



Effect of plant growth substances on growth, fruit setting and yield of pomegranate cv. SINDURI

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Abstract : The present investigation of plant growth substances on fruit setting, yield and other components were carried out on pomegranate. Out of 15 treatments, two treatments viz. NAA 50 ppm and Ethrel 200 ppm were found effective for fruit setting, yield and for other components. Application of NAA 50 ppm was found effective in increasing number of fruits per tree, fruit weight, yield, number of stem at the time of pruning, number of hermaphrodite flower, number of fruit per plant and minimum fruits drop per plant. And application of Ethrel 200 ppm was superior for minimum days taken for first ripe fruits, maximum sex ratio and minimum number of male flower.

Key Words : Pomegranate, PGRs, Fruit setting, Yield

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INTRODUCTION

Pomegranate (*Punica granatum* L.) is an important tropical fruit belongs to family Punicaceae. It is originated from Persia, Afghanistan and Baluchistan and it is found well established in the western region of India. Fruits are large round or globose and modified berry with tough golden or orange rind. Seeds are numerous surrounded by acidic juicy pulp known as 'aril' which is an edible portion. Dried seeds with pulp are called Anar-dana which is an important condiment. The importance of synthetic plant growth regulators in achieving higher yield and better quality of horticultural crop has been well recognized in recent time. Plant growth regulators have given encouraging results in case of pomegranate fruit crop. However, practically, there has been very little work done on use of plant growth regulators in pomegranate crop in Gujarat state.

MATERIALS AND METHODS

The experiment was conducted in pomegranate orchard planted at 3 x 3 m distance in Department of Horticulture, C. P.

College of Agriculture, S.D. Agricultural University, Sardarkrushinagar. The experimental trees were four year old. Total 15 different treatments of 2,4-D, NAA, GA₃ and Etherel were used in pomegranate orchard with three replications and Randomized Block Design was used as a experimental design. Two spray of 2,4-D, NAA, GA₃ and etherel i.e. 1st spray of 2,4-D, NAA, GA₃ and ethrel treatments just after pruning, in 2nd fortnight of September and 2nd spray of GA₃ 25 ppm was done at the time of minimum 20 number of fruit sets on the plant were used.

RESULTS AND DISCUSSION

In Table 1, maximum number of stem at the time of pruning was observed when application of NAA 50 ppm was done on pomegranate and recorded result was non-significant. The data indicated that significantly the minimum days taken for first ripe fruit (152.33 days) was obtained by treatment T₈ (Ethrel 200 ppm), which was at par with the treatment T₇ (Ethrel 100 ppm), while maximum days taken for first ripe fruit (197.00 days) was noted in control (water spray). Results indicated that the effect of different levels of plant growth regulators

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Table 1 : Effect of 2,4-D, NAA, GA₃ and ethrel on different characters in pomegranate

Sr. No.	Treatments	No. of stems per plant	Days taken for first ripe fruit	No. of fruits per plant	Average weight of fruit (g)	No. of male flowers per plant	No. of hermaphrodite flowers per plant	Sex ratio	Fruit drop (%)	Fruit yield (kg/plant)
T ₁	2,4-D 5 ppm	2.33	173.33	34.00	154.00	67.67	33.00	0.48	13.00	5.20
T ₂	2,4-D 10 ppm	2.00	175.00	35.00	158.00	66.00	35.00	0.53	12.00	5.57
T ₃	NAA 25 ppm	1.97	172.00	45.50	200.00	70.67	41.67	0.58	10.00	9.10
T ₄	NAA 50 ppm	2.80	169.67	47.67	210.00	66.00	45.00	0.68	7.00	10.08
T ₅	GA ₃ 25 ppm	2.33	167.00	39.00	180.00	68.67	32.00	0.46	22.00	7.02
T ₆	GA ₃ 50 ppm	1.98	168.00	40.00	185.00	73.67	33.93	0.46	27.00	7.40
T ₇	Ethrel 100 ppm	1.99	164.00	43.00	190.00	61.33	36.00	0.58	14.00	8.17
T ₈	Ethrel 200 ppm	1.95	152.33	44.00	195.00	57.33	41.33	0.72	10.00	8.73
T ₉	2,4-D 5 ppm + GA ₃ 25 ppm	1.97	175.00	36.00	160.00	73.00	33.00	0.45	18.00	5.76
T ₁₀	2,4-D 10 ppm + GA ₃ 25 ppm	2.33	175.67	37.00	162.00	63.00	37.00	0.58	14.00	6.00
T ₁₁	NAA 25 ppm + GA ₃ 25 ppm	2.33	168.33	38.00	186.00	78.00	37.00	0.47	22.00	7.07
T ₁₂	NAA 50 ppm + GA ₃ 25 ppm	1.96	167.33	39.00	188.00	73.00	40.00	0.54	13.00	7.33
T ₁₃	Ethrel 100 ppm + GA ₃ 25 ppm	1.90	177.67	36.00	182.00	73.00	38.00	0.52	16.00	6.55
T ₁₄	Ethrel 200 ppm + GA ₃ 25 ppm	2.00	169.00	36.67	184.00	66.00	40.33	0.61	8.00	6.80
T ₁₅	Control	2.00	197.00	28.00	143.33	85.33	31.00	0.36	32.00	4.00
	S.E.(±)	0.16	5.01	1.40	7.39	1.98	1.41	0.02	1.09	0.49
	C.D. at 5%	NS	14.51	4.05	21.39	5.73	4.07	0.07	3.16	1.41
	C.V. %	13.12	5.06	6.29	7.17	4.93	6.59	7.88	11.93	12.05

on number of fruits per plant was found to be significant. The maximum number of fruits per plant (47.67) was recorded in the T_4 treatment (NAA 50 ppm), which was at par with the treatment T_3 (NAA 25 ppm) and treatment T_8 (Ethrel 200 ppm), while the treatment T_{15} (control) recorded minimum number of fruits per plant (28.00).

An application of plant growth regulators significantly increased the average weight of fruit. The maximum average weight of fruit (210.00 g) was observed in the treatment T_4 (NAA 50 ppm), which was at par with the treatments T_3 (NAA 25 ppm), T_7 (Ethrel 100 ppm) and T_8 (Ethrel 200 ppm), while the minimum average weight of fruit (143.33 g) was noted in the treatment T_{15} (Control). These results are in agreement with the findings of Rao *et al.* (1974) and Singh and Chundawat (1978) in grape.

Significantly the lowest number of male flowers (57.33) was recorded with the application of treatment T_8 (Ethrel 200 ppm), which was at par with the treatment T_7 (Ethrel 100 ppm) and T_{10} (2,4-D 10 ppm + GA₃ 25 ppm). Significantly the highest number of male flowers (85.33) was recorded with the treatment T_{15} (Control). Significantly the highest number of hermaphrodite flowers (45.00) was recorded with the application of treatment T_4 (NAA 50 ppm), which was at par with the treatment T_3 (NAA 25 ppm) and T_8 (Ethrel 200 ppm). Significantly the lowest number of hermaphrodite flowers (31.00) was recorded with the treatment T_{15} (control), which was at par with T_1 (2,4-D 5 ppm), T_2 (2,4-D 10 ppm), T_5 (GA₃ 25 ppm), T_6 (GA₃ 50 ppm) and T_9 (2,4-D 5 ppm + GA₃ 25 ppm). In case of ethrel 200 ppm investigation number of male flower decreased and number of hermaphrodite flowers increased with treatment NAA 50 ppm. These results are in agreement with Ahire *et al.* (1994) in pomegranate.

The highest sex ratio (0.72) was observed with spraying of ethrel 200 ppm (T_8), which was at par with the treatment T_4 (NAA 50 ppm), while the treatment T_{15} (Control) gave the

lowest sex ratio (0.36). Significantly the minimum fruit drop (7.00 %) was observed with spraying of NAA 50 ppm (T_4), which was at par with the treatment T_3 (NAA 25 ppm) and treatment T_8 (Ethrel 200 ppm), while the treatment T_{15} (Control) gave the maximum fruit drop (32.00 %). These results are in agreement with the findings of Rajput *et al.* (1977) in guava, Bal *et al.* (1982) in ber. In the present studies, it was observed that NAA increased the yield over other treatments. NAA rapidly increased the number of leaves, shoots and length of shoots. Similar observations were earlier reported by Yadav *et al.* (2001) in guava. An application of plant growth regulators significantly increased yield of pomegranate fruits. The maximum yield per plant (10.08 kg) was recorded with treatment T_4 (NAA 50 ppm), which was at par with treatment T_3 (NAA 25 ppm) and treatment T_8 (Ethrel 200 ppm). Whereas, the treatment T_{15} (Control) recorded minimum yield per plant (4.00 kg).

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