Friends of Geelong Botanic Gardens

Plant in Focus, July 2022

Cunninghamia lanceolata Chinese Fir

Distribution

This tree represents one of the world's most ancient types of vegetation, a very similar plant being found in a fossil state.

Native to East Asia, China, Vietnam, Laos and Cambodia where it grows in mixed evergreen and deciduous forests or forming small, pure stands. It is mostly found in moist, monsoon forests and, in China, at elevations of 200 - 2,800 metres. In China it has been cultivated for over 8,000 years. Plantations have more recently been established in other countries including Japan, Malaysia, South Africa, Argentina, Brazil and New Zealand.

Description

Chinese Fir is an evergreen conifer with a pyramidal crown. It can grow up to 50 metres tall with a bole which can measure up to 3 metres in diameter. The branches are in whorls of 5-6 together, spreading and pendulous at the ends. Bark is dark brown, fissured, shedding in long strips and exposing aromatic, yellow or reddish inner bark.

Leaves are stiff, densely and spirally arranged, but spreading in 2 ranks, glossy deep green, linear-lanceolate, straight or slightly falcate, 3-6.5 cm long by 0.3-1.2 mm wide, with finely serrated margins.

Male and female cones are in separate clusters at the end of the shoots. Pollen cone fascicles are terminal, broadly obovoid with 8-2 cones.

Female cones are ovoid or rounded, 2.5-5 cm long by 3-4 cm wide, solitary or several together. Cone scales brown with serrate margin and the apex elongated with a spine. The female cones are normally situated lower in the crown than the male cones.

Seed on each scale is thin, dark brown, oblong or narrowly ovate, 7-8 mm long and 4-5 mm wide.

Propagation

Trees commence producing viable seed when they are around 6 - 8 years old. Seed does not need pre-treatment. Germination can be improved by soaking the seeds in warm water for a few hours before sowing. Germination begins after 7 days.

Cunninghamia lanceolata GBG Conifer lawn, December 2021, DJ

Species: *Cunninghamia lanceolata*

Family: Cupressaceae

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Optimal time for harvesting seed is 2 - 3 weeks after cones have turned from dark green to yellow brown. The cones are harvested using long hooks. Following harvest, the seeds are after-ripened in shade for one week.

New plants can be grown from rooted cuttings, a feature it shares with some of its relatives (e.g., Sequoia) but not with most conifers. These cuttings are taken from coppices from basal stumps after felling.

Uses

This tree is the most important timber crop in China where it accounts for 20% - 30% of the total commercial timber production and is harvested from the wild and from plantations. It is also the main re-forestation tree in China. It is widely used for landscaping in public gardens, along roads, in parks and temples because of its fast growth, beautiful crown shape and resistance to pests and diseases.

The bark is a source of tannins. The branches produce an essential oil that is used in the perfume industry.

The pale yellow to white, fragrant wood is uniform-textured, straight grained, light in weight and durable, though it rots easily if it is continually wet. It is easily worked and resists insect and termite damage. It is used in construction wherever great strength is required - buildings, bridges, ships and lampposts, and in furniture manufacture. It is also popular for coffins.

A good quality fuel and charcoal can be made from the wood.

Medicinally

A decoction of the wood is used internally in the treatment of varnish poisoning, chronic ulcers and hernia. Externally this is also used as a bath for smelly feet.

An essential oil from the plant is used to treat bruises, pain,rheumatism and wounds.

The ash from the bark is used to treat burns, scalds and wounds.

A decoction of the cones is used in the treatment of coughs.

Chinese Fir photos from the top: Immature male cones, Krzysztof Ziarnek, Wikimedia Commons CC BY-SA 4.0; Mature male cones, Agnieszka Kwiecień, Wikimedia Commons CC BY-SA 4.0; Immature female cone, and below, Mature female cone, GBG, July 2017, DJ

Agroforestry

This tree is suitable for re-forestation systems in China as it is usually intercropped with a number of crops such as maize, beans, wheat, Chinese sorghum, buckwheat, potato, tobacco and upland rice. Interplanting is important not only to increase the income of farmers during the early stages of plantations but also to avoid the land degradation that results from continuous cropping of this tree.

Cunninghamia lanceolata, Photos from the top:
The under-side of the leaves is different from the upper surface, because the undersides shows light bands of closely packed stomata, separated by the mid vein of the leaf. Leaves of old trees and those exposed to sunlight show less obvious stomatal bands than leaves in shade. Photo: Ellywa, Wikimedia Commons, CC BY-SA 4.0;
Seeds, already released, were collected from the ground, Pablo Orofino, Wikimedia Commons, CC BY-SA 4.0

Nomenclature

James Cunninghame (1664 - 1709) is perhaps best known as the earliest European who made botanical collections in China and whose rich herbarium safely arrived home. Although little is known about his early life, he was a Scot who, in 1686, was studying medicine at Leiden. Cunninghame left England late in 1697 bound for the Chinese island of Amoy (present day Xiamen), engaged as a trader and collector by Henry Gough. During his six-month stay, he collected large numbers of plants and animals and commissioned 800 paintings of useful plants by Chinese artists. As well as plants, he collected insects, molluscs and butterflies, all previously unknown in Europe. Arriving back in England in mid 1699, he was feted by his friends and proposed as a fellow of The Royal Society.

Within 6 months, Cunninghame was again to join a ship bound for China, this time as ship's surgeon on Eaton, an East India Company ship sailing to the island of Chusan (present day Zhoushan) with hopes of establishing a trading station there. This proved difficult and, in a local dispute, most of the British party were massacred. Although wounded, Cunningham survived and was taken to the mainland and imprisoned for two years. Upon his release, he made his way to Batavia to become chief of a factory for the East India Company. Three weeks after his arrival, the factory was attacked and destroyed. In the autumn of the following year he wrote to friends in England that he was sailing in the Anna for England. However, this was the last his friends heard from him as the ship disappeared without trace after leaving Bengal.

Left: *Cunninghamia lanceolata*, Fangshan, China, Photo: Micromesistius, Wikimedia Commons CC BY-SA 3.0

Below: Location of *Cunninghamia lanceolata* in Geelong Botanic Gardens.

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This information was prepared by Peggy Muntz, Volunteer Guide, Friends of Geelong Botanic Gardens