

## EFFECT OF PLANT GROWTH REGULATORS ON PLANT GROWTH AND FLOWER YIELD OF DAHLIA (*DAHLIA VARIABILIS* L.). CV. SURYODYA

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### ABSTRACT

The present investigation entitled "Effect of plant growth regulators on plant growth and flower yield of Dahlia (*Dahlia variabilis* L.) cv. Suryodya" was undertaken at Department of Horticulture, during the year 2012-13. The experiment was laid out in simple randomized block design with 3 replication and 10 treatments separately. The treatment consists of three chemicals each of three different concentrations and distilled water as control applied after transplanting. Application of GA<sub>3</sub> at 100, 200, 300 ppm and NAA at 50, 100, 150 ppm and Maleic Hydrazide (MH) at 250, 500, 750 ppm at 30, 45, 60 days after transplanting. GA<sub>3</sub> 200 ppm gives better flower yield. In treatment T<sub>5</sub> (GA<sub>3</sub> 200 ppm) had significantly effect on spread of plant, number of leaves, number of branches, size of flower, early flower emergence, number of flowers per plant, high yield and maximum self life was observed in treatment T<sub>5</sub>.

**Key Words:** *Dahlia*, NAA, GA<sub>3</sub>, MH, growth, yield and flower.

### INTRODUCTION

Dahlia (*Dahlia variabilis* L.) is tuberous rooted half hardy herbaceous perennials. Stems are mostly erect, branched, glabrous or scabrous, belonging to the Family Asteraceae having its origin in Mexico. Dahlia was named in honor of the Swedish botanist Dr. Andreas Dahl, pupil of Linnaeus from where it was first introduced into Madrid (Spain) in 1789 and other European countries. Dahlia was introduced to India as early as 1857 under the auspices of the Agri Horticultural society of India (formerly, Royal Agri - Horticultural society of India). Calcutta. Apart from cultivation in ground, Dahlia in pots is very popular in most parts of the country. The other notable contributions of this society are the development of late cutting method of dahlia preservation and plant breeding.

The height of dahlia plants varies from 30 to 180 cm depending upon the cultivar. Dahlia flower consists of a certain number of outer ray florets in which the male organs are modified in to a strap - shaped petal, arranged round a central disk of bisexual florets. Actually the ray florets in dahlia have all the flower colors, whereas the disk florets are generally yellow. In double flowered cultivars more of the male organs get converted in to ray petals with proportionate reduction in the number of dices.

Dahlia is one of the most important garden plants. Multitude of colors, great variation in sizes (ranging from miniature, less than 2.5 cm across to giant over 40 cm in diameter), attractive shapes, and many forms, profusion of flowering and easy cultivation has made them immensely popular. They are easy to grow both in ground and pot, and are extensively used for exhibition, garden display and home decoration and cut flowers of pompon and miniature types stay fresh in flower vases for many day and also make moderately good garlands.

### MATERIALS AND METHODS

A field experiment entitled "Effect of plant growth regulators on plant growth and flower yield of Dahlia (*Dahlia variabilis* L.) cv Suryodya" was carried out at Horticultural Experimental Field, Department of Horticulture, Sam Higginbottom University of

Agriculture, Technology and Sciences, Deemed-to-be University, (formerly known as Allahabad Agricultural Institute-AAI-DU), during rabi season of 2012-2013.

Experimental area had sandy loam soil with PH of 7.2, the soil was moderately fertile. Experimental plot was ploughed twelfth days before planting of seedling. There after three harrowing were given in order to bring the land to a fine tilth. On 12 November, 2012 the experimental area was laid out in flat beds of size (1.2 x 1.5 m) well decomposed farmyard manure was applied eight days prior to the transplanting of the seedling at the rate of the 5 kg/m<sup>2</sup> and mixed well in the soil. The commercial variety of Dahlia viz. Suryodya was subjected to 3 sprays of GA<sub>3</sub>, MH and NAA. The plants were planted in the field of treatments in Randomized Block Design with Factorial Concept (Panse and Sukhatme, 1967).

The data recorded on each character were analysed by the ANOVA technique. The critical difference values were calculated at 0.05 level of significance.

### RESULT AND DISCUSSION

Influence of growth regulators, under study on vegetative growth under different treatments is described.

The plant height at 60 DAP was found to be significant among the treatments. Maximum plant height (99.87 cm) was found to be in treatment (T<sub>3</sub>) with GA<sub>3</sub> 200 ppm. The minimum plant height (60.87 cm) was recorded in treatment (T<sub>0</sub>) control followed by treatment (T<sub>7</sub>) with NAA 250 ppm (64.87 cm).

The plant spread at 60 DAP was found to be significant among the treatments. The maximum plant spread (59.87cm) was recorded in treatment (T<sub>5</sub>) with GA<sub>3</sub> 200 ppm. Minimum plant spread (39.47cm) was recorded to be in treatment (T<sub>0</sub>) control.

The number of branches at 60 DAP were found to be significant among the treatment. The maximum numbers of branches (9.33) were recorded in treatment (T<sub>3</sub>) with GA<sub>3</sub> 200 ppm. And the minimum numbers of branches (4.47) were recorded in treatment (T<sub>0</sub>) control.

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Treatment	Plant Height (cm)	No. of Branches/plant	No. of Leaves/plant (cm)	Plant spread (cm)	Days taken to first flower bud emergence	Diameter of flower (cm)	Weight of flower (g)
T0 (Control)	60.87	4.47	49.13	39.47	48.47	22.67	67.87
T1 (NAA @ 50 ppm)	71.27	5.47	57.07	48.47	45.33	24.07	75.13
T2 (NAA @ 100 ppm)	87.47	7.33	61.73	53.87	41.40	26.93	84.07
T3 (NAA @ 150 ppm)	77.33	5.87	57.93	49.93	44.07	25.27	77.20
T4 (GA <sub>3</sub> @ 100 ppm)	92.33	7.73	62.67	55.93	40.80	27.87	87.53
T5 (GA <sub>3</sub> @ 200 ppm)	99.87	9.33	69.53	59.87	39.53	29.73	92.73
T6 (GA <sub>3</sub> @ 300 ppm)	79.67	6.33	59.13	51.07	43.53	25.87	79.13
T7 (MH @ 250 ppm)	64.87	5.00	56.40	47.27	46.80	23.53	72.40
T8 (MH @ 500 ppm)	95.67	8.27	64.87	57.33	40.20	28.27	89.13
T9 (MH @ 750 ppm)	82.80	6.73	60.53	52.60	42.47	26.47	81.47
F-test	S	S	S	S	S	S	S
S. Ed.(±)	1.55	0.19	0.41	0.59	0.29	0.29	0.92
C.D(P=0.05)	3.26	0.40	0.87	1.24	0.60	0.60	1.92

The number of leaves at 60 DAP were found to be significant among the treatment. The maximum numbers of leaves (69.53) were recorded in the treatment (T<sub>5</sub>) with GA<sub>3</sub> 200 ppm. Minimum numbers of leaves (49.13) were recorded to be in treatment (T<sub>0</sub>) control.

It is observed that spraying of P.G.R. produced significant effect on days to first flower bud emergence. Minimum number of day (39.53) for flower bud emergence was recorded to be treatment (T<sub>5</sub>) GA<sub>3</sub> 200 ppm which took least number of days, followed by treatment (T<sub>8</sub>) with MH 500 ppm (40.20) where as treatment (T<sub>0</sub>) control.

Maximum flower diameter (29.73 cm) was recorded in treatment (T<sub>5</sub>) with GA<sub>3</sub> 200 ppm followed by treatment (T<sub>8</sub>) with MH 500 ppm (28.27 cm). Minimum flower diameter (22.67cm) was recorded to be in (T<sub>0</sub>) control.

Maximum weight of flower was observed in treatment T<sub>5</sub> with GA<sub>3</sub> 200 ppm (92.73 g) followed by T<sub>8</sub> with MH 500 (89.13 g). Minimum weight of flower (67.87 g) was obtained in treatment T<sub>0</sub> control.

Shelf life of flower. It was observed that plants sprayed with GA<sub>3</sub> 200 ppm recorded the maximum shelf life (19.87 days) while treatment T<sub>0</sub> (control) recorded the minimum shelf life (11.13 days).

Shelf life of flower (days)	No. of flowers per plant	Flower yield per plant (g)	Flower yield (t ha <sup>-1</sup> )	Benefit Cost Ratio
11.13	6.33	429.89	21.49	1:1.78
13.00	7.73	580.88	29.04	1:2.40
15.87	8.73	734.36	36.72	1:3.02
13.47	7.87	607.16	30.36	1:2.49
16.27	9.07	793.91	39.70	1:3.26
19.87	10.13	939.85	46.99	1:3.84
14.20	8.00	633.11	31.66	1:2.57
12.33	7.20	522.08	26.10	1:2.12
17.67	9.47	843.85	42.19	1:3.35
14.53	8.27	673.45	33.67	1:2.63
S	S	S	S	S
0.21	0.13	12.34	0.62	0.90
0.44	0.27	25.94	1.30	1.90

Significantly maximum numbers of flowers per plant (10.13) were recorded in treatment (T<sub>5</sub>) with GA<sub>3</sub> 200 ppm followed by treatment (T<sub>8</sub>) with MH 500 ppm (9.47). Minimum numbers of flowers (6.33) were recorded in treatment (T<sub>0</sub>) control.

Significantly maximum yield of flower per plant (939.85g) was recorded in treatment (T<sub>5</sub>) with GA<sub>3</sub> 200 ppm than all other treatment. Minimum flower yield (429.89) was obtained in treatment (T<sub>0</sub>) control.

It is recorded that maximum yield of flowers per hectare (46.99 t/ha) was obtained in treatment T<sub>5</sub> with GA<sub>3</sub> 200 ppm followed by treatment T<sub>8</sub> with MH 500 ppm (42.19 t/ha). Minimum yield of flower per ha (21.49 t/ha) was obtained in treatment T<sub>0</sub> control.

The maximum gross return, net return and benefit cost ratio (Rs. 1409780, 1042484, 3.84) were obtained in T<sub>5</sub> (GA<sub>3</sub> 200 ppm) followed by T<sub>8</sub> (Rs. 1265780, 888484, 3.35) and the minimum (Rs. 644840, 282544, 1.78) was recorded in T<sub>0</sub> control.

## CONCLUSION

On the basis of present findings it is concluded that, in respect of cultivation of Dahlia, the application of P.G.R. (T<sub>5</sub>) GA<sub>3</sub> 200 ppm was effective for enhancing plant growth, yield and flower quality of Dahlia with maximum B C R (3.84). As the study was undertaken only for one season, it needs further confirmation by conducting more trials.

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