



Influence of Organic Manures and Integrated Nutrient Management on Floral Characteristics and Corm Yield in *Gladiolus* cv. Nova Lux

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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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 with 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. Average height of plant in (90 DAS) 73.16cm, Average number of leaves per plant (60 DAS) 5.78, Average width of longest

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leaf in 5.77cm (final stage), Average length of florets in 9.88 cm (full blooming stage), Average Number of cormels 32.04 per plant, Average weight of corms 150.51 (g). It can be concluded that application of N.P.K. and vermi compost could be used as organic fertilizer for production of Gladiolus.

Keywords: *Gladiolus*; *FYM*; *Vermi-compost*; *organic manures and inorganic fertilizers*.

1. INTRODUCTION

“The word gladiolus is derived from the Latin word “Gladius” meaning sword. It is also named as “Sword Lily”. Corn flag is another name in Europe because *Gladiolus illyricus* is found as wild weed in corm field. Gladiolus is cultivated all over the world. The major countries producing gladiolus cut flowers are the USA, Italy, France, Holland, Bulgaria, Brazil, Australia and also Israel. It was introduced that into cultivation towards the end of the 16th century. In India its cultivation dates back to 19th century” [1]. “It stands fourth in the international cut flower trade after carnation, rose and chrysanthemum. The major gladiolus growing states in India are West Bengal, Madhya Pradesh, Maharashtra, Uttar Pradesh, Punjab, Haryana and Andhra Pradesh” [2]. “In Maharashtra it is mostly cultivated on large scale in Pune, Nashik, Kolhapur and Nagpur districts. The total area of gladiolus in India is 1270 hectare and 127 million cut spikes was produced” [1]. “Flower crops are very much responsive to fertilizer. It is highly capable of exhausting huge nutrients from native soil. So, it requires a higher amount of chemical fertilizer in a balanced proportion for ensuring maximum flower production. Fertilizer requirements of gladiolus like other crops have a vital role in growth, quality, corn, and cormel production. After green revolution the continuous use of fertilizers has led to an increase incrop production but there was a decline in the nutrient-use efficiency making fertilizer consumption uneconomical and producing adverse effects on atmosphere and ground water quality, causing health hazards” [3]. “Therefore, it was suggested to replace some of the applied chemical fertilizers by some organic manures and integrated nutrient management. The use of inorganic fertilizers is of paramount importance in horticulture in general and floriculture in particular, as the integrated nutrient management concept is one of the eco-friendly approaches” [4]. “In many countries, there is some information about nitrogen (N), phosphorus (P), and potassium (K) fertilization requirements. Major nutrients like nitrogen, phosphorus, potassium along with zinc noticeably increase the number of

flowers, florets/spike, length of the spike, and flowering stem of gladiolus” [5].

“Gladiolus being a highly nutrient responsive crop, fertilizer requirement plays a vital role in growth, quality, corm and cormel production of gladiolus. The proper application of fertilizer has optimum plant population and perquisites for higher returns” [6]. Keeping in view the need and importance, present study was undertaken to study the impact of organic manure and integrated nutrient management on vegetative and Flowering and corm characters of Gladiolus cv. Nova Lux.

2. MATERIALS AND METHODS

The present study 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, flowering & yield parameters like: Height of plant in cm (90 DAS), Number of leaves per plant (90DAS), Width of longest leaves in cm (final stage), Length of florets in cm (at full blooming stage), Number of cormels per plant, Average weight of corms (g)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 as per method given by Panse and Sukhatme [7] and the results were evaluated at 5% level of significance.

3. RESULTS AND DISCUSSION

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

Vegetative characters: The effect of organic manures and integrated nutrient management on vegetative characters of Gladiolus cv. Nova Lux. The data were recorded and analyzed depicted in Table 1. The maximum plant height 73.16cm at 90 DAS was recorded in treatment T₈ (N.P.K. 120:80:80 kg + V.C. 10t/ha) followed by 72.72cm with T₆ (N.P.K.90:60:60 kg+F.Y.M.10t/ha). The minimum plant height 70.41cm was recorded with T₁ control. The results are in conformity with the findings of Shivam *et al.* [8] reported that maximum plant height treated with the combination of F.Y.M. at 10t/ha + 70% recommended vermicompost rate compared to other combination.

The number of leaves per plant after 60 DAS range between 5.17and 5.78. The maximum number of leaves 5.78 was recorded under T₈ (N.P.K. 120:80:80 kg + V.C. 10t/ha). While minimum number of leaves per plant 5.17 was recorded under control. These findings nearly corroborate with the result of Dalvi *et al.* [9] they reported organic manures and inorganic fertilizers increased growth, yield and quality

attributes of gladiolus viz. plant height, number of leaves per plant.

The maximum width of longest leaves in cm 5.77 cm was recorded under T₈ (N.P.K. 120:80:80 kg + V.C. 10t/ha). While minimum width of longest leaves in 3.90cm was recorded under control. The results are in conformity with the findings of Kejkar and Polara [10] also noticed that the plants applied with 20:20:15 NPK g/m². As a result, the 20:20:15 NPK g/m² treatment could be beneficial for Gladiolus cv. Nova Lux, vegetative and reproductive characteristics.

Flowering and corm characters: The effect of organic manures and integrated nutrient management on flowering and corm characters of Gladiolus cv. Nova Lux. The data were recorded and analyzed depicted in Table 2. The maximum length of florets in (9.88 cm) was recorded in T₈ (N.P.K. 120:80:80 kg + V.C. 10t/ha) followed by (8.88) with T₆ (N.P.K. 90:60:60 kg + F.Y.M.10t/ha). The difference between two treatments is significant. The minimum length of florets (8.17) was recorded with T₁ control. These findings agreed with the result of Rajesh *et al.*, [11] who reported that the application of NPK in gladiolus, in terms of the longest duration of blooming, the highest length of spike and the highest length of florets, the application of N.P.K. (4.5:2.7:1.8 g/plant) was shown to be the best. The maximum Number of cormels per plant (32.04) was recorded in T₈

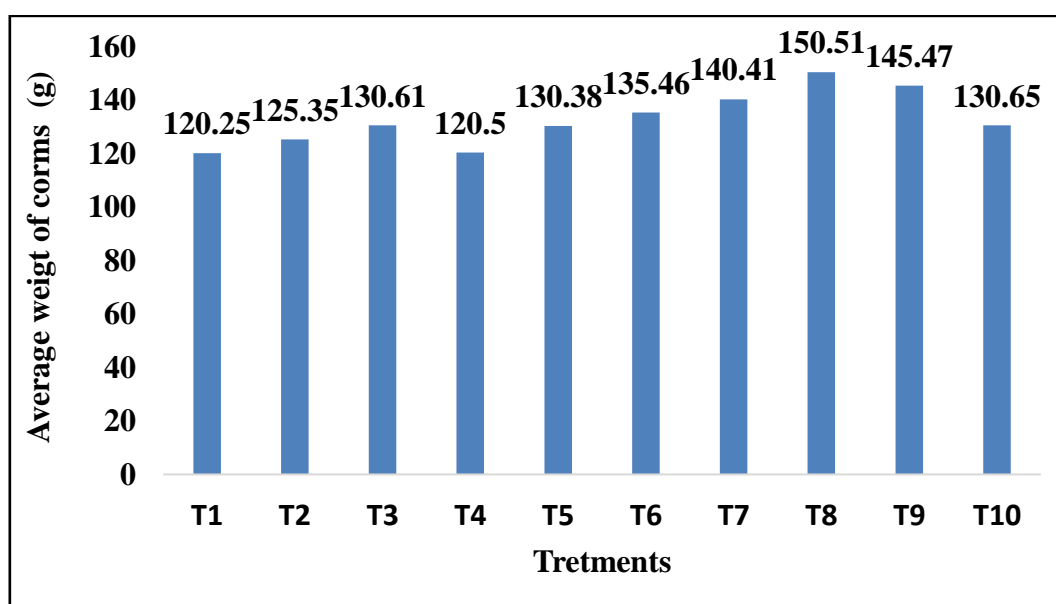


Fig. 1. Effect of various treatments of organic manures and inorganic fertilizers on average weight of corms(g) of gladiolus cv. Nova Lux

Table 1. Influence of Organic Manures and Integrated Nutrient Management on Vegetative Growth of Gladiolus cv. Nova Lux

Treatments Combinations	Vegetative Characters		
	Height of plant in cm (90 DAS)	Number of leaves per plant (60 DAS)	width of longest leaves in cm (final stage)
T ₁ –Control	70.41	5.17	3.90
T ₂ - N.P.K. 120: 80:80 kg/ha	71.08	5.38	4.28
T ₃ -N.P.K. 90:60:60 kg/ha	71.47	5.49	4.20
T ₄ -N.P.K. 60:40:40 kg/ha	72.17	5.54	4.65
T ₅ -N.P.K. 120:80:80 kg + F.Y.M.10t/ha	70.45	5.53	4.85
T ₆ - N.P.K. 90:60:60 kg + F.Y.M.10t/ha	72.72	5.28	4.44
T ₇ -N.P.K. 60:40:40 kg + F.Y.M.10t/ha	71.70	5.76	4.69
T ₈ -N.P.K. 120:80:80 kg + V.C. 10t/ha	73.16	5.78	5.77
T ₉ -N.P.K. 90:60:60 kg + V.C. 10t/ha	71.83	5.67	4.06
T ₁₀ - N.P.K. 60:40:40 kg + V.C. 10t/ha	71.80	5.53	4.85
S.E.(m)	0.163	0.077	0.036
CD at 5%	0.489	0.232	0.106

Table 2. Influence of Organic Manures and Integrated Nutrient Management on Flowering Characters and Corm Characters of Gladiolus cv. Nova Lux

Treatments Combinations	Flowering Characters and Corm Characters		
	Length of florets in cm (full blooming stage)	Number of cormels per plant	Weight of corms (g.)
T ₁ –Control	8.17	28.80	120.25
T ₂ - N.P.K. 120:80:80 kg/ha	8.19	29.66	125.35
T ₃ -N.P.K. 90:60:60 kg/ha	8.30	29.85	130.61
T ₄ -N.P.K. 60:40:40 kg/ha	8.38	29.96	120.50
T ₅ -N.P.K. 120:80:80 kg + F.Y.M.10t/ha	8.43	30.97	130.38
T ₆ - N.P.K. 90:60:60 kg + F.Y.M.10t/ha	8.88	30.80	135.46
T ₇ -N.P.K. 60:40:40 kg + F.Y.M.10t/ha	8.72	30.85	140.41
T ₈ -N.P.K. 120:80:80 kg + V.C. 10t/ha	9.88	32.04	150.51
T ₉ -N.P.K. 90:60:60 kg + V.C. 10t/ha	8.60	29.77	145.47
T ₁₀ - N.P.K. 60:40:40 kg + V.C. 10t/ha	8.50	30.70	130.65
S.E.(m)	0.032	0.212	0.118
CD at 5%	0.095	0.634	0.354

(N.P.K. 120:80:80 kg + V.C. 10t/ha) followed by (30.97) number of cormels under T₅ (N.P.K. 120:80:80 kg + F.Y.M.10t/ha). The minimum number of cormels (28.80) was recorded with T₁ control followed by other treatments. These findings nearly corroborated with the result of Sharma *et al*, [12]. They observed that in a field experiment, the fertilizer combination of N at 50 g/m², P at 30 g/m², and K at 30 g/m² resulted in the highest number of cormels per plant, good size of cormels for gladiolus. The maximum average weight of corms in (150.51 g.) was recorded in T₈ (N.P.K. 120:80:80 kg + V.C. 10t/ha) followed by (145.47 g.) with T₉ (N.P.K. 90:60:60 kg + V.C. 10t/ha). The minimum weight of corms in (120.25g.) was recorded with T₁ control. The results are in conformity with the findings of Qazi Altaf *et al*, [13] they are reported weight of corms per plant treated with the combination of F.Y.M. at 10t/ha + 70% recommended vermi compost rate compared to other combination [14].

4. 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, which is cost effective and eco-friendly for the cultivation.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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