



TREE TOMATO (*CYPHOMANDRA BETACEA*)



What is Tree tomato (*Cyphomandra betacea*)?

Common Names

Spanish: tomate de árbol, tomate extranjero, lima tomate, tomate de palo, tomate francés
Portuguese: tomate de árvore, tomate francês
English: tree tomato, tamarillo
Dutch: struiktomaat, térong blanda
German: Baumtomate
Italian: pomodoro arboreo



The tree tomato or tamarillo (*Cyphomandra betacea*) is a native to the Andes and distributed throughout much of the world's subtropics. In Latin America it has been cultivated since pre-Columbian times. It is very popular and can be found growing on a small scale in home gardens from Chile to Venezuela. Only in New Zealand where the species received a commercial boost during World War II (when bananas and oranges could not be imported) has it been developed to create a commercial industry. The fruit has a lot of potential; it is flavourful, pretty, and has multiple uses and a long production season.

Scientific Name

Family: *Solanaceae*

Genus: *Cyphomandra*

Species: *betacea*

Synonyms: *Solanum betaceum*

Botanic Description: The plant is a small, half-woody, attractive, fast-growing, brittle tree; shallow-rooted; reaching 10 to 18 ft (3 to 5.5 m) in height. The leaves are muskily odorous, evergreen, alternate, more or less heartshaped at the base, ovate, pointed at the apex, 10 to 35 cm long and 4 to 12 cm broad. The flowers are fragrant, 1.25 to 2 cm wide, have 5 pale-pink or lavender, pointed lobes, 5 prominent yellow stamens, and green-purple calyx. The fruit is , smooth, egg-shaped and ranges from 5 to 10 cm long and 3.7 to 5 cm in width. Skin colour may be solid deep-purple, blood red, orange or yellow, or red-and-yellow. Flesh colour varies from orange-red or orange to yellow or cream-yellow. While the skin is somewhat tough and unpleasant in flavour, the outer layer of flesh is slightly firm, succulent and bland, and the pulp surrounding the seeds in the 2 lengthwise compartments is soft, juicy, subacid to sweet; it is black in dark-purple and red fruits, yellow in yellow and orange fruits.



Fig 1: *Cyphomandra betacea* adapted from Fruit Facts, Volume 2. California Rare Fruit Growers www.crfg.org/pubs/ff/tamarillo

Where does Tree Tomato grow?

The tree tomato is unknown in the wild state, and the area of its origin is at present unknown. Recent studies indicate that it probably had its origin in the southern Andes. The tree is generally believed to be native to the Andes of Peru Chile, Ecuador and Bolivia where it is extensively grown, as it is also in Argentina, Brazil and Colombia. It is cultivated and naturalized in Venezuela and grown in the highlands of Costa Rica, Guatemala, Jamaica, Puerto Rico and Haiti. In tropical lowlands, tree tomato grows poorly and seldom set fruit (fruit set seems to be affected strongly by night temperature). Short periods of frost below -2°C kill all but the largest stems and branches. It cannot tolerate prolonged drought, waterlogged soils or standing water. Protection from wind is necessary as the tree is shallow rooted and brittle and can be easily blown over or damaged, especially when laden with fruit.

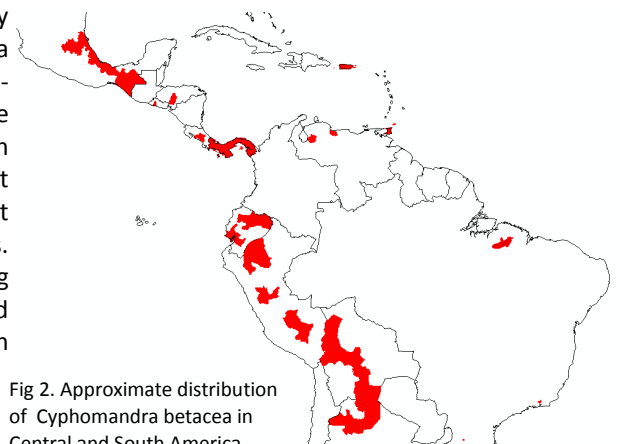


Fig 2. Approximate distribution of *Cyphomandra betacea* in Central and South America

Ecological Requirements

Altitude: Grows at 1,100–2,300 m at the equator in the Andes; near sea level in New Zealand .

Optimum mean annual temperature: 16 and 22°C

Optimum mean annual rainfall: 600 to 800 mm

Frost tolerance: None **Soil:** Grows well on Fertile, light, well-drained soil.

Geographic distribution in Central and South America

Argentina, Bolivia, Brazil, Costa Rica, Ecuador, Honduras, Panama, Peru, Trinidad and Tobago, Puerto Rico and Venezuela



How do you grow Tree Tomato?

In Ecuador most tree tomato production is carried out on small holder farms. The majority of propagation is carried out from cuttings. Grafted plants develop into a short, bushy plants with low-lying branches, and therefore more suitable for exposed, windy sites. Chemical pesticides and fertilisers and organic composts are applied. During the fruiting season harvesting takes place approx. every 15 days. Pruning, if timed appropriately, can extend the total fruiting period. The tree tomato cannot tolerate prolonged drought and must have an ample water supply during extremely dry periods. A mulch is very beneficial in conserving moisture at such times. Tree tomato flowers are normally self-pollinating. If wind is completely cut off, pollination is adversely affected unless there are bees to transfer the pollen. Un-pollinated flowers will drop prematurely. Although adaptable and easy to grow, the tree seems to be short-lived; the life of a commercial plantation is usually no more than eight years.

Why should you grow Tree Tomato?



Nutritional Value of Tree Tomato

Tree Tomato are excellent sources of provitamin A (carotene 150 International Units per 100 g), vitamin B₆, vitamin C (25 mg per 100 g), vitamin E, and iron, calcium, iron and phosphorus; it contains high levels of protein, pectin and fibre that helps to prevent constipation, reduces the rate of cholesterol in the blood and control sugar levels of people with diabetes. Tree Tomato is rich in carotenoids and polyphenols, leading to high antioxidant activity. These compounds are linked with possible health benefits, such as reducing the risk of cancer and cardiovascular disease. Both red and yellow tree tomato have similar phenolic composition except for anthocyanins which are absent in yellow tree tomato. Both varieties have a high phenolic content, providing high provitamin A activity. They are low in carbohydrates meaning an average fruit contains less than 40 calories.



Uses of Tree Tomato

To eat fresh the tree tomato are usually cut in half, and the flesh scooped out, the seeds are soft and edible, although poor tasting the skin is easily peeled off when dipped briefly in hot water. The fruits can be used in desserts or to make juices or jams. They can be used as savoury products in sandwiches and green salads or cooked and eaten in stews, soups, baked goods, relishes, and sauces. The richly coloured juice of tree tomato (especially of the deep red types) seems to have much potential for blending with grapefruit and other juices whose consumer appeal may be increased by the added colour. The PAVUC project is establishing methods to produce tree tomato chips by vacuum frying and clarified juices obtained by crossflow of Andean blackberry and Tree tomato.

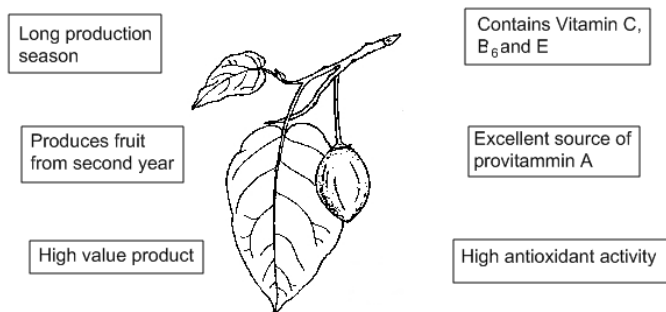


Fig 3 Benefits of Tree Tomato

Economics of Tree Tomato

Tree tomato is a hillside, non-mechanized crop that requires intensive pre and post-harvest hand-labour for processing and commercialization, thus generating employment. Due to consistent market prices, it represents an alternative source of income for many small-to medium scale farmers in the Andean zone. This crop gives them with more profit than other traditional crops such as potatoes and vegetables. Tree Tomato production in Ecuador is estimated to be around 20,000 tonnes grown across approximately 3000 hectares. Companies produce pulp and juice in tree tomato production

areas, selling most of their produce to hotels, restaurants and supermarkets. In most cases trees receive little management, and by export standards, the fruits in Andean markets are far from premium quality. Selection and propagation of elite cultivars, better management of the plants, and better handling of the fruits would enhance this crop's prospects in the region. With such developments Andean countries could be at the forefront of an expanding international commercial industry.

Further reading: Mertz C., P. Brat, C. Caris-Veyrat, Z. and Günata. (2009) Impact of thermal treatment coupled with oxygen level on carotenoids and vitamin C degradations of tamarillo puree (*Solanum betaceum* Cav). Food Chemistry (in press)

For further details please see the PAVUC website: www.pavuc.soton.ac.uk

