

Flowering, Flower Quality and Yield of Tuberose (*Polianthes tuberosa* L.) as Influenced by Vermicompost, Farmyard Manure and Fertilizers*

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Abstract: A field experiment conducted at the University of Agricultural Sciences, Dharwad, to study the response of tuberose to vermicompost at different levels (1,2,3kg/sq m) alone and in combination with 50 per cent recommended dose of fertilizer (RDF) and recommended dose of FYM during 2000-01 revealed that plants which received vermicompost either alone or in combination with $\frac{1}{2}$ RDF were early to initiate flowering. Significantly higher flower spike yield (1.12 and 1.16 lakhs/ha in 2000 and 2001, respectively) was obtained with the application of 3 kg vermicompost /sq m along with 50 per cent RDF.

Introduction

Tuberose is an important commercial flower crop widely grown throughout the world for its charm and long lasting qualities. Because of its popularity as cut flower, loose flower as well as for its potential in perfume industry it occupies a prime position among the commercially grown flowers in India. The flower spikes are largely consumed for vase decoration, bouquet preparation and the florets for making garland and floral ornaments. To meet the ever increasing domestic market demand and to tap the export potential of fresh flower and the value added products from tuberose, there is a need to increase the productivity of this flower crop.

Tuberose responds well to the application of manures and fertilizers. Continuous use of synthetic fertilizers have degraded the soil and they are gradually turning economically unsustainable. There is an urgent need to reorient the research priorities towards developing

alternate system in crop production. One such area study has been taken on the products and utilization of organic wastes. The vermicompost is rich in macro (N, P, K) and micro nutrients (Fe, Bo, Zn, Mo) vital plant promoting substances, humus forming microorganisms and nitrogen fixers (Gravilov, 1962 and Bano *et al.*, 1987). The use of vermicompost could be an important approach to replenish the use of synthetic fertilizers in farming system. In the present investigations, studies have been made to know the effects of vermicompost either alone or in combination with fertilizers on flowering, flower quality and flower yield in tuberose cv. Single.

Material and Methods

The field experiment was laid out in randomized block design with three replications during the years 2000 and 2001 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. Totally eleven treatments were given with three levels of

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vermicompost (1,2 & 3 kg/sq m each) alone and in combination with half the recommended dose of fertilizers, half and full recommended dose of FYM and fertilizers and control. The observations on growth, flowering and yield parameters were recorded.

Results and Discussion

In the present study, the plants supplied with $\frac{1}{2}$ RDF, control plants and the plants which received only organic matter were early to initiate flowering. Time taken for emergence of spike in days ranged from a minimum of 129.33 days in T_7 (3 kg vermicompost/sq m) to a maximum of 162.00 days in T_2 (RDF alone) (Table 1). Duration of flowering was more in plants supplied with vermicompost either alone or in combination with 50 per cent RDF. This might be due to the fact that the spikes obtained from plants supplied with vermicompost alone or in combination with fertilizer had more number of florets per spike. Spikes with good quality attributes like spike length, rachis length, spike girth and spike weight were produced by plants which received 50 per cent RDF along with 2 and 3 kg vermicompost/sq,m and RDF + RDFYM (Table 2). These spikes inturn had increased number of florets with increased length and diameter which inturn increased their fresh weight (Table 2). This might be due to the fact that these plants had put forth good vegetative growth which enabled the plants to produce more photosynthates and supply to spikes for their development. The improvement in quality of spikes was mainly due to castings

of earthworms which consists of plant growth hormones, various enzymes along with macro and micronutrients (Gravilov, 1962 and Bano *et al.*, 1987). Similar improvement in quality by the incorporation of vermicompost was reported by Tomati *et al.* (1990),Baphana (1992), Desai (1992), Kulkarni (1994) and Patil (1999).

Maximum flower yield was observed in plants which received 50 per cent RDF along with 3 kg vermicompost/sq m RDF+RDFYM, 50 per cent RDF along with 2 kg vermicompost/sq m Increase in spike yield per plot and per hectare might be due to increased number of spikes per plant and increased loose flower yield per plot and per hectare was mainly due to increased number of florets per spike and increased fresh weight of florets in the above said treatments. This increase in number of spikes per plant, florets per spike and fresh weight of florets could be attributed to increase in vegetative growth in terms of plant height, number of leaves, number of shoots and leaf area.

The significant differences in flower production when vermicompost applied alongwith fertilizers might be due to the fact that it presents the nutrients in most available form, which made it possible for the plants to grow and put forth luxuriant growth which in turn helped the plants to produce more photosynthates to produce higher flower yields. Similar increased yields due to incorporation of vermicompost alongwith fertilizers were reported by Patel (1992), Kulkarni (1994) and Patil (1999).

Table 1. Effect of organic manures and inorganic fertilizers on flowering in tuberose

Sl. No.	Treatments	2000		2001	
		Time taken (days) for spike emergence	Duration of flowering (days)	Time taken for spike emergence (days)	Duration of flowering (days)
1.	RDF+RDFYM	156.00	26.67	158.03	27.07
2.	RDF alone	162.00	26.67	164.11	26.39
3.	RDFYM alone	144.33	26.00	146.21	24.02
4.	½ RDF	145.33	23.67	147.22	25.04
5.	1 kg vermicompost/sq,m	140.67	29.00	142.50	29.43
6.	2 kg vermicompost/sq,m	137.00	30.00	138.78	30.45
7.	3 kg vermicompost/sq,m	129.33	26.00	131.02	26.39
8.	½ RDF+1 kg vermicompost/sq,m	140.67	25.33	142.50	25.71
9.	½ RDF +2 kg vermicompost/sq,m	140.67	27.33	141.15	29.77
10.	½ RDF+ 3 kg vermicompost/sq,m	139.33	29.33	142.50	27.74
11.	Control	131.00	21.67	132.70	21.99
S.Em±		2.58	0.86	2.61	0.88
CD at 5%		7.60	2.54	7.70	2.58

RDF= Recommended dose of fertilizers

RDFYM= Recommended dose of farm yard manure

Table 2. Effect of organic manures and inorganic fertilizers on spike and floret characters in tuberose

Treatments	2000						2001							
	Spike length (cm)	Rachis length (cm)	Spike girth (cm)	Spike weight (g)	Number of florets /spike	Floret length (cm)	Floret diameter (cm)	Spike length (cm)	Rachis length (cm)	Spike girth (cm)	Spike weight (g)	Number of florets /spike	Floret length (cm)	Floret diameter (cm)
RDF+RDFYM	82.20	22.52	0.59	26.52	48.39	5.60	0.79	83.27	22.84	0.61	27.71	51.05	5.68	0.81
RD alone	78.40	22.43	0.55	23.40	43.43	5.44	0.74	79.42	22.75	0.56	24.46	45.82	5.52	0.75
RDFYM alone	76.70	21.12	0.56	23.39	42.77	5.55	0.69	77.70	21.41	0.58	24.45	45.12	5.64	0.71
½ RDF	76.24	20.35	0.53	21.86	42.37	5.35	0.68	77.23	20.64	0.54	22.84	44.70	5.43	0.69
1 kg vermicompost/sq.m	83.35	21.33	0.58	24.26	46.72	5.58	0.74	84.44	21.63	0.60	25.35	49.29	5.62	0.75
2 kg vermicompost/sq.m	81.75	21.72	0.60	25.62	47.62	5.59	0.73	82.81	22.03	0.65	26.78	50.24	5.67	0.75
3 kg vermicompost/sq.m	82.12	22.02	0.61	26.08	47.21	5.61	0.74	83.18	22.33	0.63	27.25	49.81	5.69	0.75
½ RDF+ 1 kg vermicompost/sq.m	83.13	22.18	0.62	27.11	48.27	5.54	0.74	84.21	22.49	0.62	28.33	50.93	5.62	0.75
½ RDF + 2 kg vermicompost/sq.m	86.40	22.35	0.63	28.06	48.27	5.60	0.76	87.53	22.67	0.63	29.33	50.92	5.68	0.78
½ RDF+ 3 kg vermicompost/sq.m	86.86	23.59	0.74	31.40	49.91	5.67	0.84	87.99	23.92	0.76	32.81	52.65	5.76	0.86
Control	74.21	17.84	0.52	17.63	39.38	5.27	0.67	74.75	18.09	0.53	18.43	41.54	5.35	0.68
S.E.m±	1.05	0.85	0.04	0.78	0.77	0.05	0.03	0.10	0.86	0.04	0.81	0.81	0.05	0.03
CD at 5%	3.10	2.51	0.10	2.29	2.27	0.14	0.08	3.14	2.55	0.11	2.39	2.39	0.15	0.08

RDF= Recommended dose of fertilizer

RDFYM = Recommended dose of farm yard manure

Table 3. Effect of organic manure and inorganic fertilizers on spike yield and loose flower yield in tuberose

Sl. No.	Treatments	Spike yield (No.)				Loose flower yield			
		2000		2001		2000		2001	
		Per plot	per hectare (lakhs)	Per plot	per hectare (lakhs)	Per plot (kg)	per hectare (tonnes)	Per plot (kg)	per hectare (tonnes)
1.	RDF+RDFYM	62.00	1.07	61.33	1.11	2.82	5.00	2.98	5.23
2.	RD alone	56.00	0.97	54.67	1.00	2.12	3.68	2.20	3.84
3.	RDFYM alone	51.33	0.89	50.67	0.92	1.87	3.25	1.97	3.39
4.	½ RDF	48.33	0.84	47.67	0.87	1.70	2.95	1.79	3.08
5.	1 kg vermicompost/sq, m	51.67	0.90	50.33	0.93	2.15	3.74	2.24	3.90
6.	2 kg vermicompost/sq, m	54.00	0.94	52.67	0.97	2.36	4.11	2.46	4.29
7.	3 kg vermicompost/sq, m	56.00	0.97	54.67	1.00	2.54	4.32	2.64	4.51
8.	½ RDF+1 kg vermicompost/sq, m	59.00	1.02	58.00	1.06	2.71	4.70	2.83	4.91
9.	½ RDF +2 kg vermicompost/sq, m	60.33	1.04	59.33	1.08	2.82	4.89	2.95	5.11
10.	½ RDF+ 3 kg vermicompost/sq, m	64.67	1.12	63.33	1.16	3.14	5.44	3.28	5.69
11.	Control	43.67	0.73	44.00	0.78	1.33	2.32	1.44	2.43
	S.E.m±	0.82	0.01	0.82	0.01	0.08	0.06	0.09	0.06
	CD at 5%	2.42	0.04	0.42	0.04	0.24	0.18	0.25	0.19

RDF= Recommended dose of fertilizer

RDFYM = Recommended dose of farm yard manure

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