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EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON POST HARVEST LIFE OF *GLADIOLUS*

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ABSTRACT

A field experiment was conducted to assess the response of nutrient management on post-harvest life of Gladiolus *(Gladiolus grandifloras)* cv. Nova Lux during the Rabi season of 2023- 24. The experiment comprises treatment combinations of organic and inorganic fertilizers. The treatment combinations were T_1 (Control), T_2 (100% RDF), T_3 (50% RDF + 50% FYM), T_4 (50%RDF + 50% Vermi compost), T_5 (50% RDF + 50% Bio- fertilizer), T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer), T_7 (30% RDF + 50% Neem Cake + 20% FYM) and T_8 (100% Poultry manure). The experiment was outlined in randomized block design with eight treatments and three replications. The data revealed that T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer) has showed maximum initial spike weight, spike weight, water uptake, opening of florets, first basal senescence and total vase life.

Key words : Gladiolus, Sucrose, Water, Vase Life.

Introduction

Gladiolus (*Gladiolus grandiflorus* L.), often referred to as the 'Queen of bulbous flowers,' belongs to the Iridaceae family. This elegant bloom, also known as the 'sword lily' due to the shape of its leaves, is celebrated for its striking beauty and graceful form. One of the major challenges in cut flower production is their short postharvest vase life (Zamani *et al*., 2011). In floriculture, the ex-vitro establishment of plants and flowers is crucial for maintaining quality (Sultana *et al*., 2011; Siddique *et al*., 2006, 2007). The limited vase life of cut flowers is primarily due to wilting, ethylene production—accelerating senescence—and vascular blockage caused by air and microbial growth (Elgimabi, 2011). These factors lead to continuous water uptake and transpiration, ultimately resulting in net water loss from flower and stem tissues (Hassan, 2005). According to Mayak *et al.* (1973), florets placed in water as a vase solution generally maintain their freshness for only 4 to 6 days. Using appropriate preservative solutions can extend the vase life of floret spikes, enhancing consumer satisfaction and benefiting the floral industry. Preservatives supply energy, reduce microbial buildup, prevent vascular blockage, improve water uptake and mitigate the effects of ethylene (Nigussie, 2005). A well-formulated vase solution may contain sucrose, which provides respiratory substrates and promotes bud opening (Pun and Ichimura, 2003). These components collectively enhance water and carbohydrate retention, improving the longevity of cut flowers for commercial use.

Materials and Methods

The experiment was conducted to assess the effect of integrated nutrient management on vase life of gladiolus cv. Nova Lux in open field condition at Horticulture Research Farm, Kamla Nehru Institute of Physical and Social Sciences, Faridipur, Sultanpur district, Uttar Pradesh, India. The area is situated on the north of Prayagraj on the right bank of Gomti river at Rewa Road at a distance of about 5 km from Sultanpur city. It is situated at 26^0 15' N Latitude and 85^0 05'E Longitude. This region has sub-tropical climate with extreme of summer and winter the temperature down to as low as

10 - 12^{0}C during winter season especially in the month of December and January. The temperature rises up to 40-43^{0}C during summer season. The average rainfall in this area is around 800-1200mm annually. The experiment was laid out in a randomized block design with eight treatments and three replications. The different treatments that were used in the experiment are as follows: T_1 (Control), T_2 (100% RDF), T_3 (50% RDF + 50% FYM (50t/ha)), T_4 (50%RDF + 50% Vermi compost (5t/ha)), T_5 (50% RDF + 50% Bio-fertilizer (4kg/ha)), T_6 (40% RDF + 30% Vermi compost + 30% Bio fertilizer), T_7 (30% RDF + 50% Neem cake (250g/ha) + 20% FYM (50t/ha)) and T_8 (100% Poultry manure(5-20t/ha)). Planting was done in the month of October with uniform sized healthy corms which was pretreated with Bavistin (0.2%) for half an hour. The distance was kept row to row at 30 cm and plant to plant at 20 cm. One spike was kept in each vase solution and kept in room temperature during the period of experiment and vase solution were changed after forth day. Flowers on vase solution were examined as and when necessary and continued up to the end of vase life of flower. Initial spike weight of cut gladioli was measured before treating. Different days after treating weight of gladioli were measured and percentages weight losses were calculated. Water uptake and days to first basal senescence was carefully observed and calculated. Flower longevity was allowed during the upper floret opening and counting the days. Data were tested to meet the assumptions of ANOVA, those that did not met the assumptions were subjected to log transformation.

Results and Discussion

Data were collected on post-harvest parameters on Initial spike weight (g), Spike weight (g) at (2nd , 4th, 6th, 8th and 10th day), Water uptake (ml) at (2nd , 4th, 6th, 8th and 10th day), Opening of florets (%) at (2nd , 4th, 6th, 8th and 10th day), Days to first basal senescence and Total vase life. The data pertaining to above parameters are displayed in Tables 1 and 2. The maximum initial spike weight 42.66 g was observed in T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer) which is at par with 33.66 g in T_7 (30% RDF + 50% Neem Cake + 20% FYM). The minimum initial spike weight 16.00 g observed in T_2 (100% RDF) (Table 1). The maximum spike weight 47.07 g was recorded in T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer) which is at par with 38.60 g in T_7 (30% RDF + 50% Neem Cake + 20% FYM) and minimum spike weight 18.00 g was noted in T_2 (100% RDF) at 2nd day then gradual increase in spike weight up to 4th day. After that there is a gradual decrease in spike weight was observed. At 10th day maximum spike weight 43.50 g was noted in T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer) followed by 32.13 g in T_7 (30% RDF + 50% Neem Cake + 20% FYM) while the minimum spike weight 15.27 g was observed in T_2 (100% RDF) (Table 1). The water uptake of spikes exhibited a continuous decline until the end of their vase life. Among the different treatments, The highest water uptake was noted at 2nd day (08.00 ml) and 10th day (39.66 ml) in T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer) and the lowest water uptake on the 2nd day (02.00 ml) in T_5 (50% RDF + 50% Bio- fertilizer) and at 10th day (25.66 ml) in T_3 (50% RDF + 50% FYM) (Table 1). Florets opening varied significantly among treatments. The maximum florets opening 20.07% at 2nd day and at 10th day (77.60%) was found in T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer). No florets opening 00.00% was noted in T_3 (50% RDF + 50% FYM), T_4 (50%RDF + 50% Vermi compost) and T_5 (50% RDF + 50% Bio-fertilizer) at 2nd day and at 10th day the minimum opening of florets 72.00% was recorded in T_3 (50% RDF + 50% FYM) (Table 2). The data pertaining to days to first basal senescence displayed in Table 2. The maximum days to first basal senescence 06.33 days was found in T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer) and the minimum days to first basal senescence 03.33 days was noted in T_1 (Control) (Table 2). The total vase life of gladiolus in a vase depends on the various factor, including harvest stage, water uptake, microbial growth and different treatments. The maximum vase life 14.33 days was noted in T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer) which is at par with 14.00 days in T_7 (30% RDF + 50% Neem Cake + 20% FYM). The lowest vase life 11.00 days was noted in T_1 (Control) (Table 2).

The increase in water uptake may be attributed to a greater sink potential, resulting from a higher number of florets per spike as well as larger floret size. The improvement in post-harvest attributes of cut spikes following the application of integrated nutrient sources could be due to the presence of ethylene inhibitors or cytokinins in the organic inputs, which help delay flower senescence. The present findings align with those reported by Chaudhary *et al*. (2013). The maximum percentage of floret opening may be attributed to the improved overall nutrient availability and food reserves in the spike under these treatments.Similar findings were also obtained by Hatibarua *et al*. (2002). Singh and Bijimaol (2003) in gladiolus cv. Red Beauty. The longest vase life might be attributed to the higher overall availability of food reserves and nutrients in the spike under these treatment combinations. This may be due to improved phosphate availability, as phosphorus is known to enhance keeping

Table 1 : Effect of various nutrient sources on Vase Life of Gladiolus.

Treatments	Initial Spike weight (g)	Spike weight (g) (2nd, 4th, 6th, 8th and 10th day)					Water Uptake (ml) (2nd, 4th, 6th, 8th and 10th day)				
		2nd day	4th day	6th day	8th day	10th day	2nd day	4th day	6th day	8th day	10th day
T_1	33.33	36.73	41.82	36.50	31.67	31.18	06.33	26.50	29.00	31.83	35.00
T_2	16.00	18.00	21.56	19.95	17.08	15.27	04.00	16.20	25.50	26.00	33.00
T_3	28.00	28.05	29.20	28.24	27.87	23.08	03.00	14.83	22.66	23.33	25.66
T_4	22.33	23.53	29.85	27.21	24.63	21.90	06.33	17.83	21.00	27.16	27.83
T_5	26.00	27.91	30.94	28.67	36.43	28.21	02.00	18.00	26.66	27.33	31.66
T_6	42.66	47.07	54.00	50.00	46.21	43.50	08.00	27.83	34.50	34.63	39.66
T_7	33.66	38.60	43.04	41.10	38.21	32.13	04.00	19.83	25.33	27.33	31.00
T_8	26.00	29.16	36.55	31.43	25.80	24.50	04.66	20.00	26.00	34.63	36.16
C.D	05.80	03.98	03.77	02.24	07.80	02.34	00.90	00.52	01.14	01.42	01.28
SE(d)	02.67	01.83	01.74	01.03	03.60	01.08	0.41	0.24	0.53	0.65	0.59

Table 2 : Effect of various nutrient sources on vase life of Gladiolus.

Treatments	Opening of florets (%) (2nd, 4th, 6th, 8th and 10th day)					Days to 1st Basal senescence	Total vase life
	2nd day	4th day	6th day	8th day	10th day		
T_1	11.00	40.00	47.66	57.20	74.00	03.33	11.00
T_2	13.57	31.43	46.48	53.86	72.33	05.00	13.66
T_3	00.00	13.58	47.00	61.16	72.00	05.33	13.66
T_4	00.00	29.25	50.28	65.69	75.33	05.00	13.00
T_5	00.00	38.17	48.14	54.53	74.00	04.66	13.66
T_6	20.07	43.52	71.96	74.50	77.60	06.33	14.33
T_7	12.85	33.68	46.17	72.00	75.00	04.66	14.00
T_8	11.00	38.66	53.33	70.66	74.00	04.66	13.66
C.D	01.91	06.16	07.18	11.78	NS	01.51	NS
SE(d)	00.88	02.84	03.31	05.44	05.56	00.69	01.13

quality (Dubey, 2003) in gladiolus cv. Jester. Jankiram *et al*. (2013) studied the combined effect of gladiolus cv. Snow Princes.

Conclusion

The present study concludes that the most effective treatment for extending the vase life of gladiolus spikes was T_6 (40% RDF + 30% Vermi compost + 30% Bio-fertilizer). This treatment resulted in significantly better post-harvest performance as evidenced by florets opening percentage 77.60%, water uptake 43.50 ml and total vase life 14.33 days.

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