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Effect of NPK on Organic Manures of Flowering and Flower Yield of Dahlia (*Dahlia variabilis* L.) cv. Kenora Sunburst

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A B S T R A C T

The present investigation "Effect of NPK and Organic Manures of flowering and flower yield of Dahlia (*Dahlia variabilis* L.) cv. Kenora Sunburst" was conducted in Research Field, Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, during November, 2019 to March, 2020. The experiment was laid out in randomized block design (RBD) with three replication spacing of 45 x 60 cm from plant to plant and row to row to accommodate six plants per 2.43 meter square area. F test were significant for all traits it indicated that variability exist in the treatment combination. On the basis of performance of Dahlia flowering and flower yield on various treatments of inorganic, organic and biofertilizers. The best treatment T5 (80% RDF through NPK + 20% FYM) found best in terms of flower and flower yield of Dahlia followed by treatment T2 (90% RDF through NPK + 10% FYM). Found to have significant effect on flowering and flower yield parameters in dahlia.

Introduction

A flower is symbol of beauty, love and happiness. Although, flowers are mute beauties, they convey best massage of love, and for expressing their finest feelings, flowers are the best media. Cut flowers of pompon and miniature types stay fresh in flower vases for many days and also better to make moderately good garlands (Prasad *et al.*, 2018). The cultivation of flowers in India is as old as India culture itself. For beautification, flowers have been one of the main ingredient since the beginning of the history and important has not yet decreased but rather increased as time products.

Flowers do not make only house beautiful but also make it homely. Even the birth and death of human being is associated with flowers. It is a showy flower with great variations in colour, size, and shape and from etc. The most important constraint limiting crop yield in developing national worldwide, and especially among resource poor farmers, is soil infertility. Biofertilizers are micro

organisms that enrich the nutrient quality of soil. The main sources of biofertilizer are bacteria, fungi and cynobacteria (blue green algae). Organic manure supplies food for microbes and makes soil porous, which is very favourable for the microbes. FYM is one of the traditional farmers. Hence, keeping in view the above facts and considered the potential of Dahlia in sub-tropical region of Uttar Pradesh, a field trial on "Effect of N.P.K. and organic manure on plant growth and flower yield of Dahlia (*Dahlia variabilis*). Vikas *et al.,* (2009) the flower petals are used in salads. Root cooked and used as a vegetable. A bitter flavor inedible according to another report. Present investigation carried out with objective of find out most suitable treatment of NPK with organic manures for flowering and flower yield Dahlia.

Materials and Methods

The present investigation "Effect of NPK and Organic Manures on Plant growth, Flowering and Flower Yield of Dahlia (*Dahlia variabilis* L.) cv. Kenora Sunburst" was conducted during winter season of the year 2019-20 in Research field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. The experiment was laid out in randomized block design (RBD) with three replication spacing of 45 x 60 cm from plant to plant and row to row to accommodate six plants per 2.43 meter square area. The treatments in each replication were allotted randomly. Different treatment combination are with sources of fertilizer like urea diammonium, phosphate and Potash along with bio fertilizers like FYM, Vermicompost and Poultry manure. Eleven treatment *viz.,* T0 (Control (RDF 100:120:100) + FYM) ,T1 (100% RDF through NPK) ,T2 (90% RDF through NPK + 10% FYM) , T3 (90% RDF through NPK + 10% Vermicompost) ,T4 (90% RDF through NPK + 10% Poultry Manure) ,T5 (80% RDF through NPK + 20% FYM) ,T6 (80% RDF through NPK + 20% Vermicompost) , T7 (80% RDF through NPK + 20% Poultry Manure) , T8 (70% RDF through NPK + 30% FYM), T9 (70% RDF through NPK + 30% Vermicompost), T10 (70% RDF through NPK + 30% Poultry Manure) and T11 (70% RDF through NPK + 10% FYM + 10% Vermicompost + 10% Poultry Manure) having one variety were tried in the experiment design. The chemical fertilizers were supplied with 100 kg of Nitrogen; 120 kg of Phosphorus, and 100 kg of Potash (Potassium) per hectare which was applied in the form of urea, Single super phosphate and Potash (MOP).

Climatic condition in the experimental site

The area of Prayagraj district comes under subtropical belt in the South east of Uttar Pradesh, which experience extremely hot summer and fairly cold winter. The maximum temperature of the location reaches up to 46°C - 48°C and seldom falls as low as 4°C - 5°C. The relative humidity ranged between 20-94 percent. The average rainfall in this area is around 1013.4 mm annually. However, occasional precipitation is also not uncommon during winter months.

Results and Discussion

The present investigation "Effect of NPK and Organic Manures on Plant growth, Flowering and Flower Yield of Dahlia (*Dahlia variabilis* L.) cv. Kenora Sunburst" was conducted during winter season of the year 2019-20 in Research field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. The experiment was laid out in randomized block design (RBD) with three replication spacing of 45 x 60 cm from plant to plant and row to

row to accommodate six plants per 2.43 meter square area. The treatments in each replication were allotted randomly. The results of the present investigation, regarding the Effect of NPK and Organic Manures on Plant growth, Flowering and Flower Yield of Dahlia (*Dahlia variabilis* L.) cv. Kenora Sunburst, have been discussed and interpreted in the light of previous research work done in India and abroad. The experiment was conducted in Randomized block design with 11 treatments, and three replications. The results of the experiment are summarized below:

Growth parameters

Among the treatments the maximum significant plant height (92.14 cm) was recorded in treatment T5 (80% RDF through NPK + 20% FYM), followed by T2 (90% RDF through NPK + 10% FYM) with (77.25 cm) and minimum (60.94 cm) was observed in treatment T 0 (Control (RDF 100:120:100) + FYM).

Among the treatments the maximum significant Plant spread (56.40 cm) was recorded in treatment T5 (80% RDF through NPK + 20% FYM), followed by T2 (90% RDF through NPK + 10% FYM) with (51.92 cm) and minimum (39.33 cm) was observed in T 0 (Control (RDF 100:120:100) + FYM).

Among the treatments the maximum significant Number of leaves (48.34 leaves/plant) was recorded in treatment T5 (80% RDF through NPK + 20% FYM), followed by T2 (90% RDF through NPK + 10% FYM) with (39.89 leaves/plant) and minimum (31.21 leaves/plant) was observed in T0 (Control (RDF 100:120:100) + FYM).

Among the treatments the maximum significant Number of branches (7.22 branches/plant) was recorded in treatment T5 (80% RDF through NPK + 20% FYM), followed by T2 (90% RDF through NPK + 10% FYM) with (6.41 branches/plant) and minimum (4.53 branches/plant) was observed in T0 (Control (RDF 100:120:100) + FYM).

The probable reason for increasing plant height in the best treatment is due to application of organic manures *i.e.* FYM act as a slow release and rich in nutrients, a small amount of nitrogen is directly available to the plant while a large portion is made available when the FYM decomposes.

Nitrogen required in each cell for the growth and development. Similar results was also reported by Vidyapriyadarsani *et al.,* (2008) in Jasmine, Bhatt *et al.,* (2010) in African marigold, Prasad *et al.,* (2017) in Asiatic lily and Prasad *et al.,* (2018) in Dahlia.

Floral parameters

Minimum significant number of Days to flower bud initiation (45.88 days) was recorded in treatment T5 (80% RDF through NPK + 20% FYM), followed by T2 (90% RDF through NPK + 10% FYM) with (50.56 days) and maximum (64.41 days) was observed in treatment T 0 (Control (RDF 100:120:100) + FYM) (Table-1) Increasing earliness for Days to first flower bud

Initiation in the best treatment is due to application of FYM increases the concentration of phosphorus and potassium due to solubility effect of certain organic matter, the increased microbial activity due to the application of FYM enhanced the process of mineralization that lead to more uptake phosphorus and potassium. Similar results were also reported by Sharma *et al.,* (2012) and Anuburani and Kavita (2006) found in jasmine, Prasad *et al.,* (2017) in Asiatic lily and Prasad *et al.,* (2018) in Dahlia.

Table.1 Effect of NPK and Organic Manures on Plant height (cm), Plant spread (cm), Number of leaves/plant, and Number of branches /plant in Dahlia (*Dahlia variabilis* L.) cv. Kenora Sunburst

Treatment	Treatment Combination	Plant height (cm)	Plant spread (cm)	Number of leaves/ plant	Number of branches/ plant
Symbol		**120 DAT**	**120 DAT**	**120 DAT**	**120 DAT**
T0	Control (RDF 100:120:100) + FYM	60.94	39.33	31.21	4.53
T1	100% RDF through NPK	68.18	47.82	36.03	4.96
T2	90% RDF through NPK + 10% FYM	77.25	51.92	39.89	6.41
T3	90% RDF through NPK + 10%	77.24	49.59	35.24	6.09
	Vermicompost				
T4	90% RDF through NPK + 10% Poultry	68.06	47.84	32.85	4.66
	Manure				
T5	80% RDF through NPK + 20% FYM	92.14	56.40	48.34	7.22
T6	80% RDF through NPK + 20%	75.56	46.21	34.03	4.94
	Vermicompost				
T7	80% RDF through NPK + 20% Poultry	70.10	45.34	32.06	4.70
	Manure				
T8	70% RDF through NPK + 30% FYM	77.20	48.96	36.21	6.03
T9	70% RDF through NPK + 30%	69.43	47.72	35.94	5.47
	Vermicompost				
T10	70% RDF through NPK + 30% Poultry	62.94	42.77	32.66	4.64
	Manure				
T11	70% RDF through NPK + 10% FYM +	70.48	46.35	34.42	
	10% Vermicompost +				5.72
	10% Poultry Manure				
	F Test	S	S	S	S
	SE(d)	1.057	0.491	0.346	0.112
	C.D. at 5 %	2.205.	1.025.	0.723.	0.235.

Table.2 Effect of NPK and Organic Manures on Days to flower bud initiation, Number of flowers per plant, Weight of single flower (g),Flower yield per plant (g), per plot (kg), per hectare (ton) Dahlia (*Dahlia variabilis* L.) cv. Kenora Sunburst

Treatment	Treatment Combination	Days to flower bud initiation	Number of flowers/ plant	Flower weight of single Flower (g)	Flower yield per plant (g)	Flower yield per plot (kg)	Flower yield/ha (ton)
T0	Control (RDF 100:120:100) + FYM	64.41	4.1	35.48	147.46	0.87	4.83
T1	100% RDF through NPK	60.77	5.37	39.65	212.96	1.27	7.05
T2	90% RDF through NPK + 10% FYM	50.56	7.83	53.62	419.77	2.51	13.94
T3	90% RDF through NPK + 10% Vermicompost	52.87	7.05	49.92	351.96	2.1	11.66
T4	90% RDF through NPK + 10% Poultry Manure	62.12	6.06	43.49	263.55	1.57	8.71
T5	80% RDF through NPK + 20% FYM	45.88	8.84	63.78	563.78	3.37	18.72
T6	80% RDF through NPK + 20% Vermicompost	58.03	6.36	55.37	352.14	2.11	11.71
T7	80% RDF through NPK + 20% Poultry Manure	60.38	5.93	52.91	313.78	1.87	10.38
T8	70% RDF through NPK + 30% FYM	54.87	7.19	48.21	346.62	2.07	11.49
T9	70% RDF through NPK + 30% Vermicompost	51.75	7.07	47.03			11.05
T10	70% RDF through NPK + 30% Poultry Manure	57.94	5.83	44.89	261.7	1.56	8.66
T11	70% RDF through NPK + 10% FYM +10% Vermicompost + 10% Poultry Manure	56.98	6.41	46.07	295.51	1.76	9.77
F- test		S	S	S	S	S	S
SE(d)		0.539	0.197	0.544	10.658	0.065	0.359
CD at 5%		1.125	0.411	1.135	22.246	0.135	0.749

For number of flowers/plant the maximum significant (8.84 flower) was recorded in treatment T5 (80% RDF through NPK + 20% FYM), followed by T2 (90% RDF through NPK + 10% FYM) with (7.83 flowers) and minimum (4.10 flowers/plant) was observed in treatment T0 (Control (RDF 100:120:100) + FYM (Table-1). Uptake of N, P, K due to improve biological characteristics, enhancement of photosynthetic activity. Similar finding were also reported by Singh (2005) in Rose, Sharma *et al.,* (2012) Sharma. 2014 in Dahlia in China aster Prasad *et al.,* (2017) in Asiatic lily and Prasad *et al.,* (2018) in Dahlia.

Yield parameters

Similarly for flower weight of single flower maximum significant weight of single flower (63.78g) was recorded in treatment T5 (80% RDF through NPK + 20% FYM), followed by T6 (80% RDF through NPK + 20% Vermicompost) with (55.37 g) and minimum (35.48 g) was observed in treatment T0 (Control (RDF 100:120:100) + FYM). Singh (2005) in Rose and Prasad *et al.,* (2018) and Tiwari *et al.,* (2018) reported similar finding in *Dahlia.* Maximum significant yield of flowers/plant (563.78 g) was recorded in treatment T5 (80% RDF through NPK + 20% FYM), followed by T2 (90% RDF through NPK + 10% FYM) with (419.77 g) and minimum (147.46 g) was observed in treatment T0 (Control (RDF 100:120:100) + FYM).For yield of flowers/plot maximum significant (3.37 kg) was recorded in treatment T5 (80% RDF through NPK + 20% FYM), followed by T2 (90% RDF through NPK + 10% FYM) with (2.51 kg) and minimum (0.87 kg) was observed in treatment T0 (Control (RDF 100:120:100) + FYM). Based on results maximum significant yield of flowers/ha (18.72 ton) was recorded in treatment T 5 (80% RDF through NPK + 20% FYM), followed by T2 (90% RDF through NPK + 10% FYM) with (13.94 ton) and minimum (4.83 ton) was observed in treatment T0 (Control (RDF 100:120:100) + FYM). Increase in Yield of flower/ha is due to integrated approach through FYM with N, P, K fertilizers which resulted in easy balanced availability of nutrients to plants by farm yard manure for better root proliferation enhanced microbial activity excellent uptake of N, P, K due to improve biological characteristics, enhancement of photosynthetic activity.

Similar results were also reported by Anburani and Kavita (2006) in jasmine, Kumar *et al.,* (2018), Gayathiri and Anuburani (2008) in jasmine and Prasad *et al.,* (2018) in Dahlia.

On the present investigation conducted in Dahlia, it is concluded that the treatment T_5 (80% RDF through NPK+20%FYM) found beat in terms of growth, yield and quality parameters of Dahlia followed by treatment T_2 (90% RDF through NPK+10% FYM). In terms vase life of flower, treatment T_{11} (70% RDF through NPK + 10% FYM + 10% Vermicompost + 10% Poultry Manure), was found best. The treatment T_5 (80% RDF through NPK+20% FYM), was found to be most economically viable in terms of gross return (Rs. 818920.00), net return (Rs. 619648.00) and cost benefit ratio(4.11). As the study was undertaken only for winter season only for winter season, it needs further confirmation by conducting more trials.

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