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Evaluation of tuberose genotypes for vegetative, flowering and yield traits

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Abstract

Tuberose is one of the popular cut flowers as well as loose flowers in Andhra Pradesh and holds great potential for its cultivation in the state. The experiment was conducted in a randomized block design (RBD) with three replications at research block of Horticultural Research Station, Anantharajupeta, DrYSRHU, Kadapa District, Andhra Pradesh during 2013-14 to evaluate the performance of nine tuberose genotypes under local agro-climatic conditions. Among the genotypes evaluated, early flowering was observed in 'Prajwal' and the same genotype recorded maximum spike girth. Rajith Rekha genotype recorded the highest number of spikes per plant and yield per plant, whereas maximum number of florets per spike was recorded in genotype GKTC-4. Furthermore, individual floral parameters viz., floret length, diameter and weight were maximum in Prajwal genotype.

Keywords: Tuberose, loose flower, genotypes, evaluation

Introduction

Tuberose (*Polianthes tuberosa*) is one of the most important loose flower as well as the cut flower in India. It is an ornamental bulbous plant, native of Mexico and belongs to the family Amaryllidaceae (Trueblood, 1973) [9]. It is popular due to its white waxy fragrant flowering spikes of single (mainly for loose flower) and double (mainly for cut flower) types of longer shelf life (Rachana *et al.*, 2013) [8]. As a loose flower, they are in great demand for making garlands and veni in Southern India. It is being used for worshipping, offerings in religious functions and auspicious days (Krishnamoorthy, 2014) [3]. The flowers are also used for the extraction of valuable essential oil, which is having a greater export demand (Martolia, 2010) [4]. It is cultivated on a large scale in Tamil Nadu, Karnataka, West Bengal, and Maharashtra. To a lesser extent, it is also grown in Andhra Pradesh, Haryana, Delhi, Uttar Pradesh and Punjab (Rachana *et al.*, 2013) [8]. At present, throughout India, several cultivars and local varieties are available in tuberose. Hence, location specific evaluation of varieties will help the growers to select the most suitable and high yielding variety for that particular region. Critical assessment of germplasm also helps in selecting parents for breeding programmes to improve the yield and quality of the flowers. Hence, the present investigation was conducted to study the relative performance of the nine genotypes and the variability present among them.

Materials and methods

The experiment was conducted at research block of Horticultural Research Station, Anantharajupeta, Kadapa District, Andhra Pradesh during 2013-14. The experimental site was geographically located at 13° 08' N Latitude, 79° 40' E Longitude and at an elevation of 162 m above mean sea level. The soil of experimental block was red loamy with pH 7.5 and E.C. 0.01 dScm-1.

A total of nine tuberose genotypes were evaluated for vegetative growth, flowering and yield in a randomized complete block design with three replications. Thirty plants per replication were planted at a spacing of 30 x 30 cm under open field conditions. The recommended agronomical practices were adopted to raise the crop. Five random plants were selected for recording various observations viz., plant height (cm), number of leaves per plant, spike length (cm), spike girth (cm), rachis length (cm), number of florets per spike, number of spikes per plant, days to first flowering, floret length (mm), floret diameter (mm), weight of floret (g), number of spikes per plant, number of spikes per plot, yield per plant (g) and yield per hectare (q/ha).

The analysis of variance was done by the method suggested by Gomez and Gomez (1984) [2].

Results and discussion

Plant growth which is considered to be a good index of plant vigour also contributes towards greater productivity. Data presented in Table 1 revealed that except plant height there was a significant variation in vegetative, flowering and yield traits among the genotypes studied. The Plant height did not differ significantly among the genotypes, however, maximum plant height (53.27cm) was registered in Rajith Rekha, and minimum in Sikkim selection (46.93 cm). The number of leaves per plant was significantly influenced by different genotypes. Maximum number of leaves per plant (40.33) was recorded in the variety Prajwal, whereas minimum (14.07) number of leaves was observed in the variety Sikkim Selection. Similar results are also observed by Ramachandrudu *et al.* (2009) [7] and Prashanta *et al.* (2016) [6] in tuberose.

Flower spike length, spike girth and rachis length are having direct influence on the quality of tuberose. Longer flower spikes having more girth can able to store more amount of carbohydrates thereby improves quality and shelf life. The maximum spike length was observed in Sikkim Selection (108.40 cm) whereas minimum in Hyderabad Single (55.93 cm). Spike girth and rachis length were recorded maximum in Prajwal (2.64 cm). Minimum spike girth was recorded in Sikkim Selection (1.28 cm) and rachis length in GKTC-4 (23.93 cm). Variation in spike length, girth and rachis length might be due to the inherent capacity of the particular genotype as well as the prevailing climatic conditions during the growing period. Ramachandrudu *et al.* (2009) [7];

Prashanta *et al.* (2016) [6] and Desai and Mamatha (2016) [1] also reported similar findings in tuberose.

Earliness in flowering is an important character, which helps farmers to fetch early market. Among the tuberose genotypes evaluated, Prajwal (65.50 days) took less of days to flower followed by Hyderabad Single (67.50 days). The maximum number of florets per spike was recorded in GKTC-4 (31.87) and it was comparable with that of Hyderabad Single (31.47) and Prajwal (30.93). Floret length, diameter and weight are important characters to market tuberose as loose flowers for garland making. Genotype Prajwal produced florets with maximum length (58.31 mm) which was at par with Rajith Rekha (56.78 mm) and Arka Niranthara (56.02 mm). Moreover, maximum floret diameter is also recorded in Prajwal which was at par with Shringar (3.86 cm). Significantly maximum floret weight (1.67g) was recorded in Prajwal over all other genotypes. The results are in accordance with the findings of Patil *et al.* (2009) [5]; Ramachandrudu *et al.* (2009) [7] and Krishnamoorthy (2014) [3] in tuberose.

The number of spikes per plant directly influence the yield of the particular genotype. A significant difference was observed for number of spikes per plant, spikes per plot (9 m²) and yield per plant (Table 1). Maximum number of spikes per plant (2.59) and spikes per plot (93.33) was recorded in Rajith Rekha. Yield per plant (79.94 g) and yield per hectare (88.82 q/ha) were also recorded maximum in Rajith Rekha. The increased yield might be due to its capacity to produce maximum number of spikes/ plant which is a genetic makeup of the genotype. This was in line with the findings of the Rachan *et al.* (2013) [8] in tuberose.

Table 1: Evaluation of single type of tuberose genotypes for vegetative, flowering and yield traits

variety name	Plant height (cm)	Number of leaves/plant	Spike length (cm)	Spike girth (cm)	Rachis length (cm)	Days taken for flowering	No. of florets/spike	Floret length (cm)	Floret diameter (cm)	Weight of floret (g)	No. of Spikes per plant	No. of spikes per plot	Yield per plant (g)	Yield per hectare (q/ha)
Sikkim Selection	46.93	14.07	108.40	1.28	32.53	117.50	30.67	5.42	3.64	0.95	0.82	29.33	23.75	26.39
Shringar	47.33	28.87	59.93	1.97	26.80	68.00	29.00	3.50	3.86	0.81	1.52	54.67	36.16	40.17
Calcutta Single	49.73	44.87	75.73	1.89	24.13	69.50	27.60	5.05	2.37	0.86	2.51	90.33	59.62	66.24
GKTC-4	47.20	18.53	56.00	1.92	23.93	69.50	31.87	4.97	2.92	0.85	1.04	37.33	28.39	31.54
Prajwal	52.93	40.33	76.53	2.67	33.40	65.50	30.93	5.83	3.92	1.67	0.85	30.67	43.73	48.59
Hyderabad single	48.40	29.27	55.93	1.97	25.20	67.50	31.47	5.14	3.36	0.97	1.57	56.33	48.33	53.69
Rajith Rekha	53.27	17.53	74.80	2.18	30.20	72.00	29.33	5.67	3.07	1.05	2.59	93.33	79.94	88.82
Arka Niranthara	52.13	20.47	71.87	2.37	31.87	78.00	26.80	5.60	2.62	1.12	1.96	70.33	59.08	65.65
Phule Rajani	51.67	29.93	59.80	2.11	25.17	68.00	27.77	5.32	2.88	1.15	0.81	29.33	26.20	29.11
SEM±	2.06	5.79	3.20	0.04	1.56	0.35	1.00	0.26	0.06	0.03	0.07	2.33	2.80	3.11
CD (0.05)	NS	17.52	9.68	0.12	4.71	1.17	3.03	0.69	0.21	0.08	0.20	7.06	8.46	9.40

Conclusion

From the present study, it can be concluded that among the nine genotypes evaluated, Rajith Rekha followed by Calcutta Single and Arka Niranthara are suitable for cultivation due to their high yielding potential over others under the Rayalaseema region of Andhra Pradesh for getting good returns to the farmers.

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