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Studies on Different Varietal Evaluation of Jamun (*Syzygium cumini* L. Skeels) for Establishment under Prayagraj Agro Climatic Condition

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ABSTRACT: The present experiment was carried out during 2020 in Central horticulture research farm of Department of Horticulture, SHUATS, Prayagraj. The experiment was conducted in Randomized Block Design with 7 Variety (treatment) replicated thrice. The treatments were V_1 Narendra-Jamun-6, V_2 Ra-Jamun, V_3 Rajendra Jamun-1, V_4 Jamrul, V_5 Bahadoli, V_6 Farida, V_7 Goma Priyanka From the present investigation. It is found that V_2 Ra-Jamun was found superior in terms of Plant height, Plant spread, number of leaves, plant girth, number of branches per plant, plant spread (E-W and N-S), leaf area and chlorophyll content. The research conducted will help the farmers to select superior Variety of Jamun under Prayagraj agro climatic condition.

Keywords: *Syzygium cumini* L. Skeels, Jamun, varieties, growth, establishment.

INTRODUCTION

Syzygium cumini (L.) Skeels, commonly called as 'jamun' or 'Indian black berry' is one of the most potential underutilized fruit crops, native to the Indian subcontinent. Though the species has been found growing throughout the tropical and subtropical regions of the country. Jamun (*Syzygium cumini* (L) Skeels) is a fruit bearing tree of Indian origin. It is also known by other common names like black plum, java plum, Indian blackberry etc. (Sartaj Ali *et al*., 2015). It is found naturally growing in Thailand, Philipines, Madagaskar and it has been successfully introduced in many other tropical countries including West Indies, California, Algeria and Israel. In India jamun trees are found scattered throughout tropical and sub-tropical regions and in certain pockets of the lower Himalayan ranges up to an elevation of 1600 m. (Mishra *et al*., 2018). The mean values of the 25 fruits of lot 1 showed that the contribution of fresh seed weight to total fruit weight ranged from 20%-80%. Seed coats and cotyledons contributed approximately 6% and 94% to the total seed weight respectively (Devi *et al.,* 2016; Sivasubramaniam and Selvarani 2012); the contribution of the embryos to seed weight was negligible. Jamun trees found in California, especially in the vicinity of Santa Barbara. In Southern Florida, the tree was commonly planted in the past. In Hawaii, fruiting is profuse but only a small portion of the crop is consumed locally. It is mostly available in tropical and subtropical parts of the world. It is one of the most hardy fruit crops and can easily be grown even in marshy areas where other fruits fail to establish (Singh *et al.,* 2007). Being highly cross pollinated by nature, huge variability exists among the seedling populations grown across the country. Variations are available in terms of fruit size, shape, pulp content, TSS and acidity which need documentation for identifying elite clones. In light of its potentiality, commercial jamun orchards are being established in the recent years. But farmers have been growing either seedlings or grafted plants of unknown yield potential due to non-availability of standard recommended varieties (Swamy *et al.,* 2017). *S. cumini* is the most famous among the species producing edible fruits and it is very often cultivated. It is characterizing the available germplasm to identify the elite genotypes of higher yield, better fruit quality and adaptability of utmost importance in jamun crop improvement programs. In addition to these fruit quality related traits, genotypes with dwarf tree stature, less vigorous types and off season bearing needs to be explored in view of area expansion and productivity in jamun (Anushma and Sane 2018). Most common type grown in North India is known as Rasjamun (large, Oblong, deep purple colour fruit). Another type in Varanasi without seed (Narendra Jamun). Highly heterozygous nature and cross pollination make it difficult to predict the characteristics of the hybrid.

MATERIALS AND METHODS

The Experiment was conducted in Randomized Block Design (RBD) with 7 variety and replicated thrice at the

Central farm of Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences Prayagraj during 2020-2021. The total number of variety are seven, V_1 Narendra Jamun -6,V_2 Ra-Jamun,V_3 Rajendra Jamun-1, V_4 Jomrul, V_5 Bahadoli, V_6 Farida, and V_7 Goma Priyanka. The Research conducted it was a challenge to evaluate the best variety among the 7 variety of jamun established. Appropriate material and methods was used according to the requirement of the research trail.

Climatic condition in the experimental site: The area of Prayagraj district comes under subtropical belt in the south east of Uttar Pradesh, which experience extremely hot summer and fairly cold winter. The maximum temperature of the location reaches up to 46°C-48°C and seldom falls as low as 4°C-5°C. The relative humidity ranges between 20 to 94 %. The average rainfall in this area is around 1013.4 mm annually. However, occasional precipitation is also not uncommon during winter months.

RESULTS AND DISCUSSION

During the experimental investigation, observations on various vegetative growth parameters of Jamun (*Syzygium cumini* L. Skeels) were recorded. The results of the investigation, regarding the effect of different Jamun (*Syzygium cumini* L. Skeels) varieties for vegetative growth and survival percentage have been presented in Table 1 and bar-diagrams, wherever required. The findings have been divided into the following sub-headings:

The experiment was conducted in Randomized Block Design (RBD) with 7 variety, and three replications.

The results of the experiment are summarized below.

In terms of survival percentage, maximum and minimum range from (100 and 22.22) with a grand mean of (53.97). The maximum survival plant (100%) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun-6, V_4 Jamrul and V_6 Farida and the minimum survival per plant (22.22%) was recorded with V_7 Goma Priyanka. All the varieties were significantly superior in their survival percentage over V_7 Goma Priyanka.

Plant height (cm): At 90 days after transplanting. The maximum plant height (cm) (107.40) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum plant height (cm) (84.73) was recorded with V_7 Goma-Priyanka at 120 DAT. The maximum plant height (cm) (130.08) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum plant height (cm) (103.65) was recorded with V_7 Goma Priyanka. At 150 DAT. The maximum plant height (cm) (148.57) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum plant height (cm) (115.77) was recorded with V_7 Goma Priyanka at 180 DAT. The maximum plant height (cm) (166.94) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum plant height (cm) (112.10) was recorded with V_7 Goma Priyanka.

Table 1: Effect of different variety of jamun on Survival percentage, plant height, and number of leaves.

Notation	Treatment combination	Survival %	Plant height						Number of Leaves					
			30 DAT	60 DAT	90 DAT	120 DAT	150 DAT	180 DAT	30 DAT	60 DAT	90 DAT	120 DAT	150 DAT	180 DAT
V_1	Narendra Jamun -6	66.67	63.78	80.32	98.35	110.52	123.47	137.58	37.32	48.43	64.37	78.38	91.07	112.79
V_2	Ra-Jamun	100.00	82.24	97.69	84.73	130.08	148.57	166.94	46.32	58.86	72.73	85.95	105.85	134.06
V_3	Rajendra Jamun-1	44.44	78.09	87.02	99.21	116.70	128.72	148.43	36.29	47.33	61.40	74.02	96.15	119.29
V_4	Jamrul	55.56	76.40	86.30	104.11	121.06	128.44	143.11	36.18	49.07	62.70	74.39	94.72	121.85
V_5	Bahadoli	33.33	75.79	85.73	106.92	121.18	131.20	112.10	40.43	53.76	60.41	80.18	93.20	118.12
V_6	Farida	55.56	71.87	83.97	107.40	120.21	128.80	141.62	43.64	56.74	61.95	80.07	96.20	116.56
V_7	Goma Priyanka	22.22	52.39	76.35	88.21	103.65	115.77	126.00	34.74	44.33	57.99	69.97	84.56	94.08
	F-Test	S	S	S	S	S	S	S	S	S	S	S	S	S
	C.D. at 0.5%	33.86	3.82	4.10	2.61	2.36	3.58	2.82	3.86	4.86	3.72	3.67	4.39	5.67
	S.Ed (±)	15.544	1.75	1.88	1.20	1.08	1.64	1.29	1.77	2.23	1.70	1.68	2.01	2.60

Number of leaves plant^{-1}: At 90 DAT, the maximum number of leaves plant^{-1} (72.73) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jomrul and V_6 Farida and the minimum number of leaves plant^{-1} (57.99) was recorded with V_7 Goma Priyanka at 120 days after transplanting. The maximum number of leaves plant^{-1} (85.95) was found in V_2 -Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum number of leaves plant^{-1} (69.97) was recorded with V_7 Goma Priyanka at 150 Days after transplanting. The maximum plant height (cm) (105.85) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum plant height (cm) (84.56) was recorded with V_7 Goma Priyanka at 180 days after transplanting. The maximum number of leaves plant^{-1} (134.06) was found in V_2 Ra-jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum number of leaves plant^{-1} (94.08) was recorded with V_7 Goma Priyanka.

Number of branches plant^{-1}: At 90 days after transplanting, the maximum Number of branches plant^{-1} (5.78) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Number of branches plant^{-1} (4.23) was recorded with V_7 Goma Priyanka at 120 days after transplanting. The maximum Number of branches plant^{-1} (6.58) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Number of branches plant^{-1} (5.17) was recorded with V_7 Goma Priyanka, at 150 days after transplanting. The maximum Number of branches plant^{-1} (7.57) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Number of branches plant^{-1} (6.84) was recorded with V_7 Goma-Priyanka at 180 days after transplanting. The maximum Number of branches plant^{-1} (8.40) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Number of branches plant^{-1} (6.78) was recorded with V_7 Goma-Priyanka.

Stem diameter (cm): At 90 Days after transplanting The maximum Stem diameter (cm)(5.24) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum stem diameter (cm) (3.22) was recorded with V_7 Goma Priyanka at 120 days after transplanting. The maximum Stem diameter (cm) (5.88) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Stem diameter (cm) (4.56) was recorded with V_7 Goma Priyanka at 150 days after transplanting. The maximum stem diameter (cm) (6.49) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Stem diameter (cm) (5.40) was recorded with V_7 Goma Priyanka at 180 days after transplanting. The maximum Stem diameter (cm) (7.67) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Stem diameter (cm) (6.08) was recorded with V_7 Goma-Priyanka.

Table 2: Effect of different variety of jamun on No. of branches, stem diameter, and leaf area.

Notation	Treatment combination	Number of branches						Stem Diameter						Leaf Area
		30 DAT	60 DAT	90 DAT	120 DAT	150 DAT	180 DAT	30 DAT	60 DAT	90 DAT	120 DAT	150 DAT	180 DAT	
V1	Narendra Jamun -6	3.19	4.44	5.08	5.38	6.25	7.22	2.52	2.94	3.22	4.64	6.07	6.86	33.61
V2	Ra-Jamun	3.68	4.78	5.78	6.58	7.57	8.40	3.19	4.75	5.20	5.79	6.49	7.61	37.52
V3	Rajendra Jamun-1	3.24	4.31	5.23	6.16	7.19	8.00	2.65	4.52	5.24	5.88	6.19	7.20	36.14
V4	Jamrul	3.40	4.27	5.14	5.85	7.34	8.18	2.38	3.84	5.16	5.17	6.36	7.67	33.04
V5	Bahadoli	2.76	4.19	5.22	6.20	6.88	7.68	2.55	3.80	4.77	5.24	6.33	7.18	34.40
V6	Farida	2.60	4.26	5.45	6.40	6.56	7.46	2.46	4.94	4.43	5.50	6.30	7.03	33.33
V7	Goma Priyanka	2.05	3.17	4.23	5.17	6.12	6.78	2.10	3.14	4.19	4.56	5.40	6.08	20.59
	F-Test	S	S	S	S	S	S	S	S	S	S	S	S	S
	C.D. at 0.5%	0.272	0.262	0.500	0.434	0.350	0.658	0.376	1.178	0.192	0.257	0.407	0.209	3.978
	S.Ed (+)	0.125	0.120	0.230	0.199	0.160	0.302	0.172	0.541	0.088	0.118	0.187	0.096	1.826

Plant spread (cm) (E-W): At 90 days after transplanting. The maximum Plant spread (cm) (E-W) (13.22) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Plant spread (cm) (E-W) (8.60) was recorded with V_7 Goma Priyanka at 120 days after transplanting. The maximum Plant spread (cm) (E-W) (14.42) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Plant spread (cm) (E-W) (10.20) was recorded with V_7 Goma Priyanka at 150 days after transplanting. The maximum plant spread (cm) (E-W) (16.39) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Plant spread (cm) (E-W) (13.38) was recorded with V_7 Goma Priyanka at 180 days after transplanting. The maximum Plant spread (cm) (E-W) (17.20) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum plant spread (cm) (E-W) (14.51) was recorded with V_7 Goma-Priyanka.

Plant spread (cm) (N-S): At 90 Days after transplanting. The maximum Plant spread (cm) (N-S) (13.11) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Plant spread (cm) (N-S) (8.60) was recorded with V_7 Goma-Priyanka at 120 Days after transplanting.

The maximum Plant spread (cm) (N-S) (14.60) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum Plant spread (cm) (N-S) (10.19) was recorded with V_7 Goma-Priyanka at 150 Days after transplanting. The maximum plant spread (cm) (N-S)(17.21) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum plant spread (cm) (N-S) (13.52) was recorded with V_7 Goma Priyanka at 180 days after transplanting. The maximum Plant spread (cm) (N-S) (17.56) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum plant spread (cm) (N-S) (14.68) was recorded with V_7 Goma-Priyanka.

Leaf area (cm^2) had maximum and minimum range from (37.52 to 20.59) with a grand mean of (32.66). The maximum leaf area (cm^2) (37.52) was found in V_2

Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum leaf area (cm^2) (20.59) was recorded with V_7 Goma Priyanka.

The chlorophyll content (SPAD) had maximum and minimum range from (71.44 to 47.42) with a grand mean of (57.38). The maximum chlorophyll content (SPAD) (71.42) was found in V_2 Ra-Jamun varieties followed by V_1 Narendra Jamun -6, V_4 Jamrul and V_6 Farida and the minimum chlorophyll content (SPAD) (47.42) was recorded with V_7 Goma Priyanka.

Table 3: Effect of different variety of jamun on Plant spread E-W, Plant spread N-S, and Chlorophyll content.

Notation	Treatment combination	Plant spread E-W						Plant spread						Chlorophyll content
		30 DAT	60 DAT	90 DAT	120 DAT	150 DAT	180 DAT	30 DAT	60 DAT	90 DAT	120 DAT	150 DAT	180 DAT	
V_1	Narendra Jamun -6	7.72	8.36	9.81	10.25	13.38	15.61	6.25	7.24	9.73	10.37	13.52	15.49	62.61
V_2	Ra-Jamun	10.46	12.74	13.22	14.42	16.39	17.20	8.22	9.75	13.11	14.60	17.21	17.56	71.44
V_3	Rajendra Jamun-1	8.44	10.39	12.63	13.23	14.59	15.48	8.23	9.41	12.66	13.41	14.41	16.14	57.41
V_4	Jamrul	8.45	10.25	12.47	13.45	15.55	16.43	8.20	9.30	12.52	13.78	15.49	16.84	54.70
V_5	Bahadoli	8.55	10.46	12.21	13.50	13.86	14.90	8.59	9.77	12.18	13.52	15.09	15.14	53.18
V_6	Farida	9.25	10.26	12.74	14.15	15.49	16.11	8.24	9.43	12.66	14.31	15.49	16.34	54.93
V_7	Goma Priyanka	6.68	8.09	8.60	10.20	13.71	14.51	6.02	7.25	8.60	10.19	13.65	14.68	47.42
	F-Test	S	S	S	S	S	S	S	S	S	S	S	S	S
	C.D. at 0.5%	0.377	0.249	0.204	0.378	1.107	0.504	0.503	1.158	0.117	0.344	1.159	0.209	3.579
	S.Ed (±)	0.173	0.144	0.093	0.174	0.508	0.231	0.231	0.531	0.054	0.158	0.730	0.096	1.643

CONCLUSION

From the present investigation it may be concluded that Jamun V_2 Ra-Jamun resulted in highest survival percentage and vegetative growth parameters like plant height (cm), number of leaves $plant^{-1}$, number of branches $plant^{-1}$, stem diameter (cm), plant spread (cm) (e-w), plant spread (cm) (n-s), leaf area (cm^2) and chlorophyll content (spad). All the varieties were significantly superior in their survival percentage and vegetative growth parameters over V_7 Goma Priyanka. Since this is based on one season trail therefore, further evaluation trails are needed to substantiates the findings. Further research on varietal evaluation of the 7 jamun variety should be carried out for more relevant findings about these 7 varieties of Jamun.

Conflict of interest. None.

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