

## Effect of Integrated Nutrient Management on Growth, Yield and Quality of Gladiolus (*Gladiolus grandifloru L.*) Cv. Psittacinus Hybrid

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### Abstract

A trial was conducted at Department of Horticulture, Junagadh Agricultural University, Junagadh to investigate the effect of organic, inorganic and biofertilizer on growth, yield and quality of gladiolus cv. Psittacinus hybrid. Twelve treatment combinations of different nutritional sources were comprised with three replications. Results due to various treatments found significant. Application of (T3) was recorded for minimum days to first spike emergence (72.10 days), maximum plant height (91.88 cm), maximum number of stems per plant (2.20) and fresh and dry weight of plant (161.36 gm and 46.37 gm, respectively). With respect to flowering, yield characters maximum number of spikes per plant (2.20), number of spikes per square meter (19.82), yield of spikes per hectare (2.87 lacks), fresh weight of whole spikes (90.03 gm), diameter of floret (7.98 cm), length of floret rachis (55.24 cm), vase life (14.32 days), longevity of spike (15.17 days) were recorded with an application of 75% RDF + NC @ 1 t/ha + Azoto. @ 2 kg/ha + PSB @ 2 kg/ha (T6). Similarly, the application of CC @ 4 t/ha + Azoto. @ 4 kg/ha + PSB @ 4 kg/ha (T11) gave poor performance.

**Keywords:** Azotobacter; Phosphate solubilizing bacteria; Castor cake; Neem cake

### Introduction

Gladiolus (from Latin, the diminutive of gladius, a sword) is a genus of perennial bulbous flowering plants in the iris family (*Iridaceae*). Sometimes called the sword lily, the most widely used English common name for these plants is simply gladiolus (plural gladioli, gladioluses or sometimes gladiolas). The quality and production of cut flowers is primarily a varietal trait, it is greatly influenced by climatic, geographical and nutritional factors. Out of them, nutritional factor is playing a major role. At present, nutrients are supplied through chemical fertilizers. The use of organic manures and biofertilizer along with judicious use of chemical fertilizers is nothing but balancing the diet of crop and soil. It improves physico-chemical and biological properties of soil, besides improving the efficiency of applied nutrients.

### Materials and Methods

The trial was conducted at Department of Horticulture, Junagadh Agricultural University, Junagadh, during Rabi, 2011. The trial was laid out in randomized block design with 12 treatments and three replication. The different treatments were T1: RDF= N:P:K 300:150:150 kg/ha, T2: FYM @ 5 t/ha + 100% RDF, T3: FYM @ 20 t/ha + Azoto. @ 4 kg/ha + PSB @ 4 kg/ha, T4: 75% RDF + VC @ 1 t/ha + Azoto. @ 2 kg/ha + PSB @ 2 kg/ha, T5: 75% RDF + CC @ 1 t/ha + Azoto. @ 2 kg/ha + PSB @ 2 kg/ha, T6: 75% RDF + NC @ 1 t/ha + Azoto. @ 2 kg/ha + PSB @ 2 kg/ha, T7: 50% RDF + VC @ 2 t/ha + Azoto. @ 3 kg/ha + PSB @ 3 kg/ha, T8: 50% RDF + CC @ 2 t/ha + Azoto. @ 3 kg/ha + PSB @ 3 kg/ha, T9: 50% RDF + NC @ 2 t/ha + Azoto. @ 3 kg/ha + PSB @ 3 kg/ha, T10: VC @ 4 t/ha + Azoto. @ 4

kg/ha + PSB @ 4 kg/ha, T11: CC @ 4 t/ha + Azoto. @ 4 kg/ha + PSB @ 4 kg/ha, T12: NC @ 4 t/ha + Azoto. @ 4 kg/ha + PSB @ 4 kg/ha.

The recommended fertilizer doses of 300:150:150 kg NPK/ha were applied in form of Urea, DAP and muriate of potash. Half dose of nitrogen and full dose of phosphorus and potash were applied as basal dose. The remaining half dose of nitrogen was applied in two split doses at interval of 45 and 90 days after application of basal dose. In case of organic source, farm yard manure, vermi compost, neem cake and castor cake were incorporated in the soil according to the treatments of respective plots. Likewise, *Azotobacter* and PSB were well mixed in organic manure and then applied in the soil of respective plots.

### Results and Discussion

(Table 1) revealed that the, were recorded with an application of (T3). This might be due to better nutrient uptake, photosynthesis, source-sink relationship, besides excellent physiological and biochemical activities due to presence of *Azotobacter* and PSB. Similar results were also observed by Ranjan and Mansee [1] in gladiolus and Gupta et al. [2] and Kukde et al. [3] in tuberose.

The observations on flowering parameters have been presented in (Tables 2-3). fresh weight of whole spikes (90.03 gm), diameter of floret (7.98 cm), length of floret rachis (55.24 cm), longevity of spike (15.17 days), vase life (14.32 days) maximum number of spikes per plant (2.20), number of spikes per square meter (19.82), yield of spikes per hectare (2.87 lacks) were recorded in treatment 75% RDF + NC @ 1 t/ha + Azoto. @ 2 kg/ha + PSB @ 2 kg/ha.(T6). This might be due to combine application of inorganic fertilizer, neem cake and biofertilizer. The beneficial effect of combined application of neem cake and inorganic fertilizer was possible as because the oil cake not only supply the NPK but also contained micronutrients and amino acid. It also protects the plant from nematodes and trace elements [4].

Treatments	Plant height (cm) 90 days	No. of stems per plant	Fresh weight of plant (g)	Dry weight of plant (g)	Days required for opening of first spike
T1	86.07	2.08	200.34	61.58	74.03
T2	87.19	1.77	182.70	50.40	79.12
T3	91.88	2.20	208.35	65.59	72.10
T4	88.97	2.03	189.37	62.70	74.42
T5	87.83	1.67	194.26	56.34	76.11
T6	84.98	2.10	177.37	59.40	78.18
T7	85.61	1.43	180.36	54.38	82.01
T8	84.32	2.00	173.39	57.81	75.14
T9	84.90	1.90	186.57	52.39	77.19
T10	82.75	1.33	173.72	48.52	83.21
T11	80.95	1.52	161.36	46.37	81.04
T12	83.82	1.55	172.44	48.03	79.17
S.Em.±	2.208	0.119	8.756	2.927	1.994
C.D. at 5%	6.48	0.35	25.68	8.58	5.85
C.V.%	7.68	11.50	8.27	9.17	8.12

**Table 1:** Effect of organic, inorganic and biofertilizer on days to vegetative parameters in gladiolus cv. Psittacinus hybrid.

These findings are in agreement with Godse et al. [5], Rajiv et al. [6], Gangadharan and Gopinath [7], Dongardive et al. [8], Dalve et al. [9] in gladiolus Hence, the use of helped in realizing better yield and quality of gladiolus.

Treatment s	Flowerin g span (days)	Fresh weight of whole spike (g)	Diamet er of floret (cm)	Length of floret rachis (cm)	Longevit y of spikes (days)	Vase life of spikes (days)
T1	23.10	88.14	7.20	54.03	13.83	13.17
T2	21.33	80.21	6.38	45.25	12.85	11.41
T3	21.47	85.32	6.73	50.29	13.52	12.90
T4	22.12	86.19	7.39	51.18	14.29	13.67
T5	21.50	82.15	6.36	50.73	13.20	12.83
T6	24.17	90.03	7.98	55.24	15.17	14.32
T7	19.65	78.15	6.20	44.61	10.95	10.38
T8	21.97	83.89	6.95	52.10	12.03	11.65
T9	21.73	80.07	6.66	49.55	12.35	12.29
T10	20.98	78.23	5.96	40.94	12.00	11.17
T11	19.48	75.10	6.02	43.62	10.03	9.28

T12	20.07	79.50	6.27	43.01	11.33	11.19
S.Em.±	1.302	2.996	0.333	2.492	0.713	0.632
C.D. at 5%	NS	8.79	0.98	7.31	2.09	1.85
C.V.%	10.51	8.31	8.66	8.92	9.79	9.11

**Table 2:** Effect of organic, inorganic and biofertilizer on flowering and flower quality in gladiolus cv. Psittacinus hybrid.

Treatments	No. of spikes per plant	No. of spikes per net plot	No. of spikes per ha (lakh no.)
T1	2.08	18.75	2.57
T2	1.77	15.91	2.21
T3	1.73	15.60	2.16
T4	2.03	18.43	2.53
T5	1.67	15.07	2.09
T6	2.20	19.82	2.87
T7	1.43	12.90	1.79
T8	2.00	18.01	2.50
T9	1.90	16.88	2.34
T10	1.55	13.95	1.94
T11	1.28	11.55	1.60
T12	1.52	13.65	1.90
S.Em.±	0.106	0.977	0.139
C.D. at 5%	0.31	2.86	0.41
C.V.%	10.46	10.66	10.97

**Table 3:** Effect of organic, inorganic and biofertilizer on spike yield in gladiolus cv. Psittacinus hybrid.

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