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Effect of Organic Manures and Inorganic Fertilizers on Growth, Flowering and Corm Yield in Gladiolus (*Gladiolus grandiflorus* L.) cv. Nova Lux

Shivam Dixit, Ashok Kumar Pandey, Harendra Tiwari, Himanshu Trivedi and Ankit Singh Bhadauria

Department of Horticulture, Janta College, Bakewar, Etawah 206 124, U.P., India

School of Advanced Agriculture Sciences and Technology, CSJMU, Kanpur 208 024, U.P., India

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ABSTRACT

A field experiment was conducted at the Department of Horticulture, Janta College, Bakewar, Etawah, India, during 2021-22. The experiment was conducted in a randomized block design with 10 treatments in three replications. Different combinations of Vermi-compost, F.Y.M., and NPK were used as treatments. The results revealed that, amongst all the treatments, the application of N.P.K. 120:80:80 kg + V.C. 10 t/ha in treatment (T₈) produced significant results. height of plant in 66.91 cm, number of leaves per plant 8.56, length of longest leaf in 48.14 cm (final stage), number of sprouts per corm 2.43, Number of days for emergence of spike 103.84, length of spike in 87.70 cm (full blooming stage), number of florets per spike 15.62 (full blooming stage), diameter of florets in 9.33 cm (full blooming stage), diameter of corms 7.50 (cm), number of corms per plant 4.80, weight of corms per plant 150.51 (g), corm yield per plot 1.90 (kg).

Key word: *Gladiolus*, FYM, Vermi-compost, Organic manures and Inorganic fertilizers.

Introduction

Gladiolus is most extensively cultivated cut flower in all over the world. The major producers of gladiolus cut flowers are the United States, Italy, France, Holland, Bulgaria, Brazil, Australia, and Israel. It was introduced into cultivation towards the end of the 16th century. In India, its cultivation dates back to the 19th century (Singh, 2014). It stands fourth in the international cut flower trade after carnations, roses, and chrysanthemums. The major gladiolus-growing states in India are West Bengal, Madhya Pradesh, Maharashtra, Uttar Pradesh, Punjab, Haryana, and Andhra Pradesh (Anonymous, 2011).

Gladiolus is a highly nutrient-responsive crop. The fertilizer requirement plays a vital role in the growth, quality, corm and cormel production of gladiolus. Proper fertilizers application encourages

healthy plant populations and higher yields. According to the National Horticulture Board, in India, total production of gladiolus was 135.10 million tonnes and the area under gladiolus cultivation was 11660 million hectares (Anonymous, 2018).

Materials and Methods

The present study on the “Effect of Organic Manures and Inorganic Fertilizers on Growth, Flowering and Corm Yield in Gladiolus (*Gladiolus grandiflorus* L.) cv. Nova Lux” was carried out in the experimental field at the Department of Horticulture, Janta College, Bakewar, Etawah (U.P.) during the session 2021–2022. The variety of gladiolus used for investigation was Nova Lux. Healthy, uniform-sized corms. Were treated with Bavistin (0.2%) and planted in the month of October. The experiment

was laid out in a randomized block design with ten treatments and three replications. The distance between rows was 25 cm, and the distance between plants was 25 cm. Different treatments that were used in the experiment are as follows: T₁ - Control, T₂ - N.P.K.120:80:80 kg/ha, T₃ - N.P.K. 90:60:60 kg/ha, T₄ - N.P.K. 60:40:40 kg/ha, T₅ - N.P.K. 120:80:80 kg + F.Y.M.10t/ha, T₆ - N.P.K. 90:60:60 kg + F.Y.M, T₇ -N.P.K. 60:40:40 kg + F.Y.M.10t/ha, T₈ - N.P.K.120:80:80 kg + V.C.10t/ha, T₉-N.P.K. 90:60:60 kg + V.C. 10t/ha and T₁₀- N.P.K. 60:40:40 kg+V.C.10t/ha. The Observations were recorded on different growth following & yield parameters like: height of plant in cm, number of leaves per plant, length of longest leaf in cm (final stage), number of sprouts per corm, number of days for emergence of spike, spike length in centimeters (full blooming stage), Number of florets per spike (full blooming stage), floret diameter in cm (full blooming stage), Diameter of corms (cm), number of corms per plant, weight of corms per plant (g), Corms yield per plot (Kg.), The experiment was laid out in a randomized block design with 10 treatments and three replications. Barring the treatments, the crop was maintained under uniform cultural practices and conditions. The data collection on various parameters of crop was statistically analyzed statistically and the results were evaluated at 5% level of significance.

Results and Discussion

The data were recorded in various vegetative growth, flowering and corm yield traits. The data

were recorded and analyzed depicted in Table 1.

Effect of Organic Manures and Inorganic Fertilizers on Vegetative Characters of Gladiolus

The maximum plant height (66.91 cm) at 60 DAP was recorded in T₈ (N.P.K. 120:80:80 kg + VC 10 t/ha), followed by 64.83 cm in T₁₀ (N.P.K. 60:40:40 kg + VC 10 t/ha). The minimum plant height (61.03 cm) was recorded with T₁ that is control. The findings are consistent with the findings of Chouhan *et al.* (2014), who compared the height of plants treated with vermicompost at 10 t/ha + 80% recommended NPK rate to other combinations. The number of leaves per plant after 90 days ranges between 7.89 and 8.49. The maximum number of leaves (8.49) was recorded under T₈ (NPK: 120:80:80 kg + VC: 10 t/ha). While the minimum number of leaves per plant (7.89) was recorded as under control. The longest leaves at 90 days (48.14 cm) was recorded in T₈ (N.P.K. 120:80:80 kg + VC 10 t/ha), followed by 45.28 cm in T₉ (N.P.K. 90:60:60 kg + VC 10 t/ha). The Shortest leaves (41.96 cm) was recorded with T₁ control. The results are in conformity with the findings of Dubey *et al.* (2010), who reported on the effects of different NPK doses after 30 and 45 days of planting. The maximum number of sprouts per corm (2.43) was recorded in T₈ (N.P.K. 120:80:80 kg + V.C. 10 t/ha), followed by (2.36) in T₇ (N.P.K. 60:40:40 kg + F.Y.M. 10 t/ha). The minimum number of sprouts per corm (1.63) was recorded with T₁ control. The results are in conformity with the findings of Kumar *et al.* (2016), who reported that the application of F.Y.M. 93 and V.C. 75 g/m² significantly increased

Table 1. Effect of Organic Manures and Inorganic Fertilizers on Vegetative Growth of Gladiolus cv. Nova Lux.

Treatments Combinations	Vegetative Characters			
	Height of plant in cm	Number of leaves per plant	Length of longest leaves in cm (final stage)	Number of sprout per corms
T ₁ -Control	61.03	7.89	41.96	1.63
T ₂ - N.P.K. 120: 80:80 kg/ha	62.10	7.95	42.84	2.02
T ₃ -N.P.K. 90:60:60 kg/ha	62.24	8.10	42.91	2.10
T ₄ -N.P.K. 60:40:40 kg/ha	61.93	8.01	43.07	2.16
T ₅ -N.P.K. 120:80:80 kg + F.Y.M.10t/ha	63.04	8.25	43.60	2.17
T ₆ - N.P.K. 90:60:60 kg + F.Y.M.10t/ha	63.13	8.18	44.21	2.24
T ₇ -N.P.K. 60:40:40 kg + F.Y.M.10t/ha	62.87	8.49	43.62	2.36
T ₈ -N.P.K. 120:80:80 kg + V.C. 10t/ha	66.91	8.56	48.14	2.43
T ₉ -N.P.K. 90:60:60 kg + V.C. 10t/ha	64.36	8.48	45.28	1.73
T ₁₀ - N.P.K. 60:40:40 kg + V.C. 10t/ha	64.83	8.32	45.22	1.97
S.E.(m)	0.163	0.124	0.072	0.032
CD at 5%	0.487	0.372	0.216	0.095

the number of sprouts.

Effect of Organic Manures and Inorganic Fertilizers on Flowering Characters of Gladiolus

The T₁ control had the maximum days for emergence spike (112.33), followed by T₄ (N.P.K. 60:40:40 kg/ha). The difference between the two treatments is significant. T₈ (N.P.K. 120:80:80 kg + V.C. 10 t/ha) had the minimum days for emergence spike (103.84). The maximum length of spike at full blooming stage (87.70 cm) was recorded in T₈ (N.P.K. 120:80:80 kg + V.C. 10 t/ha), followed by (85.39 cm) in T₉ (N.P.K. 90:60:60 kg + V.C. 10 t/ha). The minimum length of the spike at full blooming stage (81.68 cm) was recorded with T₁ control. The results are in conformity with the findings of Kumar *et al.* (2016), who reported that the application of F.Y.M. 93 and V.C. 75 g/m² significantly increased spike length. The maximum number of florets per spike (15.62) was recorded under T₈ (N.P.K. 120:80:80 kg + V.C. 10 t/ha), followed by 14.36 florets per spike under T₉ (N.P.K. 90:60:60 kg + V.C. 10 t/ha) where the minimum number of florets per spike (12.60) was recorded with T₁ control. The maximum diameter of florets in (9.33 cm) was recorded under T₈ (N.P.K. 120:80:80 kg + V.C. 10 t/ha), followed by the 8.97 cm diameter of florets under T₄ (N.P.K. 60:40:40 kg/ha), where the minimum diameter of florets in (7.20 cm) was recorded with T₁ control. These findings are consistent with those of Patel *et al.* (2010), who discovered that the plants used organic manures (V.C. 80% and F.Y.M. 75%) to

produce more florets per spike while also increasing floret diameter.

Effect of Organic Manures and Inorganic fertilizers on Corm Yield of Gladiolus

The maximum diameter of corms (7.50 cm) was recorded in T₈ (N.P.K. 120:80:80 kg + V.C. 10 t/ha), followed by 7.35 cm in T₃ (N.P.K. 90:60:60 kg/ha). The minimum diameter of corms (6.58 cm) was recorded with T₁ control. The maximum number of corms per plant (4.80) was recorded in T₈ (N.P.K. 120:80:80 kg + V.C. 10 t/ha), followed by 3.76 in T₂ (N.P.K. 120:80:80 kg/ha). The minimum number of corms per plant (2.19) was recorded with T₁ control. These findings nearly corroborate with the results of Singh *et al.* (2017), who reported that organic manures and inorganic fertilizers increased the growth yield and quality attributes of gladiolus, viz., plant height and number of corms per plant. The maximum average weight of corms of 150.51 g was recorded in T₈ (N.P.K. 120:80:80 kg + V.C. 10 t/ha), followed by 145.47 g in T₉ (N.P.K. 90:60:60 kg + V.C. 10 t/ha). The minimum weight of corms (120.25 g) was recorded with T₁ control. The maximum corm yield per plot of 1.90 kg was recorded in T₈ (N.P.K. 120:80:80 kg + V.C. 10 t/ha), followed by 1.81 kg in T₇ (N.P.K. 60:40:40 kg + F.Y.M. 10 t/ha). The minimum corm yield per plot (1.16 kg) was recorded with T₁ control. These results corroborate with those of Basil *et al.* (2010), who reported that the application of F.Y.M. 500 and V.C. 350 g/m² significantly increased the corn yield per plot in kg.

Table 2. Effect of Organic Manures and Inorganic Fertilizers on Flowering Characters of Gladiolus cv. Nova Lux.

Treatments Combinations	Flowering Characters			
	Number of days for emergence of spike	Length of spike in cm (full blooming stage)	Number of florets per spike (full blooming stage)	Diameter of florets in cm (full blooming stage)
T ₁ -Control	112.33	81.68	12.60	7.20
T ₂ - N.P.K. 120:80:80 kg/ha	105.06	82.89	12.94	7.35
T ₃ -N.P.K. 90:60:60 kg/ha	103.84	83.00	13.26	7.54
T ₄ -N.P.K. 60:40:40 kg/ha	107.66	83.60	13.31	8.97
T ₅ -N.P.K. 120:80:80 kg + F.Y.M.10t/ha	105.93	83.85	14.09	7.48
T ₆ - N.P.K. 90:60:60 kg + F.Y.M.10t/ha	104.96	82.88	13.90	7.99
T ₇ -N.P.K. 60:40:40 kg + F.Y.M.10t/ha	105.73	82.99	13.96	8.45
T ₈ -N.P.K. 120:80:80 kg + V.C. 10t/ha	103.84	87.70	15.62	9.33
T ₉ -N.P.K. 90:60:60 kg + V.C. 10t/ha	105.33	85.39	14.36	7.55
T ₁₀ - N.P.K. 60:40:40 kg + V.C. 10t/ha	105.00	83.70	13.96	8.87
S.E.(m)	0.975	0.088	0.052	0.078
CD at 5%	2.920	0.262	0.155	0.110

Table 3. Effect of Organic Manures and Inorganic Fertilizers on Corm Yield of *Gladiolus* cv. Nova Lux.

Treatments Combinations	Corm yield			
	Diameter of corms in cm	Number of corms per plant	Weight of corms (g.)	Corms yield per plot (kg.)
T ₁ -Control	6.58	2.19	120.25	1.16
T ₂ - N.P.K. 120: 80:80 kg/ha	7.02	3.76	125.35	1.23
T ₃ -N.P.K. 90:60:60 kg/ha	7.35	2.92	130.61	1.27
T ₄ -N.P.K. 60:40:40 kg/ha	6.72	3.25	120.50	1.48
T ₅ -N.P.K. 120:80:80 kg + F.Y.M.10t/ha	6.66	2.28	130.38	1.34
T ₆ - N.P.K. 90:60:60 kg + F.Y.M.10t/ha	6.63	3.28	135.46	1.56
T ₇ -N.P.K. 60:40:40 kg + F.Y.M.10t/ha	7.34	2.80	140.41	1.81
T ₈ -N.P.K. 120:80:80 kg + V.C. 10t/ha	7.50	4.80	150.51	1.90
T ₉ -N.P.K. 90:60:60 kg + V.C. 10t/ha	6.78	2.30	145.47	1.72
T ₁₀ - N.P.K. 60:40:40 kg + V.C. 10t/ha	6.73	3.20	130.65	1.30
S.E.(m)	0.207	0.013	0.118	0.014
CD at 5%	0.620	0.038	0.354	0.042

Conclusion

Based on the findings of the present investigation, it may be concluded that the application of N.P.K. 120:80:80 kg + VC 10 t/ha is beneficial for the commercial traits of *Gladiolus* cv. Nova Lux.

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