Plant Guide

Trees, Herbs and Grasses
In the Lowlands of Ethiopia
Afar and Somali Regional State

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german cooperation
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MINISTRY OF AGRICULTURE

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Introduction

The purpose of this plant guide is to create ease of practical field use in Afar and Somali Regional State of Ethiopia, considering the absence of a plant guide handbook for easy identification of indigenous species and their specific use. The Plant Guide hereby intends to promote the growing and use of existing species, and contains the following information:

- **Feed names** including vernacular and scientific names
- **Description** of the plants or plant parts/products used as feed
- **Feeding recommendations** for the main livestock species: cattle, sheep, goats, camels, poultry, pigs, rabbits, horses, and fish
- **Illustrations** including photos
- **Distribution** and basic agronomic information
- **Forage management**
- **Potential constraints** such as presence of anti-nutritional and toxic factors
- **Environmental impact** of the production and use of feeds.

This plant guide was elaborated between members of an Afar community and GIZ Strengthening Drought Resilience. It covers the most important indigenous as well as some invasive plants being used by pastoral and agro-pastoral communites for their herds and livelihoods. While delivering a very good insight into these plants, the plant guide is not comprehensive.

Special thanks go to Kadre Hanfare and his community in the Awra woreda, Afar region, sharing their knowledge with the author, Simon Kamenisch.

Ada´ado/Waadhi — Acacia Senegal

Synonyms: Tikibileyit**a,** Gum Arabic; Sudan gum;, Kordofan gum; *Senegalia senegal*,; *Acacia verek*; *Acacia rupestris*; *Acacia trispinos*; *Mimosa senegal*

Adoda/ Waadhi tree

Adado/ Waadhi leaves

Adado/ Waadhi thorns and stem (bark)

Adado/ Waadhi pods

Ecology: Annual rainfall: 100 to 950 mm (300-400 mm best for gum arabic production); altitude: 100-1700 m; mean annual temperature: -4 -48°C; drought and heat resistant; sensitive to waterlogging; light sandy soil, slightly loamy sand and skeletal soils (lithosols); prefers coarse-texture soils such as fossil dunes; requires strong light; both tap roots and lateral roots are very developed ; the latter may spread many metres from the tree, particularly in sandy terrain; when water is only available at great depth, deeply penetrating tap roots can develop, and the tree will grow considerably larger than normal, taproot up to 30 m in depth; tree is able to fix nitrogen from the air

Uses: Timber: fuel wood, charcoal, poles, fence-posts, tool handles, weaver's shuttles, wood (hard and heavy), throwing-sticks, carts and Persian wheels, sugar cane crushers; **Roots**: trad. medicine (dysentery, gonorrhea, nodular leprosy);

Root bark fiber: Strong ropes, cordage, fishing nets; **Seeds**: Food (dried and preserved as vegetables), medicine (fat), soap making (fat);

Gum: is considered an aphrodisiac; yield at three to four years of age; trees die at an age of 25 to 30 years; tapped when the trees are stressed; average annual yield may be of the order of 100 g per tree and up to 250 g/ tree/ annum in best managed systems; the market is open ended. The gum can be used for: food additive (only when evaluated toxicologically safe) (flavour fixative, emulsifier, sugar crystallisation prevention, stabiliser in frozen dairy products, bakery products (viscosity and adhesive properties), foam stabiliser and clouding agent in beer), pharmaceutical (stabiliser for emulsions, binder/ coating for tablets, ingredient in cough drops/ syrups) trad. medicine (coughs, diarrhoea, dysentery, haemorrhage, to cover inflamed areas), matches, ceramic pottery, cosmetics; ink (adhesive, protective colloid, safeguarding agent); lithographic plates (sensitiser), papers (coating), cloth (sizing agent), prevent metal corrosion(coating)

General use: sand dune stabilisation; wind break; honey; re-vegetation of degraded areas; soil fertility improvement (N-fixing (questionable), nutrient cycling after leaf fall); fencing; highly suitable for agroforestry systems (in combination with watermelon, millets, forage grasses

Animal feed: Leaves and pods are browsed by sheep, goats and camels

Threats: Locusts and browsing goats and camels are major enemies; herdsmen lopping off branches to make enclosures

Propagation: Strict protection from fire and livestock grazing; efficient control of weed competition during at least the first two years is important for seedling survival

Miscellaneous: A. senegal is associated with a wide range of vegetation types, from semi-desert grasslands to Anogeissus woodlands;

Adaiyto/Caday — Salvadora persica

Indigenous
Local synonyms: Hadaiyto; Dadaho; Adad`to
Synonyms: Tooth-brush tree; Saltbush; Mustard tree; Miswak

Adaiyto/Caday bush

Adaiyto/ Caday leaves

Adaiyto/ Caday leaves

Adaiyto/ Caday leaves

Ecology: Annual rainfall: <200-1000 mm; Altitude: 0-1800 m; Salt tolerant; Drought tolerant; Grows where it can access groundwater; Dry locations, most often along rivers, wadis, luggas, lakes or wells;; Adapted to alkaline or very saline soils, usually clay-rich, and soils without salt. It prefers clays, but is found on loams, black soils, and sand

Use: Leaves: Edible (salad, vegetable and sauce), trad. medicine (cough, asthma, scurvy, rheumatism, piles, etc.), properties (deobstruent, astringent to the bowels, tonic to the liver, diuretic, analgesic, anthelmintic, useful in ozoena and other nose troubles, piles, scabies, leukoderma, lessening inflammation, and strengthening the teeth pungent), Leather production (crusted leaves + cow urine + *Pergularia tomentosa* leaves allow easy removal of hair from tanned hides); **Fruit:** Edible (fresh, cooked, dried, fermented drink), trad. medicine (biliousness and rheumatism), properties (deobstruent, carminative, diuretic, lithontriptic, and stomachic); **Twigs, roots**: Tooth-brush; **Root bark**: trad. medicine (gonorrhea, vesical catarrh and tonic in amenorrhea – decoction); **Seeds:** trad. medicine (rheumatism - tonic seed oil applied on skin), properties (purgative, diuretic); products (oil can replace coconut oil in soaps and detergents); **Timber:** Firewood, charcoal (foul taste when cooking meat), coffins, clubs, construction, furniture, properties (soft, white, easy to work, termite resistant); **General:** antibacterial and plaque inhibiting activity; ingredient of some commercial tooth pastes; windbreak, improvement of saline/impoverished soils, shade (beneficial to soil moisture and livestock, thereby improving soil fertility)

Veterinary medicine: Helminthiasis, brucellosis, retention of the foetal membrane, anthrax

Animal Feed: Leaves: browsed by cattle, sheep, goats and camels, high water content (water source for animals), high levels of minerals (up to 40%) (is said to make milk taste bad, problem for almost all ruminants, excepted for camels that are able to cope with it by their ability to store minerals when fed in excess); **Flowers** (nectar for honeybees); Dry season forage (evergreen); Rich in NaCl ("salt cure" for livestock)

Growth properties: Slow growing; Grown in plantations or hedges

Propagation: Seedlings; sow seed in pots.

Threats: Vulnerable to habitat loss and overgrazing

Ee`bi/Qudhac — Vachellia tortilis

Indigenous

Local synonyms: E'ebto; E'ibito; Behbey; Ehebto

Synonyms: Umbrella thorn; *Acacia tortilis; Acacia heteracantha; Acacia litakunensis; Acacia raddiana; Acacia spirocarpa; Mimosa tortilis; Acacia fasciculata*

Ee'bi/ Qudhac tree

Ee'bi/ Qudhac thorns

Ee'bi/ Qudhac leaves

Ee'bi/ Qudhac flowers

Ecology: Annual rainfall: <100-1000 mm; altitude: 0-1 000 m; mean annual temperature: 23-31°C; grows in sand dunes, sandy loam, rocky soils and other soils that drain well; does well on light brown, sandy soil with little or no calcium carbonate; drought tolerant (deep taproot system and numerous lateral roots, phreatophyte, relying on aquifers as deep as 40-50 m); tolerant to seasonal waterlogging and salt; generally forms open, dry forests in pure stands or mixed with other species.

Uses: Pods: Edible (famine food), tanning; **Fruits**: Edible (more nutritious if ground), kill the snail species that carry schistosomiasis without affecting fish; **Timber**: fence posts, firewood, furniture, wagon wheels, charcoal, trad. medicine (asthma), not durable in the open but moderately so under cover; **Roots**: shelters (flexible), tanning; **Bark**: string; tanning, trad. medicine (disinfectant in healing wounds – dried powder, anthelmintic); **Gum**: Said to be edible ("poor man's gum Arabic"); **Seeds**: trad. medicine (diarrhea); Branches: barriers (thorny); **General**: trad. medicine (vermifuge, skin infections, oedema, allergic dermatoses), molluscicide, algicide, soil improvement (N-fixing), erosion control, afforestation species, shelter for birds

Animal feed: Pods: Fodder (more nutritious when ground, superior to leaves); **Leaves**: Fodder (fresh and dry); **Flowers**: Fodder (over 90% abort and drop); nutritional limitations (Acacias contain high levels of phenolics and tannins); supplementation with readily available nitrogen sources can counter the anti-nutritive effects of tannins; highest microbial degradation potential; dairy cows fed *Acacia tortilis* pods were reported to produce milk with an unpleasant odour

Growth properties: fast growing (about 1.5 m in 2 years); good coppicing behaviour; can survive heavy browsing; fairly slow-growing; seedling growth is rather slow and even after planting out, trees often progress tardily (growth to a height of 0,8 m in four years has been observed)

Propagation: Seeds can be immersed in boiling water and soaked until they swell; the testa (seed coat) is thick and impervious and could be nicked or filed before soaking (tedious operation); germination after 4 to 10 days; seedlings germinating from the dung after digestion; plantation by direct seeding of treated seeds should always be preferred in order to avoid the trauma of transplanting and disturbing the tap-root that grows about ten times faster than the stem (this principle applies to many desert trees and shrubs that share this fast root growth characteristic).

Garsa

Dobera glabra

Indigenous
Local synonyms: Ghersa

Garsa tree

Garsa leaves and branches

Garsa leaves

Garsa leaves and stem

Ecology: Annual rainfall: 100-800 mm; altitude: 0-1500m; temperature: 15-45 °C; soil pH: 5.5-8.5; occurs on rocky hillsides and saline riverbeds; tolerant to short-term waterlogging; grows on sandy, alluvial, black cotton or calcareous loam soils

Uses: Fruits: Edible; **Seeds**: Edible (need to be boiled for a long time, famine-food); **Timber:** Firewood; wood work (pestles, mortars, spoons, storage containers, bed-frames, stools, other domestic items, fairly soft wood); **General**: Shade/shelter; ornamental

Animal Feed: Leaves: very palatable and browsed by all livestock

Growth properties: Growth is slow; even after a year, seedlings may have grown only 10 cm in height; need to be protected from browsing for the first 4-5 years of their lives; once trees are properly established they can tolerate repeated lopping or browsing; spacing should be at least 10 m apart

Comments: The species may be endangered, so planting of trees should be encouraged; in the lowlands of Konso Special Woreda, along the Segen River, it is a typical drought indicator plant; new shoots always grow during the dry season; if rains are delayed or fail, the tree typically shows an enhanced production of new shoots, fruits and seeds; farmers revealed that in normal times, when rains are on time or abundant, Dobera glabra does not produce much fruit and seed; when the tree is blooming abundantly, Konso people fear that a drought may very well be under way and hence, food may become scarce; has the capacity to regulate water use in response to water depletion and high salinization

Goronto/Gumar

Vachellia nubica

Local synonyms: Geronto
Synonyms: *Acacia nubica; Acacia virchowiana; Acacia merkeri; Acacia oerfota*

Geronto/ Gumar bush

Geronto/ Gumar leaves

Geronto/ Gumar flowers

Gernonto/ Gumar pods

Ecology: Altitude: Commonly occurs in deciduous bush lands and semi arid desserts, altitude 100-1.600 meters.

Uses: Firewood, Poles (hut frames), medicine (bark), fodder (leaves, twigs and pods), fiber (bark)

Animal feed: leaves and pods are high in calcium, but the leaves have more phosphorus

Propagation: Seedlings

Management: Coppicing, pollarding and looping

Comments: A bark extract is used to cure rheumatism

Hedayito/Dhafaruur

Grewia tenax

Local synonyms: Huda, Minegure

Hedaiyto/ Dhafaruur tree/bush

Hedaiyto/ Dhafaruur leaves

Hedaiyto/ Dhafaruur leaves

Hedaiyto/ Dhafaruur fruit (early stage, fruit becomes yellow)

Ecology: Annual Rainfall: <200-1000 mm; altitude: 0-1800; soil type: Sandy, rocky and lateritic soils; drought resistant

Growth properties: very slow-growing; generally a very slow-growing plant, though young plants have been recorded to sometimes reach a height of up to 1.5 meters within 8 months; growth is fast, sometimes up to 1.5 m in 8 months

Uses: Fruits: Food (high amount of iron – refreshing drink, can be dried); trad. medicine (promote fertility in females, special diet for pregnant women, anemic children); **Branches**: firewood; charcoal; **Bark**: Ropes; binding purposes in house construction; hair vermin (mucilaginous preparation); **Wood**: Weapons, canoes, walking sticks, etc. (termite resistant), fuel, charcoal; **General use**: Honey; trad.

medicine (cold, chest complaint, as a chief constituent in a typhoid remedy, bone fracture, tissue healing); soil protection (aggressive root system against wind and water erosion); intercropping might be possible; soil improvement (physical and chemical properties by leaf litter); hedging; mild antibiotic properties; rehabilitation of wastelands; gum was found to improve the fluidity of paracetamol granulation; may serve as a good suspending agent for Ibuprofen pediatric formulation

Animal fodder: Young leaves are consumed by livestock, they are slightly palatable at the end of dry seasons, and have fairly good feed value

Propagation: Plants need protection from browsing animals

Comments: *Grewia tembensis* and *G. tenax* are virtually indistinguishable in fruit

Keselto/Maraa — Acacia nilotica

Synonyms: Egyptian mimosa; Egyptian thorn; Red thorn; Prickly acacia; Black piquant; Egyptian acacia; Indian gum arabic tree; Thorn mimosa; Thorny acacia; Acacia gomifera; Acacia de cayenne; *Acacia Arabic; Acacia scorpioides; Mimosa Arabica; Mimosa nilotica; Mimosa scorpioides; Acacia adansonii; Acacia benthamii; Acacia scorpioide; Acacia subalata; Acacia vera; Mimosa adstringens; Vachellia nilotica*

Keselto/ Maraa tree

Keselot/ Maraa leaves

Keselto/ Maraa flowers

Keselto/ Maraa pods

Ecology: annual rainfall: 300-2200 mm; altitude: 0-1500 m; mean annual temperature: 18-28°C; drought resistant; heat resistant (> 50°C); tolerates light frost and salt; tolerant to water logging and submersion; grows best in alluvium and heavy clay soil; strong light and permanent soil moisture requirement

Uses: Fruit: traditional medicine (stomach upset and pain – can be poisonous if eaten in large quantities); **Leaves** (bruised): trad. medicine (poulticed onto ulcers); **Pods/ Seeds**: trad. medicine (antiscorbutic, lactogogue); edible (roasted young pods/ seeds, vegetable); **Tender shoots**: edible (vegetable); **Bark**: trad. medicine (chewed against scurvy, cough, nerve stimulant, diarrhoea, dysentery, leprosy, decoction against intestinal pains, stomach worms, antiseptic for open wounds); leather (preserves and softens – tannins); **Timber:** fuel wood (little smoke); charcoal; construction (e.g. railway, mines, durable, termite and borer resistant); quality timber (poles, carpentry, boat, house construction); **Roots**: trad. medicine (impotence, aphrodisiac, tuberculosis**); Flowers**: trad. medicine (syphilis lesions);

Gum: emulsifying agent; emollient (commercially inferior quality), Edible, trad. medicine (throat, chest complaints);

General use: honey; pioneer species in land rehabilitation; vertebrate poisons; soil reclamation; soil enrichment (N-fixing); protection against fire and wind; haven for biodiversity; intercropping with grass or cereal crops (depresses yields of sorghum); paper production; **Veterinary medicine:** e.g. Molluscicide to reduce liver-flukes in cattle; **Animal fodder:** Pods desirable fodder for cattle; leaves, young shoots, young pods are thought to aid milk production

Propagation: slow-growing; moderately long-lived; rapid tap root growth; young trees coppice well; can be propagated from truncheons, root suckers and cuttings; seed is hard-coated and must be scarified (mechanical abrasion, acid, or hot-water treatment); Can be established by direct seeding of scarified seeds or by transplanting of nursery-grown seedlings, or seeds carried in animal droppings, Can be aerially seeded; Seeds germinate quickly (7-15 days); use long poly-tubes (20 x 7 cm) not to restrict rapid tap root growth; Frequent root

pruning is advised; Nursery grown seedlings planted out after six months, Seedlings need full exposure to sunlight and a free-draining soil

Miscellaneous: tolerant of regular grazing and defoliation; tolerant of fire; fruiting within 5-7 years and yield about 18 kg pods/ year

Kusra/Gob — Ziziphus mucronata

Synonyms: Kusira(to); Qurqura, Buffalo thorn; Cape thorn

Kusra/ Gob tree

Kusra/ Gob laves and thorns

Kusra/ Gob leaves, thorns and flowers

Kusra/ Gob leaves, branches and flowers

Ecology: temperate and tropical climates; found in a wide range of habitats such as woodlands, open scrubland, on rocky koppies, open grasslands, on a variety of soils along streams, nutrient-rich valley bottoms and forest margins; its presence is said to indicate the presence of underground water; very hardy species most common in dry areas; resistant to both frost and drought; altitude: up to 2000 m; mean annual temperature: 12-30C°; mean annual rainfall: 446-1200 mm; tolerant to shallow soils, seasonal waterlogging, salt spray and soil salinity

Uses: Roots: used for treating snake bites; commonly administered as a painkiller for all sorts of pains as well as dysentery; mixed with leaf paste used as treatment for tubercular gland swellings, boils, swollen glands, wounds, sores, measles, dysentery, lumbago and chest complaints; a concoction of the bark and the leaves is used for respiratory ailments and other septic swellings of the skin; all of the above can be attributed to the peptide alkaloids and antifungal properties isolated from the bark and leaves; **Fruit:** honey; berries are edible and nutritious fresh or dried; contain an extremely high vitamin C; beer; seeds are roasted, crushed and used as coffee substitute; **Wood**: firewood; charcoal; timber; termite-resistant wood is used for building poles and posts, live and dry fences and for hunting and fishing weaponry; elasticity of the shoots makes it suitable for bows and whip; **Young leaves**: cooked and eaten as spinach; they are not very palatable but are nutritious; **Bark**: used as an emetic; bark decoction is used for rheumatism and stomach troubles; bark infusion is used to treat coughs; used in a steam bath to purify the complexion; helps in tanning leather because of its high tannin content (12-15%); **Sap**: used as a mixing agent for arrow poison; **Animal feed:** highly nutritious leaves and fruit; it is considered as a potential protein supplement in low-grade forage diets; the Ca, P, Mg, Na and K contents are variable but higher than cattle requirements; buffalo thorn forage is palatable to livestock, and more palatable to goats than to sheep

Propagation: very easily raised from seed or cuttings, growing in just about any soil type and withstanding heat and cold equally well; seed however has poor keeping properties and should be sown fresh; after cleaning the nut, it can be placed between the jaws of a vice or a normal nutcracker and closed gradually until the nut cracks and seed is released; the seeds can then be covered with hot water, allowed to cool, soaked for two days and sown; seedlings and small plants need moderate water, full sun and efficient drainage or they will damp off; slow-growing (0.3 m or less per annum); under good conditions it will reach a height of 4-6 m in 4-5 years; can be managed through lopping, pollarding and coppicing

Madera/Madhedh Qox

Cordia africana

Synonyms: Mukumari; Mukebu; Sudan teak

Madera/ Madhedh Qox tree

Madera/ Madhedh Qox leave

Madera/ Madhedh Qox leaves and stem

Madera/ Madhedh Qox fruits

Ecology: Found on a wide variety of soils; prefers light, deep, and well-drained soils and moist conditions; occurs at medium to low altitudes, in woodland, savannah and bush, in warm and moist areas, often along riverbanks; frost tender; grows in drier conditions but thrives in good rainfall areas and is scattered in occurrence; termite and fungus resistant; altitude: 550-2600 m; mean annual rainfall: 700-2000 mm; large leafed cordia thrives in forest soil

Uses: early colonizer in forest regrowth; often left when forests are cleared for cultivation, as the tree is an excellent shade tree for crops; provides very good mulch; used in other mixed cropping systems on cropland, pastureland, or rangeland to improve microclimatic conditions; high quality honey production**; Wood:** is light, yet durable, moderately soft, fairly straight-grained, and relatively termite and fungus resistant; used to make grain mortars, water containers, utensils, tool handles, high-quality furniture, beehives, containers for local brew, and shingles; firewood; left to grow sufficient wood so that it serves as live fence around grazing units and farmyards; **Fruits:** have a sweet, mucilaginous, edible pulp; provides good bee forage; beehives are often placed in the trees; brewed either with the addition of leaves of *Rhamnus prinides* to give the local alcoholic drinks, **"***tela***"** and **"***tej***"** or without it to give the local alcoholic drink "Beerz"; the fresh, juicy **bark** is used to tie a broken bone; this splint is changed occasionally with a fresh one until the bone is healed; helps to cure acute febrile, wounds, cough, toothache, stomach ache, fire burn, Michi, diarrheal, jaundice, eye infection, tonsillitis, eye problems, anthrax of cattle, Epilepsy, urination at night, jaundice, malaria, chest pain, skin rash, smell of foot, scabies, spider poison, fever and influenza; **Animal Feed:** the tree is lopped periodically for fodder and sometimes fruits of the tree are consumed by cattle, goat, sheep, donkey and mule

Propagation: Wildlings, transplants (6 months) and seed; coppices well; collect ripe fruits and sun dry until the coat is hard; rub together to remove seed coat; germination is slow at first but fairly good after 3 weeks; the seed stores well for up to 1 year; seeds are normally sown directly in beds with germination beginning in 2 weeks; seedlings need about 4 to 6 months in the nursery;

moderate to slow growing; rotation of 35 to 45 years; germination from seed appears to be erratic but once started the tree grows fast and well; can reach 7 to 8 m in 7 years and tolerates pollarding and lopping; proclaimed as one of the most threatened tree species of Ethiopia

Merka'ato/Bilcin — Senegalia mellifera

Local synonyms: Maka'arto;

Synonyms: Black thorn; Wait-a-bit; Hook thorn; *Acacia detinens* Burch.; *Mimosa mellifera* Vahl; *Acacia mellifera* (M. Vahl) Benth

Merka'ato/ Maegherto Bilcin bush

Merka'ato/ Maegherto Bilcin fruit

Merka'ato/ Maegherto Bilcin pod

Ecology: drought-resistant; widely spread in arid and semi-arid areas; prefers sandy, clayey or stony-rocky soils but is tolerant of a wide range of soils, including black cotton soils (vertisols); mean annual rainfall: 250-700 mm; mean altitude: 0-1500 m

Uses: Flowers: high quality honey, hence the name *mellifera*; **Timber** is hard, almost black when polished; resistant to termites; used for construction, building huts, live fencing, posts, hedging; fuel wood, charcoal; **Bark:** trad. medicine used to treat stomach problems, sterility, pneumonia, malaria and syphilis; **Twigs**: chewed and used by humans as toothbrushes.

Gum: edible and relished by children, animals and birds; powdered grub mixed with the sap poison used to tip Bushmen's arrows; **Animal feed:** leaves, pods and young shoots are nutritious and make fodder for livestock and wild animals; foliage has high protein content (15 to 27% DM)

Propagation: extensive and aggressive root system that explores large volumes of soils, allowing survival in dry areas; slow-growing tree; does not coppice well; young trees are very palatable to livestock and should be protected during the first two years; bush encroachment can occur: when left unattended, the trees form dense, impenetrable thickets, sometimes hundreds of metres across, slowly taking over grazing land; this phenomenon can be controlled with fire; certain soil bacteria form nodules on the roots and fix atmospheric nitrogen which is utilized by the growing plant and by other plants growing nearby; commercially the seeds are scarified by soaking them in concentrated sulphuric acid for 5-15 min prior to direct sowing; germinating from the 5th day onwards; lives less than 10 years; flowering and fruiting starts 3 years after planting and generally occurs twice a year.

Udaiyto/Irir — Balanites aegyptiaca

Local synonyms: Alaito

Synonyms: desert date, Soapberry tree, Thorn tree, *Ximenia aegyptiaca* L. (excl. *Balanites roxburghii* Planch), *Agialida senegalensis* van Tiegh., *Agialida barteri* van Tiegh., *Agialida tombuctensis* van Tiegh., *Balanites ziziphoides* Milbr. Et Schlechter, *Balanites latifolia* (van Tiegh.) Chiov., Balanite, desert date, soapberry tree, thorn tree, Egyptian balsam tree, zachum oil tree

Udaiyto/ Irir tree

Udaiyto/ Irir leaves

Udaiyto/ Irir thorns

Udaiyto/ Irir fruit

Ecology: lowland species; found on varied soils, it prefers valley soils but will grow in sand, sandy loams, clays, cracking clay, black cotton, alluvial, gravelly, and stony soils; drought resistant; mean altitude: 300 – 2000m; mean annual temperature of 20 to 30°C; mean annual rainfall of 250 to 400 mm; withstands occasional flooding but it cannot tolerate prolonged waterlogging; not damaged by grass fires; invades areas having periodic fire and areas with heavy livestock activity; young plants are fairly termite resistant, but *Bunea alcinoe* defoliates the tree

Uses: traditional Medicine used for jaundice, intestinal worm infection, wounds, malaria, syphilis, epilepsy, dysentery, constipation, diarrhea, hemorrhoid, stomach aches, asthma, and fever; **Wood:** firewood; durable and resistant to insects making it good for tool handles and domestic items such as spoons; high-quality charcoal; **Pulp**: bitter-sweet and edible; by adding *Piper betle* leaf, juices are taken once with water for 9 days, soon after the menstruation to avoid unwanted pregnancy; **Seed:** used as expectorant, antibacterial, and antifungal; seed oil is used to treat tumors and wounds; used as laxative; **Fruit**: used in whooping cough, leucoderma and other skin diseases; used to treat dysentery and constipation, liver and spleen diseases; known to kill the snails which carry schistosomiasis and bilharzia flukes; **Bark**: used in the treatment of syphilis, round worm infections, and as a fish poison; used as spasmolytic and as a febrifuge; **Root:** extracts have proved 'slightly effective' against experimental malaria; used for abdominal pains and as a purgative; **Gum:** mixed with maize meal porridge to treat chest complaints; **Latex:** used in epilepsy, administered through intranasal route; used as tooth brush

Animal feed: protein rich leaves and shoots are an excellent source of fodder

Propagation: tree begins to flower and fruit at 5 to 7 years of age; seedlings, cuttings, potted stock and root suckers, soak the fruit overnight in lukewarm water until the pulp can be removed and the pit extracted; does not withstand transplanting well because of the deep tap root; slow growing but very resilient; lives to more than 100 years; usually evergreen behaviour potentially makes it an attractive element to introduce into shelterbelts

Weyane/Garanwa/Kabtan — Prosopis juliflora

Synonyms: Mesquite; Meskit; Ironwood: Cashaw; Mimosa juliflora Sw.; Prosopis horrida Kunth; Prosopis vidaliana Náves

Weyane/ Garanwa/kabtan bush

Weyane/ Garanwa/kabtan leaves

Weyane/ Garanwa/kabtan flowers

Weyane/ Garanwa/kabtan pods

Ecology: thrives in almost all types of soils under widely varying climatic conditions; mean altitude of 2900 m; mean annual temperatures from 14°C to 34°C; average annual rainfall between 50 mm and 1200mm; exceptional tolerance of heat and drought (8 months and possibly longer); bears fruit regularly, even in years of drought; tolerates strongly saline or alkaline soils; sensitive to cold weather and frost

Uses: enriches the soil with organic matter and nitrogen; prevents excessive drying up; has a deep taproot, growing downwards in search of water tables (down to 35 m depth), with well-developed lateral roots competing with grasses; *Prosopis juliflora* and its close relative *Prosopis pallida* are two of the most economically and ecologically important tree species in arid and semi-arid zones of the world, extremely invasive and often considered as a scourge by ranchers and

pastoralists; **Wood:** firewood has been termed "wooden anthracite", because of its high heat content, burning slowly and evenly and holding heat well; charcoal; posts; timber; shade; windbreak; living fence; **Fruit pods**: sweet pods contain both glucose and protein; bee forage; **Animal feed**: animals will browse the foliage during dry seasons or droughts when no other forage sources are available.

Propagation: fairly fast growing; capable of becoming a weed on wetter sites; pods production begins 3 years after planting; it naturalizes easily and competes strongly with other species when introduced into areas where soils are better and the climate more humid; control mesquite by regular pruning and turn it into a valuable tree that is less aggressive to grasses or crops; removing the poorly nutritive side branches results in smaller roots and more efficient water utilization; loss of grass cover under canopies may also promote soil erosion; it has massive impacts upon water resources; the tree resprouts easily after damage; the best form of invasive species management is prevention; control is generally best applied to the least infested areas before dense infestations are tackled; consistent follow-up work is required for sustainable management; once an infestation has established control is very difficult, labour intensive and may not be successful because of regeneration from the soil seed bank and regeneration of trees from cut stems

Abure/Cayo

Trianthema portulacastrum L.

Synonyms: Trianthema monogyna L., Tetragonia chisimajensis Chiov., Trianthema flexuosa Schumach. & Thonn., Trianthema procumbens Mill., Horse purslane, carpetweed, giant pigweed

Abure/ Cayo herb

Abure/ Cayo pods

Abure/ Cayo leaves

Abure/ Cayo leaves and flowers

Ecology: Trianthema portulacastrum is a common weed in fields and in open, sunny localities such as roadsides, often found on clayey soils near the sea, up to 200 m altitude. It is an aggressive weed and can be controlled either by uprooting the plants before flowering, or by spraying the herbicide Fernoxone.

Uses:

Food: The young tops and leaves of *Trianthema portulacastrum* are eaten as a cooked vegetable or in soups. **The plant may cause diarrhoea or paralysis, particularly when older leaves are eaten.** The seeds are harmful contaminants in food grains and other crop seeds.

Fodder: When used as a fodder, it may cause diarrhoea or paralysis and most domestic animals refuse to eat it.

Medical: The leaves are diuretic and are applied in the treatment of oedema, jaundice, painful discharge of urine and dropsy. A decoction of the herb is used as a vermifuge and is useful in rheumatism; it is considered an antidote to alcoholic poisoning. The fleshy nature of the leaves makes them suitable for use as a wound-dressing or poultice.

Environment: The plant has a potential value as a source of organic matter because it contains considerable amounts of nitrogen, potassium and phosphorus. Trianthema *portulacastrum* shows allelopathic effects on other weeds and crops including sorghum, pumpkin, eggplant, radish, several pulses and wheat, by inhibiting seed germination and vigour of seedlings

Management: *Trianthema portulacastrum* is often an aggressive weed. It can be controlled either by uprooting the plants before flowering, or by spraying e.g. the mycoherbicide Gibbago trianthemae or the herbicide Fernoxone**.** It is also attacked by fungi such as *Macrophomina phaseolina*, causing dry root rot, and by *Colletotrichum capsici, Fusarium semitectum, Drechslera spp*. and *Stemphylium spp*., all of which cause leaf spot diseases.

Aiylaiyto/Buuhood — Aerva javanica

Synonyms: Aerva persica, Aerva tomentosa Forssk., Aerva ruspolii Lopr, Celosia lanata L., Illecebrum javanicum (Burm.f.) Merr., Iresine javanica Burm.f., Kapok-bush

Aiylaiyto/ Buuhood plant

Aiylaiyto/ Buuhood leaves

Aiylaiyto/ Buuhood plant

Aiylaiyto/ Buuhood flowers

Ecology: Very variable ecology; dry thorn-bushland on finer soils; soil heavy or more commonly light and sandy; 0-1900 m alt. Drier parts of the tropics and subtropics of the Old World, adventive elsewhere.

May be dominant in places and fairly abundant in vegetation, after occasional rain. Occurrence in very varied deciduous woodland and bush land to grassland and disturbed places. Salt tolerant. The plant is wind dispersed.

Uses:

Food: Young leaves can be used as pot herb but only resorted to when better foods cannot be found. Roots are put into milk vessel to make it smell or taste better.

Fodder: Distasteful to stock but eaten in the absence of other feed

Medical: Protective against rheumatism. Juice extracted from the roots is used in southwestern Saudi Arabia to treat eye disease. Plant used to stop bleeding. Remedy for mouth ulcers. Dry woolly inflorescences can cause skin rashes.

Environment: Erosion control

Material: Woolly spikes used for stuffing pillows, mattresses and donkey saddles.

Baro bangi/Caano Khadhadheye — Argemone mexicana

Synonyms: Argemone mucronata Dum.-Cours. ex Steud., Echtrus mexicanus Nieuwland; Echtrus trivialis Lour., ; Argemone spinosa Moench ,; Argemone albiflora Hornem, Mexican poppy, prickly poppy, yellow thistle, Mexican thistle, Gemeiner Stachelmohn

Baro bangi/ Caano Khadhadheye plant

Baro bangi/ Caano Khadhadheye plant

Baro bangi/ Caano Khadhadheye flower

Baro bangi/ Caano Khadhadheye leave

Ecology: *Argemone mexicana* occurs mainly in regions with a pronounced dry season, on open waste ground, along roadsides and railways, in fields as a weed, mostly at sea-level, but sometimes up to 3000 m altitude. It is locally abundant, but on the whole scattered. It tends to grow well in soils of low fertility. It cannot grow in the shade.

Uses:

Medical: It is considered a painkiller, diuretic, cholagogue and anti-inflammatory. The seed oil is used as a purgative and as a pomade. Both the seed oil and leaf infusions are drunk to relieve cough. Root and leaf decoctions are applied to the skin to cure oedema, inflammation, muscle pain, ulcers, yaws, to remove warts, to kill Guinea worm and to promote wound healing. A root decoction is used as a mouhwash and eye bath to treat infections. Leaf sap is used as eardrops to cure ear inflammation.

Food: Flowers, leaves and seeds are used in alcoholic and non-alcoholic drinks for their psycho-active properties. Caution is advised in the use of this oil, prolonged ingestion produces toxic effects resembling those occurring in epidemic dropsy.

Fodder: Cattle do not graze the plant as it is spiny, but they can be poisoned if they consume it in hay or the chaff. Sheep and goats eat it when other vegetation is in short supply, while ostriches relish it.

Material: The seed oil can be used for production of soap and as a fuel.

Management: *Argemone mexicana* is hardly cultivated and generally considered a weed. As a weed in cultivated land it is generally not an aggressive competitor.

Prospects: Several compounds of *Argemone mexicana* display interesting pharmacological effects as purified compounds, making further research desirable. *Argemone mexicana* might be of interest as a natural source of berberine. The toxic effects of seed oil, flowers and to a lesser extent leaf sap make their use for medicinal purposes hazardous, but they will probably continue to be used extensively.

Democracy/Shanfarod

Parthenium hysterophorus

Synonyms: 'Altamisa'; Carrot grass; Bitter weed; Star weed; White top; Wild feverfew; the "Scourge of India"; Congress grass

Democracy/ Shanfarod bush

Democracy/ Shanfarod bush

Democracy/ Shanfarod leaf

Democracy/ Shanfarod flowers

Ecology: occurs in the humid and subhumid tropics, typically favouring heavier fertile soils, such as black, alkaline clay loams; able to grow on a wide variety of soil types from sea level up to 2400; weed has strong adaptive methods to tolerate both moisture stress and saline conditions; especially prolific in disturbed habitats, such as along roadsides and railway tracks, river and creek banks, in stock yards, around buildings and on wasteland, from where it spreads and invades agricultural systems

Uses: traditional medicine; traditional medcremedy for skin inflammation, rheumatic pain, fever, diarrhoea, urinary tract infections, dysentery, malaria and neuralgia; **General:** Removal of heavy metals and dye from the environment; eradication of aquatic weeds; use as substrate for commercial enzyme production; additives in cattle manure for biogas production, as biopesticide, as green manure and compost

Threats: considered to be a cause of allergic respiratory problems, skin inflammation, eczema, asthma, allergic rhinitis, hay fever, black spots, burning and blisters around eyes, diarrhoea, severe papular erythematous eruptions and breathlessness

Propagation: high fecundity; a single plant can produce 10,000 to 15,000 viable seeds and these seeds can disperse and germinate to cover large areas; all its parts including trichomes and pollen contain toxins called sesquiterpene lactones; parthenin, hymenin and ambrosin are found to be the culprits behind the menacing role of this weed in provoking health hazards

Control: Eradication by burning, chemical herbicides, eucalyptus oil and biological control by leaf-feeding beetle, stem-galling moth, stem-boring weevil and fungi have been carried out with variable degrees of success

Gali Dimak/Bunji

Datura stramonium

Synonyms: Datura tatula L., Datura bertolonii Parlat. ex Guss.; Datura wallichii Dunal.; Datura laevis L.f. in L.f.; Datura lurida Salisb. , Stramonium vulgatum Gaertn.; Datura inermis Jacq. ,; Stramonium tatula (L.) Moench , Datura tatula L. ,; Datura parviflora Salisb. , ; Stramonium spinosum Lam., Stechapfel, Thorn apple, green thorn apple, Jimson weed, Jamestown weed, devil's apple, and devil's trumpet

Gali Dimak/ Bunji plant with flower

Gali Dimak/ Bunji plant

Gali Dimak/ Bunji fruit

Gali Dimak/ Bunji fruit

Ecology: Datura stramonium occurs in open locations such as grassland, roadsides, waste places, scrub vegetation and open forest. It tolerates various soil types but prefers clayey or loamy soils. A widespread and common weed of cultivation and disturbed ground.

Food/Food: Seed contains an alkaloid **which may cause death if eaten!**

Medicine: The most widely known use of *Datura stramonium* and of other Datura species is for relieving asthma, cough, tuberculosis and bronchitis by smoking the dried leaves, roots or flowers. 'Asthma cigarettes' have been shown to be very effective in some cases, but in other cases they had little or no effect. Cigarettes made with the leaves are also used to treat Parkinson's disease. A decoction or infusion of leaves is given as a sedative to mental and schizophrenic patients. The leaves are applied as a dressing to cure rheumatic pain, swellings, wounds, gout, burns, ingrown toe-nails, fungal infections, tumours and ulcers. Dried pulverized leaves are dusted on wounds or applied after mixing the powder with fat or Vaseline. In Ethiopia the plant has been used to tattoo the gums, partly

as a treatment of gingivitis or dental decay and pieces of young fruit are sucked against tonsillitis and sore throat and applied to abscesses and swollen glands. The stems are used as firewood.

Prospects: Although the tropane alkaloids scopolamine, hyoscyamine and atropine can be produced synthetically, it is more economical to extract them from plants such as Datura spp. However, Atropa, Duboisia and Hyoscyamus species are the major sources of raw materials. On the world market of pure tropane alkaloids, it will be difficult for African producers to compete with producers in China, India and Australia.

Gerba Ado/Mindiqsi/guryo fan — Withania somnífera

Synonyms: Physalis somnifera, Physaloides somnifera, Withania microphysalis, Withania mucronata, Manoellia pallida, Winter cherry, Indian ginseng, poison gooseberry

Gerba Ado/ Mindiqsi/guryo fan plant

Gerba Ado / Mindiqsi/guryo fan plant

Gerba Ado/ Mindiqsi/guryo fan leaves

Gerba Ado/ Mindiqsi/guryo fan fruit

Ecology: Withania somnifera occurs on disturbed soil, along roadsides, in cultivated land, on termite mounds in grassland, in open woodland and riverine vegetation, from sea-level up to 2300 m altitude. It is grown in areas with 500–750 mm annual rainfall and prefers well-drained soil; waterlogging is harmful. It grows well in sandy loams and stony red clay soils with pH 7.5–8. It thrives in full sun, but tolerates some shade.

Medical: It acts mainly on the reproductive and nervous systems, having a rejuvenative effect on the body, and is used to improve vitality and aid recovery after chronic illness. In Ethiopia the plant is used in the treatment of cough, asthma and epilepsy. In Somalia smoke of the burning plant is wafted over patients with slow blood circulation. The leaves or roots are pounded together with parts of other plants as an abortifacient, which seems to contradict their use in South Africa to enhance fertility in women with a history of miscarriages or the use to regulate mense. The leaves are given as a purgative and to treat general body pain. Ash of the leaves is rubbed in to treat ulcers and gingivitis. Leaves or decoctions of them are used to treat erysipelas and haemorrhoids. Leaf or root powder is boiled with fat and applied as an ointment on sores, abscesses or smallpox. Leaf sap is applied on anthrax pustules, and anthrax infected meat is boiled in water to which leaves are added. Leaf sap is used as ear drops to cure purulent otitis. Leaves or roots are also used in preparations to treat poorly healing open wounds. The plant is also used as a tonic, aphrodisiac and to treat skin problems.

Fodder/Food: Leaves are sometimes eaten by goats and even by humans as a vegetable, but there are several reports that they are **poisonous**. The seeds are used to curdle milk to make cheese.

Material: The fruits are rich in saponins and can be used as a soap substitute; they also have an emetic effect.

Others: The leaves have insect repellent properties.

Propagation: Withania somnifera is propagated by seed, either sown in a nursery or directly in the field. Traditional land preparation consists of several ploughings and planking to prepare a weed-free seedbed. When sown in a nursery, seeds are sown at the onset of the rains and the seed requirement is (0.5–)2–5 kg/ha

Prospects: With the medicinal potential presented by Withania somnifera, the prospects for further exploitation look promising. Modern research confirms the activity of the drug, although the information has not yet resulted in registered drugs in mainstream medicine. The efficacy and relative safety of this plant, coupled with the ease of propagation, seem to warrant the planting of Withania somnifera for medicinal purposes.

Ghala`ato/Galiile/Booco — *Calotropis procera*

Indigenous

Local synonyms: Gele'ato; Ghula'ento

Synonyms: Aak; Dead Sea Fruit; Mudar Bark; Sodom-Apple; Swallow-Wort; Auricula tree; Cabbage tree; Calotrope; Camel tree; Desert wick; French cotton; Giant/ Indian/ Sodom's milkweed; Roostertree; Rubber tree; *Calotropis heterophylla*; *Calotropis inflexa*; *Calotropis persica*; *Calotropis syriaca*; *Calotropis wallichii*; *Madorius procerus*

Ghala´ato/ Galiile/Booco bush

Ghala´ato/ Galiile/Booco leaves

Ghala´ato/ Galiile/Booco flowers

Ghala´ato/ Galiile/Booco fruit

Ecology: Annual rainfall: 150-1000 mm; altitude: 0-1300 m; mean annual monthly temperatures generally 20-30°C; drought tolerant; frost sensitive; prefers free-draining sandy soils; grows on a wide variety of soil types and will survive on alkaline and saline soils; favours open habitat with little competition

Uses: Leaves: traditional medicine (antidote for snake bite, sinus fistula, rheumatism, mumps, burn injuries, body pain, jaundice); nematicide (chopped); **Bark**: trad. medicine (smoke is inhaled for coughs, asthma, and to cause sweating, leprosy and elephantiasis (bark powder infusion)), dehairing hides; tanning (macerated extract); spear poison; **Roots**: extremely poisonous; Cu remediation (washed, cooked and transformed into a biosorbent); **Root bark**: trad. medicine (diaphoretic, asthma, syphilis); **Stem**: roofing; building `huts (termite proof); charcoal; **Flowers**: trad. medicine (analgesic, astringent, inflammations, tumours – cytotoxic activity, antibacterial activity); **Seeds**: stuffing for mattresses and pillows (floss); cloth (floss); **Twigs**: trad. medicine (diuretics, stomach tonic, anti-diarrhoetics and for asthma, abortion,

anthelmintic, colic, cough, whooping cough, dysentery, headache, lice treatment, jaundice, sore gums and mouth, toothache, sterility, swellings and ulcers); **Latex**: trad. medicine (purgative, antisyphyilitic, antiodontalgic, verrucas); larvicidal activity against mosquitos (extracts); nematicide; coagulation agent for cheese making in West Africa; spear posion; cardiotoxic; contains 11-23% of rubber; **Fibre**: ropes, bags, nets, paper; **General:** trad. medicine (digestive disorders - diarrhea, constipation, stomach ulcers; painful conditions - toothache, cramps, joint pain; parasitic infections - elephantiasis, worms; syphilis, boils, inflammation (swelling), epilepsy, hysteria, fever, muscular spasm, warts, leprosy, gout, snakebites, and cancer, but **serious safety concerns**); Nematode control; molluscicide; fungicidal activity; coagulant in cheese-making (extracts); erosion control; charcoal; fuelwood; soil binder; nurse crop for more valuable species in afforestation programs; green manure;

Animal feed: Fodder (young pods, senescing leaves, flowers – goats, camel, sheep); poisonous to mammals

Propagation: Seeds dispersed by wind, water and animals; can regrow from the root system; light competition with tall weeds, brush, and especially grass may be an efficient way to weaken calotropis and to prevent seed germination

Miscellaneous: Serious weed in pastures, overgrazed rangelands; poorly managed hay fields; fire resistant; indicator of over-cultivation; deep-rooted (rarely grows in shallow soils over unfractured rock)

Humbukto/Balanbaal — Abutilon ramosum

Synonyms: Abutilon harmsianum, Abutilon elaeocarpoides Webb, Abutilon sidoides Gibs., Abutilon sparmanoides Guill. & Perr, Sida ramosa Cay.

Humbukto/ Balanbaal plant

Humbukto/ Balanbaal plant

Humbukto/ Balanbaal leaves

Humbukto/ Balanbaal flower

Ecology: Abutilon ramosum occurs from sea level up to 1800 m altitude in Acacia woodland, riverine forest, degraded forest and fallows.

Material uses: The bark yields fibre.

Medical uses: The powdered root is added to beer or porridge to be drunk for the treatment of stomach ailments.

Subahi/Kuntze Gubtanyo — Acalypha fruticos

Synonyms: Birch leaved acalypha; *Ricinocarpus fruticosus* (Forssk.)

Subahi/ Kuntze Gubtanyo bush

Subahi/ Kuntze Gubtanyo leaves

Subahi/ Kuntze Gubtanyo eaves

Subahi/ Kuntze Gubtanyo leaves

Ecology: common in moist spots within dry areas, e.g. at woodland edges in lowland as an undershrub, in bushland thicket near the coast and on overgrazed land; mean altitude from sea level to 1,800 metres

Uses: traditional Medicine; **Leaves**: collected, chopped, boiled and served with a staple or mixed with other vegetables such as beans or peas; sometimes pounded simsim or groundnuts are added to make it more palatable; dried leaves are used as a substitute for tea, aqueous leaf extract showed significant antibacterial activity; **Roots**: washed, boiled and the liquid is drunk to treat fevers and colds, convulsions, cholera, VD, stomach problems, whooping cough, snake bites; boiled in goat bone soup, which is then drunk to treat liver problems, and stomach-ache caused by eating too much honey; liquid can also be applied to the eyes to treat conjunctivitis; **Stems and roots**: source of basketry material; used for weaving granaries and local doors; used to make arrow shafts; are chewed to treat toothache;

Animal feed: leaves and young twigs readily eaten by cattle

Ya´a/Elji/Xaskul — Agave sisalana

Synonyms: Agave rigida, sisal, sisal hemp, sisal agave, hemp plant

Ya´a/ Elji/Xaskul plant

Ya´a/ Elji/Xaskul plant

Ya´a/ Elji/Xaskul flower

Ya´a/ Elji/Xaskul flowers

Ecology: Sisal is a hardy tropical plant needing full sunlight and moderate relative humidity. It grows best in regions with an average annual rainfall of 1000–1250(–1800) mm, but is often grown with less. The maximum temperature should be 27–32°C, with minimum temperatures of 16°C or higher and daily fluctuations not exceeding 7–10°C. Sisal is damaged by frost and hail. Under dry conditions or at low average temperatures it forms fewer leaves per year and has a longer life cycle. In tropical Africa it is grown up to 1800 m altitude. Sisal prefers sandy-loam soils but can be grown on a range of soils, provided they are rich in bases, especially Ca, and well drained, as sisal does not tolerate waterlogging. The pH should be between 5.5 and 7.5, though sisal has been grown on soils with pH 4–5. Hybrid 11648 does not tolerate waterlogging.

Uses: The main sisal product is the long fibre ('line fibre') from its leaves, which form the major part of the 'hard fibres' of commerce. Sisal fibre is mainly used to make twines, ropes, strings, fishing nets and hammocks. In Madura (Indonesia), for instance, sisal cordage is used for making ship cords, fishing gear and for packing tobacco. Sisal has been widely used for the manufacture of binder and baler twines, but this use has declined steadily in the past decades due to the increasing application of synthetic twines. Sisal fibre is also woven into material for carpet-backing, sacks, industrial fabrics and matting and is used as padding in cars and upholstery. Shorter fibres ('tow') are used for the production of upholstery material, mats, carpets, building panels and cellulose. Sisal fibres serve for making specialty papers, such as cigarette paper, newsprint, bag paper, carbon paper, safety and banknote paper, filter paper and tea bags. However, sisal pulp is more often used in the production of common grade paper, in blends with wood pulp to add porosity or to reinforce weaker pulps, such as those from recycled paper. Sisal waste material after fibre extraction and discarded sisal products may also be utilized for papermaking. Hecogenin from sisal leaves has been used as a precursor in the partial synthesis of corticosteroids such as cortisone, hydrocortisone and prednisone, whereas waxes and pectin can also be obtained from sisal leaves. The inflorescence stalks are used for house construction, fencing and thatching. Waste material after fibre extraction and boles may serve as animal feed, either directly or after ensilage.

Production: In terms of production, sisal occupies 6th place among fibre plants,

representing 2% of the world's production of plant fibres, and it accounts for about 70% of the world's hard fibres. World sisal production reached its peak of over 600,000 t per year in the 1960s, but has declined gradually since then due to the introduction of synthetic fibres and stagnating prices.

Propagation: Sisal is propagated vegetative with bulbils or suckers. Though suckers are directly available from the field, bulbils are often preferred, because they are produced in greater numbers, making selection possible and thus giving a more uniform crop. Bulbils may be collected from the ground after they have fallen, or the pole may be cut and the bulbils shaken into sacks.

Yi´e/Xaskul — Sansevieria ehrenbergii

Synonyms: Sansevieria robusta, Sansevieria powellii, Sansevieria rorida, Seleb sansevieria, blue sansevieria, Somaliland bowstring hemp, Mkonge

Ecology: Sansevieria ehrenbergii occurs from sea-level up to 1900 m altitude in open bushland, dry grassland and dunes, often on rocky ground, usually in the shade of small trees or thickets. Minimum annual rainfall requirements of Sansevieria spp. are c. 250 mm. For commercial production a warm, moist climate and well-drained, somewhat calcareous soils are recommended. Shading is sometimes recommended, but its favourable effect may be due more to its influence on soil moisture and nutrient status than to a direct effect on plants.

Uses: In Ethiopia Sansevieria ehrenbergii is the most common of the five species of Sansevieria that are found in the country, and the leaves are harvested in large quantities for the extraction of the fibres. The fibres are used to make brushes, straps for carrying gourds, in the construction of huts and to tie bundles. The young leaves and fruits are eaten by goats, the rhizomes by cattle. The plants exude an edible gum. The fruits are made into beads. In traditional medicine in Kenya leaf sap is rubbed into wounds to promote healing and whole leaves are warmed up and placed on aching body parts for pain relief. Leaf sap is applied to aching teeth. In Tanzania leaf sap is used to cure skin infections. The fruits are used in Yemen to treat warts and as an antiseptic.

The leaf is wrung and the juice put on the wound to prevent it from swelling.

Propagation: Propagation of Sansevieria spp. is easily done by division, suckers, leaf cuttings, seed or in-vitro culture**.**

Harvesting: Best yields and quality of fibres are obtained by respecting a harvest interval that is long enough not to reduce the leaf-length. A first harvest could take place at 2.5–3.5 years after planting and consecutive harvests at 2 year intervals. At a high growth rate the harvest interval can be shorter.

Handling after harvest: In Ethiopia the leaves of Sansevieria ehrenbergii are retted in water before the fibres are extracted.

Afaramoila/Sarriig

Dactyloctenium aegypticum

Synonyms: Egyptian crowfoot grass, Egyptian grass, coast button grass, comb fringe grass, crowfoot grass, duck grass, durban crowfoot, finger comb grass, beach wiregrass

Afromalia/ Sarriig grass

Afromalia/ Sarriig grass

Afromalia/ Sarriig seeds

Afromalia/ Sarriig flowers

Description

Egyptian crowfoot grass (Dactyloctenium aegyptium (L.) Willd.) is a tufted, slightly stoloniferous annual or short-lived perennial grass, up to 75 cm high. It is much branched. The stems are slender, erect or geniculate, and ascending. The stolon may creep, and they root from the lower nodes. Roots are horizontal. The leaves are broadly linear, 3-25 cm long, 3-15 mm broad, somewhat succulent, and crisp. The inflorescences are borne at the apex of the stem. They are typically digitate or sub digitate and arranged in 2 to 6 unilateral, horizontal spikes. The seeds are angular, wrinkled, or rugose, white or brown in color and about 1 mm long.

Egyptian crowfoot grass is highly variable. The seed heads are typical, looking like a crow's foot, hence the name "Egyptian crowfoot grass".

Uses: *Dactyloctenium aegyptium* is a multipurpose grass. *Animal feed:* It is a mainly used as fodder and relished by all classes of ruminants. In semi-arid areas it makes valuable annual pastures as well as excellent hay. It is also suitable for silage. It is rich in cyanogenetic glucosides at times and may be a danger to grazing stock. The seeds can be fed to poultry. *Food:* The seeds can be used to make alcoholic beverages, and are eaten by humans in periods of food scarcity. They have ethno-medicinal properties and may be used as a fish poison. *Environmental: Dactyloctenium aegyptium* is used as a stabilizer of sandy soils in Australia and for erosion control elsewhere.

Forage management: *Dactyloctenium aegyptium* can be sown 1 cm deep at the onset of the wet season in semi-arid areas. It grows quickly and can be cut for fresh feeding or hay-makin. It is suitable for grazing and does well in overgrazed pastures. *Dactyloctenium aegyptium* yields excellent hay in quantities ranging from 3 to 6 t DM/ha. When grown in crops, it can be removed during weeding operations and fed fresh to livestock.

Propagation: *Drought tolerance:* One of the most drought-resistant grasses because of its rapid growth and seeding each wet season,

even if of short duration. *Soil requirements:* It is adapted to soils of a wide range of textures. *Land preparation for establishment:* Some soil disturbance such as discing is generally necessary. *Sowing methods:* For reseeding rangeland in Kenya the seed has been broadcast on to uncultivated land among cut branches, and on to harrowed land. *Sowing depth and cover:* It is surface sown and protected by branches, mulch or a light harrowing. *Sowing time and rate:* It is sown just ahead of the wet season at 0.25 kg/ha of. *Number of seeds per kg:* About 1.25 million spikelets or 2.7 million loose caryopses.

Asa`ayso/Beer U eke/ Beer Yaxaas Bothriochloa insculpta

Synonym: *Bothriochloa pertusa* auctt., non (L.) A. Camus, *Amphilophis insculpta* (A. Rich.) Stapf., Pinhole grass (South Africa), Creeping bluegrass (Australia), Sweet pitted grass (East Africa).

Asa´ayso/ Beer U eke/Beer yaxaas grass

Asa´ayso/ Beer U eke/Beer yaxaas grass

Asa´ayso/ Beer U eke/Beer yaxaas seeds

Asa´ayso/ Beer U eke/Beer yaxaas seeds

Ecology: A grass which prefers tropical conditions, i.e. moderate to high temperatures, although it is often found in relatively low rainfall conditions (300-600 mm annual rainfall). It is a sub-climax grass that often increases due to disturbance and/ or overgrazing. It is a strong competitor and not easily taken over by climax species. It has high seed production and can quickly colonize bare ground. *Altitude*: Sea-level to 2000 m.

Description: A perennial, sometimes stoloniferous grass that grows to a height of 1,500 mm tall. The leaf blades are blue-green, 40-300 mm long and 2-8 mm wide. The ligule is a fringed to unfringed membrane. The nodes have a ring of conspicuous white hairs. Inflorescence of spike-like main branches of 3-20 many-jointed digitate or sub-digitate racemes with a purple colour. Inflorescence axis shorter than racemes. The spikelets are in pedicellate/sessile pairs and 4.5-5.0 mm long. The sessile spikelets are hermaphroditic and awnless, the pedicellate ones male-only or sterile. Female fertile spikelets compressed dorsiventrally. Lemmas with 1 awn. Two more or less equal glumes, the lower glumes pitted. The leaves and inflorescences have a strong aromatic smell when crushed.

Use: *Animal feed:* This species is an average grazing grass. It has good leaf production, but its aromatic smell deters animals. *Erosion:* Useful grass for combating soil erosion. It is one of the few suitable grasses as it establishes quickly and forms a good ground cover. The runners do not take root readily, but this is improved by prolonged wet weather, trampling or by soil cover, and using high seeding rates. The pastures must be grazed or burnt periodically

Grazing management: Graze when the runners are well developed. Trampling by stock will develop the ground cover. Graze well during summer to prevent if from becoming stemmy. In pure stands or with Stylosanthes humilis keep it grazed to 10-15 cm; with siratro let the pasture reach 30 cm.

Tolerance to flooding: It will not thrive under waterlogged conditions.

Delita/Qaali

Digitaria milanjiana

Synonym: Milanje finger grass, woolly finger grass, *Digitaria boivinii, Digitaria endlichii, Digitaria kilimandscharica,*

Delita/ Qaali grass

Delita/ Qaali grass

Delita/ Qaali spire

Delita/ Qaali seeds

Ecology: Digitaria milanjiana occurs naturally in a wide range of habitats which are mostly subject to some degree of disturbance, at altitudes up to 2000 m, with an annual rainfall of 400—800 mm. It is well-adapted to the humid lowlands of Malaysia and cultivar 'Mardi' (generally referred to as Digitaria setivalva) is suitable for peat and alluvial soils. The cultivar is recommended for smallholdings and commercial enterprises on well-drained, fertile soils and can tolerate brief periods of moisture stress. It is neither shade-tolerant nor tolerant of waterlogging. It is reported to combine well with Leucaena leucocephala (Lamk) de Wit on alluvial soils in Malaysia. Ecotypes have been shown to differ in seed-dormancy depending on provenance. Accessions from regions with a protracted dry season have an extended period of dormancy which may be broken by high temperature.

Uses: *Animal feed:* Digitaria milanjiana is used as forage for grazing by cattle and goats. *Environment:* erosion control.

Durfu/Dareemo

Chrysopogon plumulosus

Synonyms: Aucher's grass, Andropogon aucheri Boiss., Ethiopia, Dscheladscheranne

Durfu/ Dareemo grass

Durfu/ Dareemo grass

Durfu/ Dareemo spire

Durfu/ Dareemo seeds

Ecology: Deciduous bushland (often with Commiphora) and sub-desert grassland. A species of semi-arid and arid grassland and bushland. Associated with Andropogon cyrtocladus Stapf. In arid grassland-bush of Kenya this species is frequently dominant. Dry stony soils or black clays. Occurs either on sandy soils, limestones, or black clays. It is possible that there are different ecotypes in these habitats. Infrequent on sandy-clay or clay soils. Altitude: 0-1800m.

Description: Stems: Wiry. Habit: Forms loose clumps. Height: Culms 10-90 cm tall. Inflorescences: Narrow panicles, 3-9 cm long, branches capillary, bearded at tip; spikelets paired, sessile; first glume 4-6.3 mm long, laterally compressed to round-keeled; second glume glabrous-ciliate on keel with an awn 5-15 mm long, plumose; lower lemma 2-4 mm long, pubescent, upper lemma entire with awn 2-3 cm long; pedicellate spikelet 4-6.5 mm long, sterile; second glume awn frequently to 15 mm long, plumose. Leaves: Glaucous, glabrous to pubescent.

Uses: *Animal feed:* A valued grazing grass in drier regions, particularly when green; when dry it is also eaten avidly by most species. *Materials***:** The grass is used for making mats for sun protection and roof thatching. *Environmental*: Erosion control.

Propagation: *Vegetative:* Multiplication by offsets is a reliable method of pasture establishment. *Generative:* 2 kg/ha gives 100 seeds per square metre.

Melif/Xarfo Andropogon canaliculatus

Synonyms:

Melif/ Xarfo grass

Melif/ Xarfo grass

Melif/ Xarfo spine

Melif/ Xarfo seed

Ecology: Moist or swampy places. Usually subject to seasonal soil moisture extremes e.g. black clays of the Accra plains and river flood plains, or sandy soils overlying impermeable ironstone hardpan. Acid moist valley, grassy places on mixed sandy-clay soil. Growing in woodland and bogs. *Altitude*: 320-1700m

Uses: *Animal feed*: Provides good acceptable grazing, but not in great bulk.

Materials: The grass is used for making mats. Mats sold all year round in Mali.

Wagelseber/Garrowle — Cenchrus ciliaris

Synonym: Buffel grass, African foxtail grass, foxtail buffalo grass, blue buffalo grass, rhodesian foxtail, Cenchrus glaucus C. R. Mudaliar & Sundararaj, Pennisetum ciliare (L.) Link, Pennisetum cenchroides Rich., Pennisetum incomptum Nees ex Steud.

Wegelseber/ Garrowle grass

Wegelseber/ Garrowle grass

Wegelseber/ Garrowle grass

Wegelseber/ Garrowle grass

Ecology: Common in hot dry areas, especially on sandy soils where it is often ruderal (grows in waste places), and also often on termitaria, on all types of soil. *Cenchrus ciliaris* ia pollinated by wind. It is adapted to fairly heavy grazing and a wide variety of conditions.

Description: A tufted perennial grass, 60–100 cm high. Leaf blades 100–250 x 4–8 mm. Inflorescence (Gibbs Russell et al. 1990): a bristly false spike, 40–120 mm long, straw- or purple-coloured; all bristles are joined at base below spikelet cluster to form a small inconspicuous disc,

bristles mostly 5–10 mm long, outer bristles slender and scabrid, inner bristles slender and plumose. Spikelet 4–5 x 3 mm; lower glume (the bracts at the base of the spikelet) 1-nerved or nerveless and upper glume 1–3-nerved, minutely awned; lower lemma usually 5-nerved, minutely awned; upper lemma similar to lower lemma (encloses grass flower), slightly thicker in texture; anther 1.5–2.7 mm long. A variable species, with many cultivars available e.g. Malopo. Flowering: August to April.

Uses: *Cenchrus ciliaris* is a palatable species with a high leaf production. It is very palatable when young, and remains fairly palatable at maturity. Generally planted as pasture. It is one of the most popular cultivated pastures, especially in the more arid parts, with many commercially available cultivars. Foxtail buffalo grass can endure trampling. Buffel grass makes reasonable-quality hay when cut in the early flowering stage, yielding up to 2 500 kg/ha per cut with a protein content of 6-10 percent of dry matter. Old grass, after the seed has been harvested, can give low-quality roughage for drought feeding with supplements. This old grass will have a protein content of 4-6 percent. Little buffer grass has been made into silage, as the moisture content in the semi-arid areas is usually low.

Propagation: It is easy to grow *Cenchrus ciliaris,* especially in lower rainfall areas on sandy soils. It is easily established by seeding. It is a hardy cultivated pasture with a deep root system (up to 2 m). Foxtail buffalo grass is difficult to establish in clay soil, but once established, it grows well. In the garden it is best used as a lawn grass, this is common in India.

Grazing management: Where the area of buffer grass is small, it is best to graze the native pastures during the summer growing period and keep the buffer grass, especially the cold-tolerant varieties, for use during the winter. An occasional fire to retard the development of woody plants and destroy old grass is generally necessary. Nitrogen fertilizers will be required to maintain productivity or increase it.

Tolerance to flooding: Where flooding in the field occurs irregularly and does not last more than six days, buffer grasses can be used in pasture mixtures.

Value for erosion control: Buffel grass is valuable in that it is one of the best adapted grasses to semi-arid conditions. Its tussocky nature, however, does not allow for complete ground cover.

Weed: In the semi-arid areas it usually dominates weeds. *Cenchrus ciliaris* is an aggressive grass due to its root system and allelopathic toxicity towards other seeds. It spreads readily and can out-compete native pastures.

References/Photo Credits

For further information please visit the following sites:

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GIZ SDR-ASAL Programme

GIZ Office

P.O.Box 100009, Addis Ababa, Ethiopia

T +251 11 6629 983

F +251 11 5540 764

giz-aethiopien@giz.de

www.giz.de

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