

# **TREES OF SOMALIA**

**A Field Guide for Development Workers**

**Desmond Mahony**

**Oxfam Research Paper 3**

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Workers**

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

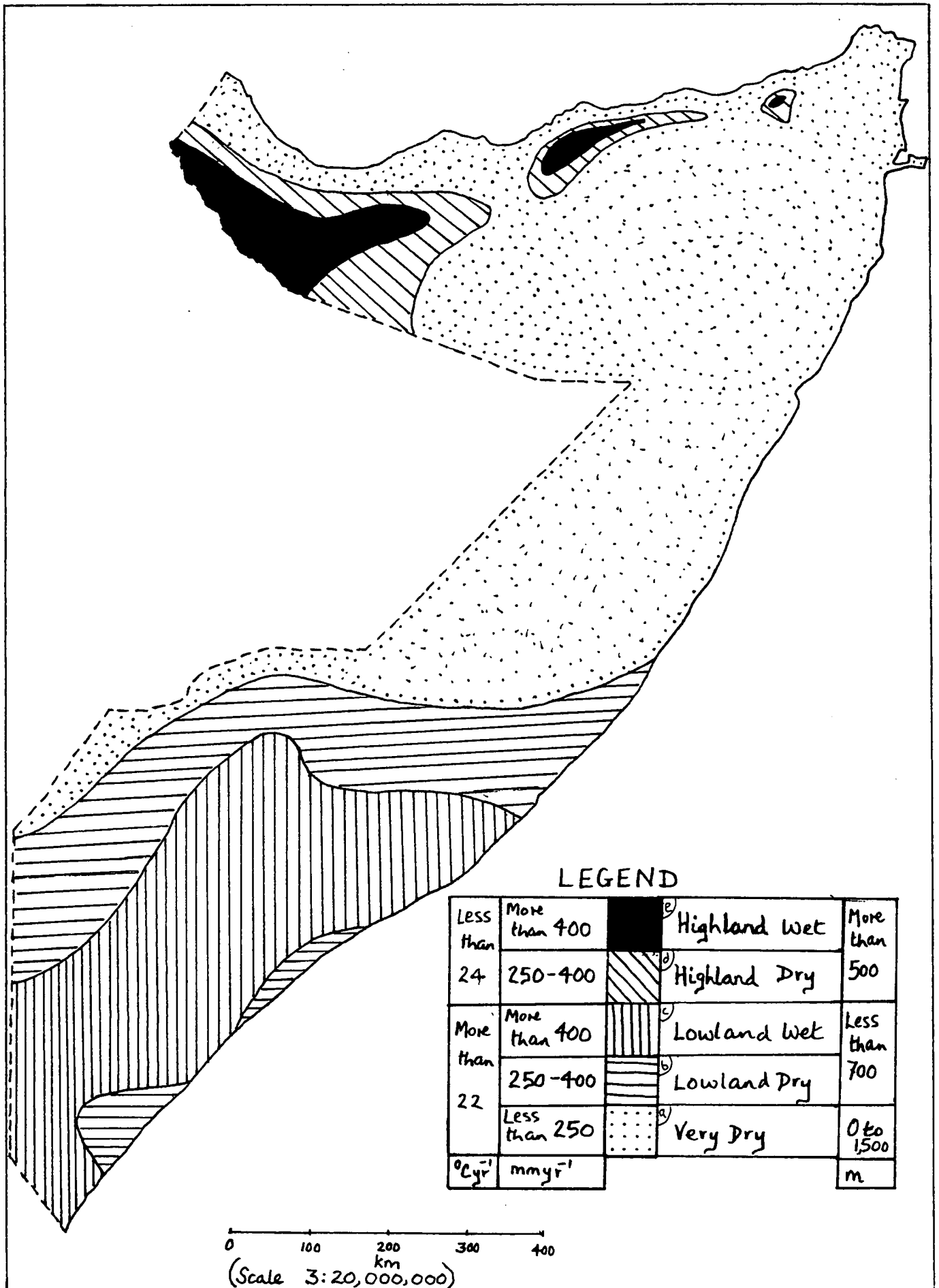
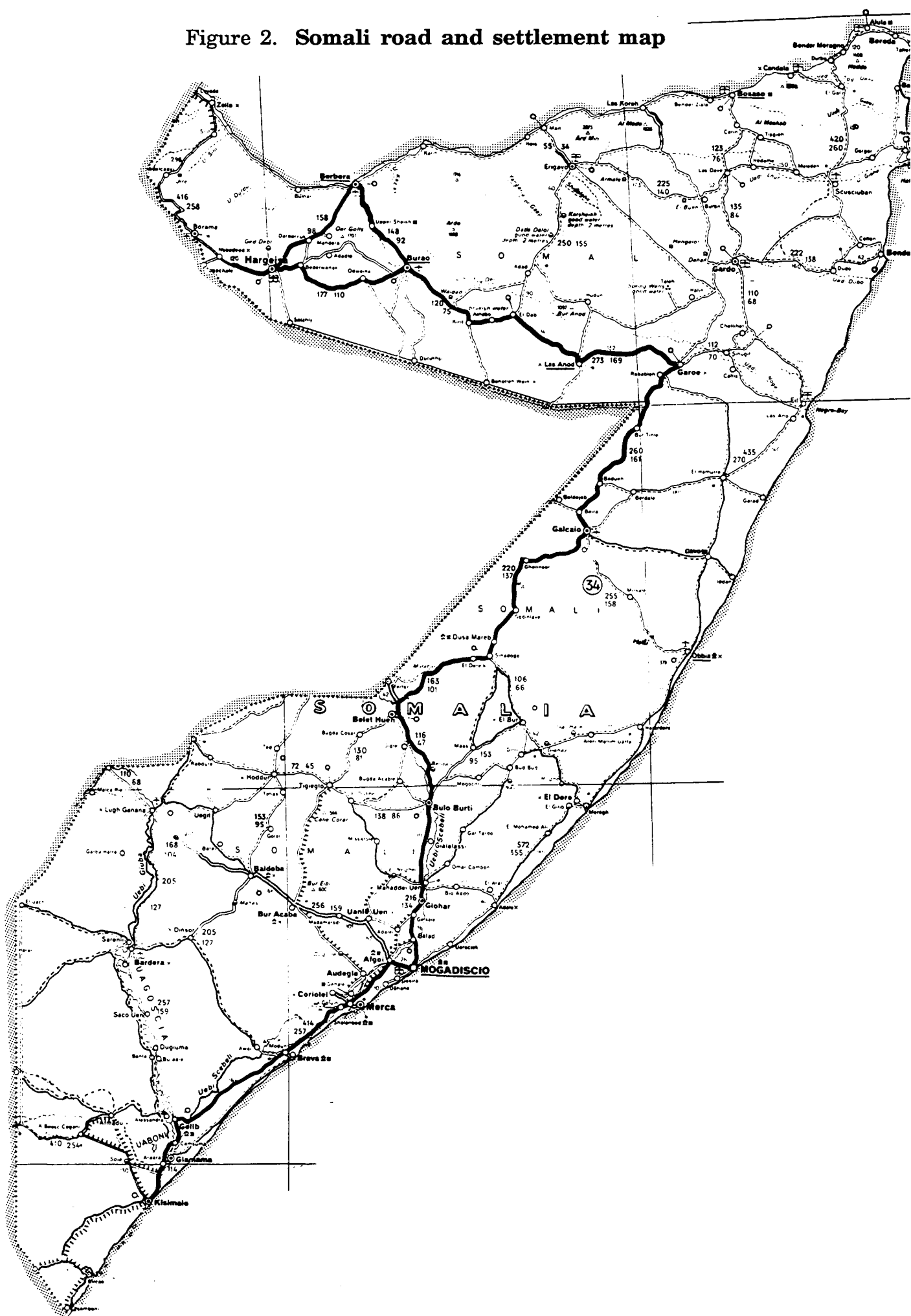


Figure 2. Somali road and settlement map



# 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.

Note to the second edition:

We have used standard Somali spelling with regard to the majority of tree names, but have adhered to English spelling for place names, as these are more familiar to expatriates.





# Chapter 1.

## Names, climate zones and uses

### 1.1 Tree names

Much confusion occurs over the names of trees in Somalia amongst expatriates due to problems with translation. 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            |
|---------------------------------|--------------|----------------|--------------------|
| <b>A. Somali trees</b>          |              |                |                    |
| <i>Acacia albida</i>            | Garbi        | Haraz          | Apple ring acacia  |
| <i>Acacia bussei</i>            | Galool       |                |                    |
| <i>Acacia nilotica</i>          | Tugaar       | Sunt           | Egyptian thorn     |
| <i>Acacia senegal</i>           | Cadaad       | Hashab, Alloba | Gum arabic         |
| <i>Acacia tortilis</i>          | Qurac        | Seyal          | Umbrella thorn     |
| <i>Balanites aegyptiaca</i>     | Quud         | Heglig (Lalob) | Soapberry tree     |
| <i>Boswellia frereana</i>       | Yagcar       |                | Frankin-cense tree |
| <i>Commiphora myrrha</i>        | Dheddin      | Balsam         | Myrrh tree         |
| <i>Conocarpus lancifolius</i>   | Dhamas       |                | Common tug tree    |
| <i>Cordeauxia edulis</i>        | Gud          |                | Yhib nut tree      |
| <i>Cordia sinensis</i>          | Mareer       |                |                    |
| <i>Dobera glabra</i>            | Garas        | Mikah          |                    |
| <i>Hyphaene compressa</i>       | Baar         | El Dom         | Doum palm          |
| <i>Juniperus excelsa</i>        | Dayib        | Ar Ar          | Pencil cedar       |
| <i>Phoenix dactylifera</i>      | Timir        | Nakl-el-Balah  | Date palm          |
| <i>Salvadora persica</i>        | Caday        | Araq           | Toothbrush tree    |
| <i>Tamarindus indica</i>        | Raqay        | Abal           | Tamarind           |
| <i>Tamarix aphylla</i>          | Dhuur        | Atel, Tarfah   | Tamarisk           |
| <i>Terminalia prunioides</i>    | Hareeri      |                |                    |
| <i>Terminalia spinosa</i>       | Xarar        |                | Spiny desert tree  |
| <i>Ziziphus mauritiana</i>      | Gob          | Nabk           | Chinese date       |
| <b>B. Foreign trees</b>         |              |                |                    |
| <i>Albizia lebbek</i>           |              | Dakn-el-Bashna | Siris tree         |
| <i>Azadirachta indica</i>       | Geed hindi   |                | Neem               |
| <i>Cassia siamea</i>            | Boordi       |                | Ironwood           |
| <i>Casuarina equisetifolia</i>  | Shawri       |                | Whistling pine     |
| <i>Eucalyptus camaldulensis</i> | Baxarasaaf   | Kafur          | Red river gum      |
| <i>Khaya senegalensis</i>       | Mahogany     | Kaya           | African mahogany   |
| <i>Leucaena leucocephala</i>    |              |                | Ipil-ipil tree     |
| <i>Parkinsonia aculeata</i>     | Geed walaayo |                | Hardbean           |
| <i>Prosopis chilensis</i>       |              |                | Mesquite           |
| <i>Prosopis cineraria</i>       |              | Ghaf           | Ghaf               |
| <i>Prosopis juliflora</i>       |              |                | Algaroba           |
| <i>Schinus molle</i>            | Mirimiri     | Filfilrafie    | Pepper tree        |
| <i>Sesbania grandiflora</i>     |              | Sisaban        | Corkwood tree      |

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

**Table 2: Somali tree names**

| Somali                 | Botanical                     |
|------------------------|-------------------------------|
| <b>A. Somali trees</b> |                               |
| Cadaad                 | <i>Acacia senegal</i>         |
| Caday                  | <i>Salvadora persica</i>      |
| Dayib                  | <i>Juniperus procera</i>      |
| Dhamas                 | <i>Conocarpus lancifolius</i> |
| Dhuur                  | <i>Tamarix aphylla</i>        |
| Dheddin                | <i>Commiphora myrrha</i>      |
| Galool                 | <i>Acacia bussei</i>          |
| Garbi                  | <i>Acacia albida</i>          |
| Garas                  | <i>Dobera glabra</i>          |
| Gob                    | <i>Ziziphus mauritiana</i>    |
| Xarar                  | <i>Terminalia spinosa</i>     |
| Hareeri                | <i>Terminalia prunioides</i>  |
| Baar                   | <i>Hyphaene compressa</i>     |
| Mareer                 | <i>Cordia sinensis</i>        |
| Qurac                  | <i>Acacia tortilis</i>        |
| Quud                   | <i>Balanites aegyptiaca</i>   |
| Raqay                  | <i>Tamarindus indica</i>      |
| Timir                  | <i>Phoenix dactylifera</i>    |
| Tugaar                 | <i>Acacia nilotica</i>        |
| Yagcar                 | <i>Boswellia frereana</i>     |
| Yicib                  | <i>Cordeauxia edulis</i>      |

**B. Foreign trees**

|              |                                 |
|--------------|---------------------------------|
| Baxarasaaf   | <i>Eucalyptus camaldulensis</i> |
| Boordi       | <i>Cassia siamea</i>            |
| Geed hindi   | <i>Azadirachta indica</i>       |
| Geed walaayo | <i>Parkinsonia aculeata</i>     |
|              | <i>Prosopis juliflora</i>       |
| Mahogany     | <i>Khaya senegalensis</i>       |
| Mirimiri     | <i>Schinus molle</i>            |
| Shawri       | <i>Casuarina equisetifolia</i>  |
|              | <i>Albizia lebbek</i>           |
|              | <i>Leucaena lencocephala</i>    |
|              | <i>Prosopis chilensis</i>       |
|              | <i>Prosopis cineraria</i>       |
|              | <i>Sesbania grandiflora</i>     |

| Somali                        | Botanical                     |
|-------------------------------|-------------------------------|
| <b>C. Foreign fruit trees</b> |                               |
| Anuune (weyn)                 | <i>Annona muricata</i>        |
| Anuune (yare)                 | <i>Annona squamosa</i>        |
| Babbaay                       | <i>Carica papaya</i>          |
| Beydaan                       | <i>Terminalia catappa</i>     |
| Bibbo                         | <i>Anacardium occidentale</i> |
| Bombelmo                      | <i>Citrus paradisi</i>        |
| Cambe                         | <i>Mangifera indica</i>       |
| Liin                          | <i>Citrus aurantifolia</i>    |
| Naarajiin                     | <i>Cocos nucifera</i>         |
| Seytuun                       | <i>Psidium guajava</i>        |

Table 3: Somali tree names with regional and spelling variations

**A. Somali trees**

|          |                                                                                                                                                       |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cadaad:  | Caddad cad, Cadaad geri, Edad, Idad, Adat, Adad Geri, Adad Jerri, Jalegan, Cadad, Adad (Gum: Xabag cadaad)                                            |
| Adei:    | Caday, Rumay, Addai, Ade, Adi, Arak, Rak, Adai, Adaj, Hadai, Hadi, Aie, Aras (Toothstick: Rummei, Rummi, Rummay)                                      |
| Dayib:   | Dayeb, Deyib, Daiyib, Deid, Sigib, Taiid, Tajib, Zerida                                                                                               |
| Dhamas:  | Hadeti, Damas, Sammas, Hodeti, Damask (Wood: Shalman, Rawakib, Tassasi)                                                                               |
| Dheddin: | Dhiddin, Gowlalla, Xagar, Xoday, Haggar, Golelu, Hotai, Surut, Wedu Dedin (Myrr: Malmol)                                                              |
| Galool:  | Galol, Galoll, Sarmaan Dhaadheer                                                                                                                      |
| Garabi:  |                                                                                                                                                       |
| Garas:   | Geras, Kharas, Garass                                                                                                                                 |
| Gobb:    | Gop, Gub, Gob, Ghebb                                                                                                                                  |
| Xarar:   | Hara, Harar, Hareeri, Hareri, Buga, Leby, Areri                                                                                                       |
| Hareeri: | Harayri, Hareri, Tiyes, Ti-e, Areri, Careri, Cordoba, Ordoba                                                                                          |
| Baar:    | (Fruit: Khoone, Qoone)                                                                                                                                |
| Mareer:  | Madheedh, Modheedh, Marerh, Marer Docol, 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, Koulun, 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                                                                                      |
| Yagcar:  | Yagar, Yegaar, Yehar, Moxoh Cad, Mohor, Gegar, Gehar, Gekar, Mohor-ad (Gum-resin Mayddi, Luubaan)                                                     |
| Gud:     | (Nut: Yicib, Jicib)                                                                                                                                   |

**Table 3: (continued)****B. Foreign trees**


---

|               |            |
|---------------|------------|
| Baxarsaaf:    | Baharasaaf |
| Boordi:       |            |
| Geed hindi:   | Mirimiri   |
| Geed waalaayo |            |
| Lebi:         |            |
| Mahogany:     |            |
| Mirimiri:     |            |
| Shawri:       |            |

**C. Foreign fruit trees**

|                |                 |
|----------------|-----------------|
| Anuune (weyn): |                 |
| Anuune (yare): |                 |
| Babbaay:       | Mafafay , Babay |
| Beydaan:       | Bidan           |
| Bibbo:         | Kashew          |
| Bombelmo:      |                 |
| Cambe:         | Ambo, Amba      |
| Liin:          |                 |
| Naarajiin:     | (Fruit: Qunbe)  |
| Seytuun:       | Zeitum          |

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**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)

## Between 50-250 mm/yr

## Climate zone

|     |                               |           |
|-----|-------------------------------|-----------|
| 50  | <i>Salvadora persica</i>      | A B D     |
| 100 | <i>Acacia tortilis</i>        | A B C D E |
|     | <i>Tamarix Aphylla</i>        | A B D     |
|     | <i>Acacia bussei</i>          | A B C D E |
| 150 | <i>Ziziphus mauritiana</i>    | A B D     |
|     | <i>Cordeauxia edulis</i>      | A B C     |
|     | <i>Prosopis juliflora</i>     | A B C D E |
| 200 | <i>Acacia senegal</i>         | A B D     |
|     | <i>Prosopis chilensis</i>     | B D       |
|     | <i>Acacia albida</i>          | B C D E   |
|     | <i>Acacia nilotica</i>        | B D       |
|     | <i>Commiphora myrrha</i>      | B C D E   |
|     | <i>Conocarpus lancifolius</i> | B C D     |

## Between 250-400 mm/yr

|     |                                 |         |
|-----|---------------------------------|---------|
| 250 | <i>Terminalia spinosa</i>       | B C D   |
|     | <i>Parkinsonia aculeata</i>     | B C D E |
| 300 | <i>Cordia sinensis</i>          | B       |
|     | <i>Casuarina equisetifolia</i>  | D       |
|     | <i>Eucalyptus camaldulensis</i> | B C D E |
| 350 | <i>Balamites aegyptiaca</i>     | D       |
|     | <i>Boswellia frereana</i>       | C E     |
|     | <i>Dobera glabra</i>            | B D     |

## Between 400-500 mm/yr

|     |                              |       |
|-----|------------------------------|-------|
| 400 | <i>Terminalia prunioides</i> | B D   |
|     | <i>Khaya senegalensis</i>    | D E   |
|     | <i>Prosopis cineraria</i>    | D     |
| 450 | <i>Azadirachta indica</i>    | B C D |

## More than 500 mm/yr

|     |                               |   |
|-----|-------------------------------|---|
| 500 | <i>Juniperus excelsa</i>      | E |
|     | <i>Albizia lebbeck</i>        | D |
|     | <i>Cassia siamea</i>          | D |
|     | <i>Schinus molle</i>          | E |
|     | <i>Anacardium occidentale</i> | D |
| 600 | <i>Tamarindus indica</i>      | D |
|     | <i>Leuceana leucocephala</i>  | D |

## Irrigated:

|                             |           |
|-----------------------------|-----------|
| <i>Hyphaene compressa</i>   | A B D     |
| <i>Phoenix dactylifera</i>  | A B D     |
| <i>Mangifera indica</i>     | A B C D E |
| <i>Citrus aurantifolia</i>  | A B C D E |
| <i>Citrus paradisi</i>      | A B C D E |
| <i>Sesbania grandiflora</i> | A B D     |
| <i>Terminalia catappa</i>   | A B D     |
| <i>Annona muricata</i>      | A B C D   |
| <i>Annona squamosa</i>      | C E       |
| <i>Psidium guajava</i>      | A B C D E |
| <i>Cocos nucifera</i>       | A B D     |

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

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



## 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 Gud (*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 Gud 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 asterisks “\*\*” 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.



## 1. Names: Garbi *Acacia albida*

|          |                                        |
|----------|----------------------------------------|
| Arabic   | Haraz                                  |
| English  | Apple ring, Goa, Winter thorn.         |
| Species  | <i>Acacia albida</i> Del.              |
| Family   | Leguminosae - Mimosoideae              |
| Synonyms | <i>Faidherbia albida</i> (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.<br>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:

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

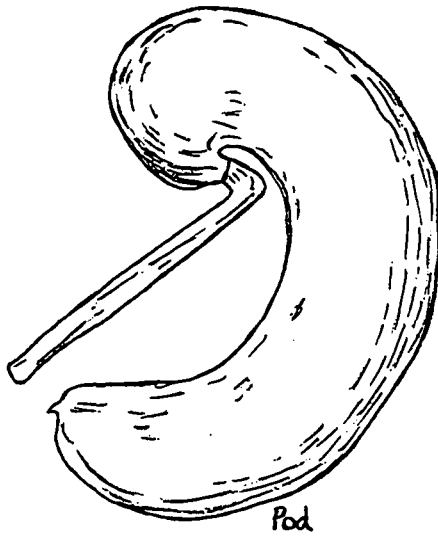
SOMALI  
NAME

GARBI

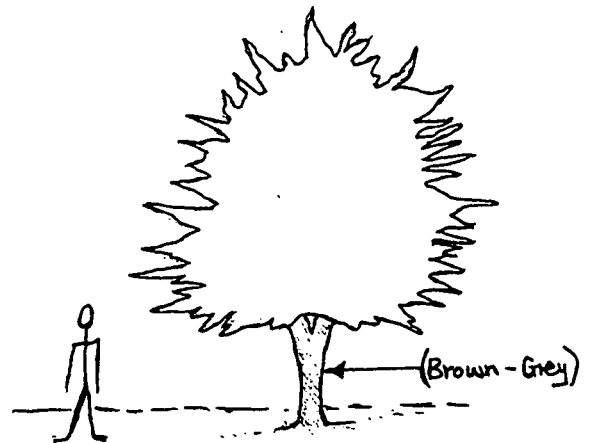
LATIN  
NAME

ACACIA ALBIDA

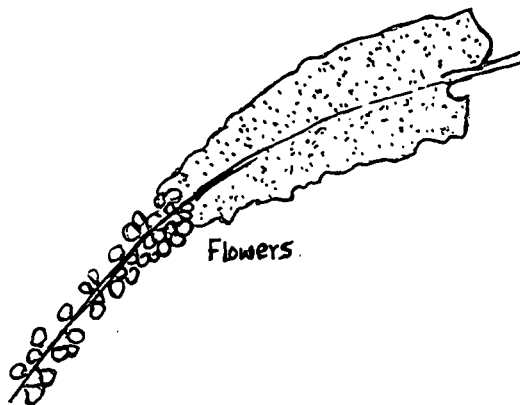
FRUIT (Orange)



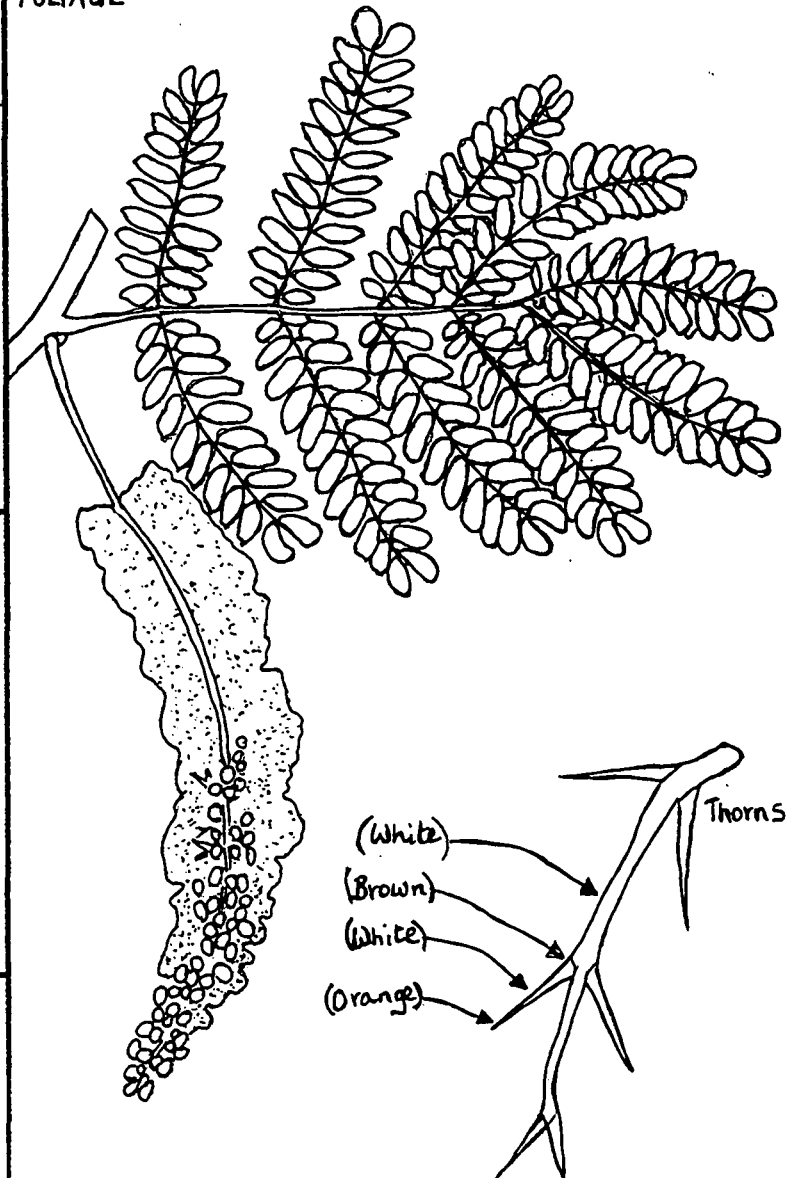
TREE SHAPE



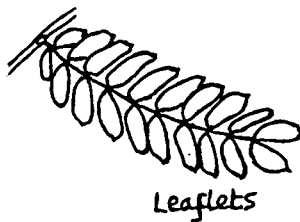
FLOWER (Yellow-White)



FOLIAGE



LEAF (Blue - Grey - Green)



SEED (Dark Brown)



# Tree growing

**Names:** Garbi

*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.<br>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        | 40-60% in 6-30 days                                                                 |
| Percentage         |                                                                                     |
| Pricking out       | After one month                                                                     |
| Shade and watering | No shade needed. Daily watering needed.                                             |
| Growth time        | 5-6 months till ready for outplanting<br>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

17

**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:

|                   |                                                                                               |
|-------------------|-----------------------------------------------------------------------------------------------|
| <b>TREE SHAPE</b> | 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:)                                                                                     |
| <b>FOLIAGE</b>    |                                                                                               |
| 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:)                                                                      |
| <b>LEAF</b>       | 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                                                                             |
| <b>FLOWERS</b>    | Sessile                                                                                       |
| Size              | Spike: 1.8-6cm long (Colour:) White (Yellowish)                                               |
| <b>FRUIT</b>      | Pod:flat, narrow, straight, oblong, dehiscent.                                                |
| Size              | 2 - 6.5 X 0.8 - 1.5cm (Colour:) Brown (slightly darker around edges)                          |
| <b>SEED</b>       | Flattened,obovate,compressed. Areole present.                                                 |
| Size              | 5 X 4 - 4.5mm (Colour:) Brown                                                                 |
| <b>ROOTS</b>      | Extensive shallow root system.                                                                |
| <b>WOOD</b>       | Very dense. (Colour:) Dark brown heartwood<br>(Colour:) Pale yellow sapwood                   |

SOMALI  
NAME

GALOOL

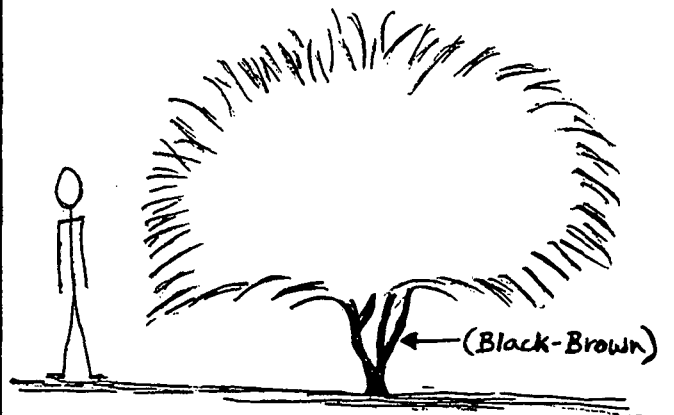
LATIN  
NAME

ACACIA BUSSEI

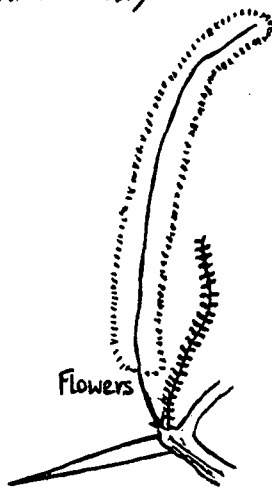
FRUIT (Brown)



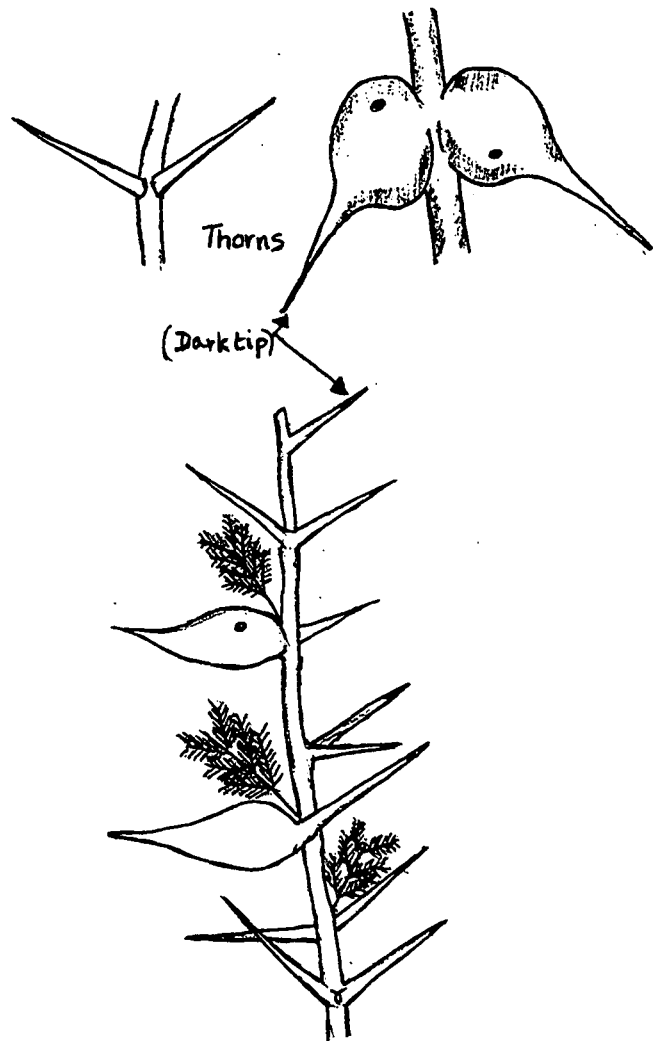
TREE SHAPE



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  
spacing

Fertilizers and  
insecticides

## 6. Aftercare:

Growth and  
yields

## 7. Other notes:

# Tree details

21

**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. Grows 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:

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

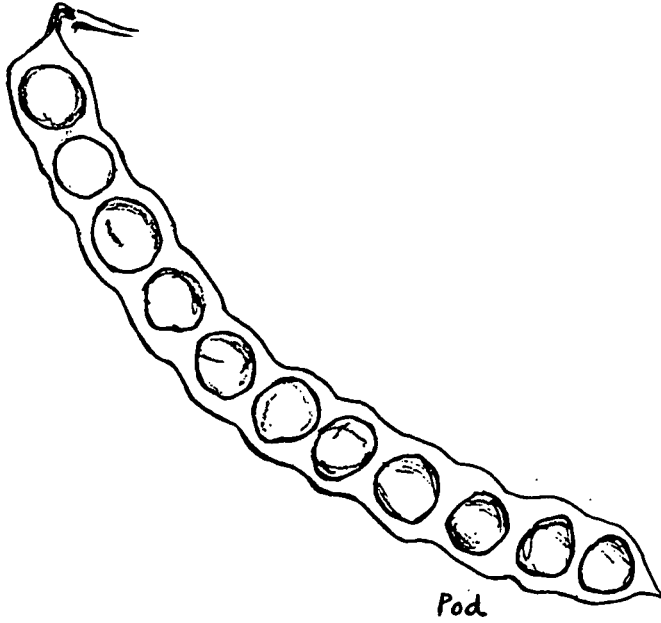
SOMALI  
NAME

TUGAAR

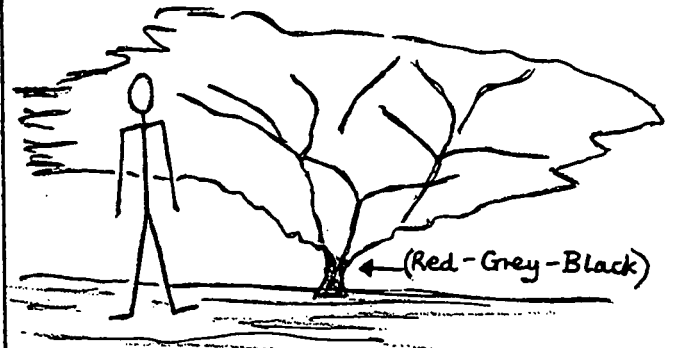
LATIN  
NAME

ACACIA NILOTICA

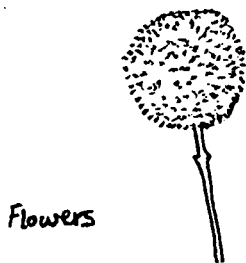
FRUIT (Black-Grey  
-Brown)



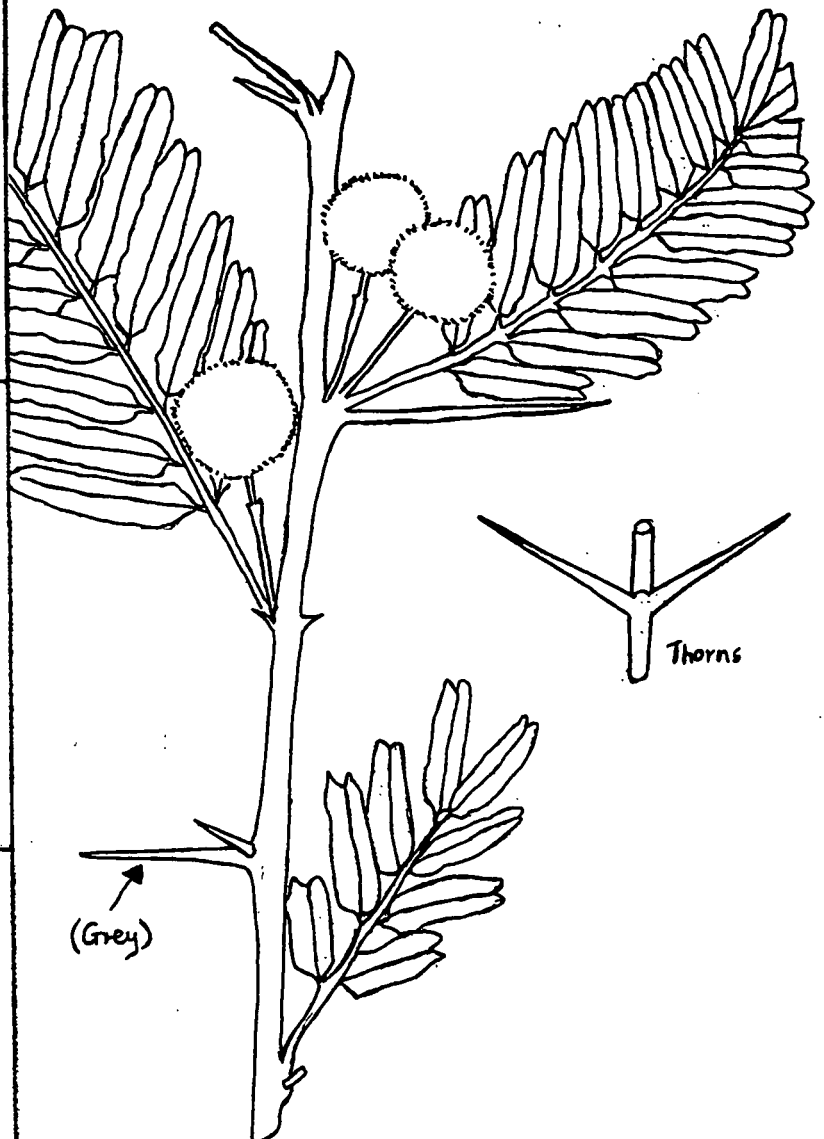
TREE SHAPE



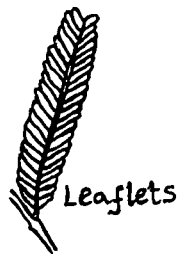
FLOWER (Yellow)



FOLIAGE



LEAF (Blue-Grey-Green)



SEED (Purple)



# 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 by various wood borers. Root boring beetle is also a pest.

## 5. Planting:

|                              |                                                                                                                                                                                        |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Soils                        | Prefers fine textured soils such as alluvial river soils.<br>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 aggressive coloniser and strong light demander.

## 1. Names: Cadaad *Acacia senegal*

|          |                                             |
|----------|---------------------------------------------|
| Arabic   | Hashab, Alloba                              |
| English  | Gum Arabic, Three thorned Acacia, (Gommier) |
| Species  | <i>Acacia senegal</i> (L) Willd             |
| Family   | Leguminosae - Mimosoideae                   |
| Synonyms | <i>Acacia verec</i> 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:

|                   |                                                                                 |                                               |
|-------------------|---------------------------------------------------------------------------------|-----------------------------------------------|
| <b>TREE SHAPE</b> | Low and widely branched. Crown becoming 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         |
| <b>FOLIAGE</b>    |                                                                                 |                                               |
| 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:)                                     |
| <b>LEAF</b>       | 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                                                                   |                                               |
| <b>FLOWERS</b>    | Arranged in narrow cylindrical clusters.                                        |                                               |
| Size              | 5-8cm long                                                                      | (Colour:) Yellow-white                        |
| <b>FRUIT</b>      | Very dry-like brittle paper with many veins. A flattened oblong pod.            |                                               |
| Size              | 8-10 X 2cm                                                                      | (Colour:)Pale straw-yellow or brown           |
| <b>SEED</b>       | Roundish, flattened (1) 3-5 (-8) seeds per pod.                                 |                                               |
| Size              | 6-10mm.d.                                                                       | (Colour:) Brown-green                         |
| <b>ROOTS</b>      | Tap root and lateral roots are well developed.                                  |                                               |
| <b>WOOD</b>       | Hard and heavy                                                                  | (Colour:) Whitish                             |

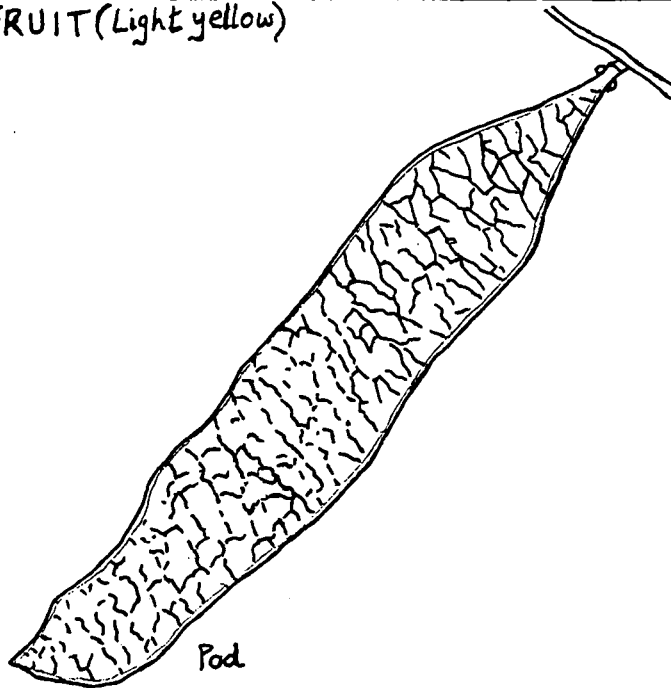
SOMALI  
NAME

CADAAD

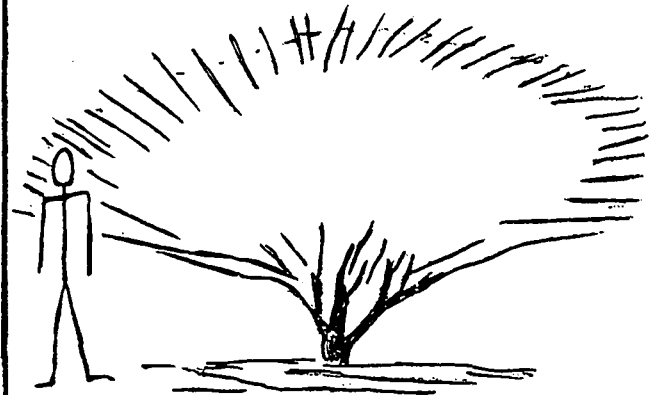
LATIN  
NAME

ACACIA SENE GAL

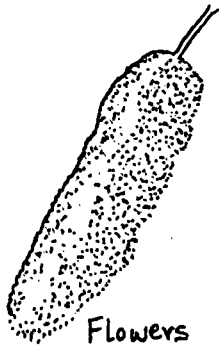
FRUIT (Light yellow)



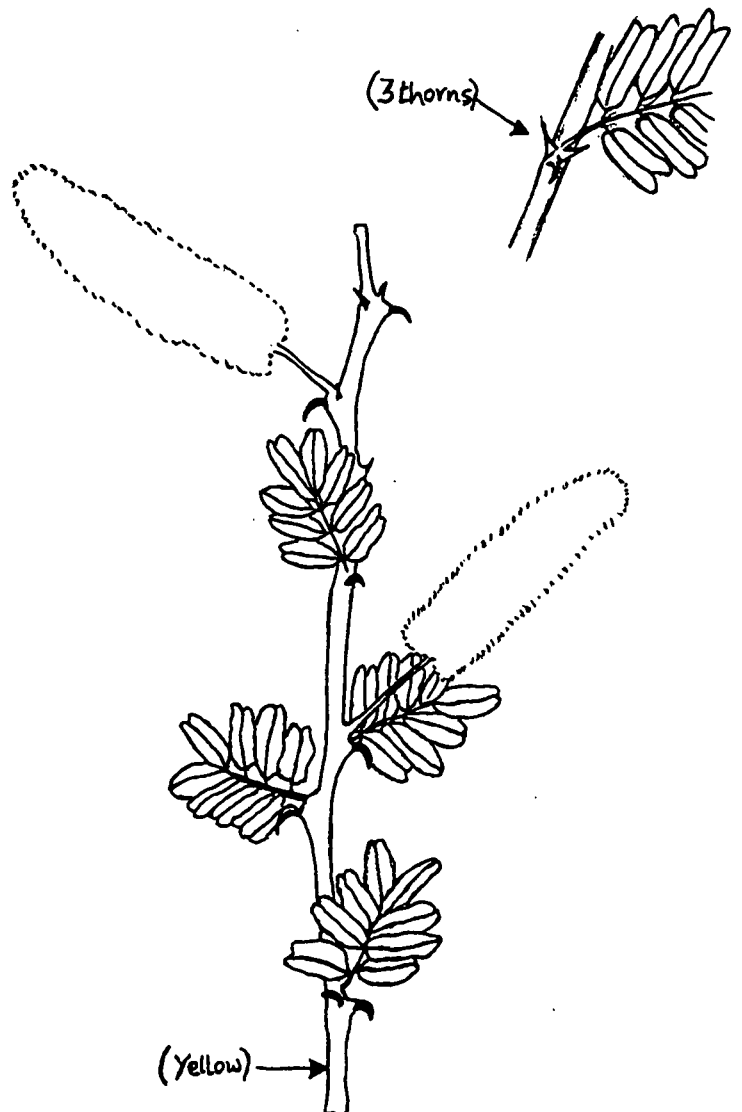
TREE SHAPE



FLOWER (Yellow-White)



FOLIAGE



LEAF (Grey-Green)



SEED (Brown-Green)



# Tree growing

**Names:** Cadaad

*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.<br>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 spacing           | Requires wide-spacing 4 X 4m spacing and 30cm depth pits.<br>5-8 seeds per pit if direct sowing.                                                 |
| Fertilizers and insecticides | 150 grammes of NPK per pit<br>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.

## 1. Names: Qurac *Acacia tortilis*

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

## 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.

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

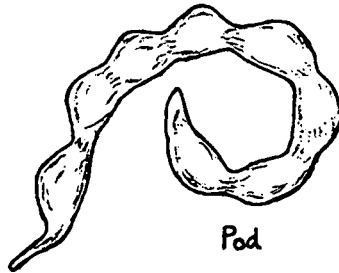
SOMALI  
NAME

QURAC

LATIN  
NAME

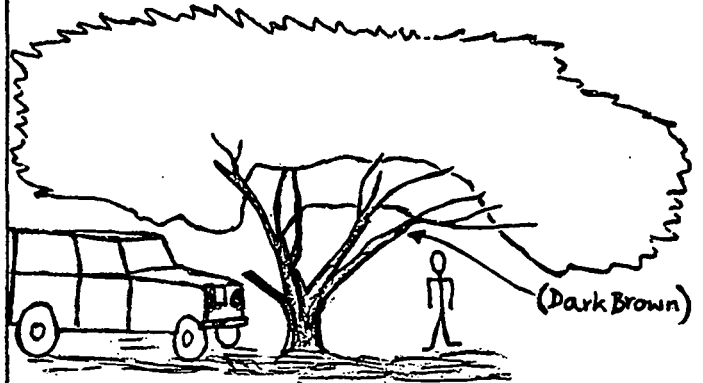
ACACIA TORTILIS

FRUIT (Yellow-Brown)

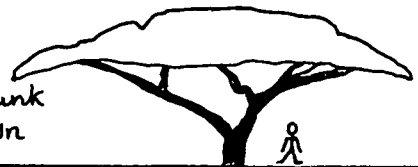


Pod

TREE SHAPE

Typical Shape:

- V-Shaped Trunk
- Umbrella Crown

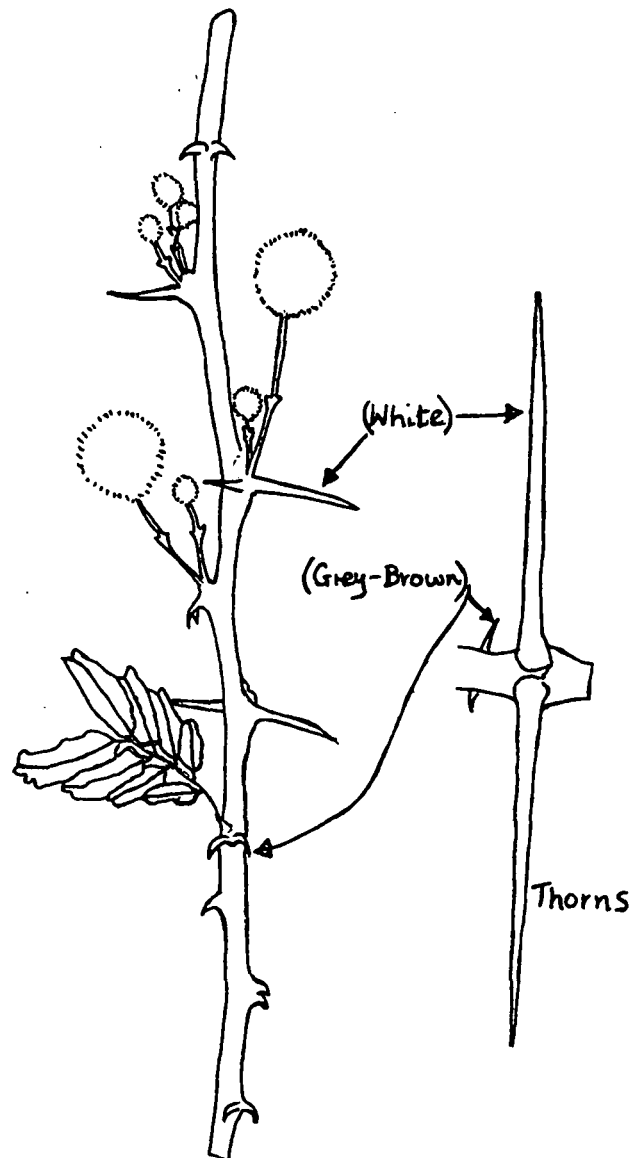


FLOWER (White-Yellow)

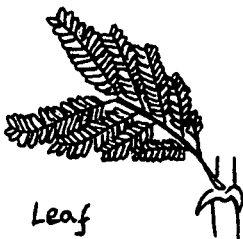


Flowers

FOLIAGE



LEAF (Blue-Grey-Green)



Leaf

SEED (Brown-Red)



Seeds

# Tree growing

**Names:** Qurac *Acacia tortilis*

## 1. Methods of propagation:

## 2. Seed:

|                 |                                                                              |
|-----------------|------------------------------------------------------------------------------|
| Number/kilogram | 12,000 -15,000                                                               |
| Collection      | From under tree before pods open.                                            |
| Extraction      | Store pods dry and under cover until seeds are released from dehiscing pods. |
| Storage         | Dry, cold airtight condition: Remain viable for many years.                  |
| Pretreatment    | Soak in tepid water for 24 hours. Stratify.                                  |

## 3. Nursery:

|                    |                                         |
|--------------------|-----------------------------------------|
| Soil mixture       |                                         |
| Potsize            |                                         |
| Sowing             |                                         |
| Germination        | 40% in 4 days.                          |
| Percentage         | 45-80                                   |
| Pricking out       |                                         |
| Shade and watering | Shade necessary                         |
| Growth time        | 10-12 weeks till ready for outplanting. |

Other notes

## 4. Pests and diseases:

Seeds often infested by bruchids and larvae.

## 5. Planting:

|              |                                                                                                                                                             |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Soils on dry | Tolerates slight alkalinity. Deep, well-drained alkaline loams, will grow however shallow soils. Light soils preferred. Can grow on clay in riverine sites. |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|

Method and spacing

Fertilizers and insecticides

## 6. Aftercare:

Weeding required initially. Tolerates heavy browsing.

|                   |                                                                                                                                                                                                                  |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Growth and yields | 100-150 years.<br>In Indian trials found to be the fastest growing Acacia. In India 12 year old plantation at 3m X 3m espacement yielded 54 tonnes of fuelwood per hectare and fodder production of 900kg/ha/yr. |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 7. Other notes:

When in very arid and/or heavily grazed conditions the tree can be reduced to a shrub of less than 1m high with seemingly unconnected branches radiating from a low sand mound.

## 1. Names: Quud *Balanities aegyptiaca*

|          |                                              |
|----------|----------------------------------------------|
| Arabic   | Heglig, (Lalob)                              |
| English  | Soapberry tree. Desert date. Jericho Balsam. |
| Species  | <i>Balanites aegyptiaca</i> (L.) Del.        |
| Family   | Balanitaceae                                 |
| Synonyms | <i>Ximenia aegyptiaca</i> 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 Bark | Often fluted<br>Very fissured and scaly                                                                                                                    | Colour: Greyish green to brown<br>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.                    |

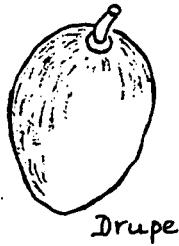
SOMALI  
NAME

QUUD

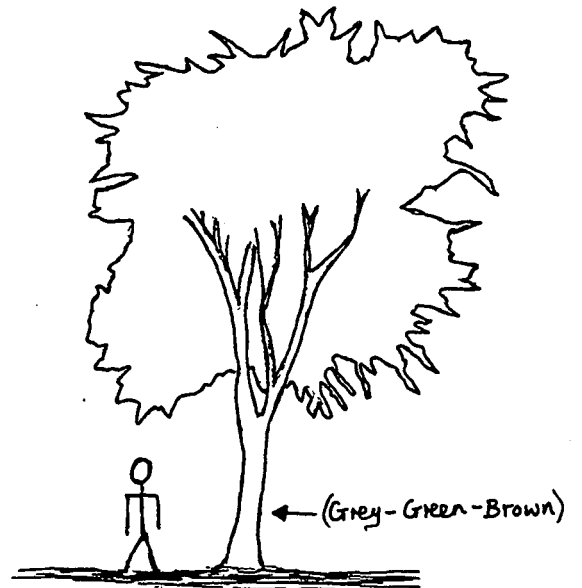
LATIN  
NAME

BALANITES AEGYPTIACA

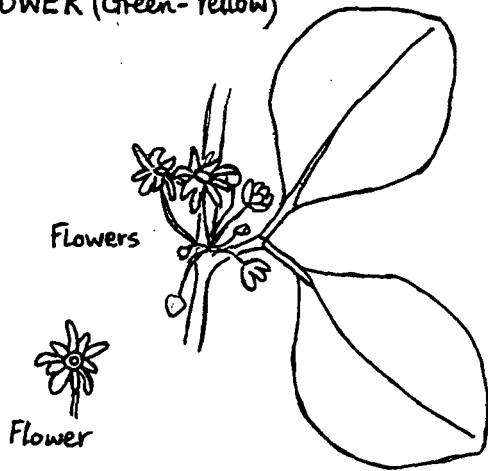
FRUIT (Green-Yellow) -(Like a date)



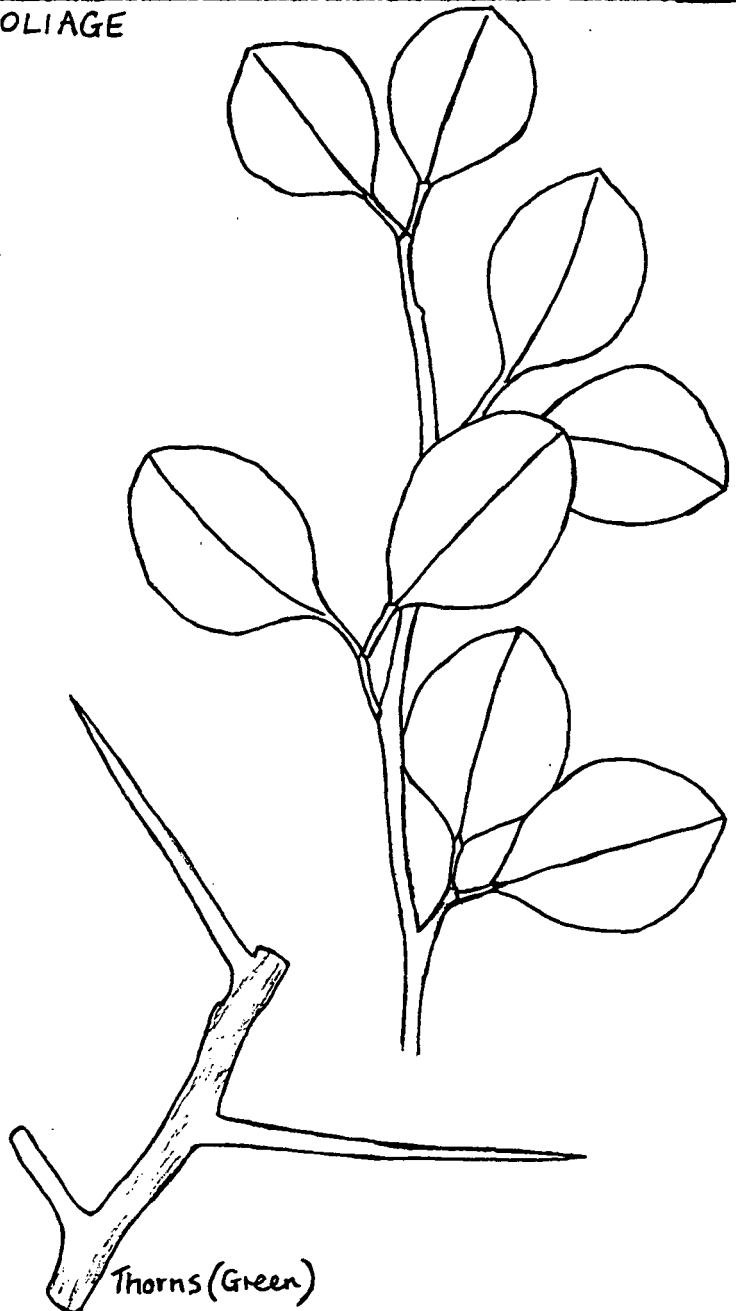
TREE SHAPE



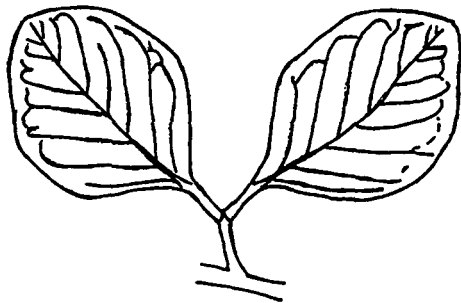
FLOWER (Green-Yellow)



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.<br>Tolerates a wide range of soil types even heavy clays.<br>Sensitive to salinity. |
|-------|---------------------------------------------------------------------------------------------------------------------------------------|

Method and  
spacing

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<br>yields | Slow growing. In Israel 2-3 years old coppice shoots have<br>reached 1-3m height. |
|----------------------|-----------------------------------------------------------------------------------|

## 7. Other notes:

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

# Tree details

37

**1. Names:** Yagcar *Boswellia frereana*

Arabic  
English Frankincense 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

Thorns

Size

Colour:

LEAF

Compound:Imparipinnate

Size

Leaflet

Size

Colour: Green-purple

FLOWERS

5 petals

Size

Colour:

FRUIT

Capsule

Size

Colour: Brown

SEED

Inside a nutlet

Size

Colour: Brown

### ROOTS

WOOD

Colour:

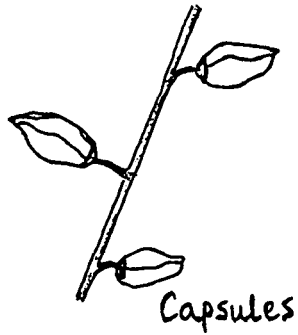
SOMALI  
NAME

YAGCAR

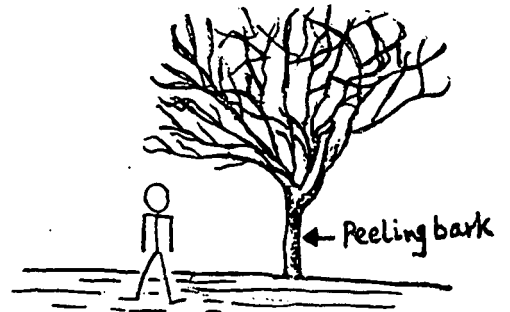
LATIN  
NAME

BOSWELLIA FREREANA

FRUIT (Brown)



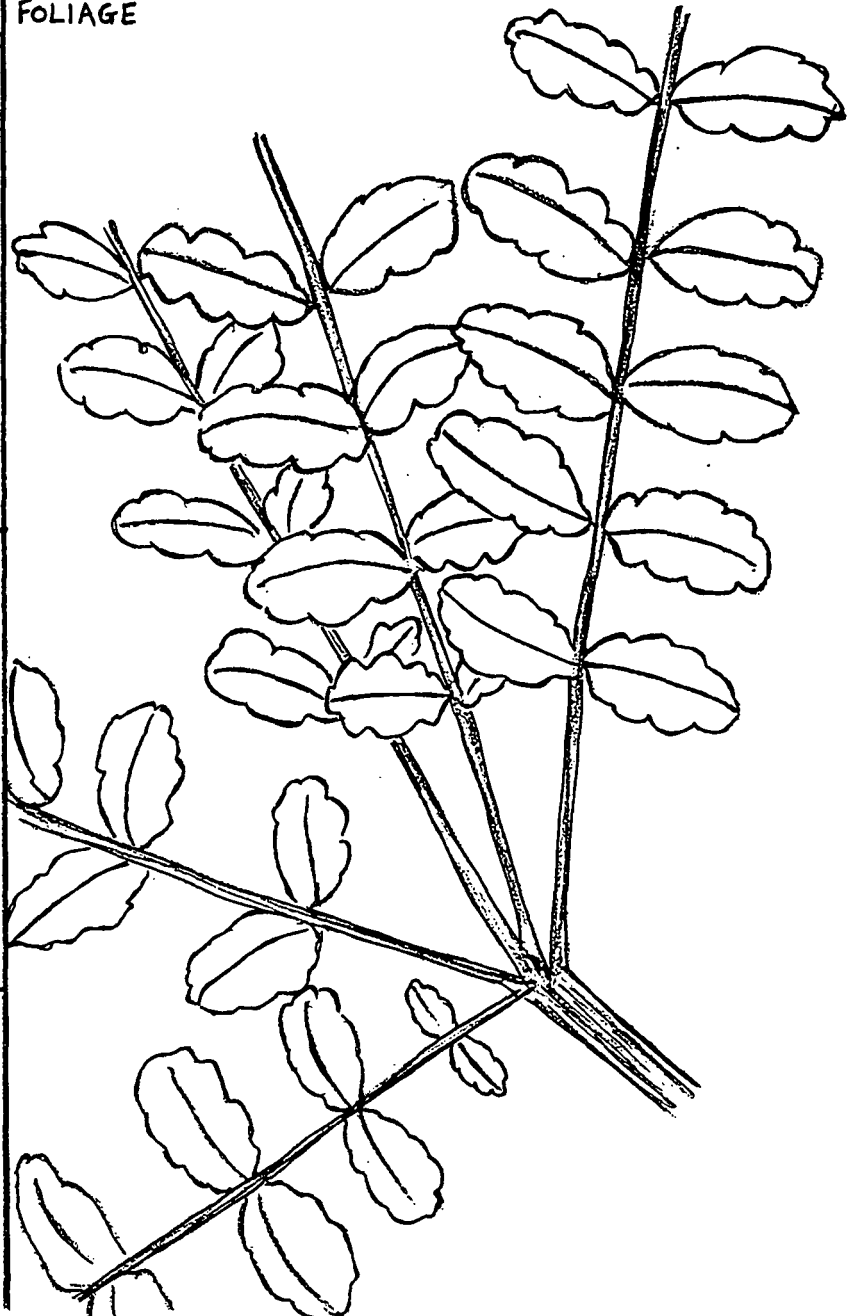
TREE SHAPE



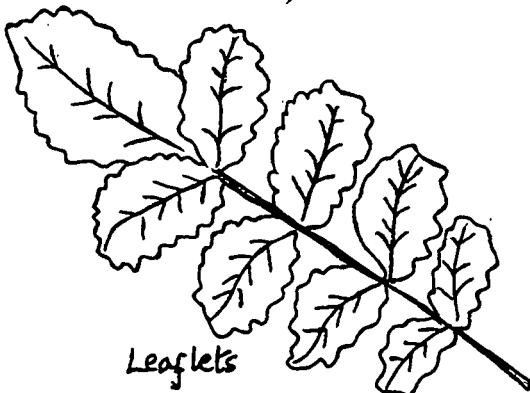
FLOWER



FOLIAGE



LEAF (Green - Purple)



SEED (Brown)



# Tree growing

**Names:** Yagcar

*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  
spacing

Fertilizers and  
insecticides

## 6. Aftercare:

Growth and  
yields

## 7. Other notes:

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

# Tree Details

41

**1. Names:** Dheddin *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        | Ovate or elliptic to obovate                 |                                         |
| Size           |                                              |                                         |
| 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

DHEDDIN

LATIN  
NAME

COMMIPHORA MYRRHA

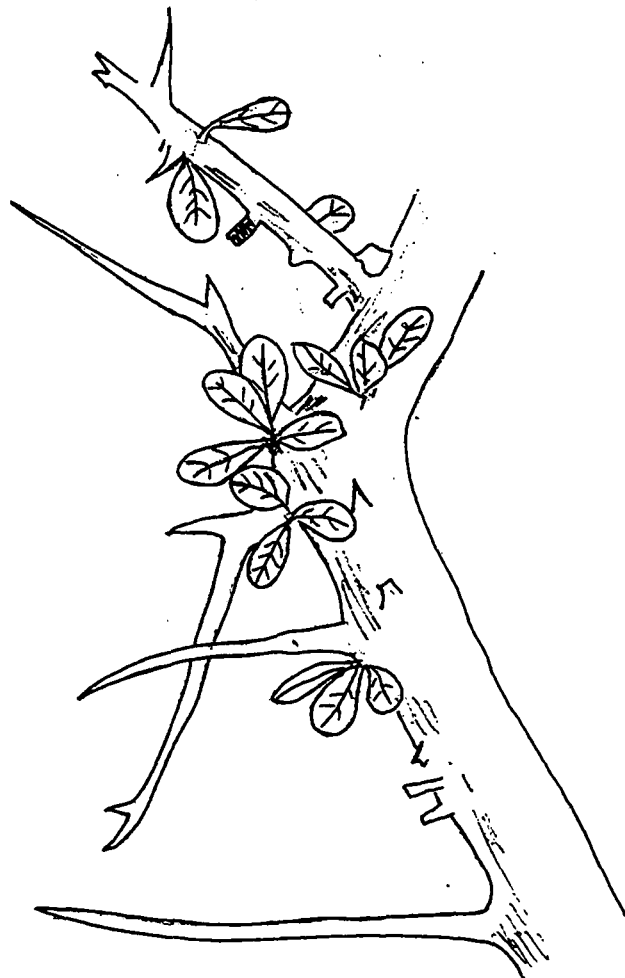
FRUIT (Green)



TREE SHAPE

FLOWER (Dull purple) - (Yellow-Green)  
(Very small)Larger than  
life

FOLIAGE



LEAF (Grey-Green)



SEED (Orange/Brown)



# Tree growing

**Names:** Dheddin

*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  
spacing

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.

**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.                              |                              |

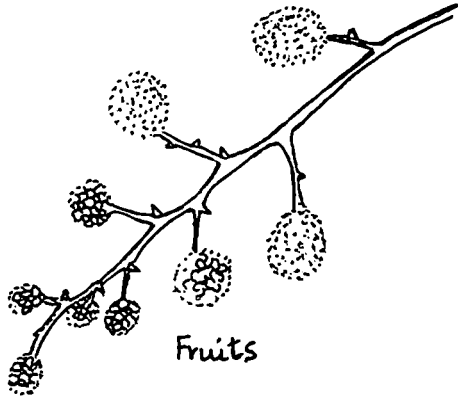
SOMALI  
NAME

DHAMAS

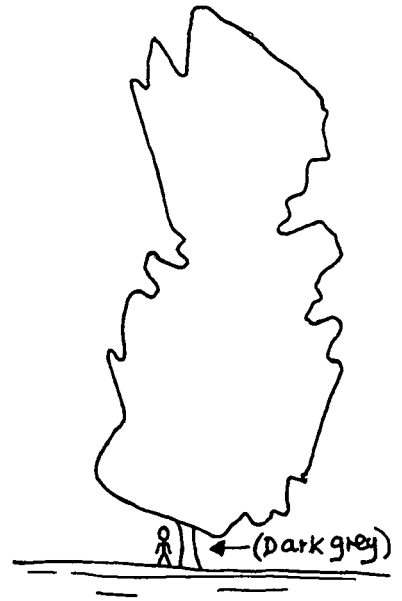
LATIN  
NAME

CONOCARPUS LANCIFOLIUS

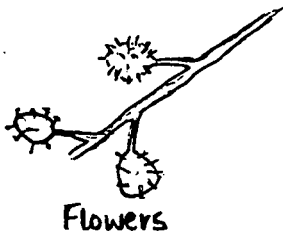
FRUIT



TREE SHAPE



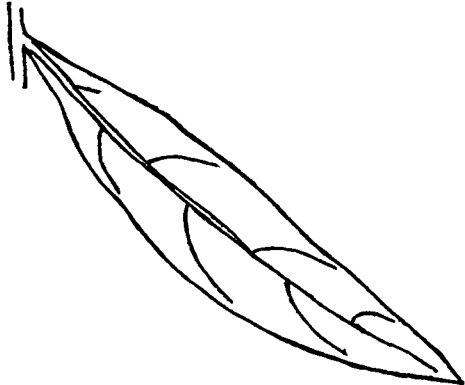
FLOWER (Green-Yellow)



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

49

**1. Names:** Gud *Cordeauxia edulis*

Arabic  
English Yhib 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  
FOLIAGE

(Colour):

Twigs  
Thorns  
Size

Numerous scale like glands

(Colour): Red-purple glands on twigs

(Colour):

LEAF  
Size  
Leaflet  
Size

Spirally arranged. Leathery  
Pinnate

(Colour): Lower surface having red glands

(Colour): Upper surface olive green

Asymmetrical (1-3) 4(-6) pairs per pinna  
3-4.5 X 1-1.5 (-3)cm

FLOWERS  
Size

5 petals, small.

Petals are 17 X 6 - 10mm

(Colour): Bright yellow

FRUIT  
Size

Pod: Oblong-ovoid dehiscent. Numerous scales on surface.

4-6 X 2cm

(Colour): Red-brown

SEED  
Size

1-2 (-4) per pod. Ovoid

3.5-5cm long

(Colour):

ROOTS

Deep tap root to 3m

WOOD

(Colour):

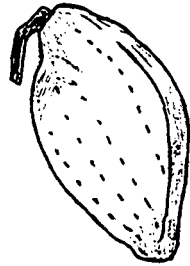
SOMALI  
NAME

GUD

LATIN  
NAME

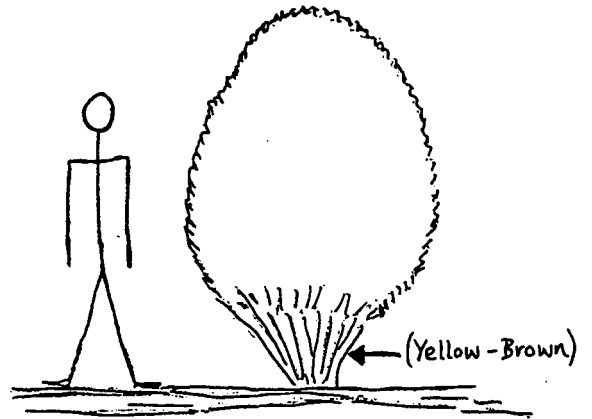
CORDEAUXIA EDULIS

FRUIT (Red-Brown) : YICIB



Pod

TREE SHAPE



FLOWER (Yellow)

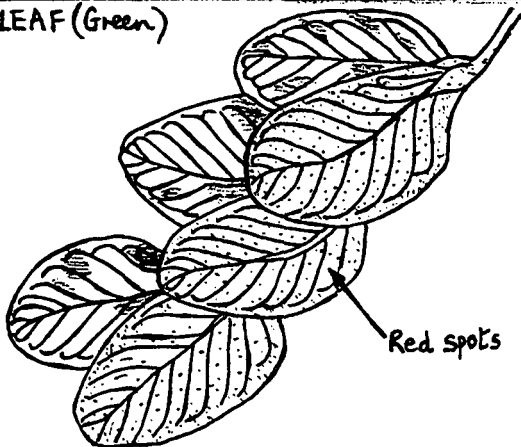


Flower

FOLIAGE (Thorns absent)



LEAF (Green)



Red spots

SEED



Nut

# Tree growing

**Names:** Gud

*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  
spacing

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.

**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:) |
|------|-----------------|

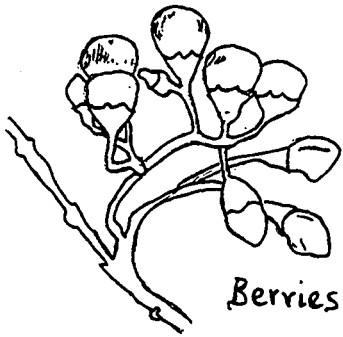
SOMALI  
NAME

MAREER

LATIN  
NAME

CORDIA SINENSIS

FRUIT (Brown-Yellow)



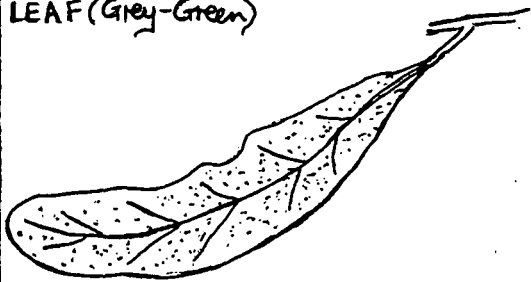
TREE SHAPE

FLOWER (White)

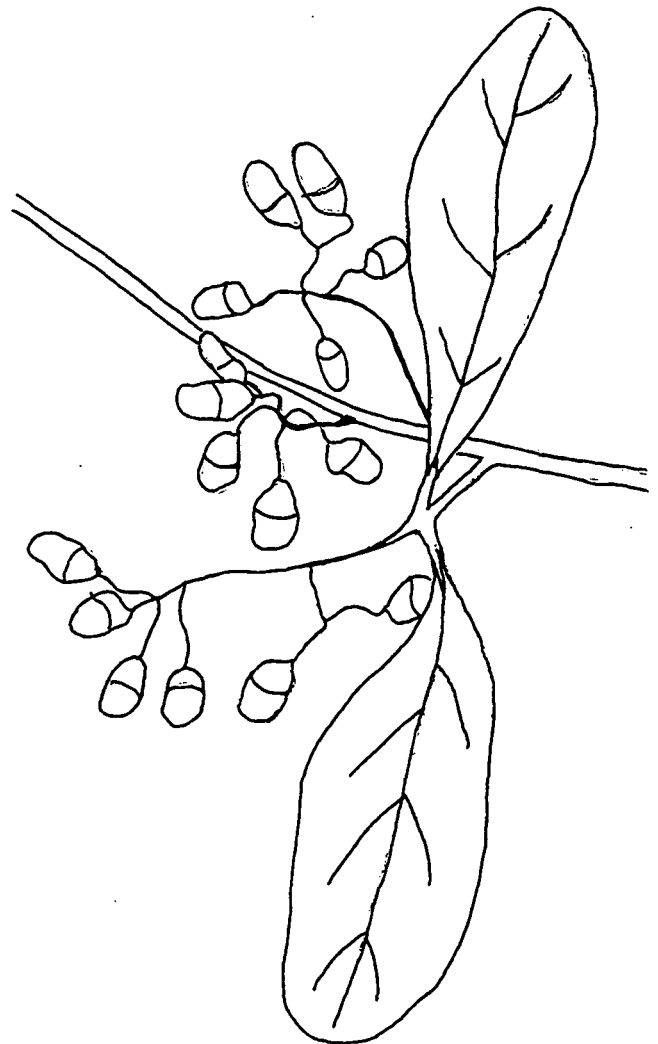


FOLIAGE

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

Method and  
spacing

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.

**1. Names:** Garas *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 domestic 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 |

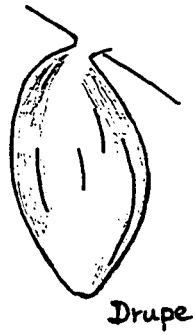
SOMALI  
NAME

GARAS

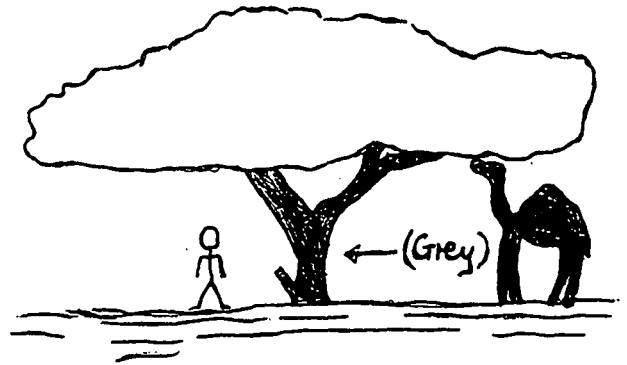
LATIN  
NAME

DOBERA GLABRA

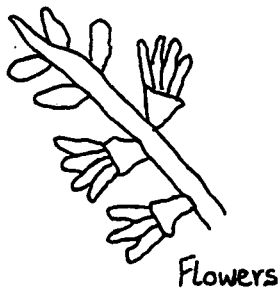
FRUIT



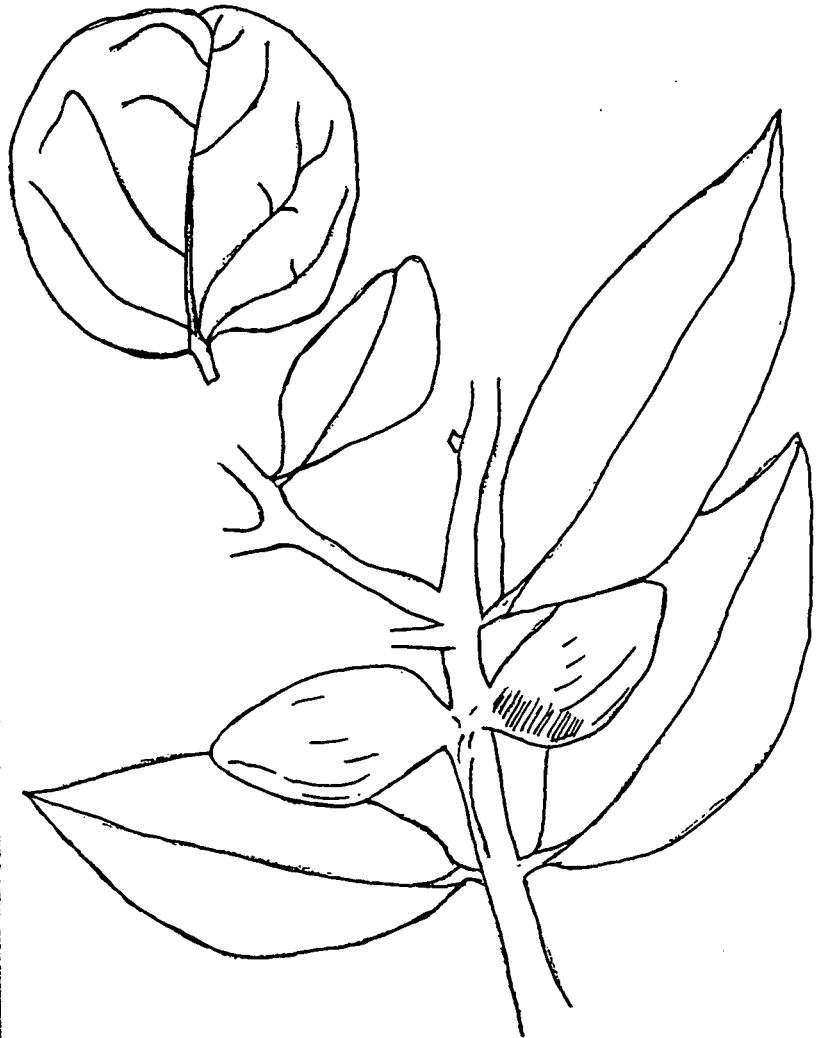
TREE SHAPE



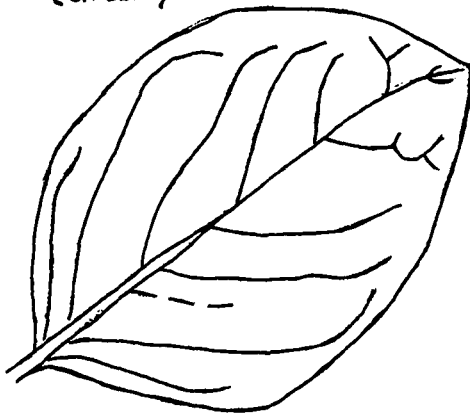
FLOWER (White)



FOLIAGE



LEAF (Green)



SEED

# Tree growing

**Names:** Garas

*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              10m X 10m in rainfed farmland  
spacing

Fertilizers and  
insecticides

**6. Aftercare:**      Protect from browsing when young

Growth and              Slow growing  
yields

## 7. Other notes:

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

**1. Names:** Baar *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:

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

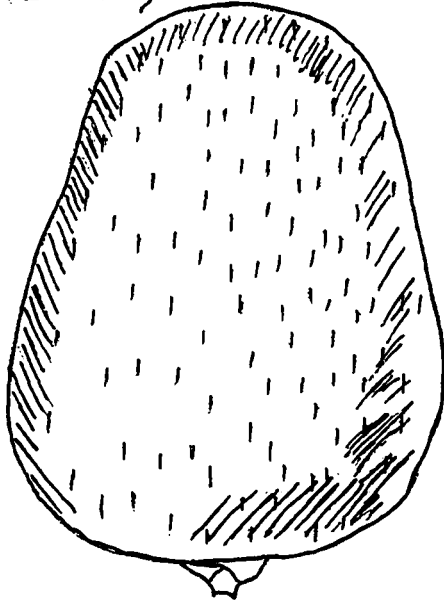
SOMALI  
NAME

BAAR

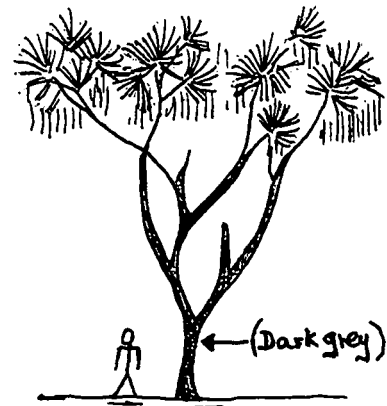
LATIN  
NAME

HYPHAENE COMPRESSA

FRUIT (Brown): QOONE



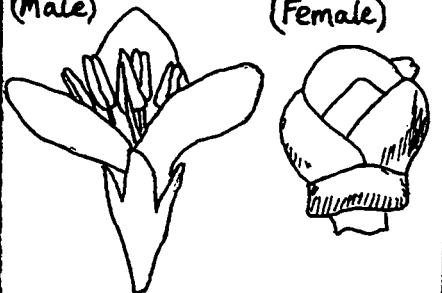
TREE SHAPE



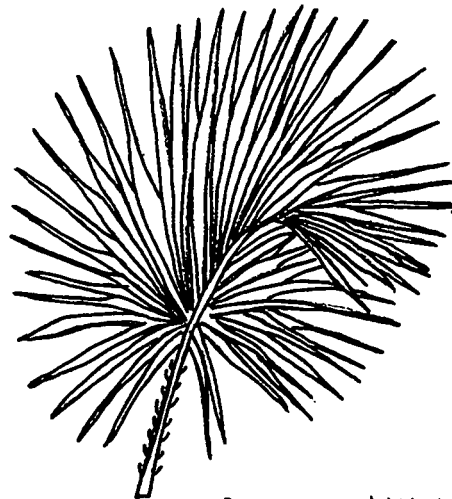
FLOWER

Larger than life  
(Male)

(Female)

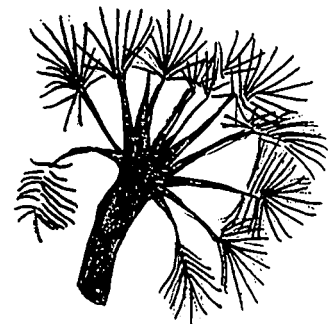


FOLIAGE

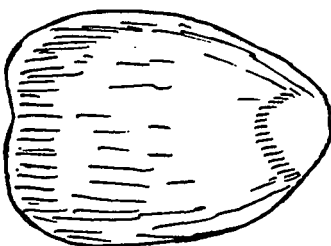


Leaf (smaller than life)

LEAF

Crown (smaller  
than life)

SEED



# Tree growing

**Names:** Baar

*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  
spacing

Fertilizers and  
insecticides

## 6. Aftercare:

Growth and  
yields

## 7. Other notes:

## 1. Names: Dayib *Juniperus excelsa*

|          |                          |
|----------|--------------------------|
| Arabic   | Ar Ar                    |
| English  | African pencil cedar     |
| Species  | <i>Juniperus excelsa</i> |
| Family   | Cupressaceae             |
| Synonyms | <i>Juniperus procera</i> |

## 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  | Tall and straight                                                          |                           |
| Bark       | Thin with shallow longitudinal 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                                                                | (Colour:) M: Yellow       |
|            | Female: 4-8mm                                                              | 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                                                    |                           |

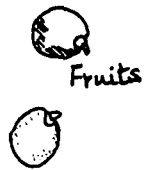
SOMALI  
NAME

DAYIB

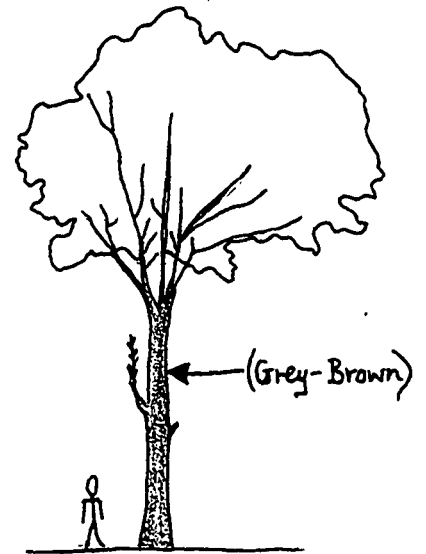
LATIN  
NAME

JUNIPERUS EXCELSA

FRUIT (Blue-Grey-Brown)



TREE SHAPE

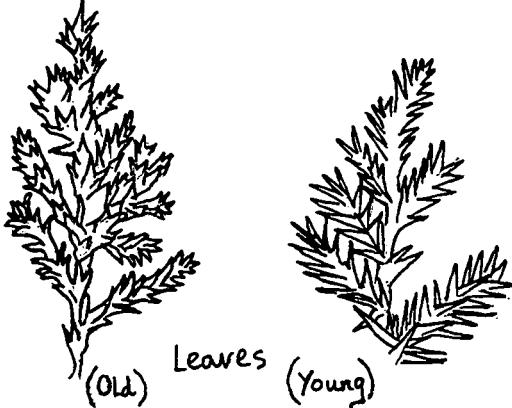


FLOWER (Yellow) or (Red-Black)

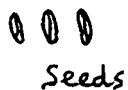
FOLIAGE



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  
spacing

Fertilizers and  
insecticides

## 6. Aftercare:

|                      |                   |
|----------------------|-------------------|
| Growth and<br>yields | Very slow growing |
|----------------------|-------------------|

## 7. Other notes:

## 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:

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

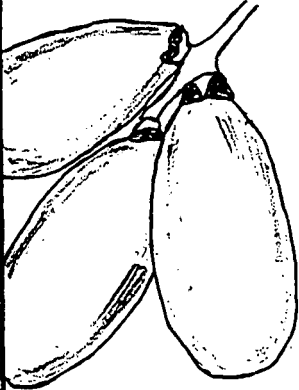
SOMALI  
NAME

TIMIR

LATIN  
NAME

PHOENIX DACTYLIFERA

FRUIT (Green-Brown)

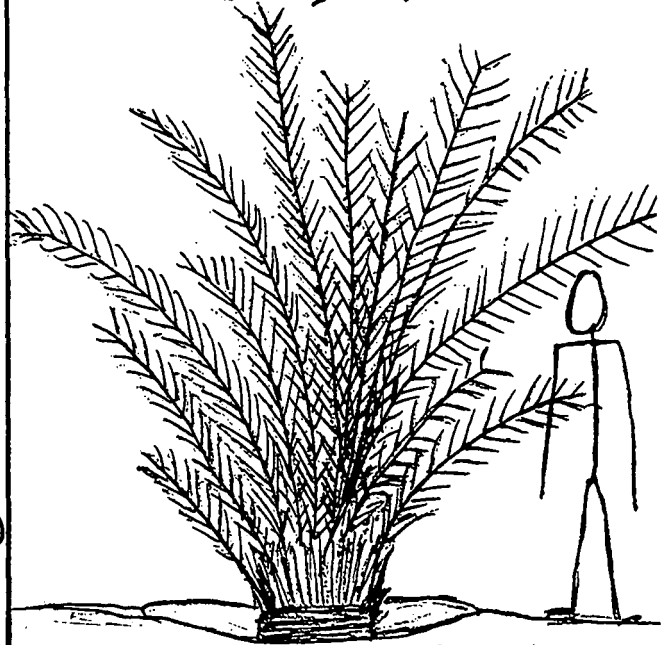


(Fresh: Green)

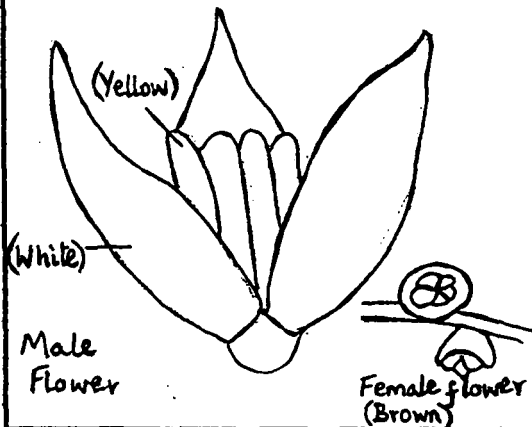


(Dry fruit: Shiny Brown)

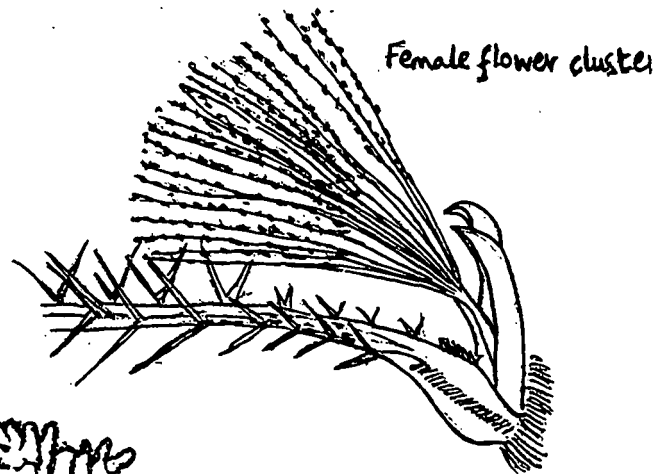
TREE SHAPE (Young tree)



FLOWER (White or Brown)

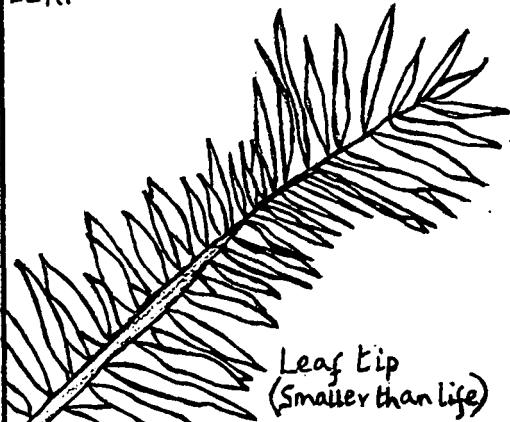
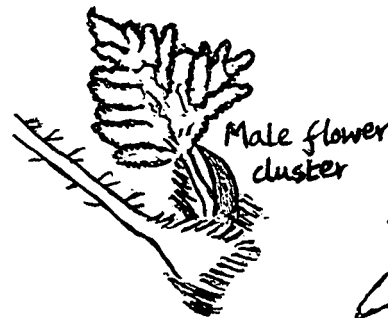
Male  
FlowerFemale flower  
(Brown)

FOLIAGE (Smaller than life)

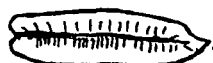


Female flower cluster

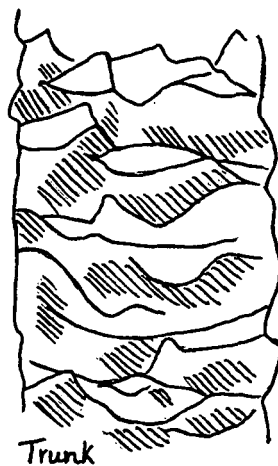
LEAF

Leaf tip  
(Smaller than life)Male flower  
cluster

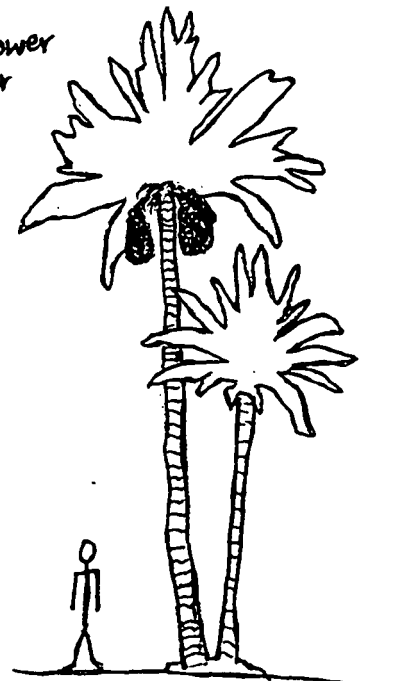
SEED (Grey)



Seed



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.

## 1. Names: Caday *Salvadora persica*

|          |                                                                                             |
|----------|---------------------------------------------------------------------------------------------|
| Arabic   | Araq, Arrak                                                                                 |
| English  | Toothbrush tree                                                                             |
| Species  | <i>Salvadora persica</i> .L                                                                 |
| Family   | Salvadoraceae                                                                               |
| Synonyms | <i>Galenia asiatica</i> Burm.f. <i>Salvadora indica</i> Wight, <i>S. cyclophylla</i> 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 |                      | Colour: |
| Size   |                      |         |

|         |                                                                                 |               |
|---------|---------------------------------------------------------------------------------|---------------|
| 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

CADAY

LATIN  
NAME

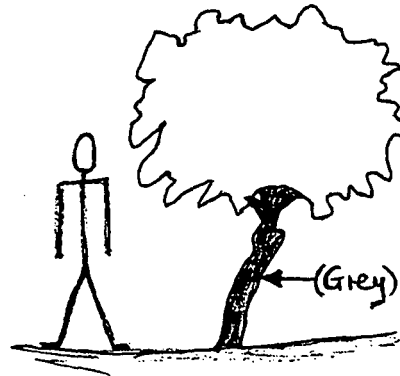
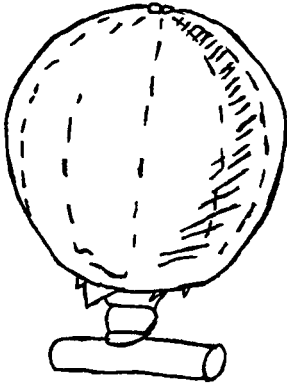
SALVADORA PERSICA

FRUIT (Red- Purple)

TREE SHAPE

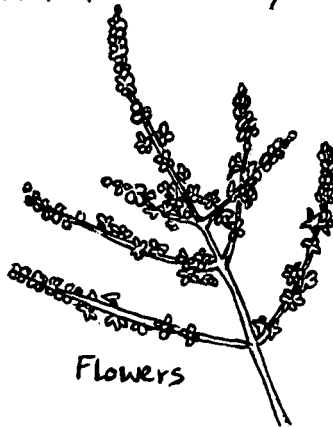


Larger than life-size



FLOWER (Green- White)

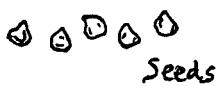
FOLIAGE



LEAF (Green)



SEED



# Tree growing

**Names:** Caday

*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  
spacing

Fertilizers and  
insecticides

## 6. Aftercare:

Growth and  
yields

## 7. Other notes:

## 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:

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

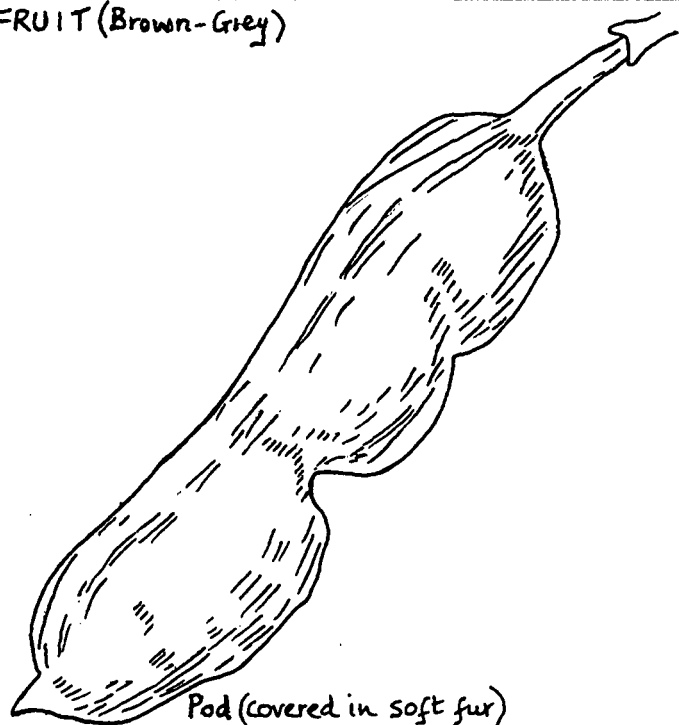
SOMALI  
NAME

RAQAY

LATIN  
NAME

TAMARINDUS INDICA

FRUIT (Brown-Grey)



Pod (covered in soft fur)

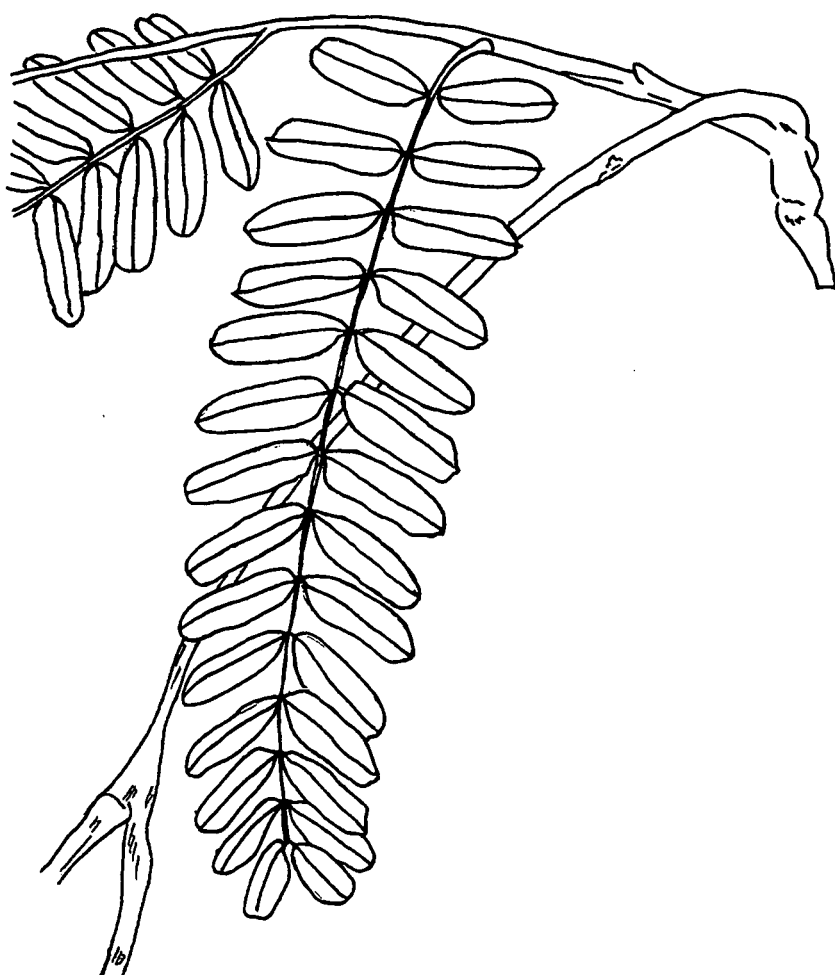
TREE SHAPE



FLOWER (Yellow-Pink)



FOLIAGE



LEAF



Leaflet

SEED (Brown)



Seeds

# 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. |
| Method and<br>spacing           | Seldom grown in plantations.                                                      |
| Fertilizers and<br>insecticides |                                                                                   |

## 6. Aftercare:

Circle weeding required. Needs protection when young.

|                      |                                                                                                                                                                                                                                             |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Growth and<br>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

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**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: |
|------|--|---------|

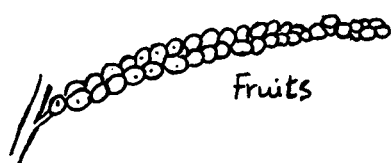
SOMALI  
NAME

DHUUR

LATIN  
NAME

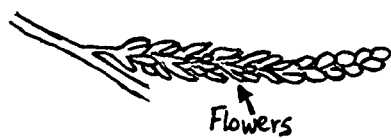
TAMARIX APHYLLA

FRUIT



TREE SHAPE

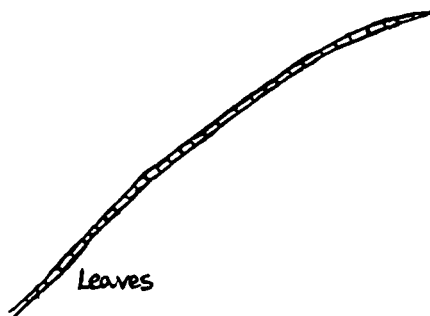
FLOWER (Green-Pink)



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  
spacing

Fertilizers and  
insecticides

## 6. Aftercare:

Growth and  
yields

## 7. Other notes:

Italian community should have knowledge of detailed propagation techniques.

## 1. Names: Hareeri *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'.

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

SOMALI  
NAME

HAREERI

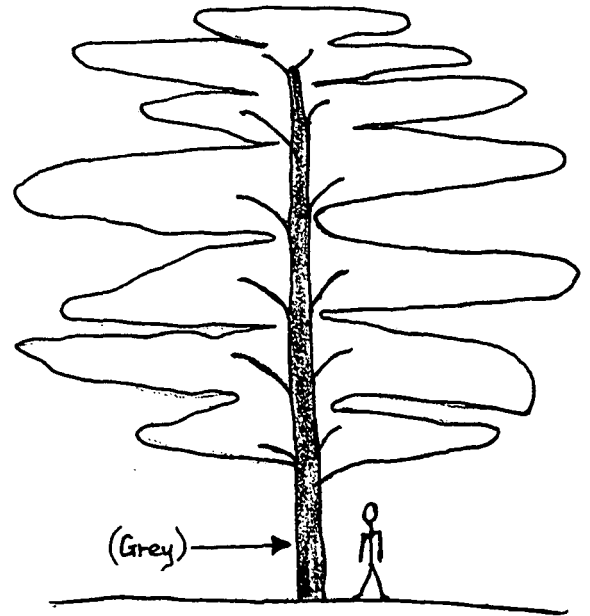
LATIN  
NAME

TERMINALIA PRUNIOIDES

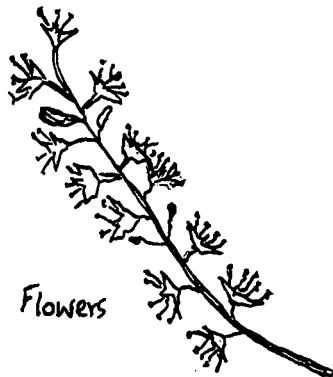
FRUIT (Red - Purple) - (Same as seed)



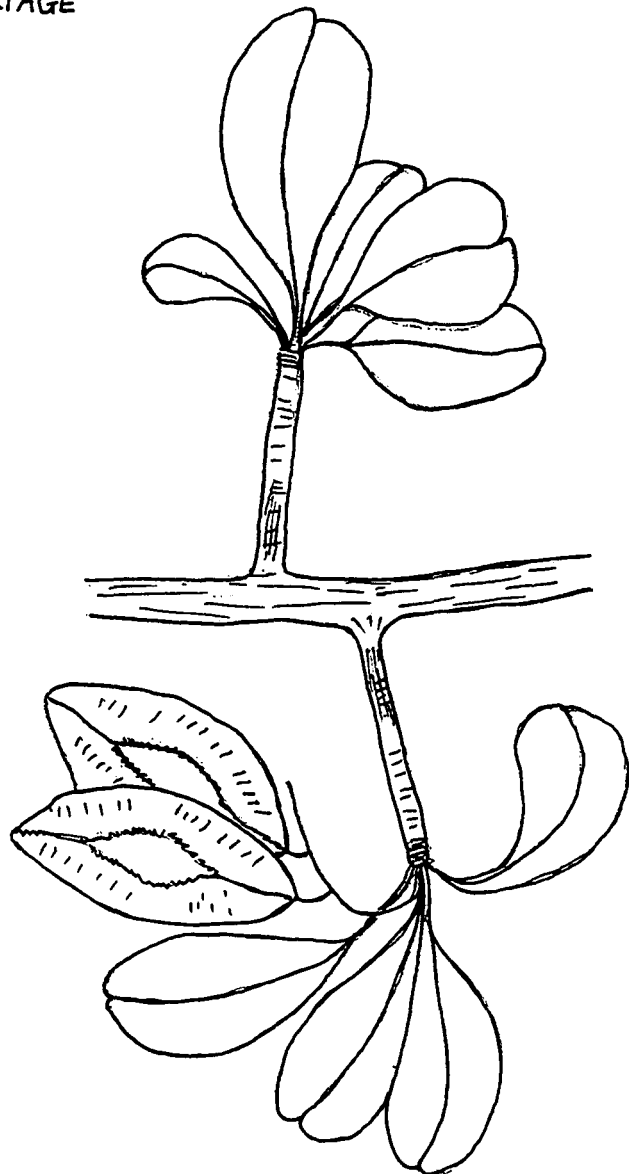
TREE SHAPE



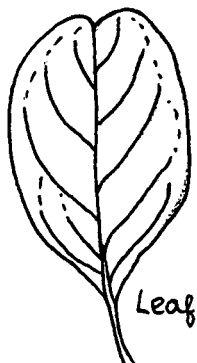
FLOWER



FOLIAGE



LEAF (Dull green)



SEED (Red - Purple)



# Tree growing

**Names:** Hareeri

*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  
spacing

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

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**1. Names:** Xarar *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      Colour: Dark brown  
durable and almost  
termite proof.

SOMALI  
NAME

XARAR

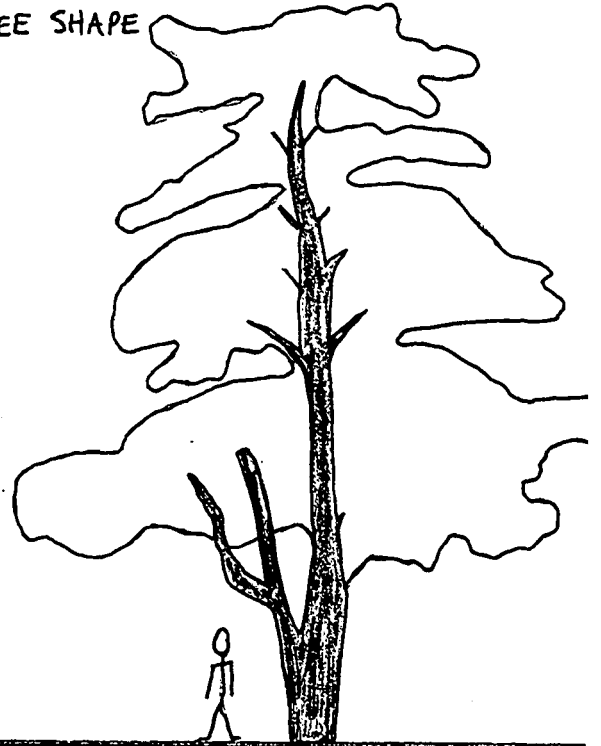
LATIN  
NAME

TERMINALIA SPINOSA

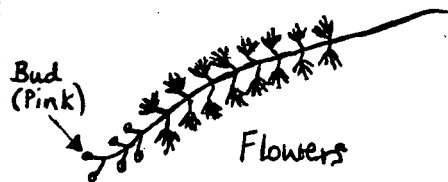
FRUIT (Yellow-Brown) -(Same as seed)



TREE SHAPE

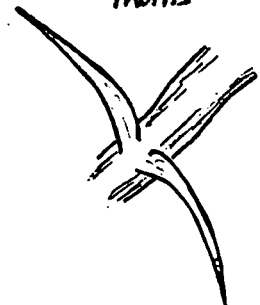


FLOWER (White-Yellow)

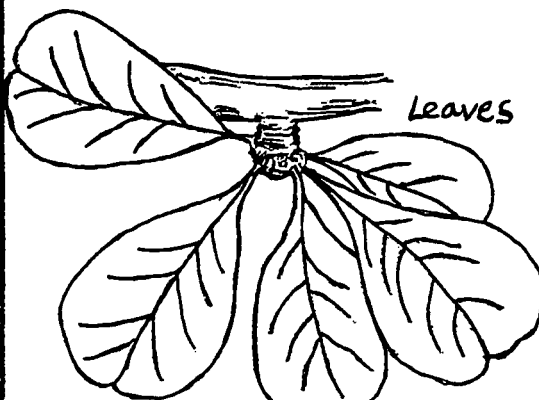


FOLIAGE

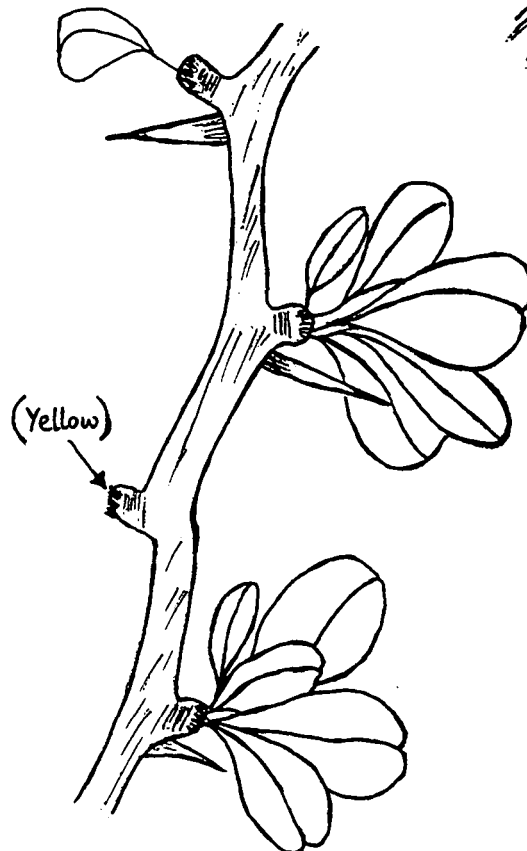
Thorns



LEAF (Light Green &amp; pink veins)



(Yellow)



SEED (Yellow-Brown)



# Tree growing

**Names:** Xarar

*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  
spacing

Fertilizers and  
insecticides

## 6. Aftercare:

Growth and  
yields

## 7. Other notes:

## 1. Names: Gob *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:

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

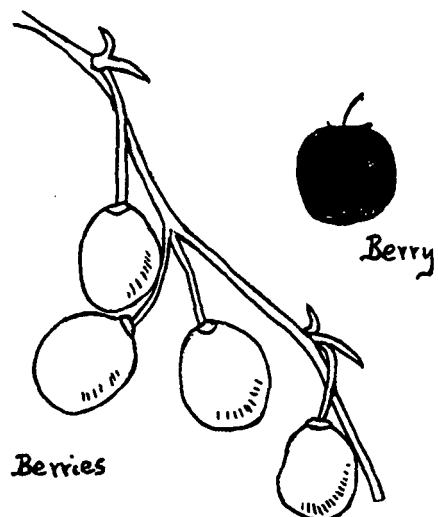
SOMALI  
NAME

GOB

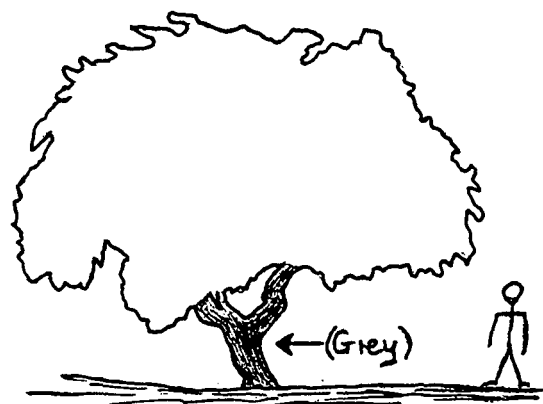
LATIN  
NAME

ZIZIPHUS MAURITIANA

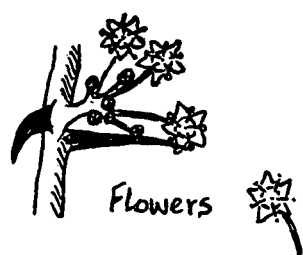
FRUIT (Brown)



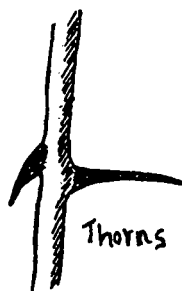
TREE SHAPE



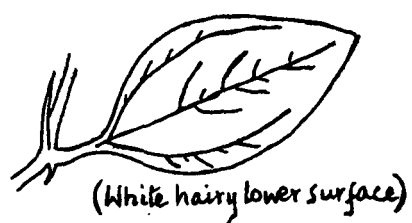
FLOWER (Orange)



FOLIAGE



LEAF (Shiny green)



SEED (Brown)



# Tree growing

**Names:** Gob

*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.<br>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 spacing          |                                                                                                      |
| 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

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## 1. Names: *Albizia lebbbeck*

|          |                                                             |
|----------|-------------------------------------------------------------|
| Arabic   | Dakn-el-Bashna                                              |
| English  | Siris tree, East Indian Walnut, Woman's tongue tree, Kokko. |
| Species  | <i>Albizia lebbbeck</i> (L.) Benth.                         |
| Family   | Leguminosae - Mimosoideae                                   |
| Synonyms | <i>Mimosa lebbbeck</i> L., <i>Mimosa sirissa</i> 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.

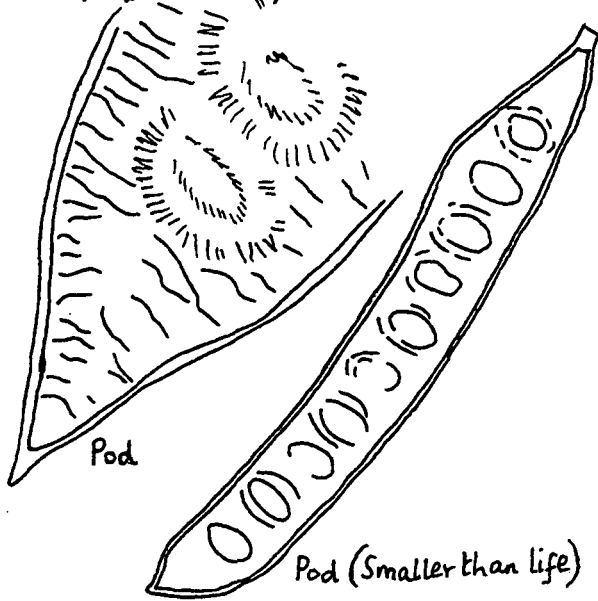
Colour: Sapwood: Yellow-White

Heartwood: Light brown streaked.

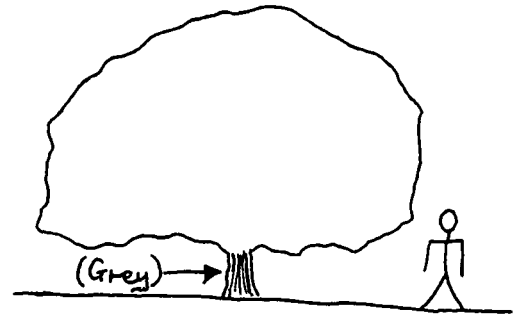
SOMALI  
NAMELATIN  
NAME

ALBIZIA LEBBECK

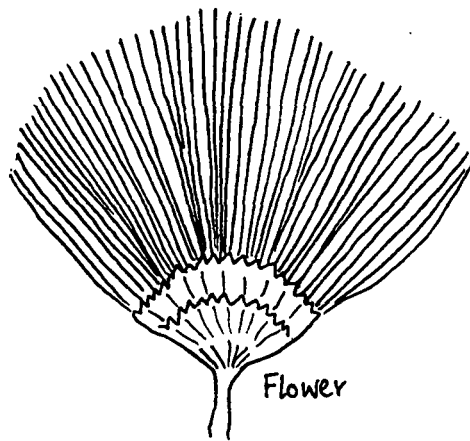
FRUIT (Light Yellow)



TREE SHAPE

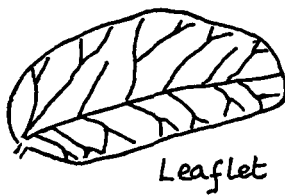


FLOWER (White)

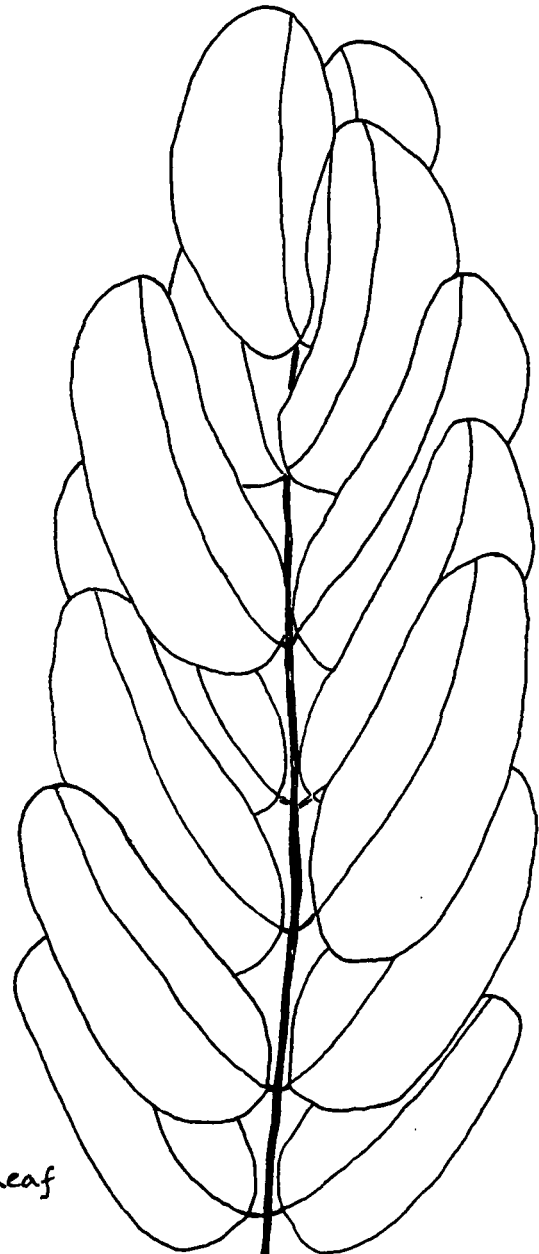
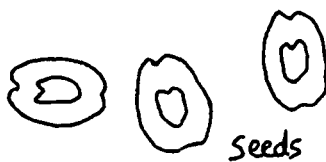


FOLIAGE

LEAF (Dull Green)



SEED (Brown)



leaf

# 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  
spacing

Fertilizers and  
insecticides

**6. Aftercare:**

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

Growth and Shortlived  
Yields

**7. Other notes:**

Moderately light demanding. Foliage is salt spray tolerant.

## 1. Names: Geed Hindi *Azadirachta indica*

|          |                                                                                                 |
|----------|-------------------------------------------------------------------------------------------------|
| Arabic   | Azadira Hindi                                                                                   |
| English  | Neem, Nim                                                                                       |
| Species  | <i>Azadirachta indica</i> Adr. Juss.                                                            |
| Family   | Meliaceae                                                                                       |
| Synonyms | <i>Melia azadirachta</i> L, <i>Melia indica</i> (Adr.Juss) Brand, <i>Antelaee azadirachta</i> . |

## 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 supply. 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  | Diameter of 100-150cm. Height of less than 4m.                                                                                                                                                                            |                                      |
| Bark       | Thick, rough, wide,                                                                                                                                                                                                       | Colour: Dark grey-brown              |
|            | shallow vertical fissures separating flat ridges. Often attacked by termites.                                                                                                                                             |                                      |
| 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                                                                                                                                                                                                |                                      |

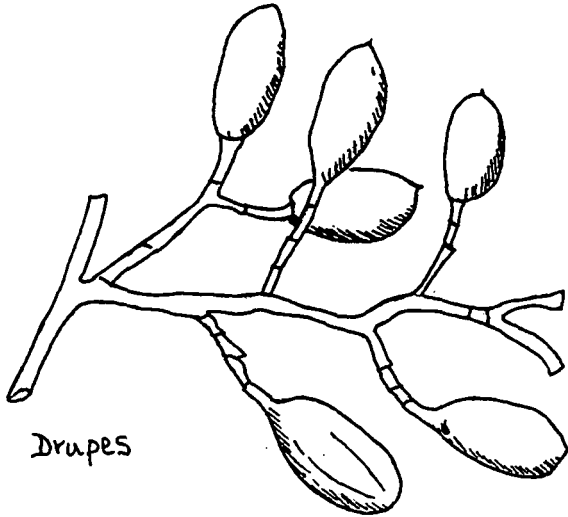
SOMALI  
NAME

GEED HINDI

LATIN  
NAME

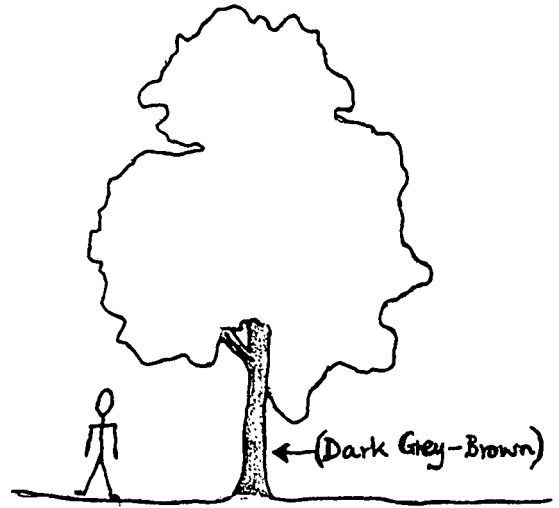
AZADIRACHTA INDICA

FRUIT (Yellow-Green)



Drapes

TREE SHAPE

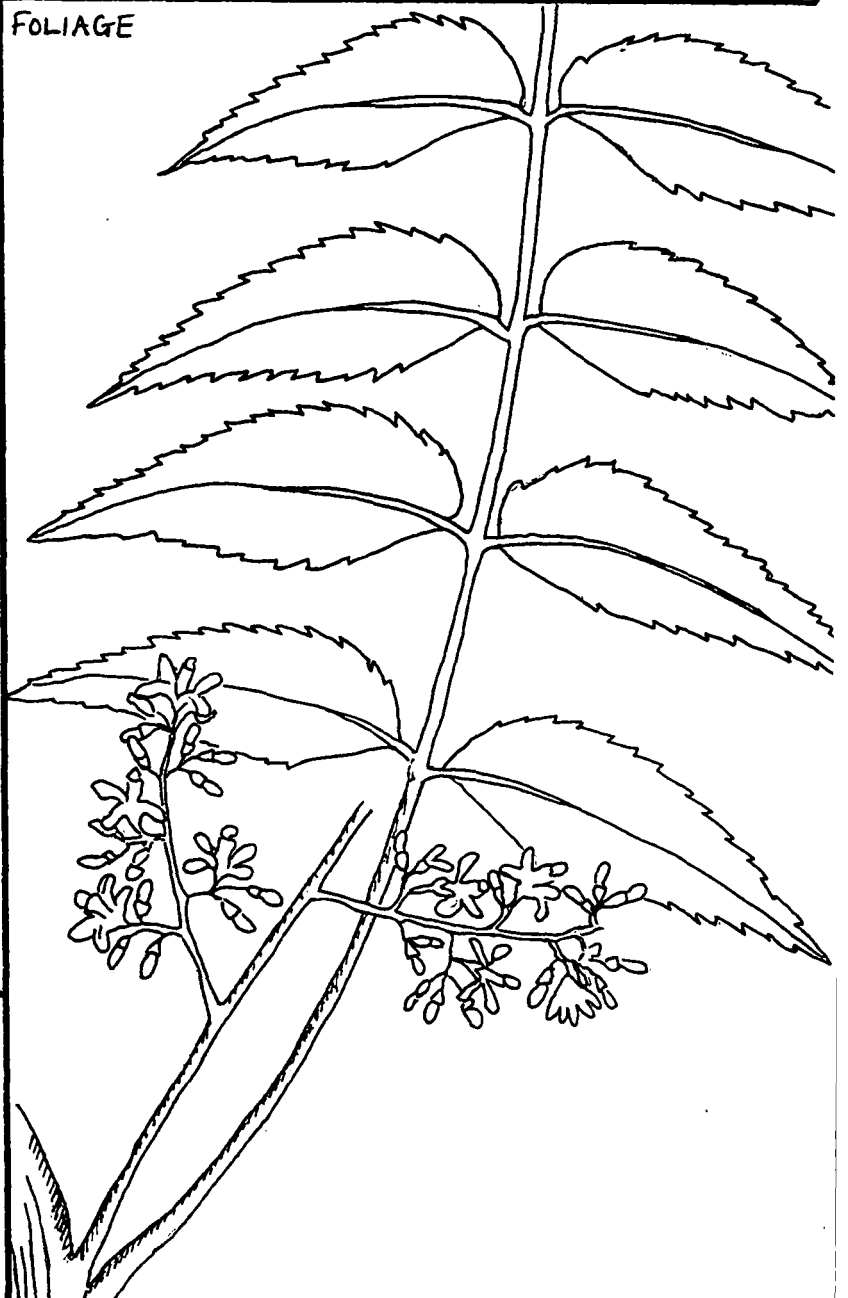


FLOWER (White)

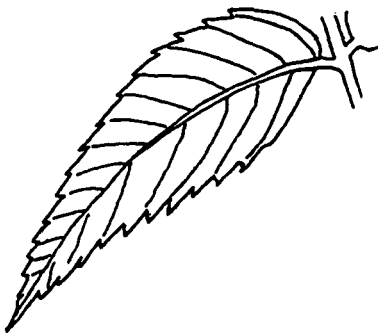


Flowers

FOLIAGE



LEAF (Green)



SEED



Seeds

# 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<br>dry sack | Only viable for 2-3 weeks (maximum of 2 months). Store in |
| 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<br>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<br>Spacement         | Dig pits at 8 x 8m espacement (3 x 3m for fuelwood plantation) Regular weeding essential in 1st year.      |
| Fertilizers and<br>insecticides |                                                                                                            |

## 6. Aftercare:

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

|                      |                                                                                                              |
|----------------------|--------------------------------------------------------------------------------------------------------------|
| Growth and<br>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.

## 1. Names: Boordi *Cassia siamea*

|          |                                           |
|----------|-------------------------------------------|
| Arabic   |                                           |
| English  | Ironwood, Yellow Cassia, Bombay blackwood |
| Species  | <i>Cassia siamea</i> Lam                  |
| Family   | Leguminosae - Caesalpinioideae            |
| Synonyms | <i>Cassia florida</i> . 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:

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

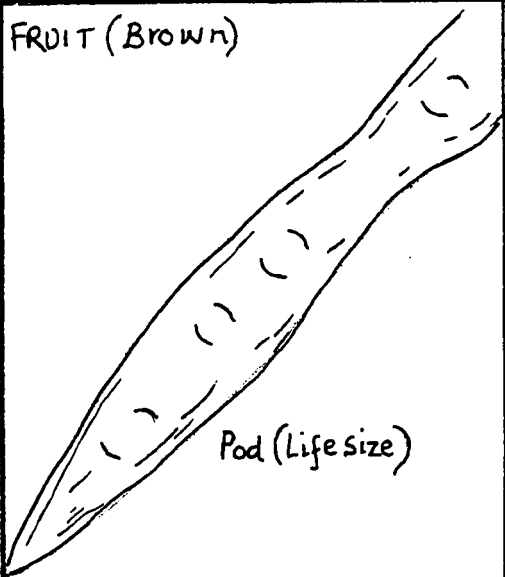
SOMALI  
NAME

BOORDI

LATIN  
NAME

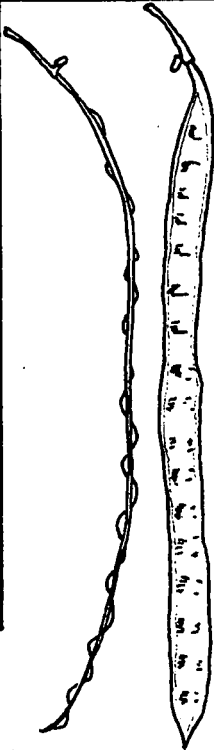
CASSIA SIAMEA

FRUIT (Brown)

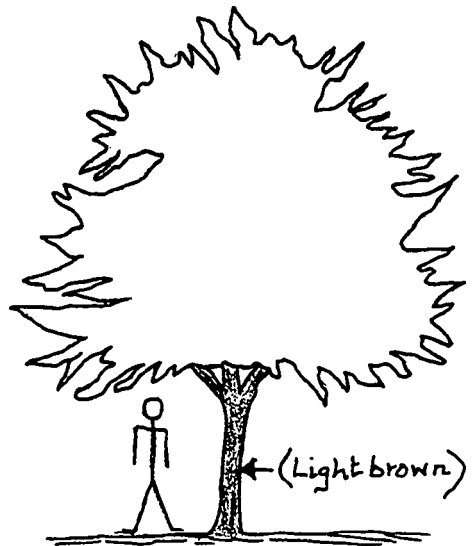


Pod (Life size)

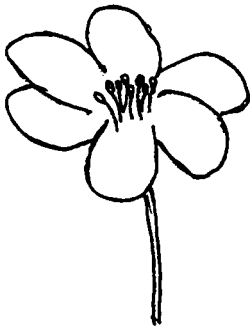
Pods (smaller  
than life)



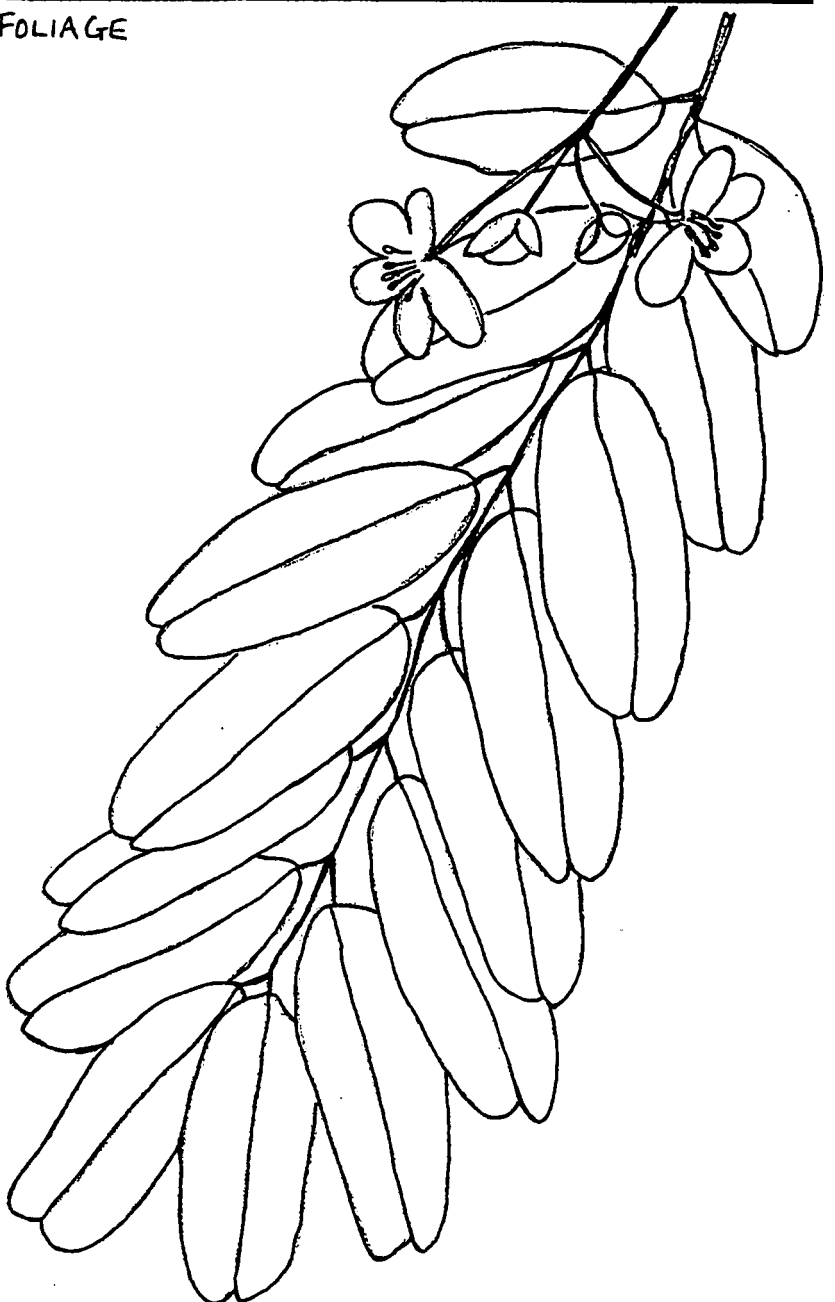
TREE SHAPE



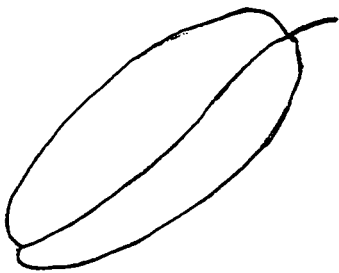
FLOWER (Bright Yellow)



FOLIAGE



LEAF (Grey-Green)



SEED (Shiny dark brown)



seeds

# 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 the sun and beat with sticks to separate seed. Mortar and pestle. |
| Extraction      |                                                                                                                            |
| 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  
spacing

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.

**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 windbreak 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:

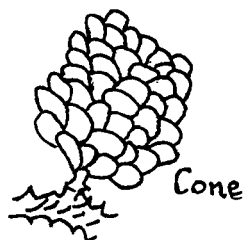
|                |                                                                                                                                                                                                             |                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| TREE SHAPE     | Narrow crown                                                                                                                                                                                                |                                           |
| Height         | Up to 20m                                                                                                                                                                                                   |                                           |
| Trunk and Bark | Straight and tall. Low spreading buttresses. Up to 40cm dbh.<br>Rough, longitudinally, flaking fissured. Smooth when young.<br>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. |                                           |

SOMALI  
NAME

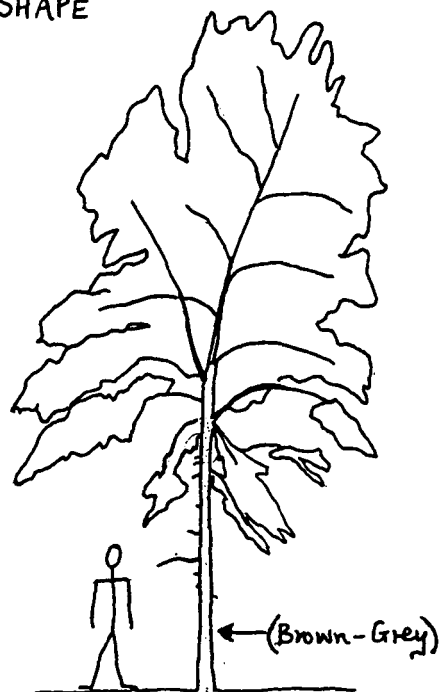
SHAWRI

LATIN  
NAMECASUARINA  
EQUISETIFOLIA

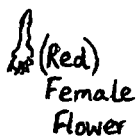
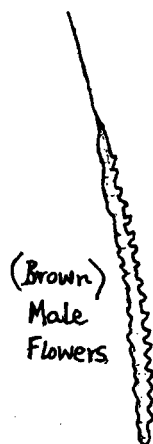
FRUIT (Light Brown)



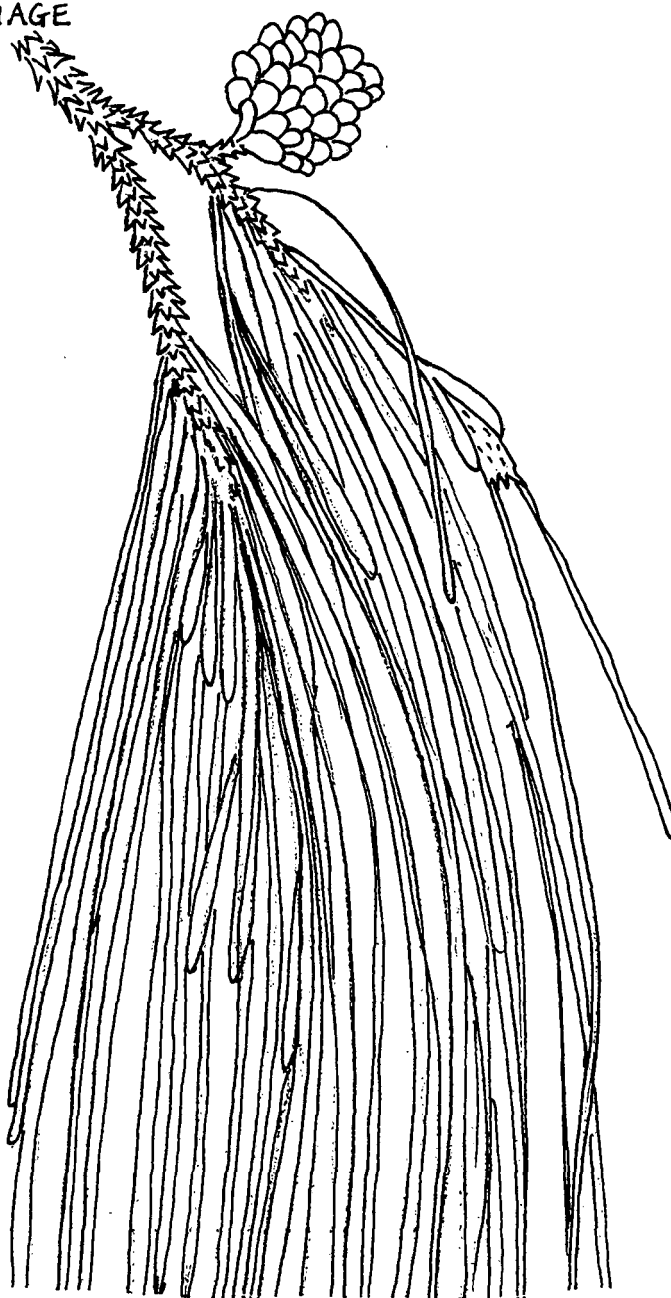
TREE SHAPE



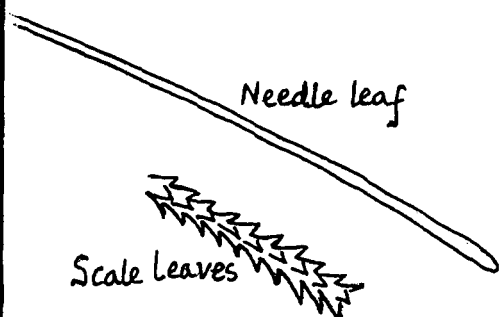
FLOWER (Brown or Red)



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 spacing           | 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.

## 1. Names: Baxarsaaf *Eucalyptus camaldulensis*

|          |                                                     |
|----------|-----------------------------------------------------|
| Arabic   | Kafur                                               |
| English  | River red gum, Long beak eucalyptus, Murray red gum |
| Species  | <i>Eucalyptus amaldulensis</i> Dehnh                |
| Family   | Myrtaceae                                           |
| Synonyms | <i>Eucalyptus rostrata</i> 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,                                                                                                                                                                                      | Colour: Blackish at base, white-light pale and peeling higher up. 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.                                                                                                                                                                                                     | Colour: White                                                                                                |
|            | Small flower clusters at leaf base                                                                                                                                                                          |                                                                                                              |
| 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                                                                                                                                                                                   |                                                                                                              |

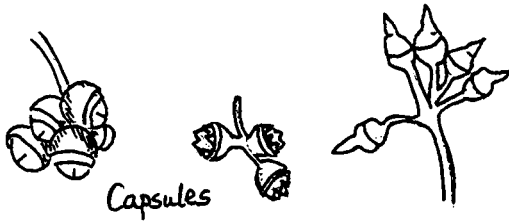
SOMALI  
NAME

BAXAR SAAF

LATIN  
NAME

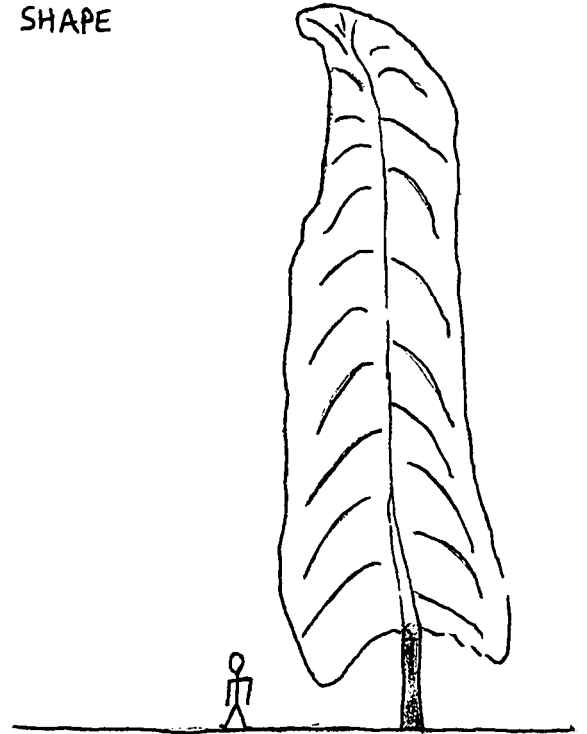
EUCALYPTUS  
CAMALDULENSIS

FRUIT (Light Brown)



Capsules

TREE SHAPE



FLOWER (White)

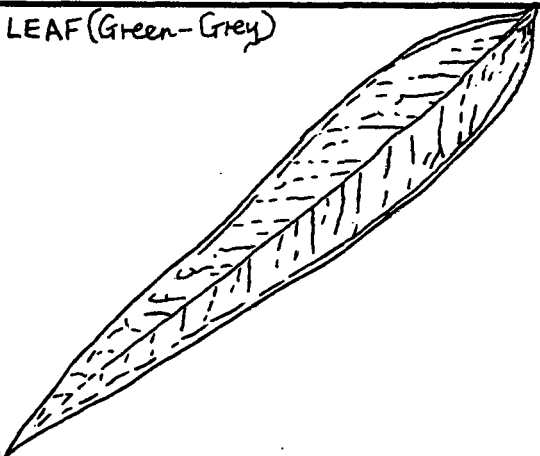


Flowers

FOLIAGE



LEAF (Green-Grey)



SEED



Seeds

# Tree growing

**Names:** Baxarsaaf

*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 spacing:** 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<sup>3</sup>/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.

## 1. Names: Mahogany *Khaya senegalensis*

|          |                                                |
|----------|------------------------------------------------|
| Arabic   | Khaya                                          |
| English  | African Mahogany, Khaya wood, Senegal mahogany |
| Species  | <i>Khaya senegalensis</i> (Desr.) A. Juss      |
| Family   | Meliaceae                                      |
| Synonyms | <i>Swietenia senegalensis</i> 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 *Cassia 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 senegalensis* 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 dehiscent 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<br>Moderately durable. Difficult to preserve. Fair to saw, easy to season. Interlocking grain, slightly aromatic, termite resistant. |                                          |
|            |                                                                                                                                                                 | Colour:                                  |

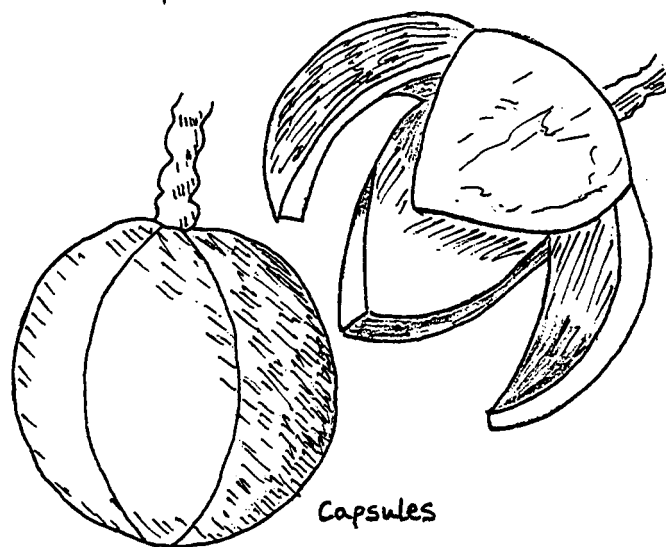
SOMALI  
NAME

MAHOGANY

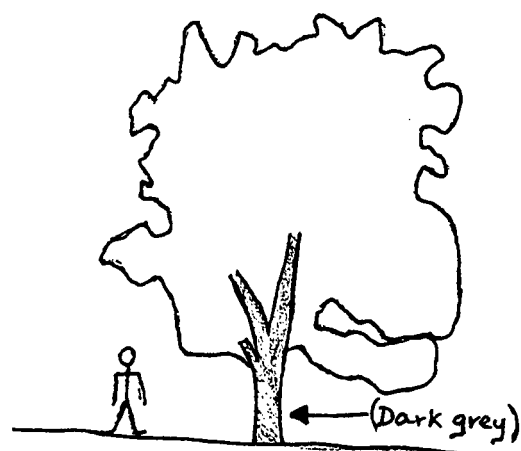
LATIN  
NAME

KHAYA SENEGALENSIS

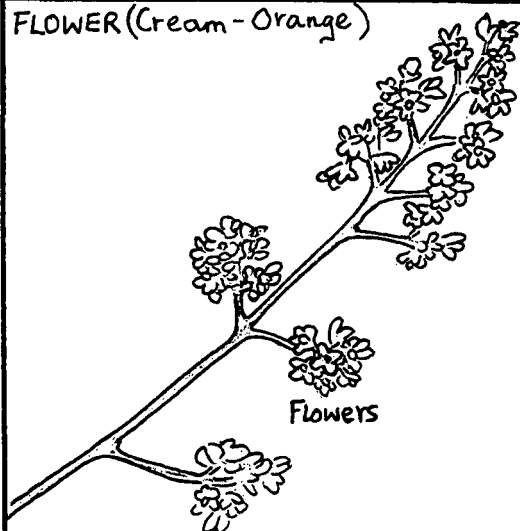
FRUIT (Brown)



TREE SHAPE



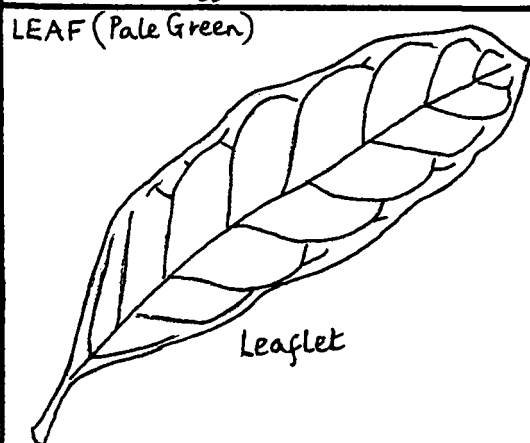
FLOWER (Cream-Orange)



FOLIAGE



LEAF (Pale Green)



SEED



# Tree growing

**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 spacing           |                                                                                                     |
| Fertilizers and insecticides |                                                                                                     |

## 6. Aftercare:

Careful weeding necessary

Growth and yields

## 7. Other notes:

Shade bearing when young. Light demanding when older.

## 1. Names: *Leucaena leucocephala*

|          |                                                                     |
|----------|---------------------------------------------------------------------|
| Arabic   |                                                                     |
| English  | Ipil-ipil tree, Horse tamarind, Tantan, White popinac, Lead tree.   |
| Species  | <i>Leucaena leucocephala</i> (Lam.) de Wit                          |
| Family   | Leguminosae - Mimosoideae                                           |
| Synonyms | <i>Mimosa leucocephala</i> Lam, <i>Leucaena glauca</i> 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 *Leucaena* 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. *Leucaena* 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:

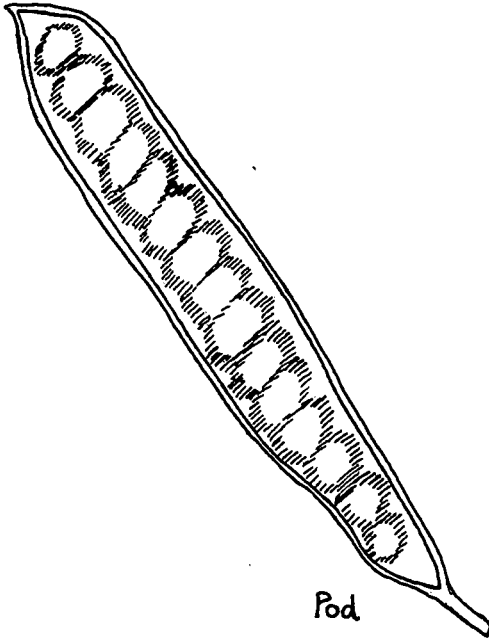
|                   |                                                                         |                          |
|-------------------|-------------------------------------------------------------------------|--------------------------|
| <b>TREE SHAPE</b> | Irregularly spreading crown - open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

SOMALI  
NAME

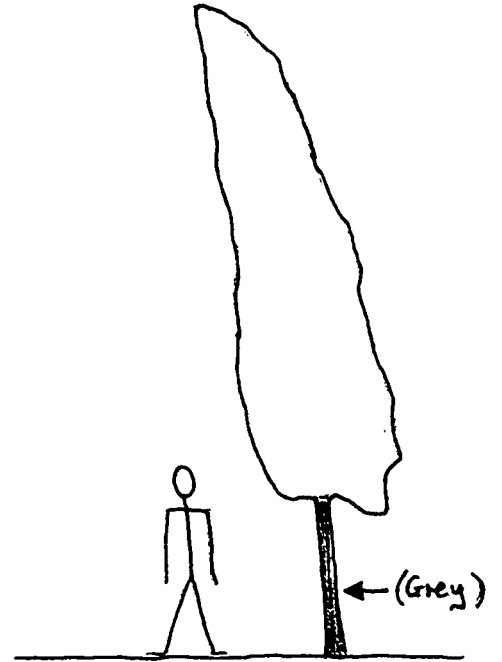
LATIN  
NAME

LEUCAENA  
LEUCOCEPHALA

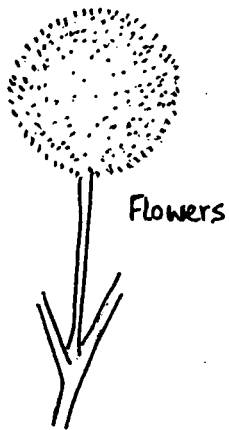
FRUIT (Dark brown)



TREE SHAPE



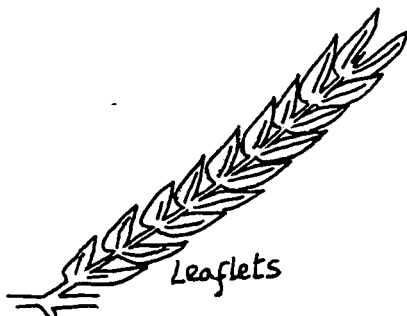
FLOWER (White)



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 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<br>spacing           | 3m x 3m                                                                                      |
| Fertilizers and<br>insecticides |                                                                                              |

## 6. Aftercare:

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

|                      |              |
|----------------------|--------------|
| Growth and<br>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.

## 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:

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

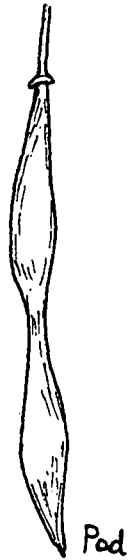
SOMALI  
NAME

GEED WALAAYO

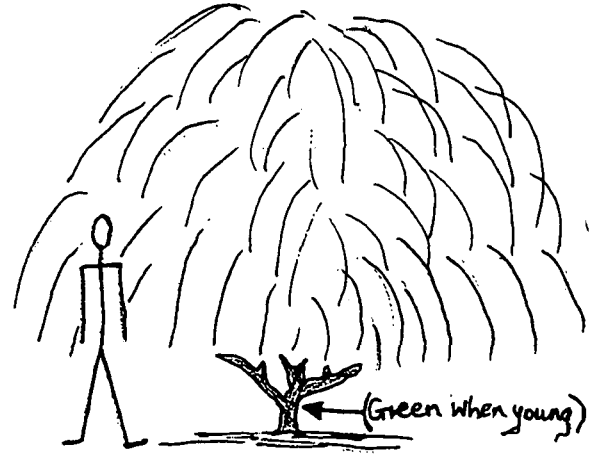
LATIN  
NAME

PARKINSONIA ACULEATA

FRUIT (Brown-Yellow)



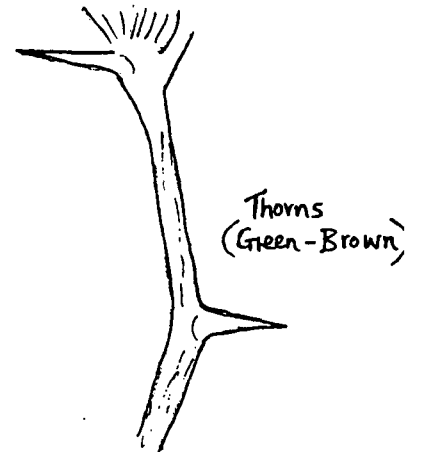
TREE SHAPE



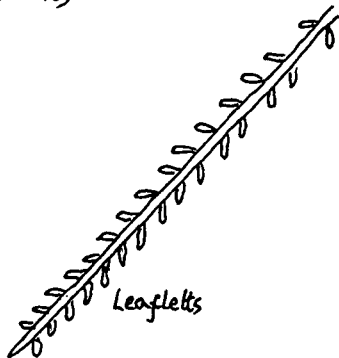
FLOWER (Yellow)



FOLIAGE



LEAF (Green)



SEED (Dark brown)



# 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 spacing           | 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.

## 1. Names: *Prosopis chilensis*

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

## 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.

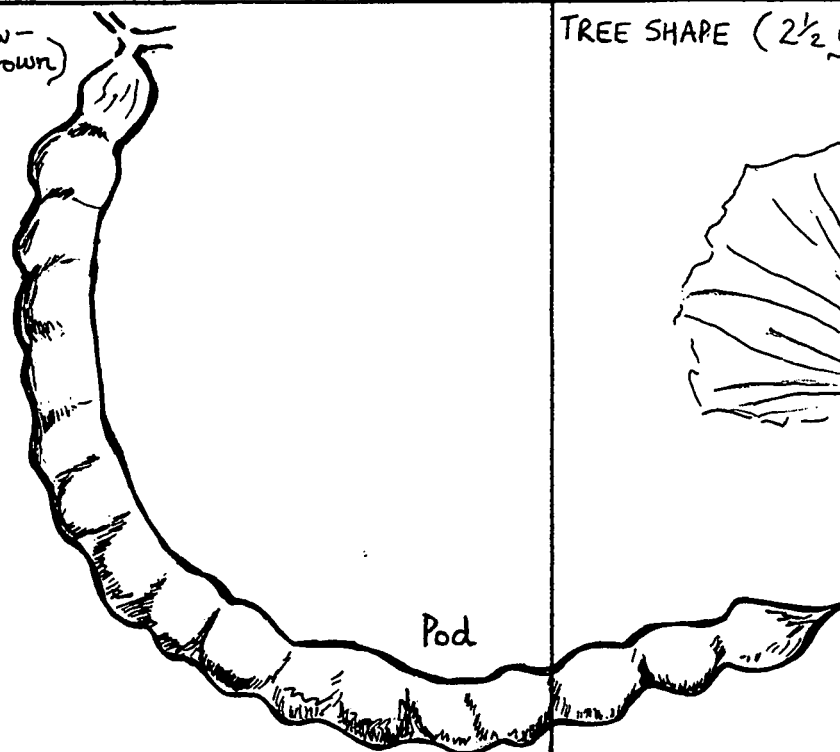
## 2. Detailed:

|                |                                                                             |                               |
|----------------|-----------------------------------------------------------------------------|-------------------------------|
| TREE SHAPE     | Rounded. Only slight shade                                                  |                               |
| Height         | 8-10m(-15m)                                                                 |                               |
| Trunk and Bark | Short                                                                       | Colour:                       |
| Branches       | Branches freely                                                             | Colour:                       |
| FOLIAGE        |                                                                             |                               |
| Twigs          | Flexible, knotty.<br>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  
NAMELATIN  
NAME

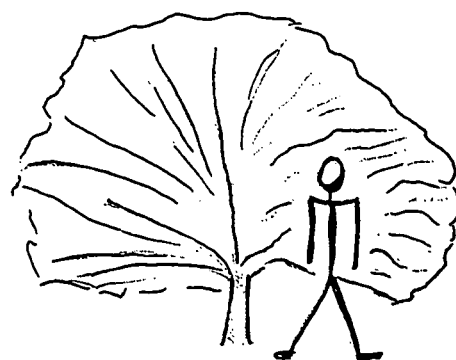
PROSOPIS CHILENSIS

FRUIT (Yellow-Brown)

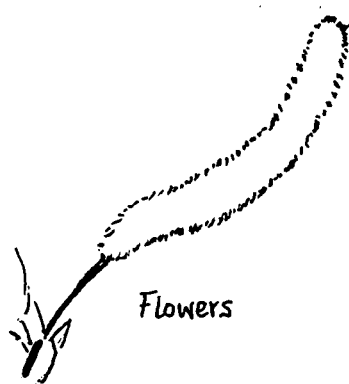


Pod

TREE SHAPE (2½ year old tree)

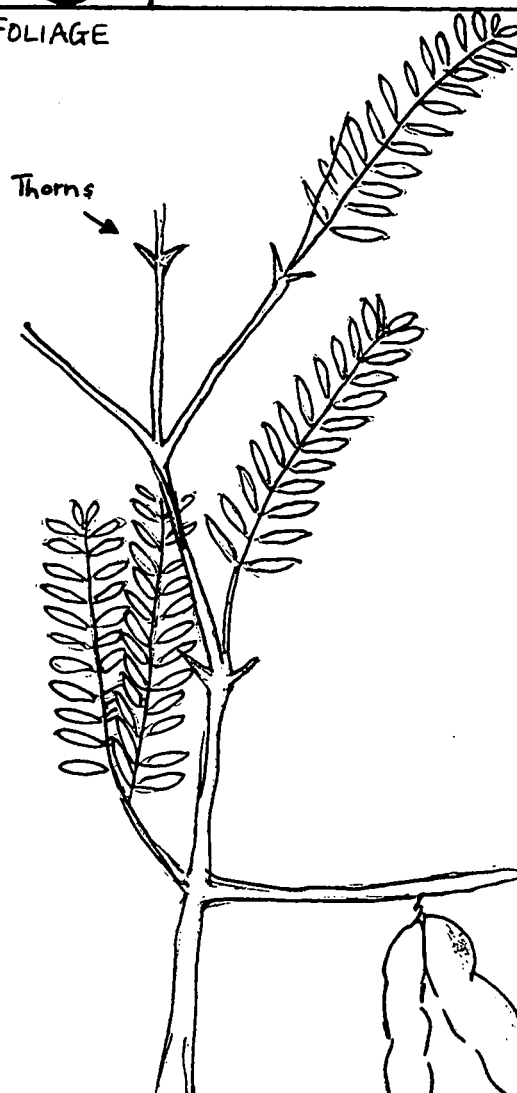


FLOWER (Green-Yellow)



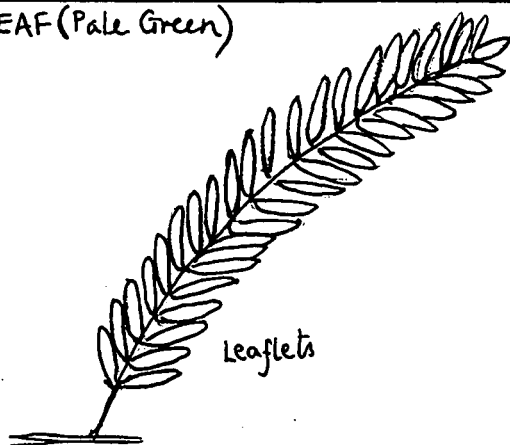
Flowers

FOLIAGE



Thorns

LEAF (Pale Green)



Leaflets

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  
spacing

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.

## 1. Names: *Prosopis cineraria*

|          |                                                                                      |
|----------|--------------------------------------------------------------------------------------|
| Arabic   | Ghaf                                                                                 |
| English  | Jand, Sumri, Dandi, Khejri.                                                          |
| Species  | <i>Prosopis cineraria</i> (L.) Druce                                                 |
| Family   | Leguminosae - Mimosoideae                                                            |
| Synonyms | <i>Mimosa cineraria</i> L, <i>Prosopis spicigera</i> L, <i>Prosopis spicata</i> 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 intercropping. 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:

|                       |                                                                                      |                                                               |
|-----------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>TREE SHAPE</b>     | Thin rounded open crown                                                              |                                                               |
| <b>Height</b>         | 5-9m                                                                                 |                                                               |
| <b>Trunk and Bark</b> | Crooked. Up to 30cm d.<br>Rough, thick with deep long furrows and horizontal cracks. |                                                               |
|                       |                                                                                      | Colour: Ash-grey                                              |
| <b>Branches</b>       | Irregularly branched.<br>Many.                                                       | Colour:                                                       |
| <b>FOLIAGE</b>        |                                                                                      |                                                               |
| <b>Twigs</b>          | Slender with thorns.                                                                 | Colour: Grey                                                  |
| <b>Thorns</b>         | Straight, pointed outward, broad conical base.                                       |                                                               |
| <b>Size</b>           | Less than 8mm                                                                        | Colour: Grey-yellow-orange                                    |
| <b>LEAF</b>           | Alternate, bipinnately compound. 1-3 pairs of pinnae.                                |                                                               |
| <b>Size</b>           |                                                                                      | Colour: Grey-green                                            |
| <b>Leaflet</b>        | 7-14 pairs on each side axis. Straight or slightly curved.                           |                                                               |
| <b>Size</b>           | 4-15 x 2-4.5mm                                                                       |                                                               |
| <b>FLOWERS</b>        | Spikelike racemes. 5 narrow petals per flower. 5mm long flower                       |                                                               |
| <b>Size</b>           | 5-13cm racemes                                                                       | Colour: Yellow-green                                          |
| <b>FRUIT</b>          | Pod. Very long, narrow, nearly cylindrical, edible. not splitting open.              |                                                               |
| <b>Size</b>           | 8-19 x 0.4 x 0.7cm                                                                   | Colour: Light straw yellow                                    |
| <b>SEED</b>           | Bean shaped, up to 25 per pod. Flattened.                                            |                                                               |
| <b>Size</b>           | 6mm long                                                                             | Colour:                                                       |
| <b>ROOTS</b>          | Large deep taproot. More than 3m long. Can penetrate more than 20m vertically.       |                                                               |
| <b>WOOD</b>           | Durable and hard                                                                     | Colour: Sapwood - thick whitish<br>Heartwood - purplish brown |

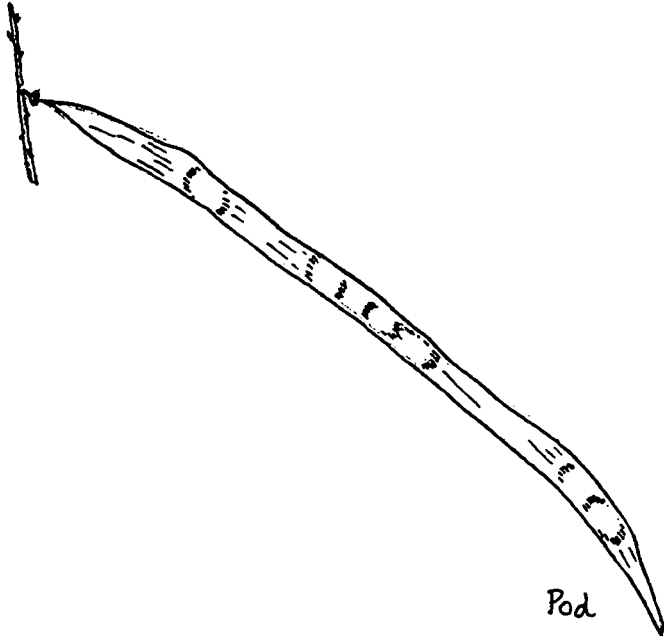
SOMALI  
NAME

LATIN  
NAME

PROSOPIS CINERARIA

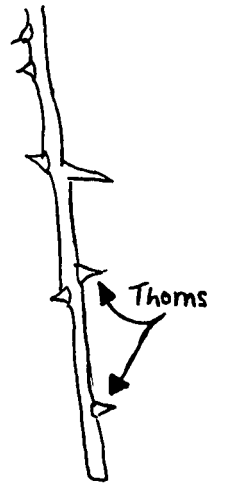
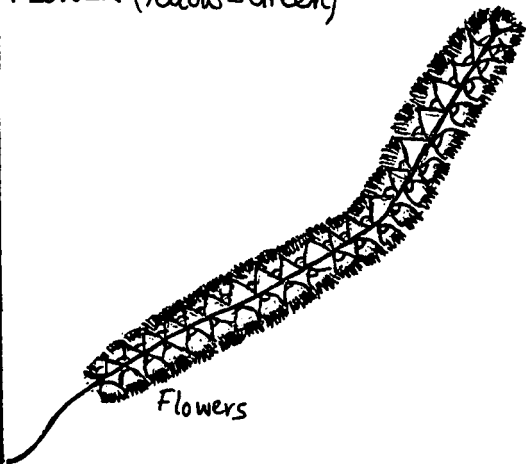
FRUIT (Light Brown)

TREE SHAPE

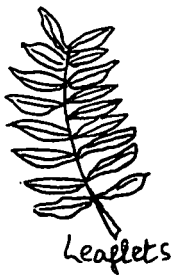


FLOWER (Yellow-Green)

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.<br>Seasonal waterlogging tolerated. Dry stony and black cotton<br>soils tolerated. Alluvial coarse sandy soils. Dry stone lands. |
| Method and<br>spacing           |                                                                                                                                                                                             |
| Fertilizers and<br>insecticides |                                                                                                                                                                                             |

## 6. Aftercare:

Poor form unless pruned. Requires weeding to begin with.

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

## 7. Other notes:

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

## 1. Names:

*Prosopis juliflora*

Arabic

English

Mesquite, Algoroba.

Species

*Prosopis juliflora* (Sw.) DC

Family

Leguminosae - Mimosoideae

Synonyms

*Mimosa juliflora*, *Prosopis cumanensis*, *P. bracteolata*, *P. dominicensis*, *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

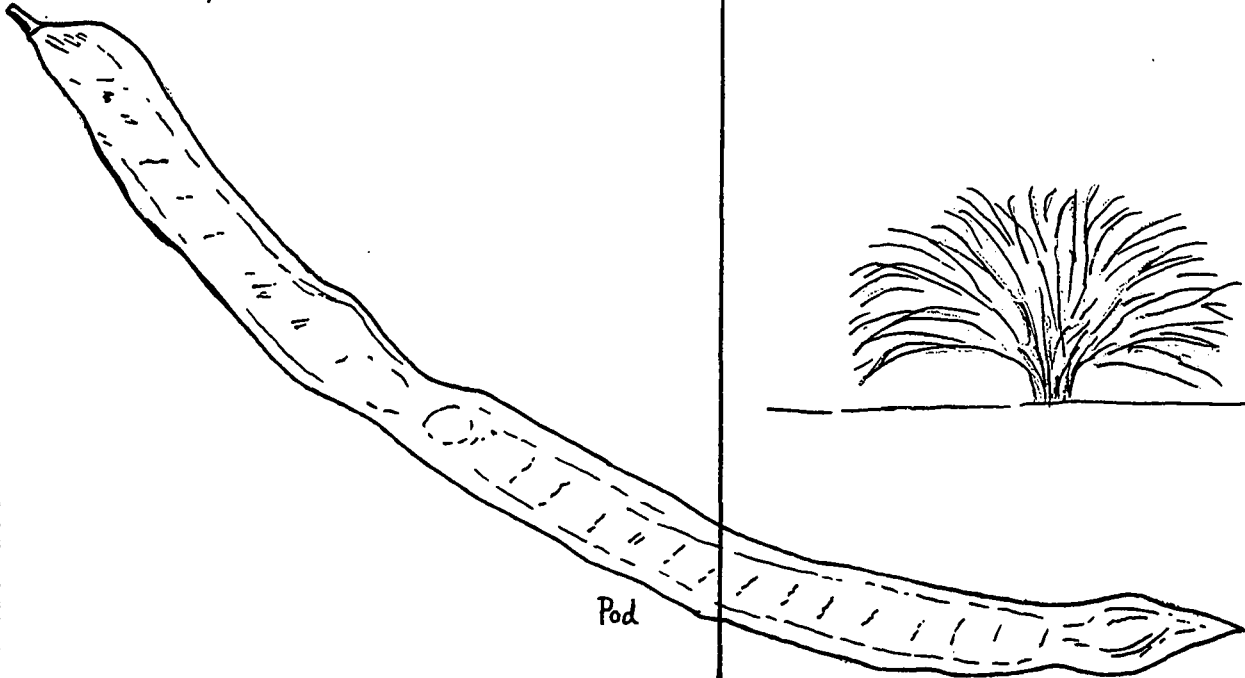
## 2. Detailed:

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

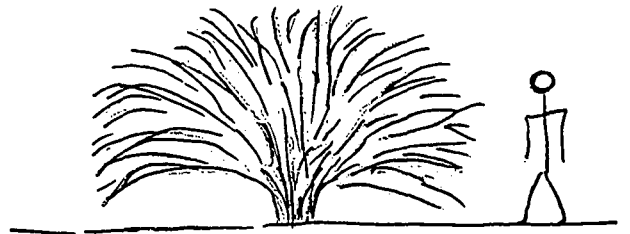
SOMALI  
NAMELATIN  
NAME

PROSOPIS JULIFLORA

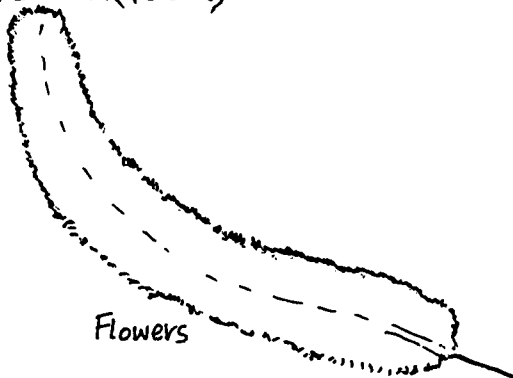
FRUIT (Yellow)



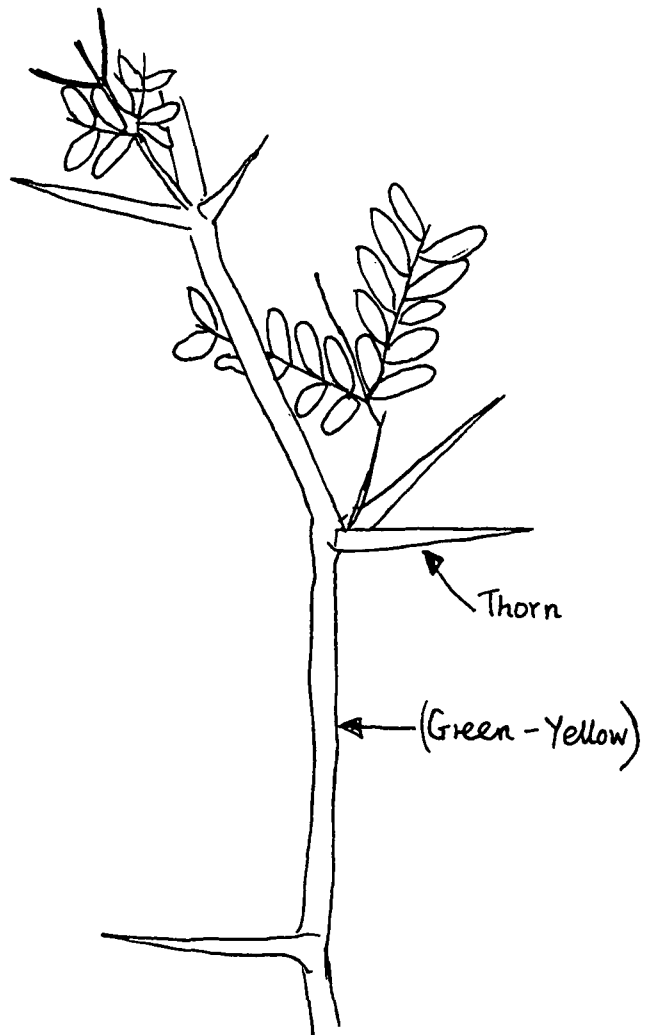
TREE SHAPE (Young tree)



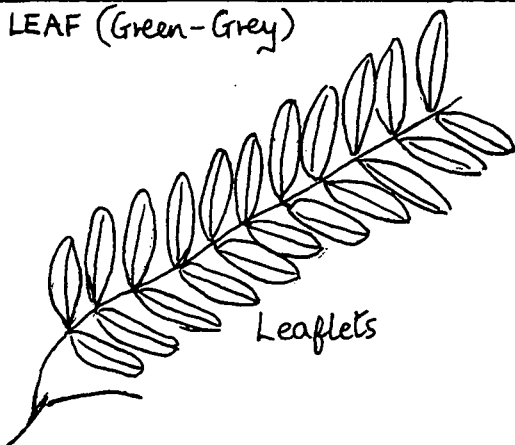
FLOWER (Yellow)



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 spacing           | 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 25m <sup>3</sup> /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

141

**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.                                      |                              |

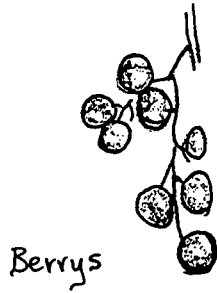
SOMALI  
NAME

MIRI MIRI

LATIN  
NAME

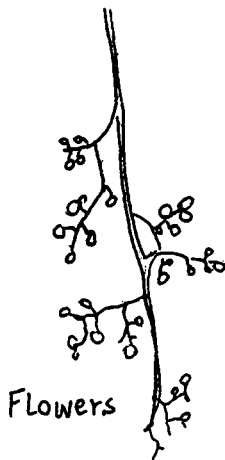
SCHINUS MOLLE

FRUIT



TREE SHAPE

FLOWER



FOLIAGE



LEAF



SEED

# Tree growing

**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.<br>Tolerates moderate salinity. Deep sandy soils. |
| Method and<br>spacing           | Requires wide spacing.                                                                             |
| Fertilizers and<br>insecticides |                                                                                                    |

## 6. Aftercare:

|                      |                          |
|----------------------|--------------------------|
| Growth and<br>yields | Shortlived. Fast growth. |
|----------------------|--------------------------|

## 7. Other notes:

Strongly light demanding. Tolerates salt winds.

## 1. Names: *Sesbania grandiflora*

|          |                                                            |
|----------|------------------------------------------------------------|
| Arabic   | Sisaban                                                    |
| English  | Corkwood tree, Agati, White dragonfly tree, Flamingo-bill. |
| Species  | <i>Sesbania grandiflora</i> (L.) Poir.                     |
| Family   | Leguminosea - Papilionaceae                                |
| Synonyms | <i>Agati grandiflora</i> (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:

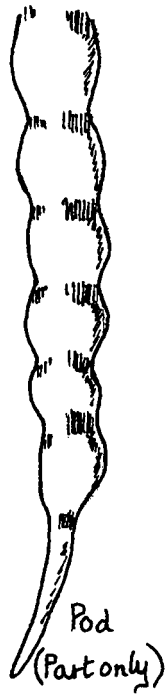
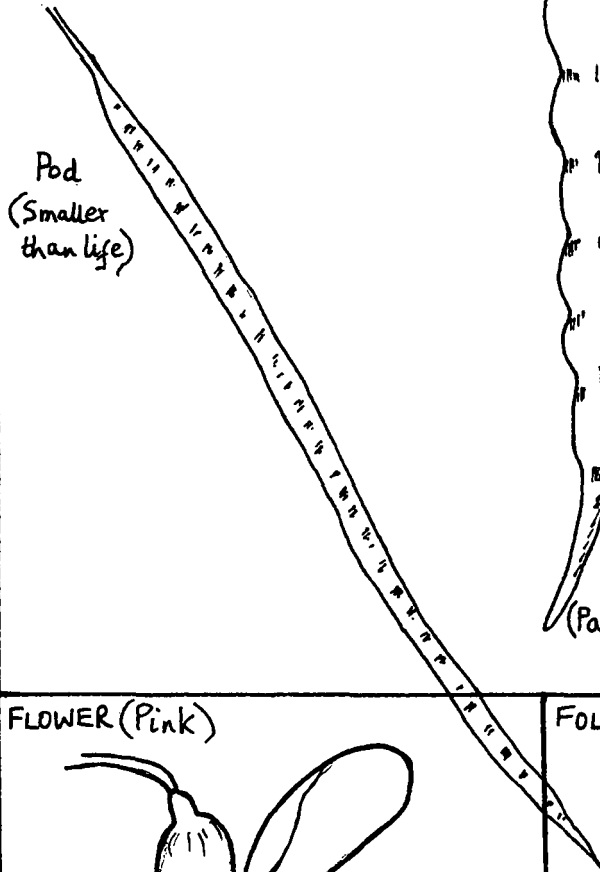
|            |                                                                        |                                     |
|------------|------------------------------------------------------------------------|-------------------------------------|
| TREE SHAPE | Spreading thinly with few nearly upright branches.                     |                                     |
| Height     | 8-10m                                                                  |                                     |
| Trunk and  | Straight. 30cm diameter.                                               |                                     |
| Bark       | 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. Elliptical.                                  |                                     |
| Size       | 5mm long                                                               | Colour: Brown                       |
| ROOTS      |                                                                        |                                     |
| WOOD       | Specific gravity = 0.42.                                               |                                     |
|            | Soft wood. (Cork like). Weak and pithy.                                |                                     |
|            |                                                                        | Colour: White                       |

SOMALI  
NAME

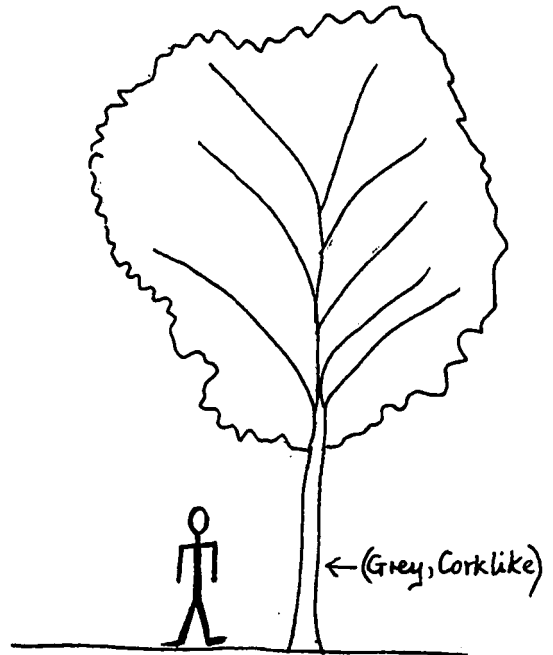
LATIN  
NAME

SESBANIA GRANDIFLORA

FRUIT (Light Brown)



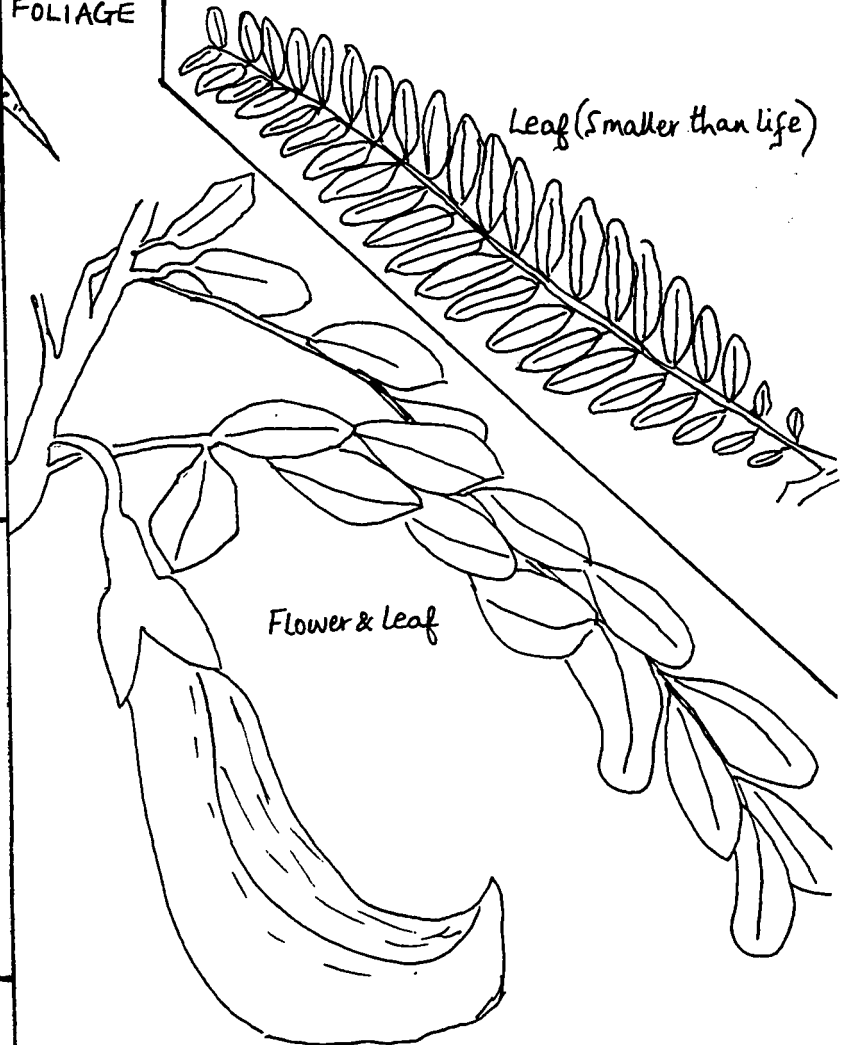
TREE SHAPE



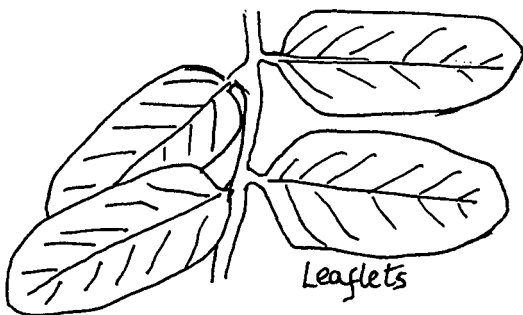
FLOWER (Pink)



FOLIAGE



LEAF (Green)



SEED



# Tree growing

**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<br>spacing | Requires very close spacing. |
|-----------------------|------------------------------|

Fertilizers and  
insecticides

**6. Aftercare:**

|                      |                          |
|----------------------|--------------------------|
| Growth and<br>yields | Shortlived. Fast growth. |
|----------------------|--------------------------|

**7. Other notes:**

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

**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:

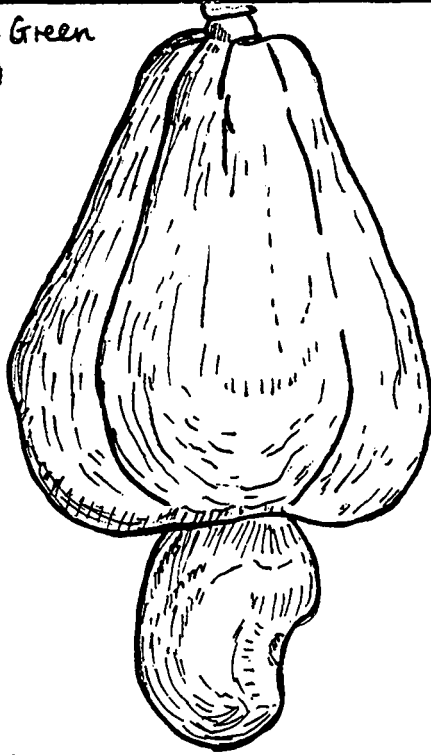
Evergreen unarmed medium sized tree.

## 2. Detailed:

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

SOMALI  
NAME

BIBBO

LATIN  
NAMEANACARDIUM  
OCCIDENTALEFRUIT (Yellow-Green  
-Red)

TREE SHAPE

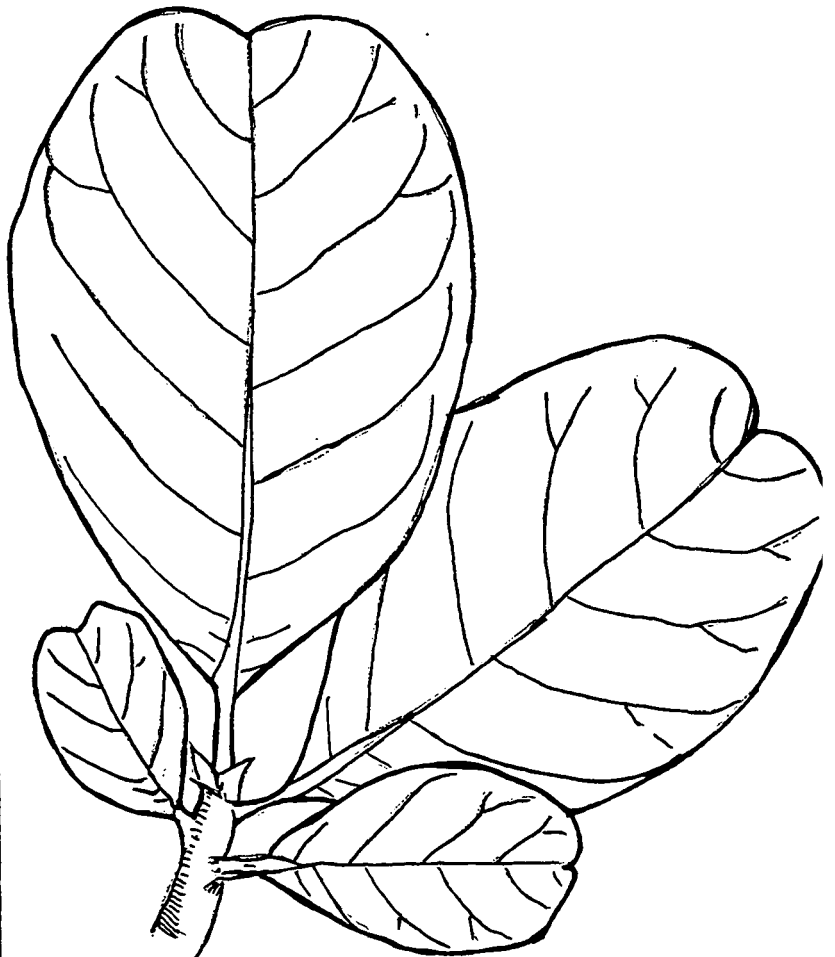


FLOWER (White-Yellow-Pink)



Flowers

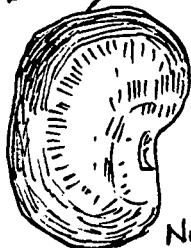
FOLIAGE



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 Dieltron 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.

**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:                                |

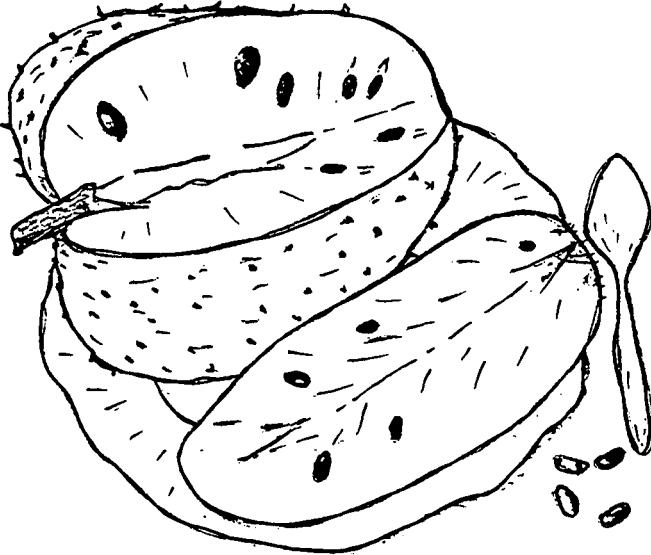
SOMALI  
NAME

ANUUNE (WEYN)

LATIN  
NAME

ANNONA MURICATA

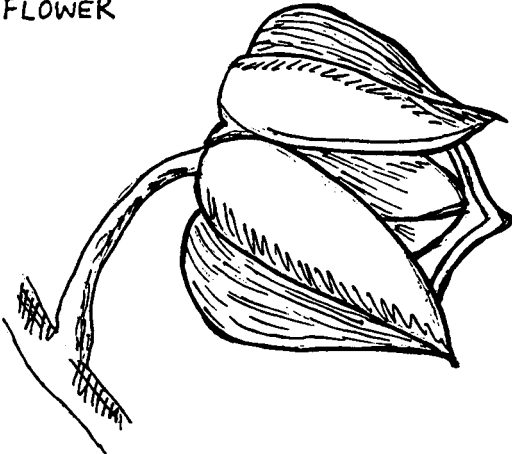
FRUIT (Green, white inside)



Edible Fruit on plate beside spoon  
(Smaller than life)

TREE SHAPE

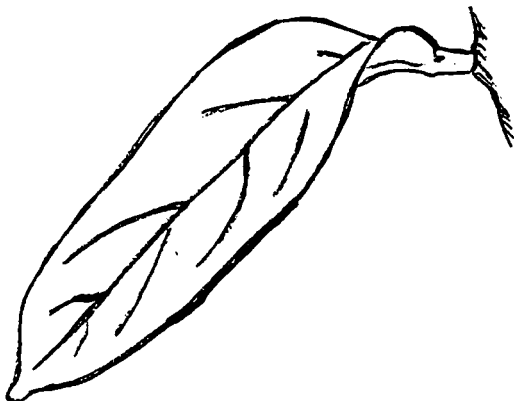
FLOWER



FOLIAGE



LEAF



SEED



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

## 7. Other notes:

**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.                                                      | Colour:                                       |
|            | Angle sharply upwards from trunk but may bend downwards at their ends. |                                               |
| 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:                                       |

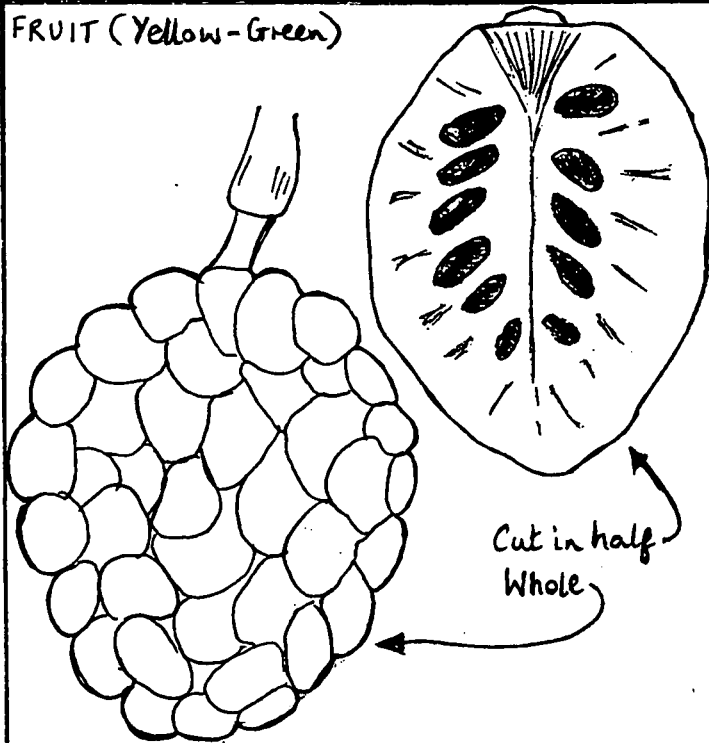
SOMALI  
NAME

ANUUNE (YARE)

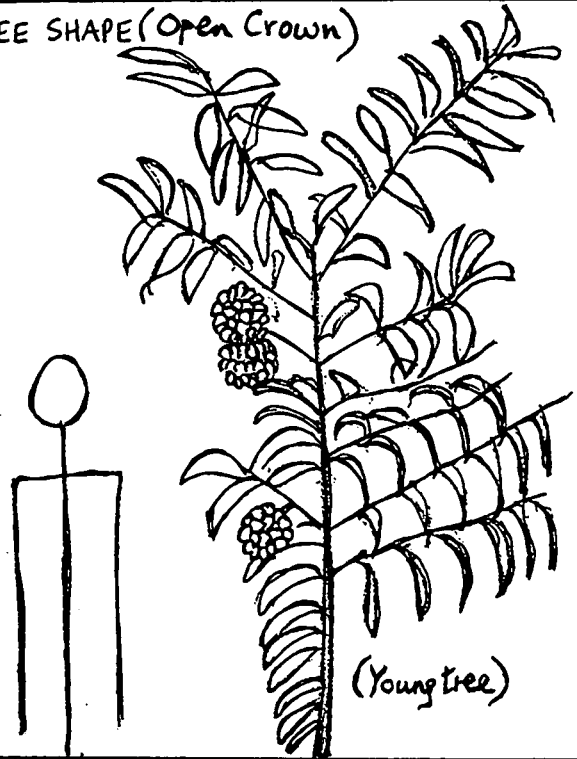
LATIN  
NAME

ANNONA SQUAMOSA

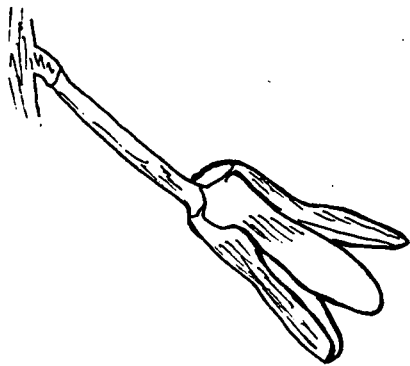
FRUIT (Yellow-Green)



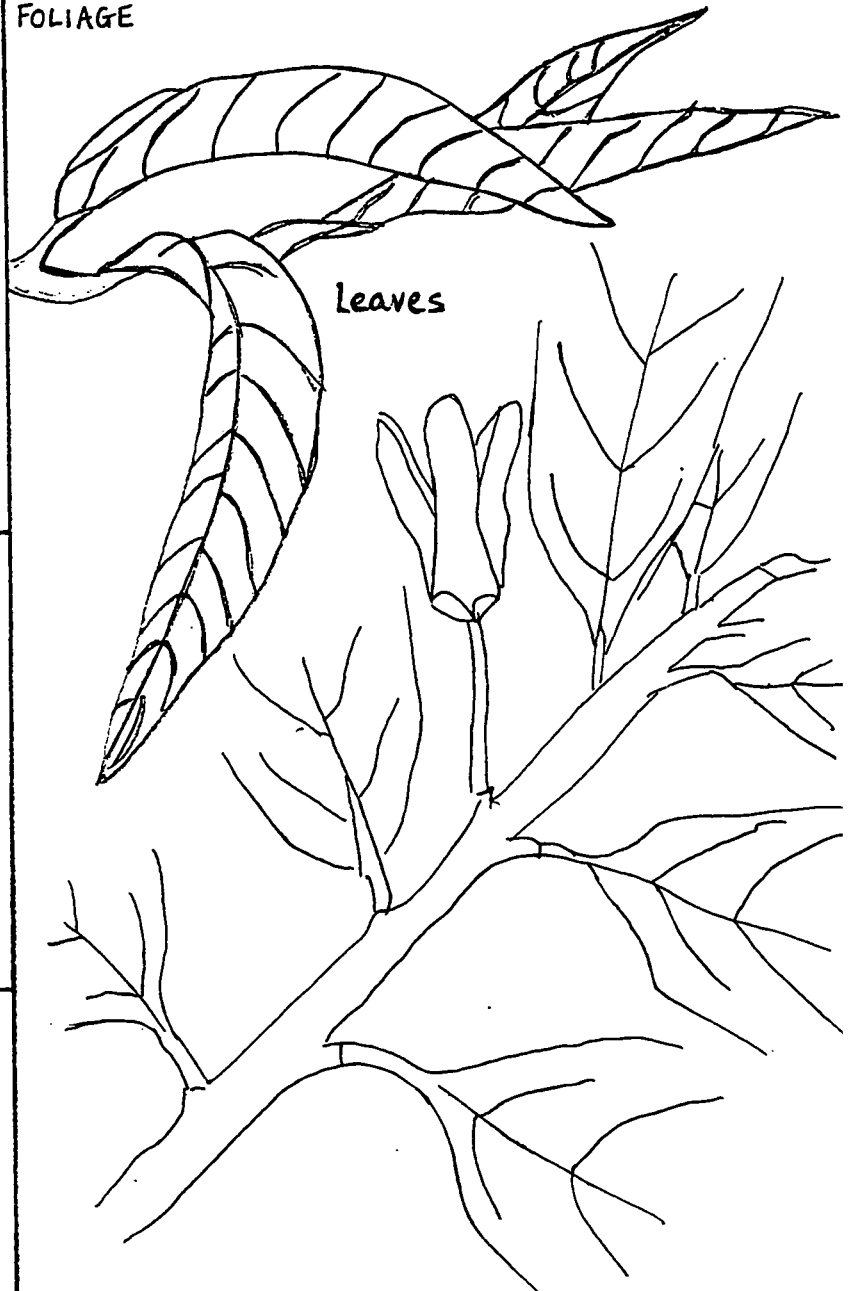
TREE SHAPE (Open Crown)



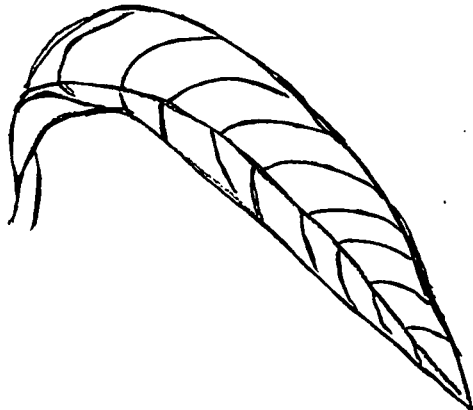
FLOWER (Yellow-Green)



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<br>spacement         | 5 x 5m. Could be intercropped with <i>Mangifera indica</i> to<br>occupy space between <i>Mangifera indica</i> until it grows up. |
| Fertilizers and<br>insecticides |                                                                                                                                  |

## 6. Aftercare:

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

|                      |                                |
|----------------------|--------------------------------|
| Growth and<br>yields | Fruits take 3 months to ripen. |
|----------------------|--------------------------------|

## 7. Other notes:

# Tree details

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**1. Names:** Babbaay *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 seedling 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** Hollow and less than 20cm diameter

**Bark** Numerous low projections Colour: Greyish  
marking leaf scars.

**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:

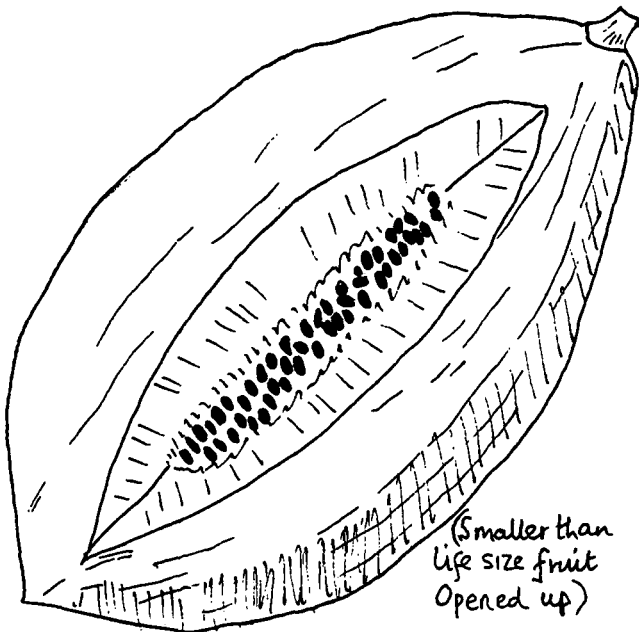
SOMALI  
NAME

BABBAAY

LATIN  
NAME

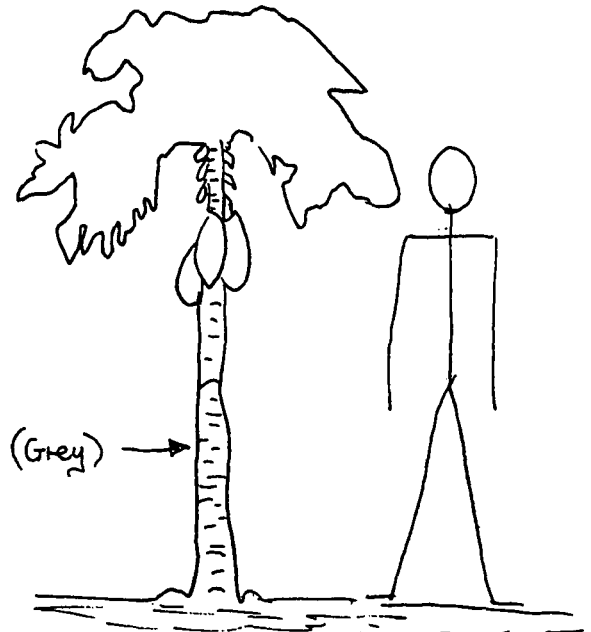
CARICA PAPAYA

FRUIT (Green - Orange)



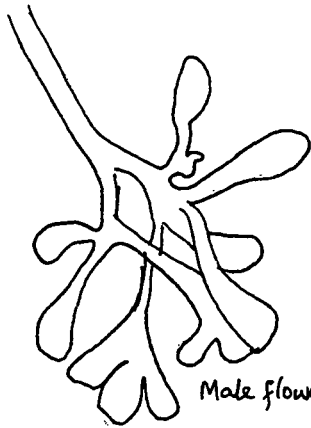
(Smaller than  
life size fruit  
Opened up)

TREE SHAPE



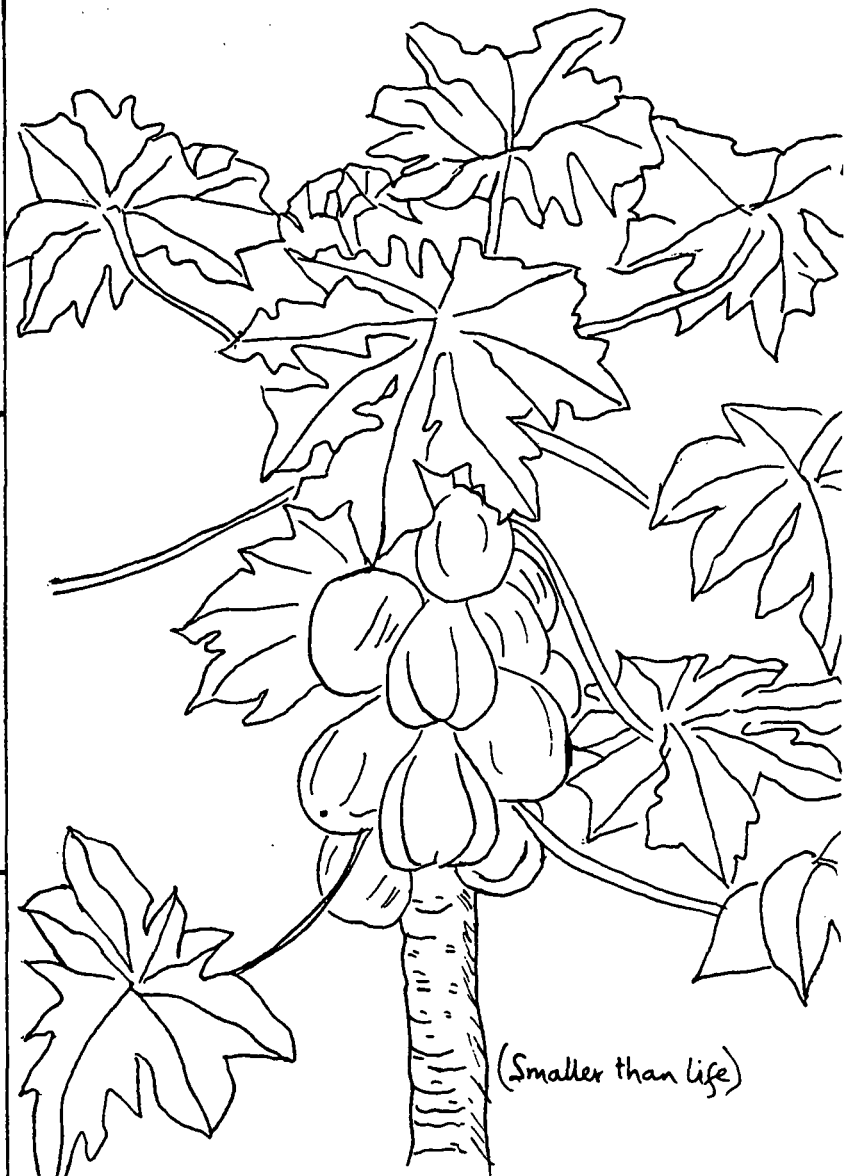
FLOWER (Yellow)

Female:  
Flower (larger  
than life)

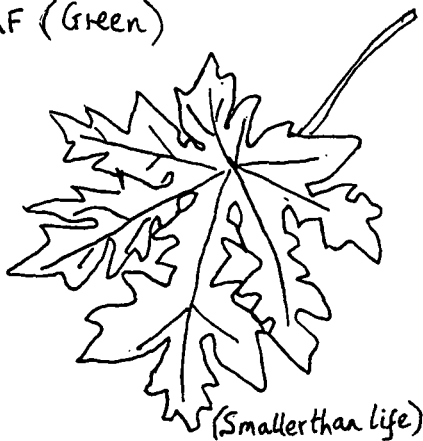


Male flower

FOLIAGE



LEAF (Green)



(Smaller than life)

SEED (Shiny black)



# Tree growing

**Names:** Babbaay

*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        | 1-4 weeks                                      |
| Percentage         |                                                |
| 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 spacing           | 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.

**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:

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

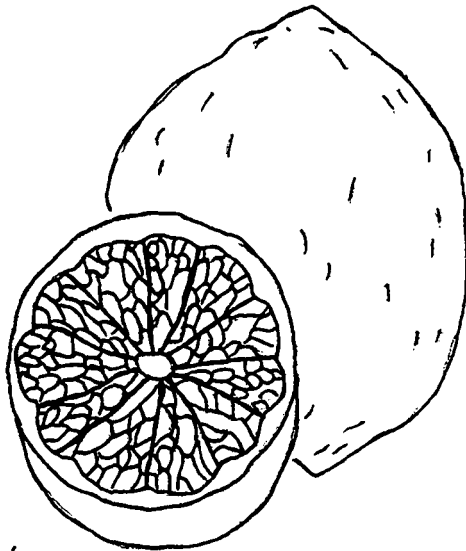
SOMALI  
NAME

LIIN

LATIN  
NAME

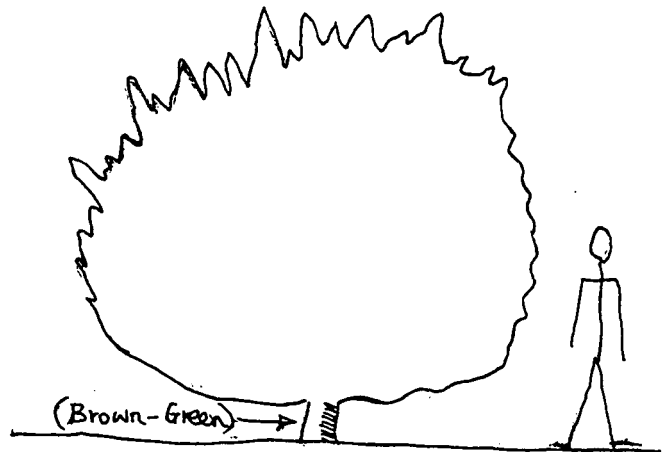
CITRUS  
AURANTIFOLIA

FRUIT (Yellow-Green)

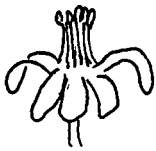


(Fruit: Cut in half)

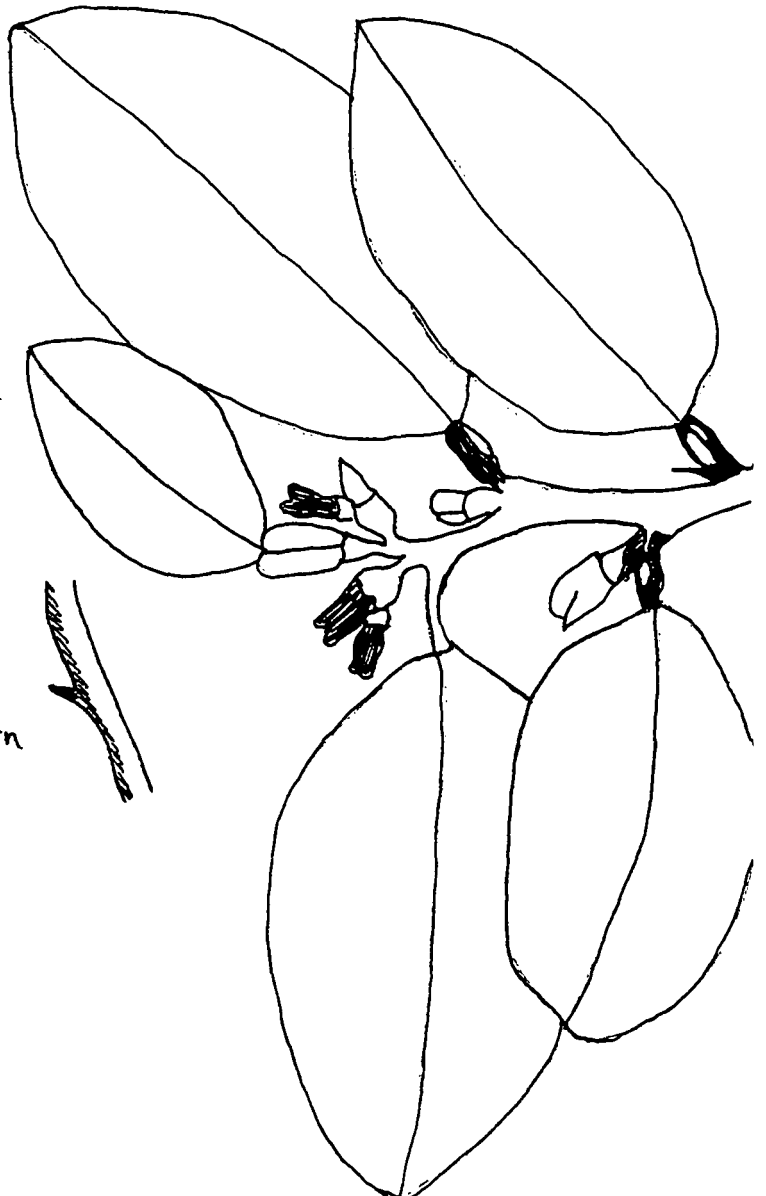
TREE SHAPE



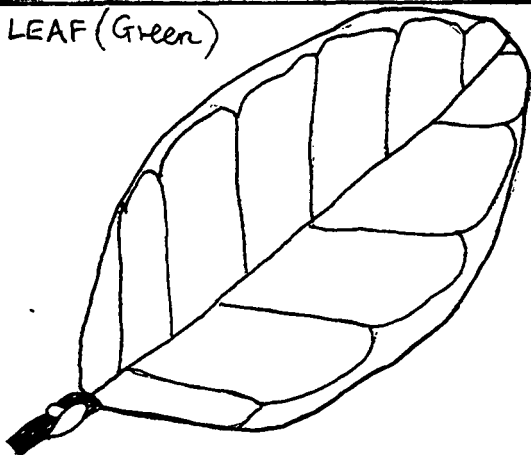
FLOWER (White)



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       | Well drained. Add NPK once/month at a rate of 2kg/100                                                               |
| seedlings          |                                                                                                                     |
| Potsize            |                                                                                                                     |
| Sowing             | Direct into pots. 3 per pot at 1cm depth                                                                            |
| Germination        | 3-4 weeks                                                                                                           |
| Percentage         |                                                                                                                     |
| 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<br>spacing           | 7 X 7m spacing. A planting hole of 40 X 40 X 40cm                                                     |
| Fertilizers and<br>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<br>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

169

**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:                  |

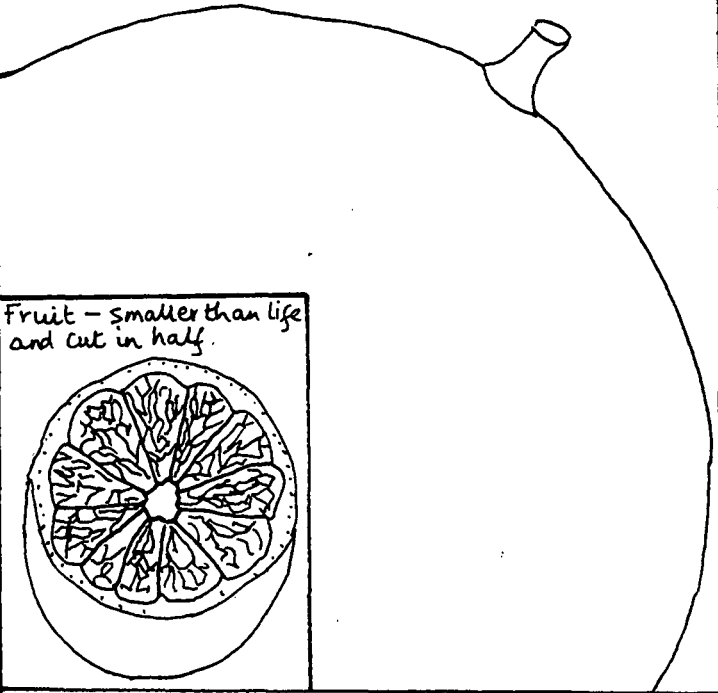
SOMALI  
NAME

BOMBELMO

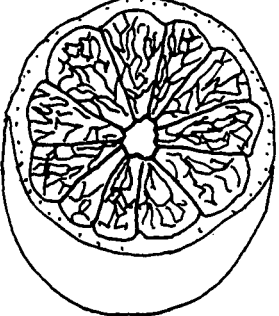
LATIN  
NAME

CITRUS PARADISI

FRUIT (Yellow - Pink)

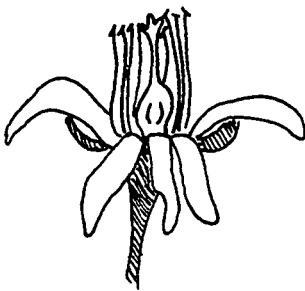


Fruit - smaller than life  
and cut in half.



TREE SHAPE

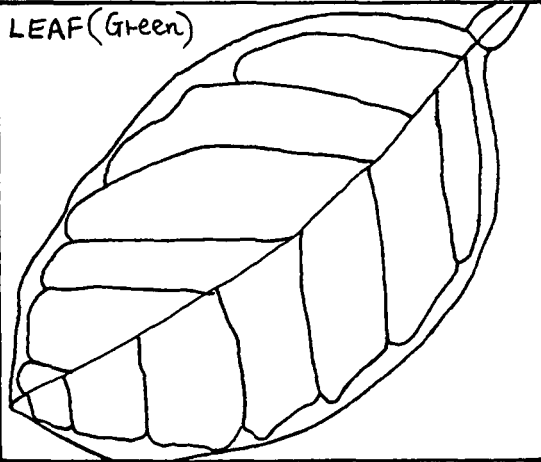
FLOWER (White)



FOLIAGE



LEAF (Green)



SEED (Yellow-White)



# Tree growing

**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  
spacing

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.

**1. Names:** Naarajiin *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  | Unbranched single stem. Uniform thickness except bulbous base. 25 cm.d.                                                                |                                 |
| Bark:      | 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                                                                                                                       | Colour: M-pale yellow, F-white  |
|            | F. -2.5cm length                                                                                                                       |                                 |
| 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 resistant.                                                                                                                       | 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. |                                 |

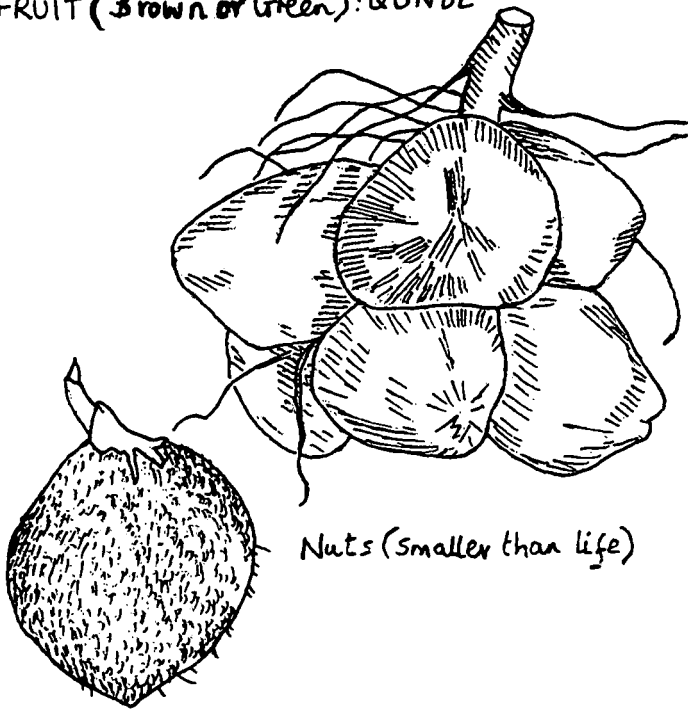
SOMALI  
NAME

NAARAJIIN

LATIN  
NAME

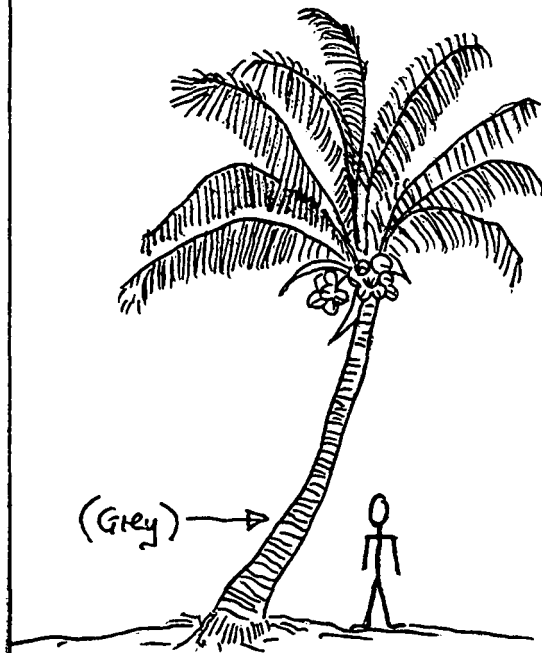
COCOS NUCIFERA

FRUIT (Brown or Green): QUNBE



Nuts (smaller than life)

TREE SHAPE



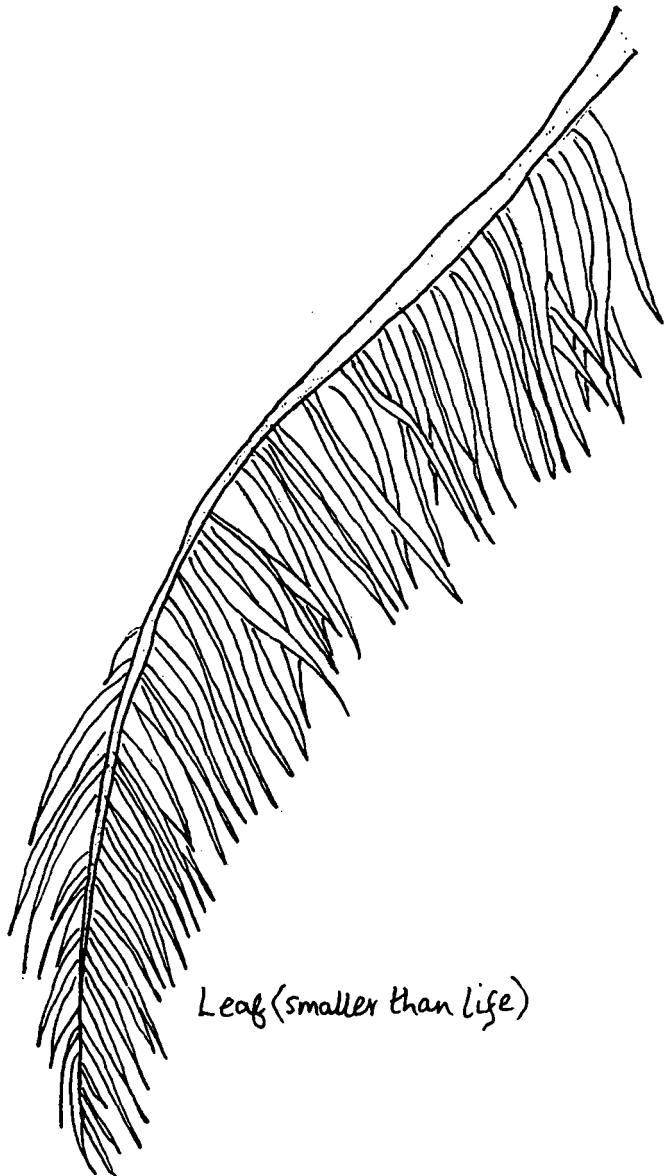
(Grey) →

FLOWER



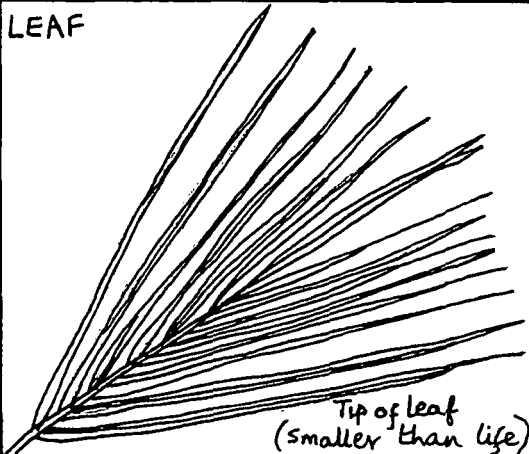
Flowers (smaller than life)

FOLIAGE



Leaf (smaller than life)

LEAF

Tip of leaf  
(smaller than life)

SEED

Seed  
(smaller than life)

# Tree growing

**Names:** Naarajiin

*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        | 8-16 weeks                                                                                                   |
| Percentage         |                                                                                                              |
| Pricking out       | Transfer to seedbeds once fruits have germinated when first leaf is 15cm high. No shade necessary.           |
| Shade and watering |                                                                                                              |
| 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)<br>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.

**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:

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

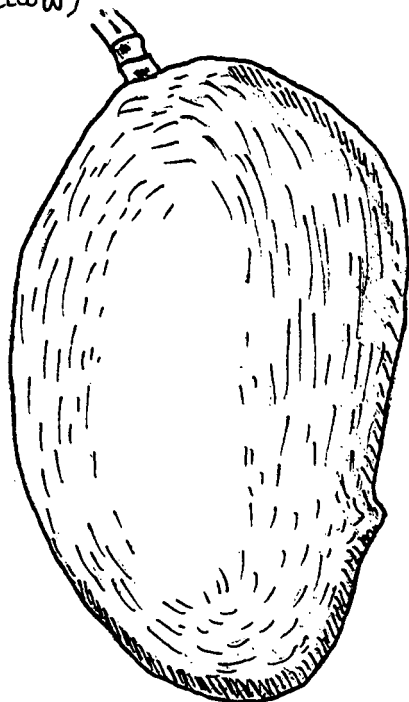
SOMALI  
NAME

CAMBE

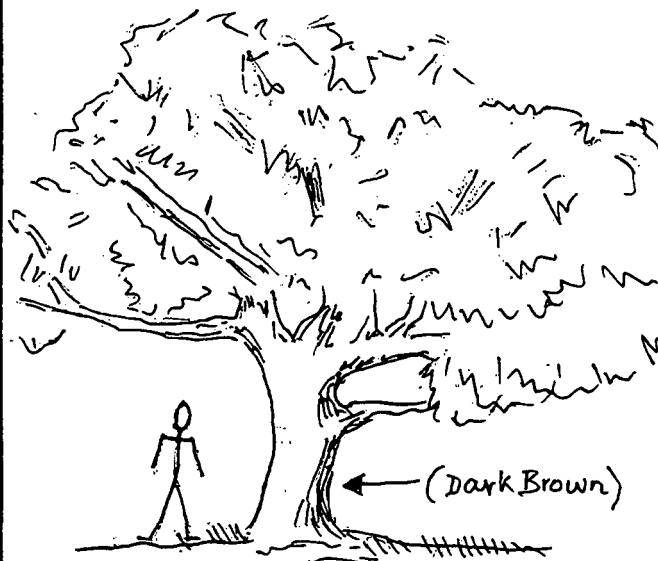
LATIN  
NAME

MANGIFERA INDICA

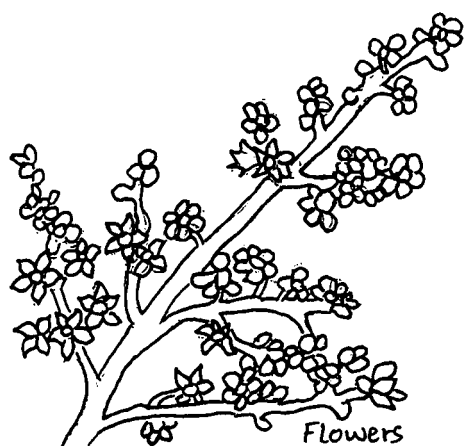
FRUIT (Green - Yellow)



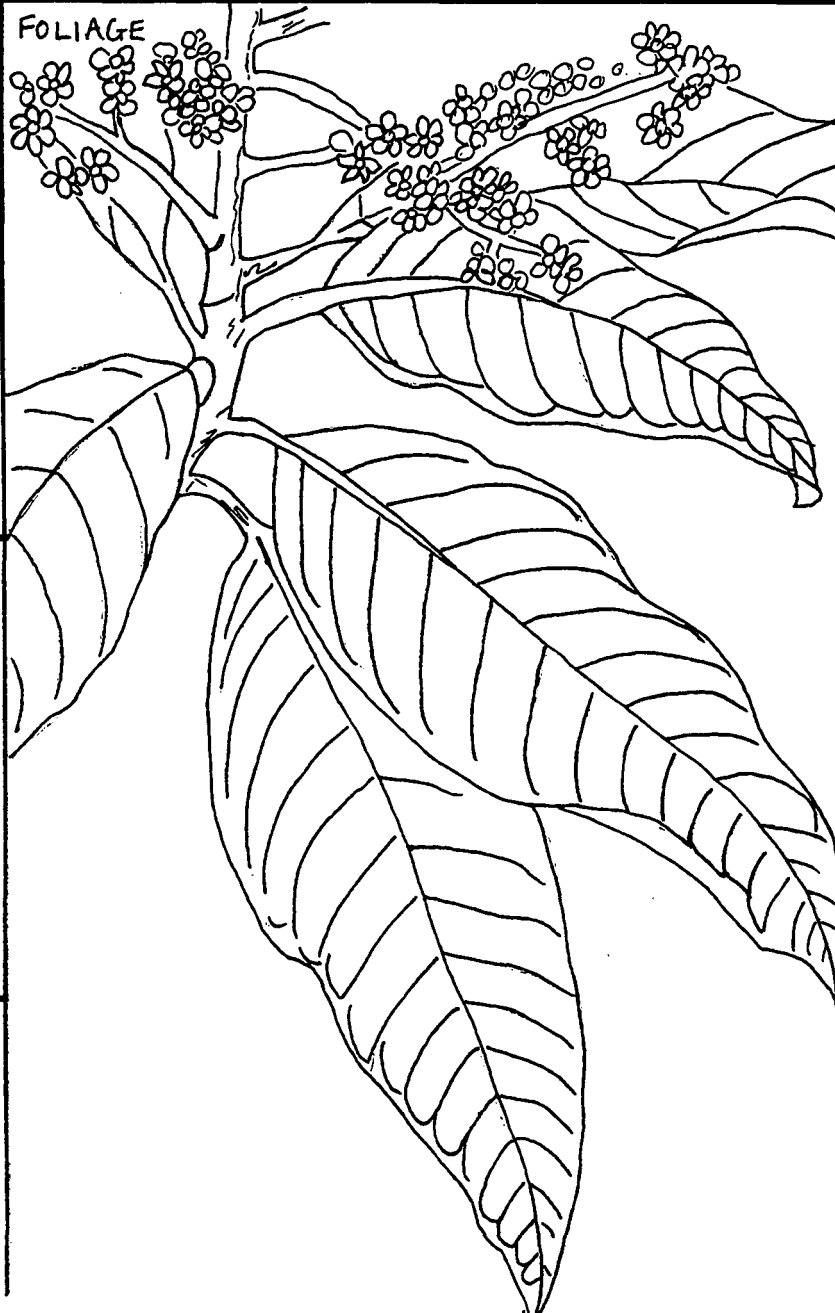
TREE SHAPE



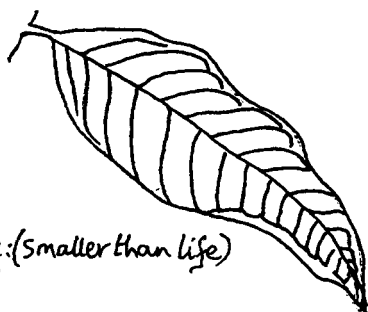
FLOWER (Red - Pink - White)



FOLIAGE

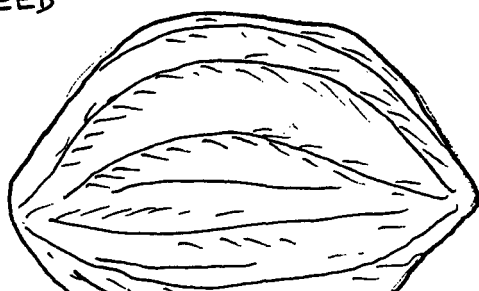


LEAF (Dark Green or Red)



Leaf: (smaller than life)

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:

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

## 5. Planting:

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

## 6. Aftercare:

Pruning should be done to remove dead or diseased growth.

|                      |                                                                       |
|----------------------|-----------------------------------------------------------------------|
| Growth and<br>yields | Lifespan: 100's of years. Fast growing. 40 year rotation recommended. |
|----------------------|-----------------------------------------------------------------------|

## 7. Other notes:

**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             Colour: Pale-dark brown-green  
translucent sheets exposing greenish brown inner bark.

**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. Elliptical.

**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.

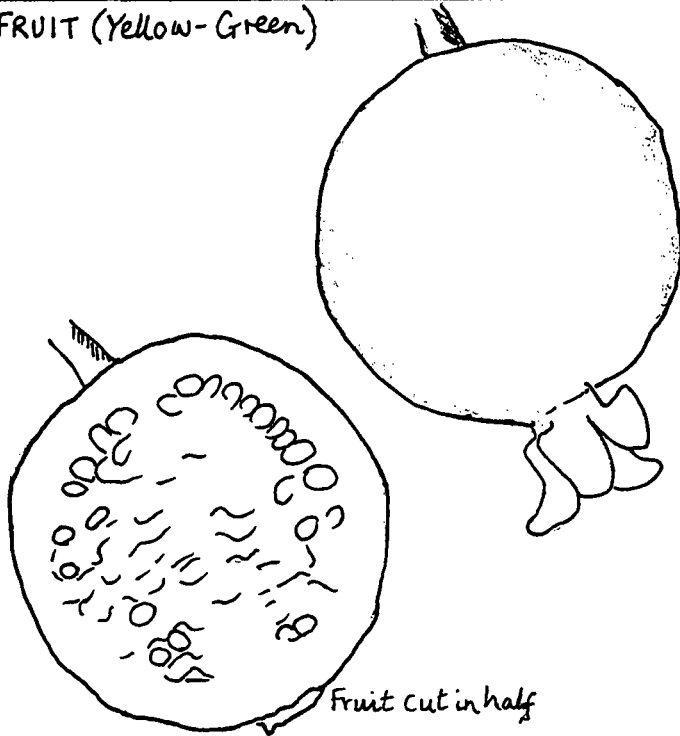
SOMALI  
NAME

SEYTUUN

LATIN  
NAME

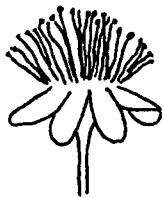
PSIDIUM GUAJAVA

FRUIT (Yellow-Green)

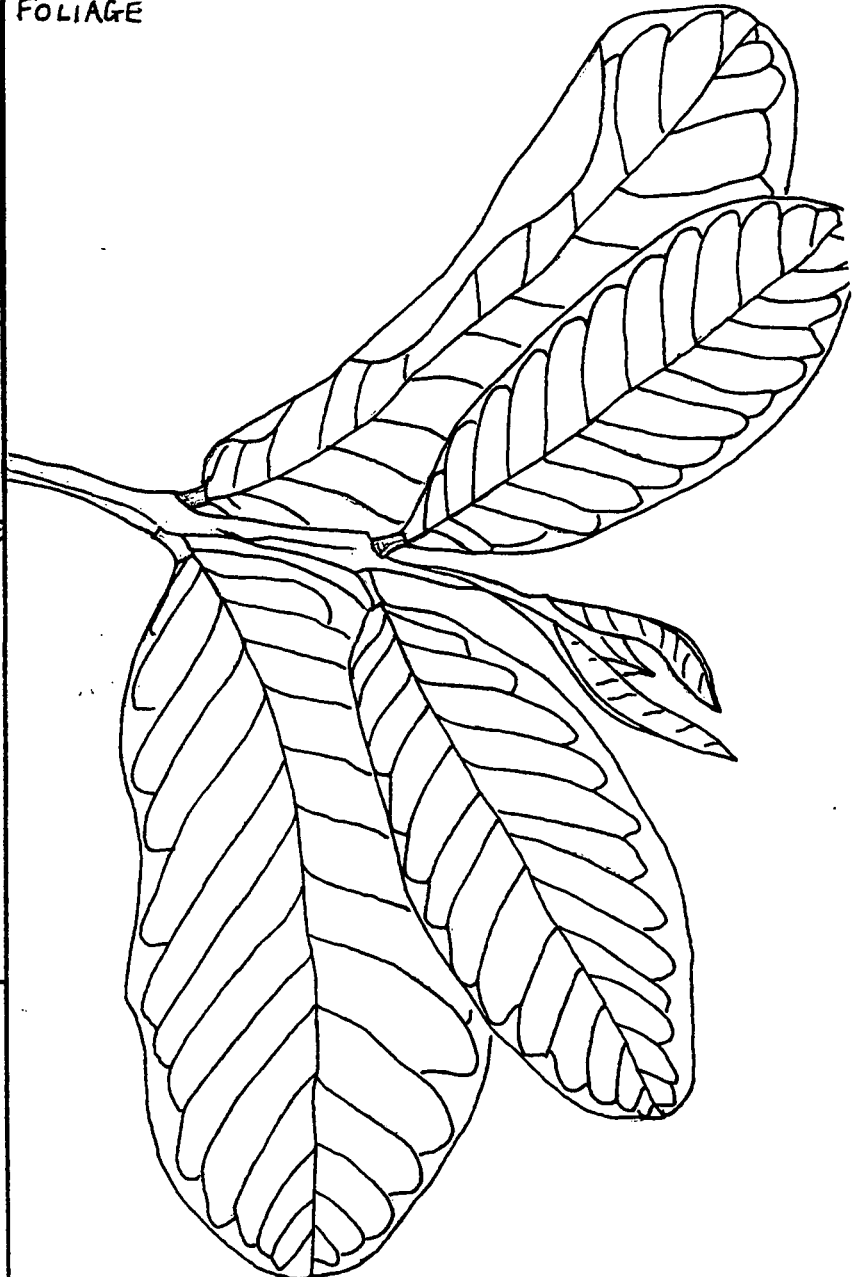


TREE SHAPE

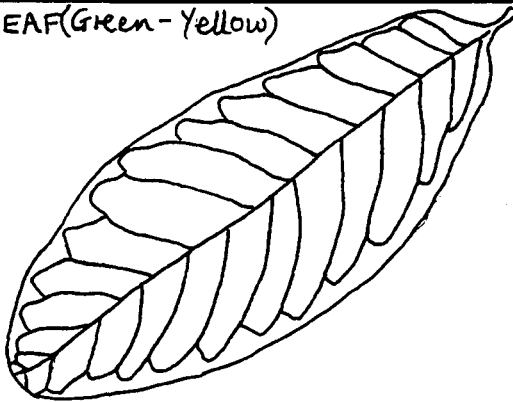
FLOWER (White)



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 spacing           | 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.

**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. Monoecious. 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 Colour:  
pattern of widely spaced whorls of branches spaced up the trunk

### 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 - ellipsoid

**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. Colour: Heartwood: Red-brown

Specific gravity: 0.59 Sapwood: Greyish

Machining is difficult. Suitable for furniture, veneer and cabinet work. Not termite resistant. Irregular, often interlocking grain.

## Other notes:

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

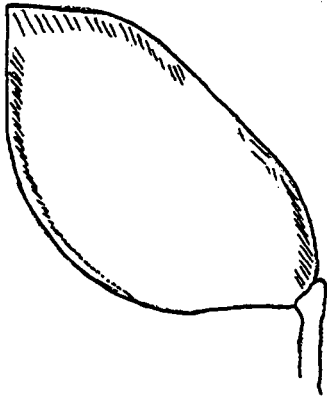
SOMALI  
NAME

BEYDAAN

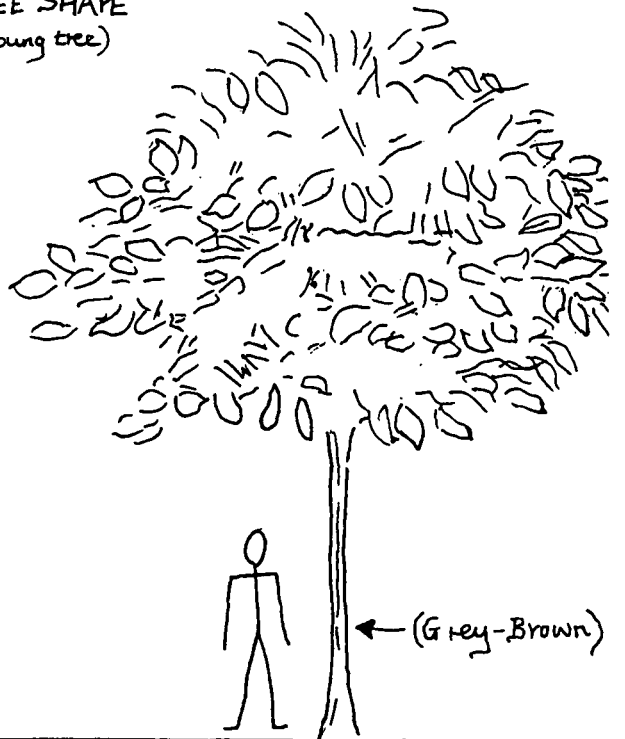
LATIN  
NAME

TERMINALIA CATAPPA

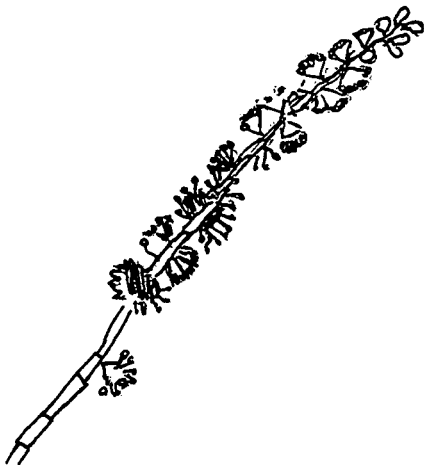
FRUIT (Yellow - Green - Brown)



TREE SHAPE  
(Young tree)



FLOWER (White-Green)



FOLIAGE

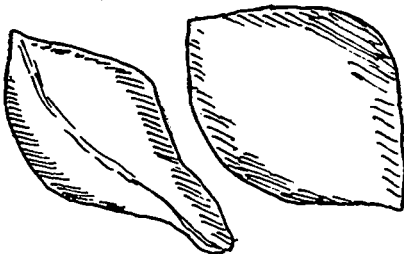


LEAF (Green or Red)



(Smaller than life)

SEED (Light Brown)



# 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  
spacing

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:

# Chapter 3.

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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 plant 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.

## 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  
spacing

Fertilizers and  
insecticides

**6. Aftercare:**

Growth and  
yields

**7. Other notes:**

