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Influence of integrated nutrient management on growth parameters of glory lily (*Gloriosa superba* L.)

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Abstract : An experiment was carried out to study the influence of integrated nutrient management on growth parameters of glory lily. The treatments consisted of different organic sources *viz.*, farm yard manure (25 t ha⁻¹), vermicompost (5 t ha⁻¹) and neem cake (5 t ha⁻¹) as basal along with the recommended dose of inorganic fertilizers as 75 and 100 per cent (112.5: 37.5: 56.25 kg NPK ha⁻¹, 150:50:75 kg NPK ha⁻¹, respectively). The results revealed that the growth parameters *viz.*, plant height (228.30 cm), number of primary (3.98) and secondary branches (7.92), number of leaves (100.10) and leaf area (36.21 cm²) were the highest in the treatment combination of FYM @ 25 t ha⁻¹, consortium biofertilizer (2 kg ha⁻¹) along with the recommended dose of inorganic fertilizers @ 112.5:37.5 : 56.25 kg NPK ha⁻¹ when compared to other treatments.

Key words : *Gloriosa superba*, Organic nutrients, Inorganic fertilizer, Growth parameters

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Glory lily (*Gloriosa superba* L.) is an important medicinal crop. It is native to tropical Asia and Africa and found growing throughout tropical India up to an altitude of 2500 m. Tubers are used as tonic, antihelmintic and also against snake bites and scorpion stings. The medicinal properties of the glory lily are due to the presence of alkaloids, chiefly 'colchicine' and 'gloriosine'. Colchicine present in seed and tubers is also capable of inducing polyploidy in plants and is used in drugs for treating gout and rheumatism (Satyavati *et al.*, 1976) and for cancer control (Amoroso, 1935).

It has become imperative to increase the productivity by maintaining the soil health through the balanced use of inorganic fertilizers and organics. The integration of organic and inorganic fertilizers will lead to the build up of soil fertility, increase in crop productivity with concomitant nutrient balance, besides minimizing the population hazards as well as the fertilizer cost. Considering the above points in view, the present investigation was carried out, to study the influence of integrated nutrient management on growth parameters of glory lily.

RESEARCH METHODS

A field experiment was conducted in a farmer's field at Kachiperumal village in Jayamkondam taluk of Perambalur district during July 2008 to December 2008. The experiment was laid out in a Randomized Block Design in twelve treatments with three replications. The experiment was conducted by using various organic manures *viz.*, farm yard manure (25 t ha⁻¹), vermicompost (5 t ha⁻¹) and neem cake (5 t ha⁻¹) applied in the soil as basal application along with the recommended dose of inorganic fertilizers @ 112.5: 37.5: 56.25 kg NPK ha⁻¹ as 75 per cent, 100 per cent @ 150:50:75 kg NPK ha⁻¹. One third nitrogen, along with entire dose of phosphorus and potassium were applied as basal at the time of planting. Remaining two third of nitrogen were top dressed at two months after planting. The fertilizers were applied in the form of urea, super phosphate and muriate of potash. Irrigation and weeding were done as per the requirement of the crop. The crop was harvested 6 months after planting. Plants in each treatment per replication were tagged for recording the observations on growth parameters *viz.*, plant height, number of primary branches,

secondary branches, leaves and leaf area were recorded and the mean values were subjected to statistical scrutiny (Panse and Sukhatme, 1978).

RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarised under following heads:

Growth:

Growth is one of the essential parameters which determine the yield attributes of the crop. Application of various organic manures and inorganic fertilizers as integrated nutrient management recorded significant effect on growth parameters in glory lily (Table 1).

Plant height:

The plant height (228.30 cm) was recorded highest in the treatment farm yard manure (25 t ha⁻¹), consortium bio fertilizer (2 kg ha⁻¹) along with RDF @ 112.5: 37.5:56.25 NPK kg ha⁻¹. Similar to the present findings Kumaraswamy *et al.* (1994) reported that nitrogen application has a favourable effect in enhancing vegetative growth and prolonging crop duration in *Gloriosa superba*. In medicinal solanum, Sundharaiya *et al.* (2000) observed that NPK 60:20:40 kg ha⁻¹ with FYM 10 t ha⁻¹ produced the maximum values for plant height, primary and secondary branches.

Number of primary and secondary branches:

The number of primary (3.98) and secondary (7.92) branches were recorded highest in the treatment combination of farm yard manure (25 t ha⁻¹), consortium biofertilizer (2 kg ha⁻¹) along with RDF @ 112.5: 37.5: 56.25 kg NPK ha⁻¹. The reason for the highest number of branches was due to adequate quantity of enzymes present in cells of microbes by the application of farm yard manure, consortium biofertilizer and also release of nitrogen from the inorganic fertilizers favoured for higher number of branches. The increase in vegetative characters like plant height, number of branches, number of leaves and leaf area might be due to increased meristematic activities in the plant and also due to enhanced photosynthesis as reported by Medhi and Bora (1993) in turmeric.

Number of leaves and leaf area:

The number of leaves (100.10) and leaf area (36.21 cm²) per plant were recorded highest in the treatment of farm yard manure (25 t ha⁻¹), consortium biofertilizer (2 kg ha⁻¹) along with recommended dose of inorganic fertilizer @ 112.5: 37.5: 56.25 NPK kg ha⁻¹. Upadhyay and Misra (1999) suggested the possible reason for maximizing the leaf production could be due to increase in chlorophyll content and availability of higher quantity of available nutrients. Watson (1952) concluded that the leaf area was highly related to crop yield, since it provided room for the photosynthetic system. Any treatment which influenced leaf area could have a control on economic

Table 1 : Influence of integrated nutrient management on growth parameters of glory lily

Tr. No.	Treatment details	Plant height (cm)	Number of primary braches	No. of secondary branches	No. of leaves	Leaf area cm ²
T ₁	75% RDF + FYM	164.03	2.00	5.01	74.14	12.01
T ₂	75% RDF + CBF	198.11	3.21	6.98	89.05	28.61
T ₃	100% RDF + FYM	197.62	3.01	6.47	88.12	27.32
T ₄	100% RDF + FYM+CBF	228.30	3.98	7.92	100.10	36.21
T ₅	75% RDF + VC	174.23	2.31	5.42	77.17	18.63
T ₆	75% RDF + VC+CBF	188.12	2.70	6.31	85.31	24.72
T ₇	100% RDF + VC	173.73	2.12	5.24	78.22	17.12
T ₈	100% RDF + VC+CBF	217.97	3.65	7.42	96.60	33.70
T ₉	75% RDF + NC	179.92	2.51	6.00	82.81	22.2
T ₁₀	75% RDF + NC+CBF	179.41	2.40	5.73	81.13	21.6
T ₁₁	100% RDF + NC	207.64	3.42	7.21	93.50	31.0
T ₁₂	100% RDF + NC+CBF	207.21	3.34	7.11	92.16	31.0
	S.E.±	5.22	0.31	0.47	1.82	1.6
	C.D. (P=0.05)	11.33	0.65	0.98	3.81	3.0

RDF – Recommended dose of inorganic fertilizer, 75%RDF-112.5: 37.5: 56.25 kg NPK ha⁻¹, 100%RDF-150:50:75 kg NPK ha⁻¹. CBF – Consortium biofertilizer, FYM – Farmyard manure, VC – Vermicompost, NC – Neem cake.

yield of the plant. Further, the acceleration in leaf area could be attributed to the level of auxins, carbohydrates and other organic compounds produced as a result of application of organic and inorganic fertilizer.

Conclusion:

Based on the present investigation, it can be concluded that the application of FYM @ 25 t ha⁻¹, consortium bio fertilizer CBF @ 2 kg ha⁻¹ along with RDF @ 112.5: 37.5: 56.25 kg NPK ha⁻¹ was found to be beneficial in improving the growth in glory lily.

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