

Early blossoming techniques for rambutan and durian In the uplands of south region

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Long Khanh, Dong Nai province is a famous area grown to rambutan and durian in the Southeast. The need of spreading the harvesting period to meet market demand and increase economical efficiency is very necessary for farmers. In principle, on pursuant to the rule of growth, development, blooming, result of fruit trees, the effect of technical methods is essential in the cultivation to control the most suitable rate between the stages of nutritional growth to the stage of reproductive growth according to economic purpose. With rambutan and durian in Long Khanh, those techniques include soil moisture control, water stress, suitable fertilization and hormone regulation. The problem is how to determine suitable level to increase economic effectiveness but guarantee the health of fruit garden for a long-term harvest.



Management of soil moisture by the technique of “Drying land” to control blooming for rambutan and durian in the uplands

Defining the starting point and techniques of “soil drying” creates the stress to change physiological process of rambutan and durian are important. “Land drying” is to create lacking of water comparing to the need of

trees, change the process of exchanging the substances and the rate of hormone in the trees for them to change nutritional growth through forming the florigen to help the trees blooming earlier. Implementing this technique in Southeast area is more difficult than in the Mekong Delta because there isn't any system of channel, ditch.

In the area of planting rambutan and durian in Long Khanh, method of making more drainage ditches combining with surface covering to prevent rain water which made rambutan flower initiation 23-37 days earlier, flower blooming 24-40 days earlier and harvest 18-39 days earlier, significantly compared to the control plant. The early harvesting has no effect on the productivity but fruit price is high leading to an increase)- 3,202,000/10 trees/ season (equivalent to VND 76-104 million/ha/season).

Similar technique made durian blooming from 20-28 days sooner and harvest from 12-28 days sooner with fruit yield similar to the control. The income increased VND345,000-1,577,000/10 trees (equivalent to VND3.8-16 million/ha).

Using growth regulation hormone for the rambutan and durian in the uplands

When plant hormone is synthesized and transported in the tree, it affects to physiological activities, adjusts the formation of reproductive organs to help the trees blooming and bearing fruits. Using some plant hormones such as KClO₃ or Paclobutrazol to inhibit the process of nutritional growth to change to the reproductive growth to help the trees bloom soon was applied successfully in many places and essentially to apply in the roots zone base on root spreading diameter. The problem is

the plant hormones can remain in the soil about 11 months which make the growth be inhibited for a long time and affect the tree life. In this research, applying the foliar spray method of ejecting to prevent remaining in the soil and the roots release plant hormone after the trees start flower initiation,

On the rambutan, 2 sprayings of KNO_3 solution at the concentration of 5/1000, 7 days interval when the new emerged leaves in the 2nd stage (Aug-Sept), spray Paclobutrazol 1 time at the concentration of 1/1000 when leaves in the 2nd stage turn into dark green (Sept-Oct) and spray 2 times of Thiourea solution at the concentration of 5/1000, 7 days interval, when the tree starts blooming. This makes the trees blooming 16 days sooner, harvest 25 days sooner. Due to harvesting soon, selling price is higher leading to an income increase of VND25-50 million/ha/year.

On durian sprayed KClO_3 , Paclobutrazol or Etylen, the result showed that 3 plant hormones had been used to help the durian bloom 30-34 days sooner. The income achieved VND14-34 million/ha/year. After two years of experimentation on many fruit gardens, it showed that using KClO_3 and Etylen influenced strongly to the health of fruit garden, their ability to recover is slow. The method of spraying Paclobutrazol at the concentration of 1/1000 gave the highest and safe effect for the durian.

Optimal fertilization method to increase productivity and quality of rambutan and durian

Applying technical methods to stimulate the blooming and harvest, providing fully and in time the nutrition for the trees have a decisive meaning to increase the productivity, quality of fruits, simultaneously protect the life of fruit garden.

The rambutan on basaltic red soil in Dong Nai province, with the formula of 1.0 kg N + 1.2 kg P_2O_5 + 1.5 kg K_2O + 15 kg

manures/tree/season and Growmore foliar fertilizer 20-20-20, spraying 2 times/season gave best result. Rambutan yield increased 7.6-16.1% compared to the farmer's fertilization practice, the benefit increased over VND60 million/ha/season.



On the durian, with the formula of 3.5 kg Urea + 7.5 kg Van Dien fertilizer + 3.0 kg K_2SO_4 + 20 kg manures (equivalently 1600g N + 1,200g P_2O_5 + 1,500g K_2O + 20 kg manures/tree/season) and supplement Growmore foliar fertilizer 20-20-20 spraying 2 times/case achieved the highest productivity and effect. Average fruit yield increased 15.8-20.5% compared to the farmer's practice. The result of trial experiment on the area also showed that applying optimal fertilization also increased the productivity and net profit for the farmer VND5.7-12 million/ha/year.

Using suitable kinds of foliar fertilizers to adjust the content of nutrient in the trees (increase the content of phosphate and kali), help the trees to split the sprouts to create a premise for blooming soon and synchronously with fruit trees which are being applied popularly. The research result showed that using Thiourea fertilizer, KH_2O_4 , KNO_3 , Growmore 10-60-10 makes the rambutan bloom 14-18 days sooner; harvest 19-29 days sooner, significant difference to control. Of which, Thiourea and KNO_3 fertilizers are the highest effective substance. Spraying these fertilizers not only makes the

rambutan bloom sooner but also has the trend of increasing yielding factors of the productivity of rambutan fruits. The interest due to apply foliar fertilizer achieved VND35-56.8 million/ha/season.

On the durian, using Thiourea, KH_2PO_4 , KNO_3 , Growmore 10-60-10 foliar fertilizers made the trees blooming 9-11 days sooner compared to the control, simultaneously increased the productivity 4.4-13.5%. The benefit obtained due to use foliar fertilizers was VND11-28 million/ha/season, of which Growmore 10-60-10 gained the highest economic effective.

Building the model

After two years of research, the best results of any technical method were selected to build the trial model on a wide area with the rambutan and durian in Dong Nai province.

With the rambutan, the model was built with two formulas:

1. Applying farmer practice (Control)
2. Recommended fertilizer formula + (making the drainage ditches + surface covering) + 02 sprayings of KNO_3 (concentration of 5/1000) + 01 spraying of Paclobutrazol (concentration of 1/1000) + 02 sprayings of Thiure (concentration of 5/1000) + 02 sprayings of Growmore 20-20-20 (concentration of 2/1000).

With the durian, the model was built with two formulas:

1. Applying farmer practice (Control)
2. Recommended fertilizer formula + (making the drainage ditches + surface covering) + 2 sprayings of Growmore 10-60-10 (concentration of 2/1000) + 1 spraying of Paclobutrazol (concentration of 1/1000) + 2 sprayings of KNO_3 (concentration of 5/1000) + 2 sprayings of Growmore 20-20-20 (concentration of 2/1000).

Table 1: Trial model results

Monitoring parameters	Technique applied model	Farmer practice
Rambutan		
Harvest time (date/month)	May 05 to May 12	June 03 to July 02
Productivity of fruits (kg/ha)	16,110	15,250
Total turnover (VND1000/ha)	110,515	66,052
Increase of cost due to applying technique (VND1000/ha)	12.166	-
Profit compared to the control (VND1000/ha)	32,297	-
Durian		
Harvest time (date/month)	May 12 to June 01	June 08 to Sept 15
The productivity of fruits (kg/ha)	13,310	12,915
Total turnover (VND1000/ha)	184,960	136,877
The productivity of fruits (VND1000/ha)	14,085	-
Profit compared to control (VND1000/ha)	33.997	-

CONCLUSIONS

The technical methods for managing soil moisture content (soil drying), using plant hormone and suitable fertilization had the good effects on adjusting rambutan and durian in the uplands of Southeast region to

bloom about one month earlier, increased the productivity of planting trees, met the prompt market need of fruits and income for the farmers but still guarantee a good life for fruit gardens.