

# Strategies for improved litchi production in South Africa

## Part 3: Flower induction to flower panicle development

The last part of the “Strategies for improved litchi production” will cover the period between flower induction and flower panicle development. In order for a litchi tree to enter the reproductive cycle, flower induction under chill temperatures needs to occur after a rest period (dormancy) during which enough starch reserves were accumulated. After panicle emergence, flower panicles will develop, eventually leading to blooming and fruit set.

Fig. 1 displays the growth cycles in litchi, highlighting the reproductive cycle and practices necessary between flower induction and panicle development.

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**Flower induction**  
Flower induction takes place in the dormant bud and requires average temperatures below 20°C. Unlike other crops such as citrus, litchi flowers are solely induced by low temperatures. As temperatures drop to below 20°C, the meristem of the terminal bud gradually acquires the identity of a flower meristem and initiates reproductive growth, and at the same time, the potential of vegetative growth is weakened or removed. This period is called flower induction phase during which the dormant bud is awakening. The successful induction of flower is evidenced by the formation of “white millets” (hairy swollen panicle primordia; Fig. 2) at the apex of the bud or at the axils of the rudimentary leaves. Appearance of whitish millets is in fact panicle emergence, after which the panicle develops and flowers differentiate. Irrigation should be resumed at this stage to encourage panicle growth, if water stress has been applied to the tree before flower induction period.

- **Applying water**  
As soon as flower panicles appear, increase irrigation to encourage panicle growth.

**Panicle development**  
The flower bud of litchi is a mixed bud with both flower and leaf primordia. At the early stage of panicle development, the rudimentary leaves may also grow. If temperatures during the flower induction phase are low enough, the rudimentary leaves may be aborted early and a pure flower panicle will grow out (Fig. 3). However, if temperatures during the flower induction phase are not cold enough, the rudimentary leaves will grow with the panicle forming a leafy flower panicle (Fig. 4). Leaves strongly compete with flowers for tree resources, and the growth of young leaves can even induce degeneration of flower primordia. Leafy flower panicles are thus weaker and produce less flowers / fruit than pure flower panicles. Therefore, it is necessary to remove the leaves on leafy panicles as early as possible. In China this is done by hand or ethephon spray (Fig. 3). Preliminary work has been done on ‘Mauritius’ in South Africa to remove leaves on leafy

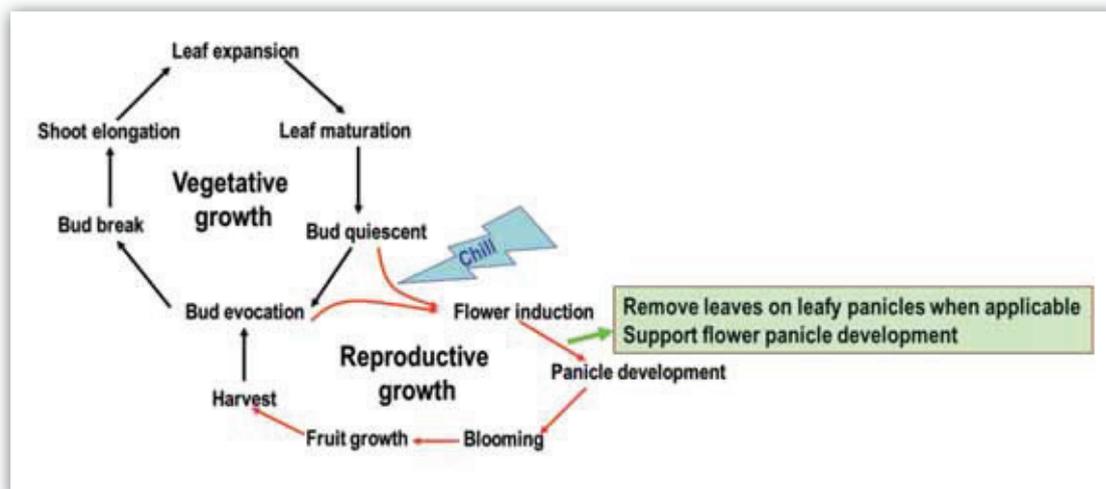


Figure 1. Vegetative and reproductive growth cycles in litchi and necessary management practices (green block) to improve litchi production between flower induction and panicle development.  
Source: X.M. Huang, keynote presentation at the 4th International Litchi and Longan Symposium, December 2012; adapted

flower panicles with ethephon and so far a concentration of 300-400 ppm was sufficient to drop the leaves without affecting the flower buds. Further trials are underway. To ensure the development of healthy flower panicles and fertile flowers, optimum fertiliser and water supply are essential.

• **Removing leaves on leafy flower panicles**

Leaves on leafy flower panicles can be removed by application of 300-400 ppm (60-80 ml/100 L water) of ethephon when flower panicles



Figure 2. "White millet" stage indicating successful flower induction.

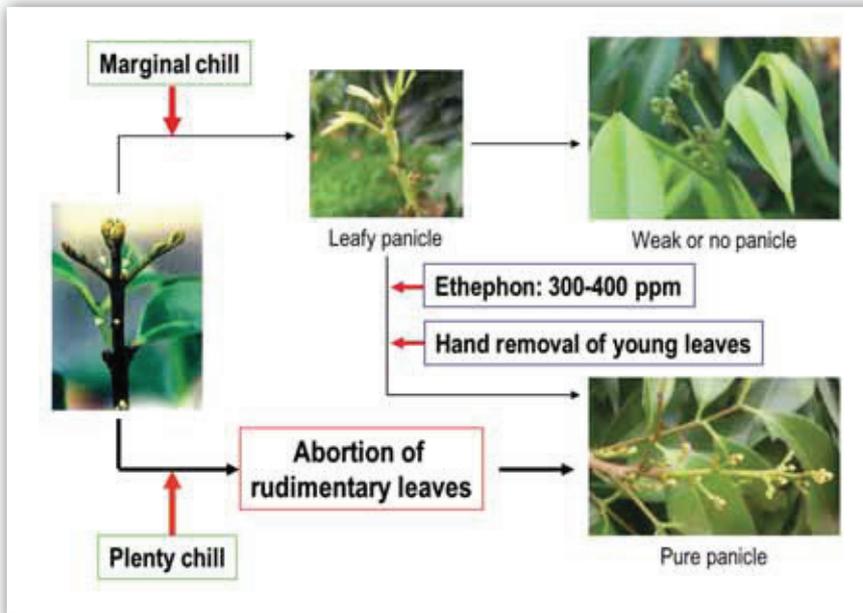


Figure 3. Processes that make flower panicles less leafy, either artificially by applying ethephon or hand removal of leaves in case of marginal chilling temperatures during flower induction, or naturally by abortion of rudimentary leaves in case of sufficient chilling temperatures.

Source: X.M. Huang, keynote presentation at the 4<sup>th</sup> International Litchi and Longan Symposium, December 2012; adapted

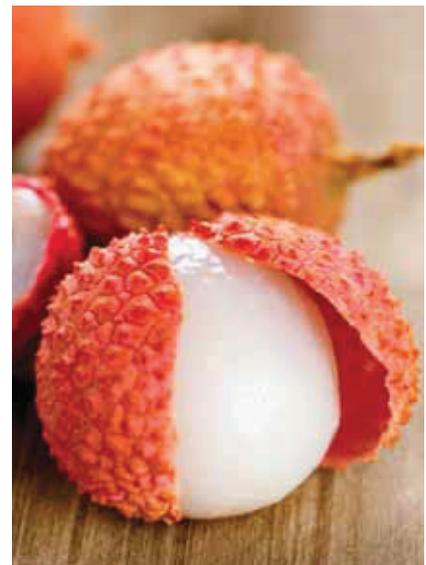
are between 10 cm and 20 cm in length and have leaves that have just unfolded (Fig. 4). As with ethephon applications for flush control, bigger leaves will not be affected by ethephon. Growers wanting to use this practice should do this on a trial basis until research results have been confirmed.

• **Applying sufficient fertiliser and water**

Availability of ample water and nutrients during flower panicle development will ensure strong and healthy flower panicles and fertile flowers. Fertilisers should be applied according to soil and leaf analysis during flower panicle development. 51



Figure 4. Leafy flower panicle during early winter.



*Honey mustard chicken with lychee puree*

- ½ cup reduced fat chicken broth
- ½ cup fresh or canned lychees
- 1 tbsp water
- 4 tbsp Dijon mustard
- 1 tbsp lychee honey
- 1 lb. boneless, skinless chicken breasts, cut into 4 pieces
- 1 tsp canola oil

**Method**

1. In a 1-quart saucepan, bring the broth and lychees to a boil over medium heat. Reduce the heat to low and cook until the sauce is reduced by about half. Let cool slightly.
2. Process the berry mixture in a blender or food processor until smooth; return the mixture to the pan. Add water to berry mixture. Cook over low heat, stirring constantly, until the lychee puree thickens, about 1 minute. Cover and set aside.
3. In a medium bowl, combine the mustard and honey. Coat the chicken evenly on both sides with the mustard mixture.
4. In a non-stick skillet, warm the oil over high heat. Add the chicken and cook until it is well-browned on both sides and no longer pink. Serve with the lychee puree.

Servings: 4

Source: <http://www.litchisa.co.za/>