

Effect of Urea, DAP and FYM on Growth and Flowering of Dahlia (*Dahlia variabilis*)

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ABSTRACT

Effect of urea, FYM and P_2O_5 was studied on growth and flowering Dahlia cultivars. Urea, P_2O_5 and FYM in different combinations showed significant results on plant height, number of branches /plant, early flowering and number of flowers/plant as compared to other doses of fertilizers, while number of leaves were effected by the combination of urea + P_2O_5 + FYM as compared to single and control. Size of flowers were significantly increased by application of urea with combination of potash and FYM and also by using single P_2O_5 , while single FYM and urea did not effect size of flowers.

Key Words: Dahlia; Fertilizer; Farm yard manure; Growth; Blooming

INTRODUCTION

Dahlia (*Dahlia variabilis*) is a very beautiful flower which by virtue of extra-ordinary quality has attained attention of many people all over the world. It is a perennial, half hardy, herbaceous plant with tuberous root system and erect growing habit. In Pakistan it is mostly grown as winter flower because of severe climatic conditions during summer. Dahlia has many ornamental characteristics such as wide range of plant heights (a few cm to more than 250 cm), single and collaret varieties, decorative in various sizes with double flowers having broad petals and cactus varieties (double with narrow petals) show a pompon Dahlia have ball- like flowers and these are orchid- flowered and anemone flowered types.

Dahlia offers a most extensive colour range with two colours in same flower. It has own laurels as to be the pride of garden amongst the naturalists and ornamentalists because of its different uses as a superb cut flower, garden display, house beautification, pot plant, border of lawns etc. More number of healthy and beautiful flowers with greater size is needed to enhance aesthetic view. The dahlia are used with advantage for making bouquets and wreaths or vase decorations. The long clean and stiff foot stocks are very suitable for both handling and decoration purposes. The lasting quality of a flower is of great importance in the cut flower trade. Like Holland, Pakistan also can develop an industry of dahlia which will enable us to earn more coveted foreign exchange by exporting tuber's seeds and flowers. In our country due to the great diversity in soil and climatic conditions the flowers can be raised for trading during a long spell of the year.

Dahlia grows better in high organic residues. Leaf mold, compost or FYM can also be used for good results. Dahlia like other plants needs NPK in large amounts and other elements like Fe, Zn, Cu, and Cl in small quantities.

Nutrition is an important factor which is directly related to growth and flowering of dahlia. Many experiments regarding fertilizer applications has been conducted in different parts of the world to improve the growth and flowering of dahlia. Bhattacharjee and Mukherjee (1983) in a field trial applied N@ 20-30 kg or 40 kg/h and P_2O_5 at 30-40 or 50 kg/ha at planting to dahlia cultivar blackout. Plant growth, number of flowers, flower size and flower's longevity was best with the highest N and P_2O_5 rates. Singh and Gupta (1995) studied the effect of N. and P_2O_5 . on tuber production and growth in *Dahlia variabilis* wild cultivar powder puff. The size of plant, bulb weight, number of flowers and growth was increased significantly with increasing rates of N and P_2O_5 . Present study was therefore, envisaged to observe the influence of different combination i.e., N, P_2O_5 and FYM on the growth and flowering of dahlia which ultimately improve the production of cut flower as well as tuber and develop interest of growers to cultivate Dahlia for making high return.

MATERIALS AND METHODS

Present research studies were carried out at experimental field of University College of Agriculture Rawalakot, Azad Kashmir. Tubers of Dahlia cultivar Procyon were obtained from NARC Islamabad. The soil was prepared thoroughly and tubers were planted on April 3rd. First irrigation was applied just after sowing. Subsequent irrigation was applied depending upon requirement of the crops and weather conditions. The fertilizer treatments included: T_0 = control; T_1 = 20 g m^{-2} urea; T_2 = 40 g m^{-2} DAP; T_3 =4 kg m^{-2} FYM; T_4 = 20 g m^{-2} urea + 40 g m^{-2} DAP; T_5 =4 kg m^{-2} FYM, 20 g m^{-2} urea and 40 g m^{-2} DAP. Full dose DAP and FYM and half dose of N were applied on May, 11th in the respective plots. The remaining half dose of N was applied on June, 4th. Fertilizer

Table I. Effect of various combinations Urea, DAP and Farm yard manure on growth and flowering of Dahlia cv. Procyon

Characteristics	Control	Urea	DAP	FYM	Urea+DAP	Urea+DAP +FYM.
Plant Height (cm)	79.25d	94.50ab	88.25bc	84.00cd	89.25bc	101.00a
No. of branches/ plant	20.75d	25.50cd	31.5bc	21.25d	36.25b	42.5a
No. of leaves/ plant	88.00c	99.75a	88.5c	92.00b	98.25ab	100.00a
Days to first flower	94.00a	94.50a	77.5bc	92.75a	86.5ab	72.00c
No. of flowers/ plant	21.25cd	25.75cd	33.25c	22.25cd	36.50b	44.00a
Size of flower (cm.)	21.15c	24.25c	30.45a	24.65bc	30.00ab	32.97a

Values with different letters within a column differ significantly at 5 % level of probability

was broadcasted, thoroughly mixed in the soil and followed by irrigations. Hoeing was done regularly to eradicate the weeds.

The experiment was laid out according to Randomized Complete Block Design. There were six treatments of fertilizers with four replicates. Five plants were randomly selected in each plot in each replication and following data were collected: Plant height (cm); Number of branches/plant; Number of leaves/ plant; Days to first flower; Number of flower/ plant; Size or circumference of flower (cm.).

The data collected were analyzed statistically and the treatment means were compared by applying Duncan's Multiple Range (DMR) Test at 5% probability level (Steel & Torrie, 1980).

RESULTS AND DISCUSSION

Plant height (cm). Significant differences were observed for various fertilizers treatments. The maximum plant height was recorded at fertilizer combination of 20 g m⁻² urea, 40 g m⁻² DAP and 4 kg m⁻² FYM and the treatments in which only the urea was applied at the rate of 20 g m⁻². Minimum plant height was measured in plants raised on control and plants which received only FYM @ 4 kg m⁻². The superiority of the former combination over others treatments would be attributed to the availability of N and P₂O₅ from urea and DAP and other miner nutrients from FYM. Besides providing essential elements to the plants, FYM also improves soil structure by improving its aeration, water holding capacity and cation exchange capacity. When only N was applied, it also enhanced plant height by increasing cell division and cell enlargement. The control remained at the least level because of minimum availability of nutrition. These results are in line with the work of Bhattacharjee and Mukherjee (1983), John *et al.* (1984) and Barman and Pal (1999).

Number of branches / plant. Significant differences were observed among fertilizer treatments for the parameters under study. Maximum number of branches per plant were recorded when all the three sources of nutrients were applied i.e. 20 g m⁻² urea, 40 g m⁻² DAP and 4 kg m⁻² FYM. Minimum number of branches was recorded in those plants raised on control conditions followed by plants which received only FYM 4 kg m⁻². The superiority of treatment

combination of all nutrients sources is because optimum amount of N and P₂O₅ were available from urea, DAP and other micro nutrients from FYM. The control remained at the lowest position due to non availability of sufficient nutrients. These findings are in accordance to the findings of John *et al.* (1984), Singh *et al.* (1996) and Baboo and Sharma (1997).

Number of leaves/plant. The data regarding the number of leaves/plant also showed significant differences among the treatment means. Maximum number of leaves was recorded when all the three fertilizers i.e., 20 g m⁻² Urea, 40 g m⁻² DAP and 4 kg m⁻² FYM were combined and applied to the crop followed by treatments in which either N was applied in combination of DAP. All these fertilizers treatments behave statistically alike. Minimum number of branches was recorded in control and when only DAP was applied @ 40 g m⁻². As number of leaves/plant depends upon number of vegetative buds formed on branches. When all three sources of fertilizers were applied, it resulted in maximum height of the plant and more number of branches and leaves per plant. Minimum number of leaves/ plant in control might be due to absence of N for leaf bud formation. These results are in close conformity with findings of Singh and Gupta (1995) and Ram *et al.* (1997).

Days to first flower. Results pertaining emergence of first flower depicted significant differences among the treatments. When all three fertilizers were mixed and applied, it produced flower earlier than all other treatments. In control or when urea or FYM applied singly or when urea and DAP was combined, it took maximum days to flower. It indicates that when FYM was applied in combination with urea and DAP, the plants completed their vegetative growth early due to optimum supply of nutrients resulting in early emergence of first flower. While in other treatments the nutrient supply was not optimum which delayed vegetative growth and also flowering. These observations followed the results of Ram *et al.* (1994) and Mishra (1998).

Number of flowers/plant. Maximum number of flowers was produced when all the three fertilizers i.e. 20 g m⁻² urea, 40 g m⁻² DAP, 4 kg m⁻² FYM. In all other treatments significantly less number of flowers was recorded. Minimum number of flowers was recorded in control (no fertilizer used). As more number of branches were produced in the former treatments (combination of all the three fertilizers) which ultimately resulted in more number of

branches. These results are in accordance with the findings of Bhattacharjee and Mukherjee (1983), John *et al.* (1984), Singh and Gupta (1995).

Size of flower. Flower size was measured in terms of circumference. Highly significant differences were observed among various fertilizer treatments. Maximum flower size was recorded when all three fertilizers were applied in combination, when DAP was applied alone or in combination with urea. Small size flowers were produced in control or when urea or FYM was applied singly. Therefore, it is found that the flower size depends upon plant growth and nutrient supply. In those treatments where nutrient supply was better these resulted in big size flowers. While there was shortage of nutrients it resulted in small sized flowers. The results are in conformity with results of Baboo and Sharma (1997) and Mishra (1998).

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