Journal of Advances in Biology & Biotechnology

Volume 27, Issue 6, Page 831-837, 2024; Article no.JABB.117419
ISSN: 2394-1081

Influence of Planting Dates on Survival and Growth Parameters of Two Jamun (*Syzygium cumini*) Cultivars: 'Goma Priyanka' and 'Ra Jamun'

Priyanka [a++*], Devi Singh [a#] and C. Jhon Wesley [b#]

[a] Department of Horticulture, Sam Higginbottom University of Agriculture Technology and Sciences, Naini, Prayagraj, India.
[b] Centre of Geospatial Technologies, SHUATS, Prayagraj, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/jabb/2024/v27i6946

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/117419

Short Research Article

Received: 21/03/2024
Accepted: 25/05/2024
Published: 30/05/2024

ABSTRACT

The present investigation was carried out in randomized block design with 10 treatment, which were replicated thrice. The treatments were **T_1** (Goma priyanka + 30 January), **T_2** (Goma priyanka + 15 February), **T_3** (Goma priyanka + 1 march), **T_4** (Goma priyanka + 15 march), **T_5** (Goma priyanka + 30 march), **T_6** (Ra jamun + 30 January), **T_7** (Ra jamun + 15 February),**T_8** (Ra jamun + 1 march),**T_9** (Ra jamun + 15 march),**T_{10}** (Ra jamun + 30 march). The experiment was carried out with an objective to study the impact of different planting dates on establishment and growth of jamun under prayagraj agro-climatic condition. On the basis of our experimental finding it can be concluded that the best

[++]M.Sc. Scholar Horticulture (Fruit Science);
[#]Associate Professor;
**Corresponding author: E-mail: priyankasuthar1728@gmail.com;*

Cite as: *Priyanka, Devi Singh, and C. Jhon Wesley. 2024. "Influence of Planting Dates on Survival and Growth Parameters of Two Jamun (Syzygium Cumini) Cultivars: 'Goma Priyanka' and 'Ra Jamun'". Journal of Advances in Biology & Biotechnology 27 (6):831-37. https://doi.org/10.9734/jabb/2024/v27i6946.*

date of planting for jamun was 15th of march. The best variety for prayagraj agro climatic condition was found to be Goma Priyanaka. Ultimately on the basis of our overall finding it can be concluded that when Goma Priyanka was planted at 15th march gives the best result in terms of vegetative growth of the jamun plant.

Keywords: Jamun; date of planting; growth; survivality %.

1. INTRODUCTION

The Jamun, (*Syzygium cuminii),* family Myrtaceae, chromosome no.2n=40 Skeels is a nutritious fruit with a variety of uses. It is one of the most hardy fruit crops and can easily be grown in neglected and marshy areas where other fruits plants cannot be grown successfully Gowtham et al*.,* [1]. The fruit is good source of iron, sugars, minerals, protein and carbohydrate etc. Fully ripened fruits are eaten as fresh fruit and can be processed into beverages like jelly, jam, squash, wine, vinegar and pickles.

Jamun, also known as *Syzygium cumini*, is a tropical evergreen tree native to the Indian subcontinent Ara et al., [2]. It belongs to the Myrtaceae family and can grow up to 30 meters tall. The tree has a dense, spreading crown with glossy, dark green leaves. Its small, fragrant flowers are typically white or cream-colored and are followed by oblong-shaped fruits. The fruit of the jamun tree is a berry, usually ovoid or oblong, with a smooth, dark purple to black skin. Inside, it contains juicy, pinkish-purple flesh surrounding a single, large seed. Jamun fruit has a unique, tangy-sweet flavor with a slightly astringent taste. It is rich in vitamins, minerals, and antioxidants, making it a popular choice in traditional medicine and culinary applications. Jamun trees are often cultivated for their fruit, which is enjoyed fresh, as well as in jams, jellies, juices, and desserts [3,4].

The planting date significantly influences the survival and growth of jamun trees. Optimal planting times coincide with the beginning of the rainy season or during mild weather conditions, allowing the young trees to establish root systems before facing harsh environmental stresses [5-9]. Planting during the rainy season ensures ample moisture for initial growth and reduces transplant shock Hossain et al., [10]. Early planting may promote better root establishment and growth, leading to higher survival rates and faster development. Conversely, late planting, particularly during dry or extreme weather conditions, can increase stress on the newly planted trees, resulting in lower survival rates and slower growth. Additionally, planting during periods of waterlogging or frost can negatively impact root development and overall tree health. Overall, selecting the appropriate planting date is essential for maximizing the survival and growth of jamun trees, ensuring they establish strong root systems and adapt well to their environment, ultimately leading to healthy and productive orchards Magad et al*.,* [11]. Planting dates depend upon the environmental factors and the geographical location of the area affecting growth. There is great variation in plant growth due to natural environmental conditions, therefore planting time cannot be standardized on national scale [12-15]. Environmental conditions vary from one location to other which brings the necessity to work out the planting time for the particular zone to get the best growth of different horticultural crops. Therefore, keeping in view the importance of plant scheduling, attempts were made to examine an applied possibility of plant scheduling of jamun by planting it at different dates to find out the optimum date of planting for establishment and survivality of jamun.

2. MATERIALS AND METHODS

The present investigation entitled “Influence of different planting dates on their survival and growth parameters of two cultivars of jamun (*syzygium cumini*) cv Goma Priyanka and Ra Jamun”. was carried out during 2022-23 at Horticulture Research Farm, Department of Horticulture, Sam Higginbottom University of Agriculture Technology and sciences, Naini, Prayagraj. The present investigation was carried out in randomized block design with 10 treatment, which were replicated thrice. The treatments were $\mathbf{T_1}$ (Goma priyanka + 30 January), $\mathbf{T_2}$ (Goma priyanka + 15 February), $\mathbf{T_3}$ (Goma priyanka + 1 march), $\mathbf{T_4}$ (Goma priyanka + 15 march), $\mathbf{T_5}$ (Goma priyanka + 30 march), $\mathbf{T_6}$ (Ra jamun + 30 January),$\mathbf{T_7}$ (Ra jamun + 15 February),$\mathbf{T_8}$ (Ra jamun + 1 march),$\mathbf{T_9}$ (Ra jamun + 15 march),$\mathbf{T_{10}}$ (Ra jamun + 30 march). The objective of the experiment was to study the best variety suitable for prayagraj and its growth and survivality percentage.

Different planting dates can be considered treatments in agricultural experiments because they represent distinct conditions that can affect plant growth, yield, and overall performance. By comparing outcomes from various planting dates, researchers can determine optimal planting times and understand how environmental factors like temperature and rainfall influence crop development [16].

Survival Percentage: To calculate the survival percentage of plants, divide the number of surviving plants by the total number of plants initially planted, then multiply by 100.

> Survival % = (No. of plants survive / No. of plants sown) x 100

Mortality Percentage:- To calculate the mortality percentage of plants, subtract the number of surviving plants from the total number of plants initially planted, then divide by the total number of plants initially planted, and multiply by 100.

Plant height: Plant height can be measured using a ruler or measuring tape, by determining the distance from the soil surface to the highest point of the plant's stem.

Bud Break: Number of days to bud break were counted manually of five healthy selected plant and data was averaged.

No. of leave: Number of leaves per plant were counted for the five selected plants and were averaged and proceeded for the data analysis.

Plant Spread: The plant spread of the plant was measured from both the direction and the data was observed and the further processed for data analysis.

Leaf area: Leaf area per plant of leaves were counted for the five selected plants and were averaged and proceeded for the data analysis.

Leaf area index: To calculate the Leaf Area Index (LAI) of plants, measure the total leaf area within a defined area on the ground, typically using instruments like a LAI-2000 or through image analysis software. Divide this total leaf area by the ground area sampled. LAI = Total leaf area / Ground area sampled. LAI quantifies leaf density and canopy coverage, crucial for understanding ecosystem functioning.

Chlorophyll Content: To measure chlorophyll content in plants, harvest fresh leaf tissue and extract chlorophyll using a solvent like acetone or ethanol. Measure absorbance of the extract at specific wavelengths (usually 664 nm and 647 nm) using a spectrophotometer

3. RESULTS AND DISCUSSION

The maximum Survivality % was observed in T_3 (Goma priyanka + 1 march) with (78.87) % respectively, followed by T_2 (Goma priyanka + 15 February) with (77.54) % which were significantly superior over T_{10} (Ra jamun + 30 march) with (68.23) %. Early planting allows for establishment before harsh conditions, potentially increasing survival rates. Experimentation across varied planting dates and monitoring survival rates can provide insights into the optimal timing for jamun plantation, aiding in maximizing survival percentages and overall crop success.

The minimum Mortality % was observed in T_3 (Goma priyanka + 1 march) with (21.13) respectively, followed by T_2 (Goma priyanka + 15 February) with (22.46) % which were significantly superior over T_{10} (Ra jamun + 30 march) with (31.77) %. The influence of different planting dates on the Mortality percentage of jamun (*Syzygium cumini*) varies due to climatic conditions, soil moisture, and growth stages. Planting during optimal conditions, such as the onset of the rainy season, typically results in higher Mortality rates due to favorable moisture levels and reduced stress.

The maximum Plant height was observed in T_3 (Goma priyanka + 1 march) with (31.16) cm followed by T_2 (Goma priyanka + 15 February) with (30.42) cm which were significantly superior over T_{10} (Ra jamun + 30 march) with (28.42) cm. Early planting allows for establishment before harsh conditions, potentially increasing Plant height. Experimentation across varied planting dates and monitoring Plant height can provide insights into the optimal timing for jamun plantation, aiding in maximizing Plant height and overall crop success.

The maximum Number of leaves was observed in T_3 (Goma priyanka + 1 march) with (20.83) cm followed by T_2 (Goma priyanka + 15 February) with (20.19) which were significantly superior over T_{10} (Ra jamun + 30 march) with (16.76). Planting during optimal conditions, such as the onset of the rainy season, typically results in higher Number of leaves due to favorable moisture levels and reduced stress.

Table 1. Influence of different planting date on Survivality %, Mortality %, Plant height, Number of leaves and Days to break of Jamun

Symbol	Survivality %	Mortality %	Plant height (cm)					Number of Leaves					Days to bud break
			Initial	30 DAT	60 DAT	90 DAT	120 DAT	Initial	30 DAT	60 DAT	90 DAT	120 DAT	
T_1	70.67	29.33	6.98	11.85	17.52	24.41	30.28	5.01	8.77	13.31	16.43	20.08	4.87
T_2	77.54	22.46	7.12	11.99	17.66	24.55	30.42	5.12	8.88	13.42	16.54	20.19	4.25
T_3	78.87	21.13	7.86	12.73	18.40	25.29	31.16	5.76	9.52	14.06	17.18	20.83	3.96
T_4	76.87	23.13	6.13	11.00	16.67	23.56	29.43	4.98	8.74	13.28	16.4	20.05	6.73
T_5	74.56	25.44	6.78	11.65	17.32	24.21	30.08	4.67	8.43	12.97	16.09	19.74	6.89
T_6	73.87	26.13	6.43	11.30	16.97	23.86	29.73	4.43	8.19	12.73	15.85	19.5	7.43
T_7	72.79	27.21	5.67	10.54	16.21	23.10	28.97	4.21	7.97	12.51	15.63	19.28	7.56
T_8	71.32	28.68	5.98	10.85	16.52	23.41	29.28	4.1	7.86	12.4	15.52	19.17	8.01
T_9	69.57	30.43	5.36	10.23	15.90	22.79	28.66	3.98	7.74	12.28	15.4	19.05	8.56
T_{10}	68.23	31.77	5.12	9.99	15.66	22.55	28.42	3.76	5.45	9.99	13.11	16.76	9.89
F Test	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**
$CD_{@5\%}$	2.543	1.685	0.897	0.88	0.975	0.93	0.893	0.453	0.651	0.569	0.468	0.765	0.764
S.Ed. (±)	1.231	0.814	0.416	0.431	0.462	0.451	0.398	0.231	0.301	0.249	0.221	0.351	0.352

Table 2. Influence of different planting date on Survivality %, Mortality %, Plant height, Number of leaves and Days to break of Jamun

Symbol	Plant spread (cm)					Leaf area (cm^2)					No. of branches	Leaf area Index	Leaf area index
	Initial	30 DAT	60 DAT	90 DAT	120 DAT	Initial	30 DAT	60 DAT	90 DAT	120 DAT			
T_1	7.12	10.33	13.45	18.01	20.99	3.54	4.88	8.22	10.09	12.13	9.01	2.54	59.65
T_2	7.45	10.66	13.78	18.34	21.32	3.76	5.10	8.44	10.31	12.35	9.54	2.76	61.45
T_3	7.86	11.07	14.19	18.75	21.73	3.98	5.32	8.66	10.53	12.57	10.76	2.89	65.87
T_4	7.01	10.22	13.34	17.9	20.88	3.45	4.79	8.13	10.00	12.04	8.43	2.39	55.39
T_5	6.98	10.19	13.31	17.87	20.85	3.39	4.73	8.07	9.94	11.98	7.98	2.21	53.36
T_6	6.12	9.33	12.45	17.01	19.99	3.31	4.65	6.21	8.08	10.12	6.78	2.13	48.37
T_7	5.78	8.99	12.11	16.67	19.65	3.1	4.44	6.00	7.87	9.91	5.87	2.01	46.29
T_8	5.15	8.36	11.48	16.04	19.02	2.98	4.32	5.88	7.75	9.79	5.07	1.98	47.82
T_9	4.49	7.7	10.82	15.38	18.36	2.76	4.10	5.66	7.53	9.57	4.65	1.81	49.35
T_{10}	4.21	7.42	10.54	15.1	18.08	2.48	3.82	5.38	7.25	9.29	4.23	1.67	45.62
F Test	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**
$CD_{@5\%}$	0.463	0.352	0.875	0.859	0.981	0.078	0.098	0.324	0.431	0.738	0.984	0.0541	2.315
S.Ed. (±)	0.231	0.176	0.4375	0.4295	0.4905	0.039	0.049	0.162	0.2155	0.369	0.437	0.03	1.856

The maximum Plant spread was observed in T_3 (Goma priyanka + 1 march) with (21.73) cm followed by T_2 (Goma priyanka + 15 February) with (21.32) cm which were significantly superior over T_{10} (Ra jamun + 30 march) with (18.08) cm. Planting during optimal conditions, such as the onset of the rainy season, typically results in higher Number of leaves due to favorable moisture levels and reduced stress. The increase in number of leaves simultaneously increases the plant sp.

The maximum Leaf area was observed in T_3 (Goma priyanka + 1 march) with (12.57) cm^2 followed by T_2 (Goma priyanka + 15 February) with (12.35) cm^2 which were significantly superior over T_{10} (Ra jamun + 30 march) with (9.29) cm^2. Increase in somatic cell division of leaf increases the leaf area of the plant which also helps in the increasing he plant spread.

The minimum Days to Bud break was observed in T_3 (Goma priyanka + 1 march) with (3.96) days respectively, followed by T_2 (Goma priyanka + 15 February) with (4.25) days which were significantly superior over T_{10} (Ra jamun + 30 march) with (9.89).

The maximum Number of branches was observed in T_3 (Goma priyanka + 1 march) with (10.76) respectively, followed by T_2 (Goma priyanka + 15 February) with (9.54) which were significantly superior over T_{10} (Ra jamun + 30 march) with (4.23). Increase in somatic cell division of branches, increases the bud of the plant which also helps in the initiation of leaf.

The maximum Leaf area index was observed in T_3 (Goma priyanka + 1 march) with (2.89) respectively, followed by T_2 (Goma priyanka + 15 February) with (2.76) which were significantly superior over T_{10} (Ra jamun + 30 march) with (1.67).

The maximum chlorophyll content was observed in T_3 (Goma priyanka + 1 march) with (65.87) respectively, followed by T_2 (Goma priyanka + 15 February) with (61.45) which were significantly superior over T_{10} (Ra jamun + 30 march) with (45.62). Increasing chlorophyll content in plants enhances photosynthesis, the process crucial for converting light energy into chemical energy. This leads to improved growth, higher yields, and enhanced overall plant vigor. Additionally, higher chlorophyll levels can contribute to better stress tolerance and improved resistance against environmental challenges.

4. CONCLUSION

On the basis of our experimental finding it can be concluded that the best date of planting for jamun was 15th of march. The best variety for prayagraj agro climatic condition was found to be Goma Priyanaka. Ultimately on the basis of our overall finding it can be concluded that when Goma Priyanka was planted at 15th march gives the best result in terms of vegetative growth of the jamun plant.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Gowtham KNP, Kuppast IJ,Mankani KL.A review on Luffa acutangula. International Journal of Pharma World Research. 2012;3(1):1–15.
2. Ara N, Kaisar MO, Khalequzzaman KM, Kohinoor H, Ahamed KU. Effect of different dates of planting and lines on the growth, yield and yield contributing characteristics of cauliflower. J. Soil. Nature. 2009;3(1): 16–19.
3. Narasannavar, et al. Heterosis studies in ridge gourd [*Luffa acutangula* (L.), (Heterosis studies in ridge gourd [*Luffa acutangula* (L.)): 2014.
4. Quamruzzaman AKM, Rahman MM, Akter L. Performance of bottle gourd lines in Bangladesh Condition. Annals of Biological Sciences. 2017;5(1):5-7.
5. Rabbani, et al. Variability, Character Association and Diversity Analysis of Ridge Gourd (*Luffa acutangula* Roxb.), Genotypes (SAARC J. Agri). 2012;10(2): 01-10.
6. Ramya B, Kerketta A, Topno SE. Evaluation of different hybrids for growth and yield attributes of bitter gourd (*Momordica charantia* L.):in Prayagraj Region. International Journal of Current Microbiology and Applied Sciences. 2020;9(12):1008-1012.
7. Rathore JS, Collis JP, Singh G, Singh KR, Jat BL. Studies on genetic variability in ridge gourd (*Luffa acutangula* L. (Roxb.)), Genotypes in Allahabad Agro-Climate Condition. International Journal of Current Microbiology and Applied Sciences. 2017;6(2):317-338.
8. Saensuk, et al. A SNP of betaine aldehyde dehydrogenase (BADH), enhances an

aroma (2-acetyl-1-pyrroline), in sponge gourd (*Luffa cylindrica*), and ridge gourd (*Luffa acutangula*), Scientifc Reports. 2022;12:3718.
9. Sharmin, et al. Hypoglycemic and Hypolipidemic Effects of Cucumber, White Pumpkin and Ridge Gourd in Alloxan Induced Diabetic Rats, J. Sci. Res. 2013; 5(1):161-170.
10. Hossain MF, Ara N, Uddin MR, Dey S, Islam MR. Effect of time of sowing and plant spacing on broccoli production. Tropical Agricultural Research and Extension. 2011;14(4):90-92.
11. Magd EI, Abou MM. Evaluation of some broccoli cultivars growth, head yield and quality under different planting dates. Journal of Applied Sciences Research. 2013;9(11):5730-5736.
12. Chavan, et al. Variability and Character Association Studies In Ridge Gourd (*Luffa acutangula* Roxb.), With Reference to Yield Attributes, Journal of Global Biosciences; 2015. ISSN 2320-1355:
13. Choudhary, et al. Genetic divergence in hermaphrodite ridge gourd (*Luffa acutangula*), Vegetable Science. 2011;38(1):68-72.
14. Haque MM, Uddin MS, Mehraj H, Uddin JAFM. Evaluation of snake gourd (*Trichasanthes anguina* L.):test hybrids comparing with four popular checks. International Journal of Applied Science Biotechnology. 2014;2(4):525-528.
15. Kandlakunta B, Rajendran A, Thingnganing L. Carotene content of some common (cereals, pulses, vegetables, spices and condiments) and unconventional sources of plant origin. Food Chemistry. 2008;106:85–89.
16. Kumar R, Kaur K. Effect of planting time and cultivars on growth flowering and seed yield in phlox (*Phlox drumondii*), Seed Research. 2000;28(1):23-6.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/117419