Melaleuca quinquenervia

(Cav.) S.T. Blake

Myrtaceae

broad-leaved tea-tree

LOCAL NAMES

English (five-veined paperback,tea-tree,broad-leaved tea-tree,paperbark tea-tree,melaleuca,cajeput-tree,white bottlebrush,broad-leaved paperback); French (niaouli); Hindi (cajaputi); Indonesian (kajuputih,kaya putih); Malay (kayuputeh); Spanish (cayeputi,cayeput,corcho); Thai (samed); Trade name (broad-leaved tea-tree)

BOTANIC DESCRIPTION

Melaleuca quinquenervia is a small to medium-sized tree, commonly 8-12 m tall but ranging from 4 to 25 m, depending on local growing conditions. The stem is moderately straight to crooked, crown narrow and open, or fairly dense; thick, pale-coloured bark is made up of many papery layers that split and peel, and on large trunks it becomes rough and shaggy.

The leaves are dark green, stiff, narrowed at each end, 4-9 x 2-3.5 cm, with entire margins, and 5 (rarely 3 or 7) more prominent parallel veins from base to tip, on a petiole 6-24 mm. They have a resinous odour and taste when crushed.

Flowers are produced in thick, fluffy spikes 4-8.5 x 2.5-3.5 cm, usually white or creamy-white, rarely greenish or reddish. The conspicuous part of each flower consists of 5 bundles of stamens 10-20 mm long. The spike grows out into a leafy twig beyond the fruit.

Each inflorescence results in 30-70 densely packed woody stalked capsules. They are short, cylindrical, 3-4 x 4-5 mm, grey-brown, hard and persistent, opening by 3-4 slits at the end. Seed pale brown, very small, about 1 x 0.3 mm tapering from the dorsal end.

Melaleuca, from the Greek words for ‘black’ and ‘white’, refers to the dark trunk and white branches of 1 species. The specific name is from the Latin ‘quinque’ and ‘nervis’ meaning ‘5-nerved’, and refers to the common number of longitudinal veins in the leaves.

BIOLOGY

The species is monoecious, flowers are complete, and pollination is by insects. The usual flowering time in Australia is March to July but may occur at other times or throughout the year. Seed ripens in spring and summer. The minute seeds begin to be produced when the trees are 3-4 years old and are released from the fruit when the branches die after fire or frost.

Melaleuca leaf weevils, Oxyops vitiosa, have been released in the Florida Everglades as a biological control agent of melaleuca trees. Control of this alein invasive species has been encouraging with this weevil. (Gary Buckingham, ARS, USDA)

Habit at Wahinepee, Maui, Hawaii (Forest and Kim Starr)

Papery trunk at Wahinepee, Maui, Hawaii (Forest and Kim Starr)

ECOLOGY
In the south of its natural range, M. quinquenervia occurs in the warm subhumid and humid climatic zones and in the north is found in the hot humid zone. It can tolerate a dry season of 0-7 months a year.

In Australia and Papua New Guinea, this species is generally confined to the lowlands below 100 m, but in New Caledonia it forms extensive stands in the uplands up to an altitude of 900-1000 m.

The best-developed stands occur as open forest and woodland on favourable sites, but elsewhere they are reduced to low woodland or tall shrubland. It is usually the dominant species and frequently occurs in more or less pure stands. In Australia, it grows along streams, fringes tidal estuaries, and frequently forms pure stands in freshwater swamps. It often grows close to the beach and will tolerate wind-blown salt. It will tolerate prolonged flooding and a fluctuating water table. In waterlogged and flooded areas it forms adventitious aerial roots.

The species seeds profusely and can become a weed, especially where periodic fires provide a suitable seedbed. Trees are highly fire tolerant during all but the early seedling stages.

Severe frosts will defoliate and kill the branches, but the tree generally recovers by epicormic sprouting.

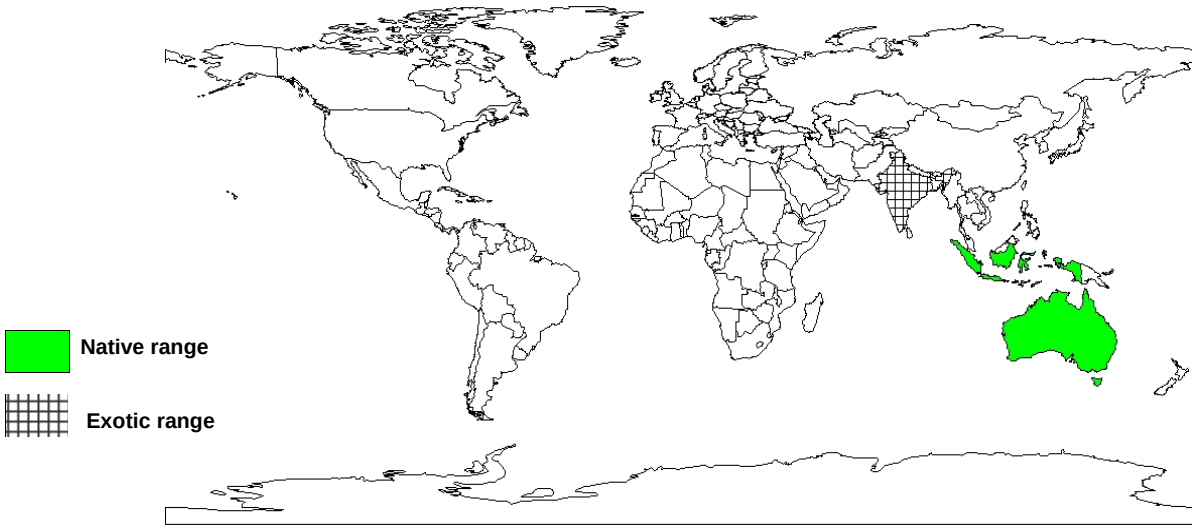
BIOPHYSICAL LIMITS
Altitude: 0-1000 m, Mean annual temperature: 17-26 deg. C, Mean annual rainfall: 800-3440 mm

Soil type: Grows on most soil types varying from wet clays to saline and dry.

DOCUMENTED SPECIES DISTRIBUTION

Native: Australia, Indonesia, New Caledonia, Papua New Guinea

Exotic: Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, India, Jamaica, Malaysia, Martinique, Montserrat, Netherlands Antilles, Philippines, Puerto Rico, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Thailand, Trinidad and Tobago, US, Virgin Islands (US)



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
Apiculture: A good source of nectar and pollen for bees, made more valuable by its extended flowering period. The honey has a strong flavour and low density.

Fuel: Exuding resin as it burns, the wood is excellent fuel and makes good-quality charcoal. Also, the papery bark is easily ignited and has high heating value. Reported calorific value for the wood is 4400 kcal/kg and for bark 6160 kcal/kg, but there is great variability in these values between trees.

Fibre: The wood has been widely used as a source of pulp.

Timber: The sapwood is pale yellow to pink. Heartwood is pink to reddish-brown with light and dark rippled figuring, hard, fine textured, porous, tough, tending to warp and difficult to season. Wood contains silica that rapidly blunts saws and planes. The specific gravity is generally within the range 0.49-0.55, and it has an air-dry density of 700-750 kg/cubic m. The wood is used for a wide range of purposes, including mine timber, fence posts and rails, flooring and house timbers.

Essential oil: Cajeput oil obtained from leaves and twigs of this and related species by steam distillation is used in medicine and local remedies. The foliar leaf oils of M. quinquenervia fall into 2 classes, based on their chemical composition. One chemotype is rich in nerolidol (90%); the other is 1,8-cineole (30-70%) and sometimes viridiflorol (0-60%). It is the cineole-rich chemotype that is the source of niaouli oil, which is produced in New Caledonia. Niaouli oil is similar to cajuput oil in composition and medicinal use.

SERVICES
Erosion control: Suitable for beach planting and erosion control on degraded and poor soils.

Shade or shelter: The trees can be used for windbreaks.

Reclamation: M. quinquenervia is an ideal species for revegetating denuded soils.

Ornamental: Common as an ornamental, a red-flowering form is becoming popular for use in landscaping. To many people, the species is undesirable because of its reputation for causing respiratory problems.

TREE MANAGEMENT
Growth is relatively fast on sites where water is abundant and soils are deep but is not impressive under marginal conditions. The species can successfully compete with weeds, but early weed control will improve growth rates. M. quinquenervia has the ability to coppice readily, but root suckers are not commonly produced.

GERMPLASM MANAGEMENT
Seed storage behaviour is orthodox; no loss in viability after 4 years of storage at 30% and up to 75% rh at 10 deg. C. There are about 2 661 400 viable seeds/kg.

PESTS AND DISEASES
As an exotic, M. quinquenervia is relatively free of pests and diseases. A large number of insects feed on this species in Australia, but damage is localized. The heartwood lacks resistance to damage by termites, fungi and marine borers.

FURTHER READNG

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SUGGESTED CITATION

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