



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(3): 3810-3812
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www.thepharmajournal.com
Received: 01-12-2022
Accepted: 02-02-2023

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Study on the effects of doses of water soluble fertilizers and straight fertilizers under drip irrigation system on the size and production of bulbs and Bulblets of tuberose (*Polianthes tuberosa* L.) cv. Prajwal

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Abstract

The experiment was carried out in tuberose (*Polianthes tuberosa*) cv. Prajwal to find out the effect of water soluble fertilizers (Urea, N:P:K::19:19:19 and N:P:K::13:00:45) with different doses and combination with straight fertilizers (Urea, DAP and MOP) at G.B. Pant University of Agriculture and Technology, Pantnagar during March 2016-January 2018. The bulbs of appropriate size (4.5-5.0 cm) were planted at spacing of 40 × 40 cm. The longest bulb (6.65 cm), maximum average bulb weight (27.82 g) and maximum average bulb diameter (26.42 mm) were found with T₃ treatment (125% of RDF using water soluble fertilizers). The same treatment showed maximum number of bulbs per clump (23.35).

Keywords: Drip irrigation, fertigation, water-soluble fertilizers, tuberose

Introduction

The bulbous ornamental crops like tuberose can be grown widely in country and enriches our flora diversity and wealth (John *et al.*, 2004)^[1]. Tuberose (*Polianthes tuberosa* L.) is a flower crop which possess strong and pleasant fragrance along with the elegant white beauty of the floral spike. Tuberose, also named as *Rajnigandha*, *Nishigandha*, *Gul-e-chari* and *Sem Pangi* and belonging to the Amaryllidaceae family, occupies the prime position among the commercial bulbous flowers. The concept of drip fertigation possess immense potential to change the present status of productivity in agriculture by reducing the wastage of fertilizers through improved fertilizer use efficiency and thus, helps in economizing the use of water and fertilizers and is more economical as reduces the cost of water, fertilizers, labour and energy.

Hence, standardization of optimum doses of fertilizers through drip irrigation is required for improving the fertilizer use efficiency in tuberose. Keeping in view, the above facts, the experiment was conducted to study the influence of doses of water soluble fertilizers and combining with straight fertilizers through drip irrigation on size and production of bulbs and bulblets in tuberose cv. Prajwal.

Materials and Methods

Investigation was carried out during March 2016 to January 2018 at Model Floriculture Centre, G.B. Pant University of Agriculture and Technology, Pantnagar to study the effect of doses of water soluble fertilizers through drip irrigation in tuberose cv. Prajwal. The soil at the experiment site was sandy loam soil with a pH of 6.68 and EC of 0.43 dS/m. The experiment was laid out in Randomized Block Design (RBD) comprising seven treatments with three replications. The treatments consists of T₁: 75% of RDF with Water soluble fertilizers (WSF), T₂: 100% of RDF with WSF, T₃: 125% of RDF with WSF, T₄: 75% of RDF as WSF + 25% of RDF as straight fertilizers (SF), T₅: 50% of RDF as WSF + 50% of RDF as SF, T₆: 25% of RDF as WSF + 75% of RDF as SF, T₇: 100% of RDF as SF (control). Recommended dose of fertilizers per hectare was 200:200:200 kg of NPK was applied through fertigation and manual help as per the treatment. At last ploughing 250 kg of FYM per hectare as basal were applied uniformly for all the treatments.

The field was divided into raised beds of height of 25 cm and width of 90 cm for allotment of various treatments. A spacing of 30 cm between the beds was provided for separation of treatments and replications and also for easy inter-cultural operation.

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Double row planting system was adopted with the spacing of 120 X 40 X 40 cm (row/plant). The drip irrigation system and venturi injector fertigation unit were installed as per the experimental layout and treatment plan. Water soluble fertilizers and straight fertilizers were applied as per the treatment combinations. Fertigation was given as per the schedule at different plant growth stages. Observations for growth and flowering characters were collected and subjected to statistical analysis under simple RBD using ANOVA.

Results and Discussion

The data pertaining to bulb and bulblet characters are presented in Table 1 and Table 2, respectively.

Significant results were obtained for bulb characters in both the years of experiment and simultaneously in the pooled data. Among all the treatments, the treatment T₃ i.e. 125 per cent of RDF using WSF significantly increased the number of bulbs per clump (23.53, 23.17 and 23.35) which is at par with treatment T₂ i.e. 100 per cent of RDF using WSF (20.87, 20.45 and 20.66) in both the years of study and in the pooled

data, respectively. The maximum average bulb length was found in treatment T₃ (6.47, 6.83 and 6.65 cm) in first year, second year and in the pooled mean of both the years of study which is at par with treatment T₂ (6.27, 6.47 and 6.37 cm). The maximum average bulb weight was found in treatment T₃ (26.80, 28.83 and 27.82 g) in first year, second year and in the pooled mean of both the years of study which is at par with treatment T₂ (25.00, 26.13 and 25.57 g). The maximum average diameter of bulb was found in treatment T₃ (24.47, 28.37 and 26.42 nm) in first year, second year and in the pooled mean of both the years of study which is at par with treatment T₂ (23.47, 26.17 and 24.82 nm). The above results showed that increasing the fertilizer dose through drip irrigation brings out the positive effect in bulb and bulblet production due to increased amount of photosynthetates due to higher N application. The results also showed efficiency of drip fertigation using water soluble fertilizer over application of straight fertilizers. Similar findings were highlighted by Shashidhar (2004)^[2] and Kabariel (2015)^[3] in tuberose.

Table 1: Effect of straight and water soluble fertilizers and their combinations on number of bulbs and bulblets per clump of tuberose cv. Prajwal

Treatments	Number of bulbs per clump			Number of bulblets per clump		
	2016-17	2017-18	Pooled mean	2016-17	2017-18	Pooled mean
T ₁	18.50	19.39	18.94	14.33	17.00	15.67
T ₂	20.87	20.45	20.66	19.47	20.17	19.82
T ₃	23.53	23.17	23.35	14.20	17.47	15.83
T ₄	20.83	21.16	21.00	16.53	21.07	18.80
T ₅	19.20	19.13	19.17	18.83	19.30	19.07
T ₆	16.47	16.03	16.25	16.20	19.33	17.77
T ₇	12.88	14.80	13.84	15.37	20.10	17.73
CD at 5%	5.09	5.03	4.36	NS	NS	NS
S.Em+	1.63	1.62	1.40	3.01	4.36	2.86

Table 2: Effect of straight and water soluble fertilizers and their combinations on length, weight and diameter of bulbs of tuberose cv. Prajwal

Treatments	Length of bulb (cm)			Weight of bulb (g)			Diameter of bulb (nm)		
	2016-17	2017-18	Pooled mean	2016-17	2017-18	Pooled mean	2016-17	2017-18	Pooled mean
T ₁	5.63	6.27	5.95	20.33	22.43	21.38	21.80	25.23	23.52
T ₂	6.27	6.47	6.37	25.00	26.13	25.57	23.47	26.17	24.82
T ₃	6.47	6.83	6.65	26.80	28.83	27.82	24.47	28.37	26.42
T ₄	6.13	6.77	6.45	22.77	27.90	25.33	22.50	28.00	25.25
T ₅	5.20	6.03	5.62	20.43	22.23	21.33	20.43	25.00	22.72
T ₆	4.80	5.40	5.10	15.27	16.67	15.97	19.60	23.60	21.60
T ₇	4.27	4.87	4.57	11.77	12.83	12.30	17.97	20.00	18.98
CD at 5%	0.63	0.78	0.51	5.16	5.33	3.99	1.87	2.23	1.48
S.Em+	0.20	0.25	0.16	1.66	1.71	1.28	0.60	0.72	0.48

Table 3: Effect of straight and water soluble fertilizers and their combinations on length, weight and diameter of bulblets of tuberose cv. Prajwal

Treatments	Length of bulblet (cm)			Weight of bulblet (g)			Diameter of bulblet (nm)		
	2016-17	2017-18	Pooled mean	2016-17	2017-18	Pooled mean	2016-17	2017-18	Pooled mean
T ₁	1.70	1.75	1.72	1.73	0.88	1.31	5.69	7.37	6.53
T ₂	1.50	1.86	1.68	1.62	2.04	1.83	5.15	6.80	5.98
T ₃	1.47	1.69	1.58	1.17	1.66	1.41	4.57	6.17	5.37
T ₄	1.77	1.37	1.57	2.40	1.15	1.78	5.87	5.93	5.90
T ₅	1.83	1.85	1.84	1.50	1.89	1.70	7.60	6.27	6.93
T ₆	1.77	1.57	1.67	1.78	1.68	1.73	5.39	5.70	5.55
T ₇	1.73	1.80	1.78	1.49	1.58	1.54	7.01	5.78	6.40
CD at 5%	0.26	0.23	0.12	0.73	0.38	0.49	1.81	1.88	1.51
S.Em+	NS	NS	NS	NS	NS	NS	NS	NS	NS

References

1. John AQ, Khan FU, Mir MM. Standardization of growing media for quality cut flower production of tulip under polyhouse conditions. In: Abstracts of International Seminar on recent trends in Hi-Tech Horticulture and Postharvest Technology, Kanpur. 2004 Feb 4-6, 1136.
2. Shashidhar H. Effect of different levels of fertigation on growth and yield of tuberose (*Polianthus tuberosa* L.) hybrids. M.Sc. (Hort.) Thesis, UAS, Bangalore; c2004.
3. Kabariel J. Standardization of fertigation levels, irrigation regimes, micronutrients and growth promoter for improved growth, yield, quality and bulb production in tuberose (*Polianthes tuberosa* L.) cv. Prajwal. Ph.D. (Hort.) Thesis, Tamil Nadu Agricultural University, Coimbatore; c2015.