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Casuarina equisetifolia

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Casuarina equisetifolia L.

Taxonomy and nomenclature

Family: Casuarinaceae

Synonyms: *Casuarina littoralis* Salisb., *C. litorea* L., *C. littorea* Oken., *C. muricata* Roxb., *C. sumatrana* Jungh.

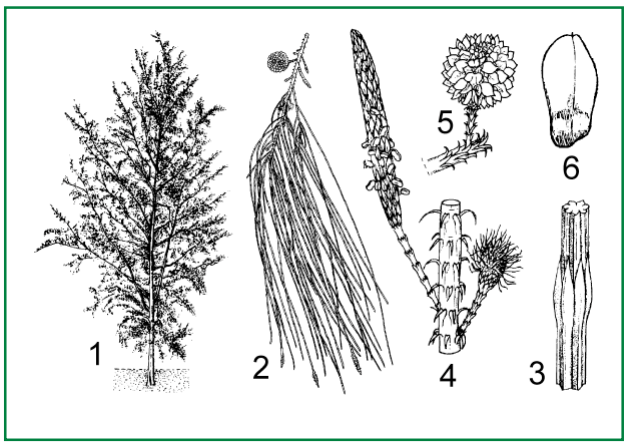
Vernacular/common names: beefwood, coast she-oak, horsetail casuarina, ironwood (Eng.); pin d'Australie (Fr.); pino australiano (Sp.). Two subspecies are recognised, *equisetifolia* and *incana*.

Distribution and habitat

Occurs naturally on subtropical and tropical coastlines from northern Australia throughout Malaysia, southern Myanmar, the Kra Isthmus of Thailand, Melanesia and Polynesia. Introduced world-wide in the tropical and subtropical zone.

Altitude range 0-1500 masl, mean annual rainfall 350-5000 mm, dry season duration 6-8 months, mean annual temperature 15-30°C, mean maximum temperature of hottest months 20-47°C and of coldest 7-20° C.

Prefers light, sandy soils; relatively fast-growing on poor soils and tolerates some salinity and salt-laden winds. Grows well in soils with pH 5.0-9.5. Does not tolerate waterlogging, is shade intolerant and sensitive to fire. Nitrogen-fixing (*Frankia* symbiosis). The life span is 40-50 years.



1, Habit of young tree; 2, flowering twig; 3, part of branchlet; 4, male and female inflorescence; 5, infructescence; 6, fruit. From: Plant Resources of South-East Asia 5:3

Uses

A true multipurpose species, providing a range of products and services for industrial and local users. Has been called "the best firewood in the world" and also produces high-quality charcoal. The wood is very difficult to work and cannot be used as sawn timber.

Because of its tolerance to salt it is used for erosion control in coastal areas. Other uses and services are paper pulp, timber, shade or shelter, ornamental, land reclamation and soil improvement. With the ability to fix nitrogen it has potential use in agroforestry.

Botanical description

An evergreen tree 6-35 m tall, subsp. *incana* typically smaller. Crown is finely branched. Bark light grey-brown, rough and furrowed on older trees. Encircling bands of lenticels are prominent on the young bark. Branchlets are drooping and needle-like; The tiny, reduced leaves are arranged 7-8 together in whorls.

Flowers unisexual, male and female flowers can be on same or on different trees. Male flowers in simple terminal, elongated spikes, female flowers borne on lateral woody branches. The female, cone-like infrutescence is round, 10-24 mm long, 9-13 mm in diameter.

Fruit and seed description

Fruit a grey or yellow-brown winged nut (samara), 6-8 mm long, with a single seed. One kg of green cones yields 20-60 g of seed. There are 370,000-700,000 seeds per kg.

Flowering and fruiting habit

Wind pollinated. Where there is a distinct wet or dry season, flowering and fruiting are regular, occurring once or twice per year. In areas with no distinct dry or wet season, flowering and fruiting tends to be irregular and may occur throughout the year.

Female cones mature 18-20 weeks after anthesis and open shortly after this, releasing the small fruits. The fruits on one tree do not all mature at the same time, presenting a problem for seed collection.

Harvest

The seeds are mature when the cones turn yellow and begin to open. The seed coat should be partly brown and the endosperm firm.

Processing and handling
The fruits are dried in the sun before the seed is extracted.

Storage and viability
Storage behaviour is orthodox. Viability can be maintained for several years in hermetic storage at 3° C with 5-9 % moisture content.

Dormancy and pretreatment
Seeds require no pretreatment.

Sowing and germination
Propagation by seed or cuttings. In the nursery, seed can be germinated in beds or trays containing sand or a mixture of sand and peat moss. Germination is normally complete after 2 weeks.

The seedlings are transferred to containers when they are 10-15 cm tall and reach plantable size (50-70 cm) in 5-8 months. Care should be exercised to avoid excessive watering as this may cause damping off. A 50% shade is suitable until seedlings are ready for out-planting. Seedlings 10-15 cm tall in germination beds can also be transplanted to open beds with 10 x 10 cm spacing to obtain bare-rooted planting stock. Soil containing mycorrhiza and *Frankia* (the nitrogen-fixing fungi in Casuarinas) from established stands should be added to the potting medium. The N_2-fixing potential can be greatly enhanced through the use of selected clones inoculated with effective *Frankia* strains.

In Thailand and India cuttings are made from small branchlets (2 mm in diameter and 10-15 cm long) and rooting is enhanced with hormones IBA or IAA. In southern China cuttings are taken from branchlets (1 mm in diameter and 5 cm long) and soaked in a solution of NAA before being placed in polythene tubes.

Plantations can be established using container seedlings, bare-root seedlings or rooted cuttings. A planting density of 2500 stems/ha is commonly used but some farmers plant up to 10,000 stems/ha when fuelwood or small poles are the required products. Pruning up to 2 m is necessary in plantations. Vegetative propagation by cuttings is very easy for this species.

Phytosanitary problems
Ants may predate the seeds and care should be taken to protect the seed after sowing.

Selected readings

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Naturally occurring trees at Wah Wee Beach, West Arnheim Land, Northern Territory, Australia. Photo: Maurice Mcdonald, CSIRO Forestry and Forest Products.

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