



## PERFORMANCE OF SINGLE PETALLED TUBEROSE (*Polianthes tuberosa* L.) GENOTYPES UNDER PUNE CONDITION

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**ABSTRACT :** Tuberose (*Polianthes tuberosa*) is one of the popular flower crop cultivated for loose flower and cut flower in India and also holds a great potential for export. Therefore, an experiment was conducted at the research farm of ICAR-Directorate of Floricultural Research, Shivajinagar, Pune to evaluate performance of seven genotypes of tuberose viz., Mexican Single, Sikkim Selection, Arka Shringar, Phule Rajani, Hyderabad Single, Arka Prajwal and Arka Nirantara for their performance under Pune condition. The study revealed that significant variation was recorded on vegetative growth and floral parameters among the evaluated genotypes. Cultivar Arka Prajwal produced significantly taller plants (62.27 cm) followed by Arka Nirantara (60.27 cm). Cultivar Phule Rajani (23.86) recorded highest number of bulbs produced per clump followed by Hyderabad Single (18.00) and Mexican Single (11.60). Genotype Sikkim Selection produced tallest spike (108.43 cm) followed by cv. Arka Prajwal (104.41 cm). Cultivar Arka Prajwal produced significantly higher rachis length (34.70 cm), fresh weight of cut spike (121.67 g), diameter of open florets (4.36 cm) and weight of 20 open (37.00 g) and mature (27.33 g) floret compared to other genotypes. Cultivar Arka Nirantara produced maximum number of florets per spike (57.60) followed by cv. Arka Prajwal (53.33).

**Keywords :** Bulb, bulblet, floret, spike, tuberose.

Tuberose (*Polianthes tuberosa* L.) belonging to the family Agavaceae, is an important commercial flower crop grown in many countries of the world including India. It is a bulbous perennial plant with tuberous roots and produce long spikes which have waxy, white and fragrant flowers. The pure white florets on long spikes can be combined well with any garden plant. Tuberose florets emit a delightful fragrance and are good source of essential oils which is considered as one of the most valuable perfumery material (Guenther, 2). Tuberose plants are helpful in phyto-remediation of soils contaminated with chromium (Ramana *et al.*, 7). Tuberose florets are used as loose flower in garlands, floral decoration, etc. while the flowering spikes are used as cut flower in bouquets, vase decoration, etc. Tuberose florets are highly fragrant and contain 0.08% to 0.14% concrete, which is extracted on a commercial scale from Single petalled florets and used in high grade perfumes. The two important perfumery products of tuberose are concrete and absolute. Concrete contains waxes, the fragrant materials and is considered as the basic perfumery material. The concrete and absolute both have cosmetic uses in soaps, toiletries, beauty products and

in tobacco industry. It is also used as an important base material which is mixed with other flower perfume. Apart from domestic consumption, tuberose flowers and concrete/absolute have great export potential also (Singh *et al.*, 9; Martolia and Srivastava, 6).

As commercial cultivation of tuberose is gaining importance, introduction and identification of higher yielding cultivars of tuberose is necessary. A particular cultivar which perform well in one region, may not perform same in other regions of varying climatic condition. It is also important to study the performance of existing genotypes for their superior desirable characters. Hence, it becomes very much necessary to study the morphological variation and evaluation of genotypes and also to identify the suitable germplasm for further improvement programme. Hence, the present investigation was undertaken to evaluate the relative performance of seven Single petalled tuberose genotypes for their vegetative growth, floral and bulb production parameters under Pune (Maharashtra) condition.

### MATERIALS AND METHODS

The present study was conducted under open field condition at the research farm of ICAR -Directorate of Floricultural Research, College of

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Agriculture Campus, Shivajinagar, Pune (Maharashtra State) during 2015-2016. The experiment consisted of seven Single petalled tuberose genotypes viz. Mexican Single and Sikkim Selection (traditional genotypes); Shringar, Arka Prajwal and Arka Nirantara (released by ICAR-IIHR, Bengaluru); Phule Rajani (released by MPKV, Rahuri - Ganeshkhind (Pune), Station); and Hyderabad Single (released by the Acharya N.G. Ranga Agricultural University – Agricultural Research Station, Hyderabad) were selected for this study. The experiment was laid out in randomized block design with three replications. Before initiating the experiment the soil was brought to a fine tilth with deep ploughings. Weeds, stubbles, stones, roots, etc. were removed from the plots. Uniform size bulbs with a diameter of 2.0-3.0 cm, were planted at a depth of 8-10 cm in the plot size of 5.0 x 2.0 m at a spacing of 30 x 30 cm. Uniform package of practices were followed along with nutritional application and normal flood irrigation to grow a healthy crop. Data were recorded on various vegetative growth, flowering and bulb development parameters upto 10 months of planting (Tables 1 & 2). Data were statistically analysed as per method suggested by Gomez and Gomez (3).

## RESULTS AND DISCUSSION

### Vegetative growth and bulb development parameters

The statistically analyzed data presented in Table 1 revealed that significant variation was recorded on studied vegetative growth parameters among the evaluated genotypes. Cultivar Arka Prajwal produced significantly taller plants (62.27 cm) followed by Arka Nirantara (60.27 cm). Cultivar Arka Prajwal also recorded significantly wider leaf (2.35 cm) when compared with other studied genotypes. Significantly maximum number of tillers per clump (18.60 cm), number of leaves per clump (162.46) and fresh weight of leaves per clump (346.26 g) was obtained in Mexican Single genotype. However, there was non-significant difference for fresh weight of leaves per clump among the genotypes viz Mexican Single, Arka Prajwal (311.93 g), Phule Rajani (287.53g) and Arka Nirantara (284.40 g). Table 1 also indicated that significantly minimum plant height (49.90 cm), number of tillers per clump (5.33), number of leaves per clump (62.60), fresh weight of leaves per clump (119.93 g) and width of leaves (1.20 cm) were produced by Sikkim Selection genotype. However, there was non-significant difference for fresh weight of leaves in Sikkim Selection, Hyderabad Single (138.80 g) and Shringar (209.06 g) genotypes and for width of leaf in

Sikkim Selection and Hyderabad Single (1.45 cm) genotypes. Attaining the varying vegetative growth parameters by different genotypes of tuberose seems to be a genetic characters. Similar results were reported in tuberose by Singh and Misra (10), Vijaylaxmi *et al.* (11), Krishnamurthy (4), and Gaidhani *et al.* (1) under the climatic condition of Delhi, Hyderabad (Telangana), Pudukkottai (Tamil Nadu) and Nagpur (Maharashtra), respectively. The perusal of data presented in Table 1 revealed that significantly higher number of bulbs produced per clump were obtained in cv. Phule Rajani (23.86), followed by Hyderabad Single (18.00) and Mexican Single (11.60). Similar results were reported by Mahawar *et al.* (5), Krishnamoorthy (4) and Ranchana *et al.* (8) in tuberose. Table 1 also revealed that cv. Arka Nirantara produced significantly higher weight of individual bulb (37.01 g), diameter of individual bulb (3.23 cm) and total clump weight (361.53 g) and weight of individual bulblet (4.52 g). However, non-significant difference was observed in cvs. Arka Nirantara and Arka Prajwal for weight and diameter of individual bulb and weight of individual bulblets. The increased weight of bulbs might be due to balanced partitioning of dry matter between floral parts and storage organs; genotype differed significantly with respect bulb and bulblet development parameters. It might be due to their genetic characters. Our findings are in consonance with the finding of Vijaylaxmi *et al.* (11), Krishnamoorthy (4), Ranchana (8) and Gaidhani *et al.* (1) in tuberose.

### Floral parameters

Table 2 revealed that the mean of performance of the genotypes for floral parameters reflected variation among the genotypes. Genotype Sikkim Selection produced tallest spikes (108.43 cm) followed by cv. Arka Prajwal (104.41 cm). Singh and Misra (10), Vijaylaxmi *et al.* (11) and Ranchana *et al.* (8) evaluated different Single petalled tuberose genotypes under Delhi, Hyderabad and Coimbatore condition, respectively and recorded tallest spikes with Sikkim Selection genotype. Table 2 also indicated that cv. Arka Prajwal produced significantly higher rachis length (34.70 cm), fresh weight of cut spikes (121.67 g), diameter of open floret (4.36 cm) and weight of 20 open (37.00 g) and mature (27.33 g) florets when compared with rest of the tested genotypes. Cultivar Arka Nirantara produced maximum number of florets per spike (57.60), followed by cvs. Arka Prajwal (53.33), Arka Shringar (52.87) and Phule Rajani (51.40).

There was non-significant difference for rachis length among the cvs. Arka Prajwal (34.70 cm), Arka Shringar (34.10 cm), Arka Nirantara (32.63 cm) and

Table 1: Performance for vegetative growth parameters of Single petalled tuberose genotypes under Pune condition.

Genotype	Plant height (cm)	No. of tillers per clump	No. of leaves per clump	Fresh weight of leaves per clump (g)	Width of leaves (cm)	No. of bulbs per clump	Av. wt. of one bulb (g)	Av. dia. of one bulb (cm)	Total wt. of bulb per clump (g)	No. of bulblets per clump	Av. wt. of bulblets (g)	Total wt. of bulblets per clump (g)
Mexican Single	55.84	18.60	162.46	346.26	1.48	11.60	16.24	2.36	234.06	20.26	4.05	54.33
Sikkim Selection	49.90	5.53	62.60	119.93	1.20	9.66	15.41	2.46	201.46	24.26	2.30	38.80
Arka Shringar	55.06	11.60	79.86	209.06	1.58	13.66	17.65	2.51	238.06	13.20	2.54	25.73
Phule Rajani	50.21	13.33	118.60	287.53	1.66	23.86	27.33	2.94	356.46	18.26	3.08	31.53
Hyderabad Single	49.93	11.33	87.13	138.80	1.45	18.00	20.44	2.62	208.06	20.13	3.64	49.73
Arka Prajwal	62.27	11.40	108.53	311.93	2.35	14.73	28.56	3.17	283.66	15.86	3.52	40.23
Arka Nirantara	60.27	11.00	119.26	284.40	1.64	12.86	37.01	3.28	361.53	23.86	4.52	56.00
CD (P=0.05)	6.07	2.25	22.68	82.23	0.25	7.57	10.24	0.29	64.82	NS	1.25	NS

Table 2 : Performance for floral parameters of Single petalled tuberose genotypes under Pune condition.

Genotype	Spike length (cm)	Rachis length (cm)	Fresh weight of cut spike (g)	No. of florets per spike	Open floret dia. (cm)	Open floret length (cm)	Weight of 20 open florets (g)	Weight of 20 mature florets (g)	Weight of individual open floret (g)	Weight of individual mature floret (g)
Mexican Single	96.45	23.59	57.53	48.87	3.47	5.45	16.33	12.66	0.81	0.63
Sikkim Selection	108.43	23.58	65.53	39.07	3.17	5.59	17.66	14.66	0.88	0.73
Arka Shringar	66.69	34.16	55.67	52.87	3.32	5.50	17.33	13.00	0.86	0.65
Phule Rajani	76.17	30.39	69.81	51.40	3.64	5.77	18.33	14.33	0.91	0.71
Hyderabad Single	57.77	29.37	51.60	50.27	3.49	5.68	18.33	13.33	0.91	0.66
Arka Prajwal	104.41	34.70	121.67	53.53	4.36	6.05	37.00	27.33	1.85	1.36
Arka Nirantara	83.17	32.63	75.13	57.60	3.46	5.82	22.00	15.66	1.10	0.78
CD (P=0.05)	4.00	4.75	10.67	6.71	0.20	NS	1.65	1.44	0.83	0.07

Phule Rajani (30.39 cm). Significantly lowest spike length (57.77 cm) and fresh weight of cut spike (51.60 g) were recorded in cv. Hyderabad Single. On the other hand, significantly lowest rachis length (23.58 cm), number of florets per spike (39.07) and diameter of open florets (3.17 cm) were recorded in Sikkim Selection genotype. Genotype Mexican Single produced significantly lowest weight of 20 open (16.33 g) and mature (12.66 g) florets. Production of better quality and yield of flowers ultimately gives higher income. The variation in studied floral parameters of different tuberose genotypes might be due to variation in their genetic factor. The higher parameters registered by cv. Arka Prajwal might be due to its capacity to produce taller and thick spikes contained more number of heavier florets per spike. Similar

results were obtained by Singh and Misra (10), Vijayalaxmi *et al.* (11), Mahawar *et al.* (5), Ranchana *et al.* (8) and Krishnamoorthy (4) under varying climate condition of India in tuberose.

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