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Effect of Foliar Spray of Growth Regulators and Cow Urine on Flowering, Quality and Yield of Rose (Rosa hybrida) *cv* Poison Under Naturally Ventilated Polyhouse

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Abstract: *The experiment was laid out under naturally ventilated polyhouse at Experiential Learning Center, Department Floriculture and Landscape Architecture, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari during March 2011 to February 2012.*

The experiment was laid out in Completely Randomized Design (CRD) having thirteen treatment combinations comprising of foliar spray viz. GA3 (50, 100 and 150 ppm) BA (50, 100 and 150 ppm), NAA (50, 100 and 150 ppm) and cow urine (1, 2 and 3%) including control (water spray) with three repetitions. The treatments were repeated twice at fifteen days intervals after bending. The response of rose to the treatments was evaluated on the basis of growth, flowering, quality and yield characteristics.

All the treatment combination comprising of foliar spray significantly improved flower parameters and yield over control. Among all plant growth regulators and cow urine, the application of GA3 @ 100 ppm (T2) had a striking influence in enhancing the, flowering, quality and yield characteristics over control (T13), while the application of BA at 100 ppm (T5) which increase flower longevity of rose.

As the economics is considered, it is clear that GA3 at 100 ppm was found more profitable with respect to the highest net return and BCR as compared to other treatments.

Keywords: *BA, cow urine, GA_3, NAA.*

INTRODUCTION

Rose is most popular flower in world flower trade. Besides protected cultivation, it is also important to ensure proper nutrition and use of plant growth regulators, etc for obtaining optimum plant growth and higher yield of good quality flowers. Plant hormones are involved in regulation of plant growth, development and plant physiology of higher plants. It is known that gibberellic acid plays a vital role in plant growth and promotes flowering, while cytokinins, especially benzyladenine, is important for cell division besides providing green and healthy leaves. NAA, a plant hormone in the auxin family induces early flowering. Besides plant growth regulators, cow urine also has an important role in growth and development of plant. It is very beneficial as organic manure, due to its high nitrogenous content. Pure and fermented cow urine is also indigenously being used for controlling pest in plants (Tesfaye and Gautam, 2003).

Increase in the number of rhizobacteria was also seen in the soil of plants treated with pure cow urine. It could be due to the presence of fatty acid having antioxidant properties (Krishnamurthi *et al*., 2004). Therefore, this experiment was designed to evaluate the effect of Gibberellic acid,

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Benzyladenine, Nepthalic Acetic Acid and Cow urine on the flowering and flower quality characters of rose under protected condition.

MATERIALS AND METHODS

A trial was conducted under naturally ventilated polyhouse at Navsari Agricultural University, Navsari, during March 2011 to February 2012. Two years old rose cv. Poison plants with a spacing of 30 × 30 cm were planted in triangular system. Two sprays were done at 15 and 30 days after bending and comprised of thirteen treatments *viz*, Gibberellic Acid (50, 100, 150 ppm), Benzyladenine (50, 100, 150 ppm), Naphthalene Acetic Acid (50, 100, 150 ppm), Cow urine (1, 2, 3%) and control (water spray). The experiment was laid out in Completely Randomized Design (CRD) with three repetitions.

Observations were recorded from randomly selected five plants of each treatment. Observations with respect to growth characteristics were recorded after 15 days of second spray. The experimental data pertaining to all the characters studied were subjected to statistical analysis of variance technique as described by Panse and Sukhatme (1967). The method of analysis of variance for completely randomized design (CRD) was used. The test of significance among treatments was worked out by 'F' test.

RESULTS AND DISCUSSION

In the present study, effect of plant growth regulators and cow urine at different concentrations on all vegetative growth characters, flower and flower quality attributes was investigated.

Plants treated with GA_3 @ 100 ppm recorded early stalk initiation to flower bud initiation (21.90 days) and minimum days for flower bud initiation to open (9.60 days), which was at par with GA_3 @ 150 ppm (Table 1). The findings are in agreement with those of Dekhaney *et al*. (2000), Dahiya *et al*. (2001), Dalal *et al*. (2009a), (Patil, 2001) and Porwal (1995). Application of BA inreased flower longevity (Table 1). Maximum Flower longevity (15.60 days) was recorded when the plants were sprayed with 100 ppm BA, which was at par with GA_3 @ 100 ppm and 150 ppm. Similar results were also reported by Prashanth *et al*. (2006) and Emami *et al*. (2011) in lily (*Lilium longiflorum*). Maximum vase life (9.87 days) was recorded with the application of GA_3 @ 100 ppm, which was at par with GA_3 @ 150 ppm (9.27 days) Dalal *et al*. (2009b) and Moond and Gehlot (2006) also reported similar results in gerbera.

It is apparent from Table 2 that maximum stalk length (55.33 cm) was recorded with the application of 100 ppm GA_3 and it was at par with the GA_3 @ 150 ppm where the stalk length was 54.65 cm. Maximum bud length (25.62 mm) was noted with the application of GA_3 @ 100 ppm, which was at par with GA_3 @ 150 ppm and BA 100 ppm (24.90 and 24.52 mm, respectively). Maximum bud diameter (17.68 mm) and flower diameter (71.29 mm) was noted for the spray of GA_3 @ 100 ppm, which was at par with GA_3 @ 150 ppm and BA 100 ppm. Chakradhar and Khiratkar (2000) reported maximum flower quality with the application of GA_3 @ 100 ppm. Dekhaney *et al*. (2000) also recorded maximum bud length, bud circumference and flower diameter with the application of GA_3 (300 ppm). Gerbera plants treated with spray of GA_3 @ 150 ppm gave maximum stem length, stem girth and flower diameter (Patil, 2001). Dalal *et al*. (2009a) and Verma (2003) reported best flower quality with the application of GA_3 in chrysanthemum and carnation, respectively.

Maximum number of flowers per plant per year (46.47) was recorded with the application of GA_3 @ 100 ppm and this treatment was at par with GA_3 150 ppm where 45.60 flowers per plant per year were noted. Similar results were reported by Hashemabadi and Mohammad (2010) in rose cv. Poison with the application of GA_3 @ 200 ppm. These results are also in line with those of Dalal *et al*. (2009b) and Farina *et al*. (1989) in gerbera and Dahiya and Rana (2001) in chrysanthemum.

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Table 1
Effect of foliar spray of growth regulators and cow urine on flowering characters of rose (*Rosa hybrida*) cv. Poison.

Treatments	*Stalk initiation to flower bud initiation (days)*	*Flower bud initiation to open (days)*	*Flower longevity (days)*	*Vase life (days)*
T_1-GA_3 @ 50 ppm	24.63	11.93	12.87	8.07
T_2-GA_3 @ 100 ppm	21.90	9.60	14.60	9.87
T_3-GA_3 @ 150 ppm	22.14	10.87	14.33	9.27
T_4-BA @ 50 ppm	24.44	13.53	11.47	6.73
T_5-BA @ 100 ppm	23.24	12.40	15.60	8.27
T_6-BA @ 150 ppm	23.84	13.47	12.53	7.47
T_7-NAA @ 50 ppm	24.53	14.40	12.60	5.27
T_8-NAA @ 100 ppm	23.26	12.47	12.53	6.80
T_9-NAA @ 150 ppm	23.67	13.87	11.27	6.73
T_{10}-Cow urine-1%	26.43	14.53	9.40	5.07
T_{11}-Cow urine-2%	26.31	14.13	9.00	5.13
T_{12}-Cow urine-3%	25.10	13.80	9.67	5.20
T_{13}-Control	27.53	15.73	8.67	4.27
C.D. at 5%	1.24	1.68	1.53	0.89

Table 2
Effect of foliar spray of growth regulators and cow urine on quality and yield of rose (*Rosa hybrida*) cv. Poison.

Treatments	*Stalk length (cm)*	*Bud length (mm)*	*Bud diameter (mm)*	*Flower diameter (mm)*	*Flowers per plant per year*
T_1-GA_3 @ 50 ppm	52.61	23.25	16.32	68.63	44.60
T_2-GA_3 @ 100 ppm	55.33	25.62	17.68	71.29	46.47
T_3-GA_3 @ 150 ppm	54.65	24.90	16.93	70.61	45.60
T_4-BA @ 50 ppm	48.63	22.40	15.31	67.73	41.67
T_5-BA @ 100 ppm	52.58	24.52	16.50	69.85	43.60
T_6-BA @ 150 ppm	50.45	23.24	15.73	67.29	42.60
T_7-NAA @ 50 ppm	50.67	23.45	14.51	66.61	39.60
T_8-NAA @ 100 ppm	51.12	22.14	15.58	67.33	40.40
T_9-NAA @ 150 ppm	50.91	22.20	15.90	65.12	40.73
T_{10}-Cow urine- 1%	46.42	21.17	13.32	63.66	37.40
T_{11}-Cow urine- 2%	46.54	21.32	13.67	63.76	37.80
T_{12}-Cow urine- 3%	46.61	21.74	13.77	63.98	38.60
T_{13}-Control	45.67	20.85	12.84	62.65	36.47
C.D. at 5%	1.96	1.37	1.34	1.52	1.57

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