

## Paniyala: An Endangered Fruit

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### Abstract

The *Flacourtia jangomas*(Lour.) Raeusch, also known as the Coffee Plum, and is native to the North-Eastern Terai region of Uttar Pradesh, Assam, Bihar, Maharashtra, Bengal, Orissa, and some areas of South India. It is a very significant fruit crop for the Gorakhpur region. The fruit has also got Geographical Indication tag. They are trees from a tropical rain forest. Due to a lack of understanding about its cultivation, nutritional value, and standard procedures for producing processed products, it has hardly acquired preference among farmers. This plant serves a variety of purposes and has both therapeutic and nutritional qualities. It is a non-climacteric fruit with a poor postharvest life and one of the underutilized fruits in the nation. Therefore, special attention should be paid to its sustainable utilization, extensive cultivation, and conservation for their nutraceutical and bio functional usage through proper agro techniques in different regions of the nation through polyvalent bio functional bio prospecting for well-being, economic growth, environment, and food security.

**Keywords:** *Flacourtia jangomas*, Paniyala, GI tag, Underutilized crop, Nutraceutical and Pharmaceutical properties.

### Introduction

Paniyala is botanically known as *Flacourtia jangomas* (Lour.) Raeusch, a member of family Salicaceae (Pai, *et al.*,2021). It has various regional or vernacular names like Talispatra, Indian Plum, Kanji, Tambat, Saralu, Chakali, Kuragayi etc (Shukla *et al.*, 2009). It has diverse therapeutic value. The genus had been named after the governor of Madagascar “Étienne de Flacourt” (1607–1660).It was placed under the defunct family Flacourtiaceae of flowering plants (Mitra, 1933). The genus *Flacourtia* contains almost fifteen small trees and shrubs and number of species especially *F. indica* is generally grown for fruits and

ornamental purpose. (Everett, *et al.*, 1981). This underutilized fruit is believed to be native of east and north Bengal and commonly cultivated in South-East Asia, Philippines, and South Malaya. Gorakhpur, a district of Uttar Pradesh is very popular for its fruits. It is generally found in Terai region. Paniyala is widely distributed to Bengal, Bihar, Assam and to the South India (Shukla *et al.*, 2009).

Several members of the genus are grown for its fruits and as ornamental purpose. They are particularly cherished in the Caribbean, where people use their fruits into cuisines and beverages. It is stewed for dessert and processed into sauces, pickles, jam, syrup, juice, and marmalade. Fruits can sometimes be astringent; they are rubbed between the hands to lower the astringency. When fruits are slightly unripe, they are used to make jellies (Leunget *et al.*, 1972, Tee *et al.*, 1997). In spite of looking akin to plum, the taste is not same as plum. It is very acidic and sometimes bitter. In Indonesia, young shoots are consumed which tastes acidic. The wood is slightly grained, crimson, or scarlet, tough, brittle, long-lasting, and shines well. It is utilized for blocks or farming equipment. Harvesting of wood for timber is occasionally done in Kerala, Tamil Nadu, and Karnataka. It can be utilized as an affordable replacement for Teak and other high-priced wood.

### **Botanical Description**

Paniyala plant is low branched shrub of 6-12 m height. the trunk has sharp spines and flaking bark. However, branches and trunk of old trees are thorn less whereas young plant has woody thorns (Mishra *et al.*, 2020). The bark is smooth, lent celled, and ranges in color from light brown to copper-red to pinkish buff. Young branches are white with numerous suborbicular lenticels, most of which are glabrous or puberulous. Petiole length is 6.0–8.0 mm (Sasi *et al.*, 2018). The leaves are deciduous, ovate-lanceolate, alternating, serrated, spirally organized, and pale pink when small. The glossy, papery, 7–11 cm × 3.5–4.0 cm size leaf comprises 3-6 pairs of secondary veins visible on both sides. The leaves have stomachic and astringent properties (Sasi *et al.*, 2018). Inflorescence is glabrous, axillary racemes and sub-corymbose. Dioecious flowers have four or five ovate triangular petals varying in color from white to greenish and have a honey-like scent prior to or with fresh foliage. Female blooms are solitary, while male inflorescence is filamentous, glabrous, and solitary or found in clusters. Male and female inflorescences are appeared on different trees. Flowering occurs from December -April and April-May in Bengal, along with new foliage

that have a wonderful fresh green color (Mishra *et al.*, 2020). Ripening starts from March to July (Sasiet *al.*, 2018). The fruits type is berry and are dark-red to black in colour when fully mature (Pai, *et al.*, 2021). The fruits have 4-5 or more flat seeds with greenish yellow pulp (Mishra *et al.*, 2020.)



a) Trunk



b) Young Leaves



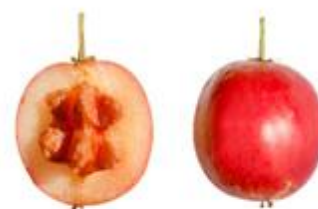
c) Flowers



d) Unripe fruits



e) Ripening Fruits



f) Cross section view of ripened fruit with seeds

**Source-** *Flacourtia Jangomas* (Lour.) Raeusch. / *Species*, n.d. and *Flacourtia Jangomas* - Wikipedia, 2021

### Nutritional Composition

This tree produces an unusual fruit that is both incredibly nutritious and beneficial to our overall good health. Hundred grams of fruits contains 24.2g Carbohydrates, 94kcal energy, 5mg Vitamin C, 30 IU Vitamin A, 0.01mg Thiamine, 0.4mg Niacin, 0.02mg Riboflavin, 0.6g Fat, 0.5g Protein, 1.2g Fibre, 33mg Calcium, 171mg Potassium, 17mg Phosphorous, 0.7mg Iron. It has a high concentration of beta-carotene, followed by lutein, zeaxanthin, retinol, and phyloquinone, all of which are crucial for the control of haemoglobin and fibrinogen in human beings (Mishra *et al.*, 2020). There are two limonoid substances namely Limolin and Jangomide present in bark and stem. Leaf and fruit extract

have 19 and 7 phytoconstituents respectively. Leaf sample of paniyala revealed significant levels of oxygen and carbon, as well as low levels of nitrogen and potassium and a modest amount of calcium. While the fruit also had a high level of oxygen and carbon and an average quantity of nitrogen and potassium, (Pai, *et al.*, 2021).

### **Medicinal Uses**

The plant and some of its chemically active compounds have been studied for their potential pharmacological effects such as anti-inflammatory, antibacterial, antiviral, antioxidant, and anti-amylase characteristics. The fruits are utilized for the treatment of a variety of conditions, including diarrhoea, fevers, biliousness, thirst, and stomach discomfort (Sasi *et al.*, 2018). Bark decoction is beneficial for piles, toothache, bleeding gums, and limb weakness (Yusuf *et al.*, 1994). Fruits are prescribed for jaundice and splenomegaly. Decoction of leaf or the whole fruit is consumed to abort in Cambodia, Laos, and Vietnam. The presence of flavonoids, saponins, carbohydrates, steroids, tannins, and phenolic substances in the plant's leaf and stem's methanolic extract gives it antidiabetic properties. It also helps to repair biological parameters that have been altered (Singh, *et al.*, 2010).

### **Soil and climate**

Indian plum can be grown on well drained fertile loamy soils. The tree is native to terrestrial habitat. The tree needs dry, tropical climates with deciduous trees. They grow most effectively in warm climates and flourish in forests. Although the tree can withstand drought, they dislike frost (Reddy, 2012).

### **Propagation**

The Paniyala tree is usually propagated by means of seed but they germinate slowly. Therefore, the tree can be propagated through budding, inarching, wedge, or softwood grafting. For nursery raising, pre-sowing treatments like seed soaking in water for forty-eight hours can be done. For clonal propagation using stem cuttings, IBA treatment @ 0.4% is recommended to produce quality planting materials at large scale. (Hossain *et al.*, 2011). It is found that optimum time for grafting is June to August in open condition (George *et al.*, 1998).

### **Planting and after care**

Grafted plants or seedlings are planted in pit of 60 cm x 60 cm x 60 cm size prepared at a distance of 6 m x 6 m in the month of July to August. Plants are planted in a square

system of planting. Before planting, pits are open and filled with mixture which is made up of equal quantity of soil and farm yard manures.

### **Manure and fertilizers**

Being underutilized, there is no any standard dose for manures and fertilizers for commercial production of such a valuable fruit tree.

### **Irrigation**

Irrigation is done frequently till the plants get established. Further irrigation is given according to the climate and requirement.

### **Weed control**

Hand weeding is done around the pit whenever required.

### **Insect-pest and Diseases**

Paniyala tree is susceptible to various insect- pest, and diseases like moulds and powdery mildew. There is no any recommended insecticides or fungicides. For effective control of such problems, one should investigate with proper diagnosis to manage this.

### **Harvesting and Yield**

The fruits can be harvested in 98 to 100 days after flowering. In Kerala, the fruit is ripened generally in the month of October -January. (George, *et al.*, 1999). The fruit ripeness is apparent in the color of its flesh. When unripe, its flesh is tough and green. As the fruit ripens, the color of its flesh depends on the variety. Some develop a purplish red hue on its thin, taut skin, while others become pinkish. Harvesting of the fruits in West Bengal is done in month of August- September. The average yield of paniyala fruit tree is 80 to 150 kg per tree. Fruit is very susceptible to an enzymatic browning reaction, which causes unwanted discoloration when exposed to air (Cimafranca, 2021). Shrivelling of skin generally starts after one or two days of harvesting.

### **Future prospects**

Indian coffee plum has a limited distribution and is underutilized. Indian coffee plum is underutilized and has a narrow distribution. According to an ethnopharmacological assessment of the Gorakhpur forests, *Flacourtia* wild plant species are now nearly extinct in this area (Ansari *et al.*, 1979). However, the fruit has got GI tag for Gorakhpur region and the initiative was taken by government of Uttar Pradesh. It needs urgent conservation strategies.

To enhance the output of fruits per unit area, systematic research should be done on various elements of crop cultivation and fruit quality.

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