

Bagging of Litchi Bunches to Harvest Export-quality Fruits

Litchi, acclaimed as the Queen of Fruits, is a valuable fruit crop that serves as a lucrative commodity and contributes significantly to the livelihoods and economies of many people. In the northern and eastern states of India, litchi fruits mature during May and June—a period characterized by high temperatures, hot desiccating winds, and low humidity. These conditions often result in severe sunburn and fruit cracking. Additionally, cloudy weather or rainfall during fruit maturity can lead to heavy infestation by fruit borers. These environmental and biotic stresses cause considerable losses in both yield and fruit quality. Bagging of litchi bunches using non-woven polypropylene bags (pink and white) during the fruit development stage (25–30 days after fruit set) has been shown to improve fruit colour and quality while also providing effective protection against cracking, sunburn, and fruit borer infestation.

LITCHI (*Litchi chinensis* Sonn.), a member of the Sapindaceae family, is one of the most important subtropical evergreen fruit crops of Southeast Asia. Litchi fruit is highly prized in their fresh form due to their attractive red skin, semi-translucent juicy white aril, high nutritive value, strong aroma, and rosy flavour.

Fruit growth and development in litchi occurs during April–May in Northeastern India, a period that often coincides with high temperatures and low humidity. These climatic conditions can cause localized light brown blotches on the fruit skin and lead to fruit cracking. Under extreme

conditions—such as continuous dry heat ($40 \pm 2^\circ\text{C}$) and relative humidity below 50%, along with hot desiccating winds—severe sunburn and

cracking of the fruit may occur. This results in a significant loss of both yield and fruit quality.

The technique of bunch bagging has been found effective in improving fruit quality and reducing damage from pests, sunburn, and cracking. It is considered one of the best available alternatives, addressing the concerns of both farmers (as a low-cost technology) and consumers (as it produces residue-free, quality fruit). In this technique, litchi fruit bunches are bagged on the tree for a specific period during development.

Bagging material and time of bagging

The effectiveness of microclimate control largely depends on the quality and type of bags used. UV-treated non-woven polypropylene bags in pink and white (length: 20 inches, width: 16 inches, thickness: 30 GSM) with strings are commonly used for bagging litchi bunches. These bags are available in the market at a price range of ₹6–8 per bag and are designed to be reusable.

Farmers should carry out bagging on bright, sunny



Covering of litchi bunch with non-woven polypropylene pink bag at 30 days after fruit set



On-tree pre-harvest bagging of litchi bunches



Table 1. Recommended time of bagging for different region

Centre (State)	Variety/ cultivar	Time of bagging (days after fruit set (DAFS) with pink colour bags)	B:C Ratio
Muzaffarpur, Bihar	Shahi	30	3.84
Pantnagar, Uttarakhand	Rose Scented	30	3.87
Ranchi, Jharkhand	Shahi	25	3.26
Sabour, Bihar	Purbi	30	3.42
Gangian, Punjab	Dehradun	25	2.97
Mohanpur, West Bengal	Bombai	30	2.10
Medziphema, Nagaland	Shahi	25	3.50
Neri, Himachal Pradesh	Dehradun	25	2.12
Ambikapur, Chhattisgarh	Rose Scented	30	-



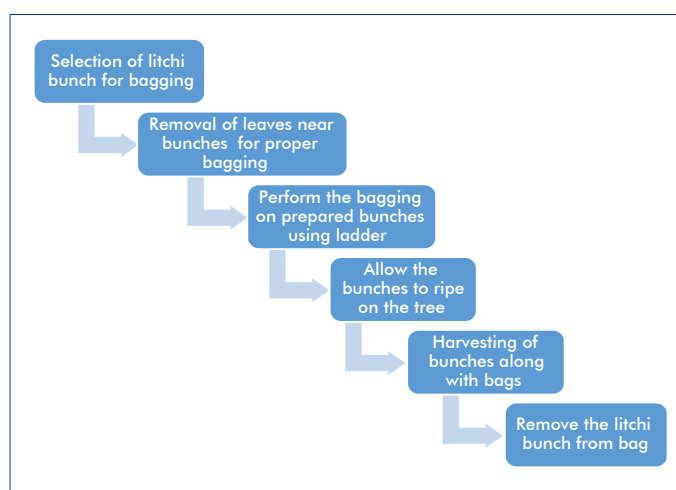
Pink and white colour non-woven polypropylene bags
(length 20 inch, width 16 inches and thickness 30 GSM)

days when there is no moisture on the fruit surface. Healthy-looking bunches (panicles) should be gently inserted into the bags, which should then be securely tied at the opening with string or thread.

ICAR-AICRP on Fruits has recommended different bagging times for different regions (see Table 1).

Advantage of bagging in litchi

- Increase in marketable yield (fruit weight >25g), and production of export quality fruits (More than 97 % fruits free from scorching and cracking)
- Uniform appealing fruit colour
- > 95% reduction in borer infestation results in a decrease in pesticide use
- Bagging can contribute to more consistent fruit sizes and appearances, which are often preferred by retailers and consumers
- Deterrence of bird's damage
- Ease in harvesting, handling and storage of harvested fruits



Flow chart of bagging in litchi

- Potential for higher selling price and net return
- Cent per cent reduction in pre-harvest fruit drop



Effect of different time of bagging on fruit colour of litchi at Muzaffarpur



Bagged and Un-bagged litchi bunches

Challenges in adoption of bagging technology

Bagging of litchi bunches is a labour-intensive process, and the cost of bagging materials is a major factor influencing its adoption on a commercial scale. It requires substantial manpower and time, which can make the practice less economically viable for some growers. Additionally, proper skill and training are essential to

ensure that the bags are correctly placed to provide effective protection for the fruit bunches.



Demonstration of bagging technology at farmer's field (Katarmala Village, Goraul Block, Vaishali District, Bihar)

CONCLUSION

On-tree bagging of litchi bunches is a simple, farmer-friendly, and eco-friendly technology that is safe to use and offers several benefits for the physical appearance and quality of the fruit. Moreover, it is one of the most effective methods to protect the fruit from insect pests (such as borers) and physiological disorders (such as scorching and cracking), while also supporting the production of export-quality litchi.

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Pollinators in chrysanthemum

Three chrysanthemum genotypes, viz. OPCH 12-7; OPCH Double White and DFR C-2 identified as highly attractive, floriferous and rewarding genotypes for honeybees. The genotypes can be used for preparation of floral calendars to improve pollinator's health and habitat restoration. Pollens from bee-friendly flora can be used as a dearth-season diet for honey bees. Multiplication and marketing of such bee-friendly flower

crops would also offer an entrepreneurship opportunity and a new source of income for rural youths and farm women. These varieties are ideal for higher seed production in cross pollinated crops. These are suitable for gardens to conserve the biodiversity and off-season flora for apiculture farmers also and useful to support pollinator's network in pollination-dependent crop.

OPCH 12-7	DFR C-2	OPCH Double white
Attract <i>Apis cerana</i> , <i>A. florea</i> and <i>A. dorsata</i>	Attract <i>Apis cerana</i> and <i>A. florea</i>	Attract <i>Apis cerana</i> and <i>A. florea</i>
Relative abundance of bees: 39.5 bees/m ² /min	Relative abundance of bees: 58.33 bees/m ² /min	Relative abundance of bees: 55.67 bees/m ² /min
Foraging rate of bees: 4.5 flowers/min	Foraging rate of bees: 6.83 flowers/min	Foraging rate of bees: 5.5 flowers/min
Foraging speed of bees: 23.67 seconds	Foraging speed of bees: 20.33 seconds	Foraging speed of bees: 17.2 seconds



Pollinator-friendly genotypes of chrysanthemum

Source: ICAR Annual Report 2023-24, p.83