

Managing fruit cracking in litchi

Owing to its high economic worth, early maturation, sweet taste, pleasant flavour, and nutritional value, *Shahi* is a very popular cultivar among Bihar's litchi growers. Fruit cracking, which occurs at a rate of 10–30% in normal years, has become a major limiting factor in the remunerative cultivation of *Shahi* litchi. To prevent fruit cracking and reduce financial losses, a comprehensive strategy that holistically considers agronomic and environmental factors is essential. The incidence of cracking can be effectively reduced by bagging litchi bunches (25–30 days after fruit set), foliar spraying of plant growth regulators (salicylic acid at 50 ppm), applying seaweed extract-based bio-stimulants (Sagarika liquid at 0.5%), and ensuring a balanced water supply through an under-canopy micro-sprinkler system.

Keywords: Bunch bagging, Micro-sprinkler irrigation, Sagarika Liquid, Salicylic acid spray, *Shahi* litchi

THE litchi (*Litchi chinensis* Sonn.), belonging to the family Sapindaceae and popularly known as the “Queen of Fruits,” is an important subtropical fruit crop cultivated for its sweet pulp, appealing colour, pleasant fragrance, and delicious taste. India is the second-largest producer of litchi, with approximately 1.0 lakh ha under cultivation and a production of 7.30 lakh tonnes. However, one of the significant challenges faced by litchi growers is fruit cracking, which can cause up to 30% crop loss in susceptible cultivars such as *Shahi*, severely affecting the quality and marketability of the fruits.

Cracking of litchi fruits typically coincides with periods of low relative humidity (around 60%) and high daytime temperatures (35–40°C). In addition, climatic factors and abnormal development of the fruit skin during early growth stages favour the occurrence of this disorder.

The ball-skin versus bladder effect theory explains that fruit cracking occurs when pressure from the expanding aril exceeds the strength of the pericarp. A reduction in pericarp strength further limits the space available for aril expansion, increasing the likelihood of cracking, particularly under elevated temperatures, high humidity, or sudden heavy rainfall, all of which promote rapid aril enlargement.

Cracking generally occurs in the final phase of fruit development, when the expanding aril exerts pressure on the slowly growing pericarp. To minimize this deterioration of fruit quality within orchards, litchi farmers can adopt several agronomic practices to protect their fruits from potential damage. Successful prevention of fruit cracking requires a comprehensive strategy that addresses both environmental and agricultural factors





Symptoms of cracking in litchi cv. *Shahi* at ICAR-NRCL, Muzaffarpur in May 2024

Management strategies to prevent cracking in litchi

Management strategies such as bunch bagging, under-canopy micro-sprinklers, application of seaweed-based bio-stimulants, growth promoters, and a balanced water supply can help prevent fruit cracking in orchards. A study undertaken at ICAR-NRCL evaluated their impact on fruit cracking in litchi cv. *Shahi* during the 2024 production cycle. Bagging with white polypropylene bags 30 days after fruit set, operation of under-canopy micro-sprinklers, foliar spraying of salicylic acid at 50 ppm, and foliar application of *Sagarika* liquid at 0.5% (a formulation containing seaweed extract) were found effective in managing fruit cracking and sunburn in litchi cv. *Shahi*.

Bunch bagging

The bagging of litchi fruit bunches with non-woven polypropylene white bags at 25–30 days after fruit set provides protection against sunburn and fruit cracking, and also improves fruit quality. UV-treated non-woven polypropylene white bags (20 inches in length, 16 inches

in width, and 30 GSM thickness) with strings are used for bagging the litchi bunches. Farmers should carry out bagging on bright sunny days when there is no moisture deposition on the fruit surface. Healthy-looking bunches (panicles) should be gently inserted into the bags and the openings tied properly with string or thread. The microenvironment inside the bag significantly reduces sunburn and cracking in litchi. In fact, the bunch bagging technique can enhance fruit skin colour and make the final product more appealing to consumers.

Under-canopy micro sprinkler

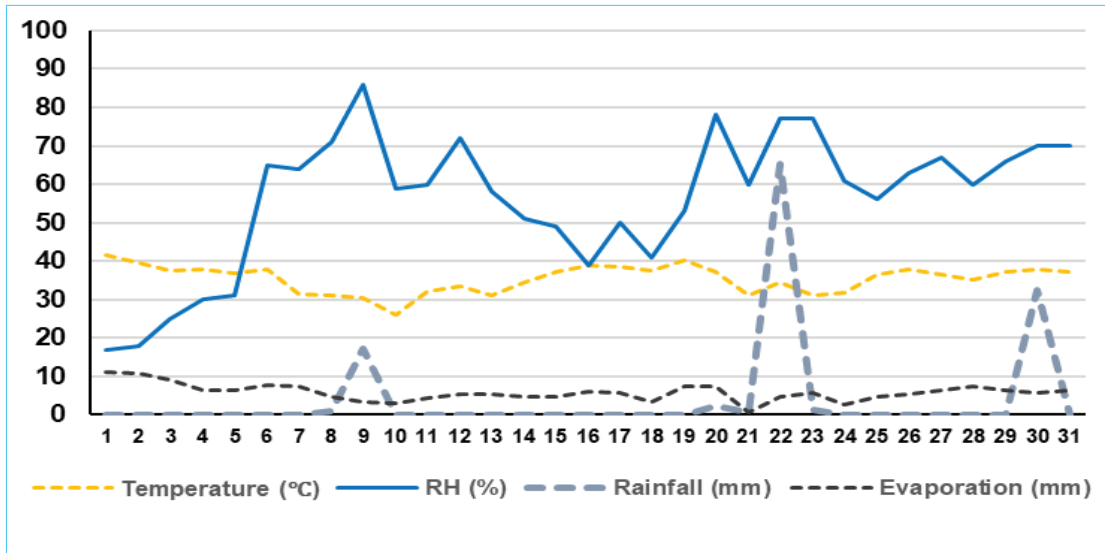
In litchi, maintaining appropriate humidity and consistent soil moisture is essential during fruit maturity. Regular irrigation at 30–40% depletion of available soil moisture helps prevent fruit cracking. The installation of drip and under-canopy micro-sprinklers significantly reduces fruit cracking and sunburn. The under-canopy micro-sprinkler system can be operated in litchi orchards from the rapid pulp development stage until fruit harvest.



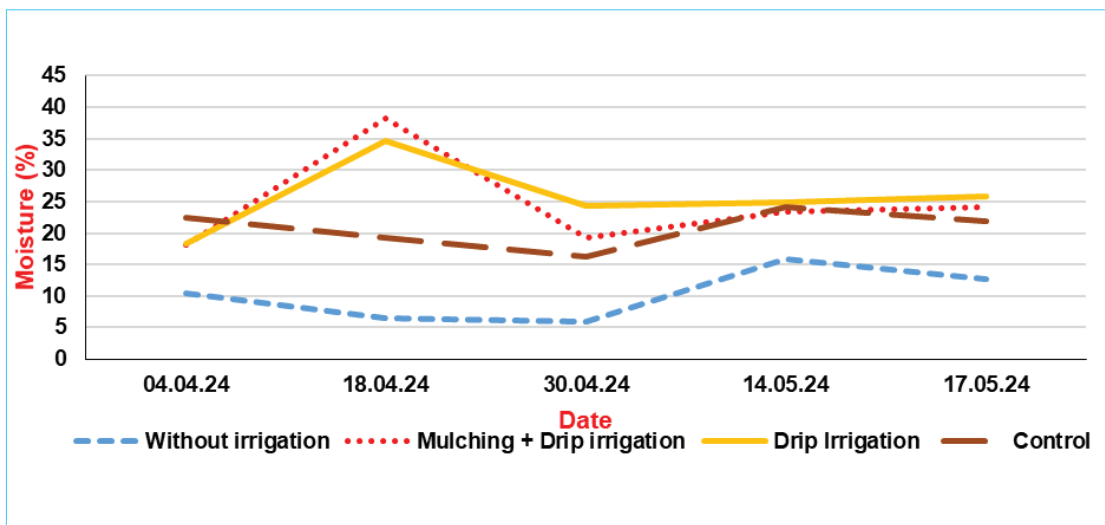
On tree bagging of litchi bunches



Fruits of bagged vs un-bagged bunches



Soil moisture content at ICAR-NRCL, Muzaffarpur during April-May 2024



Weather parameters of Muzaffarpur (Bihar) during May 2024



Mulching with black polyethene sheet in litchi orchard



Measurement of soil moisture content in orchard

Sprinkling water beneath the tree canopy modifies the microclimate and reduces both sunburn and fruit cracking.

Foliar spray of plant growth regulators

Growth-promoting plant hormones play an important role in the normal physiological functioning of fruits, and an imbalance of these PGRs may result in cracking or splitting during fruit growth and development. Foliar application of salicylic acid (50 mg L^{-1}) at 35–40 days after fruit set has been found beneficial in reducing the incidence of cracking in litchi.

Application of bio-stimulants

Application of seaweed extracts based bio-stimulants promotes the enhancement of plant growth, nutrient incorporation and improving the stress management. Foliar spray of Sagarika liquid (formulation from IFFCO containing Sea weed extract) at 0.5% (5 mL/L) at 35-40 days after fruit set also reduced the problem of cracking and sun-burning in litchi.

SUMMARY

Cracking of litchi fruits is a serious physiological disorder that affects the quality and marketability of litchi especially the very famous *Shahi* litchi and it is influenced by a multitude of factors. It can be effectively controlled by bagging of litchi bunches (25-30 days after the fruit set), foliar spraying of salicylic acid at 50 ppm, sea weed extract based bio-stimulants (Sagarika liquid at 0.5%), and a balanced water supply through under canopy micro sprinkler. Besides, proper orchard management and the judicious use of micro-nutrients (Ca and B) can mitigate the risk of cracking fruits in orchards.

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Articles invited for Special Issues of *Indian Farming* and *Indian Horticulture* On the occasion of the 98th ICAR Foundation Day

ICAR invites articles for two Special Issues of its flagship magazines, *Indian Farming* and *Indian Horticulture*, to be published on the occasion of the 98 ICAR Foundation Day. Researchers, scientists, and subject matter experts are encouraged to contribute high-quality articles aligned with the themes given below.

1. Special Issue of *Indian Farming* on “Environmental Sustainability”

This issue will focus on innovations, technologies, and products that contribute to Environmental Sustainability and support the attainment of the Sustainable Development Goals (SDGs). Articles should present a clear and complete storyline demonstrating how the described method advances specific SDGs and promotes sustainable agricultural practices.

Authors are requested to follow the submission guidelines available on the *Indian Farming* ePubs portal: <https://epubs.icar.org.in/index.php/IndFarm/about/submissions>

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This issue will highlight advancements that enhance nutrition, improve health outcomes, and promote sustainable food systems, contributing to relevant SDGs. Articles should present a coherent narrative demonstrating how the work supports better nutrition and health through horticultural innovations.

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While submitting the article, please clearly mention that the submission is for the Special Issue.

Last date for submission: 28th February 2026