



Research Article

EFFECT OF GRAFTING TECHNIQUES AND CURING PERIOD OF SCION IN JACKFRUIT (*Artocarpus heterophyllus* Lam.)

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Abstract- Investigations consisted of two trials viz., effect of grafting methods and curing period of scion on success of graft union and growth of grafts and effect of age of rootstock on success and growth of softwood grafting. Among the three grafting methods under study, epicotyl grafting recorded the highest per cent of graft success (48.08%) as compared to softwood grafting (35.55%) and approach grafting (9.17%). With regard to scion curing, 10 days old cured scion registered significantly the maximum per cent of graft success (37.75%). The interaction effects were significant with the highest success recorded in epicotyl grafting with ten days old cured scion (ET₂) (64.00%). The minimum number (17.99) of days taken for bud sprouting was in case of epicotyl grafting, among the various methods tried. Whereas, among the interaction effect, least number of days (17.50) was recorded with epicotyl grafting with ten days old cured scion. Growth parameters like number of leaves, number of buds, number of branches, length and girth of shoot were the maximum in scions cured for ten days. Among the grafting methods and interaction effect, number of leaves, number of branches and length of shoot were maximum in epicotyl grafting with scion cured for ten days. Vigour of grafts expressed in terms of number of buds and girth of shoot were maximum in softwood grafting with ten days old cured scion. The least mortality (32.20%) was recorded in epicotyl grafting with ten days old cured scion.

Keywords- Grafting, Curing, Scion, Epicotyl, Mortality.

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Introduction

The jackfruit, being monoecious, is an obligate cross-pollinated fruit crop exhibiting high variability due to its heterozygous nature. This warrants propagation through vegetative means to multiply desirable genotypes. Extensive use of vegetative propagation methods would be the greatest single step which could be taken for the improvement of tropical fruit cultivation [1]. The area under jack is increasing day by day due to its popularization as desert fruit and also as processed products and also its potential for better adaptation to diversified soil and climatic conditions. There is great demand for genuine true-to-type planting materials in order to optimize production of quality fruits.

Also there are several variations have been found wild in the Western Ghats and some of the types are worth multiplying. But lack of information on grafting technique, scion curing period and age of rootstocks for grafting rendered the clonal multiplication process more difficult to produce large scale planting material to meet the growing demand.

Material and Methods

An experiment was conducted to know the best method of grafting and also to know the influence of scion curing for different days with Factorial Randomized Complete Block Design. The different methods of grafting like Epicotyl grafting (age of rootstock-15 days), Softwood grafting (age of rootstock-4 months) and Approach grafting (age of rootstock-6 months) were performed and the scions

were cured for zero, ten and twenty days prior to grafting were used for grafting purpose. The selected scions were cured by defoliation with sharp secateurs. Curing was done twice i.e., 20 days prior grafting, 10 days before grafting and also on the of grafting (without curing).

Treatment details: ET₁ - epicotyl grafting without scion curing; ET₂- epicotyl grafting with scion curing (10days); ET₃-epicotyl grafting with scion curing (20days); ST₁- softwood grafting without scion curing; ST₂- softwood grafting with scion curing (10 days); ST₃- softwood grafting with scion curing (20 days); AT₁- approach grafting without scion curing; AT₂-approach grafting with scion curing (10 days); AT₃- approach grafting with scion curing (20 days).

After grafting the grafts were kept under polyhouse and at monthly interval percent graft success, days taken for bud sprouting, number of leaves, number of bud sprouts per graft, number of branches, length of shoot (cm), girth of shoot (cm), mortality at monthly intervals (%) were taken.

Results and Discussion

The method of grafting significantly influenced the per cent of graft success, where in epicotyl grafting obtained the highest success (48.08%) and the least success was observed in case of approach grafting (9.17%) [2]. This may be due to younger age of tissues, which have maximum capacity to form callus and better union. The younger seedlings have also more reserve food material in their embryos compared to old seedlings [3]. Similar views were expressed by in

epicotyl grafting with precured scions [4].

Scion curing period also had significant effect on the percentage of graft success. Scions cured for 10 days (T₂) prior grafting had the highest per cent of graft success (37.75%) and the lowest percentage of graft success (24.54%) was recorded when scions cured for zero days or uncured scions were used. The higher success in such grafts due to prior defoliation was attributed to the activation of apical and axillary buds [5]. The 10 days defoliation period resulted in more success and clearly showed that definite swelling of bud is important for grafting which comes only after defoliation.

The interaction between the method of grafting and scion pre curing was significant on 90 days after grafting. The per cent of graft success recorded was significantly highest (64.00%) in ET₂ followed by (43.33%) ET₃, while per cent of graft success was minimum (8.13%) in AT₁. The variation in grafting success may be attributed due to the differences in the quantity of endogenous phenolic compounds and / due to the differential capacity of rootstocks in the production of undifferentiated mass of parenchyma cells when grafting performed [6].

The climatic and physiological conditions of scion and rootstock seedlings have favoured rapid callus formation and strong graft union, and therefore, resulted in higher success. Non-availability of bud sticks of proper size, vigour and maturity during flowering season and prevailing low temperatures as well as relative humidity might have caused low success from November to February [7].

Table-1 Effect of grafting methods and curing period of scion on percentage of graft success in jackfruit at different days after grafting

Treatment					
Grafting method (G)	Graft success (%)	Days taken for bud sprout	Number of leaves (90 DAG)	Number of bud sprouts (90 DAG)	Number of branches (90 DAG)
E	48.08(43.92)	17.99	6.66	1.38	1.55
S	35.55(36.62)	26.05	3.48	1.29	1.54
A	09.17(17.64)	77.38	1.05	0.92	0.84
S. Em±	00.73	00.91	0.09	0.03	0.05
C.D @ 5%	02.20	02.73	0.27	0.08	0.16
Scion curing period (T)					
T ₁	25.24(30.17)	43.14	3.32	1.09	1.24
T ₂	37.75(37.93)	38.59	3.99	1.31	1.44
T ₃	29.81(33.11)	39.68	3.88	1.18	1.24
S. Em±	00.73	00.91	0.09	0.03	0.05
C.D @ 5%	20.20	02.73	0.27	0.08	0.16
Interaction (GxT)					
ET ₁	36.92(37.44)	18.47	5.64	1.28	1.50
ET ₂	64.00(53.16)	17.50	7.33	1.48	1.73
ET ₃	43.33(41.19)	18.00	7.00	1.37	1.41
ST ₁	30.67(33.65)	27.32	3.35	1.26	1.49
ST ₂	39.05(38.69)	24.95	3.49	1.33	1.63
ST ₃	36.92(37.44)	25.87	3.60	1.27	1.50
AT ₁	08.13(16.58)	83.63	0.98	0.72	0.75
AT ₂	10.20(18.63)	73.33	1.13	1.12	0.96
AT ₃	09.18(17.65)	75.17	1.03	0.91	0.82
S. Em±	01.27	01.57	0.16	0.04	-
C.D @ 5%	3.81	04.72	0.47	0.13	NS

*Figures in parenthesis indicate transformed values NS: Non significant

E: Epicotyl grafting S: Softwood grafting A: Approach grafting

T₁: Scions without curing T₂: Scion curing for 10 days T₃: Scion curing for 20 days

Table-2 Effect of grafting methods and curing period of scion on length of shoots in jackfruit at different days after grafting

Treatment			
Grafting method (G)	Length of shoot (cm) (90 DAG)	Girth of shoot (cm) (90 DAG)	Mortality of grafts (%) (90 DAG)
E	21.57	0.36	51.92(46.12)
S	14.54	0.57	64.45(53.43)
A	10.19	0.48	90.83(72.41)
S. Em±	0.34	0.01	0.73
C.D @ 5%	1.02	0.03	2.20
Scion curing period (T)			

T ₁	14.42	0.44	74.76(59.87)
T ₂	16.86	0.51	62.25(52.12)
T ₃	15.02	0.46	70.19(56.94)
S. Em±	0.34	0.01	0.73
C.D @ 5%	1.02	0.03	2.20
Interaction (GxT)			
ET ₁	20.82	0.33	63.08(52.61)
ET ₂	22.29	0.40	36.00(36.89)
ET ₃	21.62	0.35	56.67(48.86)
ST ₁	12.38	0.53	69.33(56.40)
ST ₂	17.99	0.62	60.95(51.35)
ST ₃	13.26	0.56	63.08(52.610)
AT ₁	10.07	0.46	91.87(73.47)
AT ₂	10.31	0.52	89.80(71.41)
AT ₃	10.20	0.47	90.82(72.40)
S. Em±	0.59	-	1.27
C.D @ 5%	1.77	NS	3.81

*Figures in parenthesis indicate transformed values NS: Non significant

E: Epicotyl grafting S: Softwood grafting A: Approach grafting

T₁: Scions without curing T₂: Scion curing for 10 days T₃: Scion curing for 20 days

DAG: days after grafting

Conclusion

Among various grafting technique and scion curing, number of leaves, number of branches and length of shoot were maximum in epicotyl grafting with scion cured for ten days. Vigour of grafts expressed in terms of number of buds and girth of shoot were maximum in softwood grafting with ten days old cured scion. The highest graft success and the least mortality was recorded in epicotyl grafting with ten days old cured scion. The results of this investigation would help to produce quality planting material in jackfruit.

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Abbreviations:

E: Epicotyl grafting,

S: Softwood grafting,

A: Approach grafting,

T₁: Scions without curing,

T₂: Scion curing for 10 days,

T₃: Scion curing for 20 days,

DAG: days after grafting.

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Conflict of Interest: None declared

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