Influence of Vermicompost, Neemcake and Groundnut Cake on Growth and Flowering in Tuberose(*Polianthes tuberosa* L.)var. Prajwal

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Abstract - An experiment was conducted at the Horticultural Research Farm, Bidhan Chandra Krishi Viswavidyalaya, Mondouri during March 2013 to February 2014, to find out the influence of vermicompost, neemcake and groundnut cake on growth and flowering in tuberose (Polianthes tuberosa L.)var. Prajwal. Totally 7 treatments were replicated thrice using randomised block design with two level each of vermicompost (2 & 4 kg/sq m),groundnut cake (200 &400g/sq m)and neem cake(200 &400 g/sq m)alone including control. Among the different organic manure application maximum plant height ,number of leaves, leaf length and leaf breadth were observed with the groundnut application i.e. groundnut cake@200g/sq m, where as reproductive parameters like spike length(108cm), rachis length(34.33cm), spike weight(105.67g), number of florets/spike(50.89), spike yield(2lakh/ha) and weight of ten florets(23.09g) were noticed maximum with increasing amount of vermicompost @4kg/sq m application. Vermicompost application @4kg/sq m. reorded the maximum field life(22.53days) and vase life(11.56 days). From these results it can be concluded that tuberose var. Prajwal may be cultivated with the application of vermicompost @4kg/sqm to obtain the optimum flower qualitative and quantitative characteristics.

Keywords: Tuberose, Vermicmpost, neem cake, groundnut cake.

I. INTRODUCTION

Tuberose(*Polianthes tuberosa* Linn.), a native of Mexico, belongs to the family Amaryllidaceae. It is cultivated on large scale in France, Italy, South Africa, and North Carolina, U.S.A. and many tropical and sub-tropical areas including India. The chief centres of its production in India are Maharashtra, West Bengal, Tamil Nadu and Karnataka. The tuberose occupies very selective and special position among the ornamental bulbous plants to flower loving people because of its prettiness elegance and pleasantly sweet fragrance. It has great economic potential for cut flower trade and essential oil industries. After the industrial revolution widespread introduction of inorganic fertilizers, led to a decline in the use of organic material in the cropping systems(1). Organic materials are the safer sources of plant nutrients which have no detrimental effect to crops and soil. Vermicompost and green manure are excellent sources of organic matter as well as primary plant nutrients (2). Vermicompost is rich in all essential plant macro nutrients (N, P, K) and micro nutrients (Fe, Bo, Zn, Mo)and provides excellent effect on overall plant growth, encourages the growth of new shoots / leaves and improves the quality and shelf life of the produce. The dual activity of Nature Neem cake as fertilizer and pest repellent, has made it a favored input. It is widely used to fertilize cash crops. When it is ploughed into the soil it also protects plant roots from nematodes , white ants and other soil insects. Groundnut cake is said to be highly palatable and has better binding properties for pelleting than soybeans. The palatability, the binding property for good pelleting quality and the non availability of anti-nutritional factor in groundnut cake gives it an advantage over other plant proteins(3).

II. SYSTEM MODEL

The use of organic manures could be an important approach to replenish the use of synthetic fertilizers in farming system. In the Present consideration, studies have been made to know the effects of vermicompost neemcake and groundnut cake on growth ,flower quality and flower yield in tuberose var. Prajwal.

III. PREVIOUS WORK

Manure is organic matter used as organic fertilizer in agriculture. The effect of organic fertilizers along with half chemical fertilizers on the growth and flower yield of tuberose cv. Single was investigated by (4) . Results revealed that plant height, leaf number per plant, leaf length and breadth and number of side shoots /plant were greater in organic fertilizers along with half chemical fertilizers than absolute use of chemical fertilizers. Padaganur *et al*. (5) reported in tuberose cv. Single that 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 recommended dose of fertilizers. Shankar *et al*.(6) noticed that in tuberose cv.double produced highest spike length (77.70 and 77.86

cm, respectively), maximum number of spikes per plant (1.49 and 1.49, respectively), and longevity of spikes (15.69 and 15.80 days, respectively) when grown with vermicompost and PSB @ 1 kg/m2 and 2 g/bulb, respectively.The effect of inorganic, organic and biofertilizers on flower yield and flower quality of tuberose was reported by Das *et al*.(7). The results of the investigation revealed that the flower yield and flower quality of tuberose in terms of spike length, floret number/spike, rachis length, self life of spike and vase life of floret were significantly affected by different treatments. The plants treated with enriched compost @ 10 t/ha produced the best results followed by plants treated with enriched compost (10 t/ha)+biofertilizer. The highest benefit: cost ratio (3.38:1) was calculated in tuberose treated with enriched compost @ 10 t/ha.

IV. PROPOSED METHODOLOGY

The field experiment was conducted during the March 2013 to February 2014 at Horticultural Research Station, Mondouri, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal. Totally seven treatments were applied with two each levels of vermicompost (2 & 4 kg/sq m),ground nut cake (200 &400gm/sq m)and neem cake(200 &400 gm/sq m) including control using randomised block design with three replication. The size of the unit plot was 1.5m X 1m. The bulbs were planted in each unit plot at about depth of 5-6 cm on April , 2013. The planting distance was 30 cm × 30 cm between row to row and plant to plant. The plots were kept weed free by regular weeding. Plots were irrigated as and when required. The observations on growth and flowering parameters were recorded.

V. SIMULATION/EXPERIMENTAL RESULTS

There is a significant effect of different treatments on the vegetative and reproductive growth on tuberose var. Prajwal over control. It was evident from the data summarized in the table-1 that highest plant height(76.70cm), number of leaves(53.00), leaf length(72cm) were observed in T_6 (groundnut cake @200g/sq m),where as T_7 (groundnut cake @200g/sq m)showed maximum leaf breadth(3.23cm)over control. Naturally a plant with good vegetative growth is indicative of its efficient photosynthesis and simultaneous partitioning of photosynthesis towards sinks(8).

TABLE:1 Effect of vermicompost ,neemcake and groundnut cake on Vegetative growth in Tuberose var. Prajwal

Treatments	Plant Height (cm)	Number of leaves	Leaf Length (cm)	Leaf Breadth (cm)
T_1	63.93	39.33	60.87	2.7
T_2	69.22	46.67	68.7	3.07
T_3	70.47	45.33	68.2	3.23
T_4	69.89	49	67.1	2.93
T_5	71.11	46	64.97	2.93
T_6	76.7	53	72	2.93
T_7	74.07	45.67	68.53	3.1
SE(±m)	0.57	0.84	0.39	0.07
CD at 1%	2.23	3.27	1.53	0.27
CD at 5%	1.65	2.43	1.13	0.2

In the present study Spikes with good quality attributes like spike length(108cm), rachis length(34.33cm) and spike weight(105.67gm) were produced by plants which received 4 kg vermicompost/ sq, m (table-2). These spikes in turn had increased number of florets/spike(50.89), number of spike/plot(30) with increasing their loose weight i.e weight of 10 floret(23.09gm).

TABLE:2 Effect of vermicompost, neemcake and groundnut cake on floral characteristics in Tuberose var. Prajwal in peak season

Treatments	Spike Length (cm)	Rachis Length (cm)	Spike Weight (gm)	Weight of 10 Floret (gm)	Number Of Floret/ Spike
T_1	93.94	23.78	75.5	22.06	43.17
T_2	106	32.98	79.58	22.52	47.22
T_3	108	34.33	105.67	23.09	50.89
T_4	98.56	27.33	86.17	19.56	44.86
T_5	102.88	32.44	85.67	22.69	46.22
T_6	104.17	29.44	90.11	19.96	45.28
T_7	11.83	26.87	104	22.24	44.83
SE(±m)	1.19	1.14	2.3	0.38	1.37
CD at1%	5.12	4.45	9.92	1.65	5.9
CD at 5%	3.65	3.3	7.08	1.17	4.21

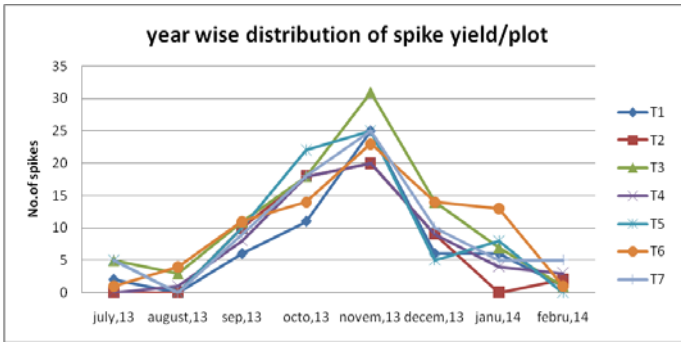
Due to activities of earthworms which consists of plant growth hormones, various enzymes along with macro and micronutrients improved quality of spikes (6) and Mitra *et al*.(9) reported that among the organic manures, vermicompost performed best in flower yield of tuberose that is quite similar with the present findings. Maximum flower yield was observed in plants which received 4 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 as well as per hectare was mainly due to increased number of florets per spike and increased fresh weight of florets in the above said

treatments. The maximum (22.53days) field life and vase life(11.56 days) were observed with T_3 i.e. vermicompost treatment @4kg/sq m.(table-3) among single organic manure application.It was found that field life of flowering was more in plants supplied with more vermicompost(7) .The present findings show also close similarity(8).

TABLE:3 Effect of vermicompost ,neemcake and groundnut cake on flower yield ,field life, vase lfe in Tuberose var. Prajwal

Treatments	No.of Spike/plot	Spike yield /hactere (lakh)	Field Life (Days)	Vase Life (Days)
T_1	19	1.27	16.83	9.67
T_2	19.67	1.31	17.17	10.56
T_3	30	2	22.33	11.56
T_4	21	1.4	19.5	10.89
T_5	25	1.67	20.83	11.11
T_6	27	1.8	16.17	11.11
T_7	25.67	1.71	19.33	10.89
SE(±m)	1.06	0.07	NS	0.29
CD at 1%	4.59	0.3		1.25
CD at 5%	3.27	0.22		0.9

Fig-1 Year wise distribution of spike yield /plot in Tuberose var. Prajwal



T_1-Control, T_2-Vermicompost@2000g/sqm, T_3-Vermicompost@4000g/sq m, T_4- Neem cake@200g/sq m, T_5-Neem cake@400g/sq m, T_6- Groundnut cake@200g/sq m, T_6- Groundnut cake@400g/sq

VI. CONCLUSION

Different organic manures significantly affected some qualitative and quantitative characters in tuberose. From these results it can be concluded that tuberose var. Prajwal with the application of vermicompost @4kg/sqm. may be advisable for tuberose cultivation to get good flower quality. Significant increases in yield parameters can be expected in the following years of the research.

VII. FUTURE SCOPES

Organic manures application are now gaining popularity in eco-friendly farming system. The presents investigation was mainly confined to three organic manure namely vermicompost, ground nut cake, neem cake .So, other organic matters can be tested on the same variety or other tropical variety of tuberose. From the result it was evident during the experiment for vase life and field life that, there is a more number of florets remain unopened than opened florets in case of vase life compared to the field life in tuberose cv. Prajwal. So, there is a scope for further studies in this regards. Most of the growers are also unaware about the factors that influence of organic manure under field conditions. Hence, there is a need for an intensive extension to popularize the use of organic manures.

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