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Influence of various levels of nitrogen on floral and quality parameters of various varieties of chrysanthemum

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Abstract : A field experiment was carried out to evaluate the effect of levels of nitrogen (100, 150 and 200 kg/ha) on different varieties (IIHR-6, Flirt, Shyamal) of chrysanthemum. Among varieties Flirt performed superior over other varieties Shyamal and IIHR-6 with 200 kg N per ha by recording maximum number of flower per plant, flower yield per plant and hectare. In quality parameters fresh weight of flower and stalk length were highest in flirt variety with 200 kg N per ha. While number of days taken to flower initiation and size of flower were maximum in IIHR-6 with 200 kg N per ha and vase life found longest in flirt with 100 kg N per ha.

Key words : Nitrogen, Chrysanthemum, Quality parameter

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Chrysanthemum is one of the leading commercial flower crops, which is a popular flower in India as well as in abroad. In India different growing regions need its qualitative improvement in addition to various agro techniques. High quality chrysanthemum is required to meet the demand of national and international flower markets. So the proper selection of variety and judicious use of nitrogen are quite imperative factors which aid to achieve sustained boosting in the flower yield and quality of chrysanthemum.

RESEARCH METHODS

The investigation was carried out at the Floriculture Research Scheme, Regional Horticulture Research Station, Navsari Agricultural University, Navsari, during 2006-2007, in clayey soil, with pH 7.7. The experiment was laid out in a Factorial Randomized Block Design with 9 treatment combinations (with three levels of nitrogen *i.e.* 100,150 and 200 kg/ha. and three varieties *viz.*, IIHR-6, Flirt and Shyamal) with three replications. Basal dose of FYM was applied at the rate of 20 tonnes per hectare. Phosphorus and potash were applied at uniformly to each plot at the rate of 100 kg per hectare. Nitrogen was

applied in two splits, first half dose of nitrogen applied at the time of preparation of soil as basal dose and second split was applied at 30 days after transplanting. Plants were grown spacing 30 x30 cm in each plot; all other culture practices were followed uniformly in experiment. Conventional methods were employed to record the observations of floral and quality parameters.

RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Flowering characters:

Number of days taken to flower initiation:

Table 1 reveals that with increase nitrogen it decreased the days to flower initiation. The highest dose of nitrogen 200 kg/ha gave lowest (128 days) as compared to other doses. Among varieties IIHR-6 took minimum (127 days) to flower initiation as compared to other varieties.

This earliness in flower initiation might be due to quick vegetative growth and there after, reproductive development of flower under optimum nitrogen treatment.

Similar results were reported by Behera *et al.* (2002).

Number of flower per plant:

Data in the (Table 1) clearly revealed that increase in number of flower per plant was by increase in the levels of nitrogen. Maximum number of flowers per plant (33) was when nitrogen was applied at 200 kg per hectare. Maximum number of flower per plant (32.8) were found in Flirt variety.

Higher number obtained due to higher nitrogen which increased shoot growth and number of lateral/secondary branches and size of plant, there by increased the number of potential sites where flower could develop.

Flower yield per plant and per hectare:

Data in Table 1 showed that highest yield of flower per plant and per hectare (118.3 g and 13148.1 kg, respectively) was observed in N₃ (200kg N per ha), while among varieties, maximum yield (115.7 g and 12855.9 kg, respectively) was obtained in variety V₂ (Flirt). This might be due to high level of nitrogen results in desirable carbohydrate: nitrogen (C:N) ratio as the more carbohydrates supply in relation to nitrogen directly affect the flower production. Belgaonkar *et al.*, (1996).

Quality parameters:

Fresh weight of flower (g):

Fresh weight of flower was affected significantly by nitrogen levels and varieties (Table 1). Maximum fresh weight of flower (3.2 g) was recorded in the 200 kg N per hectare. Among varieties highest fresh weights of flower (3.1 g) was obtained in Shyamal. Improvement in fresh weight might be due to improved vegetative growth of plant under optimum level of nitrogen which caused more storage of carbohydrates and thus improved fresh

weight. Similar results were obtained by Jain and Gupta (2004) in American marigold.

Size of flower (cm):

Flower size increased with an increase in nitrogen level in different varieties (Table 1). Largest flower (5.8 cm) was obtained in 200 kg N per hectare, while IIHR-6 variety had maximum flower size (5.8 cm). This increase in the size of flower may be contribution of increase maristamatic activity of metabolites from vegetative growth of plants. Similar results were obtained by Beniwal *et al.* (2005) in chrysanthemum and Karuppaiaha and Krishna (2005) in French marigold.

Flower stalk length (cm):

Data in Table 1 reveal that flower stalk length was significantly influenced by nitrogen level and variety. The longest flower stalk length (11.6 cm) was noted in 200 kg N per hectare, variety flirt showed highest flower stalk length (11.9 cm). The increase in length of flower stalk may be attributed to excessive growth on radial aspect of plant as observed through increase in plant height with higher nutrient application. Gaikwad *et al.* (2004) reported similar observations in Chinaaster.

Vase life of the flower (days):

Various levels of nitrogen and varieties also influenced vase life of flower (Table 1). The longest vase life (12.8 days) was obtained in nitrogen applied @ 100 kg per hectare. Among varieties Flirt showed maximum vase life (12.8 days). This improvement in keeping quality due to the nitrogen which produces carbohydrates that extend the vase life but with increase nitrogen depletion of carbohydrates causing digestion of protein which might reduce sugar content which is one factor to extend vase

Table 1 : Effect of varieties and different levels of nitrogen on flowering and quality parameters in chrysanthemum

Treatments	Number of days to flower initiation (days)	No. of flower per plant	Flower yield per plant (g)	Flower yield per ha. (kg)	Fresh weight of flower (g)	Size of flower (cm)	Stalk length of flower (cm)	Vase life of flower (days)
Nitrogen								
100	143.1	28.4	86.2	9584.4	2.7	3.8	9.6	12.8
150	133.1	30	101.3	11259.3	2.9	4.2	10.5	10.9
200	128.8	33	118.3	13148.1	3.2	5.8	11.6	9.8
C.D. (P=0.05)	9.55	30.5	0.31	2040.4	0.31	0.54	1.23	1.28
Variety								
IIHR-6	126.5	28.8	88.3	9814.8	3.0	5.9	10.6	9.7
Flirt	135.9	32.8	115.7	12855.9	2.7	3.8	11.9	12.8
Shyamal	142.5	30	101.9	11320.9	3.1	4.3	9.2	11.0
C.D. (P=0.05)	9.55	30.5	0.31	2040.4	0.31	0.54	1.23	1.28

life Graval *et al.* (2004).

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