

limba, korina, afara

**LOCAL NAMES**

English (yellow pine, white afara, limba, black korina); French (limba, frakè); German (limba); Spanish (akom); Swahili (mwalambe); Trade name (limba, korina, afara); Yoruba (afara, afa)

**BOTANIC DESCRIPTION**

*Terminalia superba* is a large tree, up to 50 m tall and 5 m in girth, bole cylindrical, long and straight with large, flat buttresses, 6 m above the soil surface; crown open, generally flattened, consisting of a few whorled branches. Bark fairly smooth, greying, flaking off in small patches; slash yellow. Root system frequently fairly shallow, and as the tree ages the taproot disappears. Buttresses, from which descending roots arise at some distance from the trunk, then support the tree.

Leaves simple, alternate, in tufts at the ends of the branches; deciduous, leaving pronounced scars on twigs when shed. Petiole 3-7 cm long, flattened above, with a pair of subopposite glands below the blade; lamina glabrous, obovate, 6-12 x 2.5-7 cm, with a short acuminate apex. Nerves 6-8 pairs; secondary reticulation inconspicuous.

Inflorescence a 7-18-cm, laxly flowered spike, peduncle densely pubescent; flowers sessile, small, greenish-white; calyx tube saucer shaped, with 5 short triangular lobes. Petals absent. Stamens usually twice the number of calyx lobes (usually 10), in 2 whorls, glabrous; filaments a little longer than calyx; intrastaminal disc annular, flattened, 0.3 mm thick; densely woolly pubescent.

Fruit a small, transversely winged, sessile, golden-brown smooth nut, 1.5-2.5 x 4-7 cm (including the wings). Nut without the wing about 1.5 x 2 cm when mature, usually containing 1 seed.

The generic name comes from the Latin 'terminalis' (ending), and refers to the habit of the leaves being crowded at the ends of the shoots.

**BIOLOGY**

*T. superba* reaches sexual maturity late and at variable ages, for example 15 years in Cote d'Ivoire and 23 years in Congo. The dates of refoliation and flowering are closely correlated; flowering, which lasts for 2-5 weeks, takes place either as the new leaves are appearing or immediately afterwards. Rarely, 2 periods of flowering may occur if there are 2 deciduous periods. *Terminalia* has an effective system of self-incompatibility. Various insects (Coleoptera, Diptera, Hemiptera, Hymenoptera and Lepidoptera) pollinate flowers. Fruit develops during the rains and mature at the onset of the dry season to coincide with the leafless period; the duration of fruiting varies from 6 to 9 months. If 2 dry seasons occur, the maximum seed production occurs in the longer of them. *Terminalia* trees show interprovenance variability with regard to early shedding of leaves, early shedding being negatively correlated with vigour.

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**ECOLOGY**

*T. superba* is essentially a tree of deciduous forest and sheds its leaves in the dry season. It is characteristic of tropical high secondary forest areas with a dry season of about 4 months, but it does not respond well to long dry spells, especially on sandy soils. The species is especially plentiful at some distance from the coast, but it gains at the expense of the rainforest following clearances.

The tree will withstand occasional flooding. It is frequently struck by lightning, presumably because of its dominant position in the forest. It is very fire sensitive. However, its wide spread owes a great deal to the activities of man and to its pioneering characteristics; light demanding, wide crown and production of regular quantities of viable seed.

**BIOPHYSICAL LIMITS**

Altitude: 150-1 000 m, Mean annual temperature: 20-28 deg. C, Mean annual rainfall: 1 000-1 800 (3 000) mm

Soil type: It grows best on rich, well-drained alluvial soils, but is also found on other types such as lateritic sands, gravel and clays, lava, black basaltic clays and crystalline soils.

**DOCUMENTED SPECIES DISTRIBUTION**

Native: Angola, Benin, Cameroon, Central African Republic, Congo, Cote d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Liberia, Nigeria, Sierra Leone, Togo

Exotic: Argentina, Bolivia, Brazil, Burkina Faso, Chile, Colombia, Costa Rica, Ecuador, Fiji, French Guiana, Guatemala, Guyana, Honduras, Indonesia, Kenya, Malaysia, Mexico, Nicaragua, Niger, Panama, Paraguay, Peru, Philippines, Solomon Islands, Surinam, Tanzania, Uganda, Uruguay, US, Venezuela, Zimbabwe



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.

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**PRODUCTS**

Fibre: *T. superba* has potential importance in paper making, offering the capability of producing a relatively wide range of pulps. The fibre has a flexibility factor of 70-79%, high values that suggest good tear-and-burst strength. The yield of raw chemical alkaline pulp is 40-50%, depending on the degree of lignification. The wood may be used in the manufacture of cellulose, panelling and also as particle boards.

Timber: The wood is normally creamy white with no noticeable distinction between sapwood and heartwood. The log varies from 50 to 120% mc, depending on the time that elapses between felling and conversion. After exposure to the air, it darkens slightly, verging on a tanned appearance, and resembling a light oak. Three types of commercial limba are recognized: white or straw coloured; black, olive-grey to blackish-brown; and multicoloured, with dark and light streaks. The wood is soft to medium hard, light in weight, somewhat weak, easy to saw and machine, and accepts paints and varnish well. The density of the wood is 480-650 kg/m<sup>3</sup> at 12% mc. It can be used for many purposes and is widely known and used, particularly in Belgium, Germany and Switzerland. Used in plywood manufacture, furniture, joinery, for plinths, mouldings, general fittings, and door faces and, after suitable treatment, for external joinery.

**SERVICES**

Intercropping: *T. superba* has been used for mixed farming; associate species pairs such as *T. ivorensis* and *T. superba*; *T. superba* and *Triplochiton scleroxylon* are common.

**TREE MANAGEMENT**

The young tree grows straight and vigorously in full light, particularly if its crown is free, but stagnates under shade. In the oldest stands in Congo, which are now 30 years old, a spacing of 12 x 12 m appears to be appropriate, and trees are straight and vigorous. Natural pruning is excellent and starts early, at 3-4 years, and from then onwards the degree of self-pruning has a strong effect on the health and future value of the tree. It coppices readily from tree stumps, bears copious amounts of seed every year, and under plantation conditions achieves sexual maturity after 6-10 years. The rotation period as applied in favourable locations in Africa is 40 years.

**GERMPLASM MANAGEMENT**

The seeds store well in sealed containers with a little desiccant at 2-4 deg. C, giving 40-60% germination after 1-2 years, but poor storage conditions reduce germination to about 30% after 1 year. There are usually 8000-10 000 seeds/kg of air-dried seed with wings attached; if in good condition they will produce 6000-7000 good planting stock. There are approximately 10 000 wingless seeds/kg.

**PESTS AND DISEASES**

The principle problems are ambrosia beetles (*Dolipygus dubius* and *D. paradubius*), which degrade the standing tree, pockets of rot caused by stem wounds or defective pruning, and the condition known as 'black heart' which occurs as a result of poor growth conditions or over-maturity. Stem-boring damage is caused by *Tridesmodes ramiculata*. Other insect and fungal parasites occur only sporadically and are not a major threat. Wood from the northern part of the species' range, north of the equator, tends to be attacked by pinhole borer, whereas that from the southern part of the range is practically free from this defect. When the tree is split, insects, notably termites, usually attack it. When freshly felled, logs are liable to attack by fungi whose effect is mainly aesthetic, but which is nevertheless serious in a wood renowned for its agreeable colour. Depending on the species causing the infection, the lustrous creamy-white colour can be spoiled completely even if only the sheen of the wood is altered. The logs are also susceptible to insect attack.

**FURTHER READNG**

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**SUGGESTED CITATION**

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