Int.J.Curr.Microbiol.App.Sci (2018) Special Issue-7: 1430-1435

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Special Issue-7 pp. 1430-1435**
Journal homepage: http://www.ijcmas.com

Original Research Article

Effect of Organic Manure and Inorganic Fertilizer on Growth and Yield Traits of Gladiolus (*Gladiolus grandiflora* L.) Cv. Plumtart

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Keywords

Gladiolus, Plumtart, Farm Yard Manure, Vermicompost, Poultry Manure, and Yield

A B S T R A C T

A field experiment was conducted at Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Science, Allahabad, India, during 2013-14 rabi season. The experiment was laid out in randomized block design with 13 treatments in three replications. The treatments comprised of FYM, vermicompost and poultry manure with 25% RDF, 50% RDF and 75% RDF in different combinations including control (RDF-N:P:K 100:120:80 kg/ha). The results revealed that among all the treatments, application of (75% RDF + 25% vermicompost) in treatment (T_{11}) produced significantly tallest plant (105.60cm) with more number of leaves per plant (8.07), maximum number of shoots per plant (2.47), and also reported maximum with yield parameters like number of spike per plant (2.87), number of spike per hectare (140848.84), number of corms per plant (3.20), number of corms per hectare (241482.28) as compared to control (To), and in economic point of view treatment T_{11} (75% RDF + 25% vermicompost) was found to be most economically viable in terms of gross return (6,94,236), net return (3,87,710) and benefit cost ratio (2.26 :1).

Introduction

Floriculture has become very lucrative and money spinner industry globally. India has a long tradition of cultivating flowers and these are being cultivated throughout the country on small holdings. In commercial floriculture, bulbous ornamental crops are an important group of plants and considered as the wealth of the country. They play an important role in floriculture industry as well as in landscaping and also regard the aesthetic value of cut flowers. Very few flowering plants can match the panorama of colors, shapes and sizes offered by this exquisite bulbous flowering crop. In India, the main centers for commercial cultivation are Srinagar (Jammu and Kashmir), Shimla (Himachal Pradesh), Chaubattia and Supi (Uttar Pradesh), Kalimpong and Darjeeling (West Bengal), Shillong and Jorhat (Assam), Pune (Maharashtra), Bangaluru (Karnataka) and Ooty (Tamil Nadu).

Gladiolus (*Gladiolus hybridus* Hort.) belongs to the family *Iridaceae*. It is one of the most important ornamentals for cut flower trade in India and abroad. Among the different cut flowers, gladiolus stands at 4th place in the international trade, after rose, carnation and chrysanthemum. It is the only flower crop accepted in Europeans countries which is grown in the open field conditions.

Hence, as a cut flower, it has a great potential for export to European countries during winter months to earn valuable foreign exchange.

In commercial floriculture, bulbous ornamental crops are an important group of plants and considered as the wealth of the country. They play an important role in floriculture industry as well as in landscaping and also regard the aesthetic value of cut flowers. The bulbous flowers are very popular throughout the world. In addition to the ornamental value many of the bulbous crops are consumed as food and medicine. They also provide fiber and other useful material to mankind. No gardener would wish to be without bulbous plants. The beauty, fragrance and wide range of colour and form make them the most attractive group among flowers. Gladiolus is a glamorous flower, a flower of perfection, without which no garden will look complete. It is one of the easiest flowers to arrange and ever favorite with flower arrangers, amateurs and experts.

It is mainly native to South Africa. The basic chromosome number of gladiolus is n=15. The South African species are mostly diploid, European species are tetraploids and those found in Russia or at higher elevation are polyploidy. It is popular for its attractive spikes having florets of huge form, dazzling colors varying sizes and long keeping quality. Gladiolus as cut flowers is increasing day by day in domestic as well as international market. In recent years, several new cultivars of gladiolus with wide range of colors have been developed for marketing. These varieties require more nutrients for higher growth, production and quality of flowers. The yield and quality of flowers and corms can be improved by adopting integrated nutrient management practices which include the judicious and combined use of organic, inorganic fertilizers (Singh *et al*., 2006). The success of gladiolus cultivation depends upon many factors like soil fertility, irrigation, planting time, planting density, plant protection measures, plant growth regulators and some chemicals etc., these may play major role towards increasing production and quality of gladiolus (Bhalla *et al.*, 2006). They are cost effective, inexpensive and eco-friendly source of nutrient, do not require non-renewable source of energy during their production.

Materials and Methods

The research work was carried out under the Allahabad agro climatic conditions at the experimental field of the department of Horticulture, Allahabad School of Agriculture, Sam Higginbottom University of Agriculture, Technology and Sciences, in the month of November to March during winter season, 2013-14. Experimental design was RBD with three replication and 13 treatments i.e. T_0 (Control), T_1 (25% RDF, T_2 25% RDF + 75% FYM), T_3 (25% RDF + 75% Vermicompost), T_4 (25% RDF + 75% Poultry manure), T_5 (50% RDF), T_6 (50% RDF + 50% FYM), T_7 (50% RDF + 50% Vermicompost), T_8 (50% RDF + 50% Poultry manure), T_9 (75% RDF, T_{10} 75% RDF + 25% FYM), T_{11} (75% RDF + 25% Vermicompost), T_{12} (75% RDF + 25% Poultry manure) which allocated randomly in each replications. Observations were recorded on following growth parameters i.e. Plant height (cm), number of leaves per plant, number of shoots per plant, and yield parameters like number of spike per plant, number of spike per hectare, number of corms per plant, number of corms per hectare. The statistical analysis of data collected was done by following standard procedure described by Panse and Sukhatme (1967).

Results and Discussion

Growth parameters

The data presented in table 1 revealed that the better plant growth in the treatment T_{11} might be due to the beneficial effect of vermicompost with recommended dose of inorganic fertilizers, while the decrease in the plant growth may be due to unavailability of sufficient nutrients at critical stages to plant for luxuriant growth (Chaitra, R. 2006). It is reported that treatment T_{11} (75% RDF + 25% Vermicompost) was superior in term of maximum vegetative growth like plant height (105.60cm), number of leaves per plant (8.07) and number of shoots per plant (2.47) followed by T_{10} (75% RDF + 25% FYM) in plant height (100.40 cm), number of leaves per plant (7.87) and number of shoots per plant (2.20) whereas the minimum values were recorded with control (T_0) (84.10 cm, 6.13 and 1.07, respectively). The significant increase in these vegetative growth traits might be due to optimum nutrient supply provided to plant by applying vermicompost along with RDF for giving balanced nutrition to plant, thereby accelerating number of leaves per plant to promote the rate of photosynthesis in term enhancing vegetative growth and development of plant. Similar findings were reported by Mohanty *et al.* (2013) and Gaur *et al.* (2006) in Gladiolus.

Fig.1 Growth of gladiolus plants at research field

Fig.2 Flowering of gladiolus plant

Fig.3 Marketable spikes of Gladiolus

Table.1 Effect of Organic Manure and Inorganic Fertilizer on Growth and Yield traits of Gladiolus (*Gladiolus grandiflora* L.) c.v. Plumtart

Treatments		Plant Height (cm)	No of leaves per plant	No of shoots per plant	No of spikes per plant	No of spikes per hectare	No of corms per plant	No of corms per ha
T_0	Control	84.10	6.13	1.07	1.07	112281.48	1.13	191281.07
T_1	25% RDF	86.40	6.33	1.13	1.13	113664.48	1.27	193534.25
T_2	25% RDF + 75% FYM	91.27	6.87	1.47	1.47	121048.10	1.67	203049.18
T_3	25% RDF + 75% Vermicompost	92.80	6.93	1.53	1.53	123443.97	1.80	204338.07
T_4	25% RDF + 75% Poultry manure	90.53	6.67	1.40	1.40	122639.27	1.53	202583.84
T_5	50% RDF	88.70	6.47	1.20	1.20	113851.15	1.33	195241.32
T_6	50% RDF + 50% FYM	95.33	7.13	1.80	1.93	124572.92	2.07	206454.32
T_7	50% RDF + 50% Vermicompost	97.27	7.27	1.93	2.00	124668.02	2.27	209710.23
T_8	50% RDF + 50% Poultry manure	94.73	7.00	1.60	1.73	123832.15	1.93	205021.25
T_9	75% RDF	89.53	6.53	1.33	1.33	115649.48	1.40	201530.43
T_{10}	75% RDF + 25% FYM	100.40	7.87	2.20	2.33	138963.48	2.80	224138.57
T_{11}	75% RDF + 25% Vermicompost	105.60	8.07	2.47	2.87	140848.84	3.20	241482.28
T_{12}	75% RDF + 25% Poultry manure	99.07	7.40	2.00	2.07	134896.70	2.53	217430.44
F- test		S	S	S	S	S	S	S
SEd ±		2.285	0.320	0.244	0.327	2.338	0.258	2.345
CD (5%)		4.717	0.660	0.504	0.674	4.825	0.532	4.839

Yield parameters

There was significant difference in respect of number of spike per plant, number of spike per hectare, number of corms per plant and number of corms per hectare as affected by different treatments (Table 3). It is observed from the table that maximum number of spike per plant (2.87) as well as per hectare (134896.70) and maximum number of corms per plant (3.20) as well as per hectare (241482.28) was observed with treatment T_{11} (75% RDF + 25% Vermicompost) followed by T_{10} (75% RDF + 25% FYM) while the minimum yield per plant as well as per hectare was observed with T_0 (control). The greater number of spikes per plant as well as per hectare in treatment T_{11} resulted in higher number of corms per plant and per hectare (Barman *et al.*, 2012). The higher number of spikes and corms per plant in the treatments T_{11} might be due to the maximum vegetative parameters along with higher flower parameters. It is also affected by the beneficial effects of vermicompost in combination with RDF. These findings were closely related with Gupta and Dikshit (2012) and Parya *et al.* (2010) in Golden rod.

Hence concluded on the basis of present investigation, it is inferred that the application of 75% RDF+ 25% Vermicompost gave better plant growth with highest spike yield effectively correlated with enhanced corms production.

References

Anita Mohanty, C. R., Mohanty, P. K. and Mohapatra 2013. Studies on the response of Integrated Nutrient Management on growth and yield of marigold (*Tagetes erecta* L). *Research Journal of Agricultural Sciences* 4(3): 383-385.

Barman, D., Rajni, K., Rampal and Upadhyaya, R.C. 2005. Corm multiplication of gladiolus as influenced by application of potassium and spike removal. *J. Orna. Hort.*, 8(2):104-107.

Bhalla, Rajesh, Dhiman, P.K. and Jain, S.R. 2006. Effect of biofertilizers and biostimulants on growth and flowering in gladiolus. *J. Orna. Hort.*, 9(4): 248-252

Chaitra, R. 2006. Effect of Integrated Nutrient Management on growth, yield and quality of China Aster (*Callistephus chinensis* L.). *University of Agricultural Sciences, Dharwad.*

Gaur, A., Misra, R. L., Kumar, P. N. and Sarkar, J. 2006. Studies on nutrient management in gladiolus. Paper presented in the *"National Symposium on Ornamental Bulbous Crops"* held on 5-6 December, 2006 at S.V.B.P.U. of Ag. & T., Modipuram, Meerut (U.P.): 107.

Gupta, P. and Dikshit, S. K. 2012. Response of African marigold (*Tagetes erecta* L.) to integrated nutrient management. *Annals of Biology*, 28(1):66-67. 4 ref.

Parya, C., Pal, B. K., and Biswas, J. 2010, Influence of integrated nutrient management on flower production efficiency, behavior and quality of golden rod. *Environment and Ecology*, 28(4):2203-2205. *5 ref.*

Singh, P. V., Kumar, V. and Kumar, R. 2006. Effect of organic manures and inorganic fertilizers on flowering of gladiolus cv. American Beauty. "*National Symposium on Ornamental Bulbous Crops*". Held on 5-6 December, 2006 at S.V.B.P.U. of Ag. & T., Modipuram, Meerut (U.P.): 110-111