



Cultivation of litchi

by Christian Didier



Requirements of litchi

Specific climatic conditions are required for litchi growing but the tree is not very fussy about soils. It is also little susceptible to viral diseases.

Cultivation zones

Litchi requires a warm, humid climate. In order to flower, it needs a vegetative resting period induced by a cool, dry season. A slight fall in temperature and relative humidity may induce flowering in some humid zones. A good supply of moisture is essential from the appearance of the flower spikes until harvesting.

Wind-breaks

The position of the land must allow good lighting. Poorly drained low-lying land should be avoided, as should steep slopes that hinder the mechanisation of maintenance work. The land must be sheltered from the prevailing winds and from sea spray near the coast. If there is no natural protection (relief, vegetation), wind breaks are installed around the field and even inside it if it is large or very exposed. Wind breaks consist of fast-growing trees with good anchorage in the ground (filao, shisham, acacia and others) planted in dense rows and require maintenance (fertilisation, irrigation and pruning). They must be allowed sufficient space.

As far as possible, wind breaks should be installed a year before the litchis are planted to give protection from planting onwards. A wind break provides protection for a distance equal to ten times its height. They should be planted closer together in sloping land. They sometimes do not have any effect in extreme cases.

Soils

Litchi adapts to numerous types of soil but prefers slightly acid soils (pH 5.5 to 6.5 and 8 or higher in some parts of India) that are rich in organic matter, deep and well drained. Although it can stand having 'wet feet' temporarily near rivers, prolonged submersion can be harmful. Drainage is all the more important as litchi is grown in zones with high rainfall and often in low-lying areas protected from wind.

The creation of orchards

Soil preparation

Planting in recently cleared land in which stump and root debris enhance the development of root rots should be avoided. If necessary, surface drainage is ensured by levelling and subsoil drainage by a network of ditches. If cultivation can be mechanised, deep subsoiling is followed by ploughing, possibly after the application of manure and phosphate and potassium fertiliser (in the light of the results of soil analysis). When the trees are planted in holes, inputs are applied at this stage.

Plants

Propagation is usually by air layering using trees noted for the quality of their production. The layers obtained during the hot, humid season from branches 10 to 15 mm in diameter and 0.50 to 0.70 m long have a small necrotic root point at the cut that heals quickly. The root system is also better balanced with the aerial part. After separation, the marcots are cultivated in pots in a nursery for 3 or 4 months before being transplanted to the orchard.

Planting density

The litchi tree displays considerable growth. Today, planting distances are 10 x 10 m or 8 x 10 m, that is to say a density of 100 or 125 trees per hectare. Nevertheless, plantation at 8 x 6 m (208 trees per ha) or 8 x 5 m (250 trees per ha) can be envisaged in more intensive cultivation. Annual pruning is necessary in this case. The orchard can be thinned by gradually cutting back the trees when they begin to hinder each other and then, in the absence of an effective pruning method, by felling one tree in two along the row.

Planting

Planting must be performed with a strict layout and perfectly aligned in each direction. If cultivation is not mechanised, a 0.8 x 0.8 x 0.8 m (500 litres) hole must be dug at the position of each seedling. The soil removed is then mixed with about 2 kg potassium sulphate + 2 kg natural phosphate + 25 to 30 kg well-rotted manure. The hole is then refilled with this mixture. A slight mound is formed as a result of the manure application and the expansion of the soil. The plants are installed in the mound and staked.

Marcots are planted inclined in the opposite direction to the wind and staked. They are thus less exposed to the wind and root better. The plants must always be watered abundantly after planting. In cool zones, they must be sheltered during the winter following planting.

Orchard maintenance

Training pruning

As for other fruit species, it is sought to train the tree on a single trunk with horizontally spaced, regularly distributed main branches. Care must be taken in the early years to prevent the forming of shoots on the trunk or the main branches that have a very closed angle, following the natural tendency of litchi. These shoots are extremely weak points during strong wind.

Soil maintenance

The soil must be bare along the rows or under the foliage in the early years. Spontaneous inter-row vegetation must be kept down. Short-cycle, small growth intercrops can possibly be grown during the first three years and managed in such a way as not hinder the trees.

Irrigation

Litchi is very susceptible to water stress throughout the fruit growth period and the vegetative growth period that follows the harvest. Irrigation is necessary in case of shortage of water. Stress during fruit setting causes substantial fruit drop. Different irrigation systems can be envisaged. Micro-jet irrigation is satisfactory. At least 200 mm water per month must be applied (according to soil type, the age of the trees, the climate, etc.).

Maintenance pruning

The fruits are in clusters at the extremities of the branches. The latter are broken at harvesting. However, this practice does not enable control of the volumes of the trees. The removal of dead wood, of small inner branches and branches that prevent sunshine from entering the tree is recommended.

Litchi growth is fast and soon becomes exuberant. The trees must therefore be controlled. For this, annual pruning is performed just after the harvest. The trees are usually too dense. The aim is to aerate them by allowing as much light as possible on the foliage and to keep them at a suitable height to make harvesting easier. The final result of pruning should be dome-shaped trees.

Fertilisation

Fertilisation is an important factor. It promotes good vegetative growth after the harvest and makes up for the exporting of minerals in the fruits. After the active vegetative growth period of about four months, litchi needs a short period of stress (nutritional, water, heat or other) to allow flower induction.

Doses are modulated according to the date of application:

- after the harvest: 1/2 of the dose;
- at panicle emergence: 1/4 of the dose;
- after 'June drop': 1/4 of the dose.

Fertiliser is applied to the ground beneath and at the limit of the foliage. Trace elements are applied by leaf spraying at fruit setting (boron, calcium).



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Harvesting

Traditional harvesting is performed by hand with 'bunches' of fruits of the branch stored in bales or crates containing 10 to 15 kg only so that the fruits at the bottom are not crushed. These hand-made bales conserve good humidity around the fruits, preventing them from drying out. It is better to use slightly ventilated plastic crates to avoid crushing the fruits. The treatment and marketing of fruits are rapid to avoid the peel discoloration resulting from drying. Litchi is not a climacteric fruit and its biochemical characteristics change little after harvesting, except for gradual deterioration. Fruit maturity is generally appraised on the basis of colour, peel texture and tasting. It is considered that a soluble dry matter/acidity ratio of 2.1 to 2.7 corresponds to optimum quality.

Litchi - Applications recommended
Grams per tree

Year	N	P	K	MgO
1 an	50	10	40	15
2 ans	80	10	60	20
3 ans	140	30	105	40
4 ans	210	45	160	55
5 ans	230	65	265	80
6 ans	380	85	345	105
7 ans	470	105	430	125
8 ans	570	125	520	155
9 ans	670	150	610	180
10 and +	920	210	840	240

Litchi quality defects

Photos © Pierre Gerbaud



Ageing fruits – dull appearance –
shell browning and drying



Puffy fruits



Fruits picked too early



Ageing fruits – too long a gap
between harvesting and sale



Puffy fruits



Unattractive colour
resulting from lack of sorting



Oxidation of the shells
of non-treated fresh litchis



Aborted and double fruits



Satisfactory colour (for reference)



Uneven colouring
resulting from sulphur treatment



Different sizes
in the same packaging