Original Research Article

"EFFECT OF MAJOR NUTRIENTS (N:P:K) ON PLANT GROWTH AND FLOWER YIELD OF JASMINE *(Jasminum auriculatum)*"

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 T_8 (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 T_6 (90:180:180g N:P:K/plant) and lowest growth by T_2 (30:60:60g N:P:K/plant). The treatment T_9 (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 T_7 (105:210:210g N:P:K/plant).

Key words**:** Jasminum**,** Nitrogen, Phosphorus, Potash (Potassium).

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 CO_2 assimilation and translocation of carbohydrates from the leaves to storage tissues.

MATERIALS AND METHODS

The Experimental was conducted in Randomized Block Design (RBD) with 9 treatments and 3 replications in the Departmental Research field of 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).

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*
T_1	60:120:120g NPK/plant
T_2	30:60:60g NPK/plant
T_3	45:90:90g NPK/plant
T_4	60:60:60g NPK/ plant
T_5	75:150:150g NPK/plant
T_6	90:180:180g NPK/plant
T_7	105:210:210g NPK/plant
T_8	120:120:120g NPK/plant
T_9	120:240:240g NPK/plant

*Note: Treatments are given as 6 splits

RESULTS AND DISCUSSION

GROWTH PARAMETER

The data on growth parameter in different treatment was recorded (Table 2). Maximum Plant Height (92.44 cm) was recorded in treatment T_8 (120:120:120g NPK/plant) being significantly superior while minimum Plant Height (82.95 cm) was obtained with treatment T_2 (30:60:60g NPK/plant) at 180 DAP respectively. Whereas maximum Spread area (61.82 cm) was recorded

in treatment T_8 (120:120:120g NPK/plant) and Minimum Spread area (54.30 cm) was obtained with treatment T_2 (30:60:60g NPK/plant) at 180 DAP respectively. Maximum number of branches (16.29) was recorded in treatment T_8 (120:120:120g NPK/plant) and Minimum number of branches (14.18) was obtained with treatment T_2 (30:60:60g NPK/plant) at 180 DAP respectively. Maximum number of leaves per plant (142.77) was recorded in treatment T_8 (120:120:120g NPK/plant) and minimum number of leaves per plant (75.66) was obtained with treatment T_2 (30:60:60g NPK/plant) at 180 days after planting respectively. Similar result was also reported by Bhattacharjee *et al.,* (1983), Haque, (2001), Amin *et al.,* (2011), Acharya *et al.,* (2004) and Ayemi *et al.,* (2017).

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 T_2 (30:60:60g NPK/plant). And minimums days to flower bud development (days) (14.25) was obtained in the treatment T_9 (120:240:240g NPK/plant). The days to first flower bud initiation (days) was found to be maximum (236.66) in the treatment T_2 (30:60:60g NPK/plant). And minimum days to first flower bud initiation (days) (219.92) was obtained in the treatment T_9 (120:240:240g NPK/plant). Whereas the duration of flower (days) was found to be minimum (3.66) in the treatment T_2 (30:60:60g NPK/plant). And maximum duration of flower (days) (5.56) was obtained in the treatment T_9 (120:240:240g NPK/plant). The flower bud diameter (mm) was found to be minimum (16.56 mm) in the treatment T_2 (30:60:60g NPK/plant). And maximum flower bud diameter (26.20 mm) was obtained in the treatment T_9 (120:240:240g NPK/plant). The flower bud length (cm) was found to be minimum (1.57 cm) in the treatment T_2 (30:60:60g NPK/plant). And maximum flower bud length (2.16 cm) was obtained in the treatment T_9 (120:240:240g NPK/plant). Similar result was reported by Larik, (1999), Mohariya *et al.,* (2004) in Gerbera, Erin odonoghue, (2006) and Ayemi *et al.,* 2017.

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) T_9 (120:240:240g NPK/plant) was recorded in treatment whereas the minimum number of flowers per plant (90.44) was obtained with treatment T_2 (30:60:60g NPK/plant). Maximum weight of single flower bud (0.198 g) T_9 (120:240:240g NPK/plant) was recorded in treatment whereas minimum weight of single flower bud (0.151 g) was obtained with treatment T_2 (30:60:60g

NPK/plant). The flower yield per ha was found to be maximum (2.54 t/ha) in the treatment T_9 (120:240:240g NPK/plant). The flower yield per ha was found to be minimum (1.50 t/ha) in the treatment T_2 (30:60:60g NPK/plant) .Similar result was also reported in Chawala *et al*., (2007), Nayak *et al.*, (2005) 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	NUNMBER OF BRANCHES	NUMBER OF LEAVES
T_1	60:120:120gN:P:K/plant	86.47	55.50	15.07	95.66
T_2	30:60:60g N:P:K/plant	82.95	54.30	14.18	75.66
T_3	45:90:90g N:P:K/plant	89.73	54.66	14.62	87.11
T_4	60:60:60g N:P:K/ plant	88.47	56.55	14.92	97.55
T_5	75:150:150g N:P:K/plant	87.06	56.40	15.07	107.44
T_6	90:180:180g N:P:K/plant	89.95	59.67	15.36	129.30
T_7	105:210:210g N:P:K/plant	89.58	57.63	15.22	114.66
T_8	120:120:120g N:P:K/plant	92.44	61.82	16.29	142.77
T_9	120:240:240g N:P:K/plant	88.66	56.03	15.33	101.11
	F- test	S	S	S	S
	S. Ed. (±)	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)
T_1	16.21	230.81	4.00	19.32	1.44
T_2	17.33	236.66	3.66	16.56	1.57
T_3	15.90	224.92	4.22	18.03	1.63
T_4	16.46	224.00	3.78	17.73	1.79
T_5	16.43	231.92	4.22	19.56	2.08
T_6	15.36	222.55	4.23	18.56	1.74
T_7	15.88	220.92	5.34	22.90	2.13
T_8	16.31	221.36	4.78	18.80	1.95
T_9	14.25	219.92	5.56	26.20	2.16
F- test	S	S	S	S	S
S. Ed. (±)	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
T_1	60:120:120gN:P:K/plant	110.66	0.167	1.67	1.01:1
T_2	30:60:60g N:P:K/plant	90.44	0.151	1.50	2.01:1
T_3	45:90:90g N:P:K/plant	132.89	0.169	1.58	2.00:1
T_4	60:60:60g N:P:K/ plant	116.33	0.177	1.55	2.06:1
T_5	75:150:150g N:P:K/plant	101.44	0.169	1.61	1.84:1
T_6	90:180:180g N:P:K/plant	138.89	0.175	1.92	2.10:1
T_7	105:210:210g N:P:K/plant	173.00	0.196	2.09	2.18:1
T_8	120:120:120g N:P:K/plant	168.78	0.191	1.58	1.88:1
T_9	120:240:240g N:P:K/plant	184.33	0.198	2.54	2.55:1
	F- test	S	S	S	
	S. Ed. (±)	22.05	0.008	0.15	
	C. D. (P = 0.05)	45.24	0.016	0.31	

CONCLUSION

Based on the present investigation, it was concluded that the treatment (T_8) 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 (T_9) that is 120:240:240g NPK/plant was found best.

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