Euphorbia tirucalli

L.

Euphorbiaceae

LOCAL NAMES
Amharic (kinchib); Arabic (injil); English (finger euphorbia,Indian spurge tree,milk bush,pencil tree,rubber euphorbia); Filipino (bali bali); French (tirucalli,euphorbe effile euphorbe,garde maison,arbre de Saint Sebastien); Gujarati (thor dandalio); Hindi (sehund,thuhar,konpalsehnd); Malay (tulang-tulang,tulang,tentulang,kayu patah); Somali (dana); Spanish (Palito,Antena,esqueleto,Alfabeto chino); Swahili (mtupa mwitu,mwasi,utupa); Thai (khia thian,khia cheen); Vietnamese (x[uw] [ow]ng c[as],san h[oo] xanh)

BOTANIC DESCRIPTION
Euphorbia tirucalli is an unarmed shrub or small tree 4-12 (-15) m high with brittle succulent branchlets 7 mm thick often produced in whorls, green and longitudinally finely striated, with white to yellowish latex.

Leaves few, fleshy, linear-lanceolate, to 15 x 2 mm, present only at the tips of young branchlets and very quickly deciduous; extreme tips of young leafy branchlets sparsely tomentose, with curled brown hairs, soon glabrescent; glandular stipules minute, dark brown.

Cymes 2-6 congested at the apices of the branchlets, forking 2-4 times, with rays less than 1 mm long producing a dense cluster of cyathia developing only male flowers, or occasionally a few female flowers also present, or cyathia fewer and only female flowers developing, the whole cyme may be glabrous or tomentose, with curled brown hairs, especially the involucres and lobes; bracts rounded, 2 x 15 mm sharply keeled, usually glabrous except on the margin.

False flowers (cyathia) subsessile, 3 x 4 mm, with cup-shaped involucres; glands 5, subglobose to transversely elliptic, 0.5 mm long. Male involucres: bracteoles linear with plumose apices; stamens 4.5 mm long; an aborted female flower is occasionally present. Female involucres: bracteoles present and occasionally a few male flowers; perianth distinctly 3-lobed below the tomentose ovary, with lobes 0.5 mm long; styles 2 mm long, joined at the base, with thickened deeply bifid recurved apices.

Fruit a glabrescent capsule, exserted on a tomentose pedicel to 1 cm long, subglobose, 8 x 8.5 mm.

Seeds ovoid, 3.5 x 2.8 mm, smooth, buff speckled with brown and with a dark brown ventral line; caruncle 1 mm across.

The generic name commemorates Euphorbos the Numidian (N.E. Algeria) physician of King Juba of Mauretania c.54 B.C. The name tirucalli is a native name from Malabar in India.

BIOLOGY
Plants usually produce male flowers. Female flowers or plants much less common. Plants with bisexual cyathia also occur, although the female flower apparently often aborts. E. tirucalli flowers in October and fruits from November-December and is pollinated by insects.

General habit: A large unarmed shrub or small tree up to 5 m tall. Branchlets are slender, smooth and cylindrical. Small leaves can be observed appearing on young green branches. The tree is at Muguga, 25 km northwest of Nairobi, Kenya. (Phanuel O. Oballa)

Windbreak: A windbreak of E. tirucalli in a farm at Kibos near Kisumu, Kenya. The row of trees is about 6 m high. (Phanuel O. Oballa)

Trimmed live hedge: A trimmed dense live hedge of E. tirucalli near Kariandusi on the Nairobi - Nakuru road, Kenya. The acacia thorns on the hedge are added to further deter penetration by intruders. (Phanuel O. Oballa)

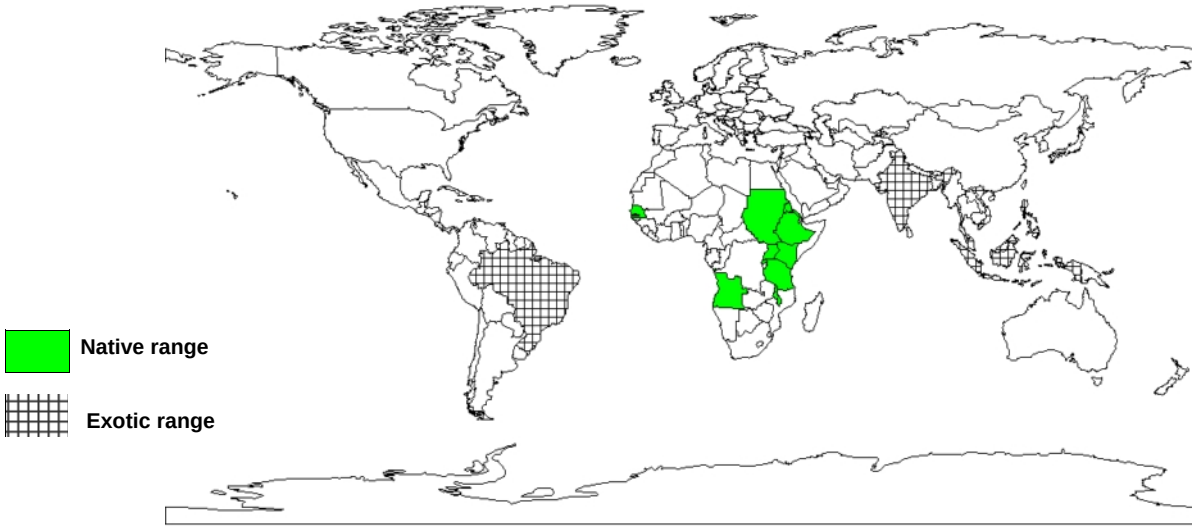
ECOLOGY
It is normally found in dry bushland thickets and naturalizes easily in brushwood, open woodland and grassland up to 2 000 m.

BIOPHYSICAL LIMITS
Altitude: up to 2 000 m
Soil type: Appears to grow on almost any soil type.

DOCUMENTED SPECIES DISTRIBUTION

Native: Angola, Eritrea, Ethiopia, Kenya, Malawi, Mauritius, Rwanda, Senegal, Sudan, Tanzania, Uganda, Zanzibar

Exotic: Brazil, India, Indonesia, Malaysia, Philippines, Vietnam



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
Fuel: Yields charcoal suitable for use in gunpowder. Its use as a source of hydrocarbon has been investigated by a number of authors, the latex hydrocarbon is largely a C30 triterpenoid which on cracking yields high octane gasoline. It is estimated that 1-2 t of crude oil can be obtained per ha per year from E. tirucalli. The gross energy value of E. tirucalli biomass is 17 600 kJ/kg. The biomass can be converted into gas, liquid fuels and solid fuels such as pellets, briquettes and charcoal.

Timber: The wood is white, close grained and fairly hard. It is used for toys, rafters and veneers.

Gum or resin: The sap has strong fixative power and is used on the east African coast for fastening knife-blades to wood handles and spear-heads to shafts.

Latex or rubber: The latex is an emulsion of about 30% (principally euphol) terpenes in water. During the Second World War the latex was used in South Africa in the development of a rubber substitute, but this proved to be unstable and unprofitable due to the high latex resin content.

Poison: The latex is highly poisonous, causing severe injury to the eye, irritation and vesication from contact, emesis and purgation from ingestion. It is also piscicidal and insecticidal. E. tirucalli showed strong activity against Colletotrichum capsici, Fusarium pallidoroseum, Botryodiplodia theobromae, Alternaria alternata, Penicillium citrinum, Phomopsis caricae-papayae and Aspergillus niger in paper disc diffusion sensitivity tests. The extracts of E. tirucalli contain a number of esters of the tetracyclic diterpenoid phorbol, many of which have been shown to act as tumour promoters (cocarcinogens). Their co-carcinogenic effect on lymphoblastoid cells poses a real threat in Africa where drinking water is drawn around the plants. Latex of E. tirucalli was highly toxic to the parasitic nematodes. Hoplolaimus indicus, Helicotylenchus indicus and Tylenchus filiformis in vitro, toxicity increased with an increase in the concentration of latex and exposure period.

Medicine: The young branches can be roasted then chewed for sore throat. The boiled root juice acts as an emetic in cases of snake bite, and also for sterility in women. Caution should be observed in making medicinal preparations of this plant due to its high toxicity. Poultices from the stem are applied to heal broken bones. In Peninsular Malaysia, a poultice of the roots or stems has been applied to ulceration of the nose, haemarrhoids and swellings. Root scrapings, mixed with coconut oil, are given to cure stomach-ache.

Other products: An oil obtained from the latex was formerly used in linoleum, oilskin, and leather cloth industries. Methane can be produced by anaerobic fermentation of E. tirucalli latex.

SERVICES
Erosion control: Protects bare soil in dry areas from wind and water erosion. E. tirucalli fences can act as erosion breaks.

Reclamation: E. tirucalli is very drought resistant and efficient in photosynthesis because of its unique photosynthetic physiology combining both the Crassulacean acid metabolism and the C3 pathways. It can be used in land reclamation programmes. In Zimbabwe plantations of E. tirucalli have succeeded in some instances at <5 000 p.p.m. in arsenic mine spoil mounds.

Ornamental: Widely planted for ornamental purposes.

Boundary or barrier or support: E. tirucalli is an extensively used hedge plant in rural areas of East Africa.

Intercropping: The finger euphorbia is an ideal species for agroforestry offering little shade and having many other uses.

Other services: The tree has a number of cultural implications in many African communities.

TREE MANAGEMENT
It coppices well at 20-30 cm height. Under semi arid conditions the regrowth of the finger euphorbia is excellent. A density of 10 000-20 000 plants is normal when grown as a fuel crop. When planted at a spacing of 1m x 1m it produced 120 t/ha fresh material and 14 t/ha dry matter after 1 year, yielding 40-88 kg of crude oil, 135-213 kg of sugar and 1.8 t of bagasse.

GERMPLASM MANAGEMENT
Germination is epigeous in E. tirucalli.

PESTS AND DISEASES
The nematode Meloidogyne incognita infests E. tirucalli in India.

FURTHER READNG

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SUGGESTED CITATION

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