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Litchi-The Queen of Subtropical Fruits

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Litchi (*Litchi chinensis* Sonn.) is a subtropical fruit crop in India belongs to Sapindaceae family. It is a perennial and evergreen tree. It is earliest known record in 1059 A.D. in Chinese literature. It was introduced in India by the end of 17th century and it is widely cultivated in subtropical and hilly regions in India.

It is grown as commercial crop. India is the second largest producer of Litchi after China. Litchi is also called as lychee or lychee nut and it is non-climacteric fruit. The Litchi tree is dense, round-topped and 9-30 m height. Its evergreen leaves, smooth, glossy, dark-green on the upper surface and 5-7.5 cm long. The flowers are tiny petal less, greenish-white to yellowish are borne in terminal clusters 75 cm long.

Litchi requires cool, dry winters and warm humid summers for best flowering and fruiting and a certain amount of winter chilling is necessary for flower-bud development. Usually male flowers appear first, then the females and imperfect bisexual flowers. Pollination is done by flies, ants and wasps, but bees are very effective. The fruits are red in colour, with oval to heart shape and rough in texture. The edible portion of aril is creamy white in colour, translucent and luscious in nature.

Market potential

China is the largest producer of litchi followed by India in the world. India and China accounts the 91% of world's litchi production. Taiwan and Thailand 3rd and 4th largest producer of litchi. In India Bihar is the largest producer of litchi. Nowadays Litchi consumption is higher in domestic markets as it as an exotic fruit crop with an appealing red fruit colour and pleasant sweet juicy pulp with aromatic flavour attracts the consumers especially during summer season.

Nutritive value of Litchi (per 100g of edible portion)

The fruits rich in vit C, B complex, calcium and antioxidants The nutritive value of litchi are energy 66 kcal, moisture 81–82 g, Carbohydrates 16.5 g mainly sugars (glucose, fructose, sucrose) protein 0.8 g, Fat 0.4 g, Crude fibre 1.3 g, Vitamin C 70 mg, Vitamin B-complex, Thiamine (B_1) 0.01 mg, Riboflavin (B_2) 0.06 mg, Niacin (B_3) 0.6 mg and minerals Calcium 5 mg, Phosphorus 30 mg, Magnesium 10 mg, Iron 0.3 mg.

Uses of litchi

Eaten as a table fruit fresh consumption, used for the preparation of canned litchi, dried litchi, juice, litchi nectar, syrup, jam, jelly ice cream and flavoured desserts. In beverage industry fruit based beverages and mocktails are prepared.

Medicinal uses: It improves digestion and cooling effect on the body and the seeds are used for starch extraction. A decoction of fruit peel is used treat smallpox eruptions and diarrohea and seed powder relieve neuralgic pains.

Soil and Climate

The litchi crop can be grown in sandy loamy well drained soils, rich in organic matter. The pH of soil should be 5.5 to 6.0 and the soil which have high lime content is beneficial for the trees. Litchi requires mild winters for flower bud differentiation and warm summer temperatures fruiting. The optimum temperature required for cultivation is 25-30°C. Cool dry winters are essential for flowering and fruit development. Very high temperature affects flowering and fruiting, leads to flower drop and fruit cracking.

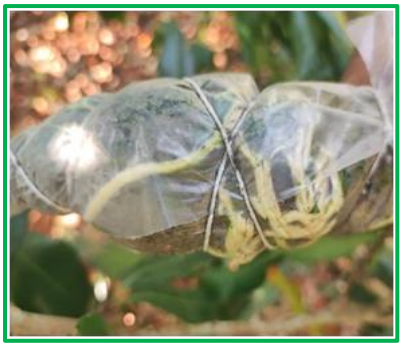
Propagation

Litchi is propagated through seeds vegetatively but it is commercially propagated by air-layering. Litchi is not propagated by seeds due to its abortiveness and less viability. Plants raised from seeds have long juvenile phase which is about 10-15 years. Because of this reasons litchi is not propagated by seed. Air-layering is done in litchi in the month of July to August (monsoon).

Flow Chart of Air-Layering

Selection of healthy mother plant
↓
Selection of 1–2 year old, pencil-thick shoot
↓
Removal of bark (ringing), 2–3 cm wide
↓
Application of rooting hormone (IBA 2000–5000 ppm)
↓
Covering the girdled portion with moist sphagnum moss / soil + FYM
↓
Wrapping with polythene sheet and tying both ends
↓
Regular moisture maintenance
↓
Root initiation (30–45 days)
↓
Well-developed roots (60–70 days)
↓
Detachment of rooted layer from mother plant
↓
Planting in nursery / polybags
↓
Hardening
↓
Transplanting to main field





Preparation of land and planting

Land should be ploughed 2-3 times. Remove the weeds, and stones and level the land gently to ensure proper drainage. The organic amendments such as FYM and compost can be incorporated to the soil to ensure the organic matter in it. Then the pits are digged with 1 m × 1 m × 1 m size and digged pits are remain open 10-20 days for solar exposure to kill soil borne pests. They are planted with 5m ×5m plant spacing. Then the plants with age 6-9 months old are planted in the pits and the pits are refilled with top soil, 20-25kg well decomposed FYM and 1kg neem cake. After planting the plants are irrigated with water and basins are formed around the pits.

Irrigation

In litchi flowering to fruiting stage is the most critical period of irrigation. The trees are irrigated by flooding or furrow irrigation. Drip and sprinklers are also most efficient for the litchi orchard irrigation which provides good micro climate for better growth development of tree.

Training and Pruning of Litchi

Training should be done in the during first three years after planting. Litchi plants are trained to maintain the better framework of the tree. The trees are allowed to grow single straight stem up to 60-75cm height. Select 4-6 well space scaffold branches around the trunk and remove the low-lying branches and crisscrossed branches, after attaining structure pruning is not required only dead and diseased branches are removed. Training provides good light penetration, aeration and ease to do cultural operations. Pruning improves the flowering and fruiting in litchi.

Manuring and Fertilization

The application of fertilizers and manure depends upon the age of the plant. At the age of 1-3 year plants 10-20 kgs of FYM/plant/year, N-0.5kg/plant/year, P-0.6kg/plant/year, 0.15kg/plant/year in the form of Urea, Super phosphate and Murate of potash respectively. At the age of 10 years FYM @ 60kg/plant/year, NPK @ 3.5, 2.5, 0.6 kg/plant/year respectively. These fertilizers are applied in three equal split doses at the month of march, June and October. The proper fertilization in litchi helpful for growth and development of plant which ensures better flowering and fruiting. Fertilizer should be applied after harvesting during the raining season for vegetative growth.

Flowering and fruiting

Litchi is a cross-pollinated fruit crop. Litchi has terminal flowering, that the flowers are borne on terminal ends of current season shoots. The inflorescence is panicle. Litchi bears three types of flowers on the same panicle which are male, functionally pistillate and imperfectly hermaphrodite (function as a male). Anthesis occurs at morning 6.00 to 9.00AM. The pollination is mainly entomophilous done by honeybees. Fruit is a drupe and the edible portion of fruit is aril which is juicy and white in colour. The fruit develops about 60-80 days after flowering. Fruits are mature during May-June.

Pests and diseases

Litchi is mostly effected by the mites. As adults and nymphs consume the sap from the undersides of leaves, shoots, and other plant parts. Infected leaves eventually become yellowish brown, curl, twist, and fall off. It can be controlled by Imidacloprid 17.8EC@1ml/ltr sprayed at the interval of 7 days. The most diseases are anthracnose, downy mildew and red rust and they can be controlled by spraying of Bordeaux mixture WP@0.2%, spraying of Copper Oxychloride 0.2% and spraying Copper Oxychloride@0.3% in June and October respectively. Due to improper storage conditions litchi fruits are affected by fruit rot which as controlled by storing of fruits at low temperatures.

Harvesting and Yield

Litchi fruits are harvested after 80-120 days after flowering. Litchi is a non climateric fruit and harvested after attaining full maturity on the tree. The fruits are harvested in the form of full bunch (whole panicle is harvested as a bunch) 9in the month of April to July. This improves shelf life of the fruits so they harvested as bunches. when the fruits attains pink or red colour, produces sweet aroma, flattening of tubercles, and TSS (18°Brix and 0.5% acidity) is criteria for the harvesting of fruits. The yield varies from 90-150kg fruits/tree depending upon age, variety and vigour of the tree.

Storage and marketing

Litchi is highly perishable and it has a thin pericarp which leads to rapid moisture loss and browning after harvest. Precooling should be done immediately after harvesting to improve the storage life. Fruits are graded based on their size and colour, packed in plastic crates or corrugated fibreboard boxes lined with paper or leaves to avoid damage. Litchi fruits are harvested at full ripe stage for local market and colour turning stage for distant markets. Fruits are stored at 5-12°C with 90% relative humidity for 3-4 weeks. Litchi can be used to produce value added products like canned litchi, litchi juice, nectar and flavoured icecreams.