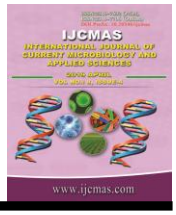
Int.J.Curr.Microbiol.App.Sci (2019) *8*(4): 562-566

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 8 Number 04 (2019)**
Journal homepage: http://www.ijcmas.com



Original Research Article https://doi.org/10.20546/ijcmas.2019.804.060

Effect of Different Age of Rootstocks on Success of Softwood Grafting Technique in Tamarind (*Tamarindus indica* L.) under Northern Dry Zone of Karnataka

Arif A. Agasimani[1]*, G. S. K. Swamy[2], Nagesha Naik[3], R.C. Jagadeesha[4], P.M. Gangadharappa[5] and N. Thammaiah[6]

[1]Department of Horticulture, Lalbagh, Bengaluru – 560 004, Karnataka, India
[2]Department of Fruit Science, COH, Mysuru, Karnataka, India
[3]K. R. C. College of Horticulture, Arabhavi – 591 218, Karnataka, India
[4]UHS, Bagalkot – 587 104, Karnataka, India
[5]College of Horticulture, Munirabad, Karnataka, India
[6]Department of HPP, COH, Mysuru, Karnataka, India

**Corresponding author*

Keywords

Tamarind (*Tamarindus indica* L.), DAG, Per cent Sprouting

Article Info

Accepted:
07 March 2019
Available Online:
10 April 2019

A B S T R A C T

An experiment was conducted on effect of different age of rootstocks on success of softwood grafting in tamarind. Higher percentage of graft success (70.39%), grafts survivability (70.95%), sprouting per cent (14.40%), minimum days taken for sprouting (12.52) and number of sprouts (7.23) were noticed in T_7 (6 month old rootstocks). The maximum graft height (37.31 cm), graft diameter (7.92 mm), length of sprouts (19.02 cm) and number of leaves (41.35) were noticed in T_7. Study revealed that, softwood grafting in April and May on 6 month old rootstocks might be followed for multiplication of elite tamarind trees with high graft success.

Introduction

Tamarind (*Tamarindus indica* L.) is a monotypic genus tree belonging to the family Leguminosae, sub-family caesalpiniaceae with somatic chromosome number of 2n=24 (Purseglove *et al.*, 1987). It is indigenous to Tropical Africa and Southern India (Nas, 1979). India exports processed tamarind pulp to western countries mainly European and Arab countries and more recently the USA (Rao and Mathew, 2012). It is estimated that India produces an annual production of pulp over 1.99 lakh tones and exported the tamarind products worth of rupees 57 crores per annum during 2017-18 (Anon., 2017). It

is highly heterozygous, cross-pollinated fruit crop and as such seedlings exhibit a wide range of variations, which aids in the selection of the superior desirable genotypes. Due to cross pollination and predominant practice of seed propagation, there is immense opportunity to locate elite trees having desirable horticultural traits, which needs to be conserved and exploited (Keskar *et al.*, 1989; Pathak *et al.*,1992; Karale *et al.*, 1999). Despite its varied advantages, it could not attract suitable scientific attention towards its propagation. True-to-the-type propagules could be multiplied from elite trees that produce good quality fruits only by asexual methods. Of various propagation methods, grafting is of paramount importance in tropical and subtropical fruit trees as they result in high success and field establishment. Therefore, the present investigation was undertaken to study the effect of different age of rootstock on success of softwood grafting under Northern dry zone of Karnataka.

Materials and Methods

The investigation was carried out at K. R. C. College of Horticulture, Arabhavi, Karnataka, India during the year 2018. The locally available seeds of tamarind (Belagavi region) were sown in the polythene bags filled with sand, soil and FYM (1:1:1) for raising the rootstocks. Irrigation, weeding and other desired intercultural operations were done as and when required. About 1-12 months old seedlings of uniform size having stem of pencil thickness were used as rootstock. Softwood grafting was carried out at March and April month of 2018 and data were recorded. Scion shoots of promising genotype (DTS-2) having desirable horticultural traits was used to perform the grafting. The experiment was laid out in completely randomized block design with three replications and 10 plants in each replication as unit. Data on days taken for sprouting, number of sprouts, sprouting per cent were recorded soon after bud burst while success per cent and survivability of grafts were recorded 3 months after grafting. Graft height (cm), graft diameter (mm), sprout length (cm) and number of leaves were recorded at an interval of 30, 60 and 90 days after grafting.

Results and Discussion

The perusal of the data presented in Table 1 reveals that days required for bud sprouting differed significantly due to different aged rootstocks used for softwood grafting. It was observed that the T_7 (6 months) took significantly minimum number of days for sprouts (12.52), maximum number of sprouts (7.23) and sprouting percentage (14.40%). Higher temperature during March-April has helped in early sprouting which may be due to fast establishment of vascular connection in rootstock and scion as has been reported by Satishkumar (2001), Ganachary (2005), Veeresh (2006), Giri and Lenka (2007), Singh and Singh (2007). The success in bud sprouting was affected significantly by time of propagation (Table 1 and 2). The highest sprouting was recorded when softwood grafting was done in March and April month, closely followed by May. Least sprouting was recorded in T_{12} (1 month). Similarly, per cent success also showed significant variation when grafting was done on April month. This finding is in agreement with the findings of Purushotham and Narasimharao (1990), Shinde *et al.*, (1996), Satisha *et al.*, (1997), Kulwal *et al.*, (1997), Nachegouda (1997), Bodkhe and Lalan (2010), Bharad and Mahorkar (2011). The best results in sprouting and success in March, April and May month may be due to optimum temperature and relative humidity prevailing during this period resulting in early contact of cambium layers of stock and scion, early callus formation and initiation of subsequent growth.

Table.1 Effect of age of rootstock on percent graft success, sprouting percentage, days taken for sprouting, number of sprouts, graft height, graft diameter, sprout length and number of leaves in softwood grafting of tamarind during 2018

Treatment	Age of rootstock	Per cent graft success	Sprouting percentage	Days taken for sprouting	Number of sprouts	Graft height (cm)			Graft diameter (mm)			Sprout length (cm)			Number of leaves		
						30 DAG	60 DAG	90 DAG	30 DAG	60 DAG	90 DAG	30 DAG	60 DAG	90 DAG	30 DAG	60 DAG	90 DAG
T_1	12 months	33.43	6.66	14.35	3.33	5.10	19.69	24.71	2.06	3.50	4.31	2.51	6.62	10.93	3.94	24.00	31.20
T_2	11 months	28.40	12.67	15.26	6.23	6.06	19.26	22.11	2.11	3.56	3.80	2.07	5.88	10.69	2.74	15.28	29.53
T_3	10 months	36.69	12.50	16.04	6.25	6.66	21.59	24.14	2.54	3.92	4.20	2.48	5.76	12.21	3.77	16.61	31.93
T_4	9 months	29.06	9.47	17.55	4.77	8.44	22.81	27.89	3.65	5.27	5.48	2.25	6.62	14.37	3.43	19.67	33.04
T_5	8 months	42.37	12.53	13.05	6.27	9.25	25.77	31.21	4.15	6.30	6.52	2.67	8.16	16.17	3.55	25.41	33.87
T_6	7 months	60.31	12.53	12.73	6.30	11.18	29.09	32.37	5.14	7.16	7.32	2.79	8.33	18.47	4.74	34.04	37.47
T_7	6 months	70.39	14.40	12.52	7.23	13.16	31.35	37.31	5.63	7.83	7.92	3.01	9.42	19.02	4.75	40.80	41.35
T_8	5 months	69.48	13.20	19.70	6.67	7.02	25.38	32.48	4.11	6.54	6.79	1.86	6.68	14.66	3.41	27.40	29.30
T_9	4 months	33.90	5.47	22.52	2.73	5.17	19.89	25.18	3.03	6.16	6.24	1.59	6.09	7.92	3.08	30.00	30.40
T_{10}	3 months	30.59	4.80	22.91	2.40	4.76	15.97	18.71	2.13	5.78	6.19	1.68	4.99	6.05	2.74	18.71	22.33
T_{11}	2 months	26.35	3.67	24.33	2.03	4.67	14.18	18.09	1.89	4.59	5.55	1.64	4.25	5.73	2.53	11.87	16.88
T_{12}	1months	20.71	2.13	25.94	1.07	4.34	11.45	14.32	1.73	3.18	4.07	1.33	3.74	5.54	2.00	8.80	15.61
	Mean	**40.14**	**9.14**	**18.07**	**4.61**	**7.15**	**21.37**	**25.71**	**3.18**	**5.32**	**5.70**	**2.16**	**6.38**	**11.81**	**3.39**	**22.72**	**29.41**
	S.Em±	1.31	0.60	0.41	0.28	0.35	0.58	0.82	0.29	0.17	0.17	0.19	0.45	0.50	0.30	1.72	1.03
	CD 0.01	5.19	2.40	1.63	1.13	1.39	2.30	3.25	1.14	0.67	0.68	0.76	1.79	2.01	1.22	6.80	4.07
	CV (%)	5.66	11.52	3.94	10.74	8.55	4.72	5.54	15.79	5.58	5.28	15.47	12.30	7.47	15.77	13.12	6.06

DAG – Days After Grafting **Month of grafting:** April 2018

Table.2 Effect of age of rootstock on grafts survival in softwood grafting of tamarind genotypes during 2018

Treatment	Age of rootstock	Graft survival (%)
		2018
T_1	12 months	31.09
T_2	11 months	30.69
T_3	10 months	39.57
T_4	9 months	30.83
T_5	8 months	38.96
T_6	7 months	62.92
T_7	6 months	70.95
T_8	5 months	60.83
T_9	4 months	38.77
T_{10}	3 months	31.11
T_{11}	2 months	28.91
T_{12}	1 months	27.03
	Mean	**40.97**
	S.Em±	0.36
	CD 0.01	1.42
	CV (%)	1.52

At the final observation (90 Days after grafting), the data revealed significant variation in graft height (cm), graft diameter (mm), length of sprout (cm) number of leaves that ranged between 14.32 to 37.31 cm, 4.07 to 7.92 mm, 5.54 to 19.02 cm and 15.61 to 41.35, respectively (Table 1).

Maximum graft height, length of sprouts, diameter of grafts and number of leaves were recorded in May month. The quick and strong union formation, better nutrient uptake and ample growing period might have caused better plant growth and more number of leaves per plant in April and May.

Awasthi and Shukla (2003), Giri and Lenka (2007), Singh and Singh (2007) recorded similar findings in tamarind under different agro-climatic conditions. Therefore, softwood grafting in April and May month may be followed for multiplication of elite tamarind trees with high graft success rate.

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How to cite this article:

Arif A. Agasimani, G. S. K. Swamy, Nagesha Naik, R.C. Jagadeesha, P.M. Gangadharappa and Thammaiah, N. 2019. Effect of Different Age of Rootstocks on Success of Softwood Grafting Technique in Tamarind (*Tamarindus indica* L.) under Northern Dry Zone of Karnataka. *Int.J.Curr.Microbiol.App.Sci.* 8(04): 562-566. doi: https://doi.org/10.20546/ijcmas.2019.804.060