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Short Communication

EFFECT OF PLANT GROWTH REGULATORS ON FRUIT CHARACTERS AND YIELD OF POMEGRANATE (PUNICA GRANATUM L.) CV.GANESH

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ABSTRACT: An investigation was carried out during 2008-09 to study beneficial effects of plant growth regulators on fruit characters and yield in pomegranate cv. Ganesh. Nine treatments with three growth regulators, viz., NAA at 20, 30 and 40 ppm; 2,4-D at 20, 30 and 40 ppm, GA3 at 25, 50 and 75 ppm and control (water spray) were sprayed three times starting at full bloom and, subsequently, at 45 and 90 days after fruit set. Results revealed that application of 2,4-D at 40 ppm gave significantly high fruit size in length, breadth and volume and higher fruit weight (262.23g), higher aril percent, maximum number of fruits (64.00) which resulted in highest fruit yield of 16.78 kg/plant, as against 7.41 kg in the control.
Key words: Pomegranate, growth regulators, fruit size, aril percent, yield.

INTRODUCTION

Pomegranate (*Punica granatum* L.*)* belongs to the family punicaceae and it is one of the favourite table fruits in the world, for its refreshing juice with nutritional and medicinal properties. This fruit crop has wide adaptability and it grows in tropical, sub-tropical and even temperate regions. In India, pomegranate is commercially cultivated in Maharashtra and parts of Karnataka where good quality fruits are produced due to dry and hot climate. Recently the area under pomegranate in Andhra Pradesh is growing in a large extent due to its drought hardy nature, wider adaptability and suitability to marginal lands. 'Ganesh' a promising selection from Maharastra has gained popularity by virtue of its larger fruit, pink and sweet aril and soft seed character. Due to non adoption of improved cultivation practices and several other horticultural practices, the growth and development of fruit, yield and quality are generally poor. Among different elite horticultural practices, growth regulators have been advantageously used in the recent time to increase the fruit production and to improve the quality of several other fruit crops. Hence, an attempt has been made to find suitable growth regulators and their doses for improving fruit size, aril development and yield in pomegranate cv. Ganesh.

MATERIALS AND METHODS

The experiment was conducted at model orchard, College of Horticulture, Rajendranagar, Hyderabad during 2008-09 on Ganesh planted at a spacing of 4.5 x 3.0 m. The experiment was laid out in a Randomized Block Design with different concentrations of three growth regulators at three levels with a control (water sprays) comprising of 10 treatments replicated thrice. The growth regulators were sprayed thrice. Two plants were sprayed in each treatment. The first spray was given at the time of flowering and again at 45 and 90 days after fruit set. Fruits were collected after attaining maturity and observations were recorded on fruit length, girth, volume, fruit weight, aril weight, aril percent. The mean yield per tree in number of fruits and weight were also recorded. The data were statically analyses and interpreted.

RESULTS AND DISCUSSION

Fruit size

Length, diameter and volume of the fruits were superior with the application of 2, 4-D 40 ppm (8.85 cm, 8.91 cm and 291.50 ml respectively). As the concentrations of these three growth regulators increased the fruit length and diameter also increased accordingly. This can be attributed to nature of auxins to increase the osmotic pressure of cell sap which is responsible for uptake of water and consequently results in increased growth. Many workers have reported similar results with the application of 2, 4-D in pomegranate [10], sweet orange [3] and in Pant Lemon-1 [2].

Fruit weight

Different growth regulator treatments resulted in an increase in the fruit weight of pomegranate. Maximum fruit weight (262.23 g) was obtained with the spray of 2, 4-D 40 ppm followed by GA_3 75 ppm (250.43 g). 2, 4-D increased the fruit weight with increase in its concentration (Table 1). The higher fruit weight in 2, 4-D treatments could be attributed to its favourable effect on fruit characters, viz., fruit length, diameter and volume. The increase in fruit weight due to application of 2, 4-D was reported in pomegranate cv. Mridula [10] and in Pant lemon-1 [7].

Table 1: Effect of plant growth regulators on fruit characters and yield of pomegranate cv. Ganesh

S.No.	Treatments	Fruit Length (cm)	Fruit diameter (cm)	Fruit Volume (ml)	Fruit weight (g)	Aril weight (g)	Aril percent (%)	No.of fruits tree^{-1}	Yield tree^{-1} (kg)
1.	NAA20 ppm	7.06	7.13	195.33	174.57	99.9	57.22	53.17	9.28
2.	NAA30 ppm	7.30	7.33	201.03	181.00	104.70	57.84	**61.50**	11.13
3.	NAA40 ppm	8.41	8.45	244.93	221.67	148.53	67.01	**63.17**	**14.00**
4.	2, 4-D20 ppm	7.57	7.59	216.17	192.67	117.67	61.07	57.00	10.98
5.	2, 4-D30 ppm	**8.49**	**8.62**	**262.13**	**235.57**	**160.73**	**68.23**	59.33	13.98
6.	2, 4-D40 ppm	**8.85**	**8.91**	**291.50**	**262.23**	**188.90**	**72.03**	**64.00**	**16.78**
7.	$GA_3$25 ppm	7.75	7.78	231.80	209.57	135.80	64.80	52.33	10.96
8.	$GA_3$50 ppm	8.39	8.53	245.03	223.10	150.70	67.55	55.50	12.38
9.	$GA_3$75 ppm	**8.69**	**8.74**	**282.30**	**250.43**	**175.77**	**70.19**	56.17	**14.06**
10.	Control	6.67	6.76	191.77	169.07	93.70	55.42	43.83	7.41
	S. Ed ±	**0.12**	**0.125**	**1.89**	**2.09**	**2.33**	**0.59**	**5.16**	**1.64**
	C.D. at 5%	**0.25**	**0.264**	**4.00**	**4.43**	**4.94**	**1.24**	**10.92**	**3.47**

Aril weight and aril percent

Different growth regulator treatments resulted in significant increase in aril weight, aril ratio and number of arils per fruit of pomegranate over control. The aril weight, aril percent were high in 2, 4-D 40 ppm followed by GA_3 75 ppm. NAA also significantly improved the aril weight, aril ratio and number of arils over control but it was less effective than 2, 4-D and GA_3. These findings are in line with earlier studies [6, 10] in pomegranate.

Yield of fruits

The highest number of fruits per tree (64.00) recorded with 2, 4-D 40 ppm. This increase might be due to reduced fruit drop and higher fruit retention till maturity. Similar results were reported earlier in mango (9) and in sweet orange (3). A significant increase in number of fruit per tree was also recorded in NAA treatments next to 2, 4-D. These results are in agreement with the earlier studies in pomegranate [10] and in mango (8). Highest yield was obtained with the spray of 2, 4-D 40 ppm (16.78 kg/tree). Increased number of fruits per tree and increased fruit size and weight might have contributed towards increase in yields due to growth regulators application. 2, 4-D treatments proved to increase total yields in other fruits like mango (9 1977), in Nagpur Santra (Ghosh and Chattopadhyay 1994; Ansari *et al* 2008), and in Khasi mandarins (Dubey, 2002).

CONCLUSION AND RECOMMENDATION

Among all the growth regulators tested, 2, 4-D 40 ppm was found to be superior followed by GA_3 75 ppm. Though NAA also improved the fruit size, aril development and yield characters of the fruits, it was found to be less effective than 2, 4-D and GA_3. From the present study it was concluded that 2, 4-D 40 ppm could be used under the agro-climatic conditions of Hyderabad to increase fruit size, aril development and yield of pomegranate fruits. The next better treatment to 2, 4-D was GA_3 75 ppm to increase fruit size and yield.

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