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# Effect of different component of integrated nutrient management on growth, yield and quality of gladiolus (*Gladiolus grandifloru* L.) Cv. Candyman

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**Abstract**
The present investigation was conducted at Horticulture Farm, Department of Horticulture, IGKV Raipur (C.G.) during the rabi season of 2010-11. The experiment was laid out in Randomized Block Design (RBD) with four replications. The cultivar under this investigation was "Candyman". There were ten treatments combinations under the study namely, $T_1$: Control, $T_2$: 50% RDF, $T_3$: 75% RDF, $T_4$: 100% RDF, $T_5$: FYM 10 t/ha, $T_6$: 50% RDF + FYM 10 t/ha, $T_7$: 75% RDF + FYM 10 t/ha, $T_8$: Vermicompost Only 3t/ha, $T_9$: 50% RDF + Vermicompost 3t/ha, $T_{10}$:75% RDF + Vermicompost 3 t/ha. The Recommendad dose of fertilizer is i.e. 120:80:60/ha. The result indicated that the $T_7$ (75% RDF + FYM 10 t/ha) performed better in growth character namely, days to sprout, numbers of sprouts, number of leaves per plant, girth of plant base, width of leaf, height of the plant up to tip of leaf, days to spike emergence, diameter of corm, weight per corm, total corm weights per plot and number of corms per plant. However length of the spike, number of florets per spikes, vase life of cut spikes was found maximum in treatment $T_{10}$ (75% RDF+ Vermicompost 3 t/ha).

**Keywords:** Gladiolus, growth, quality and Recommended dose of fertilizer

## Introduction
Gladiolus (*Gladiolus grandiflorus* L.) is one of the most popular ornamental bulbous plants grown in many parts of the world for its bewitching flowers. Internationally it is known for its dazzling florets colour, sturdy spike, size, attractive appearance and keeping quality which occupies fifth position in the international trade. Gladiolus is also known by the name of "sword lily" due to sword like appearance of leaves. "Corn foliage" is another common name in Europe because of *Gladiols illyrius* is found as wild weed in the corn field. Besides aesthetic significance as bulbous flower many other uses of Gladiolus species has also been documented. Guillarmod (1977) mentioned that *Gladiolus crassifolius* is used for headache and lumbago, whole plant is crushed heated and applied to the affected part. Cooked corms of *Gladiolus saundersii* when mixed with food are effective against diarrhea. Gladiolus is valued for its majestic spikes, beautiful colors, attractive shapes and excellent keeping quality or vase life. The gladiolus cultivation is very economical from farmer's points of view. It can be commercially propogated through corms and cormels. In Chhattisgarh area under floriculture crops is about 12169 hectares out of which gladiolus crop occupy area around 1922 hectares during 2016-2017 (Dir, of Horticulture C.G.). Chhattisgarh state is one of the potential areas for commercial exploitation of floriculture crops. There are heavy demands of flowers during marriage festivals and other social occasions and most of the requirements fulfilled by growers/suppliers of other state.

To ensure maximization of productivity in any crop, optimum nutrient supply is one of the important factors. Nitrogen, phosphorus and potassium are the three major nutrients that play very vital role in influencing vegetative growth, flower yield and quality attributes. However, considering the recent concept for ecofriendly-technology, increased cost and timely non-availability of inorganic fertilizers, discriminate usage of chemicals has led to poor soil fertility and soil health. In recent years use of cost effective and eco friendly biofertilizers and different organic sources in combination with inorganic fertilizers has resulted in increased production in many crops besides improving soil health and fertility levels. Similarly it is essential to evolve integrated nutrient management practices suitable for gladiolus crop.

## Material and Methods

The experiment was conducted in Horticulture Farm, Department of Horticulture IGKV Raipur (C.G.) during the *rabi* season 2010-2011. The gladiolus variety under study was "Candyman". The experiment was laid out in a randomized block design with 10 treatments and four replications. The treatment includes T1: Control, T2: 50% RDF, T3:75% RDF, T4:100% RDF, T5: FYM 10 t/ha, T6: 50% RDF + FYM 10 t/ha, T7:75% RDF + FYM 10 t/ha, T8:
Vermicompost Only + 3t/ha, T9:50% RDF + Vermicompost 3t/ha, T10:75% RDF+ Vermicompost 3 t/ha. The Recommended dose of fertilizer was 120:80:60 kg/ha. Each treatment was assigned to a plot size of 2.0 m x 1.5 m. Parameter for which observation were recorded included - days to sprout, numbers of sprouts, number of leaves per plant, girth of plant base, width of leaf, height of the plant up to tip of leaf, days to spike emergence, diameter of corm, weight per corm, total corm weights per plot and number of corms per plant.

## Results and Discussion

The experiment resulted that Application of 75% RDF + FYM 10 t/ha (T7) took minimum number of days (5.25) for 50 percent sprouting where as treatment T1 (control) took the maximum days (9) to sprout The treatment T7 was statistically superior over the rest of the treatments The earliness in sprouting may be due to the application of chemical fertilizer in combination with FYM which promotes or induces early sprouting of corm This result is conformity with the findings of Bisen and Barholia (1990) [4] and Singh (1998) [8] in potato and gladiolus respectively.

Whereas in the observation of the parameter number of sprouts per mother corm (1.55) was maximum found in the treatment T7 (75% RDF + FYM 10 t/ha) and T10 (75% RDF +Vermicompost 3.0 t/ha) which was significantly superior over all the treatments except with the treatment T6 (50% RDF + FYM 10 t/ha) and T9 (50% RDF +Vermicompost 3.0 t/ha The minimum number of sprouts per mother corm (1.18) was recorded in Control (T1) The superiority of treatment T7 (75% RDF + FYM 10 t/ha) and T10 (75% RDF +Vermicompost 3.0 t/ha) over the rest of the treatments might be due to availability of optimum amount of nutrient from inorganic fertilizer in combination with FYM This result is in close conformity with the findings of Singh *et al.* (1998) [8].

The treatment (T10) receiving 75% RDF +Vermicompost 3.0 t/ha was taken minimum number of days to spike emergence (63.25days) The maximum number of days to spike emergence (72.5days) was taken by the Control (T1) The earliness in spike emergence by the application of FYM in combination of inorganic fertilizer may be due to optimum availability of nutrients to the plant due to which plant completed their vegetative growth soon and resulting in early spike emergence. These results are in close conformity with the findings of Ahmed *et al.* (2004) [6].

As for as the observation length of spike was noticed maximum in the treatment T10 (75% RDF + Vermicompost 3 t/ha) i.e. (101.88 cm) followed by the treatment T7 (75% RDF + FYM 10 t/ha) i.e. (101.80 cm) The minimum length of the spike was observed in the treatment T1 (control) The maximum length of the spike in treatment T10 (75% RDF +Vermicompost 3.0 t/ha) may be due to the availability of sufficient amount of nitrogen in different phases of growth and development of plants which promotes the length of the spike. Similar result was recorded by Gupta *et al*. in (2008) [7].

Maximum number of florets per spike was noticed in the treatment T10 (75% RDF + Vermicompost 3 t/ha) i.e. (14.47) where as the minimum number of florets per spikes was recorded in the treatment T1 (control) i.e. (10.37) The superiority of treatment T10 (75% RDF +Vermicompost 3.0 t/ha) for maximum number of florets over the other treatments may be due to the availability of organic and inorganic nitrogen and other essential nutrients for longer period at optimum level resulting in more number of florets per spikes This result is in close agreement with the findings of Ahmed *et al.* (2004) [6].

Treatment T10 had the longest vase life of 6.4 days in distilled water whereas the treatment T1 (control) had minimum vase life 3.17 days The maximum vase life in treatment T10 (75% RDF +Vermicompost 3.0 t/ha) may be due to the positive effect of inorganic nitrogen in combination with organic manure on the vase life and also due to more accumulation of carbohydrate which increased the vase life of cut spikes.

Data regarding diameter of corm was noticed maximum in the treatment T7 (75% RDF + FYM 10 t/ha) i.e. (5.82 cm) The minimum diameter of corm was obtained in the treatment T1 (control) (2.92 cm) The maximum diameter of corm in the treatment T7 (75% RDF + FYM 10 t/ha) may be due to availability of nitrogen and other essential nutrient regularly to the plant at critical stage of growth and development of corm which in turn resulted in faster and better development of corm. This result is in close agreement with the findings of Sasani *et al.* (2003) [10].

The weight of per corm was recorded maximum in the treatment T7 (75% RDF + FYM 10 t/ha) i.e. (65.07g) The minimum weight per corm was found in the treatment T1 (control) i.e. (30.1g) The increase in weight per corm in treatment T7 (75% RDF + FYM 10 t/ha) was mainly due to the balanced supply of nutrients from both inorganic fertilizer and FYM throughout the development period of corms.

The maximum no. of corms per plant was noticed in the treatment T7 (75% RDF + FYM 10 t/ha) whereas the minimum number of corms per plant was obtained in the treatment T1 (control) Increase in numbers of corms per plant in treatment T7 (75% RDF + FYM 10 t/ha) may be due to higher germination percentage of corm with the application of inorganic fertilizer in combination with FYM. This result is in close agreement with the findings of Patel and Mehta (1984) [9].

The result obtained that total number of cormels per plant is reveals that the maximum number of cormels per plant (60.25) was observed in Control (T1) followed by treatment T2 (50% RDF) It might be due to non availability of nitrogen in the later stage of growth which prevented the cormels from developing into corms. Similar trends had also reported by Bisen and Barholia (1990) [4] in potato.

**Table 1:** Effect of integrated nutrient management on growth, yield and quality of gladiolus Cv. 'Candyman'

| Treatments | Days to sprouting of corm | No. of sprouts per mother corm | Days to spike emergence | Length of spike (cm) | No. of florets per spike | Vase life of cut spike (Days) | Diameter of corm (cm) | Weight per corm (gm) | Total No. of corms per plant | Total no. of cormels per plant |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 9.00 | 1.18 | 72.50 | 80.65 | 10.37 | 3.17 | 2.92 | 30.10 | 1.00 | 60.25 |
| T2 | 7.70 | 1.37 | 68.50 | 90.85 | 12.37 | 4.25 | 4.20 | 43.27 | 1.10 | 53.25 |
| T3 | 7.50 | 1.37 | 68.00 | 96.65 | 12.52 | 4.55 | 4.25 | 47.57 | 1.11 | 50.25 |
| T4 | 6.70 | 1.46 | 67.50 | 99.12 | 12.77 | 4.72 | 4.35 | 51.35 | 1.12 | 46.25 |
| T5 | 8.00 | 1.32 | 69.00 | 86.97 | 11.42 | 3.80 | 3.95 | 39.80 | 1.07 | 54.75 |
| T6 | 6.70 | 1.47 | 65.50 | 100.18 | 13.12 | 5.00 | 4.65 | 56.95 | 1.16 | 45.25 |
| T7 | 5.20 | 1.55 | 63.50 | 101.80 | 13.87 | 5.92 | 5.82 | 65.07 | 1.25 | 42.25 |
| T8 | 8.00 | 1.37 | 69.20 | 87.15 | 11.57 | 3.72 | 3.62 | 39.50 | 1.10 | 55.25 |
| T9 | 6.70 | 1.47 | 66.00 | 100.20 | 13.55 | 5.32 | 4.57 | 53.37 | 1.15 | 44.25 |
| T10 | 6.50 | 1.55 | 63.25 | 101.88 | 14.47 | 6.40 | 5.75 | 60.02 | 1.22 | 40.75 |
| S.Em± | 0.411 | 0.030 | 1.665 | 3.970 | 0.824 | 0.172 | 0.393 | 2.952 | 1.856 | 3.258 |
| C.D (p=0.05) | 1.193 | 0.090 | 4.833 | 11.521 | 2.391 | 0.500 | 1.142 | 8.568 | 5.387 | 9.456 |

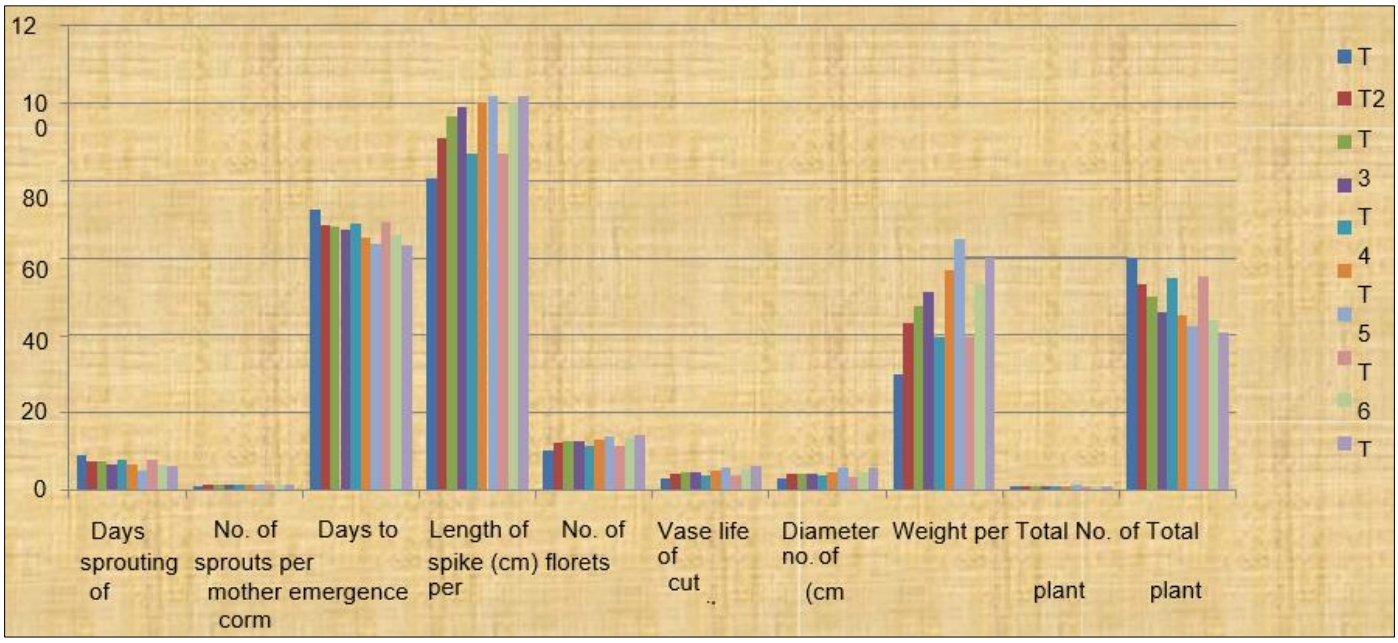


**Fig 1:** Effect of integrated nutrient management on growth, yield and quality of gladiolus Cv. 'Candyman'

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