

RESEARCH ARTICLE

Quantity and quality of bulbs and bulblets as influenced by plant spacing in *Polianthes tuberosa* at farmers field of Tumkur district

■ NAGAPPA DESAI, CHANDRU PATIL AND B. MAMATHA

SUMMARY

A field experiment was conducted on quantity and quality of bulbs and bulblets as influenced by spacing in *Polianthes tuberosa* at farmers field of Tumkur district. The experiment consisted of three different plant spacing viz., 45cm x 30cm (S₁), 30cm x 30cm (S₂) and 30cm x 15cm (S₃) with seven replications at farmers field and Randomized Block Design. The result of three year data showed the significant difference on growth, bulb quality, bulbs and bulblets yield as affected by spacing. The spacing of 30 x 30cm was found to be optimum for better growth and recorded significantly highest plant height (53.57 cm) at 180 days after planting, maximum number of leaves per plant (111.78) and side shoots per pant (21.13) at 360 days after planting, which was at par with 45 x 30cm spacing. Bulbs and bulblets characters such as maximum number of bulbs per plant (16.80) and bulblets per plant (14.02), size of mother bulb (4.68 cm), daughter bulbs (3.77 cm) and clump weight (455.10 g) were recorded significantly at wider spacing (45 x 30cm), whereas lowest was recorded at a closer spacing 30 x 15cm due to lesser competition between plants for source of light, moisture, space and nutrient and as consequence showed better physiological activities, which in turn reflected improvement of bulb yield.

Key Words : Bulbs, Bulblets, Clump, Multiplication, Productivity, Spacing, Yield

How to cite this article : Desai, Nagappa, Patil, Chandru and Mamatha, B. (2017). Quantity and quality of bulbs and bulblets as influenced by plant spacing in *Polianthes tuberosa* at farmers field of Tumkur district. *Internat. J. Plant Sci.*, **12** (2): 216-219, DOI: 10.15740/HAS/IJPS/12.2/216-219.

Article chronicle : Received : 18.04.2017; Revised : 23.05.2017; Accepted : 13.06.2017

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Tuberose (*Polianthes tuberosa* L.) is a native of Maxico, it is leading commercial flower crops because of its multipurpose uses as cut flower, loose flower as well as its potential in perfume industry. Tuberose flowers are considered to be diuretic and emetic. Dried tuberose bulbs in the powdered form are also used as a remedy for gonorrhoea. The flower spike is used as a cut flower in vases, whereas, the individual florets are harvested for making garlands and venis

(Singh *et al.*, 1996). Its natural flower oil remains as one of the most expensive of the perfumery raw material. Tuberose concrete and absolute are of great demand due to its expensive and high grade perfumery qualities. Tuberose grows successfully in the warm plains of India. The commercial cultivation of tuberose in India is confined to West Bengal, Karnataka, Andhra Pradesh, Tamil Nadu and Maharashtra.

The successful cultivation is influenced not only by the high yielding variety, but also by various agro-techniques *viz.*, optimum spacing. So spacing between plants is particularly important for the cultivation of tuberose for obtaining good quality and quantity of bulbs and bulblets. At present, there is a constraint of elite planting material to increase the area under commercial cultivation. Also, the optimum size (1.5 - 2.0 cm) and weight (223 g/clump) of mother bulbs recommended for planting (Biswas *et al.*, 2002). To obtain higher yield and productivity of bulbs, the present experiment was undertaken to standardize optimum spacing for bulb multiplication in tuberose.

Objective :

- To study the effect of spacing on growth and bulb quality.
- Standardize the optimum spacing.
- To study the effect of spacing on yield of bulbs and bulblets

MATERIAL AND METHODS

The experiment was conducted at Khombaradevanahalli village, Mayasandra hobli of Turveker taluk, Tumkur district, Karnataka during 2011-12 to 2013-14 and observations were recorded regularly by Krishi Vigyana Kendra, Konehalli, Tiptur, Tumkur district. The soil status of experiment plot was red sandy loam with uniform fertility. Variety used for experiment in tuberose *viz.*, single type Prajwal. Three different plant

spacing *viz.*, S₁ – 45 x 30 cm, S₂ – 30 x 30 cm and S₃ – 30 x 15 cm with seven replications and Randomized Complete Block Design. Uniform sized bulbs having a diameter of 2.0 - 2.5 cm were selected (Mukhopadhyay, 1981) and planted at 5 cm depth. Uniform cultural operations were followed as per University of Agricultural Sciences, GKVK, Bengaluru package of practices for all the treatments in farmer's field. Observation were recorded on various growth and bulb production and statistically analysed (Sundararaj *et al.*, 1972).

RESULTS AND DISCUSSION

The comparative performances of growth, bulbs and bulblets parameters influenced by plant spacing were evaluated.

Influence of spacing on growth parameters:

Growth parameters such as plant height, number of leaves and side shoots per plant were significantly influenced by different spacing (Table 1 to 3). The spacing S₂ (30 x 30 cm) was found to be optimum with maximum plant height (53.57 cm) at 180 DAP, maximum number of leaves (111.78/plant) and number of side shoots (21.13/plant) at 360 DAP, which was at par with S₁ (45 x 30 cm) spacing. Whereas lowest plant height (51.80 cm), number of leaves (108.79/plant) and number of side shoots (19.73/plant) were found in S₃ spacing (30 x 15 cm). This might be due to the fact that more space available with lesser competition for soil nutrient, moisture and more light which might have better photosynthetic activity and increased growth and development. Similar results were reported by Mane *et al.* (2007) and Singh (1999) in single cultivars and Deswal *et al.* (1983).

Effect of spacing did not significantly influence the number of days taken for sprouting of bulbs (Table 1). It is due to the fact that, sprouting of bulbs is an initial

Table 1 : Influence of spacing on plant height in tuberose

Treatments	Sprouting of bulbs (days)	Plant height (cm) at different stage of plant growth					
		30 DAP	60 DAP	90 DAP	120 DAP	150 DAP	180 DAP
45 cm x 30 cm (S ₁)	11.52	12.59	19.69	28.77	39.71	47.67	53.40
30 cm x 30 cm (S ₂)	11.83	12.96	20.05	29.40	39.99	47.75	53.57
30 cm x 15 cm (S ₃)	12.45	11.58	18.28	27.27	37.55	46.10	51.80
S.E. ±	--	0.14	0.21	0.31	0.32	0.35	0.26
C.D. (P=0.05)	NS	0.40	0.57	0.89	0.92	1.03	0.74

NS = Non-significant. DAP= Days after planting

Table 2 : Influence of spacing on leaf production in tuberose

Treatments	Number of leaves per plant at different stage of plant growth					
	60 DAP	120 DAP	180 DAP	240 DAP	300 DAP	360 DAP
45 cm x 30 cm (S ₁)	21.49	34.48	59.92	77.49	93.31	111.50
30 cm x 30 cm (S ₂)	22.01	35.78	60.63	77.78	94.19	111.78
30 cm x 15 cm (S ₃)	20.24	30.38	56.42	74.77	91.81	108.79
S. E. ±	0.33	0.36	0.57	0.75	0.62	0.41
C.D. (P=0.05)	0.95	1.04	1.65	2.16	1.79	1.20

NS = Non-significant, DAP= Days after planting

Table 3 : Influence of spacing on number of side shoots per plant in tuberose

Treatments	Number of side shoots per plant at different stage of plant growth					
	60 DAP	120 DAP	180 DAP	240 DAP	300 DAP	360 DAP
45 cm x 30 cm (S ₁)	4.40	8.51	12.49	16.21	18.09	20.88
30 cm x 30 cm (S ₂)	4.41	8.81	12.83	16.44	18.51	21.13
30 cm x 15 cm (S ₃)	4.06	7.41	11.36	15.08	17.94	19.73
S.E. ±	--	0.15	0.33	0.07	0.08	0.32
C.D. (P=0.05)	NS	0.43	0.95	0.22	0.22	0.93

NS = Non-significant, DAP= Days after planting

Table 4 : Influence of spacing on bulb quality, bulbs and bulblets yield in tuberose

Treatments	Size of mother bulbs (cm)	Size of daughter bulbs (cm)	Clump weight (g)	No. of bulbs per plant	No. of bulblets per plant
45 cm x 30 cm (S ₁)	4.68	3.77	455.10	16.80	14.02
30 cm x 30 cm (S ₂)	4.46	3.48	447.20	16.53	13.69
30 cm x 15 cm (S ₃)	3.99	3.30	393.75	15.75	13.03
S.E. ±	0.04	0.03	3.21	0.02	0.03
C.D. (P=0.05)	0.11	0.07	9.19	0.07	0.09

process of growth, which is completed within 10-14 days after planting by utilizing the stored food material. Planting density also did not show the significant difference on number of days taken for sprouting. Similar results were reported by Khalaj *et al.* (2012) and Sadhu and Das (1978).

Influence of spacing on bulbs and bulblet parameter:

Bulb and bulblet parameters such as number of bulbs and bulblets per plant, size of mother and daughter bulbs and clump weight were significantly influenced by different spacing (Table 4). The maximum number of bulbs (16.80/plant) and bulblets (14.02/plant), size of mother bulb (4.68 cm), daughter bulbs (3.77 cm), clump weight (455.10 g) were recorded at wider spacing (45 x 30 cm), whereas lowest was recorded at a closer spacing 30 x 15 cm. This might be due to the fact that lesser competition between plants for source of light, moisture, space and nutrient and as consequence showed better physiological activities, which in turn reflected in

improvement of bulb yield. Khalaj and Edrisi (2012) and Bhattacharjee *et al.* (1994) reported similar results in tuberose.

Conclusion :

Cultivation of *Polianthes tuberosa* at spacing 30 x 30 cm can be recommended to be optimum for better growth such as maximum plant height, number of side shoots and leaves per plant. Whereas bulb parameters like size of mother and daughter bulb, number of bulbs and bulblets per plant, and clump weight can be recommended at wider spacing 45 x 30 cm for obtain may superior quality bulbs and bulblets.

Acknowledgement :

We thanks to the farmers of Khombaradevanahalli village, Mayasandra hobli of Turveker taluk, Tumkur district for growing the tuberose in their field as per research objective guided by KVK scientist and co-operate with cultural operation, inputs supply, irrigation

management etc.

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