

## Calotropis procera

(Ait.) Ait. f.

Asclepiadaceae

### LOCAL NAMES

Amharic (tobiaw,ghinda,qimbo); Arabic (dead sea plant,usher,kisher); English (calotrope,calotropis,Dead Sea fruit,desert wick,giant milkweed,swallow-wort,mudar fibre,rubber bush,rubber tree,sodom apple); French (pomme de Sodome,algodón de seda,arbre á soie,coton soie,arbre a soie du Senegal); Hausa (tumfafia); Hindi (madar,akada,akdo,aak); Italian (Calotropo); Mandinka (kipapa); Sanskrit (alarka); Somali (boah,bo'ah); Spanish (bomba,algodón extranjero,cazuela); Swahili (mpamba mwitu); Tamil (vellerukku); Tigrigna (dinda,ghindae,akalo); Wolof (faftan)

### BOTANIC DESCRIPTION

*Calotropis procera* is a shrub or small tree up to 2.5 m (max. 6) high, stem usually simple, rarely branched, woody at base and covered with a fissured, corky bark; branches somewhat succulent and densely white tomentose; early glabrescent. All parts of the plant exude a white latex when cut or broken.

Leaves opposite, simple, subsessile, stipule absent; blade oblong-obovate to broadly obovate, 5-30 x 2.5-15.5 cm, apex abruptly and shortly acuminate to apiculate, base cordate, margins entire, succulent, white tomentose when young, later glabrescent and glaucous.

Inflorescence a dense, multiflowered, umbellate cyme arising from the nodes and appearing axillary or terminal; flowers hermaphroditic, pentamerous; pedicle 1-3 cm long; calyx 5-lobed, shortly united at the base, lobes ovate, 4-7 x 3-4 mm, glabrescent.

Fruit, a simple, fleshy, inflated, subglobose to obliquely ovoid follicle up to 10 cm or more in diameter; seeds numerous, flat obovate, 6 x 5 mm, with silky white pappus 3 cm or more long.

The specific name, *procera* is Latin for tall or high.

### BIOLOGY

Highly cross-pollinated through insects such as monarch butterflies. Progeny genetically both divergent and different from its parents (chromosome number  $2n = 22$ ). Both animals and wind disperse seeds.



*Calotropis procera* slash (Joris de Wolf, Patrick Van Damme, Diego Van Meersschaut)



*Calotropis procera* flowering shoot (Joris de Wolf, Patrick Van Damme, Diego Van Meersschaut)



Plant invading cultivated fields. (Chris Fagg)

**ECOLOGY**

*C. procera* is drought-resistant, salt-tolerant to a relatively high degree, and through its wind and animal dispersed seeds, it quickly becomes established as a weed along degraded roadsides, lagoon edges and in overgrazed native pastures. Has a preference for and is often dominant in areas of abandoned cultivation especially sandy soils in areas of low rainfall; assumed to be an indicator of over-cultivation.

**BIOPHYSICAL LIMITS**

Altitude: Up to 1 300 m, Mean annual rainfall: 300-400 mm

Soil type: Prefers disturbed sandy soils.

**DOCUMENTED SPECIES DISTRIBUTION**

**Native:** Afghanistan, Algeria, Burkina Faso, Cameroon, Chad, Cote d'Ivoire, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Gambia, Ghana, Guinea-Bissau, India, Iran, Iraq, Israel, Kenya, Kuwait, Lebanon, Libyan Arab Jamahiriya, Mali, Mauritania, Morocco, Mozambique, Myanmar, Nepal, Niger, Nigeria, Oman, Pakistan, Saudi Arabia, Senegal, Sierra Leone, Somalia, Sudan, Syrian Arab Republic, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam, Yemen, Republic of, Zimbabwe

**Exotic:** Antigua and Barbuda, Argentina, Australia, Bahamas, Barbados, Bolivia, Brazil, Chile, Colombia, Cuba, Dominica, Dominican Republic, Ecuador, French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Surinam, Trinidad and Tobago, Uruguay, Venezuela, Virgin Islands (US)



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

---

**PRODUCTS**

**Food:** The bark and latex are used in brewing and to curdle milk.

**Fodder:** Young pods, senescing leaves and flowers are eaten by goats, occasionally by sheep in times of need, and rarely by cattle and other livestock because they are slightly toxic. Nutritional analysis of shade-dried leaves of *C. procera* shows they contain 94% dry matter, 43% acid detergent fibre, 20% ash, 19% crude protein, 19% neutral detergent fibre, 5% magnesium, 2% oil, 0.59% phosphorus, 0.2% zinc, 0.04% iron and 0.02% calcium.

**Fuel:** Stems produce a good charcoal, while the stem pith makes good tinder. Produces an effective and sustained smoky fire, suitable for drying fish. Charcoal has been used for gunpowder in India.

**Fibre:** White, silky, strong, cylindrical, flexible and durable stem fibre used for various purposes, such as for making ropes, to form cheap cots, gunny bags, bow strings, fishing nets, and in the manufacture of paper, pulp and duplicating stencils. The floss from the seeds, which is about 2-3.5 cm long, white silky and strong, is used as an inferior stuffing for mattresses and pillows as well as for weaving into a strong cloth. The floss may also substitute cotton wool for surgical purposes. Strong inner bark fibres produce a binding material and are processed into fabrics.

**Timber:** Stems are termite proof and used for roofing and building huts. The very light wood can also be used for fishing net floats.

**Latex or rubber:** The liquid latex of *C. procera* can be used as a renewable source of hydrocarbons and intermediate energy resources. Latex contains 11-23% of rubber.

**Tannin or dyestuff:** A macerated bark extract can be used for dehairing hides and tanning. Additional minor uses includes dyes.

**Poison:** The bark and the latex are widely used as arrow and spear poisons. The latex is cardiotoxic with the active ingredient being calotropin. Latex of *C. procera* is 80% effective in inhibiting the activity of the tobacco mosaic virus. The leafy branches are said to deter ants.

**Medicine:** Compounds derived from the plant have been found to have emeto-cathartic and digitalic properties. The principal active medicinals are asclepin and mudarin. Other compounds have been found to have bactericidal and vermifugal properties. The latex contains a proteolytic enzyme called calotropaine.

An infusion of bark powder is used in the treatment and cure of leprosy and elephantiasis. It is inadvisable to use bark that has been kept for more than a year. The root bark is an emetic, the flower a digestive, and a tonic is used for asthma and catarrh. Bark and wood stimulate lactation in cattle. Roots (extremely poisonous) are applied for snakebite. The milky sap is used as a rubefacient and is also strongly purgative and caustic. The latex is used for treating ringworm, guinea worm blisters, scorpion stings, venereal sores and ophthalmic disorders; also used as a laxative. Its use in India in the treatment of skin diseases has caused severe bullous dermatitis leading sometimes to hypertrophic scars. The local effect of the latex on the conjunctiva is congestion, epiphora and local anaesthesia. The twigs are applied for the preparation of diuretics, stomach tonic and anti-diarrhoeics and for asthma. Also used in abortion, as an anthelmintic, for colic, cough, whooping cough, dysentery, headache, lice treatment, jaundice, sore gums and mouth, toothache, sterility, swellings and ulcers.

**SERVICES**

**Soil improver:** A source of green manure. The plant can help improve soil water conditions and also acts as a soil binder.

**Pollution control:** *C. procera* is an ideal plant for monitoring sulphur dioxide emissions in the air.

**Other services:** A suitable indicator of exhausted soil.

**TREE MANAGEMENT**

*C. procera* has been cultivated in South America and on the Caribbean Islands for the production of fibres at a spacing of 1-1.5 m. When cultivated, annual yields of up to 500 kg/ha are expected. A single harvest per season is preferable to a double (or triple) harvest; a single harvest would result in a net saving of energy input both on the farm and in the processing plant. Well suited for intensive energy farming in arid or semi-arid regions where frost is not a limiting factor.

**GERMPLASM MANAGEMENT**

Seed storage behaviour is orthodox.

**PESTS AND DISEASES**

Susceptibility to pests is relatively high. Aphids, grasshoppers and other insect pests eat or suck the leaves despite the toxic latex within.

The caterpillar of the plain tiger butterfly, *Danaus chrysippus*, feeds on *C. procera*, which is common all along the Tihama coastal plains of Saudi Arabia. The milkweed food plant contains cardiac toxins and these are transferred to the tissue of the adult butterfly. These toxins afford excellent protection against attack from vertebrate predators, such as birds and lizards.

**FURTHER READING**

Abbas B, El-Tayeb AE, Sulleiman YR. 1992. *Calotropis procera*: feed potential for arid zones. *Veterinary-Record*. 131(6):132.

Abbiw D. 1990. *Useful plants of Ghana*. Intermediate Technology Publications and the Royal Botanical Gardens, Kew.

Anon. 1986. *The useful plants of India*. Publications & Information Directorate, CSIR, New Delhi, India.

Aronson JA. 1984. *Energy plants for desert agriculture: Current state of knowledge: an Israeli perspective*. Israel Ministries of Agriculture and Energy. File No. 74.12

Arora SS. 1982. *Calotropis procera* (Ait.) R. Br. - Ak: A new and free source of fibre and renewable hydrocarbons. *Agricultural mechanization in Asia, Africa and Latin America*. 13(3):71-75.

Beentje HJ. 1994. *Kenya trees, shrubs and lianas*. National Museums of Kenya.

Bein E. 1996. *Useful trees and shrubs in Eritrea*. Regional Soil Conservation Unit (RSCU), Nairobi, Kenya.

Bekele-Tesemma A, Birnie A, Tengnas B. 1993. *Useful trees and shrubs for Ethiopia*. Regional Soil Conservation Unit (RSCU), Swedish International Development Authority (SIDA).

Eggeling. 1940. *Indigenous trees of Uganda*. Govt. of Uganda.

FAO. 1986. *Some medicinal plants of Africa and Latin America*. FAO Forestry Paper. 67. Rome.

Hong TD, Linington S, Ellis RH. 1996. *Seed storage behaviour: a compendium*. Handbooks for Genebanks: No. 4. IPGRI.

Leeuwenberg AJM. 1987. *Medicinal and poisonous plants of the tropics*. Pudoc Wageningen.

Perry LM. 1980. *Medicinal plants of East and South East Asia : attributed properties and uses*. MIT Press. South East Asia.

Singh N. 1995. *Monitoring of auto exhaust pollution by roadside plants*. *Environmental Monitoring and Assessment*. 34(1): 13-25.

Vogt K. 1995. *A field guide to the identification, propagation and uses of common trees and shrubs of dryland Sudan*. SOS Sahel International (UK).

von Maydell HJ. 1986. *Trees and shrubs of the Sahel - their characteristics and uses*. GTZ 6MBH, Eschborn.

Williams R.O & OBE. 1949. *The useful and ornamental plants in Zanzibar and Pemba*. Zanzibar Protectorate.

**SUGGESTED CITATION**

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. *Agroforestry Database:a tree reference and selection guide version 4.0* (<http://www.worldagroforestry.org/af/treedb/>)