Comprehensive study to Standardize the Propagation Method, Time and Variety of Jamun (*Syzygium cumini* (L.) Skeels.) under Southern Region of Rajasthan, India

Abstract

In this report we studied about the effect of different propagation method (i.e softwood, wedge, and patch budding), time (15^{th} Feb. – 29^{th} Feb 2024, 1^{st} April – 15^{th} April.) and Variety for scion (Goma Priyanka and Thar Kranti) in Jamun (*Syzygium cumini* Skeels.) under southern Region. The experiment was laid out in Factorial Complete Randomized Design. In all twenty-four-treatment combination with three replications. The results revealed that softwood grafting during 1^{st} April – 15^{th} April with scion Goma Priyanka had significantly increase graft success (80.60%), maximum number of leaves per plant (12.05), number of shoot per plant (4.14), leaf area (14.22cm^2), plant height (36.50cm), sprouting per centage (83.28) after propagation on desi jamun rootstock.

Keywords: Propagation method, time, scion, Jamun, Percent Graft success.

1. Introduction

Jamun [*Syzygium cumini* (L.) Skeels] is also known by different names like java plum, black plum, jambul, duhat plum, damson plum, Malabar plum and Indian blackberry etc. It is an underexploited indigenous fruit tree in India (Ruchitha *et. al.*, 2022). "It is a large evergreen tree grown in subtropical region of India and it belongs to family Myrtaceae. In India jamun is commonly grown in viz. Punjab, Haryana, Uttar Pradesh, Maharashtra, Rajasthan, Gujarat, Madhya Pradesh, Bihar, Chhattisgarh, Jharkhand, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh" (Singh *et al.*, 2011). "Jamun fruit is a good source of anthocyanins, pectin, phenols, proteins, iron and have antioxidant properties. The fully ripe fruit are sub acidic in nature and are eaten fresh while pulp can be processed into various product such as jam, jelly, squash, wine, vinegar, digestive churan" (Thaper, 1958). "The seeds of jamun contains glucoside jamboline and ellagic acid which converts starch into sugar in case of excess production of glucose. Seed is used as a lotion for the cure of ringworm" (Dastur, 1952). "Leaves of jamun tree also play a crucial role for amelioration of diabetic conditions. Leaves are also used for controlling blood pressure and it also reduces the radiation induced DNA damage in the cultured

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human peripheral blood lymphocytes" (Jagetia and Baliga, 2002). "Besides its medicinal properties, every part of the jamun tree has been utilized by both urban and rural areas. During drought, the foliage of jamun tree serves as a fodder for cattle. The timber of jamun is used in making buildings, agricultural implements and railway sleepers. It is mostly planted along the avenues or as a wind break on the boundary of the orchards. Despite its huge importance, relatively long pre-bearing periods, perishable nature, very few number of recognized standard cultivars and location specific production and propagation techniques are the major problems for expansion of area under this crop. Although, seed prorogation is advisable, due nucellar embryony, large scale variation in its fruit morphology, fruit quality, maturity and productivity have been reported owing to its cross-pollination nature and long juvenile phase" (Chundawat, 1990; Muniyappan et al., 2019). The main vegetative methods of propagation like patch budding (Sharma *et al*., 2016), T- budding and soft wood grafting (Subash *et al.,* 2016) have been performed in jamun. "The propagation time mainly depend upon temperature, humidity and availability of scion material reported that maximum graft success was noticed in guava in January" (Mutteppa *et al.,* 2017); in jamun June (Gowda *et al.*, 2011). Therefore, while choosing the technique, propagation time and cultivar should be taken into consideration as success of graft vary from region to region due to change in agro climatic region. Any particular method and time may be suitable for one place may not suitable for other. Therefore, the present investigation was conducted to standardize propagation method, time and variety in jamun for Southern region of Rajasthan (India).

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2. Materials and Methods

The experiment was conducted under net house during Feb, 2024 to May, 2024 Horticulture farm, at Department of Horticulture, Rajasthan College of Agriculture, Udaipur to find out the best method and time of propagation and variety in Jamun. The experimental design was laid Factorial Completely randomized design (FCRD) with 24 treatments and 3 replications. The experiment unit is situated at in South-Eastern part of the Rajasthan India i.e. 24° 35' N latitude, 73° 42' E longitude with an altitude of 579.5 m above mean sea level. The region falls under the Agro-climatic zone -IVa (Sub-Humid Southern Plain and Aravalli Hills) of Rajasthan. The temperature ranges from 25oC to 38oC and relative humidity was maintained between 80 to 90 (per cent). Vegetative

Propagation namely softwood grafting, Wedge grafting and patch budding were tried for present study and four durations viz., 15th Feb – 29th Feb, 1st March – 15th March, 16th March – 31st March and 1st April – 15th April with two scion cultivars *ie.*, Goma Priyanka and Thar Kranti were considered for propagation. To conduct this study twenty rootstock plants were grafted on the basis of method, time and cultivar. In all 1,440 desi rootstock were required. Further, the biometrical observation were recorded from five randomly selected plants of each replication to assess the number of days taken to bud sprouting, , first leaf emergence (days), shoot length (cm); Number of leaves per plant; number of shoot per plant; Graft success (%); Mortality (%). The data pertaining to number of shoot per plant, number of leaf were recorded at 60, 90 days after propagation. The data on graft success and mortality (%) were recorded after 90 days of planting the grafting/budding. The data regarding the number of days taken to sprouting calculated by observation of plants on alternate days from the days of propagation and their mean value was used to calculated the days taken to first sprouting.

Statistical Analysis:

The data pertaining to graft success was statistically analyzed by using Factorial completely randomized design with three replications. The level of significance was noticed at P = 0.05 to determine the significant difference (Panse and Sukhatme, 1985).

3. **Result and Discuss**

3.1.Per cent success (%):

(Table 1.) The investigated result revealed that the maximum per cent sucess (75.02%) and minimum (58.09%) where recorded in softwood grafting and patch budding. The effect of time of propagation was also significant with respect to per cent success of jamun, the maximum (80.60) and minimum (39.44) was observed during 15th Feb. – 29th Feb and 1st April – 15th April. The effect of variety was found significant with respect to per cent sucess, the maximum per cent sucess (64.74) was observed in the variety Goma Priyanka. Per cent sucess of jamun was also influenced by the interaction effect of methods of propagation, time and variety in jamun where maximum per cent sucess (90.17) was observed in softwood grafting during 1st April – 15th April in with variety Goma Priyanka. This might be due to the factors viz., grafting method, incompatibility or weather condition occurred during the period of experiment. Another component important to the success of

the graft is the maturity of scion (Singh and Singh, 2006, Khatun *et al.*, 2014 and Aseef *et al.*, 2018). According to Bhaskaran *et al*., (2008) graft failure can be influenced by the amount of carbon assimilate in the scion thus, lesser assimilates in the scion would result in poor success per cent.

3.2.Sprouting percentage:

(Table 2.) The result of sprouting percentage are revealed among different methods of propagation, time and variety. Maximum (78.14%) sprouting percentage where recorded in softwood grafting. The effect of time of propagation was also significant with respect to sprouting percentage of jamun, the maximum (83.28%) was observed during 1st April – 15th April. The effect of variety was found significant with respect to sprouting percentage, the maximum sprouting percentage (68.37%) was observed in the variety Goma Priyanka. Sprouting percentage of jamun was also influenced by the interaction of methods of propagation, time and variety in jamun where maximum (92.17%) was observed in softwood grafting during 1st April – 15th April in with variety Goma Priyanka. The probable reason for this is that the more contact area between scion and stock which leads to the formation of more callus and strong graft union. Similar results were reported by Ray *et al*., (1988), Gotur *et al.*, (2017). Maximum sprouting is due to better adaptability to climatic conditions existing at the time of propagation, better physiological conditions and more active buds. The emerging buds are controlled by the apical dominance, proper supply of nutrients along with presence of suitable climatic conditions viz., temperature, moisture and relative humidity. Similar results are obtained by Giri and Lenka (2007) in jamun and Angadi and Karadi (2012) in jamun.

3.3.Days taken to first sprouting:

Analysis of the data presented (Table 3.) indicated that among different methods of propagation, time and variety, minimum days to first sprouting (18.24 days) was recorded in softwood grafting. The effect of time of propagation was also significant with respect to days taken to first sprouting of jamun, the minimum days taken to first sprouting (18.34) was observed during 1st April – 15th April. The effect of variety was found significant with respect to first sprouting, the minimum days to first sprouting (22.87) was observed in the variety Goma Priyanka. Number of days taken to first sprouting was also influenced by the interaction of method of propagation, time and

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variety in jamun where minimum (13.39) number of days taken to first sprouting was observed in softwood grafting during 1st April – 15th April in with variety Goma Priyanka. The early sprouting of grafts during the month of April may be attributed to the favourable climatic conditions such as high temperature with high relative humidity (Collected from Department of Agrometeorology, Udaipur). Alkhatabi (1986) also attributed that the higher temperature favoured maximum meristematic activity in mango. The seasonal differences in graft success was also observed in mango (Majumdar and Rathore, 1970) and sapota (Madalagiri et al., 1990), where warm and mild climate was found favourable for grafts sprouting. (Chawda *et al*. 2018)

3.4. Number of leaves per plant:

(Table 4.) The influence of methods of propagation, time and variety on number of leaves per plants registered that the highest leaves 10.94 and 12.38 at 60 and 90 DAP respectively recorded in softwood grafting. The effect of time of propagation was also significant with respect to number of leaves per plant in jamun, the highest leaves 10.46 and 12.05 at 60 and 90 DAP respectively observed during 1st April – 15th April. The variety significantly influences number of leaves per plant in jamun. Maximum number of leaves per plant 8.33 and 9.44 at 60 and 90 DAP were observed in the variety Goma Priyanka. Number of leaves at jamun was also influenced by the interaction effect of methods of propagation, time and variety in jamun where highest leaves 14.05 and 15.65 at 60 and 90 DAP was observed in softwood grafting during 1st April – 15th April in with variety Goma Priyanka. Reasons for enhanced number of leaves is due to activity and better healing of grafts during these time and also due to genetic characters of a variety. The enhanced vegetative growth might have been due to activated physiological process by stimulating factor in the metabolism and growth of the plant. Maximum number of leaves during 1st April – 15th April is due to fairly high temperature and optimum humidity. Kalalbandi *et al.* (2014)**.** During spring season, maximum number of leaves were produced which might be due to proper sap flow between rootstock and scion which further accelerated proper supply of reserved food materials and encourages profuse vegetative growth of the plant. Similar results were also reported by Kulkarni (1990), Singade (1993) in jamun.

3.5.Number of shoot per plant:

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(Table 5.) The result revealed that the number of shoots per plant with methods of propagation, time and variety maximum number of shoots 60 and 90 DAP were 4.65 and 4.73 respectively recorded in softwood grafting. The effect of time of propagation was also significant with respect to number of shoots per plant in jamun, the maximum 4.62 and 4.84 shoots per plant 60 and 90 DAP respectively observed during 1st April – 15th April. The variety significantly influences number of shoots per plant in jamun. Maximum number of shoot per plant 3.63 and 3.73 at 60 and 90 DAP were observed in the variety Goma Priyanka. Number of shoots at jamun was also influenced by the interaction of methods of propagation, time and variety in jamun where maximum shoots 5.83 and 5.93 at 60 and 90 DAP respectively was observed in softwood grafting in during 1st April – 15th April in with variety Goma Priyanka. The production of more shoots per plant might be due to activity and better healing of grafts in these months and also due to genetic characters of a variety. The enhanced vegetative growth is due to activated physiological process by stimulating factor in the metabolism of the plant. Kulkarni 1990, Parmar *et al*. 2019 in Mulberry. Maximum number of shoots during the month of April might due to optimum atmospheric humidity along with fairly high temperature resulted in better scion growth. Prasanth *et al.* 2007 in mango, Karna and Varu 2018 in mango.

3.6.Average leaf area (cm^2):

Analysis of the data presented (Table 6.) indicated that among different methods of propagation, time and variety, maximum leaf area 14.97 cm^2 and 16.25cm2 at 60 and 90 DAP respectively recorded in softwood grafting. The effect of time of propagation was also significant with respect to leaf area of jamun, the maximum leaf area 14.42 cm^2 and 15.82 cm^2 at 60 and 90 DAP respectively observed during 1st April – 15th April. The variety significantly influences leaf area in jamun. Maximum leaf area 11.15cm^2 and 12.17 cm^2 at 60 and 90 DAP were observed in the variety Goma Priyanka. Average leaf area at jamun was also influenced by the interaction of methods of propagation, time and variety in jamun where maximum leaf area 20.46 and 21.81 at 60 and 90 DAP respectively was observed in softwood grafting during 1st April – 15th April with variety Goma Priyanka. Reason for this is due to vigorous growth of plants during this time and strong union and development of vascular tissues at the union which regulates the transport of water and nutrient and thereby enhancing the leaf area in grafts. Another reason for this is due to grafting during

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the month of April received long growing period of congenial environment of optimum temperature and relative humidity which might be reflected in better leaf growth. As number of leaves increased, significantly leaf area could be increased. Similar results were reported by Kulkarni (1990) and Singade (1993) in Jamun.

The variety Goma Priyanka recorded maximum average leaf area, this is due to the better adaptability of the cultivar in Udaipur region and also the genetic variability exist in the variety. The variety Goma Priyanka exhibit vigorous growth and strong union between rootstock and scion. (Ruchita *et al.* 2022)

3.7.Plant height (cm):

Analysis of the data presented (Table 7.) indicated that among different methods of propagation, time and variety, maximum plant height 29.08 cm and 32.96 cm at 60 and 90 DAP respectively recorded in softwood grafting. The effect of time of propagation was also significant with respect to plant height of jamun, the maximum plant height 32.9 cm and 36.50 cm at 60 and 90 DAP respectively observed during 1st April – 15th April. The variety significantly influnces plant height in jamun. Maximum plant height 25.97cm and 29.90 at 60 and 90 DAP were observed in the variety Goma Priyanka. Plant height at jamun was also influenced by the interaction of methods of propagation, time and variety in jamun where maximum plant height 36.20 cm and 40.22 cm at 60 and 90 DAP respectively was observed in softwood grafting during 1st April – 15th April with variety Goma Priyanka. Probable reason for maximum plant height recoded in the month of April is due to optimum temperature, sufficient sunlight, and relative humidity ensured water availability which increased the photosynthesis rate that lead to the formation of more food materials which facilitated and enhanced the plant growth and sprout development. It is also due to optimum temperature and relative humidity congenial for plant activity which resulted enhance the plant height with more meristematic activity and faster healing of graft union. Sivudu *et al*. 2014 and Makavana *et al*. 2022.

Table 1. Effect of method of propagation, time and variety on Graft success (%) of jamun.

Method of	Time of propagation

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propagation	**15th Feb-29th Feb**	**1st March-15th March**	**16th March-31st March**	**1st April-15th April**	**Mean**
Patch budding	34.54	50.85	71.07	75.92	58.09
Softwood grafting	46.38	75.15	88.84	89.69	75.01
Wedge grafting	37.41	55.72	71.50	76.20	60.20
Mean	39.443	60.57	77.13	80.60	-
Variety					
Goma Priyanka	39.75	60.82	77.49	80.89	64.74
Thar kranti	39.13	60.32	76.77	80.30	64.13
Mean	39.44	60.57	77.13	80.59	-
	Methods	**Time**	**Variety**	**Interaction (M×T×V)**	
SE(d)	0.12	0.14	0.10	0.34	
C.D. (p=0.05)	0.34	0.40	0.28	0.98	

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Table 2. Effect of method of propagation, time and variety on sprouting percentage of jamun.

Method of propagation	Time of propagation				
	15th Feb-29th Feb	1st March-15th March	16th March-31st March	1st April-15th April	Mean
Patch budding	38.61	54.85	75.07	79.92	62.11
Softwood grafting	50.38	79.15	91.32	91.69	78.13
Wedge grafting	41.41	59.72	75.84	78.24	63.79
Mean	43.46	64.57	80.74	83.28	-
Variety					
Goma Priyanka	43.80	64.82	81.26	83.58	68.36
Thar kranti	43.13	64.32	80.22	82.97	67.66
Mean	43.46	64.57	80.74	83.27	-
	Methods	**Time**	**Variety**	**Interaction (M×T×V)**	
SE(d)	0.11	0.13	0.09	0.32	
C.D. (p=0.05)	0.32	0.37	0.26	0.92	

Table 3. Effect of method of propagation, time and variety on days taken to first sprouting of jamun.

Method of propagation	Time of propagation				
	15th Feb-29th Feb	1st March-15th March	16th March-31st March	1st April-15th April	Mean
Patch budding	38.21	26.61	24.99	23.46	28.31
Softwood grafting	27.70	16.20	15.29	13.77	18.24
Wedge grafting	32.31	21.86	19.73	17.78	22.91
Mean	32.73	21.55	20.00	18.33	-
Variety					
Goma Priyanka	32.58	21.21	19.68	17.98	22.86
Thar kranti	32.89	21.90	20.31	18.68	23.44
Mean	32.73	21.55	20.00	18.33	-
	Methods	**Time**	**Variety**	**Interaction (M×T×V)**	
SE(d)	0.10	0.12	0.08	0.30	
C.D. (p=0.05)	0.30	0.35	0.25	0.86	

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Table 4. Effect of method of propagation, time and variety on number of leaves per plant after 90 days of propagation in jamun.

Method of propagation	Time of propagation				
	15th Feb-29th Feb	1st March-15th March	16th March-31st March	1st April-15th April	Mean
Patch budding	3.34	7.02	8.70	9.55	7.15
Softwood grafting	8.07	11.75	13.93	15.75	12.37
Wedge grafting	4.44	8.05	10.09	10.85	8.35
Mean	5.28	8.93	10.90	12.05	-
Variety					
Goma Priyanka	5.44	9.07	11.00	12.22	9.43
Thar kranti	5.12	8.80	10.81	11.88	9.15
Mean	5.28	8.93	10.90	12.05	-
	Methods	**Time**	**Variety**	**Interaction (M×T×V)**	
SE(d)	0.06	0.07	0.05	0.18	
C.D. (p=0.05)	0.18	0.21	0.14	0.51	

Table 5. Effect of method of propagation, time and variety on number of shoot per plant after 90 days of propagation in jamun.

Method of propagation	Time of propagation				
	15th Feb-29th Feb	1st March-15th March	16th March-31st March	1st April-15th April	Mean
Patch budding	0.67	1.50	2.18	2.87	1.80
Softwood grafting	2.80	4.80	5.57	5.84	4.75
Wedge grafting	2.13	4.51	5.41	5.88	4.48
Mean	1.86	3.60	4.38	4.86	-
Variety					
Goma Priyanka	1.91	3.64	4.47	4.92	3.74
Thar kranti	1.80	3.55	4.29	4.80	3.61
Mean	1.86	3.60	4.38	4.86	-
	Methods	**Time**	**Variety**	**Interaction (M×T×V)**	
SE(d)	0.04	0.04	0.03	0.11	
C.D. (p=0.05)	0.11	0.13	0.09	0.33	

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Table 6. Effect of method of propagation, time and variety on average leaf area after 90 days of propagation in jamun.

Method of propagation	Time of propagation				
	15th Feb-29th Feb	1st March-15th March	16th March-31st March	1st April-15th April	Mean
Patch budding	3.45	8.71	10.61	11.80	8.64
Softwood grafting	9.45	15.19	18.84	21.53	14.11
Wedge grafting	6.33	11.20	13.23	14.11	11.21
Mean	6.41	11.69	14.22	15.81	-
Variety					
Goma Priyanka	6.54	11.83	13.22	14.32	15.99
Thar kranti	6.28	11.56	14.12	15.63	11.90
Mean	6.41	11.69	14.22	14.97	-
	Methods	**Time**	**Variety**	**Interaction (M×T×V)**	
SE(d)	0.04	0.04	0.03	0.11	
C.D. (p=0.05)	0.11	0.13	0.09	0.32	

Table 7. Effect of method of propagation, time and variety on plant height after 90 days of propagation in jamun.

Method of propagation	Time of propagation				
	15th Feb-29th Feb	1st March-15th March	16th March-31st March	1st April-15th April	Mean
Patch budding	17.56	25.98	32.05	34.70	27.57
Softwood grafting	22.38	31.57	38.05	39.85	32.96
Wedge grafting	17.98	26.64	32.66	34.94	28.05
Mean	19.30	28.06	34.25	36.49	-
Variety					
Goma Priyanka	19.55	28.39	34.77	36.88	29.90
Thar kranti	19.05	27.72	33.73	36.10	29.15
Mean	19.30	28.06	34.25	36.49	-
	Methods	**Time**	**Variety**	**Interaction (M×T×V)**	
SE(d)	0.10	0.11	0.08	0.28	
C.D. (p=0.05)	0.28	0.32	0.23	0.80	

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Conclusion

Based on the experiment at result obtained that softwood grafting performed during month of April with variety Goma Priyanka was found to be the best for jamun propagation in southern region of Rajasthan. Hence the standardization of softwood grafting method of propagation will facilitate the large-scale multiplication of genuine planting material for the benefit of farmer.

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3.

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References

Angadi, S.G. and Karadi, R. 2012. Standardization of softwood grafting technique in jamun under poly mist house conditions. *Mysore Journal of Agriculture Scienc* **46**: 429-432.

Aseef, R.M., Kavino, M. and Vijayakumar, R.M. 2018. Effect of age old rootstocks on growth pattern of grafted scions in jackfruit (*Artocarpus heterophyllus* Lam.). *International journal of Chemical Studies*, **6**(5):1951-1954.

Bhaskaran, A., Saraswathy, S. and Prathiban, S. 2008. Standardisation of propagation methods for jack (*Artocarpus heterophyllus* Lam). *Asian Journal of Horticulture*, **3**(2):361-363.

Chavda, J. K., Patil, S. J., Rajni, R., Tandel, B. M. and Gaikwad, S. S. 2018. Effect of defoliation and storage of scion stick on survival and scion growth of softwood graft of jamun var. Goma Priyanka. *International Journal of Chemical Studies*, **6**(3):1535-37.

Giri, B. and Lenka, P.C. 2007. Effect of time on grafting success in jamun (*Syzigium cumini* Skeel). *Orissa Journal of Horticulture*, **35**: 122-123.

Gotur, M., Sharma, D. K., Chawla, S. L., Joshi, C. J. and Navya, K. 2017. Performance of wedge grafting in guava (*Psidium guajava* L.) under different growing conditions. *Plant Archives*, **17**(2): 1283-1287.

Kalalbandi, B. M., Ziauddin, S. and Shinde, B. N. 2014. Effect of time of soft wood grafting on the success of sapota grafts in 50% shadenet under Marathwada conditions. *Agricultural Science Digest-A Research Journal*, **34**(2): 151-153.

Karna, A. K., Varu, D. K., Patel, M. K. and Panda, P. A. 2018. Effect of grafting time on success of softwood grafting in mango (*Mangifera indica* L.). *International Journal of Current Microbiol and Applied Sciences*, **7**(8): 3072-3077.

Kulkarni, G.M. 1990. Studies on softwood grafting in some dry land fruit crops viz., custard apple (*Armona squamosa*) and jamun (*Syzygium cuminii* Skeel.). M.Sc. (Agri.) Thesis, MAU, Parbhani.

Majumdar, P.K. and Rathod, 1970. Tropical and Sub-Tropical Fruits and Flower cultivation, National Institute of Industrial Research Board, **pp**: 600.

Makavana, P. C., Patel, K. D., Kavad, M. H. and Hathi, D. K. H. 2022. Standardization of grafting time and various environmental conditions in Jamun (*Syzygium cumini* Skeels). *The Pharma Innovation Journal*, **12**(12): 136-140.

Parmar, C. B., Sitapara, H. H., Vasava, S. R. and Chaudhri, H. J. 2019. Effect of different time and growing conditions on growth parameters, success and survival of softwood grafting in mulberry (*Morus nigra* L.) cv. local. *Journal of Pharmacognosy and Phytochemistry*, **8**(3): 2674-2677.

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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. *Agricultural Science Digest*, **27**(1): 18-21.

Ray, A.R., Chaterjee, B.K. and Dash, S.N. 1988. Propagation of Mango (*Mangifera indica* L.) by softwood grafting, M.Sc Thesis, University of Agricultural Sciences, Bangalore.

Ruchitha, T., Honnabyraiah, M. K., Mangala, K. P., Fakrudin, B., Sakthivel, A. S. A. and Shankarappa, K. S. 2022. Studies on soft wood grafting of elite jamun (*Syzygium cuminii* Skeels.) genotypes. *The Pharma Innovation Journal*, **11**(12): 379-38.

Shinde, S.B., Saiyad, M.Y., Jadav, R.G. and Chavda, J.C. 2017. Effect of time on softwood grafting success and survival of jamun grafts (*Syzygium cumini* Skeel). *International Journal of Agriculture Sciences*, **7**(1):83-85.

Singade, 1993. In situ softwood grafting in some dry land fruits as affected by dates of grafting, viz., Custard apple, Tamarind and Jamun. M.Sc. (Agri.) Thesis, MAU, Parbhani.

Singh, S. and Singh, A. K. 2006. Standardization of method and time of propogation in Jammu (*Syzygizun cuminii* Skeels) under semiarid environment of western India. *The Indian Journal of Agricultural Sciences*, **76**(4): 242-245.

Sivudu, B.V., Reddy, M.L.N., Baburatan, P. and Dorajeerao, A.V.D. 2014. Effect of structural conditions on veneer grafting. *Plant Archives*, **14**(1): 71-75.

Muniyappan C, Rajangam J, Kumar CS, Venkatesan K. The Standardization of method and time of propagation in jamun (Syzygium cuminii. Skeels) var. Konkan Bahadoli. Journal of Pharmacognosy and Phytochemistry. 2019;8(3):467-71.

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