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EFFECT OF PLANT GROWTH REGULATOR ON PLANT GROWTH AND FLOWER YIELD OF PETUNIA (*PETUNIA X HYBRIDA)* CV. PURPLE PRINCE.

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ABSTRACT

The present investigation entitled "Effect of Plant Growth Regulators on Growth and Flower Yield of Petunia (*Petunia x hybrida*) cv. Purple Prince" was carried out during 2015– 2016 at research field of Department of Horticulture, Allahabad School of Agriculture, SHIATS, Allahabad. The experiment included thirteen treatments and three replications. Treatment details were T_0 (Control), T_1 (GA_3 @100ppm), T_2 (GA_3@150ppm), T_3 (GA_3@200ppm), T_4 (GA_3@300ppm), T_5 (CCC@250ppm), T_6 (CCC@500ppm), T_7 (CCC@700ppm), T_8 (CCC@800ppm) and T_9 (NAA@30ppm), T_{10} (NAA@40ppm), T_{11} (NAA@50ppm), T_{12} (NAA60@1250ppm). It was concluded that application of GA_3 @300 ppm in treatment T_4 was found to be superior on plant height(23.00cm), plant spread(48.63cm), number of branches(13.30), number of leaves(570.50) and application of T_8 NAA@60ppm was found to be minimum on no. of days for first flower bud emerge(51.47days), and treatment T_8 CCC@800ppm fresh weight of flower(4.3g), diameter of flower(6.70cm) and treatment T_1 GA_3@100ppm was found to be superior on number of flowers per plant(54.47), yield of flowers per plant(126.63 g), yield of flowers per plot(1115.33 g) and yield of flowers per hectare(7.56 t) was observed as compared with control.

KEYWORDS: Plant Growth Regulators, GA_3, CCC, NAA, Petunia Etc

INTRODUCTION

Petunia is a popular, easy to grow and versatile annual with showy flowers and has the longest season of bloom of all garden annuals. A wide range of colours and forms has been developed over the years, which are classified on the basis of the characteristics of flowers. Petunia plants are perennials but are generally grown as half-hardy annuals in open gardens. It are a commercial floriculture all over the world has been significant in the last two decades. The trends for the production and consumption of flower have changed. This has exposed the in adequacy of the traditional methodology for production and marketing of this beautiful creation. Petunia belongs to the family Solanaceae and Genus Petunia, has its origin in South America. Petunia has 25 species including synthetic garden species *Petunia hybrida* (Vilm) which has arisen in historical times from two wild sps. Petunia *axillaries and P. violacea.* **Weiss, D. et al., (2004)** GIP, a Petunia hybrida GA- induced cystien-rich protein: a possible role in shoot elongation and transition to flowering.

The petunia flower is funnel shaped, but hybridizers have created many variation including singles and doubles with petals that have wavy or fringed margins. Many patterns are available in strips, mauve, speckles and borders is an extensive colour palette that includes purple, mauve, lavender, pink, red, white, yellow and some cultivars are bicoloured. Leaves and stems are sticky to the touch and have a distinctive odor. The height may vary between 20-30 cm and 30-45

cm, depending upon the type. Petunia is a free flowering plant.**R. L.*et al.*, (2007)** Effect of plant growth regulators on growth and flowering of gladiolus, *India J. Horti.*

Petunias were among the first flowers artificial hybridized in America in 1946. The petunias that we grow today comprise a large family of hybrids derived from many species including *Petunia axillaries, P. violacea, and P. inflates.* The modern petunias are the result of crosses between two South American species, namely, *Petunia integrifolia* and *P. nyctaginiflora*. **Nayak, B.*et al.*, (1990)** Studies on the effect of growth regulators on growth of salvia (Salvia splendens, Ker Gawal). *Orissa J. Hort.*

As a result of these efforts, the petunias of today are the most popular, loveliest and a valuable race of garden plants. **Dabas, S.*et al.*, (2001)** Effect of different Concentration of GA3, MH and NAA on primary branches of marigold (Tagetes erecta L.) *India Agriculturist.*

MATERIALS AND METHODS

A field experiment entitled "**Effect of Plant Growth Regulators on Growth and Flower Yield of Petunia (*Petunia x hybrid*)c.v. Purple Prince"** was carried out at Horticultural Experimental Field, Department of Horticulture, Allahabad School of Agriculture, Sam Higginbottom Institute of Agriculture, Technology and Sciences (Deemed -to- be- University), Allahabad during the winter season of 2015-2016. The detail pertaining to the materials and method adopted are presented. The experimental site was fairly level land with sandy loam soil of uniform fertility status with low clay and high sand percentage. Composition soil sample were collected as random spots from depth of 0-30 cm and the soil was analyzed for pH, electrical conductivity (EC), organic carbon, available nitrogen, available phosphorus and available potassium.**Gladon, R.J.*et al.*, (1995)** (Aminooxy)acetic acid inhibits petunia growth and gibberllin and cytokinin-stimulated growth in bioassays. *J. Plants Growth Regulation.*

The solution of cycocel and NAA prepared in distilled water. The chemical used GA_3 and NAA was available in powder form. The GA_3 was prepared by dissolving in a 2-3 ml of absolute alcohol and making of the volume with distilled water.

RESULT AND DISCUSSIONS

The results of the present investigation presented in table 1 and table 2 showed that Growth parameters, Flower parameters and Flower yield parameters.

GROWTH PARAMETERS

Maximum plant height (23.00cm) was recorded in treatment T_4 (GA_3@300ppm) followed by T_2 (GA_3@150ppm) (21.20cm). Minimum plant height (20.03cm) was recorded in treatment T_3 (CCC@700ppm).Maximum plant spread (48.63cm) was recorded in treatment T_4 (GA_3@300ppm) followed by T_3 (GA_3@200ppm) (47.07cm). Minimum plant spread (30.00cm) was recorded in treatment T_{10} (NAA@40ppm).Maximum no. of branches per plant (13.30cm) was recorded in treatment T_4 (GA_3@300ppm) followed by T_5 (CCC@250ppm) (12.13cm). Minimum no. of branches per plant (6.50cm) was recorded in treatment T_1 (GA_3@100ppm)Maximum number of leaves per plant (570.50cm) was recorded in treatmentT_4 (GA_3@300ppm) followed byT_6 (CCC@500ppm) (500.37cm). Minimum number of leaves per plant (205.60cm) was recorded in treatment T_{11} (NAA@50ppm).The promoting effect of plant growth regulators in increasing

the number of leaves has been reported by **Kadam *et al.* (2002)** in China aster.

FLOWER PARAMETER

Number of days required for first flower bud emergence from transplanting (67.60days) was recorded in treatment T_3(GA_3@ 200ppm) followed by treatmentT_5 (NAA@ 100ppm) (58.3 days). The minimum number of days required for first flower bud (56.3 days) was founded the treatment T_8 (CCC@800ppm) respectively. Similar results were also reported by **Parmar *et al*. (2009)** found in spider lily.

YIELD PARAMETER

Yield parameters like weight of flower (4.3 g) was significantly increased in treatment T_8 (CCC@800ppm) followed by treatment T_4 (GA_3@300ppm) (3.7 g) respectively. The weight of flower (1.8) was recorded with treatment T_{11} (NAA@50ppm) respectively. Flower diameter (6.70 cm) was significantly increase in treatment T_8 (CCC@250ppm) followed by treatment T_6 (NAA@150ppm) (6.30 cm). The minimum flower diameter (5.03 cm) was recorded with treatment T_{10} (CCC@750ppm) respectively. Significantly increase in number of flowers per plant (54.47) was recorded in treatment T_1 (GA_3@ 100ppm) followed by treatment T_8 (CCC@ 80ppm) (48.57). The minimum number of flower per plant (26.30) was recorded with treatment T_0 (Control). Significantly maximum yield of flower per plant (121.63g) was recorded in treatment T_1 (GA_3@ 100ppm) followed by treatment T_4 (GA_3@ 300ppm) (104.37g).The minimum yield of flower per plant (50.53) was recorded with treatment T_0 (Control) respectively. Significantly increase in yield of flowers per plot (1115.33g) were recorded in treatment T_1 (GA_3@ 100ppm) followed by treatment T_7 (CCC@ 700ppm) (1011.40 g) per plot. The minimum yield of flower per plot (438.43) was recorded with treatment T_{10} (NAA@ 40ppm) respectively. Significantly increase in yield of flowers per hectare (7.56 t) were recorded in treatment T_1 (GA_3@ 100ppm) followed by treatment T_2 (GA_3@ 150ppm) (6.66 t) per hectare. The minimum yield of flower per hectare (1.07 t) was recorded with treatment T_{12} (NAA@ 60ppm) respectively. Similar results were also reported by **Parmar *et al*. (2009)** found in spider lily.

CONCLUSIONS

On the basis of present investigation it is concluded that the application of T_4 (GA_3@300ppm) was best in term of growth and flower yield and maximum cost benefit ratio (1:1.97) of Petunia followed by treatment T_1 (GA_3 @100ppm) (1:1.57).

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APPENDICES

Table 1: Effect of Plant Growth Regulators on Petunia (*Petunia x hybrida*) cv. Purple Prince

Treatment No.	Treatments	Plant Height(cm)	Plant Spread(cm)	No of Branches Per Plant	No of Leaves Per Plant
T_0	Control	21.5	37.30	7.63	404.83
T_1	GA_3 @100ppm	21.33	38.57	6.50	425.27
T_2	GA3@150ppm	23.00	35.70	9.33	450.47
T_3	GA_3@200ppm	21.00	47.07	11.50	460.07
T_4	GA_3@300ppm	23.04	48.63	13.30	570.50
T_5	CCC@250ppm	20.54	35.00	12.13	370.33
T_6	CCC@500ppm	20.67	36.83	10.10	500.37
T_7	CCC@700ppm	20.04	37.63	8.20	250.60
T_8	CCC@800ppm	20.33	30.93	9.15	490.57
T_9	NAA@30ppm	21.00	34.03	11.27	300.33
T_{10}	NAA@40ppm	20.34	30.00	6.57	360.47
T_{11}	NAA@50ppm	21.00	33.10	7.30	205.60
T_{12}	NAA@60ppm	20.21	34.10	8.13	290.43
	F-test	S	S	S	S
	S. Ed (±)	**1.12**	**0.60**	**0.17**	**62.78**
	CD 5%	**2.31**	**1.24**	**0.34**	**129.57**

Table 2: Effect of Plant Growth Regulators on Flower Yield and Flower Quality of Petunia (*Petunia x hybrida*) cv. Purple

Treatment Combination	No of Days Taken for First Bud Emergence	Weight of Flower (g)	Diameter of Flower (cm)	No of Flowers Per Plant	Yield of Flower Per Plant (g)	Yield of Flower Per Plot(g)	Flower Yield Per Hectare (t)	Benefit Cost Ratio
T_0	70.23	1.7	5.13	26.30	50.53	450.40	4.63	1.17
T_1	65.17	2.5	5.20	54.47	126.63	1115.33	7.56	1.48
T_2	64.63	2.3	4.40	48.47	101.20	950.27	6.66	1.44
T_3	67.60	3.5	5.80	36.43	98.27	870.37	5.62	1.64
T_4	66.40	3.7	4.27	47.80	104.37	563.83	5.06	1.50
T_5	60.27	2.5	4.33	30.37	60.27	971.10	6.25	2.70
T_6	59.37	2.8	6.30	28.43	71.33	640.57	4.09	2.31
T_7	55.60	3.5	5.63	32.33	64.60	1011.40	2.74	2.97
T_8	51.47	4.3	6.70	48.57	67.50	751.73	1.25	1.78
T_9	62.77	3.3	5.43	39.00	78.33	464.60	3.45	1.32
T_{10}	61.27	3.7	5.03	37.70	59.43	438.43	2.96	1.16
T_{11}	52.37	1.8	5.50	27.50	55.70	515.40	3.63	1.26
T_{12}	53.40	3.4	5.83	35.30	90.50	611.63	1.07	1.12
S. Ed. (±)	**0.22**	**0.12**	**0.09**	**0.27**	**0.24**	**1.35**	**0.03**	
C.D.at 5%	**0.46**	**0.25**	**0.18**	**0.56**	**0.51**	**2.78**	**0.06**	