



Effect of Various Levels of Nitrogen on Growth and Flowering Characters of Different Varieties of Chrysanthemum

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ABSTRACT

Investigation was carried out to evaluate the performance of different varieties under varying levels of nitrogen. Variety Flirt with 200 kg N ha⁻¹ gave superior performance in all vegetative and yield parameters like plant height, number of branches per plant, number of flower per plant, flower yield per plant and hectare basis compared to other varieties. Early flower emergence was observed in variety IIHR-6 with 200 kg N ha⁻¹.

Key words : Chrysanthemum, Growth , Nitrogen, Yield Parameters.

Chrysanthemum the “Queen of East” is a popular flower crop of domestic and international market. It ranks second (next to rose) in the international cut flower trade. It is extensively being used in the religious purpose. Chrysanthemum has wider adaptability to varying soils and agro-climatic zones, while few attempts have been made to standardize the nutritional requirement (nitrogen) for chrysanthemum. Hence, the present investigation carried out to find out the “Effect of various levels of nitrogen on growth and flowering characters of different varieties of chrysanthemum.

MATERIAL AND METHODS

A field trial was conducted at the Floriculture Research scheme, Regional Research Station, Navsari Agricultural University, Navsari during 2006-2007. The soil of experimental field had a pH of 7.7, with available nitrogen 160 kg ha⁻¹, available phosphorus 40.02 kg ha⁻¹, available potash 387.50 kg ha⁻¹ content. The experiment was laid out in factorial randomized block design with three nitrogen levels i.e. 100, 150 and 200 kg ha⁻¹ and three varieties viz. IIHR-6, Flirt and Shyamal. Basal dose of FYM is applied at rate of 20 tonnes per ha, phosphorus and potash were applied uniformly to each plot at the rate of 100 kg ha⁻¹. Nitrogen was applied in two splits first half dose of nitrogen applied at basal and second split was applied after 30 days after transplanting. The data on plant height, number of branches per plant, number of days taken to first flower appearance, number of flowers plant⁻¹, number of flowers plot⁻¹, yield of flowers plant⁻¹, yield of flowers hectare⁻¹ were presented in Table -1 after statistical analysis.

RESULTS AND DISCUSSION

1) Plant height:

Table.1 reveals that plant height was influenced significantly by levels of nitrogen and varieties. Highest plant height (46.5 cm) resulted in 200 kg N ha⁻¹ which also been reported by Singh and Baboo (2003). Maximum plant height (45.8 cm) was recorded in IIHR-6 which was at par with Shyamal. Increase in nitrogen level increased plant height which may be attributed to synthesis of protein and ultimately it increased vegetative growth. Similar results were also reported by Gaikwad *et al.*, (2004).

2) Number of branches plant⁻¹ :

Number of branches plant⁻¹ was significantly affected by nitrogen dose and varieties. Maximum number of branches (11.9) observed in 200kg N ha⁻¹ as compared to other levels of nitrogen. Among different varieties highest number of branches (12.6) recorded in V₂ (Flirt). Nitrogen has known to play important role in plant metabolism due to its constitutional role in various important protein molecules. This had utilized in higher production per unit area. Belgaonkar *et al.*, (1996), Singh and Baboo (2003) reported similar results.

3) Number of days taken for first flower:

This parameter was also significantly influenced by nitrogen level and variety (Table-1). With an increase in the nitrogen content it reduces the days taken for the flower initiation and advanced the flowering. The maximum dose of nitrogen 200 kg ha⁻¹ recorded minimum days (128 days) as compared to other doses. Also the variety IIHR-6 recorded minimum days (127 days) to flower

Table 1. Effect of varieties and different levels of nitrogen on vegetative and flowering parameters in chrysanthemum

Treatment	Plant height (cm)	No. of Branch per plant	Number of days to Flower initiation (days)	No. of flower per .plant	Flower yield per plant (g)	Flower yield per ha. (kg)
Nitrogen						
100	41.7	10.3	143	28.4	86.2	9584.4
150	43.2	10.8	133	30	101.3	11259.3
200	46.5	11.9	128	33	118.7	13148.2
Variety						
IIHR-6	45.8	9.5	127	28.8	88.3	9814.8
Flirt	41.9	12.6	135	32.8	115.8	12856.7
Shyamal	43.7	10.8	142	30	101.9	11320.9
CD at 5%	3.08	0.83	9.55	30.5	0.31	2040.4

initiation compared to other varieties. These results are in acceptance with the finding of Behera *et al.*, (2002) who reported that more protein and protoplasm will form the carbohydrates and the amount of carbohydrates stored will be very less in vegetative parts, since the nature of protoplasm is hydrated which results in succulence of plants and delayed bud formation.

4) Number of flowers plant⁻¹ :

Number of flowers plant⁻¹ was influenced by different levels of nitrogen and varieties (Table 1). The maximum number of flowers (33) was recorded in 200 kg N ha⁻¹ as compared to other nitrogen doses. Also the highest number of flower (32.8) was obtained in the V₂ (Flirt). The application of nitrogen at optimum level attributed to acceleration in development of growth and reproductive phases. Moreover higher content of nitrogen might have accelerated protein synthesis, thus promoting earlier floral primordial development. The results are in confirmation with Anuradha *et al.*, (1990) who reported higher flowering and yield parameter significantly influenced with higher level of nitrogen application in marigold.

5) Flower yield plant⁻¹ and hectare⁻¹ :

Highest flower yield plant⁻¹ and also hectare⁻¹ (118.7 and 13148.2 kg) was obtained with higher dose of nitrogen (200 kg ha⁻¹). Among different varieties flower yield plant⁻¹ and yield hectare⁻¹ basis

(115.8 and 12856.7 kg) was recorded by V₂ (Flirt). Higher nitrogen might be attributed to rapid rate of photosynthesis and manufacturing of carbohydrates in vegetative and reproductive parts of chrysanthemum. Similar results were reported by Baboo and Sharma (1997), Acharya and Dashora (2004), Karuppaiaha and Krishna (2005) in marigold. Increased vegetative growth with higher levels of N also might have advanced the flowering and increased flower yield.

LITERATURE CITED

- Acharya M M and Dasora L K 2004.** Response of graded level of nitrogen and phosphorus on vegetative growth and flowering in African marigold (*Tagetes erecta Linn.*) J. of Oranm. Hort. 7(20) 179-183.
- Anuradha K, Pampapathy K and Narayana N 1990.** Effect of nitrogen and phosphorus on flowering, yield and quality of marigold. Indian J. Hort., 47(3):353- 357.
- Baboo R and Sharma K S K 1997.** Effect of nitrogen and potash fertilizer on growth and flowering of Annual chrysanthemum (*C. coronarium*). J. of Oranm. Hort. 5(1-2):44-45
- Behera T K, Sirohi P S and Anandapal 2002.** Assessment of chrysanthemum germplasm for commercial cultivation under Delhi condition. J. Oranm. Hort., Vol.5 (2):11-14.

- Belgaonkar D V, Bist M A and Wakde M B 1996.** Effect of levels of nitrogen and phosphorus with different spacing and growth and yield on annual chrysanthemum. J. Soils and Crops, 6(2):154-158.
- Gaikwad S A, Patil S S and Patil G D 2004.** Effect of different levels of nitrogen and phosphorus on the growth and flower production of chinaaster (*Callistephus chinensis* (L) Ness). J. Maha. Agric. Univ. 29(2):140-142.
- Karuppaiah P and Krishna G 2005.** Response of spacing and nitrogen level on growth, flowering and yield characters of French marigold. (*T. pultechela Limm*). J. of Oranm. Hort. 8(20):96-99.
- Singh M K and Baboo R 2003.** Response of nitrogen, potassium and pinching levels on growth and flowering in chrysanthemum. J. of Oranm. Hort. 6(4):390-393

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