

TAMARILLO: A TREE TOMATO

Archana Brar, Sumit Deswal and Amit Luhach
Department of Vegetable Science
College of Agriculture, CCSHAU, Hisar

The tamarillo (*Solanum betaceum*) is a small tree or a shrub in the nightshade family or Solanaceae family. It is best known species that bears an egg-shaped edible fruit i.e., the tamarillo. It is also known as the tree tomato, tomate de árbol, tomate andino, tomate serrano, blood fruit, tomate de yuca, tomate de espana, sachatomate, berenjena, chilto and tamamoro in South America, tyamtar, rambheda or rukh tamatar in Nepal, and Dutch eggplant in Indonesia. It is widespread universally, especially in Peru, Colombia, New Zealand, Ecuador, Nepal, Rwanda, Burundi, Australia, Bhutan and the United States.



PLANT ORIGIN AND REGIONS OF CULTIVATION

The tamarillo is native to and one of the most popular fruit in the Andes of Ecuador, Colombia, Peru, Chile, Argentina and Bolivia. Today, it is still cultivated in gardens and small orchards for local production. Other regions of cultivation are the subtropical areas throughout the world, such as Burundi, Kenya, Rwanda, South Africa Nagaland, Manipur, Darjeeling and Sikkim in India, Nepal, Hong Kong, China, the United States, Australia, Bhutan, New Zealand and Spain. In 1993, about 2,000 tons were produced on 200 hectares of land in New Zealand and exported to the United States, Japan and Europe. For the export, the existing marketing channels developed for the kiwifruit are used. The first internationally marketed crop of tamarillos in Australia was produced around 1996. The tamarillo is also successfully grown at higher elevations of Malaysia and the Philippines, and in Puerto Rico. In the hot tropical lowlands, it develops only small fruits and fruit setting is seldom. Prior to 1967, the fruit was known as the 'tree tomato', but the New Zealand Tree Tomato Promotions Council dubbed it the 'tamarillo' in order to distinguish it from the ordinary garden tomato and increase its exotic appeal. However, the name 'tamarillo' is not universally used, and this plant has a different name in many regions.

PLANT

The plant of this tree tomato is a fast-growing tree and grows up to a height of 5 metres. After 4-5 years of its growth, it produces surplus production and its life expectancy is approximately 5 to 12 years. The tree usually produces a single erect trunk with lateral branches. The flowers and fruits hang from the lateral branches. The leaves of this tamarillo tree are large, simple and perennial and have a strong pungent smell. The flowers are fragrant, pinkish-whitish in colour and form the clusters of 10 to 50 flowers. One cluster bear 1 to 6 fruits. Flowers can set fruit without cross-pollination, but due to fragrance of the flowers, they attract insects. This causes cross-pollination and it seems to improve fruit set. The roots of tree tomato are very shallow and not so very pronounced; therefore, the plants are not able to tolerate drought stress conditions and they can be easily damaged by strong winds. Tamarillos flowers can with many other solanaceous crop but the hybrid fruits will be sterile and unpalatable in some instances.

FRUIT

The fruits of tamarillo are egg-shaped and its length is about 4-10 centimetres. Its colour varies from yellow and orange to red and purple. Sometimes they have dark, longitudinal stripes. Red fruits are more sour, yellow and orange fruits are sweeter in taste. The flesh has a firm texture and contains more and larger seeds than a common tomato. The fruits are very rich in vitamins and iron and low in calories i.e., about 40 calories per fruit.

CULTIVATION

Soil and climate requirements

The tamarillo prefers a subtropical climate with a rainfall between 600 and 4000 millimetres and annual temperatures between 15 and 20°C. It is not able to stand against

frost stress i.e., below -2°C and drought stress conditions. It is expected that fruit setting is affected by night temperature. Tamarillo plants grow best in light, deep, fertile soils with a pH of 5 to 8.5. Soils must be friable and permeable as the plants are not able to tolerant water-logging conditions.

Growth

Propagation of tree tomato is possible by both using seeds or cuttings. Seedlings first develop a straight trunk of about 1.5 to 1.8 meters tall after it secondary branches come out. Propagation by seeds is very easy and ideal method for protected conditions. However, in orchards with different cultivars, there is cross-pollination and characteristics of the cultivars get mixed up and sometimes fruits are unpalatable in taste. Seedlings should be kept in the nursery until they reach

a height of 1 to 1.5 metres as they require protection against frost condition. Plants grown from the cuttings branches out earlier as compared to propagation by seed method. Cuttings required for propagation should be selected from basal and aerial shoots. These cuttings should be healthy and free from pathogenic viruses and diseases. Plants grown from cuttings should be kept in the nursery until they reach a height of 0.5 to 1 meter. The tree grows very quickly and is able to bear fruiting after 1.5 to 2 years. The plant is day length-insensitive. A single tree can produce more than 20 kg of fruit per year and an orchard of one hectare yields about 15 to 17 tons. Tamarillos are also suitable for growing with limited space like in kitchen garden, as in indoor container plants or as in roof gardening as they are very easy to grow.



PLANT MANAGEMENT

The tamarillo trees are very adaptable and very easy to manage and easy to grow. However, some plant management strategies can help to stabilize its growth, quality and can improve its plant performance.

Planting

Planting distances depend on the growing system whether, it is mechanized or traditional. In New Zealand, with mechanized system of production, in a single row plant to plant distance of 1 to 1.5 metres, whereas, 4.5 to 5 metres between rows are recommended. In traditional growing regions such as the Andean region, plantations distance between plant to plant is 1.2 to 1.5 metres are recommended. Dense planting system can be an approach for protection against strong winds. On poorly drained soils, plants should be planted on ridges.

Pruning

Pruning can help in maintaining the fruit size, plant canopy structure and harvesting of fruits. Cutting the tip of young plants leads to the desired branch height. Pruning is the removal of old or dead woody parts and previously fruited branches. Otherwise, branches will produce smaller with lower quality fruits. In protected structures, timely pruning is very required and it will prevent excessive vegetative growth.

Mulching

Since the plants of tree tomato are very sensitive to drought stress condition and mulching can help in maintaining of moisture status in the soil as well as in suppressing of weeds. Other soil management practices such as ploughing etc. are not possible due to its shallow and very sensitive root system.

Shelter

The shelters are required to protect the plants from wind. Due to their shallow root system, plants do not have enough stability and the lateral branches are also fragile and break easily when carrying fruits.

Irrigation and fertilization

Irrigation and fertilizers should be provided properly according to the need of the plant and also to maximize and stabilize the production. The plants are very sensitive to drought stress as well as water logging conditions due to their shallow root system. So, apply the irrigation continuously according to the requirement of plant. Drought stress results in reduction of plant growth, fruit size and productivity. Recommended fertilizer doses per hectare are 170 kg of nitrogen, 45 kg of phosphorus and 130 to 190 kg of potassium. Phosphorus and potassium are applied in the beginning of the season, whereas, nitrogenous fertilizers are applied throughout its lifecycle.

Pest management

If compared to similar crop like common tomato, this tamarillo tree shows quite

resistant to pests. But, to reduce the risk in intensive production systems, some pests have to be controlled to avoid major crop loss and damage. To control the pests, the same control measures as for other solanaceous crops can be used.

HARVEST

Several harvestings are required as ripening of fruits is not simultaneous. Tamarillo trees can flower and set fruit throughout the year. In climates with pronounced seasons such as in New Zealand, fruits ripen in autumn. Tamarillo fruits are climacteric in nature so harvesting of immature fruits and ripening of these fruits in ethylene induced controlled atmospheric chambers is possible with minimal loss of fruit quality. The lateral branches are very fragile and can break off easily when loaded with the fruits, so harvesting of premature fruits will help to reduce this risk. These fruits can be up to 20 days at ambient conditions. A cold-water dipping process, developed by the New Zealand Department of Scientific and Industrial Research also maintains its storage life up to 6–10 weeks.



USES

Yellow-fruited cultivars of tree tomato are sweeter in flavour, occasionally their sweetness is compared to mango or apricot fruits. The red-fruited varieties are widely cultivated. In the Northern Hemisphere, tamarillos are most frequently available from July to November month and the fruits of earlier season are sweeter in taste and less astringent.

Some people in New Zealand cut the fruit in half, scoop out the pulpy flesh and spread it on toast. They can be used in chutneys and curries like the common tomato. When lightly sugared and chilled, the flesh is used for a breakfast dish.

In Colombia, Ecuador, Panama, Venezuela parts of Indonesia including Sumatra and Sulawesi, fresh tamarillos are blended together with water and sugar to make a juice. It is also available as a commercially pasteurized purée.

In Nepal, it is locally known as Tyamtar and Ram Bheda and typically consumed as a chutney and a pickle during the autumn and winter months. The fruit is roasted in open fire till the outer skin breaks and then mashed with chillies, garlic and other spices of their choice. Similar to Nepal, the Indian regions of Ooty, Darjeeling and Sikkim also consume Tamarillo. In Northeast India, it is roasted and chutneys are made with it by blending the roasted or fried dried or fermented fish along with chillies and garlic.