

## **Standardisation of propagation methods for JACK (*Artocarpus heterophyllus*, Lam)**

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### **ABSTRACT**

Clonal propagation is the common and fast method employing in fruit crops for production of elite grafts by mass multiplication. An experiment was conducted to standardize propagation methods for jack (*Artocarpus heterophyllus*) under 50 per cent shade (shade net) condition at Horticulture College and Research Institute, Periyakulam. Among the different types of propagation methods viz., inarching, epicotyl and soft wood grafting tested, soft wood grafting performed at different age groups of rootstock (*i.e.*, two, three and four months old seedlings). The studies revealed that in general softwood grafting performed well compared to other methods of propagation. In particular soft wood grafting on two months old rootstock recorded least number of days taken to graft union and the highest percentage of sprouting and graft take, length of shoots, girth of rootstock, girth of scion and number of leaves followed by soft wood grafting on three and four months age old rootstocks.

**Key words :** Jack, Clonal propagation, Root stock, Scion, Inarch grafting, Epicotyl grafting, Soft wood grafting.

**J**ack (*Artocarpus heterophyllus*, Lam) is an indigenous fruit, belonging to the family Moraceae is very popular among the rural areas of India. It is an ever green tree growing well in areas of receiving annual rainfall more than 1,200 mm (Mitra, 1998) and is widely grown in eastern and southern regions of India. The agro-climatic conditions prevailing in low hills and plain areas of India as a whole is highly propitious and offer splendid scope for successful cultivation of jack. In south India, the jack is a popular food ranking next to the mango and banana in total annual production.

Among the various constraints for expanding the jack fruit cultivation, lack of availability of suitable clonal planting materials is one of the impediments to expand the area of cultivation. Though, seed propagation is the most common method of propagation, which will not produce true-to-type progenies, besides having longer gestation period. Hence, standardization of suitable vegetative propagation technique is a prerequisite for successful cultivation. Though, inarching and air layering is in practice, these methods have some limitations like cumbersome and multiplication rate is low.

### **MATERIALS AND METHODS**

A study was conducted on standardization of propagation methods for jack (*Artocarpus heterophyllus*, Lam) at Horticulture College and Research Institute, Department of Fruit Crops, Periyakulam. The location of experiment is situated at 10° N latitude and 77.8° E longitude with an elevation of about 300 m above

MSL. The average rainfall is 750 mm per year.

Healthy jack seeds were collected from local and were utilized for raising seedling rootstocks. Soil, sand and well decomposed FYM in the composition of 2:1:1 ratio was used as the rooting medium. The rooting medium was thoroughly mixed. It was filled in polythene bags of 200 gauge thickness, 20 cm length and 10 cm width. The polythene bags were provided with number of vents for proper drainage. Soft and well matured terminal shoots of 10 cm length were selected with same thickness of the seedling rootstock. The experiment was carried out by Randomized Block Design (RBD) with four replications.

The experiment comprised of five treatments performed with different methods of propagation – T<sub>1</sub> - Inarch grafting, T<sub>2</sub> - Epicotyl grafting (20-25 days old), T<sub>3</sub> - Softwood grafting (2 months old), T<sub>4</sub> - Softwood grafting (3 months old), T<sub>5</sub> - Softwood grafting (4 months old).

The grafted plants were maintained under shade net (50% shade).

### **RESULTS AND DISCUSSION**

Days taken for the union of stock and scion were found to be significantly influenced by the age of the rootstock and the maturity of the scion. Among the different ages of the rootstock, two months old rootstock of softwood grafting recorded the least number of days (20.6) for graft union followed by three and four months old rootstocks where as inarch grafting took the maximum number of days for union.

Treatments	Graft union	Graft take (%)	Sprouting (%)	Length of longest shoot (cm)	Girth of rootstock (cm)	Girth of Scion (cm)	Leaves produced/graft
T <sub>1</sub> - Inarch grafting	26.9	81.3 (64.38)	55.5 (48.16)	0.25	0.45	0.43	0.29
T <sub>2</sub> - Epicotyl grafting (20-25 days old)	25.4	75.4 (60.27)	43.8 (41.44)	0.46	0.33	0.31	0.36
T <sub>3</sub> - Softwood grafting (2 months old)	20.6	93.5 (75.23)	70.6 (57.17)	0.75	0.98	0.95	0.65
T <sub>4</sub> - Softwood grafting (3 months old)	21.8	90.6 (72.15)	72.6 (58.44)	0.73	0.95	0.92	0.62
T <sub>5</sub> - Softwood grafting (4 months old)	21.9	90.5 (72.05)	71.7 (57.86)	0.71	0.92	0.93	0.60
S.E. ±	1.21	1.26	0.73	0.029	0.034	0.027	0.026
C.D. (P=0.05)	2.64	2.76	1.60	0.063	0.074	0.059	0.0582

Values in parenthesis are transformed values

Age of the rootstock significantly influenced the grafting percentage. Among the different treatments, softwood grafting at two months age of rootstock recorded the maximum graft take percentage (75.23) followed by three and four months old rootstocks. This was corroborated by Mini Jose and Valsalakumari (1991) found that two months old rootstock gave higher percentage of graft take in jack by soft wood grafting method under Kerala conditions. The variation in grafting success with the age of the rootstock may be attributed due to the differences in the quantity of endogenous phenolic compounds (Venkata Reddy and Melanta, 1989) and / or due to the differential capacity of rootstocks in the production of undifferentiated mass of parenchyma cells when grafting performed. The treatments T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> were at par with each other.

Significant differences obtained by the age of rootstocks on percentage of sprouts. Among the treatments, softwood grafting at two months (T<sub>4</sub>) age rootstock recorded the highest percentage of sprouts. This was followed by T<sub>4</sub> and T<sub>5</sub>. The epicotyl grafting (20-25 days old) rootstocks recorded the least (41.44) percentage of sprouting on the scion. Among the different age group of rootstocks tried, two months old rootstock (T<sub>3</sub>) recorded the longest scion length (0.75 cm) when compared to other treatments. Where as epicotyl grafting (T<sub>2</sub>) and inarching method of propagation (T<sub>1</sub>) registered the lowest length of shoots.

The girth of the rootstock and scion on different age group of rootstocks revealed significant differences among the treatments. Softwood grafting at two months age recorded the highest girth of rootstock and scion when compared to other treatments. The treatments (T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub>) were at par with each other.

The number of leaves per graft were the highest

(0.65) in softwood grafting at two months age of rootstock when compare to epicotyl grafting (T<sub>2</sub>) and inarch grafting.

The maturity of the scion is also another important key factor in deciding the success of grafting in any fruit crops. More success in a shorter period could be recorded with softwood scion than the hard wood scion. This is in contrary to other fruit crops like mango (Panicker and Desai, 1989), Cashew (Kadam *et al.*, 1996), where relatively matured scion had more graft success. This variation may be attributed to the latex yielding nature of jack tree, where more latex exudates in hard wood scions than softwood ones. Further, latex contains phenols, which are known to interfere with auxin synthesis (Kefeli and Kutacek, 1977).

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