



## *Dialium guineense*

### Velvet tamarind



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Velvet tamarind fruits for sale in Godomey market (Benin)

#### Common name

Velvet tamarind, black velvet, Sierra Leone tamarind, tumble tree (English)

Tamarinier noir, tamarinier velours, dialium de Guinée, afambeau (French)

#### Scientific name

*Dialium guineense* Willd.

#### Synonyms

*Dialium guineense* Steud.

#### Family

Fabaceae

#### ■ Eben-Ezer BK EWEDJE

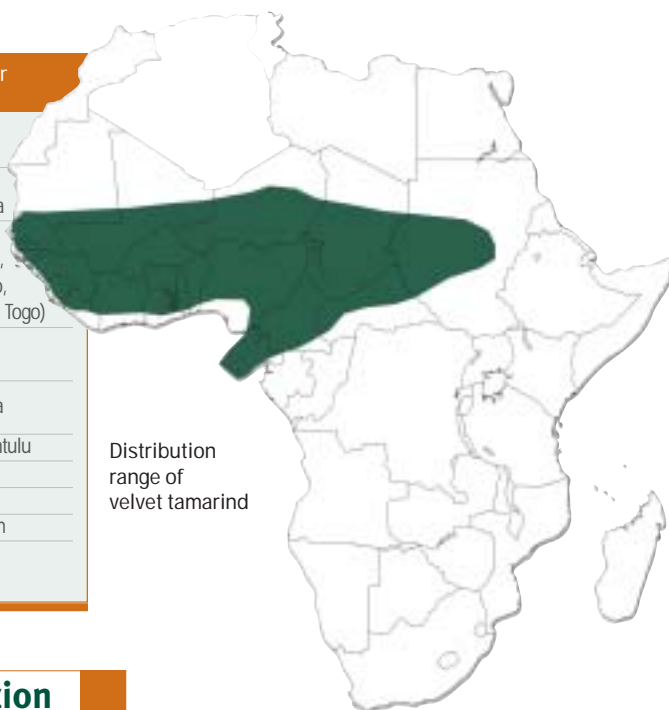
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This leaflet highlights the nutritional and socio-economic potential of velvet tamarind and provides information to assist those working with the species. The focus is on conserving genetic diversity and promoting sustainable use of velvet tamarind. The leaflet presents a synthesis of current knowledge about the species. The recommendations provided should be regarded as a starting point, to be further developed according to local or regional conditions. These guidelines will be updated as new information becomes available.

Socio-cultural group	Country	Vernacular name
Fon, Goun	Benin	Assonswen, asiswetin
Yoruba, Nagot	Benin	Anwin, iwin, igi anyi, agiya
Fulbe	Benin, Guinea, Mali, Senegal, Sierra Leone, Togo	Kurilahi (Benin, Togo), meeko/meko, moké (Benin, Togo)
Bambara	Côte d'Ivoire, Gambia, Mali, Senegal	Kofina
Mandinka	Gambia, Guinea-Bissau, Senegal	Kosito, kofina
Guerzé	Guinea	Kpolokurénintulu
Kissi	Guinea, Sierra	Kuofina
Susu	Leone	Moké, mókè
Wolof	Guinea-Bissau	Solom, solum
Mina	Mauritania, Senegal Togo	Assonsouin



## Geographical distribution

Velvet tamarind is commonly present in humid dense forests, dry dense forest and forest galleries in West and central Africa. Its native range includes Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Equatorial Guinea, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Sudan and Togo.

## Importance and use

On farmland *Dialium guineense* is predominantly a fallow species. It is believed to restore lost soil fertility as it usually emerges as one of the

Uses	Part of plant
Food	Fruit
Fodder	Leaves
Timber or charcoal	Wood, roots
Medicine	Roots, leaves, fruits, bark
Fishing tools	Young stems and branches

## Chemical composition of fruit and seeds

	Seeds	Fruit pulp
Sugar (glucose, g/kg)		582.1
Proteins (g/kg)	148.8	61.3
Lipids (g/kg)	60.1	700.0
Acidity (pH)	5.5	3.3

pioneer species in abandoned lands. It has been recommended for use in outlying farms in the forest area as an agroforestry tree crop.

The fruits are widely sold on local markets and are consumed fresh by people of all ages as a snack. Some old people consume non-alcoholic drink made from the fruit.

According to the producers and sellers of medicinal plants of Benin, the leaves, bark and roots can be used to treat a variety of health problems.

Fruits are rich in minerals, sugars and tartaric, citric, malic and ascorbic acids. They are used in the management of fever, diarrhoea and palpitations, and as an antibacterial treatment. Extracts from velvet



Young branches used for fishing

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## Ecology and biology

Velvet tamarind grows best on well-drained iron-rich acidic soils within a temperature range of 25 to 32°C and an annual rainfall of 900-3000 mm.



Flowering

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tamarind plants growing in Nigeria have been shown to possess both antimutagenic and molluscicidal activities.

Bundles of stems of velvet tamarind collected from pruning mature trees and cutting saplings are 'planted' in fish ponds in the south of Benin to provide food and shelter for the fish. Known as 'acadjas', they increase the yield of fish raised in the ponds.

Velvet tamarind wood is hard, heavy and fine-textured, and is used for flooring and other local construction. It is also a high-quality fuel and is used for making charcoal.

## Socio-economic value

Velvet tamarind is a source of substantial income to the population in rural and suburban zones in Benin, Nigeria and Togo. The fruits are traded locally and across borders.



Fruiting

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## Reproductive biology

Flowers are hermaphroditic, i.e. both male and female, and are pollinated by both wind and insects, including flies, bees, wasps and butterflies.

Flowers grow in cluster of 13–59 flowers, which open over a period of 4-6 days. Individual flowers are pollinated as they open, between 6 and 12 a.m. Seeds are orthodox, i.e. tolerant of drying and cold storage, and dispersed by wind, birds, squirrels, water and humans.

### Phenology

Leaf flush, flowering and fruit development phenology vary widely according to the ecogeographical region where the species is present. In Benin, velvet tamarind produces new leaves three times but blossoms and produces fruit only once a year. Flowering starts in September and ends in December, with a peak in October. Fruit development occurs from November to April, with a peak in January. The fruits ripen from January to April but ripe fruits are most abundant in February.

### Morphological traits and their variation

Velvet tamarind is a medium-sized tree reaching about 30 m in height. Leaves are compound and usually have two pairs of leaflets and one terminal leaflet. Leaflet shape is generally elliptical but the tip may be notched or pointed. Sometimes the leaves have fine hairs on the lower side. Leaf length ranges from 4.2 to 10.3 cm and width from 2.3 to 6.1 cm.

The small, white flowers grow in large clusters, sometimes 30 cm long. The fruits are black with a velvet-textured surface, and seeds are embedded in a red pulp. They are more or less round and usually flattened but sometimes globular. The fruits are 1.3–3.2 cm in length, 1.0–2.9 cm in width and 0.2–1.3 cm in thickness. One hundred fruits weigh approximately 60-97 g.

### Related species

The *Dialium* genus includes 24 species that are found in sub-Saharan Africa.

### Genetic knowledge

No molecular genetic studies have been published about this species. Chloroplastic

Species	Country/region
<i>D. angolense</i> Welw. ex Oliv., <i>D. corbisieri</i> Staner, <i>D. englerianum</i> Henriq, <i>D. gosseweileri</i> Baker f., <i>D. hexasepalum</i> Harms, <i>D. kasaiense</i> Louis ex Steyaert, <i>D. pentandrum</i> Louis ex Steyaert, <i>D. reygartii</i> De Wild.	Burundi, Democratic Republic of Congo
<i>D. aubrevillei</i> Pellegr., <i>D. pobeguinii</i> Pellegr.,	Côte d'Ivoire, Ghana, Guinea, Liberia, Sierra Leone
<i>D. bipindense</i> Harms, <i>D. densiflorum</i> Harms, <i>D. eurysepalum</i> Harms, <i>D. soyauxii</i> Harms, <i>D. tessmannii</i> Harms	Gabon
<i>D. dinklagei</i> Harms, <i>D. guineense</i> Willd.	Cameroon, Côte d'Ivoire, Gabon, Guinea, Liberia, Nigeria, Sierra Leone
<i>D. excelsum</i> Steyaert, <i>D. holtzii</i> Harms, <i>D. orientale</i> Bak.	East Africa
<i>D. zenkeri</i> Harms	Cameroon
<i>D. pachyphyllum</i> Harms	Angola, Cameroon, Congo, Gabon, Nigeria
<i>D. quinquepetalum</i> Pellegr., <i>D. schlechteri</i> Harms	



Differences in fruit shape: ovoid, orbicular, one seed oval, two seeds.

lineages and genetic diversity of velvet tamarind in Benin and in Gabon is currently under study at Université Libre de Bruxelles, Belgium.

management. Men receive income from the sale of medicinal and therapeutic products made from velvet tamarind, while women receive the income from the sale of fruit.



Branching

### Threats

Like other trees in the region, populations are threatened by deforestation in the species' natural habitat and by changes in agricultural practices where it has been maintained in farmers' fields. It is thought to

### Local practices

In West Africa, local people recognize two varieties, one with sweet fruit and one with sour fruit.

Men, women, boys and girls have different roles in managing velvet tamarind trees and their products.

Men harvest roots, bark and wood for therapeutic use, as well as timber and shoots and branches for use in fish ponds. Women and children harvest fruit and girls help women with marketing the fruit. Women and girls process fruit for consumption and to produce traditional treatments.

Trees are owned by both men and women, who jointly take decisions concerning their



Velvet tamarind tree in a courtyard

be overexploited for fruit and for wood, compromising the regeneration of the species.

Harvesting branches and young stems for fish farming has a direct impact on the fruit production.

The wood of adult trees is attacked by the larvae of wood-boring beetles (*Cerambycidae*) and the seeds are attacked by two species of seed beetles (*Bruchidius* sp. and *Caryedon dialii*).

### Conservation status

Velvet tamarind's natural habitat is in dense humid forests in sub-Saharan Africa. Although it undoubtedly occurs in parks and forest reserves, this has not been documented. The degree to which such areas are actually protected is also not known.

The seeds are orthodox and storage trials have been undertaken in the National Forest Seed Centre (NSF) of Burkina Faso. Recommended conservation conditions are: seed moisture content 5–10%; temperature: + 5°C to + 25°C or ambient temperature; relative humidity 60–80%.

In Benin, Nigeria and Togo the species is in the early stages of domestication and it grows in home gardens and in farmers' fields. In Benin there are regulations and a degree of control over harvest practices. There is a requirement for sales receipts for fruit and branches to be registered under the finance laws. However, overexploitation is common and unauthorized felling reduces the density of the species in the forests.

### Management and improvement

The traditional cultivation methods consist of the preservation and maintenance of saplings and mature trees in fields and home gardens. The only reports of farmers planting



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Velvet tamarind seedlings

and cultivating the species are from Nigeria. Seed has been grown in a nursery at the National Institute of Agricultural Research of Benin (INRAB).

### Propagation from seed

Seed must be scarified to promote germination. The seed coat can be scarified mechanically to weaken it or the seed should be immersed in concentrated sulphuric acid

for up to 15 minutes, then rinsed and soaked in water for 24 hours.

### Vegetative propagation

Velvet tamarind has been propagated successfully using grafting and budding techniques. Both methods reduce the time to produce fruit (3–4 years, compared with 5–10 years or more if established from seed). Vegetative propagation is the best way to multiply a mature tree that has superior qualities.

### Guidelines for conservation and use

Conservation and use guidelines are required to ensure continued availability of the species and to integrate the management of the genetic resources with other forest and environmental policies. Successful implementation of the guidelines would depend on strengthening institutions involved in forest tree conservation and increasing the accountability of forest resource managers.

Success of *in situ* conservation may be enhanced through joint management of protected areas with local populations. Protected areas include national parks, reforestation perimeters, botanical reserves, sacred areas and traditional agroforestry systems.

Seed should be collected from remaining natural areas that are facing the threat of

deforestation for *ex situ* conservation in arboreta and botanical gardens, as well as in seed banks.

Basic tree improvement programmes should be initiated using village nurseries and farmers should be encouraged to plant the improved seedlings.

### Research needs

- Basic information about the species
- Determine the number of viable populations in protected natural areas such as national parks
- Identify seed handling methods to enhance potential for improvement programmes and *ex situ* conservation
- Determine genetic variation in drought tolerance and location of important sources of variation
- Determine genetic variation in tree growth and fruit production
- Identify pollinator species, investigate effective pollen flow and determine threats to pollinator species
- Investigate effectiveness of seed dispersal and degree of dependence on fauna that are rare or threatened
- Determine effective population sizes in semi-natural farmland populations and minimum viable populations for conservation and long-term sustainable use. ■



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This leaflet was produced by members of the SAFORGEN Food Tree Species Working Group. The objective of the working group is to encourage collaboration among experts and researchers in order to promote sustainable use and conservation of the valuable food tree species of sub-Saharan Africa.

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