



Effect of Major Nutrients (N:P:K) on Plant Growth and Flower Yield of Jasmine (*Jasminum auriculatum*)

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present investigation entitled, "Effect of major nutrients (N:P:K) on Plant growth and Flower yield of Jasmine (*Jasminum auriculatum*)" was under taken in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (Allahabad) during 2021-2022. The experiment was layout in Randomized Block Design (RBD) with 09 treatments and each treatment replicated thrice. The treatments consist of different combinations of Chemical fertilizers (N, P and K). The treatment T8 (120:120:120g N:P:K/plant) was found the statistically significant compared to other treatment combination, which recorded highest plant height (92.44 cm), plant spread (61.82 cm), Number of leaves (142.77), Number of branches (16.29), followed by T6 (90:180:180g N:P:K/plant) and lowest growth by T2 (30:60:60g N:P:K/plant). The treatment T9 (120:240:240g N:P:K/plant) was found the statistically significant compared to other treatment combination, which recorded least days for flower bud development (14.25 days), days to first flower bud initiation (219.92 days), duration of flower (5.56 days), flower bud diameter (26.20 mm), flower bud length (2.16 cm), weight of single flower bud (0.198 g), flower yield per ha. (2.54 tons.) followed by T7 (105:210:210g N:P:K/plant).

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1. INTRODUCTION

Jasminum auriculatum is a beautiful flower with extremely heavy gardenia type scent. It is one of the oldest ambrosial flowers cultivated. The flower is used for colorful purposes viz. making libraries, bouquet, decorating hair of women, religious immolation etc. Jasmine is also known as the "Queen of the Night" because of its heady scent. India is one of the centers of origin of jasmine. It's used for ornamental purposes and carnivals in India. It's generally called "JUI" in India. *Jasminum auriculatum* is called Nityamalli in tamil. The flowers are also used for the product of incense, hair canvases and bouquets. Jasmine essential oil painting has a sweet and flowery aroma. It's regarded as unique, as it blends well with other flowery excerpts and which is largely valued throughout the world for its high grade scents, which is used in cleaner and ornamental diligence and in spicing mouth marshland liquids. Jasmine is also used for catarrh, coughs, laryngitis, labour pains, uterine disorders and many skin problems.

Plant nutrition plays an important role for enhancing growth and yield in Jasmine. Nitrogen is especially important, and every amino acid in plants contains nitrogen as an essential component for plants to manufacture new cells. Phosphorus which has been called the key to life is essential for cell division and for development of meristematic tissues and it is very important for carbohydrate transformation due to multitude of phosphorylation reaction and to energy rich phosphate bond. Potassium is important for growth and elongation probably due to its function as an osmoticum and may react synergistically with IAA. Moreover, it promotes CO₂ assimilation and translocation of carbohydrates from the leaves to storage tissues.

2. MATERIALS AND METHODS

The Experimental was conducted in Randomized Block Design (RBD) with 9 treatments and 3 replications in the Departmental field at the department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad during the year 2021-2022.

The experiment material consist of jasmine Co1 (*Jasminum auriculatum*). It was planted in the field at a spacing of 1.5*1.5m and the observation were recorded for plant

height(cm), plant spread (cm), number of leaves, number of branches, flower bud length(cm), flower bud diameter (mm) ,weight of a single flower bud(g), days to first flower bud initiation, days for flower bud development ,duration of flowers(days), number of flowers per plant, flowers yield per hectare (tons).

2.1 Statistical Analysis

The results and data were subjected to statistical analysis separately by using analysis of variance technique (ANOVA). The difference among treatments means was compared by using least significant difference test at 0.05 probability levels.

Table 1. Details of treatments

Notation	Treatment Combinations*
T1	60:120:120 g NPK/plant (RDF)
T2	30:60:60 g NPK/plant
T3	45:90:90 g NPK/plant
T4	60:60:60 g NPK/ plant
T5	75:150:150 g NPK/plant
T6	90:180:180 g NPK/plant
T7	105:210:210 g NPK/plant
T8	120:120:120 g NPK/plant
T9	120:240:240 g NPK/plant

*Note: Treatments are given as 6 splits

3. RESULTS AND DISCUSSION

3.1 Growth Parameter

The data on growth parameter in different treatment was recorded (Table 2). Maximum Plant Height (92.44 cm) was recorded in treatment T8 (120:120:120 g NPK/plant) being significantly superior while minimum Plant Height (82.95 cm) was obtained with treatment T2 (30:60:60 g NPK/plant) at 180 DAP respectively. Whereas maximum Spread area (61.82 cm) was recorded in treatment T8 (120:120:120g NPK/plant) and Minimum Spread area (54.30 cm) was obtained with treatment T2 (30:60:60 g NPK/plant) at 180 DAP respectively. Maximum number of branches (16.29) was recorded in treatment T8 (120:120:120 g NPK/plant) and Minimum number of branches (14.18) was obtained with treatment T2 (30:60:60 g NPK/plant) at 180 DAP respectively. Maximum number of leaves per plant (142.77) was recorded in treatment T8 (120:120:120 g NPK/plant) and minimum number of leaves per

plant (75.66) was obtained with treatment T2 (30:60:60 g NPK/plant) at 180 days after planting respectively. Similar result was also reported by Bhattacharjee et al., [1], Barad et al. [2], Haque, [3], Acharya et al., [4] and Ayemi et al., [5].

3.2 Flowering Parameter

The data on flowering parameters in different treatment combination was recorded (Table 3). The days to flower bud development (days) was found to be maximum (17.33) in the treatment T2 (30:60:60g NPK/plant). And minimums days to flower bud development (days) (14.25) was obtained in the treatment T9 (120:240:240 g NPK/plant). The days to first flower bud initiation (days) was found to be maximum (236.66) in the treatment T2 (30:60:60g NPK/plant). And minimum days to first flower bud initiation (days) (219.92) was obtained in the treatment T9 (120:240:240 g NPK/plant). Whereas the duration of flower (days) was found to be minimum (3.66) in the treatment T2 (30:60:60g NPK/plant). And maximum duration of flower (days) (5.56) was obtained in the treatment T9 (120:240:240 g NPK/plant). The flower bud diameter (mm) was found to be minimum (16.56 mm) in the treatment T2 (30:60:60g NPK/plant). And maximum flower bud diameter (26.20 mm) was obtained in the treatment T9 (120:240:240 g NPK/plant). The flower bud length (cm) was

found to be minimum (1.57 cm) in the treatment T2 (30:60:60 g NPK/plant). And maximum flower bud length (2.16 cm) was obtained in the treatment T9 (120:240:240 g NPK/plant). Similar result was reported by Mohariya et al., [6] in Gerbera, Parekh et al., [7], Selvaraj et al., [8] and Ahamed et al., [9].

3.3 Yield Parameter

The data on the yield parameter in different treatment combination was recorded (Table 4). The number of flowers per plant was increased significantly in (184) T9 (120:240:240g NPK/plant) was recorded in treatment whereas the minimum number of flowers per plant (90.44) was obtained with treatment T2 (30:60:60g NPK/plant). Maximum weight of single flower bud (0.198 g) T9 (120:240:240g NPK/plant) was recorded in treatment whereas minimum weight of single flower bud (0.151 g) was obtained with treatment T2 (30:60:60g NPK/plant). The flower yield per ha was found to be maximum (2.54 t/ha) in the treatment T9 (120:240:240g NPK/plant). The flower yield per ha was found to be minimum (1.50 t/ha) in the treatment T2 (30:60:60 g NPK/plant). Highest B:C ratio was also recorded (2.55:1) in the treatment T9 (120:240:240 g NPK/plant) Similar result was also reported in Kishore et al., [10], Nayak et al., [11,12] and Chan, (1995).

Table 2. Effect of major nutrients (N:P:K) on plant height(cm), plant spread (cm), number of branches, number of leaves of jasmine (*Jasminum auriculatum*)

Treatments	Treatment combinations	Plant height	Plant spread	Number of branches	Number of leaves
T1	60:120:120gN:P:K/plant	86.47	55.50	15.07	95.66
T2	30:60:60g N:P:K/plant	82.95	54.30	14.18	75.66
T3	45:90:90g N:P:K/plant	89.73	54.66	14.62	87.11
T4	60:60:60g N:P:K/ plant	88.47	56.55	14.92	97.55
T5	75:150:150g N:P:K/plant	87.06	56.40	15.07	107.44
T6	90:180:180g N:P:K/plant	89.95	59.67	15.36	129.30
T7	105:210:210g N:P:K/plant	89.58	57.63	15.22	114.66
T8	120:120:120g N:P:K/plant	92.44	61.82	16.29	142.77
T9	120:240:240g N:P:K/plant	88.66	56.03	15.33	101.11
	F- test	S	S	S	S
	S. Ed. (\pm)	1.50	0.67	0.40	17.41
	C. D. (P = 0.05)	3.09	1.38	0.82	35.71

Table 3. Effect of major nutrients (N:P:K) in terms of days for flower bud development, days for first flower bud initiation, duration of flower, flower bud diameter (mm), flower bud length (cm) of jasmine (*Jasminum auriculatum*)

Treatments	Days for flower bud development (days)	Days to first flower bud initiation (days)	Duration of flower (days)	Flower bud diameter (mm)	Flower bud length (cm)
T1	16.21	230.81	4.00	19.32	1.44
T2	17.33	236.66	3.66	16.56	1.57
T3	15.90	224.92	4.22	18.03	1.63
T4	16.46	224.00	3.78	17.73	1.79
T5	16.43	231.92	4.22	19.56	2.08
T6	15.36	222.55	4.23	18.56	1.74
T7	15.88	220.92	5.34	22.90	2.13
T8	16.31	221.36	4.78	18.80	1.95
T9	14.25	219.92	5.56	26.20	2.16
F- test	S	S	S	S	S
S. Ed. (\pm)	0.68	1.32	0.30	0.22	0.13
C. D. (P = 0.05)	1.39	2.71	0.61	0.47	0.29

Table 4. Effect of major nutrients (N:P:K) in terms of number of flower per plant, weight of single flower bud(g), flower yield per ha.(tons), benefit:cost ratio of jasmine (*Jasminum auriculatum*)

Treatments	Treatment combinations	Number of flowers per plant	Weight of single flower bud (g)	Flower yield per ha. (tons)	Benefit: Cost ratio
T1	60:120:120g N:P:K/plant	110.66	0.167	1.67	1.01:1
T2	30:60:60g N:P:K/plant	90.44	0.151	1.50	2.01:1
T3	45:90:90g N:P:K/plant	132.89	0.169	1.58	2.00:1
T4	60:60:60g N:P:K/plant	116.33	0.177	1.55	2.06:1
T5	75:150:150g N:P:K/plant	101.44	0.169	1.61	1.84:1
T6	90:180:180g N:P:K/plant	138.89	0.175	1.92	2.10:1
T7	105:210:210g N:P:K/plant	173.00	0.196	2.09	2.18:1
T8	120:120:120g N:P:K/plant	168.78	0.191	1.58	1.88:1
T9	120:240:240g N:P:K/plant	184.33	0.198	2.54	2.55:1
F- test		S	S	S	
S. Ed. (\pm)		22.05	0.008	0.15	
C. D. (P = 0.05)		45.24	0.016	0.31	

4. CONCLUSION

Based on the present investigation, it was concluded that the treatment (T8) 120:120:120g NPK/plant was found to be the best in terms of plant growth of the flower jasmine. However in case of yield, quality, flower production and B:C ratio of jasmine (T9) that is 120:240:240g NPK/plant was found best.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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