Plant Archives Vol. 24, Special Issue (GABELS), 2024 pp.165-168 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org

DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2024.v24.SP-GABELS.025

EVALUATION OF DIFFERENT GENOTYPE OF TUBEROSE (*POLIANTHES TUBEROSA* L.) FOR VEGETATIVE GROWTH AND YIELD CHARACTERS

Samir Kumar Tamrakar* and Alka

Department of Floriculture and Landscape Architecture, College of Agriculture
Indira Gandhi Agricultural University, Raipur, Chhattisgarh- 492012, India
*Corresponding author E-mail: Kumarsamir2008@yahoo.com; Mobile no. 9694206413

ABSTRACT

A field experiment was conducted at Horticulture Research cum Instructional Farm, Department of Floriculture and Landscape Architecture, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur during Rabi 2021-22 and 2022-23. The experiment was laid out in Randomized Block Design with 11 cultivars of tuberose viz., Mexican Single (T_1), Hyderabad Single (T_2), ArkaNirantara (T_3), Kalyani Single (T_4), Star 505 (T_5), Arka Sugandhi (T_6), Sikkim Selection (T_7), Kolkata Single (T_8), Prajjwal (T_9), Phule Rajni (T_{10}) and GKTC-4 (T_{11}) and replicated each at three times. The results of study revealed that the cultivar Prajwal (T_9) recorded tallest plant (65.30 cm), number of leaves plant^{-1} (96.95), yield of spike plant^{-1} (5.44), spike plot^{-1} (205.65), spike ha^{-1}(3.94 lacs), weight of floret^{-1} plot^{-1}year^{-1}(15.56 kg), floret^{-1}ha^{-1}year^{-1} (294.91 q) and weight of florets spike^{-1}(86.71 g) was recorded in cv. Hyderabad Single (T_2). On the basis of all parameters of different tuberose cultivars, cv. Prajwal (T_9), Hyderabad Single (T_2), Kolkata Single (T_8) and Arka Sugandhi (T_6) were identified as promising tuberose varieties may be preferred for cut flower production as well as loose flower production under Chhattisgarh plains.

Introduction

Tuberose (*Polianthes tuberosa L.*) belongs to family Amaryllidaceae and native to Mexico (Trueblood, 1973). *Polianthes* derived from a greek word '*Polis*' means white or shinning and '*anthos*' means flower. It is commonly known as Gulchari and Gulshabbo in Hindi, Sukandarji and Nelasanpengi in Telugu, Nilasompangi in Tamil, Rajanigandha in Bengali and Sugandharaja in Kannad. Genus *Polianthes*, having almost fifteen species out of them twelve species have been reported from Mexico and Central America having white flowers, one is white tinged with red and two are red. Tuberose is half-hardy, herbaceous perennial, bulbous plant. It is a monocotyledon and an erect herb having 60-120 cm height with short and sturdy bulbs. Tuberose flowers are valued by their aesthetic world for their beauty and delightful fragrance. Tuberose is grown in beds, borders and as potted plants (Sathynarayana *et al.*, 1994). In India commercially grown major flowers such as Rose, Tuberose, Gladiolus, Anthurium, Carnation and Marigold etc.It is a leading bulbous ornamental flowering plant of tropical and subtropical areas and greatly influenced by climatic condition and genetic factor. There are many excellent varieties of tuberose with splended inflorescence in full length, varying number of flowers size and wide range of keeping quality. Now-a-days the commercial cultivation of tuberose is gaining importance, introduction and identification of high yielding varieties is necessary. Considering the importance of these aspects the research was undertaken with the objective of varietal evaluation of tuberose for better vegetative growth and cut as well as loose flower production under Chhattisgarh plains

Materials and Methods

The present investigation was carried out at Horticulture Research cum Instructional Farm, Department of Floriculture and Landscape Architecture, College of Agriculture, Indira Gandhi

Krishi Vishwavidyalaya, Raipur during Rabi 2021-22 and 2022-23. The experiment was laid out in Randomized Block Design with 11 cultivars of tuberose viz., Mexican Single (T_1), Hyderabad Single (T_2), Arka Nirantara (T_3), Kalyani Single (T_4), Star 505 (T_5), Arka Sugandhi (T_6), Sikkim Selection (T_7), Kolkata Single (T_8), Prajjwal (T_9), Phule Rajni (T_{10}) and GKTC-4 (T_{11}) and replicated each at three times. Healthy and disease free bulbs of eleven tuberose genotypes were used in this experiment. The land was brought to fine tilth by repeated ploughing and harrowing. The plots of required size were prepared. Well decomposed farm yard manure was applied before the land preparation @ 25 tonnes per hectare and mixed well into the soil. Healthy bulbs were planted on ridges at a spacing of 45 X 30 cm and light irrigation was given immediately after planting. Gap filling was done whenever it was necessary. Five plants were selected at random within the net plot area of each treatment and replication for the purpose of recording the observations. The mean value of the data recorded from five plants in each treatment of the three replications was taken to represent a particular variety with respect to a character. The data on various biometric parameters recorded during the crop growth period of this study was subjected to statistical analysis as per the procedures suggested by Panse and Sukhatme (1969).

Results and Discussion

Vegetative Parameters

Plant height (cm)

The data measured to plant height as shown by different cultivars of tuberose had been presented in Table 1. Plant height ranged between 45.48 cm to 65.30 cm. significantly superior plant height (65.30 cm) was recorded in cv. Prajwal (T9), which remained at par with Mexican Single (T_1), Hydrabad Single (T_2) and Star-505 (T_5). Conversely, the minimum plant height (45.48 cm) was observed in cv. Arka Sugandhi (T_6). This variation in the plant height among all these genotype might be due to the differences in the genetic structure that influenced the plant hormones natural activity in stem. Prajwal found to be superior that may be higher growth which is controlled by cell division and cell elongation and longer and wider leaves. These results are in agreement to those reported by Singh *et al.* (2017), Naik *et al.* (2018), Dalvi *et al*. (2021), Lalthawmliana *et al*. (2017) and Sateesha *et al.* (2011) in tuberose.

Number of leaves plant^{-1}

The data regarding displays the number of leaves plant^{-1} had been presented in Table 1 that different genotype of tuberose significantly differed on number of leaves production during both the year of experimentation as well as in pooled basis. It is evident from the data presented in table 1.that significantly more number of leaves plant^{-1} (96.95) was recorded in cultivar Prajwal (T9). The data also clearly depicted that it was followed by with cv. Mexican Single (T_1) and Phule Rajni (T_{10}). On the contrast, least number of leaves plant^{-1} (44.12) was recorded in cv. Sikkim Selection (T_7). Plant height also correlated with production of leaves. The variation of number of leaves per plant among various genotypes may be due to the hereditary traits, which is further modified by prevailing environmental condition. Similar findings were also reported by Sateesha *et al.* (2011) and Desai and Chawla (2010) in tuberose.

Table 1: Effect of different genotypes on vegetative and yield parameters of tuberose (Pooled data of 2021-22 & 2022-23)

Treat.	Treatments (Cultivars)	Plant Height (cm)	No. of leaves plant^{-1}	Weight of florets spike^{-1} (g)	Yield of Spikes plant^{-1}
T_1	Mexican Single	60.96	84.30	69.05	3.36
T_2	Hyderabad Single	60.73	64.89	86.71	4.19
T_3	Arka Nirantara	54.97	78.99	65.12	3.03
T_4	Kalyani Single	52.68	74.65	45.03	2.43
T_5	Star-505	60.00	72.07	75.51	2.52
T_6	Arka Sugandhi	45.48	67.66	63.67	3.00
T_7	Sikkim Selection	49.47	44.12	11.75	1.97
T_8	Kolkata Single	58.38	75.42	71.91	4.68
T_9	Prajjwal	65.30	96.95	77.23	5.44
T_{10}	Phule Rajni	53.73	84.47	74.05	3.92
T_{11}	GKTC-4	52.02	63.54	36.79	3.16
	SEm (±)	**1.92**	**0.73**	**0.79**	**0.17**
	CD (P=0.05%)	**5.66**	**2.17**	**2.34**	**0.50**

Yield Parameters

Weight of florets spike^{-1} (g)

The data of experiment regarding weight of florets spike^{-1} as influenced by different cultivars of tuberose has been presented in table 1. The data clearly depicted that maximum weight of florets spike^{-1} (86.71 g) was recorded in treatment T_2 (Hydrabad Single) which was followed by with T_5 (Star-505) and T_9 (Prajwal). Meanwhile, minimum weight of florets spike^{-1} (11.75 g) was noted in cultivar T_7 (Sikkim Selection).This variation in the weight of florets spike^{-1} may be due to varietal character and environmental condition. It was also concluded that this parameter is in direct relation with weight of individual floret. This has been confirmed by Patil *et al.* (2009) for maximum weight of flower spike (152.6 g) in Prajwal to support this present study.

Yield of spikes plant^{-1}

The data on yield of spikes plant^{-1} was recorded during both the experimental years and in pooled mean and presented in table 1. It ranged from 1.97 to 5.44. The data revealed that different genotype differed significantly in tuberose to yield of spikes plant^{-1} during both the experimental years and in pooled mean basis. Cv. Prajwal (T_9) resulted significantly highest yield of spikes plant^{-1} (5.44) which was followed by treatment T_2 (Hyderabad Single) and T_8 (Kolkata Single). Whereas, cv. Sikkim Selection (T_7) recorded minimum yield of spikes plant^{-1} (1.97). The more production of spikes has direct relation with better vegetative growth of the plants, which leads to the production of more number of spikes per plant; in turn it results in increased spike yield per plant and per hectare. These results were also experimentally supported by the findings of Dalvi *et al.* (2021), Sateesha *et al*. (2011) and Krishnamoorthy (2014) tuberose.

Yield of spikes plot^{-1}

The data measured to yield of spikes plot^{-1} as shown by different cultivars of tuberose had been presented in table 2.The result depicted in table 3.clearly revealed that significantly highest yield of spikes plot^{-1} (205.65) was registered in cv. Prajwal (T_9). It was noted followed by treatment T_2 (Hydrabad Single) and T_8 (Kolkata Single).While, minimum yield of spikes plot^{-1} (72.57) was observed in treatment T_7 (Sikkim Selection). Yield of spikes plot^{-1} is directly correlated with yield of spike plant^{-1}. These results were also experimentally supported by the findings of Gorivale *et al.* (2020) and Dalvi *et al.* (2021) in tuberose.

Yield of spikes ha^{-1}

The data clearly showed depicted in table 2. The significantly highest yield of spikes ha^{-1} (3.94 lacs) was registered in treatment T_9 (Prajwal) and it was followed by treatment T_2 (Hydrabad Single) and T_8 (Kolkata Single). Moreover, minimum yield of spikes ha^{-1} (1.42 lacs) was recorded in cv. Sikkim Selection (T_7). Yield of spikes ha^{-1} is directly correlated with yield of spike plant^{-1} and plot^{-1}. This variation in spikes ha^{-1} due to genetic factor, environmental conditions and more number of leaves are in accordance with the findings of Naik *et al.*,(2018), Sateesha *et al*. (2011) and Patil *et al.* (2009) in tuberose.

Weight of florets^{-1}plot^{-1}year^{-1} (kg)

Data pertaining to weight of florets^{-1}plot^{-1}year^{-1} influenced by various cultivars has been presented in table 2. Maximum weight of florets^{-1}plot^{-1}year^{-1}(15.56 kg) was recorded in Prajwal (T_9) that was found at par with treatment T_2 (Hyderabad Single) whereas, minimum weight of florets^{-1}plot^{-1}year^{-1} (0.98 kg) was found in T_7 (Sikkim Selection). More weight of florets^{-1}plot^{-1}year^{-1} might be due to relation production of more number of spike/plot that leads to production of more number of florets/ plant. Similar trends were also observed by Naik *et al.* (2018) and Dalvi *et al.* (2021) in tuberose.

Weight of florets^{-1} ha^{-1} year^{-1}(q)

The tuberose cultivars exhibited a wide range of variation with respect to weight of florets^{-1} ha^{-1} year^{-1}has been presented in table 2.Significantly maximum weight of florets^{-1} ha^{-1} year^{-1}(294.91 q/ha) was recorded in treatment T_9 (Prajwal).This treatment T_9 (Prajwal) was noted significantly at par with treatment T_2 (Hydrabad Single). However, the minimum weight of florets^{-1} ha^{-1} year^{-1} (19.50 q/ha) was recorded in Sikkim Selection (T_7). More weight of florets^{-1}ha^{-1}year^{-1} might be due to relation production of more number of spike / ha that leads to production of more number of florets/ plant. Similar trends were also observed by Naik *et al.* (2018) and Dalvi *et al.* (2021) in tuberose.

Table 2 : Effect of different genotypes on yield parameters of tuberose (Pooled data of 2021-22 & 2022-23)

Treat.	Treatments (Cultivars)	Weight offlorets^{-1}plot^{-1} year^{-1} (kg)	weight of florets^{-1} ha^{-1} year (q)^{1}	Yield of Spikes plot^{-1}	Yield of Spikes ha^{-1} (lacs)
T_1	Mexican Single	7.83	147.61	115.64	2.21
T_2	Hyderabad Single	15.32	290.29	177.01	3.40
T_3	Arka Nirantara	7.09	133.93	111.15	2.15
T_4	Kalyani Single	3.72	72.41	81.47	1.61
T_5	Star-505	6.47	122.72	93.11	1.82
T_6	Arka Sugandhi	6.75	130.51	105.37	2.04
T_7	Sikkim Selection	0.98	19.50	72.57	1.42
T_8	Kolkata Single	12.76	239.89	175.21	3.34
T_9	Prajjwal	15.56	294.91	205.65	3.94
T_{10}	Phule Rajni	10.93	206.54	150.56	2.89
T_{11}	GKTC-4	4.85	93.58	120.62	2.32
	SEm (±)	**0.76**	**13.38**	**7.10**	**0.13**
	CD (P=0.05%)	**2.23**	**39.45**	**20.93**	**0.38**

References

Dalvi, N.V., Salvi, B.R., Pawar, C.D., Salvi, V.G., Dhekale, J.S., Joshi, M.S. and Khandekar, R.G. (2021).Varietal evaluation on tuberose (*Polianthes tuberosa L.*) under Konkan agro climatic conditions. The Pharma Innovation J., 10(10): 444-447.

Desai, J.R. and Chawla, S.L. (2010). Assessment of tuberose varieties under agro-climatic conditions of south Gujarat. *National Symposium on Lifestyle Floriculture Challenges and Opportunities*, Dr YS Parmar University of Horticulture and Forestry Solan,: 25-26.

Gorivale, A.A., Dalvi, N.V., Salvi, B.R., Pawar, C.D. Joshi, M.S., Khandekar, R.G., Mane, P.S. and Narute, T.T. (2020). Studies on Vase Life of Tuberose (*Polianthes tuberose L.*) varieties by Use of Aluminium Sulphate. *Int. J. Curr. Microbiol. App. Sci*., 11: 1919-1922.

Krishnamoorthy, V. (2014). Assessment of tuberose (*Polianthes tuberosa*) varieties for growth and yield characters. *The Asian J. Horticulture*, 9: 515-517.

Lalthawmliana, A., Keditsu, R., Buchem, Y.A. and Bagang, L. (2017). Evaluation of tuberose (*Polianthes tuberose L.)* cultivars under the foothill conditions of Nagaland. *J. Ornamental Horticulture*, 20 (1&2): 69-74.

Naik, B.C., Kamble, B.S., Shantappa, T. and Parit, S. (2018). Evaluation of different genotypes of tuberose (*Polianthes tuberosa L.*) for growth, flowering and yield characters. *Int. J. Curr. Microbiol. App. Sci*., 7(7): 4135- 4141.

Panse, V.G. and Sukhatme, P.V. (1967). Statistical Methods for Agricultural Workers, ICAR, New Delhi.

Patil, V.S., Munikrishnappa, P.M. and Shantappa, T. (2009). Performance of growth and yield of different genotypes of tuberose under transitional tract of north Karnataka. *Journal of Ecobiology*, 24, 327-33.

Sateesha, G.R., Kumar, A. and Biradar, M.S. (2011). Performance of different tuberose varieties under field conditions. *Plant Archives*, 11, 467-468.

Sathyanarayana, R.B., Singh, K., Singh, A. and Saini, A. 1994.Studies on effect of bulb size in tuberose. *Advances in Agricultural Research in India*, 2(1): 123-130.

Singh, A.K. and Jonah, D. (2017). Evaluation on performance and superiority of tuberose (*Polianthes tuberosa L.*) cultivars for growth and flowering under North Indian plain. *Environ. Ecol*., 35: 341-345.

Trueblood, E.W.E. (1973). "Omixochitl" -the tuberose (*Polianthes tuberosa*). *Econ. Bot*., 27: 157-173.