indigenous rangeland Acacias. Pruning necessary to train it into a fence or shade tree - whichever is required.

Growth and yields Fastgrowing, short lived.

7. Other notes:

Light demanding aggressive coloniser. Withstands heavy pruning and browsing. Although used as a shade tree, Somalis prefer unarmed trees without thorns if they have a choice.

Tree details

1. Names: *Prosopis chilensis*

Arabic	
English	Algaroba, Mesquite
Species	Prosopis chilensis (Molina) Stuntz
Family	Leguminosae - Mimosoideae
Synonyms	Ceratonia chilensis, Prosopis siliquastrum, P. schinopoma.

2. Natural distribution:

Argentina, Bolivia, Chile, Peru.

3. Where found in Somalia:

Introduced to the northern mountain zone mostly. Also Barre region, Beletweyne, Luug, Shalambood and Gelib - survival data not known.

4. Climate requirements: Very drought resistant

Rainfall (mm/yr)	200-400
Temperature(°C)	Above 27°C (0-40). Not frost tolerant.
Altitude (m)	Up to 2900 (340-1230) (Usually less than 1500)
Groundwater	Not needed close to surface

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	*	Fruit	*
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	*
Toolhandles		Nitrogen fixation	*?	People shade	*
Carving	**	Shelterbelt		Amenity	*
Timber		Hedge		Medicine	
Insecticide		Soil improvement			
Sandune fixation		Tannins	*		

Edible fruit. Fruits as main fodder source.

6. Recommendations and notes:

Probably best suited to the Northern Mountain Zone as most of Southern Somalia is below 340m altitude. Introduced in the 1950s in the north.

7. References: Nair, SEPESAL.

Tree description

1. Summary:

Deciduous. Much variation in pod size and shape. Thorny shrub.

2. Detailed:

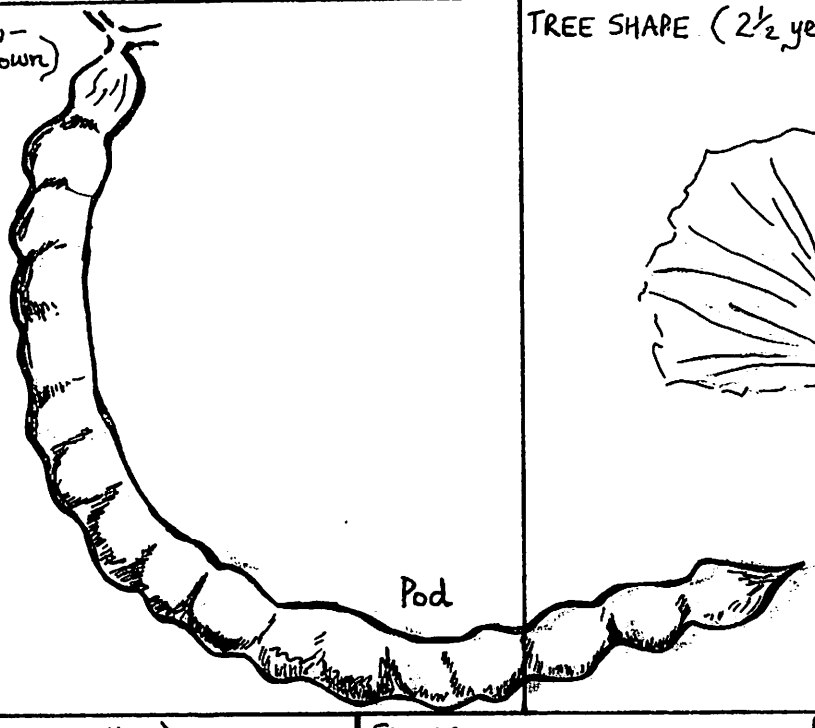
TREE SHAPE	Rounded. Only slight shade	
Height	8-10m(-15m)	
Trunk and Bark	Short	Colour:
Branches	Branches freely	Colour:
FOLIAGE		
Twigs	Flexible, knotty. Partly thorny	Colour:
Thorns	Hard on strong shoots	
Size	Up to 6cm long	Colour:
LEAF	Glabrous, elongate. Pinnae 8-24.5cm long	
Size		Colour: Pale green
Leaflet	10-29 pairs per pinna	
Size	1.1 x 5.4 x 1.1-3cm	
FLOWERS	Dense racemes	
Size	7-12cm long racemes	Colour: Greenish yellow-white
FRUIT	Slender pod, linear compressed. Mesocarp sugary edible.	
Size	12-18 x 1-1.8cm	Colour: Straw yellow
SEED	16-32 seeds/pod. Ovoid, compressed.	
Size	6-7mm long	Colour: Brown
ROOTS	Shallow and spreading	
WOOD	Specific gravity = 0.8-0.92	
	Rather coarse texture	Colour: Dark brown heartwood
	and irregularly grained.	Colour: Purplish hue
	Easy to work, finishing smoothly and taking a natural polish. Very durable.	

SOMALI NAME

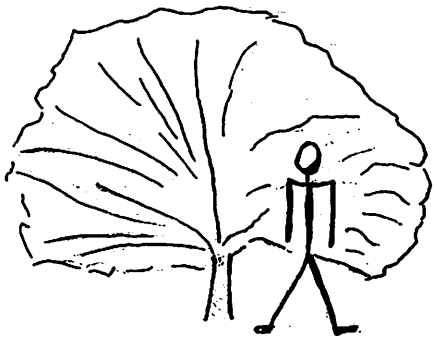
LATIN NAME

PROSOPIS CHILENSIS

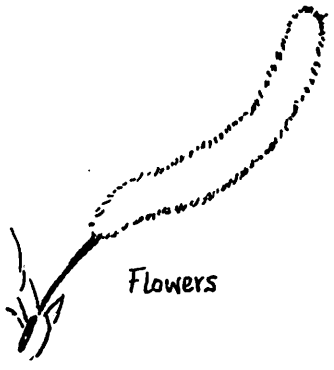
FRUIT (Yellow-Brown)



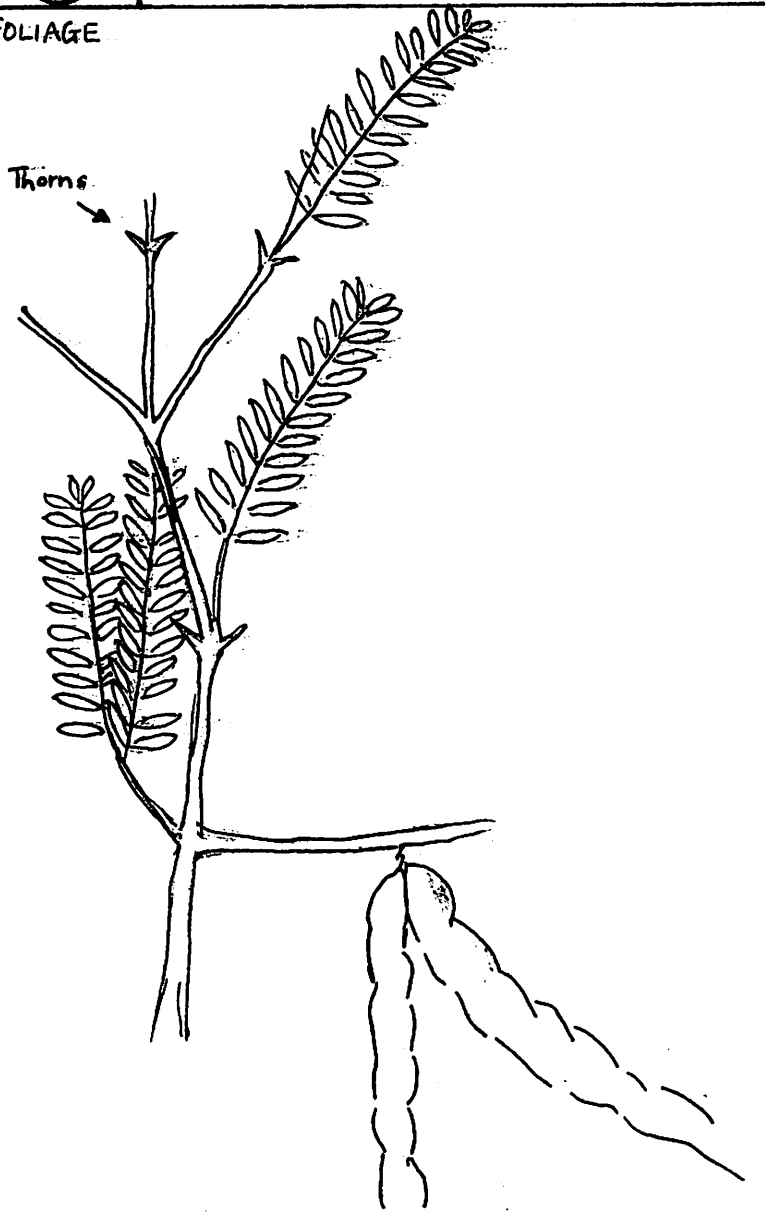
TREE SHAPE (2½ year old tree)



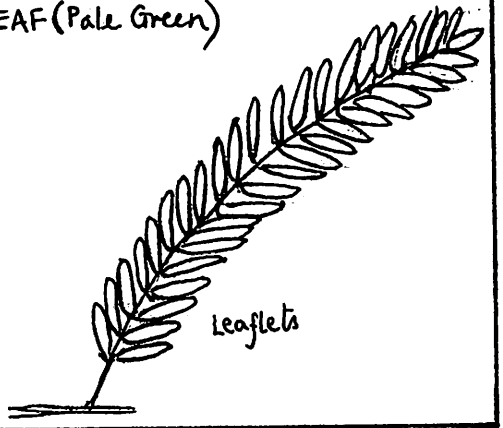
FLOWER (Green-Yellow)



FOLIAGE



LEAF (Pale Green)



SEED (Brown)

Tree growing

Names: *Prosopis chilensis*

1. Methods of propagation:

From seed

2. Seed:

Number/kilogram	9800-36000
Collection	
Extraction	Difficult
Storage	Store well in pod or out of it.
Pretreatment	Immerse in boiling water, allow to cool. Nicking seed also possible.

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	
Percentage	40-80
Pricking out	
Shade and watering	
Growth time	3 months
Other notes	Subject to damping off. Root pruning frequently needed.

4. Pests and diseases:

Largely disease free. Bruchid beetles destroy many of seeds.

5. Planting:

Soils	Dry, saline tolerant, light soils.
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Growth and yields	Has produced over 14t/ha/yr of biomass in California (USA) tests.

7. Other notes:

Thornless varieties are becoming popular as amenity trees in S.W. of U.S.A.

Tree details

1. Names: *Prosopis cineraria*

Arabic	Ghaf
English	Jand, Sumri, Dandi, Khejri.
Species	Prosopis cineraria (L.) Druce
Family	Leguminosae - Mimosoideae
Synonyms	Mimosa cineraria L, Prosopis spicigera L, Prosopis spicata Burm

2. Natural distribution:

Afghanistan, India, Iran, Oman, Pakistan, S. Yemen, Saudi Arabia, United Arab Emirates. In Abu Dhabi plantings totalling 2000ha have been made.

3. Where found in Somalia:

Introduced to Jalalaqsi forestry project (Refugee camp) and Brava sandune fixation project - both in 1980s. Only very recently introduced to Somalia.

4. Climate requirements: 6-8 month dry season. Drought hardy. Hot winds.

Rainfall (mm/yr)	400-800
Temperature(°C)	(4)21-28(50) Slightly frost tolerant
Altitude (m)	0-600 Low
Groundwater	Not required close to the surface.

5. Uses: (In other countries and/or Somalia)

Fuel	**	Fodder	**	Fruit	*
Charcoal	*	Livestock shade		Edible leaves	
Poles	*	Intercropping	**	Honey	*
Toolhandles	*	Nitrogen fixation	*	People shade	
Carving	*	Shelterbelt	*	Amenity	
Timber	*	Hedge	**	Medicine	*
Insecticide		Soil improvement	**	Gums (Edible)	*
Sandune fixation	*	Tannins	*		

Fibres and famine food from bark. Fruit edible uncooked. Fuel (c.v = 16,800-20,400 KJ/kg). Roots obtain water and nutrients from subsoil and do not compete at surface level: hence very suitable for inter-cropping. Pods valued for fodder.

6. Recommendations and notes:

Pollards and coppices. Casts little shade during growing season. Can survive extremely dry conditions. Used as an agro_forestry tree in arid north-west India because it causes increased sorghum crop yields and supplies wood to farmer on rainfed farmland. Slower growing than other *Prosopis* species but is only one suited to agro-forestry. Recommend that intercropping trials be established on rainfed farmland in Somalia in Bay region or Afgooye area. Like *Acacia albida*, food crops (or grass) increase in yield the closer they are to the tree trunk. Unlike *Acacia albida*, *Prosopis cineraria* is suited to close line planting - hedge at say 1m spacing.

7. References: Little, NAS, SEPESAL, Webb *et al.*

Tree description

1. Summary:

Evergreen thorny tree. Slow growing, hardy deciduous.

2. Detailed:

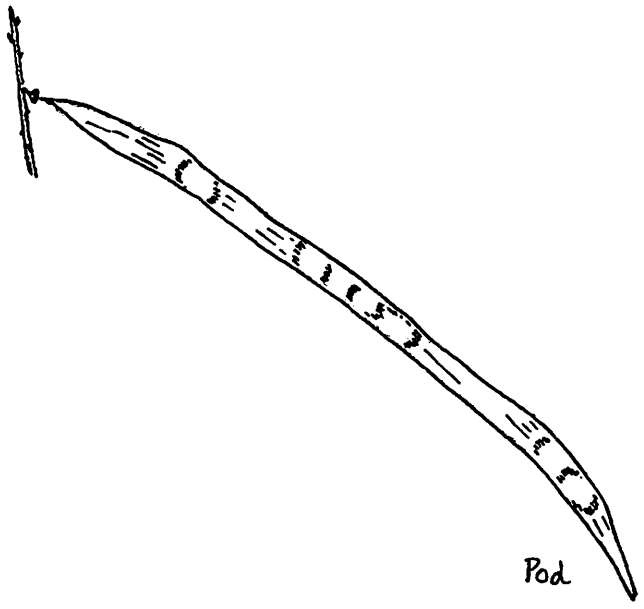
TREE SHAPE	Thin rounded open crown	
Height	5-9m	
Trunk and	Crooked. Up to 30cm d.	
Bark	Rough, thick with deep long furrows and horizontal cracks.	Colour: Ash-grey
Branches	Irregularly branched. Many.	Colour:
FOLIAGE		
Twigs	Slender with thorns.	Colour: Grey
Thorns	Straight, pointed outward, broad conical base.	
Size	Less than 8mm	Colour: Grey-yellow-orange
LEAF	Alternate, bipinnately compound. 1-3 pairs of pinnae.	
Size		Colour: Grey-green
Leaflet	7-14 pairs on each side axis. Straight or slightly curved.	
Size	4-15 x 2-4.5mm	
FLOWERS	Spikelike racemes. 5 narrow petals per flower. 5mm long flower	
Size	5-13cm racemes	Colour: Yellow-green
FRUIT	Pod. Very long, narrow, nearly cylindrical, edible. not splitting open.	
Size	8-19 x0.4 x 0.7cm	Colour: Light straw yellow
SEED	Bean shaped, up to 25 per pod. Flattened.	
Size	6mm long	Colour:
ROOTS	Large deep taproot. More than 3m long. Can penetrate more than 20m vertically.	
WOOD	Durable and hard	Colour: Sapwood - thick whitish Heartwood - purplish brown

SOMALI NAME

LATIN NAME

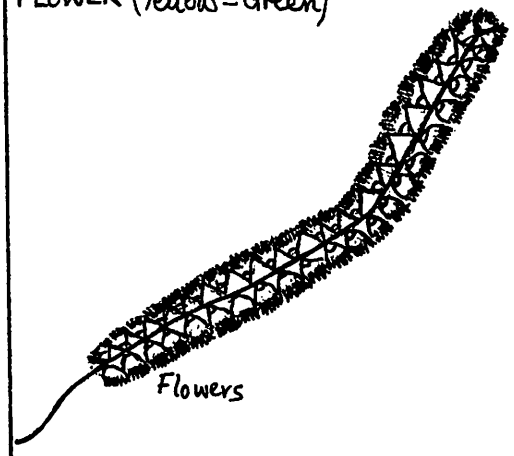
PROSOPIS CINERARIA

FRUIT (Light Brown)

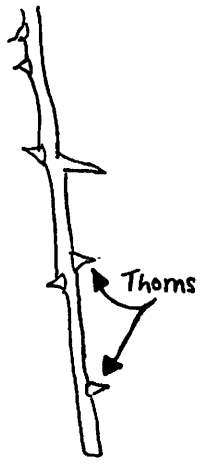


TREE SHAPE

FLOWER (Yellow-Green)



FOLIAGE (Orange-Grey)



LEAF (Grey-Green)

SEED

Tree growing

Names: *Prosopis cineraria*

1. Methods of propagation:

Direct sown or bare rooted stock. Root suckers and coppice shoots.

2. Seed:

Number/kilogram	25,000-27,000
Collection	(Jalalaaxi, Brava?) or India, Pakistan, Netherlands.
Extraction	
Storage	Dry for several years
Pretreatment	Soak in tepid water for 24 hours

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	2 weeks
Percentage:	60-90
Pricking out	
Shade and watering	
Growth time	2 months
Other notes	Care of taproot necessary. This may cause problems for propagating in nursery.

4. Pests and diseases:

Locust attack reported. Fungus and insects are known to attack tree.

5. Planting:

Soils	Saline tolerant. Dry soils. Alkaline soils. Free draining. Seasonal waterlogging tolerated. Dry stony and black cotton soils tolerated. Alluvial coarse sandy soils. Dry stone lands.
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Poor form unless pruned. Requires weeding to begin with.

Growth and yields	Slow growing 10-20 years to grow 10m high.

7. Other notes:

Strongly light demanding. Aggressive coloniser. Root suckers vigorously. Not suitable to plant in riverine areas.

Tree details

1. Names: *Prosopis juliflora*

Arabic	
English	Mesquite, Algoroba.
Species	Prosopis juliflora (Sw.) DC
Family	Leguminosae - Mimosoideae
Synonyms	Mimosa juliflora, Prosopis cumanensis, P. bracteolata, P. dominquensis, P. vidaliana, Acacia cumanensis.

2. Natural distribution:

American tropics. Central America and Northern South America.

3. Where found in Somalia:

Very successful on Shalambood sandunes above Hotel Sambuusi on the road to Merca. Also planted in Northern Regions, Jalalaqsi, Arabsyo (W. of Hargeisa), Luug, Brava, Barre region, Central Rangelands.

4. Climate requirements: Dry zones

Rainfall (mm/yr)	150-750
Temperature(°C)	Not frost hardy
Altitude (m)	0-1500
Groundwater	Not required close to the surface.

5. Uses: (In other countries and/or Somalia)

Fuel	**	Fodder	*	Fruit	*
Charcoal	**	Livestock shade	*	Edible leaves	
Poles	*	Intercropping		Honey	*
Toolhandles		Nitrogen fixation		People shade	*
Carving	*	Shelterbelt		Amenity	*
Timber		Hedge		Medicine	*
Insecticide		Soil improvement	*	Dyes	*
Sandune fixation	**	Tannins	*	Gums (Edible)	*

Fibres, Adhesive gum, Edible fruit and seed, Livefencing. Wood burns slowly with a high heat and little smoke.

6. Recommendations and notes:

Often mistakenly confused with *Prosopis glandulosa*, known as Mesquite, a weed in South West U.S.A and West Australia.

Much planted on the Kenya coast. Along with *Parkinsonia aculeata* it has proven to be hardy and able to grow in very arid hostile sites. There is a thornless large *Prosopis* in the Burao NRA nursery which is worth propagating. A thornless *Prosopis* would make a better arid zone shade tree and fodder source.

7. References: Baumer, Nair, NAS, SEPESAL.

Tree description

1. Summary:

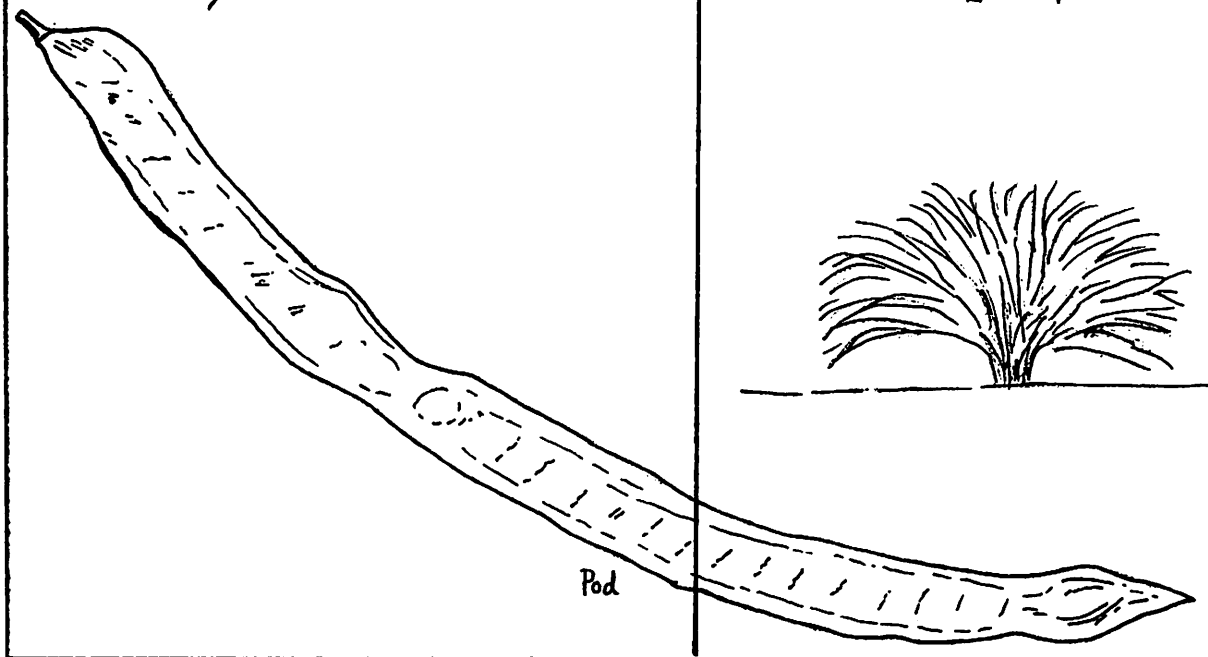
Deciduous thorny shrubby tree

2. Detailed:

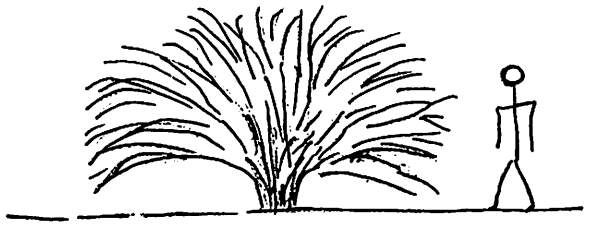
TREE SHAPE	Spreading large crown, variable shape	
Height	3-12m	
Trunk and	Short. Can reach up to 1m diameter.	
Bark	Thick, rough, cracked and scaly	Colour: Greenish-grey
Branches	Tortuous	Colour:
FOLIAGE		
Twigs	Cylindrical	Colour: Green
Thorns	Paired. Divergent and sometimes absent.	
Size	0.5-5cm long	Colour:
LEAF	Bipinnate with glands. 1-3 pairs of pinnulae.	
Size	Pinnae 3-11cm long	Colour: Green (Greyish)
Leaflet		
Size	6-23 x 1.6-5.5mm	
FLOWERS	Clustered in cylindrical racemes. Fragrant flowers.	
Size		Colour: Green-White-Yellow
FRUIT	Pods, long, narrow, nearly cylindrical indehiscent.	
Size	8-29cm x 4-17mm	Colour: Light straw yellow-brown
SEED	Bean shaped, flattened, oval. Up to 25 per pod.	
Size	6mm long	Colour: Brown
ROOTS	Deep rooted, up to 20m.	
WOOD	Hard. Specific gravity = 0.7.	Colour:

SOMALI NAME	LEBI	LATIN NAME	PROSOPIS JULIFLORA

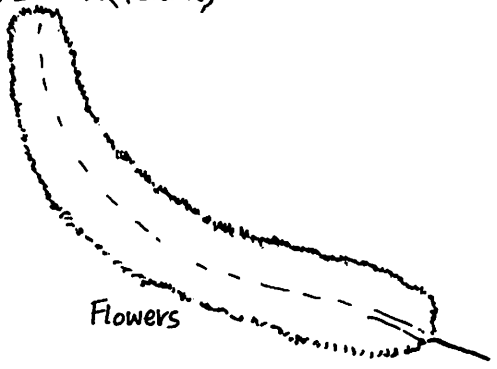
FRUIT (Yellow)



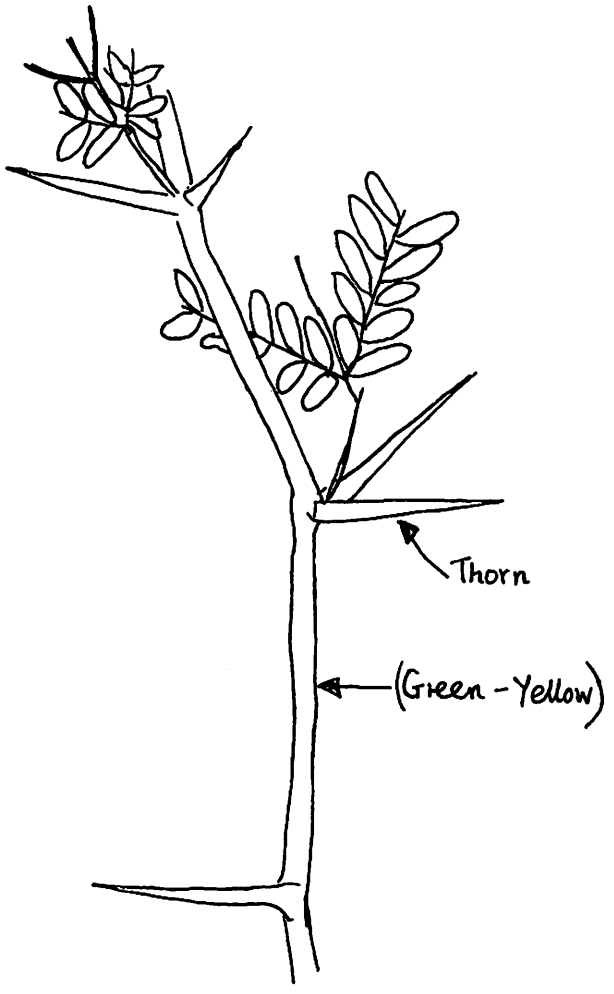
TREE SHAPE (Young tree)



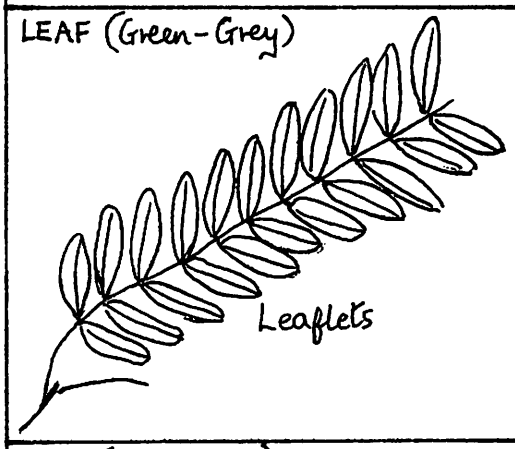
FLOWER (Yellow)



FOLIAGE



LEAF (Green - Grey)



SEED (Shiny Brown)

Tree growing

Names: *Prosopis juliflora*

1. Methods of propagation:

Root suckers or potted stock. Broadcasting of pretreated seed in holes or pits. Seeds germinate after passing through digestive tract of animals.

2. Seed:

Number/kilogram	8,000-30,000
Collection	Easy. Pods drop when ripe and can be collected from ground.
Extraction	Difficult
Storage	Dry, cool conditions
Pretreatment	Either scarify or cover with boiling water and allow to soak for 24 hours.

3. Nursery:

Soil mixture	
Potsize	
Sowing	1cm depth. 2 seeds per pot.
Germination Percentage	80-90 (40-80)
Pricking out	
Shade and watering	
Growth time	10-12 weeks
Other notes	Root pruning frequently needed.

4. Pests and diseases:

In other countries Bruchid beetles often damage seeds.

5. Planting:

Soils	Saline tolerant. Dry soils. Sandy soils preferred. Rocky sites tolerated. Cannot tolerate iron hardpans.
Method and spacement	Growth slow while taproot establishes. 1st fruiting after 3-4 yrs.
Fertilizers and insecticides	

6. Aftercare:

At age 10-15 years can be cut back for firewood and should regenerate from stumps.

Growth and yields	Fast growth. On light soils and low rainfall sites can yield up to 4000kg of pods/ha/an. A 16 year old stand, north of Khartoum yielded 25m3/ha of firewood. Yields 6-7 tons/ha of fodder pods if irrigated.

7. Other notes:

Not recommended on riverine sites as can be an aggressive weed on irrigated sites. An important pioneer species for arid zones which the majority of Somalia is.

Tree details

1. Names: Mirimiri *Schinus molle*

Arabic	Filfilrafie
English	Pepper tree, Molle, Peruvian mastic, Weeping pepper.
Species	Schinus molle L.
Family	Anacardiaceae
Synonyms	

2. Natural distribution:

Highlands of Pacific coast of South America: Peru to Argentina. Introduced and naturalised in South USA and Mexico.

3. Where found in Somalia:

Sheik and Burao. Northern regions with higher altitude. Also Hargeisa.

4. Climate requirements: 4-8 month dry season. Tolerates salt wind. Drought hardy.

Rainfall (mm/yr)	300-620 (500-700)
Temperature (°C)	(5)12-20(28) Slightly frost tender
Altitude (m)	1000-3500
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder		Fruit	
Charcoal	*	Livestock shade		Edible leaves	
Poles	*	Intercropping		Honey	*
Toolhandles		Nitrogen fixation		People shade	**
Carving		Shelterbelt	*	Amenity	**
Timber		Hedge	*	Medicine	
Insecticide		Soil improvement			
Sandune fixation		Tannins	*		

Fibres, Resins, (Spice from fruit?)

6. Recommendations and notes:

Suitable for hills of the north over 1000m high.

7. References: Anon., Nabil *et al.*, SEPESAL, Webb *et al.*

Tree description

1. Summary:

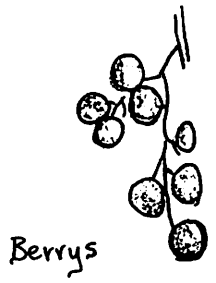
Small evergreen fragrant tree. Unarmed.

2. Detailed:

TREE SHAPE	Open wide branching crown. Branches elegantly drooping.	
Height	Less than 10m.	
Trunk and	Short	
Bark	Scaly or fissured	Colour: Light grey-brown
	Exudes a white resin when cut.	
Branches	Spreading slender arching.	Colour:
FOLIAGE	Hanging branches	
Twigs	Drooping, pendulous	Colour:
Thorns		
Size		Colour:
LEAF	Pinnate, Alternate, imparipinnate.	
Size	Up to 25cm	Colour:
Leaflet	12 to 15 pairs. Fragrant (peppery) when crushed.	
	Linear-lanceolate.	
Size	3-6cm long	
FLOWERS	Arranged in open panicles. Dioecious. 5 sepals.	
Size	Individually very small	Colour: Green-white
FRUIT	Berry, spherical.	
Size	About 7mm d.	Colour: Purple/Rose-coloured
SEED	Single seed per fruit.	
Size		Colour:
ROOTS	Shallow root system.	
WOOD	Moderately durable.	Colour:
	Termite resistant.	

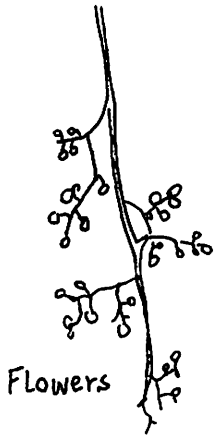
SOMALI NAME	MIRI MIRI	LATIN NAME	SCHINUS MOLLE

FRUIT



TREE SHAPE

FLOWER



FOLIAGE

LEAF

SEED

Names: Mirimiri *Schinus molle*

1. Methods of propagation:

Potted stock

2. Seed:

Number/kilogram	35000-65000 (14000-44000)
Collection	Sheik pass between Burao and Berbera. Directly off mother trees.
Extraction	Rub off outer husk manually.
Storage	Room temperature for 3 months.
Pretreatment	None. Put in water for 12 hours.

3. Nursery:

Soil mixture	
Potsize	
Sowing	Sow seed shallowly.
Germination	2-3 weeks
Percentage	50(40-80)
Pricking out	
Shade and watering	
Growth time	6 months
Other notes	Weeding is necessary.

4. Pests and diseases:

Termites attack young plants.

5. Planting:

Soils	Light textured, alkaline/neutral, free draining. Tolerates moderate salinity. Deep sandy soils.
Method and spacement	Requires wide spacing.
Fertilizers and insecticides	

6. Aftercare:

Growth and yields	Shortlived. Fast growth.

7. Other notes:

Strongly light demanding. Tolerates salt winds.

Tree details

1. Names: *Sesbania grandiflora*

Arabic	Sisaban
English	Corkwood tree, Agati, White dragonfly tree, Flamingo-bill.
Species	Sesbania grandiflora (L.) Poir.
Family	Leguminosea - Papilionaceae
Synonyms	Agati grandiflora (L.) Desv

2. Natural distribution:

South East Asia from India, through Malaysia, Indonesia to the Philippines.

3. Where found in Somalia:

Mostly compounds of houses which have enough water to give them: Mogadishu. The NRA nursery in Afgooye. Riverside sites.

4. Climate requirements: Dry season of up to 3 months.

Rainfall (mm/yr)	1000-2000
Temperature(°C)	(18)22-30(36) Frost tender
Altitude (m)	0-800
Groundwater	Required close to surface.

5. Uses: (In other countries and/or Somalia)

Fuel		Fodder	**	Fruit	
Charcoal		Livestock shade		Edible leaves	*
Poles		Intercropping	**	Honey	
Toolhandles		Nitrogen fixation	**	People shade	*
Carving		Shelterbelt	*	Amenity	*
Timber		Hedge	*	Medicine	*
Insecticide		Soil improvement	**	Gum	*
Sandune fixation		Tannins	*		

Short fibre pulp, fruit, flowers and leaves can be eaten. Wood not suitable for timber construction. Poor fuelwood.

6. Recommendations and notes:

Fastest growing tree in Somalia. Requires permanent irrigation. It is a fairly popular garden tree due to its fast growth and large flowers. It has potential to be used as an agroforestry soil improving species in irrigated farmland especially as it is easy to cut down with very soft wood. Could be grown as an alley crop strip in the same way that Leuceana can be. Kept cut down to 1m height and place the foliage on the soil as a mulch.

7. References: Hargreaves, Little, NAS, SEPESAL, Webb *et al.*

Tree description

1. Summary:

Small tree. Quick-growing large flowered evergreen. Unarmed. Feathery foliage.

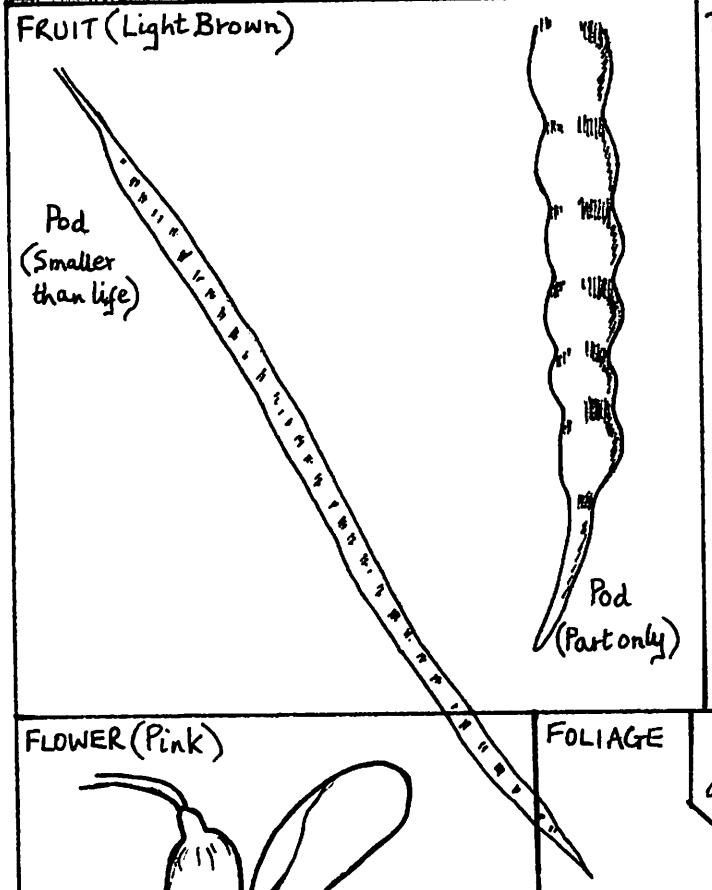
2. Detailed:

TREE SHAPE	Spreading thinly with few nearly upright branches.
Height	8-10m
Trunk and Bark	Straight. 30cm diameter. Rough, deeply furrowed Colour: Grey in thick corklike plates. Inner bark is pink.
Branches	Nearly upright. Colour:
FOLIAGE	Flower has unpleasant odor.
Twigs	Finely hairy Colour:
Thorns	
Size	Colour:
LEAF	Alternate, pinnately compound.
Size	15-35cm Colour: Pale yellow-green
Leaflet	10-30 pairs per pinnae. Oblong. Rounded.
Size	2-4cm x 6-12mm
FLOWERS	Clusters of 2-5 flowers hanging together. Pea shaped. 2 curved petals. Colour: Creamy white or Pinkish red
Size	6-9cm long
FRUIT	Pod. Flattened, hanging down, very long and narrow.
Size	30-45(-60)cm x 6-8mm. Colour: Light brown
SEED	15-50 seed/pod. Beanlike. Eliptical.
Size	5mm long Colour: Brown
ROOTS	
WOOD	Specific gravity = 0.42. Soft wood. (Cork like). Weak and pithy. Colour: White

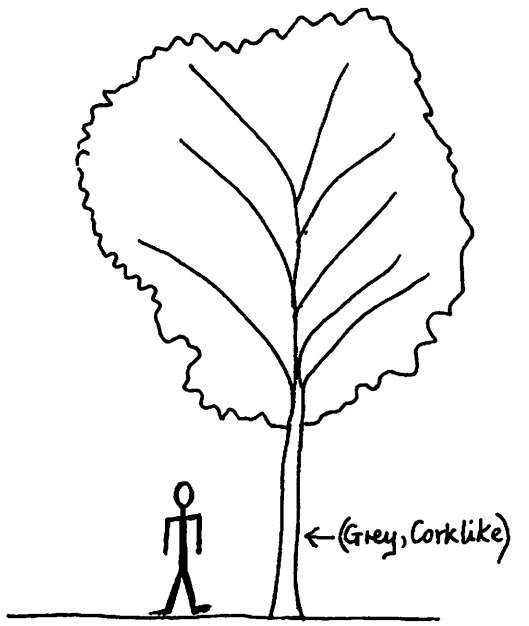
SOMALI NAME

LATIN NAME SESBANIA GRANDIFLORA

FRUIT (Light Brown)

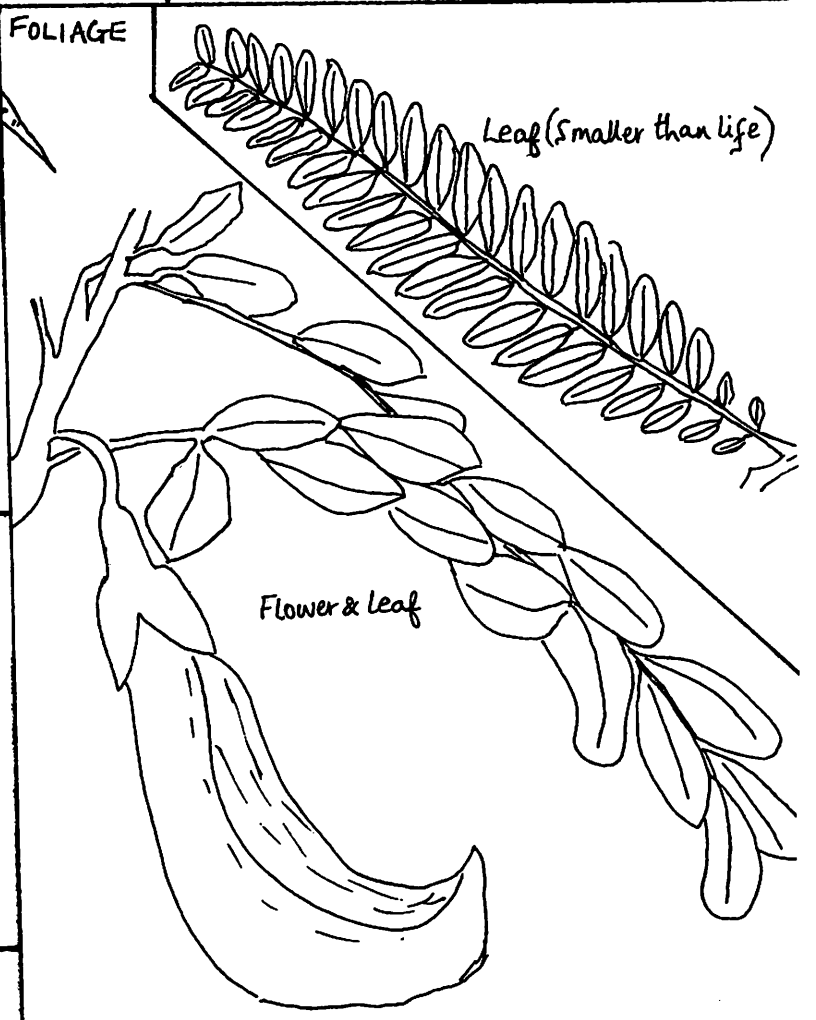


TREE SHAPE

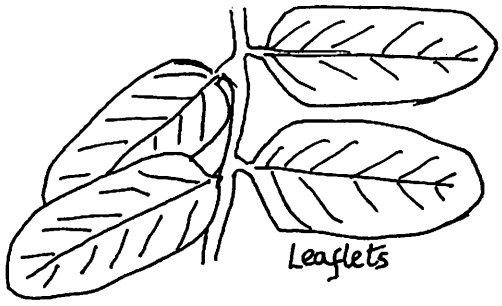


FLOWER (Pink)

FOLIAGE



LEAF (Green)



SEED

Names: *Sesbania grandiflora*

1. Methods of propagation:

Direct sown, Cuttings, Potted stock.

2. Seed:

Number/kilogram	17000-20000
Collection	
Extraction	
Storage	1-2 years
Pretreatment	None

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	
Percentage	85-90
Pricking out	
Shade and watering	
Growth time	
Other notes	Easy to produce in nursery. Requires regular root pruning.

4. Pests and diseases:

Susceptible to nematodes.

5. Planting:

Soils	Acid. Tolerates seasonal waterlogging. Tolerates sand or clay equally.
Method and spacement	Requires very close spacing.
Fertilizers and insecticides	

6. Aftercare:

Growth and yields	Shortlived. Fast growth.

7. Other notes:

Strongly light demanding. Little is known of Sesbania's silviculture.

Tree details

1. Names: Bibbo *Anacardium occidentale*

Arabic
English Cashew nut, Mkanju.
Species Anacardium occidentale L.
Family Anacardiaceae
Synonyms

2. Natural distribution:

Tropical Americas: Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Guyana, Honduras, Nicaragua, Panama, Peru, Suriname, Venezuela, West Indies. Introduced into much of Africa.

3. Where found in Somalia:

Successfully established and fruiting on Shalambood sandunes south of Mogadishu. Also planted at Jalalaaxi and Brava but survival data not known.

4. Climate requirements: 4-6 month dry season. Very hardy.

Rainfall (mm/yr) 500-1600 (over 700 for good results)
Temperature(°C) (9)27-33(35) Frost sensitive
Altitude (m) 0-1000
Groundwater

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	*	Fruit	**
Charcoal	*	Livestock shade		Edible leaves	*
Poles	*	Intercropping	*	Honey	*
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt	*	Amenity	
Timber	*	Hedge		Medicine	*
Insecticide	*	Soil improvement	*	Gum	*
Sandune fixation	*	Tannins	*	Ink	*

The fruit is edible and highly nutritious, however the shell is POISONOUS until it is roasted. Dyes. Fruit pulp is edible uncooked, seed must be roasted or boiled. Cooking fats and oils available from fruit. Spreading habit of tree makes it useful for protection. the apple is a source of Vitamin C.

6. Recommendations and notes:

Along with 'Qumbe' (*Cocos nucifera*) the 'Bibbo' is well suited to food production on the coastal sandunes of Southern Somalia. However it is not salt tolerant and must be planted in dunes sheltered from the seawind. It is feasible to suggest that 'Shawri' (*Casuarina equisetifolia*), which is salt tolerant, could act as a shelterbelt of 'Bibbo' plantations on the sandunes. The expertise for the growing of Cashew nut exists on the Kenyan coast where they have had significant success.

7. References: Anon., SEPESAL, Teel, Webb *et al.*, Weber, Williams *et al.*

Tree description

1. Summary:

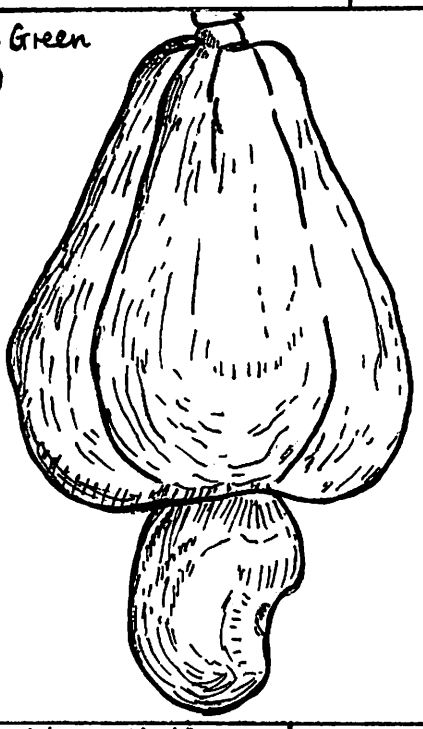
Evergreen unarmed medium sized tree.

2. Detailed:

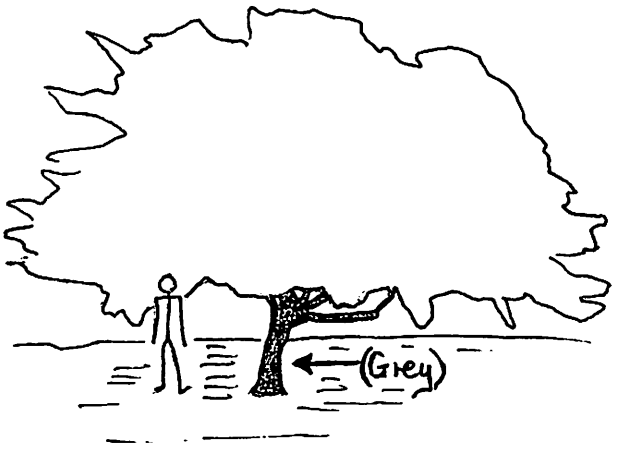
TREE SHAPE	Wide dense spreading crown.	
Height	5-15m	
Trunk and Bark	Up to 60cm d. Usually less than 1m d. Rough Lowest branches often descend to the ground.	Colour: Grey
Branches	Heavy and crooked	Colour:
FOLIAGE		
Twigs		Colour:
Thorns		
Size		Colour:
LEAF	Simple, ovate	
Size		Colour:
Leaflet Size		
FLOWERS	Small. Arranged in terminal panicles at branch ends.	
Size	Panicles up to 25cm.l.	Colour: White-Yellow-Pink-Red
FRUIT	Cashew apple (edible). Take 2-3 months to mature. Fleshy pedicel.	
Size	7-8 x 5cm	Colour: Bright yellow-red-green
SEED	Kidney-shaped nut (poisonous until roasted)	
Size	2.5cm long	Colour: Grey-brown
ROOTS	Large lateral roots. Roots twice diameter of crown. Taproot present.	
WOOD	Termite resistant, durable.	Colour:

SOMALI NAME	BIBBO	LATIN NAME	ANACARDIUM OCCIDENTALE

FRUIT (Yellow-Green -Red)



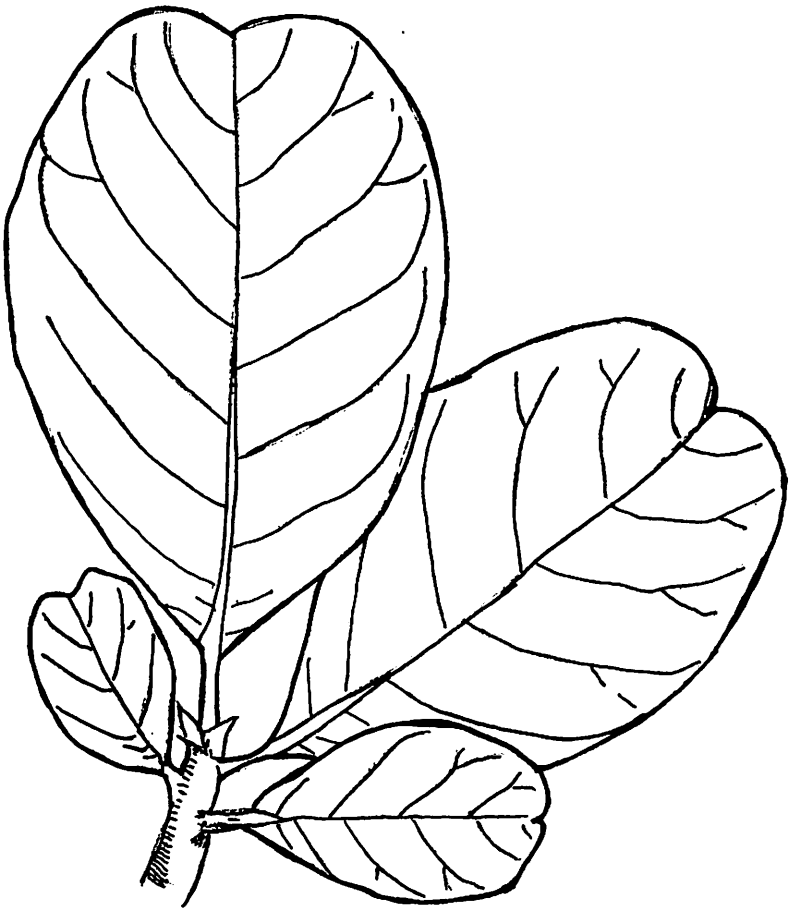
TREE SHAPE



FLOWER (White-Yellow-Pink)

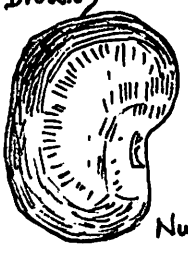
Flowers

FOLIAGE



LEAF (Green)

SEED (Grey-Brown)



Nut

Tree growing

Names: Bibbo *Anacardium occidentale*

1. Methods of propagation:

Potted, stumps, direct sown. Not open rooted stock as impossible to transport without damaging taproot. Grafting practised and recommended. Expertise exists in Kenyan coastal area. See appendix.

2. Seed:

Number/kilogram	138-300
Collection	Pick ripe fruits.
Extraction	Separate nutlet from fruit. Dry in sun for 2-3 days.
Storage	Up to one year if kept dried and sealed.
Pretreatment	Soak for 24 hours in water. (None)

3. Nursery:

Soil mixture	Sow seeds shelled unless experienced at delicate process of unshelling them.
Potsize	
Sowing	At 3cm depth with convex side up (on edge).
Germination	4-7 weeks
Percentage	60-70
Pricking out	
Shade and watering	Water daily.
Growth time	Transplant at one year old. (14-18 weeks)(5-8 months).
Other notes	Care of taproot needed. Spray with Dieldron at time of planting against termite attack.

4. Pests and diseases:

In other countries *Helopetis spp* main pest. *Plocaederus ferrugineus* - a cerambycid root/shoot boring beetle. *Crimissa cruralis*, chrysomelid bug.

5. Planting:

Soils	Light texture, neutral/acid reaction, needs good drainage. Tolerates poor soils. Thrives on coastal soils if fresh ground- water available. Sandy soil. Eroded soils. Dry sites. Not salt tolerant.
Method and spacement	Requires wide spacing. 7-10m x 7-10m. Intercropping (Tuangya) recommended for first 2 years. (10-15 x 10-15m.) (15m x 15m.)
Fertilizers and insecticides	Dung, ash and rock phosphate (120g/hole) should be added per hole.

6. Aftercare:

Pruning necessary for first 3 years to shape the tree: remove side shoots arising from trunk. Plants must be weeded, but carefully so as not to damage roots.

Growth and yields	About 30 years. Fruiting starts in 3rd year. Maximum yields after 10 years.

7. Other notes:

Light demanding.

Tree details

1. Names: Anuune (Weyn) *Annona muricata*

Arabic	
English	Soursop
Species	Annona muricata
Family	Annonaceae
Synonyms	

2. Natural distribution:

Caribbean region

3. Where found in Somalia:

4. Climate requirements: A warm humid climate

Rainfall (mm/yr)	1000mm -
Temperature(°C)	
Altitude (m)	0-1000
Groundwater	

5. Uses: (In other countries and/or Somalia)

Fuel		Fodder		Fruit	**
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	*
Insecticide		Soil improvement		Gums (Edible)	
Sandune fixation		Tannins			

Fruit is pulpy, stringy, sour juicy flesh. Edible raw or made into a drink. Seeds are toxic and care must be taken to assure that all are removed from the pulp.

6. Recommendations and notes:

In other countries it is seldom grown commercially. A backyard tree needing regular irrigation. Cannot tolerate cold mountain conditions. Might be necessary to bag young fruits to avoid pests infesting and malforming them. Suitable for riverine villages and permanently irrigated plots.

7. References: Williams *et al.*

Tree description

1. Summary:

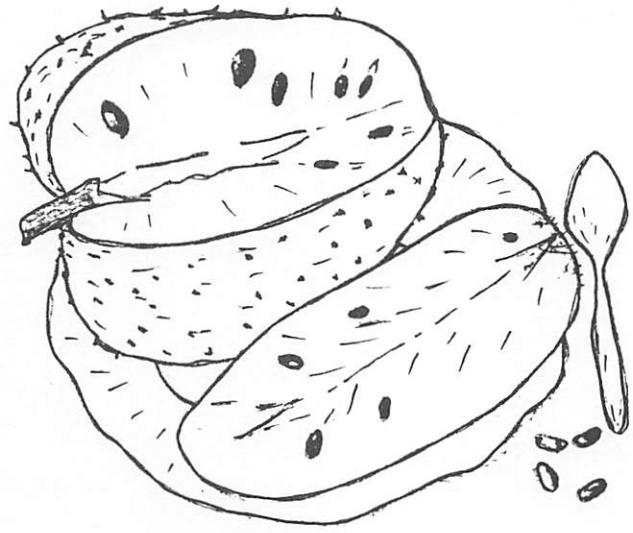
A small straggly fruit tree which flowers and fruits throughout the year.

2. Detailed:

TREE SHAPE	Upturned limbs and bushy.	
Height	Up to 8-10m	
Trunk and Bark		Colour:
Branches	Low branching	Colour:
FOLIAGE		
Twigs		Colour:
Thorns		
Size		Colour:
LEAF	Unpleasant smell	
Size		Colour: Green
Leaflet Size		
FLOWERS	Unpleasant smell	
Size		Colour:
FRUIT	Oval or irregular	
Size	15-30cm long	Colour: Pulp is white. Shell is green.
SEED	Shiny and toxic	
Size		Colour: Black
ROOTS		
WOOD		Colour:

SOMALI NAME	ANUUNE (WEYN)	LATIN NAME	ANNONA MURICATA

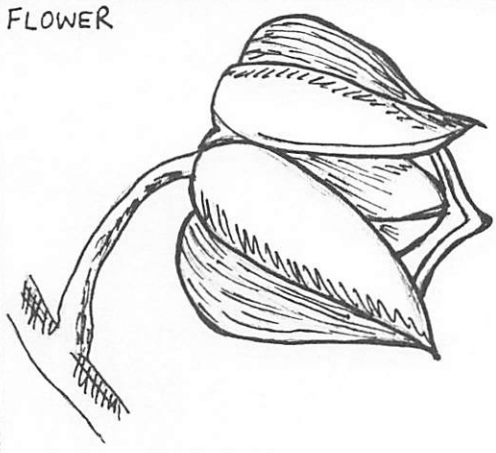
FRUIT (Green, White inside)



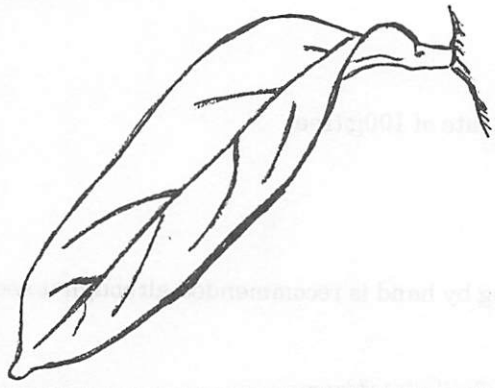
Edible Fruit on plate beside spoon
(Smaller than life)

TREE SHAPE

FLOWER

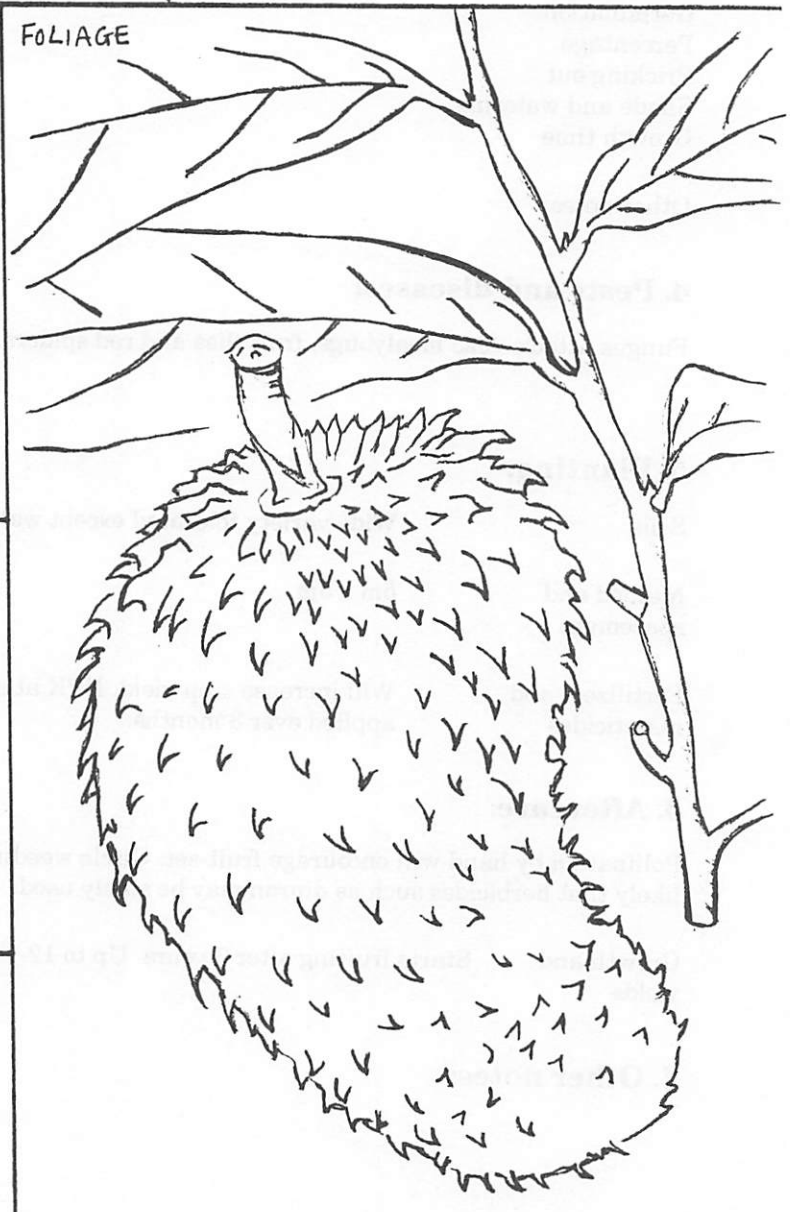


LEAF



SEED

FOLIAGE



Tree growing

Names: Anuune (Weyn) *Annona muricata*

1. Methods of propagation:

Budding onto rootstocks.

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth time

Other notes

4. Pests and diseases:

Fungus attack. Also mealybugs, fruit flies and red spiders.

5. Planting:

Soils	Wide variety tolerated except waterlogging.
Method and spacement	5m x 5m
Fertilizers and insecticides	Will increase crop yield. NPK at a rate of 100g/tree applied ever 3 months.

6. Aftercare:

Pollination by hand will encourage fruit-set. Circle weeding by hand is recommended although it seems likely that herbicides such as diuron may be safely used.

Growth and yields	Starts fruiting after 3 years. Up to 12-14 fruits/tree/year.

7. Other notes:

Tree details

1. Names: Anuune (Yare) *Annona squamosa*

Arabic
English Sweet Sop, Sugar Apple, Anona, (Custard apple).
Species Annona squamosa. L.
Family Annonaceae
Synonyms

2. Natural distribution:

Native to West Indies and South America.

3. Where found in Somalia:

A popular tree in the riverine villages.

4. Climate requirements: Wet lowlands

Rainfall (mm/yr) 1000mm -
Temperature(°C) 18-23
Altitude (m) 500-1200
Groundwater

5. Uses: (In other countries and/or Somalia)

Fuel		Fodder		Fruit	**
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	*
Insecticide	*	Soil improvement		Gums (Edible)	
Sandune fixation		Tannins			

Insecticides from roots and seeds. Rope from shoots.

6. Recommendations and notes:

Easy to grow and fruits early in life and then continuously. Suitable for riverine sites and permanently irrigated plots.

7. References: Anon., NRC (1975), SEPESAL, Williams *et al.*

Tree description

1. Summary:

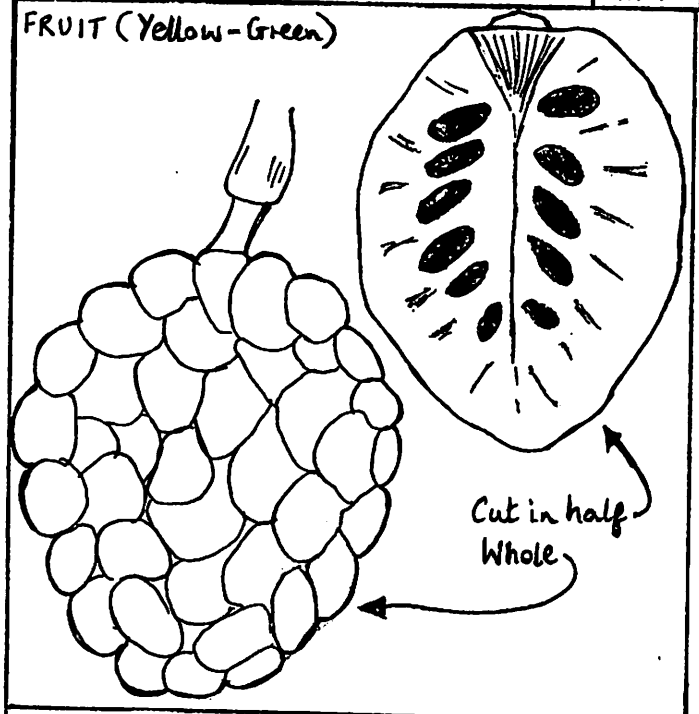
Small unarmed fruit tree. Sometimes sheds leaves if water shortage when fruiting would stop.

2. Detailed:

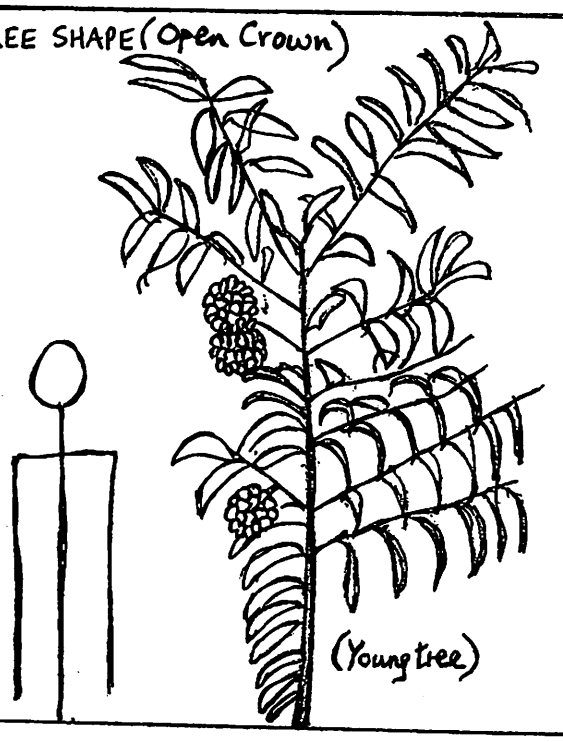
TREE SHAPE	Open crown	
Height	Up to 7m	
Trunk and	Less than 1m high. Up to 20cm d.	
Bark	Interlaced pattern of shallow fissures.	Colour: Grey
Branches	Long and slender. Angle sharply upwards from trunk but may bend downwards at their ends.	Colour:
FOLIAGE		
Twigs		Colour:
Thorns		
Size		Colour:
LEAF	Short stalked, slightly elliptic to ovate. Hairy when young.	
Size		Colour: Dull green
Leaflet		
Size		
FLOWERS	Solitary or four together. Pendulous. Continuous after 3rd yr.	
Size	2cm diameter	Colour: Yellowish-green
FRUIT	Heart shaped to ovoid. Loose easily separated parts (composed of).	
Size	6-12cm long	Colour: Flesh is yellow-white Surface is yellow-green (occasionally purple)
SEED		
Size		Colour:
ROOTS		
WOOD		Colour:

SOMALI NAME	ANUUNE (YARE)	LATIN NAME	ANNONA SQUAMOSA

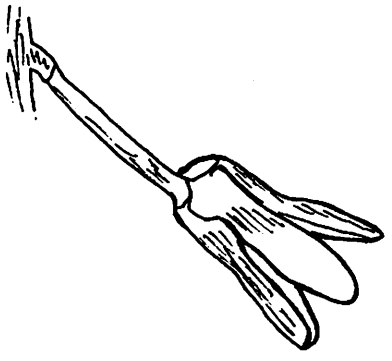
FRUIT (Yellow-Green)



TREE SHAPE (Open Crown)

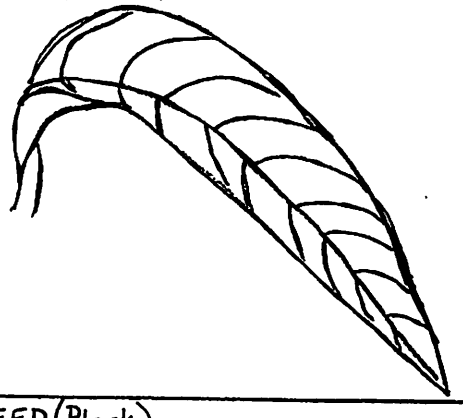


FLOWER (Yellow-Green)



FOLIAGE

LEAF (Green)



SEED (Black)

Tree growing

Names: Anuune (Yare) *Annona squamosa*

1. Methods of propagation:

2. Seed:

Number/kilogram	
Collection	Ripe fruits
Extraction	Maceration
Storage	
Pretreatment	None

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	2-4 weeks
Percentage	
Pricking out	
Shade and watering	
Growth time	12 months

Other notes

4. Pests and diseases:

Reported from other countries that sometimes damaged by the atlas moth (*Attacus atlas*).

5. Planting:

Soils	Good drainage and slightly acidic soils are best.
Method and spacement	5 x 5m. Could be intercropped with *Mangifera indica* to occupy space between *Mangifera indica* until it grows up.
Fertilizers and insecticides	

6. Aftercare:

Regular weeding. Prune to 1m above ground level to encourage secondary branching and keep fruits clear of the ground.

Growth and yields	Fruits take 3 months to ripen.

7. Other notes:

Tree details

1. Names: Babay *Carica papaya*

Arabic	
English	Papaya, Pawpaw
Species	Carica papaya. Linn.
Family	Caricaceae
Synonyms	

2. Natural distribution:

Tropical America. (Costa Rica to Mexico?). Has been introduced throughout the Tropics.

3. Where found in Somalia:

All small farms where some water is available. In house compounds. Beside houses in refugee camps.

4. Climate requirements:

Rainfall (mm/yr)	1200mm -
Temperature(°C)	20 - Killed by frost
Altitude (m)	0-1500
Groundwater	Cannot tolerate waterlogging

5. Uses: (In other countries and/or Somalia)

Fuel		Fodder		Fruit	**
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	
Insecticide		Soil improvement			
Sandune fixation		Tannins	*		

Fruit edible, nutritious and contains vitamins A and C. Fruit can make pickles and jams. Meat tenderising (papein). Papain and pectine.

6. Recommendations and notes:

A very popular tree (upright perennial herb) in refugee camps because it is drought hardy and produces fruit in less than one year: it can grow on waste water irrigation. It is an ideal species to use in forest extension programmes with school- children where they can raise a seeding with school supervision and then take it home and plant it close to their house.

7. References: Anon., Teel, Williams *et al.*

Tree description

1. Summary:

Evergreen. Not a true tree because it does not produce wood. An unarmed tree-like herb. Begins flowering after 6 months and continues, except during severe water shortage. Usually either male or female, sometimes hermaphrodite. Female flowers found in leaf axils. Male flowers found on pendulous racemes.

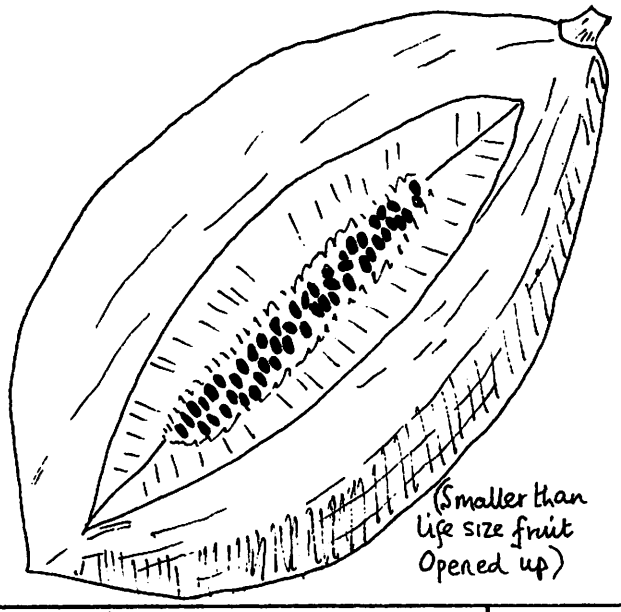
2. Detailed:

Clean stem ending at single crowded group of leaves.

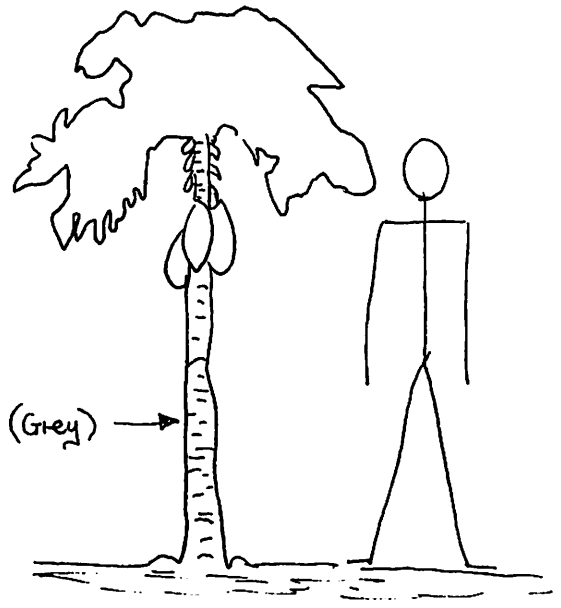
TREE SHAPE	No branches, unless terminal bud is damaged.	
Height	2-10m	
Trunk and Bark	Hollow and less than 20cm diameter Numerous low projections marking leaf scars.	Colour: Greyish
Branches		Colour:
FOLIAGE	Flowers formed in leaf axils.	
Twigs		Colour:
Thorns		
Size		Colour:
LEAF	10-30 per crown. Long stalked. Palmately 7-lobed leaf blade.	
Size	Up to 60cm across.	Colour: Green
Leaflet Size		
FLOWERS	Male flower arranged, many together, in groups at the ends of the branches of pendulous axillary panicles, 25-100cm long. The female flowers develop singly, or in small numbers along short axillary racemes.	
Size		Colour: M: Light yellow. Small. Less than 5mm. F: Yellowish, fragrant, 1-1\cmd.
FRUIT	Fleshy, thin skinned, oblong, nearly spherical berry. 3 months to ripen.	
Size	7-50 x 15cm	Colour: Green-Yellow-Orange skin Pulp = Orange
SEED	Mucilaginous. 10-1000 per fruit	
Size		Colour: Black
ROOTS	Shallow and very sensitive to damage. Soft.	
WOOD	Does not produce real wood	Colour:

SOMALI NAME	BABAY	LATIN NAME	CARICA PAPAYA

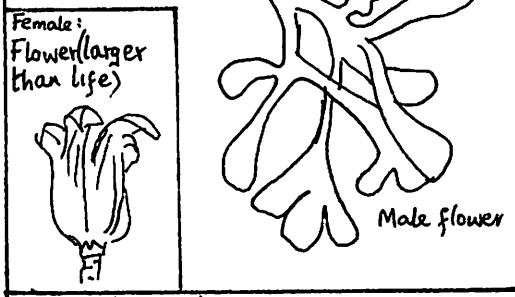
FRUIT (Green - Orange)



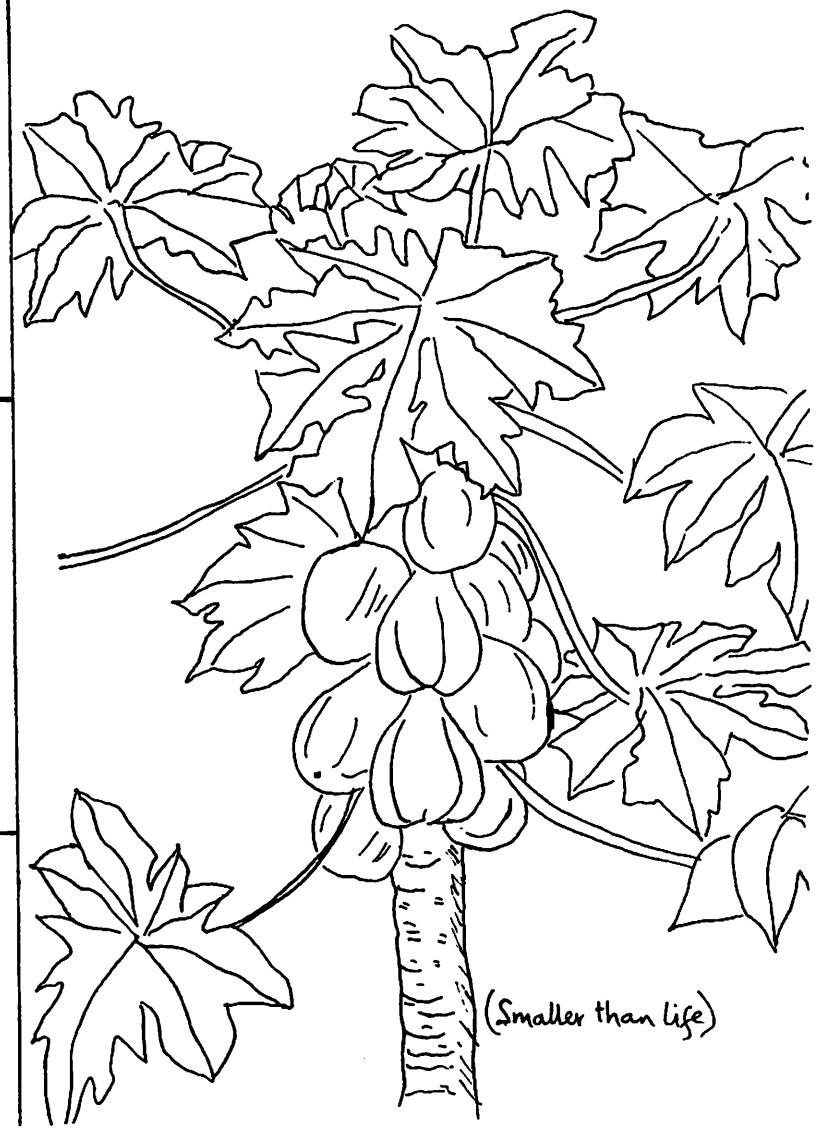
TREE SHAPE



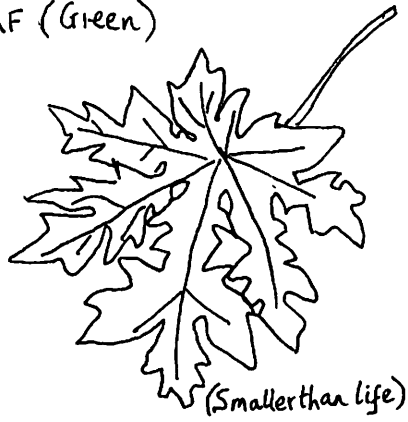
FLOWER (Yellow)



FOLIAGE



LEAF (Green)



SEED (Shiny black)

Tree growing

Names: Babay *Carica papaya*

1. Methods of propagation:

Direct sowing preferable to potted stock. See Appendix.

2. Seed:

Number/kilogram	76,300
Collection	Ripe fruit. Smaller fruits better as easier to transport.
Extraction	Eat the fruit!
Storage	Air dried. Can store for 3 years (one year)
Pretreatment	

3. Nursery:

Soil mixture	Sandy
Potsize	15x20cm when flat
Sowing	1cm depth in trays
Germination Percentage	1-4 weeks
Pricking out	After one week transfer to pots.
Shade and watering	Should receive morning sun. Water twice daily.
Growth time	6-9 weeks
Other notes	If direct sowing, 5-30 are sown together. After 6 months, when they flower, inferior females and males are removed.

4. Pests and diseases:

Suffer from damping off if overwatered. Nematodes build up on Papaya crop land. Abnormal or infected trees should be immediately uprooted and burnt.

5. Planting:

Soils	Well drained with slight acid reaction. Sandy soil best.
Method and spacement	3x3m spacing. Plant spacement 3 seedlings 25cm apart and later single to one female per 2-3m spacing. Leave one male to 50 females.
Fertilizers and insecticides	1.5kg of NPK/tree/year is recommended.

6. Aftercare:

Aftercare must be careful and superficial because roots are very sensitive to disturbance. Herbicides recommended: Diuron at 2kg per ha. and Paraquat at 1 litre per ha.

Growth and yields	10-15 years. Flowers within 6 months and fruits within 9 months. Rotation can be as short as 4 years. Fruits should be harvested at half ripe stage.

7. Other notes:

Should not be grown successively on the same soil unless soil is fumigated. Best to rotate land with other crops, otherwise trees will suffer from root rot.

Tree details

1. Names: Liin *Citrus aurantifolia*

Arabic	Mawaleh
English	Lime, Citrus
Species	Citrus aurantifolia
Family	Rutaceae
Synonyms	

2. Natural distribution:

Tropical and subtropical South East Asia.

3. Where found in Somalia:

Along the Juba and Shebelle river. Irrigated sites. Hargeisa, Boroma, Bosaso area.

4. Climate requirements:

Rainfall (mm/yr)	800 -
Temperature(°C)	20-25
Altitude (m)	0-1000
Groundwater	Essential if not irrigated

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder		Fruit	**
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	
Insecticide		Soil improvement			
Sandune fixation		Tannins			

Pulp discarded from fruit can be fed to livestock. Used as a flavouring of juice and food.

6. Recommendations and notes:

Develop and mature quickly. Relatively saline tolerant. Require shelter from high winds in the form of windbreaks. Liin can survive on poor soils often under neglected conditions. Not advisable to propagate from seed, better to obtain budgrafted stock from horticultural nursery. Only possible to grow if irrigated.

7. References:

Anon., Purseglove, Williams *et al.*

Tree description

1. Summary:

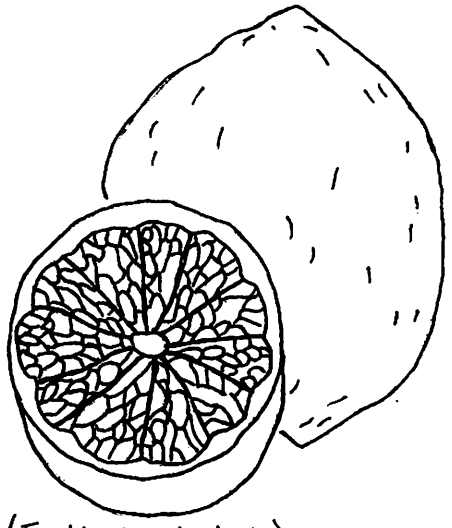
Evergreen heavily armed small tree. Flowers after 3-5 years.

2. Detailed:

TREE SHAPE	Dense rounded or umbrella shaped crown.	
Height	Up to 5m	
Trunk and	Up to 25cm.d. Single stem, usually fluted. Less than 1m high.	
Bark	Smooth	Colour: Dark brown-green
Branches	Many	Colour:
FOLIAGE		
Twigs	Tough, sharp, straight	Colour:
Thorns	Present	
Size		Colour:
LEAF	Tough, unifoliate, ovate-elliptic margin crenulate, small.	
Size	4-8 X 2-5cm	Colour: Dark green
Leaflet	New leaves pale green	
Size		
FLOWERS	Continuously fragrant. 4-5 petals (8-12 X 2.5-4mm)	
Size	2.5-4.5cm.d.	Colour: Whitish
FRUIT	Globose, leathery, ovary, berry. Thin peel. Small.	
Size	3-6cm.d.	Colour: Yellow-green. Pulp greenish.
SEED	Small oval	
Size		Colour: White
ROOTS	Taproot present and extensive network of lateral roots.	
WOOD		Colour:

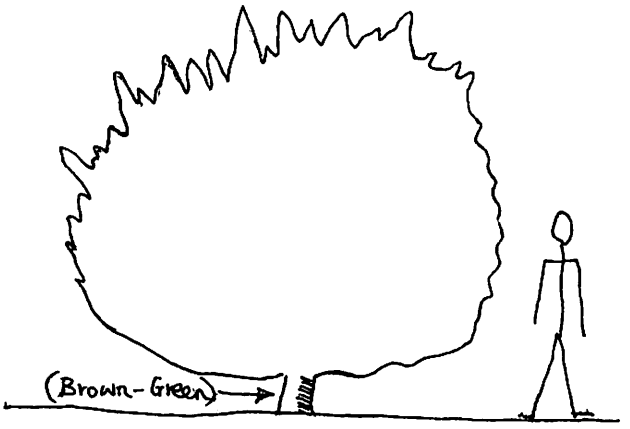
SOMALI NAME	LIIN	LATIN NAME	CITRUS AURANTIFOLIA

FRUIT (Yellow-Green)

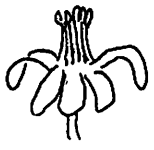


(Fruit: Cut in half)

TREE SHAPE

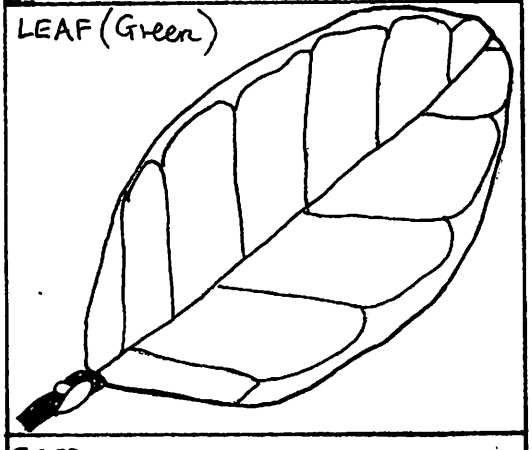


FLOWER (White)



FOLIAGE

LEAF (Green)



SEED

Tree growing

Names: Liin *Citrus aurantifolia*

1. Methods of propagation:

Grafting recommended combining a rootstock adapted to site conditions with a bud intended to develop into a crown able to produce fruit of a desired kind. Rootstock grown from seed in nursery. Marcotting and cuttings also possible. See Appendix.

2. Seed:

Number/kilogram	
Collection	From good fully mature fruits on vigorous adult healthy trees
Extraction	Maceration in water. Select largest seeds.
Storage	Very short, Must be kept moist. In sand at 5-10°C for two weeks
Pretreatment	None

3. Nursery:

Soil mixture seedlings	Well drained. Add NPK once/month at a rate of 2kg/100
Potsize	
Sowing	Direct into pots. 3 per pot at 1cm depth
Germination Percentage	3-4 weeks
Pricking out	
Shade and watering	Shaded
Growth time	12 months before rootstock is ready for grafting at a height of 45cm. Select only best rootstock, discard the rest.
Other notes	Essential to control weeds. Regularly prune off side branches.

4. Pests and diseases:

Sensitive to rootrot. Good drainage essential.

5. Planting:

Soils	Well drained deep soil. Heavy soils tolerated. Not very acid. Saline tolerant. Sandy loam ideal.
Method and spacement	7 X 7m spacement. A planting hole of 40 X 40 X 40cm
Fertilizers and insecticides	Apply fertiliser to the ground around boundary of the crown. 150g of NPK X 5 times/yr = 750g/yr/tree.

6. Aftercare:

Prune low branches - especially growth from rootstock.

Growth and yields	Flowers and fruits after 3-5 years. Fruits take 8-12 months to ripen. Pick fruits while still green. In the first two years of the plantation it is possible to grow food crops in the ground between the seedlings.

7. Other notes:

Advisable to obtain rootstock and budded seedlings from agricultural extension services or from areas with expertise such as Janaale or Italian farms.

Tree details

1. Names: Bombelmo *Citrus paradisi*

Arabic	Mawaleh
English	Grapefruit
Species	Citrus paradisi
Family	Rutaceae
Synonyms	

2. Natural distribution:

(West Indies). Tropical and subtropical South-east Asia.

3. Where found in Somalia:

Along the Juba and Shebelle river irrigated farmland and Hargeisa, Borama Bosaso area.

4. Climate requirements: Short dry season.

Rainfall (mm/yr)	800 -
Temperature(°C)	20-25
Altitude (m)	0-1000
Groundwater	Essential unless irrigated

5. Uses: (In other countries and/or Somalia)

Fuel		Fodder		Fruit	**
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	
Insecticide		Soil improvement		Gums (Edible)	
Sandune fixation		Tannins			

6. Recommendations and notes:

Not advisable to propagate from seed as is likely to produce high yielding trees. Better to buy budgrafted seedlings from a horticultural nursery. Only possible to grow with irrigation.

7. References: Anon., Purseglove, Williams *et al.*

Tree description

1. Summary:

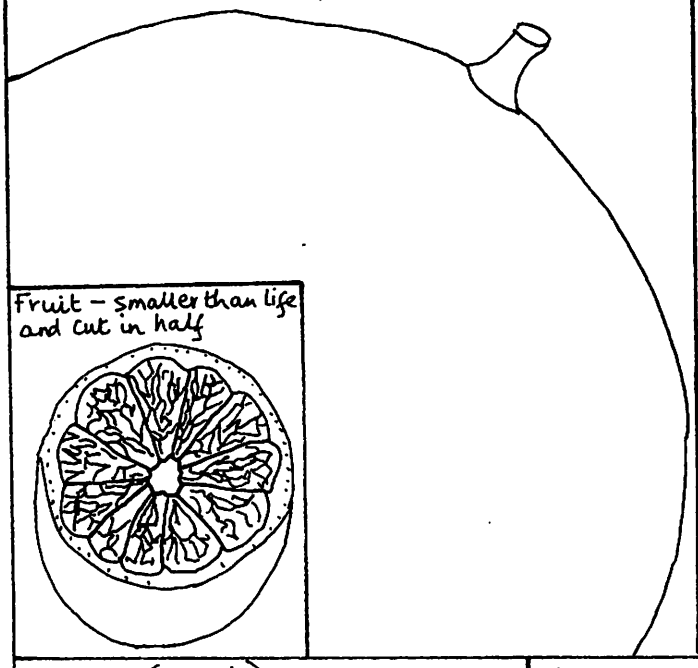
Evergreen armed tree which begins flowering after 3-5 years, twice per year after rains. Fruit takes 8-12 months to ripen.

2. Detailed:

TREE SHAPE	Dense, rounded crown.	
Height	10-15m. Less than 1m height	
Trunk and	Up to 25cm.d. Single stem, usually fluted.	
Bark	Smooth.	Colour: Dark-brown-green
Branches		Colour:
FOLIAGE		
Twigs	Glabrous	Colour:
Thorns	Tough, sharp, straight spines.	
Size		Colour:
LEAF	Tough	
Size	Up to 5-20 X 2-12cm	Colour: Dark green
Leaflet		(Pale green when young)
Size		
FLOWERS	Fragrant. 5 petals	
Size	4-5cm.d.	Colour: White
FRUIT	Berry leathery, large, globose, thin skin.	
Size	8-15cm	Colour: Yellow-pink skin
		Yellow pulp
SEED		
Size		Colour: White
ROOTS	Taproot and extensive network of lateral roots.	
WOOD		Colour:

SOMALI NAME	BOMBELMO	LATIN NAME	CITRUS PARADISI

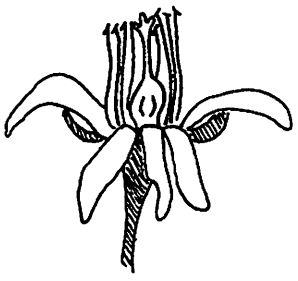
FRUIT (Yellow - Pink)



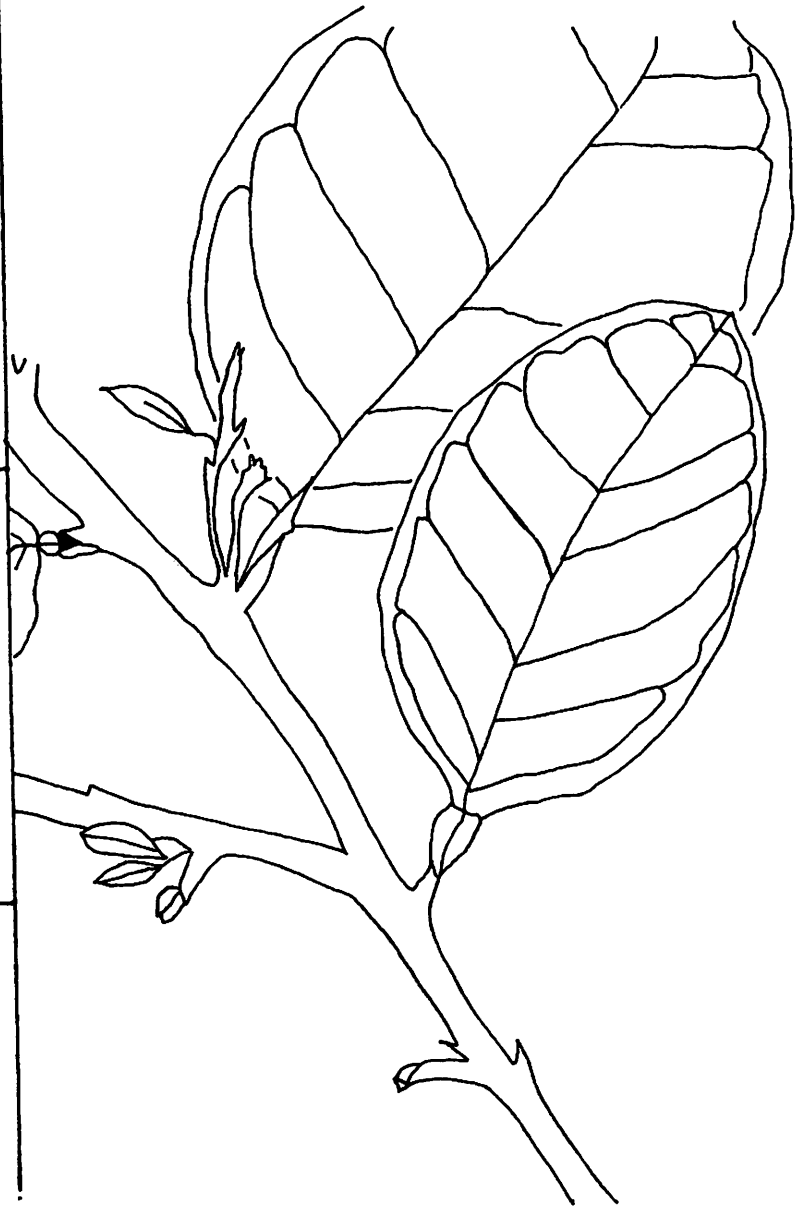
Fruit - smaller than life and cut in half

TREE SHAPE

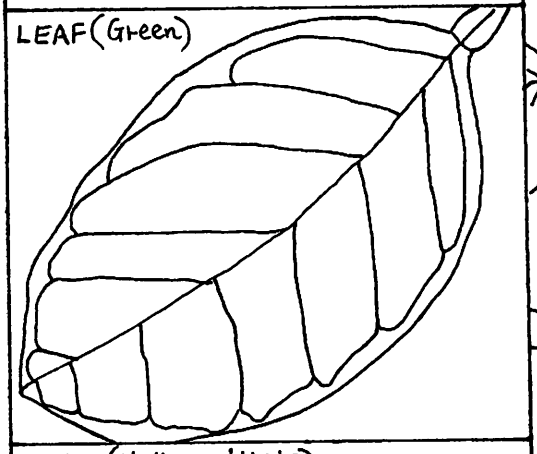
FLOWER (White)



FOLIAGE



LEAF (Green)



SEED (Yellow - White)

Names: Bombelmo *Citrus paradisi*

1. Methods of propagation:

Grafting recommended combining a root stock adapted to site conditions with a bud intended to develop into a crown able to produce fruit of a desired kind. Rootstock grown from seed. See Appendix

2. Seed:

Number/kilogram	
Collection	From good fully mature fruits on vigorous adult healthy trees.
Extraction	Maceration in water. Select largest seeds.
Storage	Very short, must be kept moist:In sand at 5-10°C for 2 weeks.
Pretreatment	None.

3. Nursery:

Soil mixture	Well drained. Add NPK once/month at a rate of 2 kg/100 seedlings.
Potsize	
Sowing	Direct into pots. 3 per pot at 1cm depth.
Germination	3 - 4 weeks
Percentage	
Pricking out	
Shade and watering	
Growth time	12 months before rootstock is ready for grafting at a height of 45cm. Select best rootstock. Discard the rest.
Other notes:	Essential to control weeds. Regularly prune off side branches.

4. Pests and diseases:

Sensitive to rootrot. Good drainage essential.

5. Planting:

Soils	Sandy loam. Slightly acid reaction.
Method and spacement	9-12m spacing. A planting hole of 40 X 40 X 40cm.
Fertilizers and insecticides	4 kg of well-rotted manure per hole when planting. Then 150g of NPK/tree X 5 times/yr = 750g/tree/yr.

6. Aftercare:

Prune low branches and all suckers from rootstock.

Growth and yields

7. Other notes:

Advisable to obtain rootstock and budded seedlings from agricultural extension services or from areas with expertise such as Janaale or Italian farms.

Tree details

1. Names: Qumbe *Cocos nucifera*

Arabic	Bondog
English	Coconut
Species	Cocos nucifera. Linn.
Family	Palmae
Synonyms	

2. Natural distribution:

South-east Asia. Western Pacific and Indian Ocean Islands. Intorduced to Africa 1000's of years ago.

3. Where found in Somalia:

Coastal settlements. River banks, eg. Koryoli, Janaale, Jiliib - lower end of rivers. Kismayo town has many coconut trees growing on its sandy streets.

4. Climate requirements:

Rainfall (mm/yr)	1000-2500
Temperature(°C)	20-27- (27-32)
Altitude (m)	0-500
Groundwater	High, fresh water needed if rainfall is low.

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder		Fruit	**
Charcoal		Livestock shade	(*)	Edible leaves	
Poles	*	Intercropping	(*)	Honey	
Toolhandles		Nitrogen fixation		People shade	**
Carving	*	Shelterbelt		Amenity	*
Timber		Hedge		Medicine	*
Insecticide		Soil improvement		Gums (Edible)	
Sandune fixation	*	Tannins			

Leaves supply material for roofing, mats, fencing and fish traps. Fibre from husks used in rope and net making. Ribs of the leaves can be used as brooms. Copra can be eaten or crushed to make coconut oil which can be used for making candles, soap, margarine, cooking oil, illumination, lubrication. Shells of nut used as fuelwood or bottles, cups, ladles.

6. Recommendations and notes:

As 12-14 leaves are shed each year the age of the tree can be estimated by counting the leaf scars on the trunk and dividing by 13. Each leaf takes about one month to develop. The fruit colour changes from green to yellow to brown as it ripens. Inside the fruit the nut develops a brown hairy covering. Inside that the coconut liquid slowly solidifies into a white solid called copra. Its propagation south from Kismayo, along the seashore, could be encouraged.

7. References: Anon., Purseglove, Teel.

Tree description

1. Summary:

Evergreen unarmed single trunked palm tree. Flowers and fruits continually, starting after 6-10 yrs old. Monoecious: Male and female flowers are separate but on the same tree.

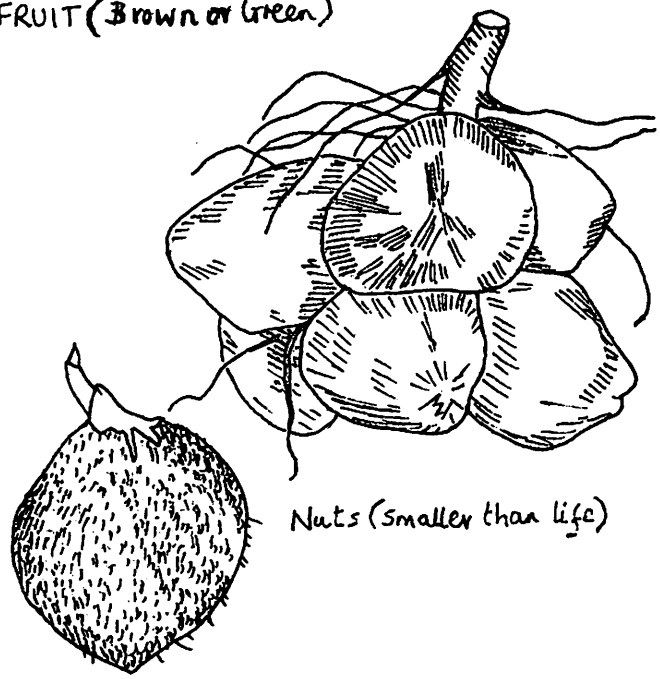
2. Detailed:

TREE SHAPE	Crown is 20-25 large leaves produced from a single terminal bud.	
Height	20-25	
Trunk and Bark:	Unbranched single stem. Uniform thickness except bulbous base. 25 cm.d. Usually somewhat curved with whole tree leaning. Columnar. Bark is ridged at scars of old leaves. Smooth.	Colour: Light grey-brown
Branches		Colour:
FOLIAGE	No branches, twigs or thorns	
Twigs		Colour:
Thorns		
Size		Colour:
LEAF	Parapinnate. Large. Radiating arrangement. Feather-like.	
Size	Up to 6m long	Colour: Green
Leaflet	200-250 per pinnae. Thick cuticle.Narrowly linear lanceolate	
Size	50-120 X 1.5-5cm	
FLOWERS	M-small; F-larger. Inflorescence is 1-2m long (Male outside, female inside).	
Size	M. 0.7-1.3X0.6cm F. -2.5cm length	Colour: M-pale yellow, F-white
FRUIT	Ovoid fibrous drupe with nut inside.	
Size	20-30cm long (1.2-2kg wt.)	Colour:Green-yellow-grey-brown
SEED	Nut. (0.5-1 kg.wt.)	
Size	10-15cm diameter	Colour: Brown and hairy
ROOTS	Many long unbranched (white-red/brown coloured) roots to 4-5m depth and 6-7m lateral growth (8-10mm diameter)	
WOOD	Water resistent.	Colour:
	If trunk is damaged wounds cannot be repaired due to absence of cambium.	
Flower	Inflorescence of 1-2m long bears 200-300 small yellow male flowers on its outside and 20-40 larger white female flowers on its inside.	

SOMALI NAME: QUMBE

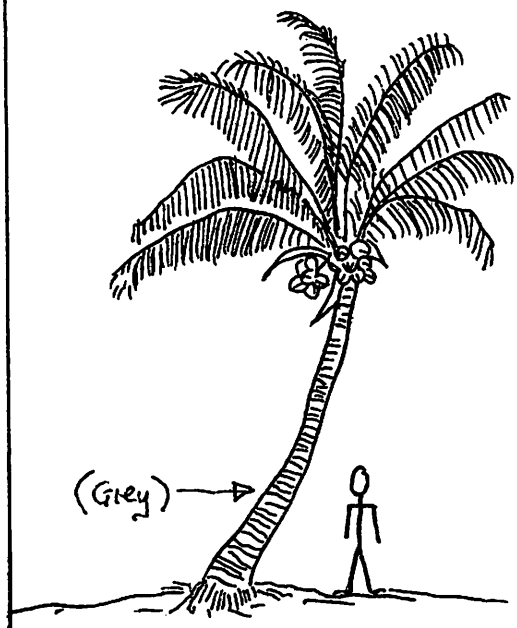
LATIN NAME: COCOS NUCIFERA

FRUIT (Brown or Green)



Nuts (smaller than life)

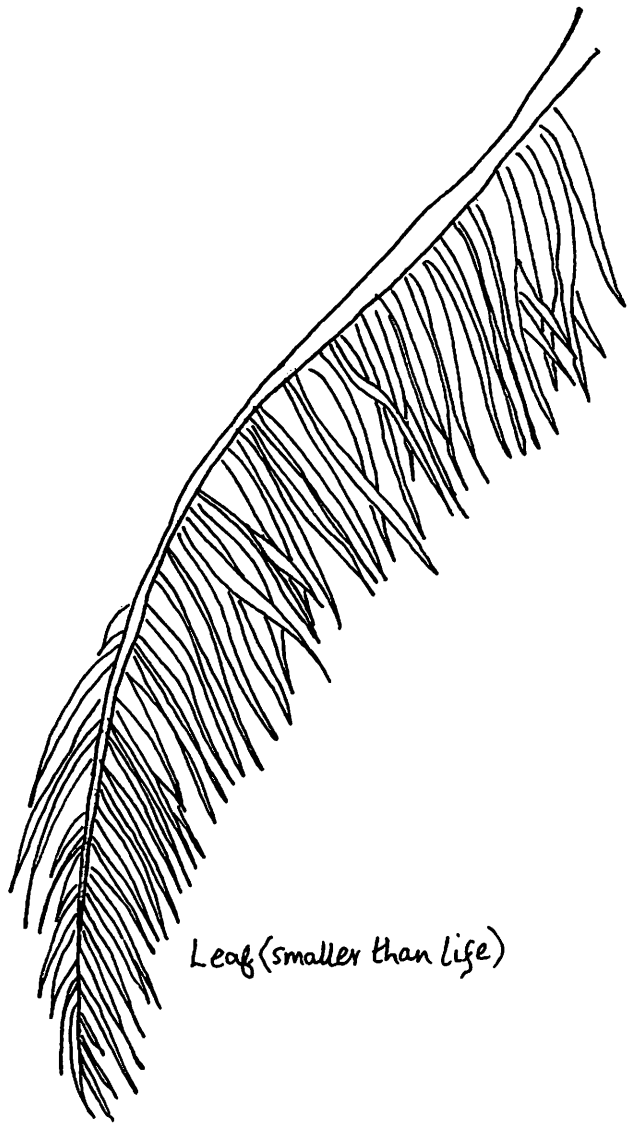
TREE SHAPE



FLOWER

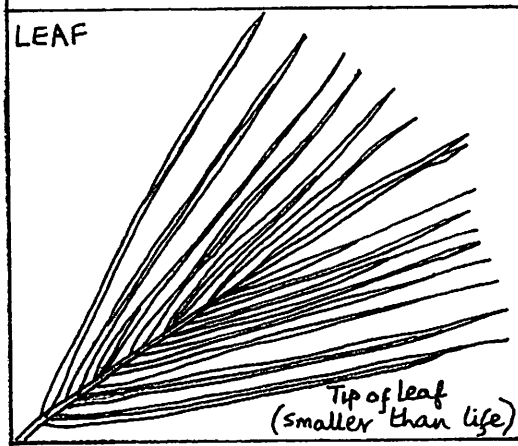
Flowers (smaller than life)

FOLIAGE



Leaf (smaller than life)

LEAF



Tip of leaf (smaller than life)

SEED

Seed (smaller than life)

Tree growing

Names: Qumbe *Cocos nucifera*

1. Methods of propagation:

From seed. Marcotting also possible. Bare rooted or potted stock.

2. Seed:

Number/kilogram	1-2 nuts (1 fruit)
Collection	From tree or ground under it
Extraction	Not necessary. Leave nut in fruit
Storage	Up to 2 yrs in cool, dry, well ventilated store
Pretreatment	Store for 3-4 weeks, soak for 1-2 weeks in water, slice off section of shell at bottom of nut (exocarp and mesocarp)

3. Nursery:

Soil mixture	Moist sandy soil for germination. Sandy loamy well drained soil for propagation.
Potsize	Sow each germinated fruit horizontally with largest face uppermost ('eye' downwards).
Sowing	30cm intervals along a trench at 15cm depth. Top 5-8cm exposed
Germination Percentage	8-16 weeks
Pricking out	Transfer to seedbeds once fruits have germinated when first
Shade and watering	leaf is 15cm high. No shade necessary.
Growth time	1.5-4 years at 60-80cm height-transfer to outplanting
	Regular weeding necessary
Other notes	Seedbeds should be raised 25cm above surrounding ground. Mulch is added to top of bed to cover exposed nuts.

4. Pests and diseases:

Any weak, light green, leggy seedlings should be rejected. Only plant best stock. Many pests and diseases.

5. Planting:

Soils	Deep and well drained, eg. Sands. High fertility also desirable, pH 5-8, ideally 7.5. Extremely salt tolerant, clay soils tolerated.
Method and spacement	Careful lifting of seedlings from nursery is essential. 9-12m spacing (80-150 trees/ha). Planting holes of 90cm X 90cm required. Shading of seedlings advantageous.
Fertilizers and insecticides	Half fill planting hole with topsoil enriched with organic matter, NPK, especially potash.

6. Aftercare:

2m radius should be kept weed free/tree. Exclude livestock and sow a leguminous cover crop between trees to bind and enrich the soil until 4-6 yrs old. Alternatively food crops could be grown between the young trees.

Growth and yields	Stops fruiting after 70 years (40 yrs for dwarf trees) Dies after 80-100 years. Fruits after 6-10 years old. Fruits take 12 months to mature. Productivity drops significantly if dry conditions continue longer than 3 months.

7. Other notes:

A 1-year old seedling has 8-10 leaves.

Tree details

1. Names: Cambe *Mangifera indica*

Arabic	Mango
English	Mango
Species	Mangifera indica.L.
Family	Anacardiaceae
Synonyms	

2. Natural distribution:

Burma, India, Malaysia. Introduced to Africa hundreds of years ago.

3. Where found in Somalia:

The most popular tree for cultivation on irrigated sites along the Shabelle and Juba rivers.

4. Climate requirements: Needs a marked dry season. Drought tolerant.

Rainfall (mm/yr)	(400) 700 -
Temperature(°C)	18-27
Altitude (m)	0-1300 (below 600)
Groundwater	Necessary if no irrigation. (1.8-2.5m below the surface)

5. Uses: (In other countries and/or Somalia)

Fuel	*	Fodder	*	Fruit	**
Charcoal	*	Livestock shade		Edible leaves	*
Poles	*	Intercropping		Honey	*
Toolhandles		Nitrogen fixation		People shade	**
Carving	*	Shelterbelt		Amenity	**
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement		Gums (Edible)	
Sandune fixation		Tannins	*		

Fruit can be eaten uncooked and also made into chutney or pickle, sauce or beverages. Young leaves are emergency fodder (older leaves are toxic). Fruit contains Vitamin C and Vitamin A. Seeds can be ground into flour.

6. Recommendations and notes:

Fruits heavily every second year. 20 fruits/tree at 5 yrs old, 500 at 10 yrs old, 1000 at 15 yrs old and 1500 at 20 yrs old

7. References: Anon., Maydel von, McCann, SEPESAL, Teel, Williams *et al.*

Tree description

1. Summary:

Large unarmed evergreen tree. After 5 yrs starts flowering, towards end of dry season, heavily every second year. Fruit takes 2-5 months to ripen.

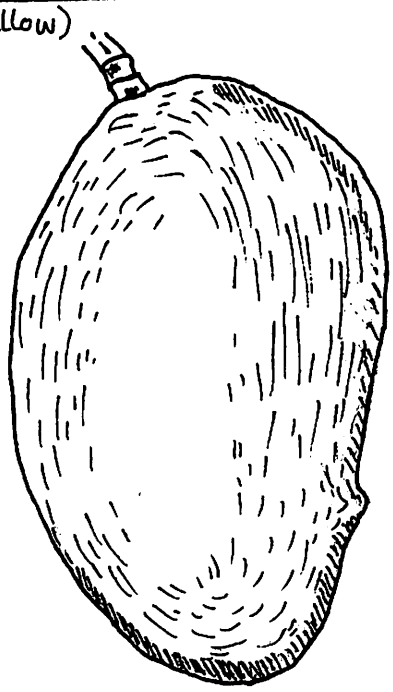
2. Detailed:

TREE SHAPE	Dense and rounded large crown.	
Height	5-25m (Rarely higher than 10m in Sahel).	
Trunk and Bark	Up to 1m.d. Usually less than 3m high. Rough and fissured,thick cork-like. Peels off in patches.	Colour: Dark brown.
Branches	Heavy and spreading	Colour: Dark brown.
FOLIAGE		
Twigs		Colour:
Thorns		
Size		Colour:
LEAF	Stiff, shiny, alternate spear shaped, leathery. Grouped at end of branches.	
Size	12-30 X 3-9cm	Colour: Red, when young. Dark green, when old.
Leaflet Size		
FLOWERS	4-5 petals/flower. Bunches at end of branches. Fragrant. Axillary panicle (20cm long)	
Size	Small: 3mm wide.	Colour: Red-pink-white (yellow)
FRUIT	Oval-rounded,fleshy drupe surrounding a single stone.	
Size	5-25 X 5-10cm	Colour: Green-yellow
SEED	Inside stone	
Size		Colour:
ROOTS	Strong deeply penetrating taproot. Dense network of smaller roots near soil surface. Up to 8m depth of taproot.	
WOOD	Not very durable. Soft.	Colour: Light yellow.

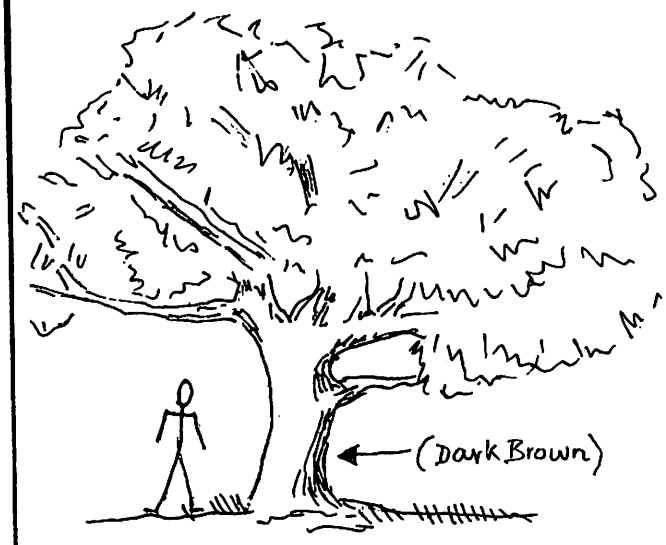
SOMALI NAME: CAMBE

LATIN NAME: MANGIFERA INDICA

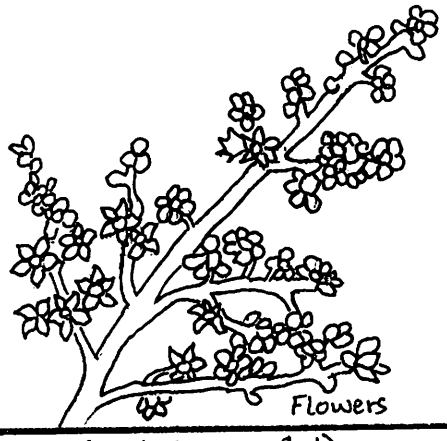
FRUIT (Green - Yellow)



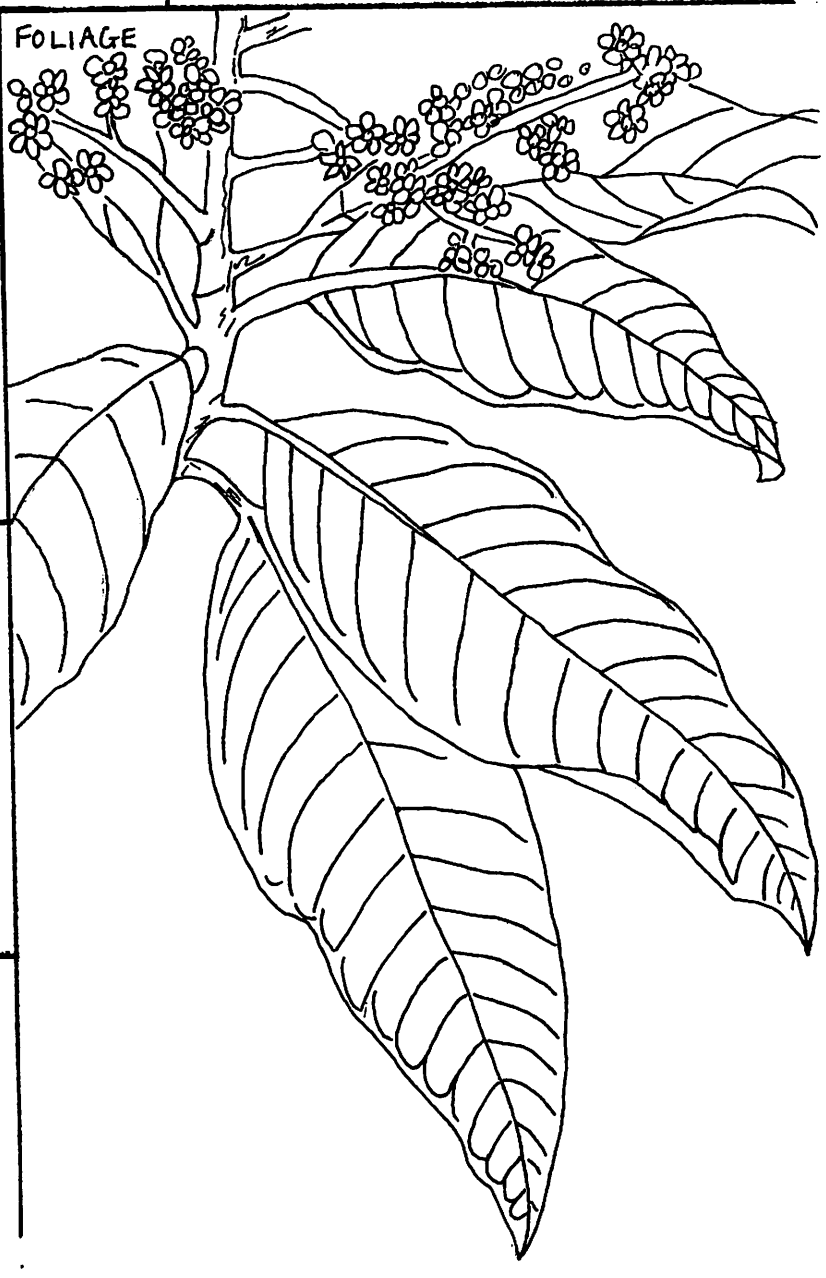
TREE SHAPE



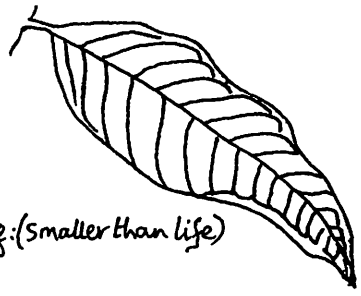
FLOWER (Red - Pink - White)



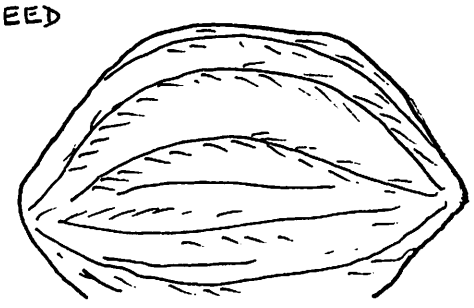
FOLIAGE



LEAF (Dark Green or Red)



SEED



Tree growing

Names: Cambe *Mangifera indica*

1. Methods of propagation:

Budding or grafting. Can be grown from seed but this is inferior.

2. Seed:

Number/kilogram	55
Collection	
Extraction	Eat fruit pulp or macerate in water
Storage	Only one month.(3 months in moist charcoal)
Pretreatment:	Crack stone. You can carefully remove seed from fruit.

3. Nursery:

Soil mixture	Moist soil
Potsize	Large
Sowing	2cm depth with concave edge down
Germination	3 weeks
Percentage	80 (60-90)
Pricking out	
Shade and watering	
Growth time	15cm tall after 6-8 weeks. 6-9 months when planted out.

Other notes

4. Pests and diseases:

Anthracnose (fungus rot). Fruit flies. Careful pruning required to remove infected parts of trees.

5. Planting:

Soils	Light, deep, sandy well drained. Loamy. Around neutral. Rich in organic matter, but with a low concentration of salts.
Method and spacement	12 X 12m espacement
Fertilizers and insecticides	Much fertiliser needed in first 5 years.

6. Aftercare:

Pruning should be done to remove dead or diseased growth.

Growth and yields	Lifespan: 100's of years. Fast growing. 40 year rotation recommended.

7. Other notes:

Tree details

1. Names: Seytuun *Psidium guajava*

Arabic	Guwafa
English	Guava
Species	Psidium guajava
Family	Myrtaceae
Synonyms	

2. Natural distribution:

Tropical America, Brazil and widely introduced to other tropical countries.

3. Where found in Somalia:

Arabsyo, Jalaalaxi, Jiliib, Koryoli, Brava. Often grown in Mogadishu compounds and gardens. Often grown around houses in riverine villages.

4. Climate requirements: Tolerates long drought (7 months).

Rainfall (mm/yr)	1000-3000
Temperature(°C)	20-35 Not frost tolerant
Altitude (m)	0-1500
Groundwater	Survives flooding and waterlogging

5. Uses: (In other countries and/or Somalia)

Fuel	**	Fodder		Fruit	**
Charcoal	*	Livestock shade		Edible leaves	
Poles	*	Intercropping		Honey	
Toolhandles	*	Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	*
Insecticide		Soil improvement		Dye	*
Sandune fixation		Tannins	*		

Fruit is Vitamin C source. Edible uncooked. Can be made into jams, jellies and juices. Leaves used to cure diarrhoea. Fruits also source of Vitamin A and rich in calcium, iron and phosphorous.

6. Recommendations and notes:

Flowers after one year, then continuously. Fruit takes 2-5 months to mature. Requires irrigation. Fruit should be picked when it begins to soften. Can be grown around houses and receive supplementary waste water irrigation. This tree was requested by villagers around Afgooye more than any other (even Cambe). It can grow, if irrigated, in northern areas and is not restricted to the riverbanks. Seytuun is probably the best foreign fruit tree for extension because it is hardy, drought tolerant, fast growing and produces very nutritious fruits within 4 years of planting.

7. References: Anon., Little, Purseglove, Teel.

Tree description

1. Summary:

Unarmed evergreen small tree. Hardy. Dull green leaves with many sunken parallel side veins. Flowers and fruits almost all year.

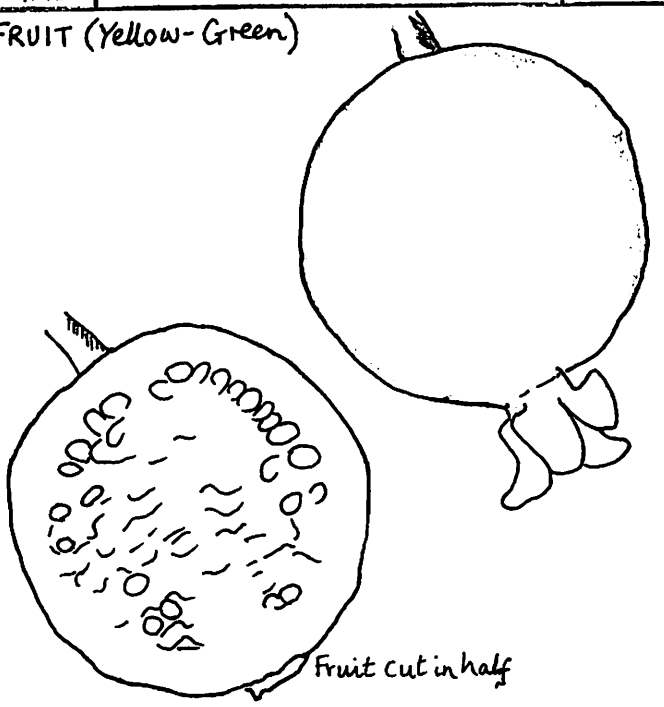
2. Detailed:

Branches carry two opposite rows of oval leaves. Sometimes paired.

TREE SHAPE	Branching close to ground. Irregular, rather open broad spreading crown.	
Height	3-10m (Little bole development)	
Trunk and	Less than 20cm.d.Thin trunk. Often producing root suckers.	
Bark	Smooth, peeling in thin translucent sheets exposing greenish brown inner bark.	Colour: Pale-dark brown-green
Branches	Crooked	Colour:
FOLIAGE		
Twigs	Bark peeling in thin flakes. Twigs are 4-angled, hairy green, becoming brown.	
Thorns		Colour: Light reddish-brown
Size		Colour:
LEAF	Oblong or elliptical, glabrous above, finely pubescent below.	
Size	5-15 X 3-7cm	Colour: Green-yellow (dull green)
Leaflet	Sunken parallel side veins	
Size		
FLOWERS	Fragrant. Axillary. Petals 4-5. Mostly single and large.	
Size	2.5-3cm(Petals:1-2cm.l.)	Colour: White
FRUIT	Berry, shiny, globose to ovoid. Fruits produced at branch ends.	
Size	5-12 X 3-5cm.	Colour: Pale green skin
SEED	Embedded in pulp. Eliptical.	
Size	3-5mm	Colour: Yellowish
ROOTS	Often producing suckers at base of tree. Shallow rooted.	
WOOD	Moderately hard (Sp.gr = 0.8) and strong.	
		Colour: Sapwood is light brown. Heartwood is brown/red.

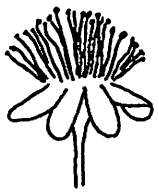
SOMALI NAME	SEYTUUN	LATIN NAME	PSIDIUM GUAJAVA

FRUIT (Yellow-Green)

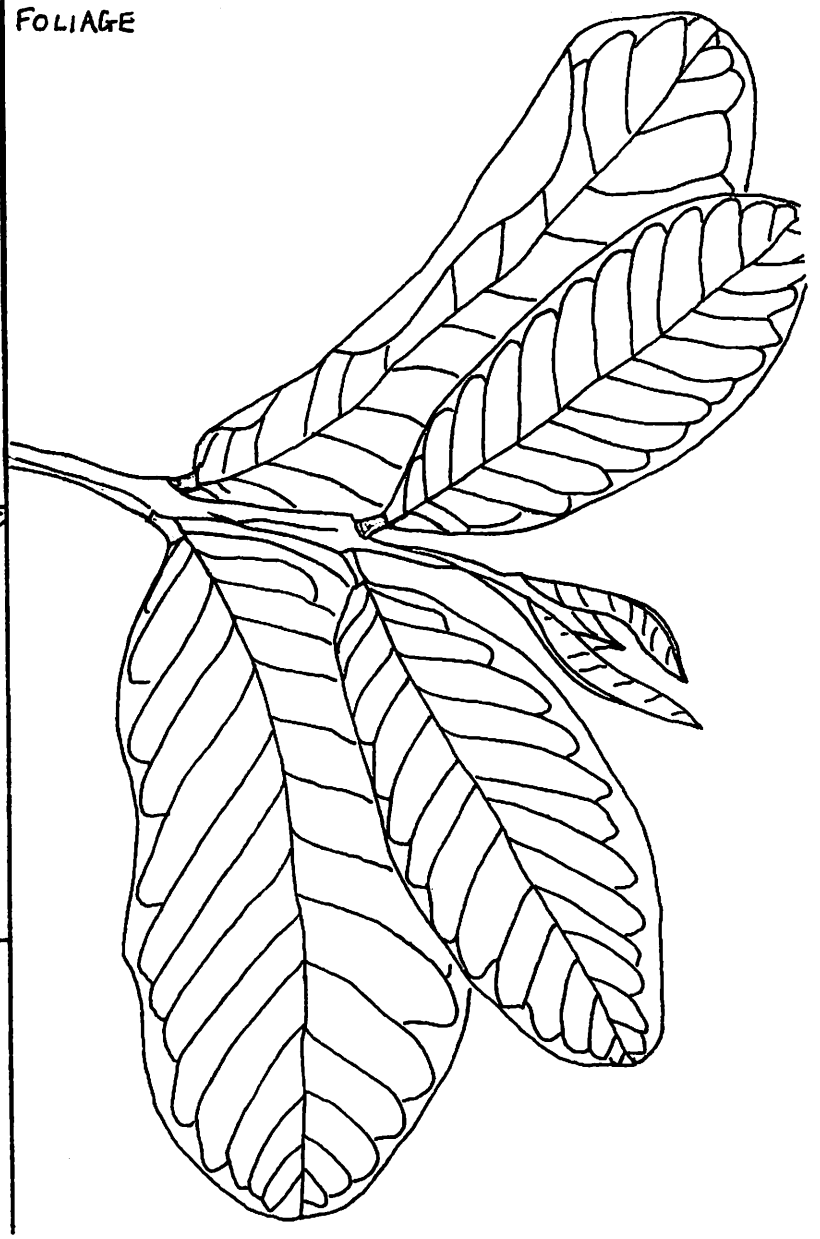


TREE SHAPE

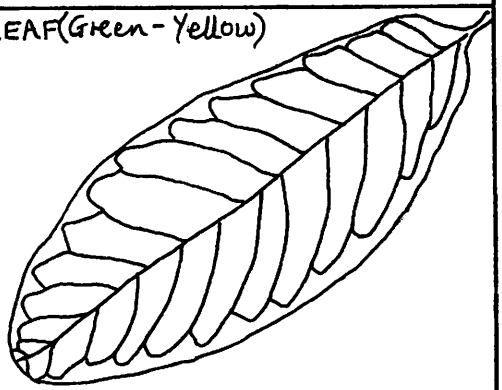
FLOWER (White)



FOLIAGE



LEAF(Green-Yellow)



SEED (Yellow)

Tree growing

Names: Seytuun *Psidium guajava*

1. Methods of propagation:

Can be produced from seed with good results. Vegetative propagation of clones is to be highly recommended, eg. bud grafting, marcotting and cuttings.

2. Seed:

Number/kilogram	
Collection	From large fruits
Extraction	(Eat fruit) or macerate pulp in water. Must be air dried.
Storage	Up to one year if kept cool and dry.
Pretreatment	Treat seeds with fungicide. No pretreatment needed.

3. Nursery:

Soil mixture	Sandy loam soil
Potsize	
Sowing	1cm depth in seedbed
Germination	3 weeks (2 weeks)
Percentage	
Pricking out	Into pots when 3cm high
Shade and watering	
Growth time	At 30cm height ready to transplant.5-7 months(- 12months)
Other notes	Tolerates root pruning well. Best sow direct into pots to avoid rootshock of transplanting.

4. Pests and diseases:

Fungus, Alga. Fruit flies. Insects. Nematodes - control by fungicides, insecticides, removing and burning infected parts.

5. Planting:

Soils	Tolerates poor acid soils. pH 4.5-8.2 tolerated.
Method and spacement	7m spacing. Tolerates shading or open sunlight. No later thinning necessary.
Fertilizers and insecticides	Generally 150g/tree of NPK, 3-4 times in 1st year. 220g in 2nd yr and 450g in 3rd year.

6. Aftercare:

Prune interior branches, especially vertical ones. Also prune away suckers and low-lying branches, especially if seedling vegetatively propagated. Irrigation required.

Growth and yields	30 years of fruiting. Begins to fruit at 4 years of age. Full bearing after 8 years.

7. Other notes:

Mature trees in a plantation should receive 150-200kg of nitrogen/ha split into 3-5 doses over the year.

Tree details

1. Names: Beydaan *Terminalia catappa*

Arabic	Luze
English	Indian almond, Sea almond, West Indian almond
Species	Terminalia catappa. Linn.
Family	Combretaceae
Synonyms	

2. Natural distribution:

Malaysia and the Andaman Islands. Introduced to India and other tropical and subtropical countries. (Especially coastal areas).

3. Where found in Somalia:

Genaale, there are some enormous trees. Often seen in Mogadishu compound gardens. Survives in Brava town proving its salt tolerance.

4. Climate requirements: Drought tolerant. Prefers humid conditions.

Rainfall (mm/yr)	1000 -
Temperature(°C)	25
Altitude (m)	0-300
Groundwater	Necessary if no irrigation available.

5. Uses: (In other countries and/or Somalia)

Fuel	**	Fodder		Fruit	**
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	**
Carving	*	Shelterbelt		Amenity	**
Timber	*	Hedge		Medicine	*
Insecticide		Soil improvement		Dyes (Black)	*
Sandune fixation	*	Tannins	*		

Fruits and nuts edible raw. Nuts can also be eaten roasted. Nut can be crushed to produce an oil. Not suitable for fodder.

6. Recommendations and notes:

The fruits take 5-6 months to ripen. The nut is slightly sour. Grows well close to the sea because it tolerates salt spray.

An ideal shade tree for coastal towns and villages. Would need supplementary watering when young.

7. References: Anon., Little, NAS, SEPESAL.

Tree description

1. Summary:

Large (briefly deciduous) unarmed tree, flowering almost continually. Strong smelling. Monoeicious. Distinctive whorled open branching pattern, giving heavy shade. Very large leaves.

2. Detailed:

Branches spread widely at right angles to the trunk.

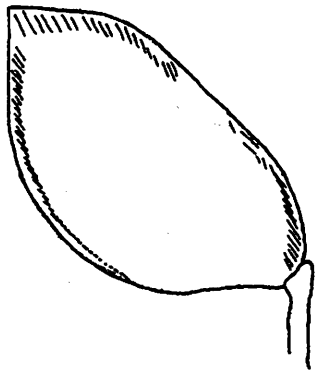
TREE SHAPE	Flattened, wide, tiered, pyramidal. Open but casting shade!	
Height	10-15 (Up to 25m)	
Trunk and	Slightly buttressed. 30cm.d. 1.5-2m height. Short and crooked.	
Bark	Rough with longitudinal fissures. Smooth higher up.	Colour: Grey-brown Inner bark: Pink-brown
Branches	Distinctive branch pattern of widely spaced whorls of branches spaced up the trunk	Colour:
FOLIAGE		
Twigs	Short, stout, pubescent	Colour: Brown
Thorns		
Size		Colour:
LEAF	Alternate, clustered close together. Obovate, not serrated, rough and leathery.	
Size	Large: 15-28 X 9-15cm	Colour: Often red. Green when young.
Leaflet	Upper surface of leaf is shiny green and glabrous.	
Size	Lower surface of leaf is pale green-brown and pubescent.	
FLOWERS	Slender racemes. Many small, mostly male: 5-6mm.d.	
Size	Racemes: 5-15cm.l. Flowers:5-6mm	Colour: White-green
FRUIT	Fleshy,indehiscent with narrowly winged edges. Drupes. Compressed - elipsoid	
Size	5-6 X 2.5-5cm	Colour: Yellow-green-light brown.
SEED	Nut: Oily, edible. One/fruit. Thick and hard.	
Size	3 X 1cm	Colour: Light brown
ROOTS		
WOOD	Hard and moderately heavy. Specific gravity: 0.59 Machining is difficult. Suitable for furniture, veneer and cabinet work. Not termite resistant. Irregular, often interlocking grain.	Colour: Heartwood: Red-brown Sapwood: Greyish

Other notes:

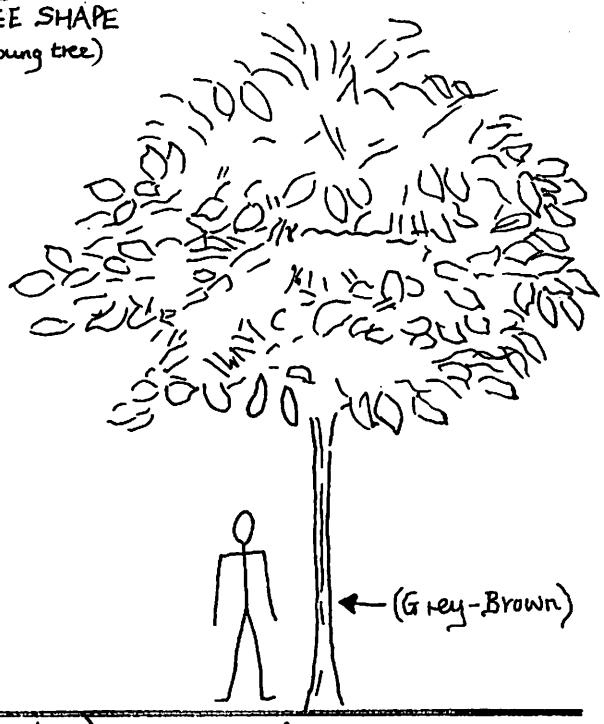
2 distinct glands near leaf base. Fruit has a thick fibrous husk.

SOMALI NAME	BEYDAAN	LATIN NAME	TERMINALIA CATAPPA

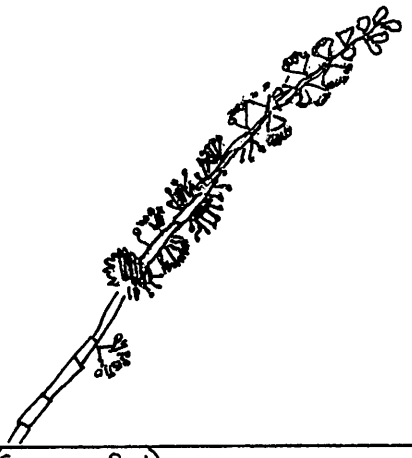
FRUIT (Yellow - Green - Brown)



TREE SHAPE
(Young tree)



FLOWER (White-Green)



LEAF (Green or Red)

(Smaller than life)

SEED (Light Brown)

FOLIAGE

Tree growing

Names: Beydaan *Terminalia catappa*

1. Methods of propagation:

2. Seed:

Number/kilogram	150-860
Collection	From ground beneath mother tree
Extraction	Not necessary though if nut is removed better germination results
Storage	Up to 6 months
Pretreatment	None. Removal of seed hull is advantageous but not essential.

3. Nursery:

Soil mixture	
Potsize	
Sowing	
Germination	3-5 months
Percentage	30-70
Pricking out	
Shade and watering	
Growth time	3-5 months at 20-25cm height.

Other notes

4. Pests and diseases:

Beetles and grasshoppers eat young leaves. Termites attack wood.

5. Planting:

Soils	Sandy. Tolerates a wide range of soils. Tolerates salinity
Method and spacement	
Fertilizers and insecticides	

6. Aftercare:

Growth and yields	10-15 year rotation. Firewood yields of 22-36 tonnes/ha have been obtained from 10 year old plantations in other countries.

7. Other notes:

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Chapter 4. Appendix

5.1 Methods of propagation of fruit trees

(i) *Anacardium occidentale*

Air layering: When the cashew tree is flowering, select a non-flowering branch.

Make a ring cut in the branch 3-6mm wide and 15-25cm from the tip. Around this cut place a mixture of wood chips and shavings and hold them there with a plastic wrap. The wood chips must be moist. Leave this on the tree about 45 days. By then roots will have formed. Moisten the wood chips again and then cut the branch half way through below the plastic wrap. Deepen the cut one week later. After 45 days the rooted sapling can be planted where desired. If planted direct in the dry season, it will require watering until the rains begin.

(ii) *Carica papaya*

Crossing a heavy bearing female tree with a superior hermaphrodite gives a high proportion of seeds which will produce female trees - which is desirable in planting up a field.

Pollen is collected from hermaphrodite flowers and stored in clean cotton plugged test-tubes in a desiccator. Pollen release takes place on sunny days from about the mid-morning. Female flowers should be enclosed in grease-proof paper bags fixed with pins prior to and for 10 days after the petals are removed and pollen has been dusted on the stigmas. Parent trees which are known to produce good seeds should be clearly marked and kept for seed production.

After outplanting the purely female trees can be recognised by the absence of male flowers before 3 months in the Tropics, at this time the best-looking female tree is left and others are cut back.

(iii) *Citrus aurantifolia*

Marcottage and cuttings

These are recommended for limes. A marcott is made by tying earth around a suitable branch shoot. Sometimes the bark is also ringed at this point. A strip of polythene should be used to tie the soil to the branch. These operations encourage roots to grow from the branch into the ball of soil and after a variable period the branch, together with the ball of soil and roots, is cut off and planted.

Producing cuttings is faster. The shoots cut should be firm (not too green and soft) but not too old and hard either. They may be pruned of leaves, treated with rooting hormones and planted in polythene bags of size about 20x30cm, filled with well-drained soil. The cuttings should be given light overhead shade (about 50%) and watered regularly until they have rooted.

(iv) *Citrus Spp*

Budgrafting

A rootstock is buddable when it has a diameter of 8mm (pencil size) at 20cm above the ground. Budwood is taken from healthy trees, from the lower outside branches, as there the juvenile properties are least seen. The bud must be round and brown, not angular and green. The bud is inserted and wrapped so that no water can penetrate, but the eye is left free. Two weeks later the plent is inspected, if the bud is green, it has survived.

T-Patch Budding

The section of bud is taken from a high fruit yielding tree and is inserted into the rootstock (grown from seed taken from a rootstock such as 'sour orange' or 'rough lemon').

When the grafted bud starts to grow out it can be forced into strong upright growth by lopping the rootstock. Just above the bud, cut the stem through and bend it back.

Two months later, when the shoot is hardened, the upper part of the rootstock is completely trimmed away leaving only bud growth.

The seedling is allowed to grow to 50-70cm height in pots, during which time any shoots coming from rootstock must be trimmed. The leader shoot is pinched out to encourage 3-6 strong side shoots to develop. Seedlings must be planted in the field as soon as the side shoots are growing strongly.

(v) *Mangifera indica*

The most common method of reproduction in Kenya is by budding or grafting. This method will ensure a harvest within 4 to 5 years. Some varieties are polyembryonic in that a single seed produces multiple shoots. Most of these shoots are vegetative, carrying the same traits as the mother tree. One shoot, normally less vigorous, is produced sexually and should be removed, for it may be less productive than its parents. Extra vegetative shoots can be either removed or transplanted to different pots after attaining 15cm in height. One can grow a tree from seed in this style and get a good quality tree, the drawback being a longer wait for fruit production to start.

Grafting normally takes place after one year. The tree may flower in the next but it is recommended that all flowers be removed from the first to third year after grafting and transplanting, so that the tree develops better.

(vi) *Psidium guajava*

Root suckers may also be used for planting; more suckers develop when the roots are cut about 60-90cm around the trunk. In the bud grafting method, seedlings and budwood should be 10-20mm in diameter, budwood is prepared by removing leaves and branches 10-15days before bud grafting to allow the buds to enlarge. Buds from selected trees are grafted on seedling rootstocks.

One of the difficulties of budded and grafted guavas is the production of water shoots and suckers from the rootstocks.

4.2 Pages for photocopying

The last two pages of this folder are for the user to photocopy, if he or she so wishes, to fill in details of tree species not covered in this text.

Tree details

1. Names:

Arabic
English
Species
Family
Synonyms

2. Natural distribution:

3. Where found in Somalia:

4. Climate requirements:

Rainfall (mm/yr)
Temperature(°C)
Altitude (m)
Groundwater

5. Uses (In other countries and/or Somalia)

Fuel		Fodder		Fruit	
Charcoal		Livestock shade		Edible leaves	
Poles		Intercropping		Honey	
Toolhandles		Nitrogen fixation		People shade	
Carving		Shelterbelt		Amenity	
Timber		Hedge		Medicine	
Insecticide		Soil improvement			
Sandune fixation		Tannins			

6. Recommendations and notes:

7. References:

Tree description

1. Summary:

2. Detailed:

TREE SHAPE

Height

Trunk and Bark (Colour:)

Branches (Colour:)

FOLIAGE

Twigs (Colour:)

Thorns

Size (Colour:)

LEAF

Size (Colour:)

Leaflet Size

FLOWERS

Size (Colour:)

FRUIT

Size (Colour:)

SEED

Size (Colour:)

ROOTS

WOOD (Colour:)

Tree growing

Names:

1. Methods of propagation:

2. Seed:

Number/kilogram
Collection
Extraction
Storage
Pretreatment

3. Nursery:

Soil mixture
Potsize
Sowing
Germination
Percentage
Pricking out
Shade and watering
Growth time

Other notes

4. Pests and diseases:

5. Planting:

Soils

Method and
spacement

Fertilizers and
insecticides

6. Aftercare:

Growth and
yields

7. Other notes:

The most comprehensive reference work to date on the useful tree species of Somalia, this extensively illustrated manual provides detailed information about the 44 most useful woody tree varieties common to Somalia. Designed as a basic reference tool for use by forestry extension workers, it includes botanical data, local names, uses, and notes on cultivation. The information contained in this fieldguide will also be of use to forestry workers in countries neighbouring Somalia.

Desmond Mahony is a forestry specialist with several years of experience in forest and range management in Somalia.

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The Henry Doubleday Research Association is a UK registered charity. It conducts research into ecologically sound and sustainable horticulture, agriculture and forestry, both in the UK and overseas. A major aspect of its current overseas work is coordinating a programme to select, evaluate and propagate species for integration into sustainable agriculture and forestry systems in arid and semi-arid areas, as a contribution towards the long-term solutions to desertification.

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