

Original Research Article

Growth and Flower Yield of Annual Chrysanthemum as Influenced by Nitrogen and Phosphorus Levels

Anant Kumar^{1*}, Joginder Singh², Rahul Kumar³, S. K. Verma⁴ and Satya Prakash⁵

¹Krishi Vigyan Kendra, Ghaziabad1, India

²Department of Horticulture, J. V. College, Baraut, UP, India

³Department of Agronomy, SVPUAT, Meerut, India

⁴KVK, Shahajhanpur, India

⁵Department of Horticulture, SVPUAT, Meerut, India

*Corresponding author

ABSTRACT

The present study was conducted at farmer's field under the Krishi Vigyan Kendra, Ghaziabad, Uttar Pradesh, during 2018-19 to evaluate the effect of different nitrogen and phosphorus levels on growth and flower yield of annual chrysanthemum. The field experiment was established with seven treatments viz., Control, 50 kg P₂O₅ ha⁻¹, 75 kg P₂O₅ ha⁻¹, 100 kg P₂O₅ ha⁻¹, 100 kg N + 50 kg P₂O₅ ha⁻¹, 150 kg N + 75 kg P₂O₅ ha⁻¹ and 200 kg N + 100 kg P₂O₅ ha⁻¹, in a randomized block design with three replications. The findings revealed that significantly higher plant height, number of primary branches, diameter of mainstem, plant spread, number of flower plant⁻¹ and flower yield was recorded with the application of 200 kg nitrogen with 100 kg phosphorus ha⁻¹.

Keywords

Annual chrysanthemum, Nitrogen, Phosphorus, Growth, Flower yield

Introduction

The floriculture sector has become a lucrative industry in many countries as a result of scientific techniques and steady supply of improved plant material. Total value of different floricultural products at wholesale level has been estimated to be over 50 billion US\$ from about two m ha area in the world. Indian floriculture industry is also fast becoming aware of the importance of offering products as per the wishes of consumers. India is known for growing of traditional flowers such as marigold, jasmine,

tuberose, chrysanthemum, rose, carnation, gladiolus, gerbera etc. Chrysanthemum is one of the most important flower crops commercially grown in different parts of India.

Among the flowers, annual chrysanthemum (*Chrysanthemum coronarium*) has its own importance. It is one of the most important flower crops grown in India. Maharashtra is one of the leading states in flower production. It has a great demand during various functions, festivals, marriages for floral decorations. In Maharashtra, annual

chrysanthemum is more popular among the farmers because of easy cultivation for cut as well as loose flowers. The growers get attracted towards annual chrysanthemum due to its short duration to product marketable attractive yellow and white colour flowers with good keeping quality. In Vidarbha region, the demand of chrysanthemum flowers is for various purposes and increasing tremendously. Growers in this region facing problem in scientific cultivation of chrysanthemum due to lack of technical information and improved agro-technique like fertilizer dose. Fertilization plays an important role in growth and flower yield production in flower crops. Therefore, the present investigation was undertaken to study the effect of nitrogen and phosphorus on growth and flower yield of annual chrysanthemum and to find out the suitable dose of nitrogen and phosphorus for better growth and quality flowers yield.

Materials and Methods

The present study was conducted at farmers field under the Krishi Vigyan Kendra, Ghaziabad, Uttar Pradesh, during 2019-20 to evaluate the effect of different nitrogen and phosphorus levels on growth and flower yield of annual chrysanthemum. The field experiment was established with four levels of nitrogen *viz.* Control, 50 kg P₂O₅ ha⁻¹, 75 kg P₂O₅ ha⁻¹, 100 kg P₂O₅ ha⁻¹, 100 kg N + 50 kg P₂O₅ ha⁻¹, 150 kg N + 75 kg P₂O₅ ha⁻¹ and 200 kg N + 100 kg P₂O₅ ha⁻¹, in randomized block design with three replications. The soil of farmer field was loam with uniform texture, colour and good drainage. The seeds were sown on raised bed for preparation of seedlings. The seedlings of annual chrysanthemum having 30 days old were planted at a spacing of 45 cm row to row and 30 cm plant to plant. The protective irrigations were given at timely intervals and when required. The field was kept free from

weeds by adopting hand weeding from time to time. Urea and single super phosphate were used as a source of nitrogen and phosphorus, respectively. Doses of nitrogen and phosphorus were given as per the treatments. Half dose of nitrogen and entire dose of phosphorus was applied as a basal dose, at the time of transplanting and remaining half dose of nitrogen was given one month after the transplanting of chrysanthemum. The observations on growth parameter were recorded *viz.*, plant height (cm), number of primary branches plant⁻¹, diameter of main stem (cm) and plant spread (cm) at 90 days after transplanting, the observations on flower yield, number of flowers plant⁻¹, flower yield plant⁻¹ (g) and per ha⁻¹ were recorded at the harvest.

Results and Discussion

Effect fertility levels on growth parameters of chrysanthemum

Data from table 1 revealed that effect of nitrogen and phosphorus on plant height was found to be significant. The maximum plant height, number of branches, stem diameter and plant spread were recorded with the application of 200 kg N ha⁻¹ with 100 kg P₂O₅ ha⁻¹ as compared to all other treatment combinations. However, significantly minimum plant height, number of branches, stem diameter and plant spread were recorded under the control treatment. The results are in close conformity with the finding of Belgaokar *et al.*, (1996) and Patil (1989) in annual chrysanthemum, Acharya and Dashora (2004) and Nagaich *et al.*, (2003) in African marigold (Fig. 1).

Effect fertility levels on flower yield of chrysanthemum

Application of 200 kg N ha⁻¹ with 100 kg P₂O₅ ha⁻¹ have resulted in maximum number of

flowers plant⁻¹(101) and flower yield plant⁻¹(203.54 g) and ha⁻¹(190.20 q). Whereas, minimum number of flowers plant⁻¹ (60) and flower yield plant⁻¹ (121.40 g) and ha⁻¹ (110.50 q) were recorded under the control treatment. Increased number of flowers plant⁻¹ and flower yield plant⁻¹ might be due to higher levels and balanced application of nitrogen and phosphorus, which would have

increased the primary branches and gave a greater number of flowers and flower yield. The results were in close conformity with the finding of Belgaokar *et al.*, (1996) in annual chrysanthemum reported by De and Dhiman (1998) in chrysanthemum, Sehrawat *et al.*, (2003) and Jadhav *et al.*, (2002) in marigold (Table 2 and Fig. 2).

Table.1 Plant height, number of branches, stem diameter and plant spread of annual chrysanthemum as influenced by nitrogen and phosphorus levels

Treatments	Plant height (cm)	Number of primary branches plant ⁻¹	Diameter of main stem (cm)	Plant spread (cm)
Control	95.20	20.40	1.8	30.50
50 kg P ₂ O ₅ ha ⁻¹	110.50	23.80	2.13	35.20
75 kg P ₂ O ₅ ha ⁻¹	115.70	27.70	2.30	38.10
100 kg P ₂ O ₅ ha ⁻¹	188.40	30.10	2.41	40.30
100 kg N + 50 kg P ₂ O ₅ ha ⁻¹	124.30	32.30	2.49	44.80
150 kg N + 75 kg P ₂ O ₅ ha ⁻¹	130.20	36.10	2.55	47.20
200 kg N + 100 kg P ₂ O ₅ ha ⁻¹	134.10	39.20	2.70	49.40
<i>SE(m)±</i>	3.84	0.99	0.08	1.32
<i>CD_(p=05)</i>	11.33	2.93	0.23	3.88

Table.2 Yield parameters of annual chrysanthemum as influenced by nitrogen and phosphorus levels

Treatments	Number of flowers plant ⁻¹	Flower yield plant ⁻¹ (g)	Flower yield ha ⁻¹ (q)
Control	60	121.40	110.50
50 kg P ₂ O ₅ ha ⁻¹	75	153.32	131.18
75 kg P ₂ O ₅ ha ⁻¹	78	160.11	140.14
100 kg P ₂ O ₅ ha ⁻¹	83	175.50	169.23
100 kg N + 50 kg P ₂ O ₅ ha ⁻¹	90	180.75	176.54
150 kg N + 75 kg P ₂ O ₅ ha ⁻¹	94	188.90	181.57
200 kg N + 100 kg P ₂ O ₅ ha ⁻¹	101	203.54	190.20
<i>SE(m)±</i>	2.69	5.54	5.17
<i>CD_(p=05)</i>	7.94	16.34	15.26

Fig.1 Growth parameters as influenced by fertility levels

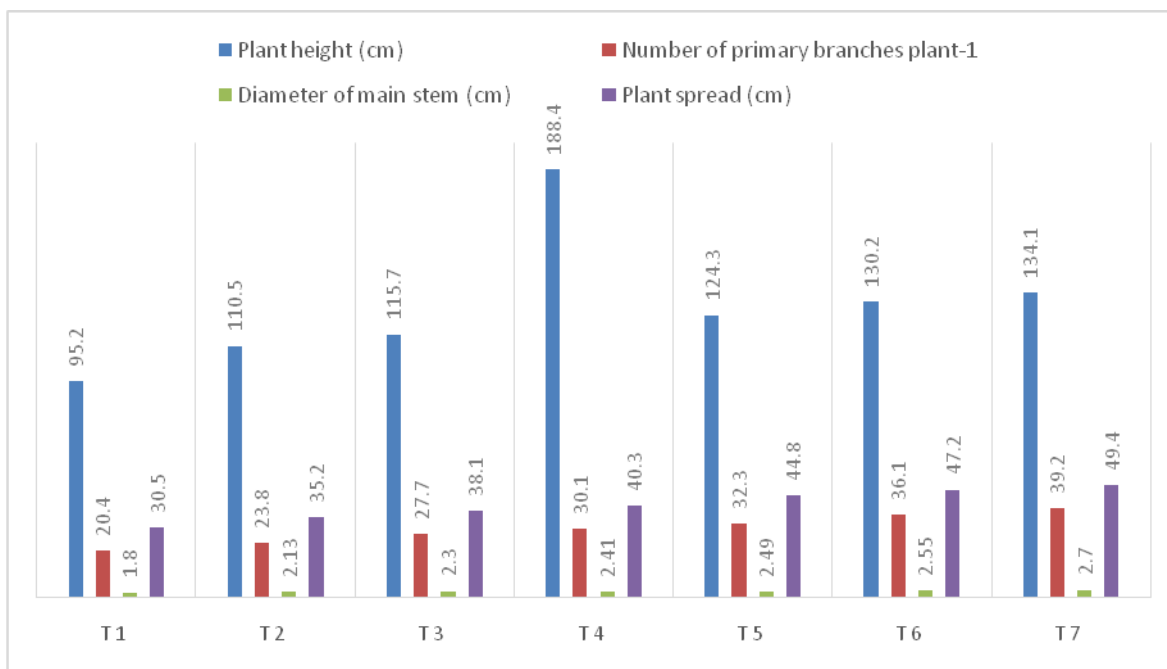


Fig.2 Flower yield as influenced by fertility levels



From the findings of the present on-farm experiment, it can be concluded that it is the best option to apply 200 kg nitrogen with 100 kg of phosphorus per hectare to achieve higher flower yield and good quality of annual chrysanthemum.

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