The Pharma Innovation Journal 2022; 11(12): 379-381

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(12): 379-381

www.thepharmajournal.com
Received: 09-10-2022
Accepted: 16-11-2022

Ruchitha T
Ph.D. Scholar, Department of Fruit Science, College of Horticulture, Bengaluru, Karnataka, India

Honnabyraiah MK
Professor and Head, Department of Fruit Science, College of Horticulture, Mysore, Karnataka, India

Mangala KP
Assistant Professor, Department of Agricultural Economics, College of Horticulture, Mysore, Karnataka, India

Fakrudin B
Professor and Head, Department of Biotechnology and Crop improvement, College of Horticulture, Bengaluru, Karnataka, India

Sakthivel
Principal Scientist, Department of Fruit science, IIHR, Bengaluru, Karnataka, India

Ashok S Alur
Professor (SAC), Department of Soil Science and Agricultural Chemistry, College of Horticulture, Bengaluru, Karnataka, India

Shankarappa KS
Assistant Professor (HPT), Department of Plant Pathology, College of Horticulture, Bengaluru, Karnataka, India

Corresponding Author:
Ruchitha T
Ph.D. Scholar, Department of Fruit Science, College of Horticulture, Bengaluru, Karnataka, India

Studies on soft wood grafting of elite jamun (*Syzygium cuminii* Skeels.) genotypes

Ruchitha T, Honnabyraiah MK, Mangala KP, Fakrudin B, Sakthivel, Ashok S Alur and Shankarappa KS

Abstract
A survey was undertaken to evaluate the seedling originated jamun genotypes in eastern dry zone of Karnataka and among them best performing types were selected and subjected to multiplication by softwood grafting. The present investigation was conducted at College of Horticulture, Bengaluru during the year 2021-22. The results revealed that, the per cent graft success was recorded highest in KJA-13 (70.00%) genotype followed by KJA-21 (56.00%) at 60 DAG (Days after grafting). The per cent survivability was highest in KJA-13 (91.66%) and it was on par with KJA-21 (85.47%) and KJA-12 (83.00%), whereas there was no survivability in the genotype KJA-23 at 90 DAG. Comparatively highest number of sprouts was found in KJA-21 (1.85), whereas lowest was recorded in KJA-12 (1.45) and the highest number of leaves was recorded in KJA-13 (8.20) and least in KJA-12 (6.24) at 90 DAG. The graft height was significantly highest (18.50 cm) in KJA-13 which was on par with KJA-21(17.65 cm) whereas, lowest graft height was recorded in KJA-12 (16.21 cm) and the maximum graft girth (5.42 mm) was observed in KJA-12 which was on par with KJA-21(5.23 mm) and KJA-13 (5.16 mm) at 90 DAG.

Keywords: Graft success, survivability, sprouts, graft height and girth

Introduction
Jamun (*Syzygium cuminii* Skeels) is an important underexploited indigenous fruit tree of India. It is a large and evergreen tree of Indian sub-continent belonging to Myrtaceae family. Jamun has gained commercial importance as a minor fruit in tropical and subtropical conditions. India ranks second in production of jamun in the world. Maharashtra is the largest jamun producer followed by Uttar Pradesh, Tamil Nadu, Gujarat and Assam (Singh *et al*., 2011) [11]. The trees has dense foliage and tends to develop umbrella shaped canopy and grows upto 15 m height. Leaves are oblong, smooth and glossy with turpentine smell. The bark is scaly grey and the trunk is forks which has fragrant white flowers in branched clusters. The Fruits are small to large, darkred-purple, ovaloid in shape, single seeded, tasty and pleasantly flavoured. The pulp ranges from dark red, purple to white, juicy with a sweet to astringent taste. It is a versatile fruit tree of both nutritional and medicinal value. The jamun fruits are abundant source of anthocyanins, phenols, pectin, protein and also rich in antioxidant properties. The seed contains jambosin and jambolin, which reduces diastatic conversion of starch into sugars. A well ripen jamun fruit contains glucose and fructose. It is a good source of iron apart from being the source of other minerals, sugars and phytochemicals. The fully ripe fruits are sub-acidic and eaten as fresh or can be processed into a range of products like jam, jelly, squash, wine, vinegar and pickles.

In recent years, jamun fruits are becoming popular among people due to its rich medicinal values particularly for its anti-diabetic properties hence the demand for this fruit has been increasing in metropolitan cities. Looking at the importance of this fruits and high price value, the demand for its planting material is also increasing. However, except one or two, no specific recommended variety is available in India and the farmers are planting seedling originated plants of unknown yield potential and quality. Seed propagation is not advisable as it results in late bearing. Clonal propagation is the easy way to preserve certain characters of variety. The main vegetative methods of propagation like patch budding, T- budding and soft wood grafting are performed in jamun (Shinde *et al*., 2010) [9]. The research work on vegetative propagation of the crop is rather scanty. So, to overcome this lacuna, an attempt was made to propagate the elite jamun genotypes by softwood grafting for commercial multiplication.

Materials and Methods

The present study on "Studies on Soft wood grafting of elite jamun (*Syzygium cuminii* Skeels.) genotypes" was conducted during the year 2021-2022 in shade house at College of Horticulture, Bengaluru. The softwood grafting was performed in four genotypes *viz*., KJA-12, KJA-13, KJA-21 and KJA-23 considered as treatments and those were replicated five times and the experimental design was Completely randomized design (CRD).

Selection and preparation of rootstock and scion

The ten months old uniformly sized vigorous rootstock that are free from pest and disease were selected for softwood grafting. The one year old terminal shoots of pencil thickness and 18-20 cm long scion stick were selected. The scion shoots were collected in the morning hours on or a day prior to grafting. The scions were immediately wrapped in moist cloth and transported in polythene covers or cloth bag to the site of grafting after being detached from the mother trees. Leaves on the scion sticks were removed without damaging the buds and the lower end of the scion stick was given a wedge shape cut of about 4-5 cm.

Grafting technique

The softwood grafting was performed on the day of scion collection. The tip of the root stock was decapitated with the help of sharp knife. The softwood of the rootstock was cut vertically in the form of a cleft to a length of two centimeters with the sharp knife. The scion was prepared by giving an approximately two-centimeter long wedge cut on the morphological base of the scion and removing the bark along with small amount of wood from its opposite edge. The wedge shaped scion thus prepared was inserted into the 'V' shaped split of the stock. The 1.5 cm wide and 15 cm long polythene tape of 200 gauge thickness was used to firmly knot the graft junction after the wedge-shaped scion had been inserted into the cleft of the rootstock. To prevent desiccation of scions, the polycaps were inserted on to the scions to create humidity.

Results and Discussion

Among the thirty genotypes studied during survey, only four superior performing genotypes in terms of yield and quality were selected for multiplication and the observations *viz.*, per cent graft success, per cent survivability, number of sprouts, number of leaves, graft height and graft girth were recorded at monthly intervals.

Per cent graft success (%)

The data pertaining to per cent graft success of elite jamun genotypes at 60 days after grafting (DAG) is presented in Table 1. The per cent graft success was recorded highest in KJA-13 (70.00%) genotype followed by KJA-21 (56.00%). 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) [12, 6, 1]. According to Bhaskaran *et al*. (2008) [3] 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.

Per cent survivability (%)

There was a significant difference between genotypes with respect to per cent survivability at 90 days after grafting and the results are furnished in Table 1. From the data it is evident that the per cent survivability was highest in KJA-13 (91.66%) and it was on par with KJA-21 (85.47%) and KJA-12 (83.00%), whereas there was no survivability in the genotype KJA-23. The temperature and relative humidity activates the cambium cell and the callus tissue arises out of the cambial region. As it is composed of thin walled turgid cells which is responsible for easily desiccation and die back where, relative humidity can protect such cells in the cambial region of the graft union. This might also be attributed to the factor that easy swelling of buds (both axillary and apical) would have caused quick healing of union, leading to better sprouting and growth of grafts. The results are in conformity with the findings of Bharad and Mohorkar (2011) [2] and Kaur and Kaur (2018) [5].

Table 1: Graft success and survivability of selected jamun genotypes

Genotypes	Per cent graft success (60 DAG)	Per cent survival (90 DAG)
KJA-13	70.00 (56.79)*	91.66 (73.22)*
KJA-12	40.00 (39.23)	83.00 (65.65)
KJA-21	56.00 (48.45)	85.47 (67.60)
KJA-23	06.00 (14.18)	00.00 (0.52)
S.Em ±	4.24	5.08
C.D. @ 5%	12.72	15.23

*Values in parenthesis are arc sin transformed values.
DAG-Days after grafting

Number of sprouts

The results with respect to number of sprouts per graft are furnished in Table 2. At 30 DAG, the highest number of sprouts (2.80) was recorded in KJA-13 and the least number of sprouts was recorded in KJA-12 (1.80). At 60 days after grafting, the highest value for the trait was recorded in KJA-13 (2.10), while the least was observed in KJA-12 (1.62). At 90 days after grafting, comparatively highest number of sprouts was found in KJA-21 (1.85), whereas lowest was recorded in KJA-12 (1.45). The sprouting per cent depends on higher meristematic activity and successful graft healing capacity. If the meristematic tissues are more active, there will be higher sprouting, which would influence successful graft healing. The similar results were also reported by Nanditha *et al.* (2017) [8] in Sardar guava.

Number of leaves per sprout

The highest number of leaves (3.11) was observed in KJA-21 genotype while the least number of leaves was recorded in the genotype KJA-12 (1.35) at 30 days after grafting (Table 2). At 60 days after grafting, the highest number of leaves was recorded in KJA-13 (4.25), while the lowest value was recorded in KJA-12 (3.25). At 90 days after grafting, the highest number of leaves was recorded in KJA-13 (8.20) and least in KJA-12 (6.24). Mulla *et al*. (2011) [7] reported that the number of leaves was influenced by season of grafting in jamun. The highest growth of leaves indicates successful union and active growth between the stock and scion. It may also be influenced by the climatic conditions, which in turn influences cambial activity.

Graft height (cm) and girth (mm)

At 30 days after grafting, graft height was significantly highest (14.98 cm) in KJA-13 followed by KJA-21 (13.65 cm). Whereas, lowest graft height was recorded in KJA-21 (12.52 cm). At 60 DAG, the graft height ranged from 13.48 cm to 16.25 cm. At 90 days after grafting, significantly highest graft height (18.50 cm) was observed in KJA-13 which was on par with KJA-21(17.65 cm). Whereas, lowest graft height was recorded in KJA-12 (16.21 cm) (Table 2).

From the data it is evident that at 30 days after grafting, graft girth was significantly highest (4.85 mm) in KJA-21 accession which was on par with KJA-12 (4.77 mm). At 60 DAG, the graft girth ranged from 5.00 mm to 5.09 mm. At 90 days after grafting, significantly maximum graft girth (5.42 mm) was observed in KJA-12 which was on par with KJA-21(5.23 mm) and KJA-13 (5.16 mm). Photosynthates produced by the leaves helps graft union to heal by increasing cambial activity. Meanwhile, roots also gets well-nourished and a strong root system might absorb more nutrients from the soils, which in turn increases height and girth of a graft. The similar results were also reported by Shinde *et al*. (2011) [10], Chander *et al*. (2016) [4] and Kaur and Kaur (2018) [5].

Table 2: Number of sprouts, number of leaves, graft height and girth of selected jamun genotypes at different intervals after grafting

Genotypes	Number of sprouts			Number of leaves / sprout			Graft height (cm)			Graft girth (mm)		
	30 DAG	60 DAG	90 DAG	30 DAG	60 DAG	90 DAG	30 DAG	60 DAG	90 DAG	30 DAG	60 DAG	90 DAG
KJA-13	2.80	2.10	1.50	2.50	4.25	8.20	14.98	16.25	18.50	4.50	5.02	5.16
KJA-12	1.80	1.62	1.45	1.35	3.25	6.24	12.52	13.48	16.21	4.77	5.09	5.42
KJA-21	2.50	1.78	1.85	3.11	3.80	7.10	13.65	14.12	17.65	4.85	5.00	5.23
KJA-23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S.Em ±	0.14	0.15	0.09	0.16	0.12	0.18	0.27	0.15	0.30	0.10	0.10	0.11
C.D. @ 5%	0.43	0.45	0.26	0.47	0.35	0.53	0.82	0.44	0.89	0.30	0.29	0.32

*DAG- Days after Grafting

Conclusion

From the present study, it can be concluded that, the softwood grafting of elite genotype was done to analyze its success and survivability, so that further this genotypes can be used for field trails and selection can be made for future crop improvement to release the best performing jamun genotypes.

References

1. Aseef RM, Kavino M, Vijayakumar RM. Effect of age old rootstocks on growth pattern of grafted scions in jackfruit (*Artocarpus heterophyllus* Lam.). IJCS. 2018;6(5):1951-1954.
2. Bharad S, Mahorkar V. Softwood grafting as useful method of propagation for commercial multiplication of *Syzygium cuminii* L. under semi-arid climatic conditions of India. Acta Hortic. 2011;890:230-234.
3. Bhaskaran A, Saraswathy S, Prathiban S. Standardisation of propagation methods for jack (*Artocarpus heterophyllus* Lam). Asian J Hort. 2008;3(2):361-363.
4. Chander S, Kumar S, Kavino M, Bora L. Effect of seasonal variation on softwood grafting under different environmental conditions in jamun (*Syzygium cumini* Skeels.). Research Crops. 2016;17(3):48-49.
5. Kaur H, Kaur A. Standardization of propagation techniques in jamun. Int. J Curr. Microbiol. App. Sci. 2018;7(10):2143-2151.
6. Khatun M, Saha MG, Khatun MM. Evaluation of exotic jamun germplasm (SC-Ex001) research report on horticultural crops. Horticulture Research Centre Bangladesh; c2014. p. 1701.
7. Mulla BR, Angadi SG, Mathad JC, Patil VS, Mummigatti UV. Studies on softwood grafting in jamun (*Syzygium cumini* Skeels.). Karnataka J Agric. Sci. 2011;24(3):366-368.
8. Nanditha GC, Patil DR, Hipparagi K, Ambresh, Patil SN, Venkateshalu Gandolkar. Study the survivability of grafts in different varieties of guava (*Psidium guajava* L.) by softwood grafting under different growing conditions. Int. J Curr. Microbiol. App. Sci. 2017;6(12):3017-3022.
9. Shinde SB, Saiyad MY, Jadav RG, Chavda JC. Effect of structural conditions on softwood grafting success and survival of jamun grafts (*Syzygium cumini* Skeels.). Asian J Hort. 2010;5:391-92.
10. Shinde SB, Saiyad MY, Jadav RG, Chavda JC. Effect of time on softwood grafting success and survival of jamun grafts (*Syzygium cumini* Skeel). Int. J Agric. Sci. 2011;7(1):83-85.
11. Singh S, Singh AK, Singh HP, Bagle BG, More TA. Jamun. Indian Council of Agricultural Research, New Delhi; c2011. p. 46.
12. Singh S, Singh AK. Standardization of method and time of propagation in jamun (*Syzygium cumini*) under semi-arid environment of western India. Indian J Agric. Sci. 2006;76:142-145.