Short Communication

# Evaluation of softwood grafting in jack fruit types

Ashok Madala, A. Rajagopalan*, K.N. Satheeshan, A.V. Meera Manjusha and N. Raji Vasudevan

*College of Agriculture, Kerala Agricultural University, Padannakkad, Kasaragod 671 314, Kerala, India*

Received 25 January 2018; received in revised form 31 October 2018; accepted 01 November 2018

**Abstract**

An experiment was conducted at the College of Agriculture, Padannakkad, Kasaragod district, Kerala during 2017-18, to study the efficacy of softwood grafting in promising jack fruit types. Out of the five types, Gumless resulted in the early emergence of grafts (28.67 days) along with highest percentage of sprouting (46.90). Maximum survival percentage (75.00 per cent) and more number of leaves (8.33) were observed in Cluster type while Early bearing Varikka resulted in maximum shoot length (8.37 cm).

**Key words**: Jackfruit types, Softwood grafting, Vegetative propagation.

Jackfruit belongs to the family Moraceae, is indigenous to India and it is an important component of homesteads in Kerala. Jackfruit is used for table purpose, making chips and for culinary purpose. Presently, demand for jack fruit is increasing because of its quality and taste. People prefer jack fruits with characters like precocity, gumlessness, seedlessness and clustering. Though standard varieties in jackfruit are less, there are good numbers of trees which are superior in yield and with desirable fruit characters. Vegetative propagation of such selected trees assumes great importance to ensure uniformity of planting material for enhancing fruit production. Softwood grafting is found to be the easiest, most efficient and economical method of propagation.

The present study was conducted at the Department of Pomology and Floriculture, College of Agriculture, Padannakkad, Kasaragod district of Kerala during 2017-18. The experiment was laid out in Completely Randomized Design with five treatments (types of jackfruit) and three replications. The five jackfruit types used were, V1 - Early bearing Varikka type (KJ 186), V2 - Gumless type (KJ 397), V3 - Seedless type (KJ 180), V4 - Cluster type (KJ 182) and V5 - Muttom varikka (KJ 231). Scions were collected from farmer's plots of different localities. Softwood grafting was done in June 2017 using two month old rootstock and 4 to 5 month old scion.

The top portion of rootstock was decapitated at about 15 cm from the soil level and a 4 to 5 cm deep cut was made in the centre. Scion of same thickness was selected. After trimming the leaves, the lower portion was given a wedge shaped cut of 4 to 5 cm with paper thickness on both sides. The latex exuding from both stock and scion were removed using cotton cloth. The wedge shaped scion was then inserted into the 'V' shaped slit of rootstock and tied firmly with 200 gauge transparent polythene strip of 2 X 30 cm size(Plate 1).

Under each treatment, thirty plants were grafted with ten grafts per replication. A moisture chamber was used during the initial one month of growth to provide optimum growth conditions to the grafts.

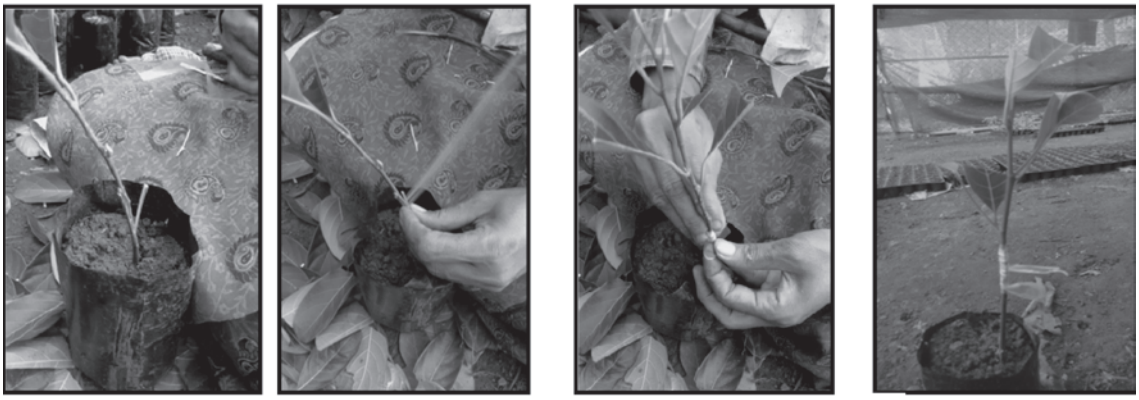
*Author for correspondence: Phone: 9447382844, Email: rajagopalan.a@kau.in

Observations on sprouting characters were recorded during initial stage and morphological characters were recorded at 90 days after sprouting.

The results on sprouting and morphological characters of grafts (Table 1) revealed that the genetic characters of jackfruit types showed significant effect on rate of success as well as survival of grafts.

i. Preparation of scion

ii. Preparation of rootstock



iii. Insertion of scion into stock

Plate 1. Proceedureof softwood grafting followed in jackfruit Types

*Table 1.* Variation in growth characters of softwood grafts in jack fruit types

| Treatments | Number of days to sprouting | Sprouting (%) | Survival (%) | Shoot length (cm) | Number of leaves |
|---|---|---|---|---|---|
| V1-Early bearing Varikka | 30.33 | 30.98 | 38.89 | 8.37 | 5.67 |
| V2 - Gumless type | 28.67 | 46.90 | 50.00 | 7.30 | 6.67 |
| V3 - Seedless type | 29.33 | 37.21 | 47.22 | 8.08 | 5.33 |
| V4 - Cluster type | 29.67 | 39.22 | 75.00 | 7.33 | 8.33 |
| V5 - Muttom Varikka | 32.33 | 26.55 | 50.00 | 5.67 | 5.67 |
| SEm± | 0.38 | 1.85 | 6.95 | 0.20 | 0.37 |
| C.D. at 5% level | 1.13 | 5.52 | 20.65 | 0.58 | 1.11 |

Early emergence of grafts was found with Gumless type (28.67 days), while late sprouting was observed in Muttom varikka (32.33 days). Less latex content of gumless type may lead to earliness in healing of grafts and in sprouting. Similar findings were reported in jackfruit (Harshavardhan et al., 2014) where the cultivars Singapore and Palur took varying number of days for sprouting. Significant variation in grafts of varieties with regard to number of days to sprouting was observed in mango (Alam et al., 2006) and aonla (Kalalbandi et al., 2014; Choudhary et al., 2016).

Highest sprouting percentage of 46.90 were obtained with gumless type and the lowest was found with Muttom varikka (26.55 per cent). Significant variations in sprouting percentages may probably be due to the different levels of compatibility of the scions of five different types with the rootstock. This result is in agreement with the findings of Bhadra (2012), Ratna (2012) and Alam et al. (2006) in mango.

Highest survival of grafts was observed in Cluster type (75.00 per cent), and Early bearing Varikka type resulted in lowest survival (38.88 per cent). Survivability of a graft is related to the different aspects concerning plant growth phases and genetic nature of the jackfruit type. Varietal influence on survivability of grafts were reported in mango (Prajapati et al., 2014; Radha and Aravindakshan, 2000). Variation in sap flow and meristematic activity would have profound influence on the success and survival percentage of grafts.

Significant variations were observed in morphological parameters in respect of jackfruit types. Highest shoot length (8.37 cm) was recorded with Early bearing Varikka type, while more number of leaves (8.33) was observed in Cluster type. The varietal variation among morphological growth parameters were reported in other crops; Nandhitha et al. (2017) in guava, Ghosh et al. (2010) in sapota and Choudhary et al. (2016) in aonla. The variation in morphological parameters might be due to the different genetic/physiological/anatomical conditions of the different scions. Critical evaluation of the results revealed the varying response of jack types to softwood grafting. Relationship between the response to a grafting technique and the growing habit of the varieties is also a possible reason for such a differential response. The findings are in consonance with those of Prasanth et al. (2007) in mango. Radha and Aravindakshan (2000) observed the same findings in different varieties of mango with epicotyl grafting under Kerala conditions. They stressed on the significance of the degree of adaptability of the varieties to a particular set of conditions, in determining the response to a propagation technique and subsequent growth of the plants under certain conditions.

**Acknowledgements**

This research article is based on the M.Sc.(Hort.) programme of the first author and the financial support from the Kerala Agricultural University is gratefully acknowledged.

## References

Alam, M.A., Islam,M.S., Uddin, M.Z., Barman, J.C., and Quamruzzaman, A.K.M. 2006. Effect of age of seedling and variety of scion in stone grafting of mango. Int. J. Sustain. Crop Prod. 1(2): 27-32.

Bhadra, R.C. 2012. Effect of off-season and variety on the grafting success and survivability of carambola. MS thesis (Hort.), Bangladesh Agricultural University, Mymensingh, 58p.

Choudhary, S.M., Kadam, A.S., Ramniwas, and Chavan, D.L. 2016. Success and growth of softwood grafts of different aonla (*Emblica officinalis* Gaertn.) varieties at nursery stage. Bioscan 11(4): 2533-2536.

Ghosh, S.N., Beral, B., Roy, S., and Banik, B.C. 2010. Effect of cultivars and season on grafting success in sapota under Paschim Midnapur conditions of West Bengal. J. Hort. Sci. 5(2): 138-139.

Harshavardhan, A., Rajasekhar, M., and Reddy, P.S.S. 2014. Effect of condition, variety, method of grafting in different months on days taken for sprouting of jackfruit (*Artocarpus heterophyllus* Lam.) grafts. J. Agric. Technol. 1(2): 72-74.

Kalalbandi, B.M., Ziauddin, S., and Shinde, B.N. 2014. Effect of time of softwood grafting on the success of sapota grafts in 50% shadenet under Marathwada conditions. Agric. Sci. Digest 34(2): 151-153.

Nanditha, G.C., Patil, D.R., Patil, S.N., Venkateshalu, and Gandolkar, K. 2017. Study on the effect of different growing conditions and varieties on graft-take, leaves and scion diameter in guava (*Psidium guajava* L.). Int. J. Pure App. Biosci. 5 (4): 601-606.

Prajapati, G.K., Patel, M.M., Bhadauria, H.S., Varma, L.R., Modi, D.J., and Garasiya, V.R. 2014. Study of softwood grafting in different mango varieties. Asian J. Hort. 9(1): 240-242.

Prasanth, J. M., Reddy, P. N., Patil, S. R., and Pampanagouda, B. 2007. Effect of cultivars and time of softwood grafting on graft success and survival in mango. Agric. Sci. Digest 27 (1): 18 – 21.

Radha, T. and Aravindakshan, K. 2000. Differential response of mango varieties to epicotyl grafting on commercial scale. Acta Hort. 509: 265-268.

Ratna, S.S. 2012. Effect of time of grafting operation and varieties on the success and survivability of cleft grafting of sapota. MS thesis (Hort.), Bangladesh Agricultural University, Mymensingh, 55 p.