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Effect of Different Media and Timing Factor on Rooting of Litchi (*Litchi chinensis*) Plant Through Air Layering

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Abstract: According to the experimental results maximum days to root appearance, number of roots, root length and root diameters were obtained in silt media. Minimum number of days to root appearance, number of roots and root length were obtained in sawdust while minimum root diameter, was noted in farm yard manure. Maximum number of roots, root length were obtained in layers made on June 18, while maximum days to root appearance, root diameter were noted in layers made on July 18. Minimum number of days to root appearance, number of roots, root length, root diameter were obtained in layers made on May 18.

Key words: Litchi, *Litchi chinensis*, air layering, media and timing factor vegetative plant propagation

Introduction

Litchi (*Litchi chinensis* sonn) belongs to the family sapindaceae and sub family Nephroleae and is a sub tropical, delicious, juicy fruit of excellent quality. It is liked very much as a table fruit in India, China, Japan, Australia, South Africa, Thailand, Hong Kong, Burma, Indonesia, Israel, United States, West Indies, Brazil, Mauritius and New Zealand. Litchi originated in Southern China particularly the provinces of Kwangtung and Fukein. Litchi is mostly used as a fresh fruit, but various other products such as pickles, preserves and wines are also made from litchi in China. Dried litchi commonly known as litchi nuts is very popular among Chinese.

Bolt and Joubert (1980) recommended air layered litchi trees for orchard establishment. In a 10 years trial, they compared marcotted vs grafted trees. The percentage of trees, which established was higher with grafted trees. Root growth was much better with grafted trees, but differences in tree growth were slight after 4 years. Initial yields were higher with grafted trees, but yields of 10 years old marcotted trees were 4 kg per tree higher. It is recommended that marcotted tree should be kept in the nursery for at least six months after removal from parent trees.

Kadman (1983) reported the branch to be air layered was girdled and a prepared peat moss bag wrapped immediately around the girdled portion. Rooted plants were ready in 46 months. Litchi and macadamise have been propagated in this way.

Kadman (1985) studied the improvements in the air layering for litchi and macadamia trees. It was observed that 90-100% rooting was obtained in litchis within 2-3 months and in macadamia within 4-5 months when girdled shoots were air layered with a damp peat ball enclosed in a plastic bag.

Sharma and Grewal (1989) studied propagation in *Litchi chinensis* sonn. In trials with cultivars Calcutta and Dehradun one year old shoots were air layered in sphagnum moss at weekly intervals between 7th July and 18th August. In Calcutta 100% rooting was obtained in air layers prepared on 14, 21 and 28 July whereas survival was highest (88%) in those prepared on 14th July. In Dehradun the best rooting (96%) was obtained in air layers prepared on 11th August and survival was best (89%) in those prepared on 28th July.

Decker and Ludders (1993) studied cultivation of *Litchi chinensis* sonn in Australia. Most of production takes place in Queensland and New South Wales, Where the climatic conditions are most favorable and the trees can be grown with minimize training. Propagation is by marcottings, grafting and cuttings and the young tree fruit in 3-4 years. The initial yield

is 80 kg/tree raising to about 250 kg/tree.

Materials and Methods

The experiment was conducted at the Agricultural Research Institute, Tarnab, Peshawar, during the year 1998. "Effect of different media and timing factor on rooting of litchi plant through air layering" were studied. Layering was done at different times i.e., 18th May, 18th June and 18th July. Different media then surrounded the injured portion i.e., sawdust, F.Y.M, silt held in the place by heavy wrapping of burlap with plastic sheet.

In the experiment, there were five air-layers in one treatment and 45 layers in one replication. The experiment was laid out in two factorial designs with three replications and three treatments (in each factor).

Three media containing sawdust, F.Y.M. and Silt were used. The data were recorded on the various parameters and analysed statistically.

Results and Discussion

Data in Table 1 show that maximum number of days to root appearance was recorded in silt media while minimum number of days to root appearance was noted in sawdust. The maximum days to root appearance was noted in layers made on July 18, while minimum days to root appearance was noted in layers made on May 18. The pattern of rooting during the month of May was significantly different. It is much less than the rest of time factor. It might be due to the difference in preserve food materials (Substrate) in shoots. It can be justified that during May shoots had enough reserve carbohydrates (substrate) and it was also the start of new growth. Therefore, they produced roots in less time compared to those made in June and July. These results have been confirmed those of Li and Le (1949) and Wilson (1920) that during July the production of roots was slower have confirmed those results. It is revealed from the meteorological data that rain fall during July was more (8 times) than May which might slowed down the photosynthate production resulting in late rooting.

Data in Table 1 show that maximum number of roots was counted in silt media while minimum number of root was observed in sawdust media. The maximum number of roots was obtained in layers made on June 18, which actually appeared after August 18, while minimum number of roots was noted in layers made on May 18. These roots actually appeared after June 15. The high rooting observed may be

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Table 1: Effect of different media and timing factor on days to root appearance and number of roots per plant

Time & media	Days to root appearance		Number of roots/plant		
	Mean of time	Mean of media	Mean of time	Mean of time	Actual time of rooting based on mean
May 18 & Sawdust.	27.22 B	44.87	3.24 B	4.19 B	June 15
June 18 & FYM	61.92 A	46.04	18.77 A	10.78 AB	August 18
July 18 & Silt	65.21 A	63.44	10.95 AB	17.99 A	September 21

SD for time at 5% = 31.10, LSD for time & media at 5% = 9.223

Values with same letters are not significantly different at 5% level of significance

Table 2: Effect of different media and timing factor on root length and root diameter

Time & media	Root length		Root diameter		Actual time of rooting based on mean
	Mean of time	Mean of media	Mean of time	Mean of time	
May 18 & Sawdust.	1.83 B	2.74	0.10 B	0.22	June 15
June 18 & FYM	4.81 A	4.11	0.22 A	0.18	August 18
July 18 & Silt	4.80 A	4.63	0.29 A	0.23	September 21

LSD for time at 5% = 2.316, LSD for time at 5% = 0.1048, Values with same letters are not significantly different at 5% level of significance

due to favorable temperature in month of August. The low rooting in layers made on May 18 could be due to high temperature in the month of June, which might have enhanced the respiration of the plant thus; the plant is left with low net photosynthates for rooting. Silt media have more nutrients and provided ideal condition for the growth of roots. From Table 2 it is clear that maximum root length was obtained in silt- media, while minimum root length was recorded in sawdust media. Maximum root length was recorded in layers made on June 18, followed by those made on July 18, while minimum root length was recorded in layers made on May 18. The minimum root length in layers made on May 18 could be due to high temperature in the month of June, July and early August. Layers made in June and July initiated their roots after August 18 and September 21 respectively. This was the time when air temperatures had dropped and had lessened the utilization of carbohydrates in respiration. Extra energy would have been diverted to root development.

Table 2 for root diameter show that maximum value for root diameter was noted in silt media, while minimum value in farm yard manure. Maximum root diameter was obtained in layers made on July 18, which actually appeared after September 21.

Minimum root diameter was obtained in layers made on May 18. The maximum root diameter may be due to high relative humidity from July 18 upto mid of September that might have reduced transpiration which in turn increased cell turgidity and enhanced cell division. Thus the greater portion of available photosynthates used in root growth resulted in larger root diameter.

References

- Bolt, L.C. and A.J. Joubert, 1980. Air-layered litchi trees recommended for orchard establishment. Information Bulletin No. 92, Citrus and Subtropical Fruit Research Institute, South Africa, pp: 4-5.
- Decker, C. and P. Ludders, 1993. Cultivation of *Litchi chinensis* Sonn. in Australia. *Erwerbsobstbau*, 35: 20-22.
- Kadman, A., 1983. Propagation of subtropical fruit trees by air layering. *Hassadeh*, 63: 1674-1678.
- Kadman, A., 1985. Improvements in the airlayering propagation method for lychee and macadamia trees. *Acta Horticulturae*, 158: 143-150.
- Li, L.Y. and C.S. Le, 1949. Effect of media on rooting of litchi through layering. *Fukien Agric. J.*, 10: 163-168.
- Sharma, R.C. and G.P.S. Grewal, 1989. A note on propagation studies in litchi. *Haryana J. Hort. Sci.*, 18: 74-76.
- Wilson, P., 1920. Manual of Tropical and Subtropical Fruits, excluding the Banana, Coconut, Pineapple, Citrus Fruits, Olive, and Fig. Macmillan Publishing Co. Inc., New York, USA., pp: 321-323.