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VEGETATIVE PROPAGATION IN JACK (*ARTOCARPUS HETEROPHYLLUS* Lam)

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The most popular method of propagation in jack is by seeds obtained from mature ripe fruits. But here the progenies exhibit wide variation on account of the heterozygous nature of the tree. Many studies have been made by various authors on the possibility of vegetative propagation in jack. Air layering has been suggested as a new technique for inducing early bearing in jack (Singh, 1961). About 90-100 per cent success has been reported for patch budding in jack done during June-July season (Teotia *et al.*, 1963). Sreenivasan (1963) has reported juvenility as a contributing factor for success of air layering in jack. About 84 per cent success has been obtained for inarching jack on its own young seedlings (Sreenivasan, 1970). Mukherjee and Chatterjee (1978) have suggested the use of juvenile shoots for better success in vegetative propagation. Not much work has been done in Kerala on the vegetative propagation of jack. Hence, a study has been taken up in the Jack Scheme, College of Horticulture, Kerala Agricultural University on different methods of vegetative propagation in jack.

Materials and Methods

The vegetative propagation was tried on both bearing plants and on one year old seedlings. Three methods of propagation were tried, viz., grafting, budding and layering. AM the trials were conducted during July-August season.

Grafting

Side, veneer, cleft, whip, saddle and approach grafting were tried. All the methods except approach grafting were tried on one year old seedlings. The scions used were from dormant, one year old shoots of bearing trees. Approach grafting was done on 10 bearing trees selecting 15 shoots on each tree. Seedlings and grafts were kept in partial shade and were irrigated on alternate days. The grafts were separated after 75 days.

Budding

'T', 'I', inverted T, patch and Forkert methods were tried. Sixty numbers were done under each category with buds taken from one year old shoots. The bud take was recorded eight weeks after budding.

Layering

Since successful initial results were obtained in the scheme on layering of jack seedlings, a detailed study was conducted on layering in jack. Different factors were tried at different levels to study the response of jack to layering. The factors and levels tried were as follows.

Factors	*Levels*	
Age of plant	One year old seedlings	A_1
	One year old shoots of bearing trees	A_2
Method of layering	Tongue	B_1
	Ring	B_2
Site of layering	Tip of shoot (within 10 cm from top)	C_1
	Bottom of shoot (within 10 cm from bottom)	C_2
Media used	Coconut pith	D_1
	Saw dust	D_2
	Dried African payal (*Salvinia* sp).	D_3
	Sphagnum moss	D_4

In all the methods, the media were placed in position by wrapping with polythene sheets Percentage of rooting was calculated based on number of layers rooted eight weeks after layering. The experiment was replicated thrice with 10 layers under each treatment. The data obtained were analysed statistically.

Results and Discussion

Grafting

Out of the six methods tried, only approach grafting was found successful in jack.

In this case the stock and scion remained healthy until separation while in the other methods got dried up within 15 days. The post separation success in approach grafting was only 7.3 per cent i e., 11 out of 150. Poor success in grafting could be attributed to the lack of an intimate contact of a cambial region of both stock and scion because of the exudation of iatex {Hartman and Kester, 1978). Similar report has been made by Mukherjee and Chatterjee (1978). The dry condition that prevailed in September-October may be another reason for reduced success, since the new callus tissue formed at the point of union easily became desiccated and dead (Hartman and Kester, 1978). The relatively high percentage of success for approach grafting might be due to the better internal condition of the scion in this method. The scion could depend on the mother for its nutrients while the union is taking place and until it is completely separated whereas in other methods, the scion has to depend fully on the stock from the very early stages itself.

Budding:

Budding was a complete failure in jack. Chip budding and patch budding have been reported to be successful in jack from other states. In Kerala conditions,

no report has been made on budding of jack and the variation in results from different localities may be due to the climatic variations in different places. Since success has been reported by Teotia *et al* (1 963) there. is scope for success **in** budding in Kerala too. The trial is to be repeated during all seasons under our conditions also Since the principles behind a graft union are the same, the factors controlling grafting might play their role here also.

Table 1

Percentage of rooting for different treatments in one year old jack seedlings (mean values)

Treatment	Per cent rooting	Rank position
$A_2B_1C_1D_1$	41.18	7
$A_2B_1C_1D_2$	15.00	10
$A_2B_1C_1D_3$	18.28	9
$A_2B_1C_2D_1$	63.67	2
$A_2B_1C_2D_2$	49.50	4
$A_2B_1C_2D_3$	2341	8
$A_2B_2C_1D_1$	59.05	3
$A_2B_2C_1D_2$	43.10	6
$A_2B_2C_1D_3$	15.00	10
$A_2B_2C_2D_1$	81.29	1
$A_2B_2C_2D_2$	48.26	5
$A_2B_2C_2D_3$	23.41	8
F	61.09**	
C. D, (0.01)	8.03	

Tabl 2

Percentage of rooting for different factors (mean values)

Media			Site of layering		Method of layering	
D_1	D_2	D_3	B_1	B.	C_1	C_2
61.30	39.11	20.02	35.17	45.12	31.93	48.36
F=225.76			F=39.25**		F=107.00**	
C.D. (0.01) = 4.00			C. D. (0.01)=3.28		C. D. (0.01)=3.28	

** Significant at one par cent level.

Layering:

The results obtained (Table 1 and 2) from bearing jack trees and one year old seedling showed wide variation. All the methods tried on bearing trees gave no positive results. The method of layering, site and the media tried for layering had no effect in rooting on aged trees. Layering on one year seedlings gave very good response. Of 16 treatments tried, ring layering done within 10 cm from bottom with coconut pith as the media gave maximum rooting (81.29 per cent) which was significantly higher than all other treatments. Among the media tried, coconut pith followed by saw dust gave significantly better results whereas response was nil for sphagnum moss. Among the different methods tried, ring layering gave significantly better rooting than tongue layering. Layering done within 10 cm from bottom was much superior in rooting as compared to layering done at the tip.

The treatment variations for success in layering could be interpreted in different ways. Better results in one year old seedlings than on bearing trees and even better results near the collar region of the seedling may b3 due to the interference of the juvenile factor. As described by Janick (1972), the juvenility may be due to substances emanating from seed or juvenile root system and the factor may gradually become exhausted as the plant grows or the distance from apex to root system increases. The extra vigour during the juvenile stage and nearness to the roots may be the reason for better success in layering of seedling. The superiority of ring layering to tongue layering may be due to additional interruption in the downward translocation of organic materials. Root formation is stimulated by the actual interruption of nutrients at the point of layering (Hartman and Kester, 1978). Again, it may be due to the wider area available for caflus formation in ring layering.

The superiority of coconut pith over other media has to be studied in detail. Similar results have been drawn out by Rajeevan (1978) and Prasannakumari (1981). They have reported decomposed coconut husk pots as the best container for maintaining the young plant materials of seed propagated clove and vegetatively propagated cashew. They have attributed the better success as due to the decomposed nature of the material and hence better nutritive value and better water holding capacity. The same may be the reasons for better success with coconut pith in jack also. Further studies are necessary to conclude whether there is any chemical or hormonal effects for the medium on rooting.

Summary

Studies were conducted on vegetative propagation of jack. Grafting, budding and layering were tried. Approach grafting was found successful. All other methods of grafting, budding and layering on bearing tree gave negative results.

Layering on one year old seedlings gave very good results. Best results were obtained with ring layering done within 10 cm from bottom of the plant with coconut pith as the media. Since juvenile factor is supposed to play an important role in rooting, it may be possible to propagate jack vegetatively by inducing new shoots near the collar region of the selected mother plants and then undertaking layering on these new shoots.

സംഗ്രഹം

ഗ്രാഫ്റ്റിങ്ങ് (ഒട്ടിക്കൽ), ബഡ്ഡിങ്ങ് (മുകുളനം), ലെയറിങ്ങ് (പതിവെക്കൽ) എന്നീ മാർഗ്ഗങ്ങളുപയോഗിച്ച് പ്ളാവിൽ നടത്തിയ പ്രവർദ്ധന പരീക്ഷണങ്ങളിൽ അപ്രോച്ച് ഗ്രാഫ്റ്റിങ്ങ് വിജയകരമാണെന്ന് കാണുകയുണ്ടായി. മറ്റു പ്രവർദ്ധന രീതികളും വളർച്ചയെത്തിയ മരങ്ങളിൽ പരാജയമായിക്കണ്ടു. ഒരു വർഷം പ്രായമായ തൈകളിൽ ചുവട്ടിൽ നിന്നും 10 സെ. മീ. ഉയരത്തിലുള്ള ഭാഗങ്ങളിൽ ചകിരിച്ചോറ് മാദ്ധ്യമമായി ഉപയോഗിച്ച് പതിവെക്കൽ നടത്തിയപ്പോഴാണ് കൂടുതൽ ഫലം സിദ്ധിച്ചു. വേരുപിടിക്കുന്നതിൽ ജുവനയിൽ ഘടക (Juvenile factor) ത്തിന് ഒരു പ്രധാന പങ്കുണ്ടെന്നതിനാൽ നല്ലയിനം വൃക്ഷങ്ങളുടെ കോളർ ഭാഗത്ത് കൂടുതൽ ശാഖകളുണ്ടാക്കി പതിവെക്കൽ വഴി പ്ളാവിന്റെ പ്രവർദ്ധനം സുഗമമാക്കാവുന്നതാണ്.

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