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Original Research Paper

Effect of Different levels of Potash, Nitogen and Spacing on Size and Weight of African Marigold *(Tagetes Erecta Lnn.)*

Horticulture

KEYWORDS : African Marigold Tagetes Erecta Lnn., Potash, Nitrogen.

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ABSTRACT

A field experiment was Conducted at Muzaffarnagar farm U.P. during two winter season 2009-10 and 2010-2011 to investigate the effect of different levels of Potash, Nitrogen and spacing on average size and weight of irrigated African marigold Tagetes Erecta Lnn. It was observed that that increasing level of nitrogen significantly enhanced the size of flower heads over control. The effect of potash was also found to be significant on the size of flower head in both the years of experimentation. Although, the wider spacing gave the larger average size of flower head, yet the effect of plant spacing on flower size was not significant. There was a significant increase in the weight of flowers per plant by the nitrogen application. Similarly, all the potash doses showed significant effect on weight of flowers.

INTRODUCTION

India is blessed with many natural advantages, which places her in an ideal position to become a leading player in the world. India has abundant sunshine, plenty of water and different agroclimatic conditions which enable us to produce a wide variety of flowers throughout the year. The cost of production, labour and energy in India are very low when compared with other countries. Marigold is one of the most important flower crop grown commercially in different part of India especially in the plains. The name *Tagetes* has been given after Tages' a demigod known for its beauty. Marigold is a short duration, free flowering hairy, hardy, evergreen crop belonging to family Compositae. It has gained popularity because of adaptability to various soil and climatic Condition and longer blooming period. Marigold is known for its festive occasions, marriages, religious ceremonies and social function. The flower is endued with a wide spectrum of attracted color, shape and size along with its good keeping quality. Besides its pristine uses, now marigold are economically used as flower for interior decoration, hanging baskets, rock gardens, for landscaping purposes and for the beautification of mandaps and decoration on of cars in marriages. Its leaf and flower are equally important for medicinal value (Tripathy *et. al.*, 1991). Leaf extract is a good remedy for earache. Flower extracts is a good blood purifier, a cure for blood piles, ulcers and eye disease. The leaves of marigold plants are characterized by the presence of distinct odoriferous oil. Essential oil of marigold has a great use in perfumery industries. The oil has bron chodilatory, "Tranquilizing anti-inflammatory effect as well as has juvenile hormone having insect repellent activities against flies, ants and mosquitoes. The world demand for its oil is about 10 tones annually (Naik *et. al.*, 2003).

Nitrogen is the main constituent of protein which occurs in the reproductive and vegetative cells of the every plant besides; nitrogen is present in many other plant compounds which has tremendous role in several physiological and metabolic processes in plants and asset key role in chlorophyll, nucleotides, phosphatides alkaloids, enzymes, hormones and vitamins. It also promotes the vegetative growth of pants. Nitrogen is essentially required for cell division, cell enlargement and cell differentiation due to that if boosted the rapid growth rate in plants. Thus, it is quite obvious that nitrogen expedite the dry matter yield and flower production, however, it favours height of plant, seed yield and excess of its would make a probable cause of lodging of plants and the flowering crops. Due to these reasons nitrogen shall be included in the present study for deciding optimum level of nitrogen for promoting marigold flower production. Potash is a form of potassium carbonate. Potash has been used for centuries to make glass, soap and fertilizer. Potash can be found as a naturally occurring mineral or can be made from the ashes of broad-leafed trees. Potassium plays a pivot role in the photosynthesis and favours carbohydrate manufacturing in plant parts. Presence of potash in plants reduced nitrates and assists in the utilization ammonium ions in ammo acids and protein synthesis. Spacing regulates plants population per unit is directly. This factor seems to play a vital role in the production of other horticultural crops. The amount of vegetative growth made by any individual plant is marked, influenced by spacing or by number of plants per unit area. There is considerable difference of opinion flowering annuals. Keeping the above facts in mind the present experiment was conducted to study the effects of Nitrogen, Potas, and spacing on size and weight of African Marigold (*Tagetes Erecta* Lnn.)

MATERIAL AND METHODS

An experiment was conducted to study the impact of nitrogen and potash fertilization at different spacings on growth and flowering behaviour of African marigold (*Tagetes erecta* L.). The experiments were conducted during 2009-2010 and 2010-11 at Muzaffarnagar (U.P.) on winter season crop of African marigold for cut flowers. The crop was transplanted with varying doses of nitrogen (0, 90, 180 and 270 kg N/ha) and potash (0, 80 and 160 kg K_2O/ha). The seedlings of African marigold nearly 25 days old were transplanted 40x20 cm, 40x30 cm and 40x40 cm apart with different combinations of nitrogen and potash per hectare. The treatment includes all possible combinations of the above mentioned treatments. The plot size was 2.4x 6.0 m and the treatments were allotted randomly in each plot. The data recorded on various aspects during field experiments was statistically analysed by the method of "analysis of variance."

RESULTS AND DISCUSSION

Size of flowers

Table 1: Effect of nitrogen, potash and spacings on average size of flower heads (cm)

Treatments	2009-10	2010-11
Levels of Nitrogen (kg/ha)		
0	8.43	8.38
90	9.52	9.43
180	10.35	10.28
270	10.77	10.52
CD at 5%	0.326	0.490
Levels of Potash(kg/ha)		
0	8.44	8.33
80	9.02	8.78
160	9.22	9.03
CD at 5%	0.326	0.490
Spacing (cm)		

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40 × 20	7.96	7.89
40 × 30	8.33	8.23
40 × 40	8.25	7.95
CD at 5%	NS	NS

NS - Non significant at 5% levels of significance

Data given in Table 1 reveals that different treatments significantly affected size of flower heads during both the seasons. It is evident from the data that increasing level of nitrogen significantly enhanced the size of flower heads over control. The maximum size of flower head of 10.77 and 10.52 cm was recorded with 270 kg N/ha, whereas., it was the minimum, 8.43 and 8.38 cm under control. The size of flower heads under 180 and 270 kg N/ha remained at par with each other, but it was significantly superior as compared to 90 kg N/ ha and control.

The effect of potash was also found to be significant on the size of flower head in both the years of experimentation. The largest flowers were produced by 160 kg K_2O/ha which gave an average size of flowers head as 9.22 and 9.03 cm during 2009-10 and 2010-11, respectively. The smallest flower size 8.44 and 8.33 cm was obtained with control to both the seasons. The potash levels 80kg K_2O/ha and 160 kg K_2O/ha were at par with each other but significantly superior than control. Although, the wider spacing gave the larger average size of flower head, yet the effect of plant spacing on flower size was not significant.

Weight of flowers per plant (g):

Table 2: Effect of nitrogen, potash and spacings on weight of flowers per plant (g)

Treatments	2009-10	2010-11
Levels of Nitrogen (kg/ha)		
0	567.55	564.44
90	612.34	610.18
180	663.42	660.35
270	695.45	689.88
CD at 5%	35.36	36.22
Levels of Potash (kg/ha)		
0	610.33	606.85
80	673.42	672.35
160	689.86	685.28
CD at 5%	35.36	36.22
Spacing (cm)		
40 × 20	589.24	580.83
40 × 30	630.48	628.28
40 × 40	623.46	621.28
CD at 5%	16.26	16.84

It is apparent from the data given in Table 2 that there was a significant increase in the weight of flowers per plant by the nitrogen application. The maximum weight of flowers was obtained at 270 kg N/ha (695.45 and 989.88 g) whereas the minimum (567.55 and 564.44 g) was obtained from control plots. Each increase in the level of nitrogen upto 180 kg N/ha increased weight of flowers per plant significantly. The treatment effect of 180 kg N/ha being noted on par with 270 kg N/ha to both the seasons.

All the potash doses showed significant effect on weight of flowers. The maximum weight of flowers (689.86 and 685.28 g) was noted with 160 kg K_2O/ha, while the minimum weight of flowers (610.33 and 606.85 g) were obtained under control. The other levels of potash also produced significant effect over control. Though, treatment to be noted on par with 160 kg K_2O/ha. The increase being noted almost identical to both the seasons.

A perusal of data mentioned in table 2 shows that increase in spacing encouraged the weight of flowers per plant upto 40 × 30 cm. It was found maximum (630.48 and 628.28 g) for 40 × 30 cm spacing and minimum (589.24 and 580.83 g) for 40 × 20 cm spacing. Further increase in spacing to 40 × 40 cm decreased the weight of flowers per plant, though, the results to be recorded non significant under 40 × 30 cm spacing to both the seasons.

CONCLUSION

The size and weight of flower heads both were noted highest with 270 kg N/ha, though its increase remaining on par with 180 kg N/ha. The similar effect of nitrogen was observed to number of floral buds and longevity of flowers at room temperature obviously highest quantity of dry matter content of flower heads (g) was recorded with 270 kg N/ ha while its increase being noted significant over rest of the nitrogen doses. The size of flower heads was improved significantly by the K application, but, 80 and 160 by K_2O/ha did not produce any significant difference between themselves in this study. A similar tendency of K treatments was noted with the weight of flower heads number of flower buds, dry matter and yield of flower heads in q/ha. The wider spacing gave the larger average size of flower head, yet the effect of plant spacing on flower size was not significant.

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