

LOCAL NAMES

Bislama (namambe); English (Polynesian chestnut, Tahitian chestnut tree); Fijian (ivi); French (chataignier de Tahiti); Samoan (ifi); Tongan (ifi)

BOTANIC DESCRIPTION

Tahitian chestnut (*Inocarpus fagifer*) is a moderately growing evergreen tree with a buttressed trunk, a distinctive, short, thick, irregular, and very fluted bole, and a broad crown reaching heights over 20 m with a crown diameter of 4–6 m. Branches have a spirally alternate arrangement. Secondary branching creates a network of branches within the dense canopy.

Leaves simple, oblong, alternately arranged, dark green, and leathery; 16–39 cm long, 7–13 cm wide with petiole 0.5–2.5 cm long. The leaf apex slightly pointed, the base lobed, and the margin entire. Leaf veins opposite, yellow, and conspicuously arranged along the mid-vein.

Flowers small (about 1 cm long), fragrant, clustered, and white to yellowish.

Fruits ovoid but irregular, slightly flattened, and rounded or oblong with a flange down one end; produced either singly or in clusters with a smooth skin covering a fibrous shell encasing the kernel. Fruit colour changes from green to orange-brown as it ripens. In some varieties or cultivars the fruits remain green even when ripe. At maturity the fruits are usually indehiscent, although there are some dehiscent varieties.

Seed (kernel) white, kidney-shaped, contained in a fibrous, brownish, thin shell. Kernels are large, each weighing 5–50 g, and measuring 20–70 mm in length by 16–40 mm in width. The seeds are edible with a chestnut-like flavor when cooked.

Bark rough and flaky, varying in color from brown to grayish with age.

The tree has a shallow taproot and well-formed network of lateral roots that are most prevalent in the topsoil layer.

BIOLOGY

Tahitian chestnut begins flowering at an age of 3-5 years. Flowering occurs in November - December, with fruiting in January - February. Bees forage on flowers and as pollinate them during flowering season. Flying foxes and cockatoos feed on the fruits and disperse the seeds. The tree's life span is 80-90 years.

ECOLOGY

Commonly found at low elevations along coastal shorelines and rivers. It is associated with lowland secondary forests, swamps and marshes, mangrove areas and coconut plantations. Other species that are found within the natural range of Tahitian chestnut, include: canarium nut (*Canarium* spp.), breadfruit (*Artocarpus altilis*), coconut (*Cocos nucifera*), cutnut (*Barringtonia* spp.), *Flueggea flexuosa*, sago palm (*Metroxylon salomonense*), Malay apple (*Syzygium malaccense*), *Mangifera minor*, *Ficus* spp., beach hibiscus (*Hibiscus tiliaceus*), beach she-oak (*Casuarina equisetifolia*), *Intsia bijuga*, *Terminalia* spp., and narra (*Pterocarpus indicus*)

BIOPHYSICAL LIMITS

Altitude: 0-500 m

Temperature: 26.4-27.7°C

- Mean maximum temperature of hottest month 29.4-34.5°C

- Mean minimum temperature of coldest month 20-23°C

Rainfall: 1500-4300 mm

Soil type: Grows in a wide range of soils including highly calcareous and saline soils poorly drained seasonal to permanently waterlogged valleys, swamps, and marshes with pH 5-14. It occurs in medium to infertile light to heavy soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: Fiji, Malaysia, Papua New Guinea, Solomon Islands, Vanuatu

Exotic: Cook Islands, French Polynesia, Kiribati, Marshall Islands, Philippines, Samoa, Tonga



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

Food: The kernel is edible when cooked, but is highly perishable and has a short shelf life.

Timber: The wood is used for carvings, tool handles, canoes, and light construction.

The buttress is used in the Reef Islands (the Solomon Islands) as a platform for dancing; when placed over a hole it provides a resounding tone. It is moderately suitable for fence posts since it is fairly durable as poles.

Medicine: Grated bark mixed with coconut milk or bark sap is used to treat urinary infections in the Solomon Islands. The juice from the mesocarp of green fruits was used in Tonga to treat insect bites and burns.

Fuel: Fallen branches and felled trees are good firewood when dried. Green wood also burns well and is used in the Solomon Islands to dry copra.

Fodder: Birds (e.g., cockatoos, parrots) and flying foxes feed on the fleshy mesocarp of fruits and flower nectar. The fallen kernels and mesocarps are food to some freshwater fish and prawns, and potentially can be useful in fish farming. The kernel is a good feed for free range chickens.

Other products: The large leaves were traditionally used for wrapping and parceling throughout the Pacific islands. In Fiji, cooked kernels were wrapped with the leaves when sold in the market. In Tonga, the leaves were used for making belts and to cover the ground beneath mats. In Wallis, the leaves were sewn together to make sails for boats.

SERVICES

Erosion control: Tahitian chestnut is rated high for soil stabilization due to a good network of lateral roots. It has been used to stabilize soils along the riverbanks and slows rapid shoreline erosion created by the rise in tides.

Intercropping: Can be used as a component of a multistory planting, both as a middle story or overstory tree. It grows together well with cutnut (*Barringtonia* spp.), sago palm (*Metroxylon salomonense*), betel nut palm (*Areca catechu*), and coconut (*Cocos nucifera*).

Boundary or barrier: Highly suitable as a living fence or a boundary line species in home gardens and within the surroundings of human settlements as a windbreak, since it tolerates strong winds and resists breakage.

Ornamental: Tahitian chestnut is an attractive evergreen tree with potential for use in urban centers for beautification, while also providing shade and shelter. It is planted and protected in rural villages for such functions as well.

Shade or shelter: It can suitably provide shade and shelter for more shade tolerant crops. With appropriate spacing, the tree provides medium shade suitable for understory crops like cocoa (*Theobroma cacao*), *Gnetum gnemon*, and betel nut (*Areca catechu*). It is also a good support tree for betel vine (*Piper betle*) and other lianas. In Pohnpei it is used to provide suitable shade for the shade-loving giant taro (*Alocasia macrorrhiza*).

Soil improver: The mulch or organic matter formed from the fallen leaves, flowers, and dead branches enrich surrounding soil.

Wildlife habitat: The tree provides a good wildlife habitat for some nesting bird species. It also provides habitat for red ants (*Oecophylla smaragdina*) that are a biological control of *Amplypelta cocophaga* (Hemiptera), a major pest of cocoa in the Solomon Islands.

Other services: Tahitian chestnut is a good medium story companion tree that can provide access to the top of other taller clear bole species such as canarium nut (*Canarium* spp.), breadfruit (*Artocarpus altilis*), and sago palm (*Metroxylon salomonense*).

TREE MANAGEMENT

Spacing of 10 x 10 m along the boundaries of a polycultural farming system is recommended. In an orchard, spacing of 5 x 5 m is suggested. Seedlings may be planted in the open or as line plantings in secondary forests. With time other trees and shrubs can be selectively removed to provide for space and light. Open plantings should ideally be in mixtures with other multipurpose trees and crops such as canarium nut, gliricidia (*Gliricidia sepium*), narra, *Flueggea flexuosa*, coconut, and *Musa* spp. to provide shade, and to diversify production and minimize risk.

Self-pruning of side branches occurs naturally, but tall and old trees may be pruned to encourage new vegetative growth. Regularly cropped stock plants can be managed as a hedge. Side branches along the main stem should be trimmed to encourage top shoot production. Trees coppice well and those considered too tall for a particular situation may be pollarded.

GERMPLASM MANAGEMENT

Ripe and well-formed fruits should be collected from the ground. Collecting fruits directly from the tree requires that fruits be judged correctly for ripeness. Mature fruits harvested prior to ripening take longer to germinate.

The seeds are recalcitrant, do not withstand drying, and do not remain viable for more than a few weeks. The fruit should be retained intact (nut-in-shell) and stored in a shady, cool (19-25°C), area with low humidity (<20%) for prolonged storage. Fruits should be protected from pests such as crabs and rodents.

Seed viability can be tested by placing the seeds in water. Fruits that float are usually non-viable.

The fruits are large; there are about 10-20 fruits/kg

PESTS AND DISEASES

No major pests or diseases are known to attack mature foliage, although developing flowers and fruits are susceptible to fruit flies. Severe fruit fly infestation may result in 100% loss of the edible kernel.

FURTHER READING

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SUGGESTED CITATION

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