Casuarina cunninghamiana

Miq.

Casuarinaceae

river she-oak

LOCAL NAMES
Amharic (arzelibanos,shewshewe); Arabic (gazwarina); English (Australian beefwood,Australian pine,beefwood,casuarina,coast beefwood,creek oak,Cunninghams beefwood,fire oak,river she-oak,river oak); French (casuarine de Cunningham); German (Kaengurußaum,Cunninghams Kasuarßaum); Hindi (jangli saru,jan); Italian (casuarina); Portuguese (casuarina cavalinha); Spanish (pino d'Australia,pino Australiano,pino de mar,casuarina); Swahili (mvinje); Tamil (kasa); Trade name (river she-oak)

Foliage (J.S. Peterson @ USDA-NRCS PLANTS Database)

Young tree (J.S. Peterson @ USDA-NRCS PLANTS Database)

BOTANIC DESCRIPTION
Casuarina cunninghamiana is a medium to large tree 12-35 m in height, 30-150 cm in diameter. Bark finely fissured and scaly brown. Leaves on new shoots erect. Deciduous branchlets thin and soft and droop in various specimens.

Leaves like teeth, less than 0.5 mm long, 6-8 in a ring at joints or nodes about 5 mm apart, on the main twigs to 3 mm long, curved back in rings close to 1.5 mm.

Flower clusters inconspicuous, light brown. Male and female flowers borne on separate trees. Male flowers borne in terminal spikes, 0.4-4 cm long, less than 3 mm wide, at the tips of shoots and arranged in whorls with 11-13 whorls per centimetre of spike; female flowers small, reddish and oval-shaped, 5 mm long.

Fruiting cones are small, subglobose, about 7-14 x 4-6 mm. The individual fruit is small, pale greyish, samara 3-4 mm long, often longer than broad.

'Casuarina' is from the Malay word 'kasuari', from the supposed resemblance of the twigs to the plumage of the cassowary bird. One of the common names of Casuarina species, 'she-oak', widely used in Australia, refers to the attractive wood pattern of large lines or rays similar to oak but weaker. The name of this species honours Alan Cunningham (1791-1839), Australian botanist and explorer and superintendent of the Botanical Gardens at Sydney.

BIOLOGY
The species is dioecious with individuals bearing unisexual flowers. The pollen is light and thus favours wind pollination. The fertilized female cone enlarges and becomes hard. Seeds are shed rapidly at maturity. Depending upon the season and locality, flowering and seed setting varies and happens either once or twice in a year.

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ECOLOGY
In its native range in Australia, C. cunninghamiana is found mainly in the warm subhumid climatic zone. Some coastal localities are in the warm humid, while farther inland some populations are in the semi-arid zone. Populations at higher altitudes in New South Wales tolerate up to 50 frosts per year and temperatures as low as -10 deg. C. Northern coastal localities are frost free.

C. cunninghamiana is generally a dominant species in riverbank vegetation. It is restricted to river- and streambanks and adjacent valley flats, and may extend for a short distance up rocky hillsides above watercourses. Moderately tolerant of saline conditions; however, under natural conditions, where the water becomes brackish in coastal rivers, C. glauca usually replaces it. It also becomes chlorotic on highly calcareous soils.

It is moderately drought resistant but is unable to tolerate semi-arid conditions unless some additional groundwater is available to supplement rainfall. It is relatively fire sensitive especially when young. When planted outside its natural habitat, it adapts itself to comparatively dry sites.

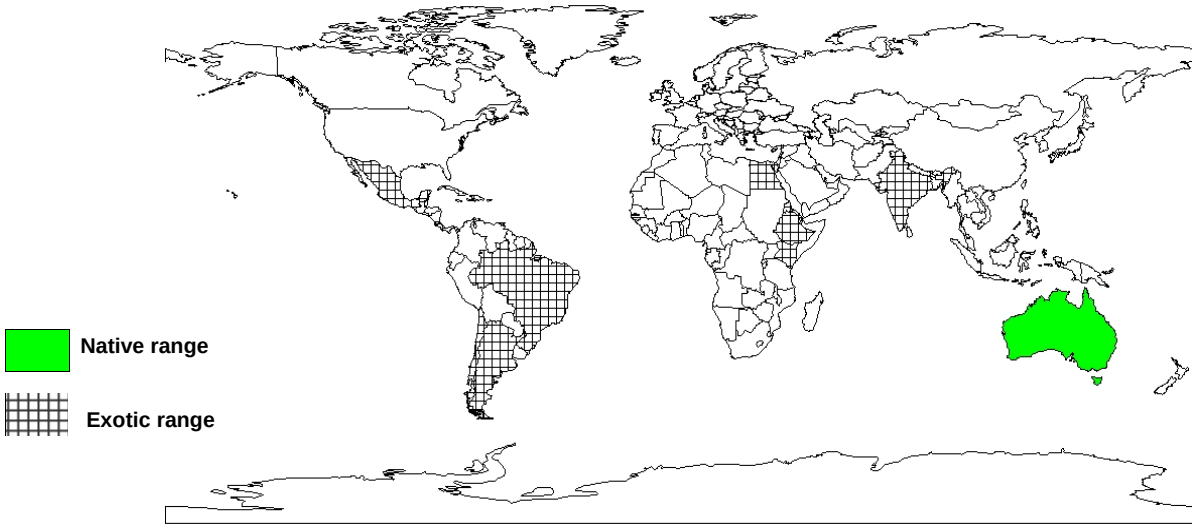
BIOPHYSICAL LIMITS
Altitude: 0-2 200 m, Mean annual temperature: 13-29 deg. C, Mean annual rainfall: 500-1 500 mm

Soil type: The soils are mainly sands or sandy loams, but include clayey loams and gravel terraces of old river courses and infrequently clays. Grows in light textured sands, and gravel including poor soils and eroded sites. Has been successfully planted in acidic, neutral, alkaline and saline soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: Australia

Exotic: Argentina, Brazil, Chile, Costa Rica, Egypt, Eritrea, Ethiopia, India, Israel, Kenya, Mexico, Palestine, Sri Lanka, Tanzania, Thailand, US, Venezuela, Zambia, 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.

PRODUCTS
Fodder: Young trees are grazed by livestock and the foliage is useful as drought fodder, although it is not high in nutritive value. Analysis of the foliage from trial plantings in southeast Queensland, Australia, indicates a moderately low digestibility (29% in vivo) and relatively low levels of crude protein (10%). It is believed to be as good as or better than some commonly used fodder tree species such as Acacia saligna or Prosopis julifera.

Fuel: An excellent firewood species that burns well and retains ashes for a long time; it is suitable for firing baker's ovens. In Egypt, gives a charcoal yield of 33.6% and an ash content of 1.9% with an estimated fuel value of 4870 kcal/kg.

Fibre: In Egypt, particleboard is made from the wood of C. cunninghamiana.

Timber: Sapwood is narrow and pale with dark reddish or purplish-brown heartwood. In Australia, the wood has a reputation of being moderately strong but tough and fissile, fine-textured, straight-grained and with wide medullary rays. It is hard to work and dress but takes a good polish, with a green density of 800-900 kg/cubic m. It requires care in gluing and preboring is necessary for nailing. Heartwood is extremely resistant to preservative treatment but is durable and may last for 15-25 years in the ground. It has been used for panelling, furniture, casks, axe handles and ornamental turnery, as well as general utility farm timber. In Argentina, it is recommended for use in parquetry flooring, packing cases, veneer and barrels. Its utilization as sawn wood is limited by its tendency to warp, twist and split during seasoning.

Tannin or dyestuff: Craft dyers in Australia have used the foliage to produce attractive colours in wool using different mordants.

SERVICES
Erosion control: With its network of fine subsurface roots, C. cunninghamiana is valued for protecting riverbanks. In Egypt, it is an important species for preventing irrigation channels from being clogged up with sand. It is also suitable for sand dune stabilization.

Shade or shelter: Extensively planted for wind protection and shelterbelts. In California, USA, it has proven particularly valuable for planting as windbreaks to protect high-value agricultural crops.

Nitrogen fixing: The river she-oak has a symbiotic relationship with the nitrogen-fixing actinomycete Frankia. This symbiosis provides nitrogen to the host plant and assists C. cunninghamiana to grow on low fertility soils. However, C. cunninghamiana introduced into exotic localities are commonly unnodulated due to a lack of native Frankia.

Ornamental: C. cunninghamiana makes a suitable ornamental tree.

Intercropping: An important agroforestry species in China.

TREE MANAGEMENT
C. cunninghamiana is a long-lived, relatively fast-growing tree with average height increments of 1-2 m/year. Seedlings require protection from browsing stock and fire in initial stages of growth. It displays fairly good coppicing ability when young, and older trees are capable of producing root suckers. When introduced to exotic localities, inoculation of the seedlings with pure culture of effective strains of Frankia rhizobia is recommended to enable the species to fix atmospheric nitrogen.

GERMPLASM MANAGEMENT
Seed storage behaviour is orthodox; storage in complete darkness appears to retard germination. There are an average of 607 200 viable seeds/kg.

PESTS AND DISEASES
In Egypt, young trees are mainly free of serious pests and diseases. However, trees over 14-15 years old are vulnerable to attack by many wood-destroying insects, including the dry-wood termite Kalotermes flavicollis, and coleopteran pests Stromatium fulvum and Macrotoma palmata. Its roots are susceptible to infection by nematodes. The species is susceptible in China to bacterial wilt disease Pseudomonas solanacearum. This is a serious disease of 2-15-year-old trees, affecting 10-100% of the trees depending on location and causing losses in yields of 10-50%. No effective control measures have been found thus far.

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SUGGESTED CITATION

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