

## Prospects of longan cultivation in India

**Longan is an exotic, subtropical, delicious fruit with sweet and juicy pulp. A recent understanding of its medicinal and health properties has led to the expansion of production areas of longan in different countries. In India, it is grown on a limited scale in Bihar, Jharkhand and West Bengal and has gained much attention in the recent years. Increasing production of longan fruit raises prospects for further utilization of this crop in India.**

**L**ONGAN (*Dimocarpus longan* Lour.), also known as the Dragon's Eye ( $2n=2x=30$ ), is a subtropical evergreen fruit crop belonging to the family Sapindaceae (Soapberry). Southern China is considered the centre of origin for longan. It is grown commercially in many countries, including China and Thailand, which account for most of the longan production. Production of longan fruit has increased over recent decades because of improvements in agronomic practices and other aspects of crop management. In India, it is grown on a limited scale in Bihar, Jharkhand and West Bengal and has gained much attention in recent years. Longan fruits resemble litchi fruit but are smaller, smoother and yellow-tan to brown. The fruit has a thin, leathery and indehiscent pericarp surrounding a succulent edible aril (semi-translucent to white) containing a large dark brown seed. Longan is widely accepted by consumers and has established great popularity in the international market with strong demand for its pleasant flavour and health benefits. It can be consumed in many forms of products such as dried longan pulp, longan juice, longan jelly, longan wine and canned longan in syrup.

### Nutritional profile and health benefits

Longan is both a tasty and nutritious fruit and possesses numerous nutritional and functional components,

including carbohydrates, protein, fibre, fat, vitamin C, amino acids, minerals, polyphenols, and volatile compounds. Since ancient times, longan fruit pericarp has been used as a traditional Chinese medicine for enhancement of human immunity and to decrease neural pain and swelling. Polyphenols and polysaccharides in longan pulp and pericarp contribute to antioxidant, antiglycation, antityrosinase, potent immunomodulatory and anticancer activities. Longan fruit can be used as a readily accessible source of natural antioxidants and/or a possible supplement in the food or pharmaceutical



Longan fruits

**Table 1.** Nutritional composition per 100 g of longan fruit aril

Calories	60 Kcal	Riboflavin (Vitamin B <sub>2</sub> )	0.07-0.14 mg
Moisture	72-82%	Niacin (Vitamin B <sub>3</sub> )	0.3 -0.6 mg
Carbohydrate	15-25 g	Ascorbic acid (Vitamin C)	60-85 mg
Protein	1.0-1.3 g	Phylloquinon (Vitamin K)	196.5 mg
Fat	0.1-0.5 g	Calcium (Ca)	1 mg
Fibre	0.4-1.1 g	Phosphorus (P)	21 mg
Retinol (Vitamin A)	28.0 IU	Iron (F)	0.13 mg
Thiamine (Vitamin B <sub>1</sub> )	0.03- 0.04 mg	Potassium (K)	266 mg

(Source: USDA Food Data Central)



Prolific bearing in longan

industries. The longan seed also shows excellent antioxidant activity, with high amounts of bioactive compounds, including phenolic acids and polysaccharides.

#### Climate and soil

Its cultivation is now increasing in both tropical and subtropical countries of the world where climates have distinct wet/dry periods with a cool, non-freezing fall/winter period. A temperature of 15-22°C for 2-3 months during winter favours profuse flowering. However, longan is sensitive to frost and is likely to be killed or badly injured by prolonged low temperatures. High night temperature (> 25°C) is detrimental to fruit development. Temperature above 40°C causes fruit damage and fruit drop. The best temperatures for flowering and fruit set are 20-25°C. Fine textured red loam soil rich in organic matter is preferred for raising longan crops. A deep well-drained fertile soil with a pH of 5.5 to 6.0 is ideal for its growth. Sufficient soil moisture is needed from fruit set until maturity. In India, the longan grows well in the alluvial soils of north Bihar and West Bengal and it can be grown in Jharkhand, Chhattisgarh, and other litchi growing areas.

#### Varieties

Wu Yuan (Black Round), Fuyan (Eye of Fortune or

Lucky Eye), Daw, Chuliang and Kohala are some of the commercially cultivated varieties in China and Thailand. Recently one variety Gandaki Uday has been developed by National Research Centre on Litchi, Muzaffarpur (Bihar). This is the first longan variety (selection from the material collected from West Bengal) released in India. It is an early maturing, regular bearer variety with superior fruit quality and dwarf tree stature. The fruits are round or oblate (11-13 g) with high pulp recovery (69-73%) and TSS (20-23°B).

#### Planting material

Air layering is the most popular, commercially used method for the propagation of longan. One year old air layered plants are available at ICAR- National Research Centre on Litchi, Mushahari Farm, Muzaffarpur (Bihar).

#### Orchard establishment

Pits of 60 × 60 × 60 cm are dug about two weeks before planting. Organic manure and phosphate fertilizer can be incorporated into the soil to be used to fill the pits. If the planting material is raised in polybags, make sure that the bags are removed at the time of planting. Saplings (air layered) are planted in the rainy season at a spacing of 6-8 m. Compact the soil after planting to ensure that there is firm contact between the root system and the



Longan seedlings in net house



1 year old air layered saplings of longan



Longan plant

soil mass. Young plants should be irrigated regularly to facilitate tree establishment and growth. Inoculation of arbuscular mycorrhizal fungus significantly promoted the growth of longan plants.

### Maturity and harvesting

Longan takes about 5 months from bloom to harvest. The fruits are non-climacteric and have to be harvested when ripe. Consequently, the fruit must be picked at optimal eating quality. In practice, longan maturity (ripeness) is usually based on fruit colour and flavour. The mature longan fruit has a dark, smooth skin, the inside of which is netted and tastes sweet. In India, longan is harvested from July to September. Sugar and acid composition of longan fruit aril has shown promise as a basis for commercial maturity standards. A fully matured tree yields 100–120 kg/year.

### Pests and diseases

In India, there are no major pests and disease problems in longan at present. However, in other countries, several pests are found to affect longan. Longan stink bug is most destructive pest of longan. The bugs usually mate in February; thus it is recommended that the trees be sprayed at that time with insecticide such as azodrine @ 10-20 g chemical diluted in 20 liters of water



Plant covered under net to protect fruits from birds



Value-added products of longan developed at ICAR-NRC on Litchi

at about 2-3 weeks intervals from February to April. A serious disease in longan is the rosette shoot or witches' broom. For management of longan witches' broom, infected shoots and inflorescences should be removed and destroyed. Sulfur compounds, neem oil spray reduce the attack of this disease.

### Value addition

Longan fruit has a short shelf-life. Under ambient temperature (25°-31°C) harvested longan fruit rind turns brown within 3-4 days, and the aril turns rotten within a week and loses its commercial value. There are a large number of products which can be prepared from longan fruits. Dried longan fruit, referred to as 'nuts', are popular in Asia. Due to their high TSS content, little sugar additive is required and longan fruit can even be canned in their own juice. Canned longan fruit tend to retain their characteristic flavor.

### Prospects

The prospect of increasing production of longan fruit raises expectations for increased utilization opportunities for this crop. Longan fruit contains significant amounts of polyphenolic compounds while phenolic compounds have attracted great attention due to their beneficial effects on human health. It is a new crop for India. Most of the present day recommendations are based on the work done in other countries. Thus there is a need to develop a package of practices for cultivation of this emerging future fruit. There is good potential for expansion of longan cultivation in Bihar, West Bengal, and Jharkhand. Longan fruits are highly perishable and have limited distant markets because of its short shelf-life. The research on extension of shelf-life and promotion the longan processed products needs more emphasis. Increasing production of longan fruit raises prospects for novel and improved postharvest treatments and handling protocols, including expanded processing, for this crop.

For further interaction, please write to:

**Sunil Kumar** (Scientist-Fruit Science), ICAR-National Research Centre on Litchi, Muzaffarpur, Bihar 842 002. \*Corresponding author email: mehtasunil98@gmail.com