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Studies on Effect of Time of Grafting on Success of Softwood Grafting in Karonda (*Carrisa carandas* L.)

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A B S T R A C T

The present investigation entitled Studies on effect of time of grafting on success of softwood grafting in karonda (*Carissa carandas* Linn) was undertaken at K.R.C. College of Horticulture, Arabhavi during 2016-2017. The experiment consisted of 5 treatments (months), which were replicated 4times and laid out in Complete Randomized Design. The results indicated that graft success (87.50 %), graft survival (97.20 %), number of sprouts (7.05), number of leaves (67.65), height of the graft (58.85 cm) and graft girth (6.21 mm) were found highest in the September month grafted plants. Lowest success (47.50 %) was found in November grafted plants at 90 days after grafting.

Introduction

Karonda (*Carissa carandas* Linn.) is native to India and grows wild in Maharashtra, Rajasthan, Uttar Pradesh, West Bengal and Bihar. It is popularly known as "Bengal currant" or "Christ's Thorn". Other names are karamanda, karavanda, kaunda, kalivi, natal plum in India. In Kannada it is called as 'Kavalikayi'. It belongs to family Apocynaceae with chromosome number 2n = 22. Karonda is an important minor indigenous underexploited fruit crop of India. It has recently attained importance as an arid zone horticulture crop because of its hardy natureand its nutritious fruits.

Karonda is a woody, evergreen dichotomously branched, spiny shrub grows to height of 10-15ft. Leaves are opposite, small, ovate and shiny. Flowers are white in colour produced in terminal cyme. It is preferred very much as a protective hedge in Gujarat and Punjab. It is sometimes grown as an ornamental plant due to its beautiful cherry like fruits. Karonda is best suited as a live protective fence due to the presence of axillary spines and formation of profuse leaves on crowded branches. It has excellent potential to be used for horticultural plantations in marginal and wastelands, owing to its hardy and xerophytic nature with wide adaptability to saline sodic soils with pH up to 10 (Bankar *et al.*, 1994 and Chundawat,

1995). Fruits are generally harvested at immature stage for vegetable purpose, while fully ripen fruits are consumed fresh or processed (Malik *et al.*, 2010). The dried fruits are good source of iron (39.10mg/100 g), pectin and contain fair amount of vitamin C.

Fruits are used in preparation of jelly, jam, syrup, murabba and chutney (Kumar *et al.*, 2007). The unripe fruits yield milky white latex which can be used in preparing chewing gum and rubber. The unripe fruits of karonda are medicinally used as an astringent.

The ripe fruit is sweet, cooling, appetiser and antiscorbutic and is useful in controlling burning sensation, skin diseases, scabies, pruritus (Imran *et al.*, 2012) and particularly suitable for tarts and puddings. It is also used in curing anaemia.

Though the fruits are being used for different purposes, it has not yet been exploited on a commercial scale. There exists a great variation in size, shape and colour of the fruits. Based on the fruit colour, three types are available – green, pink and white (Singh, 1967). Based on taste, it can be further grouped into two types – sweet and sour. As the crop is highly cross-pollinated, large variability exists in natural population. The seed is quite hard and germination is low. Still the fruit crop is commercially propagated by seeds. The objective of present study was to improve the seed germination to standardize the pre-sowing treatments for raising the crops.

Materials and Methods

The investigation on effect of time of grafting on success of softwood grafting in karonda was carried out in the Department of Fruit Science, Kittur Rani Channamma College of Horticulture, Arabhavi, during 2016-2017. The experiment on grafting was performed on the 15thof every month, starting from July 2016 to November 2016 with 5 treatments T_1 – July, T_2 – August, T_3 – September, T_4 – October, T_5 – November and 4 replications. The observations on per cent graft success, per cent graft survival, number of leaves, number of sprouts, height of graft (cm), graft girth (mm) were recorded at an interval of 15 days up to a period of three months.

The vigorously grown one year old rootstocks were selected and top growth was decapitated with a sharp knife. While selecting the scion material care was taken to match the girth of the stock. The softwood of stock was vertically splited in the form of cleft to a length of two to three centimetres downward with a sharp knife. The cleft looked like a fork or letter 'V'. The scion was prepared by giving a cut into gently sloping wedge of about two centimetres to the morphological base of the scion by removing the bark on the remaining two sides of the scion. The wedge shaped scion thus prepared was inserted into the 'V' shaped slit of the stock.

After insertion of wedge shaped scion into the cleft of stock plant, precautions were taken to see that scion and the stock come in close contact with each other. The joint was then tied firmly with 1.5 cm wide and 15cm long polythene strip of 200 gauge. The grafts were covered with polytube, covering the joint completely and then kept in shade net house.

Results and Discussion

The outcome of the present experiment highlighted that softwood grafting in karonda can be successfully carried out from July to November with varying degree of success. The graft prepared in the month of September (90.00, 87.50 and 87.50 %) gave highest success at 30, 60 and 90 DAG, respectively. Graft survivability (97.20 and 100.00 %) was found highest in same month at 60 and 90

DAG, respectively (Table 1). Similar findings were reported by Ghosh *et al.,* (2011) in Karonda and Shubhas *et al.,* (2016) in Jamun. The highest graft success may be related to the prevailing optimum, maximum and minimum temperatures, which is coupled with good humidity and rainfall which encouraged early contact of cambium layers of stock and scions resulting in early callus formation and initiation of further growth in grafts under Arabhavi conditions.

The number of sprouts was significantly recorded highest in grafts prepared in the month of September (4.65, 6.35 and 7.05) at 30, 60 and 90 DAG, respectively (Table 2). Similar findings were reported by Waghamare (1990) in Sapota. The optimum temperature and relative humidity have major role on number of sprouts as well as early sprouting by avoiding desiccation of buds and influencing the sap flow in the grafts. Graft success was also found highest in September due, to increase in sprout.

Number of leaves was significantly recorded highest in grafts prepared in the month of September (51.75, 57.43 and 67.65) at 30, 60 and 90 DAG, respectively (Table 2). Similar findings were reported by Ghosh *et al.,* 2011 in karonda and Prasanth *et al.,* (2006) in mango. There is variation in number of leaves during different month because of graft exposure to different relative humidity and temperature. Better growth of grafts during a particular month causes higher cell activity and active growth of both stock and scion. There no much variation in relative humidity in September month. As number of sprouts was found high in grafts done in month of September, hence the number of leaves was also found significantly higher. Good relative humidity and rainfall was also found in same month.

Table.1 Effect of time of grafting on graft success and survival in softwood grafting of karonda

Treatments	Graft success (%)			Graft survival (%)	
	30DAG	60DAG	90DAG	60 DAG	90 DAG
T_1 - July	62.50 (52.33)*	60.00 (50.89)	57.50 (49.38)	95.80 (83.75)*	96.40 (84.23)
T_2 - August	80.00 (63.80)	75.00 (60.63)	70.0 (57.53)	93.30 (79.12)	92.70 (78.65)
T_3 - September	90.00 (71.56)	87.50 (69.53)	87.50 (69.53)	97.20 (84.25)	100.00 (89.71)
T_4 - October	75.00 (60.63)	70.00 (57.47)	70.00 (57.47)	93.30 (79.12)	100.00 (89.71)
T_5 - November	57.50 (49.38)	50.00 (45.00)	47.50 (43.55)	90.80 (77.18)	95.80 (83.76)
SEm±	**3.00**	**3.60**	**3.68**	**6.21**	**4.62**
CD@5%	**9.04**	**10.89**	**11.09**	**NS**	**NS**

DAG- Days after Grafting ()*Values in parenthesis are arc sign transformation data.
NS – Non- significant

Table.2 Effect of time of grafting on number of sprouts and leaves in Softwood grafting of karonda

Treatments	Number of sprouts /graft			Number of leaves /graft		
	30 DAG	60 DAG	90 DAG	30 DAG	60 DAG	90 DAG
T_1 - July	3.90	5.70	5.75	39.55	50.20	58.30
T_2 - August	4.00	5.70	6.20	45.00	52.25	62.25
T_3 - September	4.65	6.35	7.05	51.75	57.43	67.65
T_4 - October	4.09	5.79	6.30	47.93	53.63	62.71
T_5 - November	3.00	4.40	4.75	31.70	43.55	49.50
SEm±	**0.16**	**0.22**	**0.32**	**1.68**	**1.54**	**1.48**
CD@5%	**0.49**	**0.67**	**0.97**	**5.09**	**4.64**	**4.47**

Table.3 Effect of time of grafting on graft height and girth in softwood grafting of karonda

Treatments	Graft height (cm)			Graft girth (mm)		
	30 DAG	60 DAG	90 DAG	30 DAG	60 DAG	90 DAG
T_1 - July	44.25	50.56	53.40	5.20	5.50	5.67
T_2 - August	47.54	52.65	54.05	5.17	5.22	5.52
T_3 - September	49.78	55.65	58.85	5.82	6.00	6.21
T_4 - October	48.38	52.93	54.90	5.50	5.77	6.19
T_5 - November	41.73	45.50	48.25	4.97	5.12	5.30
SEm±	**1.18**	**1.30**	**0.91**	**0.18**	**0.20**	**0.22**
CD@5%	**3.56**	**3.90**	**2.74**	**0.55**	**0.62**	**0.66**

Graft height and girth was recorded highest in grafts prepared in month of September (49.77, 55.65 and 58.85 cm) and (5.82, 6.00 and 6.21 mm) at 30, 60 and 90 DAG respectively (Table 3). These findings were in accordance with Ghosh *et al.*, (2011) in karonda.

Graft height is greatly influenced by growth parameters (number of leaf, leaf area) which influence growth of height. As a higher cell activity and early healing of graft union during the optimum season of graft results in early sprouting and faster growth of leaves.

Higher leaf number resulted in more photosynthetic rate which reflects better growth of graft (Pawar *et al.*, 2003).

References

Bankar, G. J., Verma, S. K. and Prasad, R. N., 1994, Fruit for arid region: Karonda. Indian Horticulture, 39: 46- 47.

Chundawat, B.S., 1995, Oxford and IBH publishing company private limited. Arid fruit culture, New Delhi. 102-110

Ghosh, S. N., Bera, B. and Roy, S., 2011, Propagation studies in karonda *(Carissa carandas L.*) under Paschim Midnapore condition of West Bengal. *J. Crop Weed*, 7(2): 247-248

Imran, M. A., Begum, G., Sujatha, K. and Mallaiah, B., 2012, Effect of adenine sulphate with cytokinins on multiple

shoot production in *Carissa carandas. Int. J. Pharm. Biol. Sci.*, 3(1): 473- 480.

Kumar, D., Pandey, V. and Nath, V., 2007, Karonda (*Carissa congesta*) an underutilized fruit crop. In: Peter, K.V., Underutilized and underexploited Horticultural Crops. New India publishing agency. 1: 313-325.

Malik, S. K., Chaudhury, R., Dhariwal, O. P., and Bhandari, D. C., 2010, Genetic resources of tropical underutilized fruits in India, NBPGR, New Delhi, 47-54.

Prasanth, J. M., Reddy, P. N., Patil, S. R. and Ampanagouda, B. P., 2006, Effect of cultivars and time of softwood grafting on graft success and survival in mango. *Agricultural Science Digest*, 27(1): 18-21.

Shubash, C., Kumar, S., Kavino, M. and Lokesh, B., 2016, Effect of seasonal variation on softwood grafting under different environmental conditions in jamun (*Syzygium cumini* Skeels.). *Res. on Crops* 17(3): 524-528.

Waghmare, G. M., 1990, Studies on standardization of softwood grafting in sapota (*Manilkara achras* Mill.) var. Kalipatti. *M.Sc (Agri.) Thesis*, Konkan Krishi Vidyapeeta, Dapoli, Maharashtra.

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