

# Vegetative Propagation in Cashew - Review of Work Done at Vittal

**S. NAGABHUSHANAM**

Central Plantation Crops Research Institute, Regional Station  
Vittal-574 243, Karnataka, India

## Abstract

Different techniques of vegetative propagation in cashew were tried with varied degrees of success at C.P.C.R.I., Regional Station, Vittal during 1977-78. The techniques tried were: (i) Veneer grafting on six month old seedlings raised in polybags, (ii) Side grafting on 3-5 year old cashew trees, (iii) Patch budding on six month old seedlings raised in polybags, (iv) Patch budding *in situ* on one year old shoots in adult trees, (v) Air-layering, (vi) Mound layering, (vii) Cleft-grafting on 8-10 month old seedlings raised in polybags, (viii) Whip-grafting on 8-10 month old seedlings raised in polybags, (ix) Stone-grafting on 40-45 days old seedlings and (x) Stem cuttings. The technique of air-layering was significantly superior over other techniques during the period of March to May. The techniques, side grafting (June, July and October) and patch budding *in situ* (April, May and June) were at par. Veneer grafting and patch budding tried on six month old seedlings raised in polybags did not give encouraging results. In mound layering trials 64 per cent of shoots struck roots and 72 per cent of them had established in polybags. The percentage take in cleft grafting was high in September (58%) followed by 54 per cent in August while the success in whip grafting being 44 and 40 per cent in August and September months respectively. Air layers on separation from the mother tree and nursed in polybags for about three weeks when transplanted in the mainfield established upto 94 per cent. Similarly veneer grafts and budded plants gave 92 and 80 per cent establishment in the field.

## Introduction

With a view to determining the relative efficacy of different methods of vegetative propagation and to find out the optimum period for each method, trials were carried out for one year at C.P.C.R.I. Regional Station, Vittal during 1977-78. Different vegetative propagation techniques tried were (i) Veneer-grafting on six-month old seedlings raised in polybags, (ii) Side-grafting on three to five year old cashew trees, (iii) Patch budding on six-month old seedlings raised in polybags, (iv) Patch budding *in situ* on one year old shoots, (v) Air-layering, (vi) Mound layering, (vii) Cleft-grafting on 8-10 months old seedlings raised in polybags, (viii) Whip-grafting on 8-10 months old seedlings raised in polybags, (ix) Stone-grafting on 40-45 days old seedlings and (x) Stem cuttings.

### Materials and Methods

Seedlings raised in polybags of 45 x 30 cm of 500 gauge with uniform vigour and thickness of stem were used for grafting by veneer method. To ensure uniformity of age of stock plants, monthly sowings of seednuts were taken up six months earlier to the commencement of trial. Every month hundred seedlings were worked upon.

Side grafting was done on 3 – 5 year old cashew trees with a stem girth ranging from 20 to 35 cm using hundred dormant terminal scion shoots every month.

Well matured one year old shoots with grey coloured bark were selected as bud-wood for grafting. The selected bud-wood, before being severed from the mother tree was precured by cutting the leaf blades of the shoot into halves and leaving them as such, for about a week to activate the auxiliary buds.

In air-layering trials, every month hundred air-layers were made, selecting shoots from the trees of the same age group and vigour. The data on percentage of rooted layers obtained every month and number of days taken for separation, percentage establishment in the field were recorded.

To study the scope of mound layering fifteen adult trees of cashew were subjected to stooling in February 1978 and the shoots emerged from the stumps were covered with a mound of sand in May 1978 for etiolation. The basal portion of the etiolated shoots of about pencil thickness were cinctured and the upper portion of the ringed area was treated with IBA for quick rooting and covered back with sand. The shoots were observed for rooting in August 1978 and the rooted ones were separated and planted in polybags for establishment. The process of cincturing the available shoots and separating the rooted shoots was repeated twice in September and November during nine months in 1978 and the total production of ground layers was worked out.

To find out the response of different techniques of grafting in cashew viz. whip-grafting and cleft-grafting, an observational trial was laid out. The grafting were done on 8 – 10 month old cashew seedlings raised in polybags.

Germinated seednuts, about 45 days age with purple plumule growth were used for seed grafting. The precured scion was trimmed to a wedge shape and inserted into the slit made in the centre of the stock by cutting off the plumule growth horizontally. On matching the cambial layers of both the stock and scion, the joint is gently wrapped with a plastic film. The seednuts on grafting were resown in small polybags for further nursing.

For propagating cashew by stem cuttings, a preliminary study was conducted using mature brown coloured stem cuttings of about 20 cm length with leaf blades half cut. The cuttings were slightly split open at the basal end before treatment with IBA 100 ppm solution for six hours. The treated cuttings were planted in polybags (30 x 10 cm) filled with sand and kept in mist chamber for rooting. The cuttings were observed for rooting after 40 days.

### Results and Discussion

Among the first five techniques of vegetative propagation listed above air-layering was significantly superior (46%) over the other methods. Side grafting *in situ* (25%) and *in situ* patch budding (23%) on one year old shoots gave encouraging results and these two techniques stood at par (Table 1).

Contrary to the results obtained with *in situ* grafting and budding, the success with veneer grafting and patch budding done on six month old seedlings raised in containers was dismal.

The seasonal influence on the success with different techniques was marked. The summer season (March-May) during which period the cashew trees are in active growth with new flush and flowering in the west coast was found suitable for air-layering to secure high percentage (74 - 79%) of rooted layers. This is indeed an added advantage since the layers would become ready for planting at the right season to ensure better establishment.

Late summer and early monsoon period (April - June) was found to be encouraging for *in situ* patch budding and during this period, the trees will be in active growth and this facilitates early sprouting of buds soon after grafting on to the stock.

The humid conditions during monsoon (June - October) and the availability of scion material are the two important factors responsible for optimum success with both veneer grafting and side grafting techniques. A maximum success (72%) with side grafting *in situ* was obtained in July followed by June (52%) and almost the same trend was observed in veneer grafting. Grafting in cashew has a limitation due to non-availability of required stage of dormant terminal shoots all round the year. The scope thus, for taking up intensive grafting on commercial scale found to confine to about 5 - 6 months period (June - November) only in an year. The success achieved with other methods of grafting like cleft and whip grafting has also confirmed the fact that the monsoon period is congenial to take up any method of grafting involving the usage of dormant terminal shoots of cashew as scion material to secure optimum success.

TABLE 1. Percentage Means\* of Success in Five Different Vegetative Propagation Techniques in Cashew (1977-78)

Technique	1977					1978					Mean		
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.		June	July
1. Veneer grafting in polybags	17.7	9.2	44.8	18.0	11.6	0.4	4.8	Nil	Nil	14.1	39.9	31.3	14.4
2. Side grafting <i>in situ</i>	38.0	43.0	52.4	1.2	15.4	24.6	Nil	Nil	Nil	Nil	51.8	71.7	24.8
3. Patch budding in polybags	3.8	2.3	2.6	5.9	11.0	6.9	1.1	6.0	3.5	1.0	11.0	14.9	5.9
4. Patch budding <i>in situ</i>	Nil	Nil	9.7	13.8	19.9	17.9	24.3	30.6	33.4	59.1	44.5	27.0	23.3
5. Air-layering	26.6	10.3	14.0	51.0	39.8	59.1	43.0	79.1	74.2	76.6	42.0	38.1	46.1
Mean	21.4	16.2	30.8	22.5	24.4	27.2	18.3	29.1	27.8	37.7	47.3	45.7	..

SE for months = 1.64; SE for techniques = 0.78; SE for M x T = 17.27

LSD (P=0.05) Months - 4.72; Techniques - 2.4

\*The data were analysed in strip-plot design with arcsin transformation.  
Table of means were presented after backward transformation.

A maximum of 53 per cent success was obtained with cleft grafting done in September followed by 50 per cent in August. The success in whip grafting varied from 18 to 25 per cent during June, August, September and October months and thus, the success achieved on higher side was confined to humid period (Table 2).

TABLE 2. Success of Cleft Grafting and Whip Grafting Done on 8 - 10 Month Old Seedlings Raised in Polybags During 1977-78.

Month	% success	
	Cleft grafting	Whip grafting
August, 1977	50.0	18.0
September, 1977	53.0	23.0
October, 1977	34.0	25.0
November, 1977	Nil	Nil
December, 1977	6.0	14.0
January, 1978	5.0	7.5
February, 1978	Nil	Nil
March, 1978	Nil	Nil
April, 1978	Nil	Nil
May, 1978	Nil	Nil
June, 1978	4.0	22.5
July, 1978	10.0	4.0

(Desirable dormant terminal scion shoots were not available from November to May)

The preliminary studies made to propagate cashew through stooling and layering gave encouraging results. Out of 307 shoots treated in three different spells, 62 per cent of shoots had struck roots of different sizes and when these shoots were separated and planted in polybags for establishment, 61 per cent of them had survived.

Propagation of cashew by stooling and layering may be economical since no wrapping material, saw dust or moss are required as in case of air-layering. Further, ground layering is risk-free since they are not subjected

to any damage due to strong winds. There is a likelihood of producing one lakh layers from an hectare of land in an year, if the planting is done initially at one metre distance with promising clonal progenies.

### Conclusions

1. It is possible to multiply high yielding cashew trees by vegetative means adopting air layering method all round the year, especially when the trees are in flush and bloom (March-May) to secure high per cent of rooted shoots and better establishment of layers in monsoon under the conditions available at Vittal in the west coast of India.
2. There is a vast scope to improve unthrifty cashew trees either by side grafting with superior scion terminal shoots or through patch budding *in situ*.
3. The studies made with regard to field establishment of clonal progenies raised in containers gave an indication that they would establish equally well as of seedling progenies when transplanted.

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### Discussion

R.T. Gunjate: You have tried stone grafting in cashew on 40-45 day old seedlings. Did you try grafting on very young seedlings say 8-10 days old? In mango the maximum success in stone grafting is obtained on such very young seedlings.

S. Nagabhushanam: The suggestion is most welcome. Stone grafting will be tried on comparatively young seedlings.

S.S. Das: The results obtained during the different months of the year with the various methods of vegetative propagation have been discussed. The climate varies in the different cashew growing areas during the same month. Will it, therefore, be possible to correlate these results with the various climatological factors like precipitation, humidity, temperature, etc. or with growth periods so that the results will be universally applicable?

S. Nagabhushanam: The trees when in flushing and flowering would give high percentage of rooting when layered.

R.C. Das: As compared to side grafting in general, budding is not very successful in cashew. Studies at Bhubaneswar have shown that "T" budding had poor response. Is there any method to increase the success by budding, since higher economic utilization of scion material could be possible by this method?

S. Nagabhushanam: Patch budding can be tried with the stock of different thicknesses. It is true that it will be more economical to resort to budding for effective utilization of scion material.