Aucomea klaineana

Pierre

Burseraceae

okoumé

LOCAL NAMES
English (okoume,Gabon mahogany); French (okoumé); Trade name (okoumé)

BOTANIC DESCRIPTION
Aucoumea klaineana is a dioecious, medium-sized to large evergreen tree up to 50(-60) m tall; bole cylindrical, often contorted and bent, up to 110(-240) cm in diameter, with buttresses up to 3 m high, and clear of branches up to 21 m. The bark 0.5-2 cm thick, greyish to orange-brown, smooth and spotted with white, yellow, orange or red bands (resulting from lichens) in young trees, detaching in more or less thick rectangular brown scales revealing orange bark in adult trees, lenticellate, slash strongly resinous, pinkish-red, fibrous; crown rather open structured.

Leaves alternate, imparipinnate; stipules absent; rachis up to 40 cm long; leaflets 7-13, petiolule up to 4 cm long, blade ovate to oblong, 1030 cm × 4-7 cm, rounded at base, acuminate at apex, margin entire, leathery.

Inflorescence an axillary or terminal panicle up to 20 cm long; male inflorescence comprising up to 5 times more flowers than the female. Flowers unisexual, regular, 5-merous; sepals lanceolate, up to 5 mm long, tomentose, greenish; petals spatulate, 5-6 mm long, tomentose on both sides, whitish; extra-staminal disk present consisting of 2-lobed nectaries; male flowers with 10 stamens and rudimentary pistil; female flowers with 10 staminodes and a superior, 5-locular ovary, each locule with 2 ovules but only 1 ovule developing.

Fruit a capsule up to 5 cm × 3 cm, opening with 5 valves from the base, 5-seeded. It is monotypic, and characterized by its extra-staminal disk and dry, dehiscent fruit (pseudocapsule), which after opening releases 5 seeds covered by a winged endocarp.

Seeds enclosed by endocarp (‘pyrenes’), ovoid extending into a wing 2-3 cm × 0.5 cm; cotyledons suborbicular, thin and foliaceous.

BIOLOGY
In Oukomé trees, new leaves appear from September to December and are bright red for about a week. Trees start to flower when they are about 10 years old, but fruiting only begins after 15 years. Flowering starts in August and lasts for 1-2 months depending on weather conditions. Individual flowers last for a few days and are insect pollinated (bees and flies). Fruiting starts in September with fruits growing to full-size in about 40 days, but mature after about 80 days. Fruiting is annual, but large quantities of seeds are produced only every 2-3 years. A healthy, dominant mature tree can produce up to 20 000 seeds. Seeds are wind-dispersed up to 80 m from the parent tree.

ECOLOGY
Okoumé is a long-lived pioneer of, in particular, large forest clearings and fire-protected savanna edges, where it often becomes mono-dominant. It requires full sun to grow well but seedlings and saplings can, however, survive in shade. It is abundant in Hygrophilous coastal evergreen Guineo-Congolian rain forest especially in old secondary forest on well-drained sites where huge individuals occur in what seems to be virgin forest. It regenerates naturally where the recuperation period between logging cycles is sufficient.

BIOPHYSICAL LIMITS
Altitude: 0-600 (-1400) m
Mean annual temperature: 23-26ºC
Mean annual rainfall: 1200-3000 mm
Soil type: Oukomé grows well on a wide range of acid soils (such as ferralitic arenosols, ferralitic soils, podzoluvisols) developed on various substrates. It can grow on infertile sandy soils but prefers fertile, deep sandy-clay-loams. It can tolerate a certain degree of impeded drainage, but not long periods of waterlogging.

DOCUMENTED SPECIES DISTRIBUTION

Native: Cameroon, Cote d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Gabon, Nigeria
Exotic: French Guiana, Indonesia, Malaysia, Surinam

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: The wood, which is used as firewood has an energy value of 29 970 kJ/kg

Timber: Okoumé is a lightweight, comparatively soft hardwood with a density of (320-)430-450(-570) kg/m³ at 12% moisture content. Okoumé is a major commercial timber in Gabon and Equatorial Guinea, representing more than 70% of timber production, while it is of lesser importance in Congo. The timber is mainly exported as logs to Europe. It is made into blockboard, particle board and veneer, and is widely used in boat building for decorative interior paneling and for exterior applications. The wood is also suitable for light interior construction, carpentry, furniture, sports equipment, cigar boxes and packing cases. Logs are traditionally used for the construction of canoes. The wood is suitable for the production of pulp for papermaking.

Gum or resin: Bark resin is used for torches and oil lamps in Gabon and Equatorial Guinea.

Medicine: Bark is applied to treat superficial wounds and abscesses. The astringent bark is used to treat diarrhea.

Other products: Several terpenoids are present in bark resin, including -terpineol and -phellandrene and several tetracyclic and pentacyclic triterpenes.

TREE MANAGEMENT
Good regeneration requires a sufficient number of seed trees, large canopy openings or clearings (>2500 m²) and clean soil during the fruiting season. These conditions are found in shifting cultivation or in logged areas (e.g. log yards and wide logging tracks). Selective logging or natural tree fall events do not produce sufficiently large canopy openings. If site conditions are favourable, okoumé dominates re-growth.

Two main site preparation methods are used for establishing plantations. The first is mechanised clear felling, in which existing woody vegetation is cleared using bulldozers and placed into windrows and burned. Seedlings are planted between the windrows. The second consists of cutting the vegetation to 50 cm above the ground to allow re-sprouting and re-growth. Seedlings are planted in lines cut through the re-growth. In both methods, existing large trees are killed. Recommended spacing for seedlings is in the range of 625–950 trees/ha. It is necessary to eliminate climbers, especially Mikania species, and trees such as Musanga cecropioides, which competes for light and space, for up to 5 years after planting.

Thinning in both natural and artificial stands is advisable but should be conducted carefully to avoid increased sensitivity to black canker attack resulting from lateral illumination of the stem. In both mixed and almost pure stands, thinning is beneficial for diameter growth, but the resulting extractable wood volume may vary. Suppressed trees are more responsive to thinning than dominant ones. In almost pure stands, thinning should be restricted to those young stands of less than 15 years, because in older stands thinning will remove potentially commercial volumes of wood.

In plantations, it is recommended that a thinning regime to reduce stem density to 350 stems/ha after 5 years, 200-250 stems/ha after 10 years and 150 stems/ha after 15 years. If resources only allow 2 thinning operations, stand density can be reduced to 250-300 stems/ha after 5 years and 150 stems/ha after 13 years. In all cases, thinning should involve girdling okoumé trees, or girdling and poisoning other species, taking care to avoid intense bole illumination of lower strata trees. Okoumé trees should not be poisoned because of the risk of affecting adjacent trees via the connected root systems.

GERMPLASM MANAGEMENT
Seed storage behaviour is intermediate. Seeds lose viability within 1 month in the field, but can be stored at 4°C in airtight containers for up to 3 years after being dried to 8% moisture content. There is a 10000 seeds per kg.

PESTS AND DISEASES
Okoumé is attacked by various pathogens, which are only serious in pure stands. The most important disease is black canker, which begins with a primary infestation of scale insects (mainly Asterolecanium pustulans) spread by ants (Crematogaster, Oecophylla). Subsequent bark injuries are then infested by a secondary fungal pathogen, Botryodiplodia theobromae, resulting in an external proliferation of smut, which blackens the bark and causes abnormal resin secretion. Very dense or severely thinned plantings and re-growth on abandoned human settlements are particularly prone to black canker. The problem can be avoided by good silvicultural practices, such as selecting a suitable planting site, adequate spacing and careful thinning.

Seedlings and young plants are attacked by psyllids (Pseudophacopteron spp.) and centipedes, although serious infestations only occur in badly managed nurseries and only affect young plantings. During December and January, in its native range, the foliage of both young and adult trees is often attacked by caterpillars of the moth Pleuroptya balteata, sometimes resulting in total defoliation of pure stands, but trees only suffer a reduction in growth. Locally, elephants cause serious destruction in young and pure stands. Logs are susceptible to forest longhorn beetle attack, while the sapwood is readily attacked by Lyctus beetles; the heartwood is resistant, but susceptible to termites, marine borers and fungal attack.

FURTHER READNG

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SUGGESTED CITATION

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