International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(5): 1944-1946

Received: 12-09-2019
Accepted: 30-09-2019

JS Patel
Department of Horticulture,
B. A. College of Agriculture,
Anand Agricultural University,
Anand, Gujarat, India

MM Masu
Department of Horticulture,
B. A. College of Agriculture,
Anand Agricultural University,
Anand, Gujarat, India

NI Shah
Department of Horticulture,
B. A. College of Agriculture,
Anand Agricultural University,
Anand, Gujarat, India

HC Patel
Department of Horticulture,
B. A. College of Agriculture,
Anand Agricultural University,
Anand, Gujarat, India

Correspondence
JS Patel
Department of Horticulture,
B. A. College of Agriculture,
Anand Agricultural University,
Anand, Gujarat, India

Effect of plant growth regulators on growth, flowering and flower yield of *desi* red rose (*Rosa damascena* L.)

JS Patel, MM Masu, NI Shah and HC Patel

Abstract
The experiment was carried with objective to find out effect of different plant growth regulators spray on *desi* red rose at College Flower Nursery, Department of Horticulture, B. A. College of Agriculture, AAU, Anand. During the experiments different growth regulators such as Gibberellic acid, NAA, and CCC were sprayed two times i.e. 30 and 60 days after pruning. The results of the three years pooled indicates that Gibberellic acid 150 mg/l recorded maximum plant height, number of primary branches at 45 days after pruning and same treatments had also recorded significantly higher primary and secondary branches at 90 days after pruning as well as flower diameter, weight of flowers, number of flowers per plants, shelf life and yield. While, NAA 75 mg/l was recorded significantly maximum number of secondary branches at 45 days after pruning. The significantly minimum day taken for first flower initiation was recorded with foliar spray of CCC 1000 mg/l.

Keywords: Plant growth regulators, growth, flowering, flower yield, *Rosa damascena* L.

Introduction
The rose is one of the most important commercial flower crops growing in our country and is an export oriented business fetching very high returns. Desi red rose a loose flower are used for worship, making garlands, button holes and bouquets. It is also used for preparation of rose water, rose oil, gulkand, etc. The area under rose cultivation on a commercial scale is increasing rapidly due it gives higher remuneration enterprise as compared to other flower crops. Now a days, plant growth regulators are given considerable importance for their value in regulating the various growth and development process in plant. They are useful in increasing the size and thereby increase the flower yield. Use of plant growth regulators has become more popular in increasing the flower yield and quality particularly in flower crops. Therefore, the present investigation entitled "Effect of plant growth regulators on growth, flowering and flower yield of *desi* red rose (*Rosa damascena* L.) was taken up in middle Gujarat climatic conditions.

Material and methods
The present investigation was conducted in College Flower Nursery, Department of Horticulture, B. A. College of Agriculture, AAU, Anand during October, 2014 to September 2017. The experiment was conducted in randomized block design with plot size 3.0 x 2.7 m (6 plants/ plot) in 3 replications. The treatments were T_1 - GA_3 100 mg/l, T_2 - GA_3 150 mg/l, T_3 - GA_3 200 mg/l, T_4 - CCC 750 mg/l, T_5 - CCC 1000 mg/l, T_6 - NAA 25 mg/l, T_7 - NAA 50 mg/l, T_8 - NAA 75 mg/l and T_9 - Control (Water Spray). PGRs were applied two times by spraying 30 and 60 days after pruning of rose plants every year. 3 kg of FYM/plant after pruning and 40:40:25 g NPK/plant + Azosprillum 1 ml/plant + PSB 1 ml/plant in three splits (June–October–January) were applied. Plant height, plant spread (N-S and E-W), number of primary and secondary branches per plant were recorded at 45 and 90 days after pruning. Flower initiation was recorded after pruning, while flower diameter (cm) and shelf life of flower (hrs) were recorded at peak flowering time. Different yield parameters like number of flowers/plant, weight of flower, flower yield per plant and flower yield per hectare were also recorded. The data presented were pooled of the three years i.e. 2014-15, 2015-16 and 2016-17.

Result & discussion

It is evident from three year pooled data presented in Table-1 that there was significant effect of different plant growth regulators on plant height, primary branches and secondary branches of desi red rose.

The significantly maximum plant height (76.53) at 45 days after pruning, number of primary branches (7.52 and 9.16) at 45 and 90 days after pruning were recorded with foliar spray of GA_3 150 mg/l (T_2). Whereas, there was non-significant differences on plant height at 90 days after pruning in of desi red rose. While, secondary branches was significantly higher under foliar spray of NAA 75 mg/l (23.79) and GA_3 150 mg/l (27.54) treatment (T_8) at 45 and 90 days after pruning, respectively. It might be due to gibberellic acid may help for cell division and cell elongation which enhanced vegetative growth parameters *i.e.* plant height, number of primary branches and secondary branches. Similar results also found in growth parameters were also obtained by Dalal *et al.*, (2009) [2] and Sangma *et al.* (2017) [5] in gerbera.

From three year pooled data presented in Table-2 revealed that there was found significant effect of different plant growth regulators foliar spray on first flower initiation of desi red rose. The significantly minimum day taken for first flower initiation was recorded with foliar spray of CCC 1000 mg/l (T_5).

Table 1: Effect of plant growth regulators on plant height, number of primary and secondary branches at 45 and 90 days after pruning of desi red rose

Treatments	Plant height (cm)		Number of primary branches		Number of secondary branches	
	45 DAP	90 DAP	45 DAP	90 DAP	45 DAP	90 DAP
T_1	74.85	111.97	5.71	6.61	18.48	24.14
T_2	76.53	113.71	7.52	9.16	22.53	27.54
T_3	75.46	106.93	6.19	7.31	20.05	25.60
T_4	70.40	107.72	6.35	7.39	16.55	19.86
T_5	66.02	108.12	5.33	6.55	14.65	18.06
T_6	69.20	109.26	5.33	6.19	19.58	23.75
T_7	66.18	105.36	5.36	6.66	18.83	22.91
T_8	70.29	108.83	6.13	7.08	23.79	27.44
T_9	63.38	104.01	5.18	5.60	13.64	19.95
S.Em±	2.46	2.69	0.29	0.46	1.38	1.66
CD at 5%	6.96	NS	0.81	1.30	3.91	4.97
CV%	10.80	7.94	14.72	21.57	21.65	13.18
Interaction (YxT)						
S.Em±	4.38	-	0.50	0.87	2.34	1.77
CD at 5%	NS	-	NS	NS	NS	5.04

Table 2: Effect of plant growth regulators on first flower initiation, flower diameter and weight of flower after pruning of desi red rose

Treatments	First flower initiation (days)	Flower diameter (cm)	Weight of flower (g)
T_1	37.23	3.80	4.47
T_2	36.93	4.00	4.71
T_3	38.38	3.77	4.36
T_4	37.26	3.85	3.95
T_5	36.78	3.63	4.03
T_6	38.69	3.83	3.94
T_7	39.90	3.64	3.80
T_8	40.54	3.62	3.63
T_9	43.12	3.35	3.29
S.Em±	0.77	0.12	0.15
CD at 5%	2.17	0.34	0.45
CV%	5.91	10.56	7.21
Interaction (YxT)			
S.Em±	1.32	0.23	0.16
CD at 5%	NS	NS	0.47

The result of three year pooled data presented in Table-2 indicated that significant influenced of foliar spray of different plant growth regulators on flower diameter and weight of flower of desi red rose. The significantly maximum flower diameter (4.00 cm) and weight of flower (4.71 g) were obtained with foliar spray of GA_3 150 mg/l (T_2) in desi red rose. It is due to fact that GA_3 increased plant growth supporting for more accumulating carbohydrate in plant body which leads to early flower bud initiation as well as bud opening, later which results in lengthening of flowering span. The similar result was also obtained by Chauhan *et al.*, (2014) [1] in gerbera and Parekh *et al.* (2010) [3] in chrysanthemum.

Table 3: Effect of plant growth regulators on number of flowers per plant, shelf life, yield per plant and yield per hectare of desi red rose

Treatments	Number of flowers per plant	Shelf life (hrs)	Yield per plant (g)	Yield per hectare (t/ha)
T_1	367.56	11.60	1647.55	11.81^{ab}
T_2	378.27	13.33	1791.65	12.91^{a}
T_3	352.67	10.76	1543.85	11.10^{ab}
T_4	356.17	10.61	1416.16	10.19^{bc}
T_5	343.25	8.40	1384.60	9.96^{bcd}
T_6	316.57	9.11	1262.54	9.12^{cd}
T_7	313.67	10.44	1193.69	8.57^{cde}
T_8	308.34	11.31	1137.90	8.22^{de}
T_9	261.13	7.44	978.89	7.25^{e}
S.Em±	13.65	0.25	74.50	0.55
CD at 5%	40.93	0.70	223.35	Sig
CV%	8.05	6.56	9.89	10.02
Interaction (YxT)				
S.Em±	15.47	0.39	78.41	0.57
CD at 5%	44.04	NS	223.14	1.63

The three year pooled data presented in Table-3 revealed that there were significant effect of different plant growth regulators on number of flower per plant, shelf life, yield per plant and yield per hectare of desi red rose. Foliar spray of $GA_3$150 mg/l (T_2) was most effective growth regulator and which was recorded significantly maximum number of flowers per plant (378.27), shelf life (13.33 days), yield per plant (1791.65 g) and yield per hectare (12.91 t/ha) of desi red rose. Similar result also obtained by Salem *et al* (2016) [4] in gerbera.

The increase in yield of flowers might be due fact that, gibberellic acid treated plants produced more number of leaves which might have resulted in production and accumulation of more photosynthesis that were diverted to the sink resulting in more number of flowers. These results are in close conformity with the findings of Dalal *et al.,* (2009) [2] in gerbera and Parekh *et al.,* (2010) [3] in chrysanthemum.

Conclusion

The result obtained from experiment that foliar spray of gibberellic acid 150 mg/l water at 30 and 60 days after pruning was most effective treatment for getting vigorous growth i.e. plant height, number of primary and secondary branches, maximum yield attribute parameters i.e. early flower initiation, flower diameter, weight of flowers, numbers of flowers, yield and improved the flower quality i.e. shelf life of *desi* red rose.

Reference

1. Chauhan RV, Kav KP, Babariya VJ, Pansuria PB, Savaliya AB. Effect of gibberellic acid on flowering and cut flower yield in gerbera under protected condition. Asian Journal of Horticulture. 2014; 9(2):404-407.
2. Dalal SR, Somavanshi AV, Karale GD. Effect of gibberellic acid on growth, flowering, yield and quality of gerbera under polyhouse condition; International journal of agriculture sciences, 2009; 5(2):355-356.
3. Parekh NS, Patel HC, Sitapara HH, Parmar AB, Nayee DD. Response of nitrogen, phosphorus and potash on growth and flower production of chrysanthemum (*Chrysanthemum morifolium* Ramat). The Asian J. of Hort. 2010; 5(1):139-142
4. Salem RAA, Saravanan S, Prasad VM. Effect of gibberellic acid spraying on yield and flowers of gerbera (*Gerbera jamesonii*) c.v Dennis. International journal of scientific research. 2016; 5(3):2277-8179.
5. Sangma ZCN, DS, Urfi F. Effect of Plant Growth Regulators on Growth, Yield and Flower Quality of Gerbera (*Gerbera jamesonii* L.) cv. Pink Elegance under Naturally Ventilated Polyhouse (NVPH). Int. J Curr. Microbiol. App. Sci. 2017; 6(10):468-476.