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Effect of defoliation and storage of scion stick on sprouting and leaf growth of softwood graft of jamun var. Goma Priyanka

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Abstract
The present study was carried out under poly house condition at Regional Horticultural Research Station, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat, India during the year 2017-2018. The experiment was laid out in Completely Randomized Design with Factorial concept and repeated thrice with eight treatment combinations. The experiment compromising with two factors (1) Effect of defoliation (with and without defoliation) and (2) Effect of storage of scion stick (1, 2, 3 and 4 days). The results of present investigation revealed that among different defoliation treatment and storage of scion stick, defoliated and one day stored scion stick of jamun var. Goma Priyanka, individually superior in all the growth parameters like minimum days required to leaf emergence, maximum number of leaves and leaf area. While, sprouting percentage was significant individually as well as in their combination. Hence it can be concluded that defoliated and one day stored scion stick of jamun var. Goma Priyanka used to softwood grafting for better growth and sprouting of graft.

Keywords: jamun, goma priyanka, sprouting, defoliation and softwood grafting

Introduction
Jamun are generally propagated by both sexual and asexual method. The most common and simplest method of raising the jamun tree is from seed. As tree do not bear true - to- type fruits it leads to immense variation and fruit character. The seeds have no dormancy and hence fresh seeds can be sown but it is not necessary that plant raised from sexual method are identical to mother plants also lack of improved varieties, long gestation period that the plants obtained from seeds take for fruiting are main responsible factors for not cultivating this crop on orchard scale despite its high potential as a dry land horticulture fruit crop and its multifarious uses. In this context the significance of vegetative propagation in maintenance of genetic uniformity and preservation of identity of clone/ cultivar is well recognized in horticultural crops. Therefore, there is immense need to find out a suitable method of vegetative propagation for quick multiplication of elite jamun plants. The research work on vegetative propagation of the crop is rather scanty and sporadic. Singh *et al*. (1979) [10] tried budding and Madalageri *et al*. (1991) [2] tried softwood grafting (vegetative propagation) of jamun with varying degree of success.

Propagation of jamun through softwood grafting is gaining popularity among nursery men and growers. Softwood grafting gives an excellence response in initial success with least possibility of mortality, better and uniform orchard establishment (Ram and Pathak, 2006) [7]. Moreover, transportation of bud sticks from one place to another is an economic proposition as compared to whole plant is costly and liable to be damaged it transit. An alternate solution to this problem is to procure bud sticks. However, the vegetative propagation techniques through softwood grafting is much influenced by the climatic conditions of the region and is mostly carried out on the onset of monsoon, thereby restricting the availability of planting material for that particular season. (Uchoi *et al.*, 2012) [12].

Storage and defoliation of scion sticks are other method to find out the best possible method for softwood grafting, generally defoliation is done to minimize the transpiration of the scion sticks and prevent wilting of it, also with this one can conclude which method is best for preserving the scion stick for long time defoliated or non-defoliated. Storage is other method to check the best period of days in which scion stick can conserve and use for making successful graft union. This method helps for transporting the scion stick to different areas by this method one can know the viability period of scion sticks of jamun and can be send to distance place.

Material and Methods

The present study was carried out under poly house condition at Regional Horticultural Research Station, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat, India during the year 2017-2018 The experiment was laid out in Completely Randomized Design with Factorial concept and repeated thrice with eight treatment combinations. The experiment compromising with two factors (1) Effect of defoliation (with and without defoliation) and (2) Effect of storage of scion stick (1, 2, 3 and 4 days). The effect of this treatments on days required to leaf emergence (days), number of leaves, leaf area (cm^2) and sprouting percentage were studied.

Result and Discussion

Days required to leaf emergence

In the present study significantly the minimum days required to leaf emergence was found in defoliated scion stick treatment compared to non defoliated. It might be due to accumulation of stored carbohydrate material in defoliated scion sticks which helps in early emergence of leaf from bud (Mane and Nalage, 2017) [4]. Also this might be due to defoliation activates buds in the axil of leaves (Jha and Brahmachari, 2002) [1]. Patil *et al.* (1984) [6] concluded that early leaf emergence may be due to higher meristamatic activity presence in swallowed buds which was present in defoliated scion stick that leads to early sprouting and leaf emergence. While, Zimmermann (1958) [13] found that bud in a defoliated shoot are in a position to sprout smoothly due to the fact that when photosynthetic organ of shoot are removed, a sink is created in a defoliated shoot and reserved food materials from the adjoining shoots get mobilized to the defoliated shoots through mass flow.

The minimum days required to leaf emergence was recorded when jamun var. Goma Priyanka scion sticks stored for one day and then used for softwood grafting. While, the increased storage period gradually delayed the days required to leaf emergence of jamun softwood grafts. The least time taken to leaf emergence might be due to abundant accumulation of carbohydrates and other food material in fresh scion stick, which initiates bud activation and they are in position to sprout early. As the storage period increased it takes more time to leaf emergence (Thakar and Shah, 2013) [11]. In the present investigation as storage period increased days required to leaf emergence increased it might be possible that with increasing time of storage, physiological activity of scion stick decreases (Pampana and Sulikeri, 2001) [5].

Number of leaves

It is clear from result that number of leaves significantly influenced by defoliation and storage of scion stick of jamun var. Goma Priyanka at 60, 120 and 180 DAG. Maximum number of leaves were observed in defoliated scion sticks used for grafting while, minimum number of leaves were observed in non defoliated scion stick. This might be due to early sprouting of buds (Sharda *et al.*, 1991) [9] resulting in early and better union of stock and scion there by making the nutritional supply in required quantity easily (Patil *et al.*,1984) [6]. Also it might due to defoliated scion containing more carbohydrate in bud and there were presence of more active and vigorous buds in it (Thakar and Shah, 2013[11] and Shama, 2013[8]) which ultimately gave more number of leaves after bud sprouting.

number of leaves. Maximum number of leaves were observed when one day stored scion stick was used for grafting. While, minimum number of leaves were obtained in four day storage of scion stick. This might be due to rapid decaying of cut ends of scion sticks as the storage period increased which gave less number of leaves in more day stored scion stick (Thakar and Shah, 2013) [11]. Also due to early sprouting and more physiological activity of scion stick during early storage days causing proper graft union leading to more success (Pampana and Sulkari, 2001) [5] in one day stored scion stick.

Leaf area

Data showed that defoliation and storage of scion stick affect significantly with relation to leaf area at 60, 120 and 180 DAG. With respect to defoliation maximum leaf area was observed in defoliated scion stick while, in case of storage period maximum leaf area was noted in 1 day storage of scion stick. This might be due to when defoliated or 1 day stored scion stick used for softwood grafting produced more number of leaves in present investigation which ultimately produced more carbohydrates by photosynthesis and increased leaf area.

Sprouting percentage

From the result obtained in the sprouting percentage of graft was affected significantly by defoliation. The maximum sprouting percentage was observed in defoliated scion shoots over non defoliated might be due to the fact that defoliation causes an immediate rise in sucrose content of phloem sap of shoot. This helps in movement of solutes toward the apex of the shoots and thereby resulting in initiation of higher meristamatic activity at the bud level. This condition helps in better sap flow and good callus formation due to stimulation of cambium division favouring better graft union (Maiti and Biswas, 1980) [3].

Maximum sprouting percentage was noted in 1 day storage of scion stick while, minimum sprouting percentage was found in 4 day storage of scion stick. Among different storage period when the period of storage increased sprouting percentage was significantly decreased. In fresh scion stick, scion cells turgid and highly turgid cell are likely to give rapid proliferation of callus and speedy healing of graft success.

Interaction between defoliation and storage of scion stick of jamun var. Goma Priyanka on sprouting percentage was found significant. Maximum sprouting percentage was observed in jamun var. Goma Priyanka when defoliated scion stick stored for 1 day and then used for softwood grafting. This might be due to defoliated scion stick have more stored carbohydrates and 1 day stored scion stick was more turgid as compared to 2, 3 and 4 days storage which ultimately increased sprouting percentage.

Table 1: Effect of defoliation and storage of scion stick on days required to leaf emergence, number of leaves and leaf area (cm^2) of jamun var. Goma Priyanka

Treatments	Days required to leaf emergence	Number of leaves			Leaf area (cm^2)		
		60 DAG	120 DAG	180 DAG	60 DAG	120 DAG	180 DAG
Defoliation (D)							
D_1 : Defoliated shoot	12.09	10.20	16.95	22.36	24.04	39.50	51.82
D_2 : Non defoliated shoot	16.42	8.39	13.66	18.38	19.03	30.80	41.10

S.Em. ±	0.23	0.14	0.20	0.24	0.40	0.60	0.63
C.D. at 5%	0.69	0.43	0.60	0.73	1.10	1.73	1.90
Storage periods (S)							
S_1 : 1 Day	11.36	10.92	17.93	23.65	26.13	42.20	55.80
S_2 : 2 Day	12.90	9.42	15.79	20.85	21.89	36.40	47.47
S_3 : 3 Day	15.49	8.73	14.30	19.08	19.80	32.30	42.69
S_4 : 4 Day	17.29	8.12	13.23	17.93	18.33	29.65	39.84
S.Em. ±	0.33	0.20	0.28	0.34	0.51	0.81	0.88
C.D. at 5%	0.98	0.61	0.84	1.03	1.54	2.46	2.65
Interaction effect (D×S)							
S.Em. ±	0.46	0.29	0.39	0.48	0.73	1.15	1.25
C.D. at 5%	NS	NS	NS	NS	NS	NS	NS
CV%	5.61	5.35	4.50	4.13	5.85	5.71	4.67

Table 2: Effect of defoliation and storage of scion on sprouting percentage of jamun var. Goma Priyanka

Defoliation Storage period	Defoliated shoots (D_1)	Non defoliated shoots (D_2)	Mean
S_1 – 1 day	81.67	76.67	79.20
S_2 – 2 day	73.33	58.33	65.83
S_3 – 3 day	61.67	55.00	58.33
S_4 – 4 day	56.67	53.33	55.00
Mean	68.33	60.83	
	S.Em.±	C.D. at 5%	C.V. %
D	0.78	2.34	4.18
S	1.10	3.30	
D * S	1.55	4.67	

References

1. Jha UN, Brahmachari VS. Success of stone grafting of mango as influenced by the defoliation of scion and age of root stocks and scion shoots. Hort. J. 2002; 15(1):9-17.
2. Madalageri MB, Patil VS, Nalwadi UG. Propagation of jamun by softwood wedge grafting. My Forest.1991; 27:176-178.
3. Maiti SC, Biswas P. Effect of scion variety and type of scion shoot on success of epicotyls grafting of mango. Punjab Hort. J. 1980; 20(3, 4):152-155.
4. Mane MD, Nalage NA. Studies on period of defoliation and storage condition of scion sticks for soft wood grafting in tamarind (*Tamarindus indica* L.). J. Pharma. and Phytochem. 2017; 6(5):2690-2695.
5. Pampanaa Y, Sulikeri GS. Effect of pre curing and storage of scion stick on the success and growth of softwood grafts in sapota cv. Kalipatti. Karnataka J. Agric. Sci. 2001; 14(4):1025-1029.
6. Patil JD, Warke DC, Patil VK, Gunjkar SN. Studies on epicotyl grafting in mango. Indian J. Horti. 1984; 41:69-72.
7. Ram RA, Pathak RK. Softwood grafting opens new avenues in cultivation of fruit crops. Indian J. Hort. 2006; 63(4):10-11.
8. Shama SB. Studies on the effect of pretreatments, time and method of propagation in mango *(Mangifera indica* L.*)* cv. Baneshan. M.Sc. (hort.) Thesis, Dr. Y. S. Parmar Horticultural University, Solan. (unpublished). 2013.
9. Sharda C, Rao VP, Ravisankar C, Rao SN. Studies on softwood grafting cashew. South Indian Hort. 1991, 39(3):199-123.
10. Singh VR, Pandey IC, Prasad RS. Propagation of jamun by budding. Punjab Hort. J. 1979; 19:74-75.
11. Thakar PD, Shah NI. Effect of scion stick storage methods on growth and success softwood grafts of mango (*Mangifera indica* L.) cv. Kesar. Asian J. Hort. 2013; 8(2):498-501.
12. Uchoi J, Raju B, Debnath A, Shira V. Study on the performance of softwood grafting in jamun. Asian J. Hort. 2012; 7(2):340-342.
13. Zimmerman. Translocation of organic substance in phloem of trees. The Physio. Forest Trees, (Ed. K. V. Thimaned) New York Ronald Press, 1958.