



Effect of different levels of nitrogen and phosphorus on flowering attributes and vase life of tuberose (*Polianthes tuberosa* L.) cv. Hyderabad Double

Mahendra Pratap Singh, Ashok Kumar* and A.K. Singh

Department of Floriculture & Landscaping, N.D. University of Agriculture & Technology, Faizabad, India

*e-mail: akmnduat@yahoo.com

(Received: September 23, 2015; Revised received: June 14, 2016; Accepted: June 19, 2016)

Abstract: The experiment was conducted in Randomized Block Design (factorial) with 16 treatment combinations, comprising of 4 levels of nitrogen (0, 200, 300 and 400 kg/ha) and 4 levels of phosphorus (0, 150, 200 and 250 kg/ha) during the year 2014-2015. Results revealed that higher levels of Nitrogen and Phosphorus had increased the spike production and number of florets per spike. Spike initiation and opening of florets was (82 days) and (85 days), duration of flowering (20.30 days) and vase life (9.33 days) was recorded superior in N_2P_2 treatment. Maximum length of spike (88.00 cm), number of spike per clump (2.70) and number of florets per spike (29.30) were noticed in N_3P_3 treatment combination.

Key words: Nitrogen, Phosphorus, Spike, Floret, Vase life.

Introduction

Flowers are an integral part of human life due to their diversity in beauty, form, texture, colour and fragrance. Tuberose (*Polianthes tuberosa* Linn.) is commercial ornamental bulbous plant popularly known as Rajnigandha. Tuberose is native to Mexico and belongs to family Amaryllidaceae. It is a very important bulbous flowering plant among the cut flowers, which lasts long in flower vase. It is important to enhance its productivity for best vase life of flowers and yield of concrete, which is a source of essential oil formed after crushing with alcohol. The extract of tuberose is also use in making perfumes (Biswas *et al.* 1983) due to their great demand; Tuberose is being a heavy feeder and highly exhaustive crop; it is grown on a wide range of soil. The judicious use of manures and fertilizer are important to obtain higher yield and good quality of flower. The flower yield, quality and its vase life are greatly influenced by judicious supply of N and P. At the same time phosphorus increased the number of spikes and longevity of flower. Nitrogen deficiency causes stunted growth and production of dull colour flowers and phosphorus deficiency cause reduced vegetative growth and delayed initiation of flower. Application of complete fertilizer improves flowering and vase life of tuberose. Present study was under with objectives to assess the individual effect of nitrogen and phosphorus does and their interactions on flowering attributes and vase life of tuberose.

Materials and Methods

The present experiment was conducted at Main Experiment Station, Department of Floriculture & Landscaping, N.D.U.A. & T., Faizabad during the year 2014-15. The experiment was conducted in Randomized Block Design (factorial) with 16 treatment combinations, comprising of 4 levels of nitrogen (0, 200, 300 and

400 kg/ha) and 4 levels of phosphorus (0, 150, 200 and 250 kg/ha) in the form of urea and single super phosphate, replicated thrice. Nitrogen was applied in two split doses (half as basal dressing at the time of transplanting and remaining half as top dressing 40 days after sowing), while full phosphorus was mixed with soil at the time of final ploughing. The soil of the experimental field was loam having medium available nitrogen, phosphorus and potassium with p^H 7.86. Healthy and uniform sized bulbs (about 2.5 cm) were selected and used as planting material. The bulbs were planted at the spacing of 30 x 30 cm in each replication having 25 bulbs per plot. Five plants were tagged in each treatment leaving the border plants. Different parameters were recorded pertaining to flowering attributes and vase life in tuberose. The data were analysed by procedure suggested by Panse and Sukhatme (1985)

Results and Discussion

Nitrogen, phosphorus and its interactions affects the flowering attributes and vase life of tuberose significantly as presented in the table (1). N_2 (nitrogen 300 kg/ha), P_2 (phosphorus 200 kg/ha) and its interaction had reduced the days taken to spike initiation and days to opening of first floret and enhanced the duration of flowering and vase life of tuberose. Higher doses of these nutrients had prolonged the days taken to spike initiation and days to opening of first florets and reduced the vase life of tuberose. It may be due to the toxic effects of nutrients. Findings are similar to the findings of Gupta *et al.*, (2006) and Kaur and Sharma (2012) in tuberose. Maximum length of spike (85.50, 80.57 and 88.00 cm) was recorded at N_3 (nitrogen 400 kg/ha), P_3 (phosphorus 250 kg/ha) and its interaction N_3P_3 treatment. Similar trends were noticed on number of spike per clumps and per hectare and number of florets per spike. However longest spike (88cm), maximum number of florets

Table-1: Effect of different levels of nitrogen and phosphorus and their interaction on flowering attributes and vase life of tuberose (*Polianthes tuberosa* Linn.) cv. Hyderabad Double

Treatments	Days to initiation of spike	Days to opening of first floret	Duration of flowering (days)	Length of spike (cm)	Number of florets per spike	Number of spike per clump	Number of spike per ha (lakh)	Vase life (days)
N ₀ (0 kg./ha)	109.75	112.25	14.92	72.27	23.14	1.72	1.51	4.91
N ₁ (200 kg/ha)	104.50	107.25	16.50	75.06	24.91	2.18	2.25	6.51
N ₂ (300 kg/ha)	88.75	92.25	19.95	77.50	26.97	2.45	2.51	7.83
N ₃ (400 kg/ha)	91.25	94.00	17.92	85.50	27.70	2.49	2.55	7.66
S.E.m±	0.67	0.81	0.31	0.26	0.16	0.06	0.09	0.22
CD at 5%	1.67	2.04	0.79	0.67	0.40	0.13	0.23	0.56
P ₀ (0 kg./ha)	103.25	106.25	16.24	75.86	23.94	1.68	1.73	5.12
P ₁ (150 kg./ha)	99.50	102.25	17.05	76.16	25.41	2.21	2.10	7.13
P ₂ (200 kg./ha)	94.00	96.50	17.92	77.73	26.29	2.44	2.45	7.67
P ₃ (250 kg./ha)	97.50	100.75	17.28	80.57	26.99	2.51	2.53	6.99
S.E.m±	0.67	0.81	0.31	0.26	0.16	0.06	0.09	0.22
CD at 5%	1.67	2.04	0.79	0.67	0.40	0.13	0.23	0.56
N ₀ P ₀	112.00	115.00	14.30	69.46	21.80	1.26	1.26	4.33
N ₀ P ₁	110.00	112.00	14.80	70.66	22.66	1.73	1.43	5.00
N ₀ P ₂	108.00	110.00	15.60	71.93	23.93	1.90	1.60	5.66
N ₀ P ₃	109.00	112.00	15.00	77.06	24.20	2.00	1.76	4.66
N ₁ P ₀	108.00	111.00	15.26	73.00	23.86	1.58	1.80	4.83
N ₁ P ₁	106.00	109.00	16.60	74.00	24.60	1.96	1.96	6.86
N ₁ P ₂	101.00	103.00	17.20	75.00	25.20	2.52	2.53	7.36
N ₁ P ₃	103.00	106.00	16.93	78.25	25.99	2.67	2.70	7.00
N ₂ P ₀	95.00	99.00	18.20	79.00	24.90	1.89	1.83	5.00
N ₂ P ₁	90.00	93.00	18.90	75.00	26.60	2.57	2.60	8.66
N ₂ P ₂	82.00	85.00	20.30	77.00	27.90	2.67	2.80	9.33
N ₂ P ₃	88.00	92.00	19.20	79.00	28.50	2.68	2.81	8.35
N ₃ P ₀	98.00	100.00	17.20	82.00	25.20	2.01	2.05	6.33
N ₃ P ₁	92.00	95.00	17.90	85.00	27.80	2.60	2.43	8.00
N ₃ P ₂	85.00	88.00	18.60	87.00	28.50	2.68	2.86	8.33
N ₃ P ₃	90.00	93.00	18.00	88.00	29.30	2.70	2.86	8.00
S.E.m±	0.22	0.27	0.10	0.09	0.05	0.02	0.03	0.07
CD at 5%	3.35	4.09	1.59	1.34	0.81	0.28	0.47	1.12

per spike (29.30) and number of spike per clump and per hectare (2.70 and 2.86 lakh) were recorded at N₃ P₃ treatment. Nutrients have encouraged the vegetative growth and production of flowers through acceleration of various metabolic activities. Similar findings have reported by Chaudhary, (2008), Dhar, *et al.* (2008), Gowda, *et al.* (1991), Kadu, *et al.* (2009), Kumar, *et al.* (2003), Patel, *et al.* (2006), Singh, *et al.* (2005) and Yadav, P. K. (2007) in tuberose.

References

- Biswas, J., Bose, J. K. and Matti, R. G.: Effect of growth substances on growth and flowering of tuberose (*Polianthes tuberosa* L.). *South Indian Hort.*, **31**:129-132 (1983).
- Chaudhary, S.V.S.: Influence of VAM, nitrogen and phosphorus on growth and flowering of tuberose (*Polianthes tuberosa* Linn.). *Haryana Journal of Horticultural Sciences*, **37**: 289-290 (2008).
- Dhar, Lokesh N, Dubey, R.K.: Kumar, Ramesh and Kaur Prabhjit.: Effect of nitrogen and phosphorus on plant growth, flowering and bulb production of tuberose. *Journal of ornamental horticulture*, **11**: 302-305 (2008).
- Gowda, J. V. N.; Jacob, S. and Huddar, A. G.: Effect of N, P and K on growth and flowering of tuberose (*Polianthes tuberosa* Linn.) cv. Double. *Indian Perfumer*, **35**: 100-101 (1991).
- Gupta, R. R.; Manju Shukla and Kumar, S.: Effect of nitrogen and phosphorus on flowering of tuberose (*Polianthes tuberosa* L.). *Crop Research (Hisar)*, **32**: 539-541(2006).
- Kadu, A. P.; Kadu, P. R. and Sable, A. S.: Effect of nitrogen, phosphorus and potassium on growth, flowering and bulb production in tuberose cv. Single. *Journal of Soils and Crops*, **19**: 367-370 (2009).
- Kaur, R. and Sharma A.: Growth and flowering as affected by NPK fertilizers in tuberose cv. Single. *Asian J. Hort*; **7**:6 19-620 (2012).
- Kumar, R.; Chaturvedi, O. P. and Mihsra, R.L.: Effect of N and P on growth and flowering of gladiolus. *J. Ornam. Horti. (New Series)*, **6**: 100-103 (2003).
- Panse, V. G. and P. V. Sukhatme: Statistical method for agricultural workers, ICAR, New Delhi (1989).
- Patel, M.M., Parmar, P.B. and Parmar, B.R.: Effect of nitrogen, phosphorus and spacing on growth and flowering in tuberose (*Polianthes tuberosa* Linn.) cultivar Single. *Journal of Ornamental Horticulture*, **9**: 286 289 (2006).
- Singh, S. R. P.; Kumar Dhiraj; Singh, V. K. and Dwivedi, R.: Effect of NPK fertilizers on growth and flowering of tuberose cv. Single. *Haryana J. Horti. Sci.*, **34**: 84 (2005).
- Yadav, P. K.: Effect of nitrogen and phosphorus on growth and flowering of tuberose (*Polianthes tuberosa* cv. Shringar). *Progressive Agriculture*, **7**: 189 (2007).