

Combretum indicum (PROTA)

From PlantUse



Plant Resources of Tropical Africa
Introduction

List of species

Combretum indicum L.

Protologue: Useful Pl. Dominica, West Indies 277 (1998).

Family: Combretaceae

Chromosome number: 22, 24, 26

General importance	★★★★☆
Geographic coverage Africa	★★★★★
Geographic coverage World	★★★★☆
Fruit	★☆☆☆☆
Medicinal	★★★★☆
Ornamental	★★★★☆
Fibre	★☆☆☆☆

Synonyms

- *Quisqualis indica* L. (1762).

Vernacular names

- Rangoon creeper, Rangoon jasmine, Chinese honeysuckle, drunken sailor (En).
- Badamier, badamier sauvage, liane vermifuge (Fr).



distribution in Africa (planted)

Origin and geographic distribution

Combretum indicum is native to tropical Asia. There is still doubt whether it is indigenous to East Africa or was introduced there long ago. It is nowadays widely cultivated throughout the tropics and subtropics, mainly as an ornamental plant, and has become naturalized in many localities.

Uses

The bitter half-ripe fruits and seeds are widely known as being anthelmintic and are used as such, usually in decoction, particularly to treat ascariasis. In large doses they cause nausea, vomiting, hiccough and even unconsciousness. The seed of the dried ripe fruit is used to reduce vomiting, and roots in decoction are also taken as a vermifuge. Although the seeds are often applied to stop diarrhoea, an oil extracted from the seed has purgative properties. Leaf juice or seeds, macerated in oil, are applied externally to treat boils, ulcers, parasitic skin infections and fever. Various preparations of the plant are applied both externally and internally for pain relief. In the Indian Ocean islands a decoction of the leaves is used to bath children with eczema.

In tropical Asia *Combretum indicum* is considered an important medicinal plant. In the Philippines the fruits are chewed as a remedy for coughs, and the crushed fruits and seeds are externally applied to alleviate nephritis. In Vietnam a root decoction is taken to treat rheumatism. In Papua New Guinea plants are eaten daily by men and women as a method of birth control.

Combretum indicum is widely cultivated as an ornamental, often planted in hedges or allowed to grow over a support. In West Africa, the long, flexible stems are used for basketry, fish weir and fish traps. Ripe seeds are reported as sweet and pleasant to eat if the seed coat is removed. The flowers are also reported as edible, although they have no flavour, and they can be mixed into salads to add color. In Indonesia, very young shoots are eaten raw or steamed.

Production and international trade

In tropical Asia the dried fruits of *Combretum indicum* are sold in small drug stores. For ornamental purposes, the plant is sold through the internet for US\$ 15 (single-flowered cultivar) to US\$ 40 (double-flowered cultivar).

Properties

The seeds contain as main components quisqualic acid, a 1,2,4-oxadiazolidin-3,5-dione derivative, and arachidic acid. The presence of trigonelline was not confirmed in all tests. The pale brown seed oil contains oleic acid, palmitic acid, stearic acid, linoleic acid, myristic acid, and arachidonic acid. From the fruits α -xylofuranosyluracil and the triterpenoids clerosterol, betulinic acid and methylursolate were isolated. The flowers are rich in the flavonoid glycosides pelargonidin-3-glucoside and rutin. The leaves and stem bark are rich in tannins. Rutin was also isolated from the leaves. From the leafy stem several diphenylpropanoids were isolated, as well as kaempferol and further the triterpenoids arjunolic acid, 23,24-dihydrocucurbitacin F and 25-O-acetyl-23,24-dihydro-cucurbitacin F.

Quisqualic acid exhibits marked anthelmintic activities. This active principle somewhat resembles the actions of the anthelmintic α -santonin. In China, seeds of *Combretum indicum* are used as a substitute for α -santonin as drug. In screening tests, parts of the fruit, e.g. the gum isolated from it, have failed to exhibit anthelmintic activity. Furthermore, quisqualic acid has shown excitatory effects on cultured neurons as well as in a variety of animal models. It causes various types of limbic seizures and neuronal necrosis.

In a test for active anticancer compounds 25-O-acetyl-23,24-dihydro-cucurbitacin F showed significant cytotoxicity activity in vitro. A flower extract showed significant and dose-dependent activity in acute and chronic anti-inflammatory models in Wistar rats. A methanolic flower extract inhibited acetylcholinesterase in vitro. A fresh or dried flower extract gave high total polyphenol contents and showed moderate antioxidant activity in vitro. Pharmacological investigation of the chloroform fraction of a hot aqueous water extract showed that this fraction inhibits cyclic AMP phosphodiesterase by about 80%.

The diphenylpropanoids isolated from the leafy stem showed low antibacterial activity against several multidrug-resistant and methicillin-resistant *Staphylococcus aureus* strains. A seed extract showed moderate anticoccidial effect against *Eimeria tenella* in chicken.

Various extracts of the aerial parts showed low to moderate antifungal, antiviral and antifeedant activity in a range of tests. It also showed low larvicidal activity against larvae of *Aedes aegypti*.

Description



1, flowering twig; 2, opened flower; 3, fruit.
Source: PROSEA

Woody liana up to 20 m long, young branches densely to sparsely short-hairy, rarely sparsely glandular. Leaves opposite or almost opposite, simple and entire; stipules absent; petiole up to 1 cm long, persisting and hardening after the leaf drops and resembling a thorn-like spur; blade elliptical or oblong-elliptical, 5–18.5 cm × 2.5–9 cm, apex acuminate, base rounded or almost cordate, densely short-hairy to nearly glabrous, papery, minutely warted, pinnately veined with 5–7 pairs of lateral veins. Inflorescence a terminal and axillary spike, 2–5(–10) cm long, sometimes forming a leafy panicle, bracts lanceolate or elliptical, 6–10 mm long, apex acuminate. Flowers bisexual, regular, 5-merous, sessile, fragrant at night; receptacle consisting of 2 parts, lower part 3–4 mm long, short-hairy, upper part narrowly tubular, slightly expanding at apex, 6–8 cm long, densely to sparsely short-hairy; sepals triangular, tiny; petals free, oblong to oblong-ovate, up to 2.5 cm × 1.3 cm, apex rounded to acute, star-shaped, white becoming pink then red to dark red on the inner face; stamens 10, in 2 rows, inserted near the mouth of the upper receptacle, 7–8 mm long; ovary inferior, 1-celled, style up to 2.5 mm long, partly adnate to tube. Fruit a 5-winged nut, ovate-elliptical, 2.5–4 cm × 1–1.2 cm, acutely 5-angled, wings 1–2 mm wide, stout, with 0.5–1 mm long stipe, reddish brown, indehiscent, 1-seeded. Seedling with hypogeal germination.

Other botanical information

Combretum is a very large genus, comprising about 250 species and distributed worldwide in the tropics and subtropics. About 140 species occur in tropical Africa; c. 20 species are endemic to Madagascar. *Combretum indicum* was formerly included in *Quisqualis*, a genus occurring in tropical Africa and Asia. After a revision all 6 African *Quisqualis* species were transferred to *Combretum*, although this transfer is disputed by some taxonomists. Several other *Combretum* species, formerly included in *Quisqualis*, also have medicinal uses.

Combretum latialatum

Combretum latialatum Engl. ex Engl. & Diels (synonym: *Quisqualis latialata* (Engl. ex Engl. & Diels) Exell) occurs in Nigeria, Cameroon, Equatorial Guinea, Gabon, Congo and DR Congo. In Gabon, Congo and DR Congo a leaf decoction is taken to treat diarrhoea, dysentery, intestinal worms, costal pains and female sterility. Leaf sap is applied to haemorrhoids. Leaf or bark powder is eaten to treat blood in the urine. A root decoction or plant sap is drunk to treat coughs and tuberculosis. Leaf sap is applied to wounds to help cicatrisation.

Combretum hensii

Combretum hensii Engl. & Diels (synonym : *Quisqualis hensii* (Engl. & Diels) Exell) occurs in Congo, DR Congo and northern Angola, and has similar uses as *Combretum latialatum*. It is also considered a good bee plant.

Growth and development

Combretum indicum is a vigorous climber, and can be found flowering throughout the year if the temperature remains high enough and enough water is available. It flowers mainly on new growth. The stems twine to the left.

The flowers, which open at dusk, are initially white but gradually turn pink then red during the next day. In the meantime the orientation of the flower changes from upwards or horizontal to pendulous. At night the white flowers are visited by hawk moths, during the day the pink and red flowers are visited by a wide range of pollinators such as solitary bees, honey bees, flies and sunbirds. Each flower lasts 3 days; the largest amount of nectar is present at the morning of the first day. The inflorescence usually opens a few new flowers at the same time, so multiple colours are always present on a plant. Fruiting plants are rare in many localities. The fruits are buoyant in both fresh water and seawater, and are thus dispersed.

Ecology

Combretum indicum occurs in shrub and tree savanna, forest margins, along stream banks, also in disturbed habitats, including roadsides, waste places, rice fields and railway tracks, from sea-level up to 1800 m altitude.

It prefers full sun, but light shade is tolerated. Once established, it is fairly drought tolerant, salt tolerant and tolerant of temporary flooding. *Combretum indicum* is considered not cold tolerant, but well-established plants can survive an occasional frost period to about -8°C . *Combretum indicum* grows on a wide range of soils, but preferably on well-drained soils.

Propagation and planting

Combretum indicum can be propagated by seeds, stem cuttings, air layering and root suckers. Seeds germinate easily when fresh. Stem cuttings root with difficulty, and best results have been obtained with 2-year-old cuttings with at least 3 nodes, planted in a sandy soil with silt added. After 1 month an adequate root system is developed. Cuttings in coarse sand showed about 50% rooting success; adding a rooting hormone increased rooting.

Management

Combretum indicum can be maintained as a large shrub with vigilant pruning. It can also be grown over a trellis or wall. It prefers a fertile humus-rich soil, and regular fertilization is needed for optimal flowering.

In the Philippines *Combretum indicum* has been planted for medicinal purposes at a spacing of 2–3 m \times c. 4 m with 1.5 m high trellises along the rows.

Diseases and pests

Combretum indicum is a host to a wide variety of insects, including aphids, scale insects and caterpillars, as well as nematodes, fungi and various crop viruses. These pests and diseases are mainly documented from Asian countries, but probably several of these problems also occur in tropical Africa.

Harvesting

Fruits can be collected for medicinal purposes half-ripe, when they are still bitter. Mature fruits are ready for picking when they have turned reddish-brown.

Handling after harvest

Mature fruits are air-dried for a month to attain a moisture content of less than 10%. Immature fruits should be checked thoroughly for parasitism. Dried fruits can be stored for up to 1 year, but the effect of storage on the quisqualic acid content is not yet known.

Genetic resources

Combretum indicum is commonly planted as an ornamental throughout the tropics and subtropics, and is therefore not threatened by genetic erosion. It is considered invasive in Australia and several of the islands in the Pacific Ocean.

Breeding

Combretum indicum is very variable in flower size and shape, and several varieties have been distinguished in tropical Asia.

The International Cultivar Registration Authority (ICRA) for *Quisqualis* is the American Association of Botanical Gardens and Arboreta, USA. However, no cultivars have been registered so far. A few types have been distinguished, including one with white petals and without scent, and ‘Thai double flower’, which has 10 petals, sometimes more, due to petaloid stamens. It also has thicker leaves.

Prospects

The prospects for *Combretum indicum* seeds as an anthelmintic are limited, due to the toxic side-effects of quisqualic acid. As it shows low antifungal and antibacterial activity in vitro, its traditional use to stop infections has not been confirmed.

The species is interesting for its ornamental value, although in small gardens it needs to be pruned regularly as it is very vigorous.

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