



RESEARCH ARTICLE

EFFECT OF INTEGRATED NUTRIENT MANAGEMENT (INM) ON GROWTH AND YIELD OF
GLORY LILY (*GLORIOSA SUPERBA*. L)

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ABSTRACT

The present investigation was carried out to study the effect of organic and inorganic nutrient management on the growth and yield parameters of glory lily. A field trial was conducted in a Randomized block design with seven different combinations of organic and inorganic fertilizers viz., T₁: Recommended dose of fertilizer 100 % NPK 120:50:75 kg ha⁻¹ (control), T₂: 75% RDF+FYM @ 12.5 t ha⁻¹, T₃: 75% RDF+ vermicompost @ 5 t ha⁻¹, T₄: 50% RDF + FYM @ 12.5 t ha⁻¹, T₅: 50% RDF + vermicompost @ 5 t ha⁻¹, T₆: 75% RDF + FYM @ 12.5 t ha⁻¹+ vermicompost @ 5 t ha⁻¹ and T₇: 50% RDF + FYM @ 12.5 t ha⁻¹ + vermicompost @ 5 t ha⁻¹. The result of the present study revealed that 75% of NPK 90:38:56 kg ha⁻¹ along with FYM @ 12.5 t ha⁻¹ and vermicompost @ 5 t ha⁻¹ was found to be superior in improving the growth and yield characters like plant height, number of branches, number of leaves, number of flowers, number of pods, pod yield per plant, pod yield per plot, seed yield per plant and estimated seed yield per hectare in glory lily.

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INTRODUCTION

Gloriosa superba L. commonly known as Glory lily, Flame lily, Kalahari, Agnishika and superb lily is an export oriented medicinal plant. Its origin is reported to be tropical Asia and Africa and is a member of Liliaceae family. In Tamil Nadu, it is known as kalappaikilangu, kanvalikizhangu, kandhalmalar, karthigai kizhangu and is recognized as the state flower of Tamil Nadu. Glory lily is commercially propagated by 'V' or 'L' shaped tubers, it is an important medicinal plant used for treating gout, rheumatism, piles, leprosy and chronic ulcers (Anonymous, 1956). The active principle of colchicines, present in its seed and tubers, is also capable of inducing polyploidy in plants and used drugs for treating gout (Satyavati *et al.*, 1976). Among the various cultural practices adopted in this crop the nutrient management plays an important role as nutrients are vital for growth and yield of the crop. In the present situation, there is a need to give more emphasis on integrated nutrient management in glory lily to get higher seed yield. Hence, the present investigation was carried out to study the effects of organic and inorganic fertilizers on growth and yield of glory lily.

MATERIAL AND METHODS

The field experiment was carried out in the field units of the Department of Horticulture, Faculty of Agriculture, Annamalai University during 2014. Healthy *Gloriosa* tubers were procured from a farmer's field in Vedaranyam. The tubers were transported and stored temporarily in a thick layer of river sand under cool dry shady place, before planting. The experiment was laid out in RBD with seven treatments replicated thrice. The treatment consisted of T₁:

Recommended dose of fertilizer 100 % NPK 120:50:75 kg ha⁻¹ (control), T₂: 75% RDF+FYM @ 12.5 t ha⁻¹, T₃: 75% RDF+ vermicompost @ 5 t ha⁻¹, T₄: 50% RDF + FYM @ 12.5 t ha⁻¹, T₅: 50% RDF + vermicompost @ 5 t ha⁻¹, T₆: 75% RDF + FYM @ 12.5 t ha⁻¹+ vermicompost @ 5 t ha⁻¹ and T₇: 50% RDF + FYM @ 12.5 t ha⁻¹ + vermicompost @ 5 t ha⁻¹. The tubers were planted at 45 X 45 cm spacing. The growth and yield attributes were recorded at harvest (150 DAP) on five plants at random from three replication in each treatments. Regular cultural practices were adopted to raise the crop successfully. Observations were recorded on growth and yield parameters viz., plant height, number of branches, number of leaves, days taken to first flowering, number of flowers, number of pods, pod yield per plant, seed yield per plant, tuber yield per plant, estimated seed yield ha⁻¹ and estimated tuber yield ha⁻¹.

RESULTS AND DISCUSSION

The results revealed that the growth parameters were significantly influenced by different nutrient treatments (Table 1). The maximum plant height (178.39cm), number of branches plant⁻¹ (13.98), number of leaves plant⁻¹ (246.10), dry matter accumulation plant⁻¹ (206.27g) and days to first flowering 32.15 days were recorded with application of 75% RDF + FYM @ 12.5 t ha⁻¹ + vermicompost @ 5 t ha⁻¹ (T₆), followed by application of 50% RDF + FYM @ 12.5 t ha⁻¹ + vermicompost @ 5 t ha⁻¹ (T₇) with a plant height of 174.89cm, 13.71 branches plant⁻¹, 241.27 leaves plant⁻¹, dry matter accumulation of 202.22g plant⁻¹ and days to first flowering 33.18 days) respectively. The lowest plant height (161.44cm), number of branches (12.65) plant⁻¹, number of leaves (222.72) plant⁻¹, dry matter accumulation (186.67g)

Table 1 Influence of organic and inorganic manures on growth parameters in glory lily

Treatment no	Plant height (cm) 150 DAP	Number of branches plant ⁻¹	Number of leaves plant ⁻¹	Dry matter production (g plant ⁻¹)	Days to first flowering (Days)
T ₁	171.53	13.44	236.63	198.34	34.16
T ₂	168.33	13.19	232.23	194.65	35.27
T ₃	171.87	13.47	237.10	198.73	34.23
T ₄	161.44	12.65	222.72	186.67	36.28
T ₅	164.90	12.93	227.50	190.68	35.89
T ₆	178.39	13.98	246.10	206.27	32.15
T ₇	174.89	13.71	241.27	202.22	33.18
SE (d)	1.23	0.10	1.69	1.42	0.36
CD (P=0.05)	3.26	0.26	4.50	3.77	0.96

Table 2 Influence of organic and inorganic manures on yield parameters in glory lily

Treatments	Number of flowers plant ⁻¹	Number of pods plant ⁻¹	Pod yield (g plant ⁻¹)	Seed yield (g plant ⁻¹)	Tuber yield per (g plant ⁻¹)	Estimated seed yield (kg plant ⁻¹)
T ₁	29.05	25.26	297.63	26.85	314.94	804.29
T ₂	28.51	24.79	292.10	26.35	309.08	789.34
T ₃	29.11	25.31	298.23	26.90	315.57	805.90
T ₄	27.34	23.77	280.13	25.27	296.42	757.00
T ₅	27.93	24.28	286.15	25.81	302.78	773.25
T ₆	30.21	26.27	309.54	27.92	327.54	836.47
T ₇	29.62	25.75	303.47	27.38	321.11	820.06
SE (d)	0.21	0.18	2.13	0.19	2.25	5.74
CD (P=0.05)	0.55	0.48	5.66	0.51	5.98	15.28

plant⁻¹ and days to first flowering (36.28days) were recorded with 50% RDF + FYM @ 12.5 t ha⁻¹ (T₄). The increased trend with respect to growth with treatment of 75% RDF+FYM @ 12.5 t ha⁻¹ + vermicompost @ 5 t ha⁻¹ in glory lily might be due to increased availability of macro and micronutrients from FYM and vermicompost that combined with major nutrients which in turn helped for the development of efficient photosynthetic system. Further this might be due to the presence of humus forming microbes and growth regulators in vermicompost (Bano *et al.*, 1987) helped in better growth of crops. The present results are concomitant with Somanath *et al* (2005) in *Coleus*. The reason for higher growth under combined nutrient management may be due to sustainable availability of nutrients especially nitrogen augmented by organic nutrient throughout the growth period (Ayanaba and Okigbo, 1974). The similar findings were made by (Gupta *et al.*, 2013).

There had been a significant differences in yield attributes due to addition of organic manures with recommended dose of fertilizers (Table 2). Significantly highest number of flower (30.21 plant⁻¹), number of pods (26.27 plant⁻¹), pod yield (309.54g plant⁻¹), seed yield (27.92g plant⁻¹), tuber yield (327.54g plant⁻¹) and estimated seed yield (836.47kg ha⁻¹) was recorded with application of 75% RDF + FYM @ 12.5 t ha⁻¹ + vermicompost @ 5 t ha⁻¹ (T₆). This was followed by application of 50% RDF + FYM @ 12.5 t ha⁻¹ + vermicompost @ 5 t ha⁻¹ (T₇). with 29.62 flower plant⁻¹, 25.75 pods plant⁻¹, pod yield of 303.47g plant⁻¹, seed yield of 27.38g plant⁻¹, tuber yield 321.11g plant⁻¹ and estimated seed yield of 820.06kg ha⁻¹. The least number of 27.34 flower per plant⁻¹, 23.77 number pods plant⁻¹, 280.13g pod yield plant⁻¹, 25.27g seed yield plant⁻¹, tuber yield of (296.42g plant⁻¹) and estimated seed yield of (757.00kg ha⁻¹) was recorded in T₄. The increased seed and tuber yield might be due to the fact that vermicompost and FYM would have supplied higher amount of major and micronutrients. Further application of FYM and vermicompost in combination with chemical fertilizers might have resulted in higher uptake of the major nutrients.

Increase in the growth and yield characteristics with conjunctive use of organic and inorganic nutrients rather than their sole application reported in the present investigation confirms the results obtained by earlier workers *viz.*, Gupta *et al.*, (2013) in *Gloriosa superba* L., Somanath *et al.*, (2005) in *coleus forskohlii*, Joy *et al.*, (2005) in black musli, and Rajendran and Ganavel (2008) in *Aloe vera*.

CONCLUSION

Combination of organic and inorganic fertilizers was found superior over application of manures or fertilizers alone for achieving higher growth and yield in glory lily. Application of 75% RDF (N 90 : P 38 : K 56 kg ha⁻¹) along with FYM @ 12.5 t ha⁻¹ and vermicompost @ 5 t ha⁻¹ is beneficial not only to increase the seed and tuber yield in glory lily and also to augment the fertility status of soil.

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