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Effect of Plant Growth Regulators (PGR) on flowering and fruiting of Pomegranate (*Punica granatum L.*) cv. Bhagwa under Prayagraj agro - climatic condition

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ABSTRACT

The present experiment carried out during 2020 in Central research field of Department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj, The experiment was conducted in Randomized Block Design (RBD) with 10 Treatments and 3 Replications they are as follows : T_0 Control, T_1 GA_3 50 ppm, T_2 GA_3 75 ppm, T_3 GA_3 100 ppm, T_4 NAA 40 ppm, T_5 NAA 50 ppm, T_6 NAA 60 ppm, T_7 Ethrel 25 ppm, T_8 Ethrel 50 ppm, T_9 Ethrel 75 ppm. The main objectives of the research is to study effect of Plant Growth Regulators (PGR) on flowering and fruiting of pomegranate cv. Bhagwa. To evaluate the economics of different treatment. on the basis of result obtained in the present investigation it is concluded that the Plant growth regulators revealed that T_3 GA_3 100 ppm was to be most effective for obtaining superior plant height (m)(4.99), Number of branches (13.03), Leaf area (cm^2) (11.78), Number of flowers (167.46), number of fruits (67.18), fruit weight (g)(249.06), Diameter of fruits (cm)(9.41), yield ($t\ ha^{-1}$)(16.73) and benefit cost ratio was found to be superior with T_3 GA_3 (2.41).

Key words : *Pomegranate, PGR, Growth, Yield*

Introduction

Pomegranate (*Punica granatum L.)* is one of the oldest known edible fruits and it is capable of growing in different agro - climatic conditions ranging from tropical to sub- tropical (Levin, 2006; Jalikop, 2007). Pomegranate belongs to family Punicaceae and is native to Persia (Iran), Afganistan and Baluchistan (De Candole, 1967). It is referred as 'super fruit' because of its high nutritive value, high antioxidant capacity capacity, high potentially bioactive compounds, chemo- preventive properties having medicinal value and high consumer's appeal (Hetog *et al*., 1997). Edible part of pomegranate comprise of 78% juice and 22% seed. The variety Ganesh, Bhagwa cultivated in Maharastra is suitable for export purposes. It is highly remunerative crop for replacing subsistence farming and alleviating poverty. The pomegranate is both self and cross - pollinated by insects, mainly bees, wind pollination is reported to occur by infrequently.

Pomegranate produces flowers in three main seasons known as ambe bahar(January - February), mrig bahar (June - July) and hasta bahar(September - October). Only one bahar in a year is advisable for regulation of flowering and fruiting to maintain productivity and to get prolific harvest at a specific time. In assured rainfall areas (June - September), flowering in June - July is advantageous, while the areas where monsoon starts late in August ,flower-

ing during August is beneficial. Areas having assured irrigation facilitates during April and May, flowering during January can be considered and where monsoon withdraws by September, induction of flowering in October is possible.

Plant Growth Regulators are used to improve fruit size and quality, extended the storage life and to increase profitability in some fruits. They have key role in different physiological processes related to growth and development of crops. Plant Growth Regulators have been used for beneficial effects like fruit size, appearance and aril quality, i.e to improve physical characteristics and fruit quality of pomegranate.

Treatments details

S. No.	Treatment notation	Treatment Details
1.	T_0	Control
2.	T_1	GA_3 50 ppm
3.	T_2	GA_3 75 ppm
4.	T_3	GA_3 100 ppm
5.	T_4	NAA 40 ppm
6.	T_5	NAA 50 ppm
7.	T_6	NAA 60 ppm
8.	T_7	Ethrel 25 ppm
9.	T_8	Ethrel 50 ppm
10	T_9	Ethrel 75 ppm

Meterials and Methods

The experiment carried out at the central research field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, 2020 - 2021.

Parameters Studied

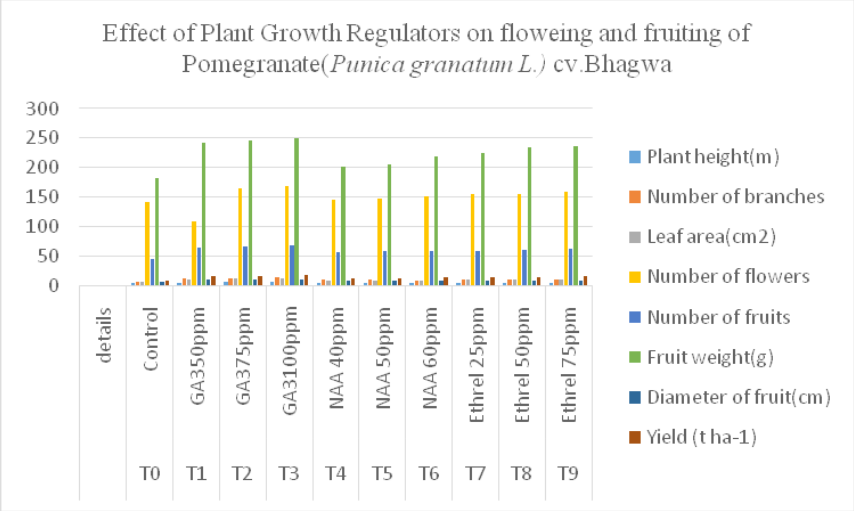
Plant height (cm), Number of branches, Leaf area (cm^2), Number of flowers, Number of fruits, Fruit weight (g), Diameter of fruit(cm), Yield (t ha^{-1}). The total cost of production (INR) was recorded along with the selling price. The net price income(INR) is determined by substracting the selling price price (INR) with the total cost of production.

Results and Discussion

A field experiment entitled 'Effect of plant growth regulators (PGR) on flowering and fruiting of well established Pomegranate (*Punica granatum* L.) cv. Bhagwa under the Praygaraj Agro-Climatic Condition'. The results obtained in the present investigations with respect to growth and fruit yield parameters are presented in the Table 1. Maximum plant height (m) (3.84 and 4.99) was observed in T_3 GA_3 100ppm, minimum plant height (m) (2.76 and 3.49) was recorded in T_0 Control. Maximum number of branches (8.50 and 13.03) was observed in T_3 GA_3 100 ppm, minimum number of branches (3.65 and 5.33) was recorded in T_0 Control. Maximum leaf area (cm^2) (11.78) was observed in T_3GA_3 100ppm, minimum leaf area (cm^2) (5.54) was recorded in T_0 Control. Maximum number of flowers (167.46) was observed in T_3GA_3 100 ppm, minimum number of

Table 1. Effect of Plant Growh Regulators (PGR) on flowering and fruiting of Pomegranate (*Punica granatum* L.) cv. Bhagwa.

Treatment notation	Treatment details	Plant height (m)	Number of branches	Leaf area (cm^2)	Number of flowers	Number of fruits	Fruit weight (g)	Diameter of fruit (cm)	Yield (t ha^{-1})
T_0	Control	3.49	5.33	5.54	141.27	44.02	181.43	6.63	7.99
T_1	$GA_3$50ppm	4.81	10.81	10.32	109.25	63.32	242.47	9.14	15.35
T_2	$GA_3$75ppm	4.90	12.14	10.82	163.62	65.03	245.26	9.22	15.95
T_3	$GA_3$100ppm	4.99	13.03	11.78	167.46	67.18	249.06	9.41	16.73
T_4	NAA 40ppm	4.17	9.01	6.99	144.36	56.16	200.42	7.41	11.26
T_5	NAA 50ppm	4.38	8.83	8.30	147.00	57.54	205.87	7.54	11.84
T_6	NAA 60ppm	4.36	8.52	8.57	150.06	58.63	218.56	7.93	12.82
T_7	Ethrel 25ppm	4.56	8.71	9.55	155.13	58.72	224.89	8.22	13.21
T_8	Ethrel 50ppm	4.65	9.66	9.45	154.84	59.73	233.39	8.44	13.94
T_9	Ethrel 75ppm	4.71	9.99	9.92	157.83	61.37	237.05	8.57	14.55
	F- Test	S	S	S	S	S	S	S	S
	C.D at 0.5%	0.489	0.832	0.778	3.122	2.642	6.434	0.729	0.746
	S.ED(±)	0.233	0.396	0.370	1.486	1.257	3.062	0.347	0.355



Chat 1. Effect of Plant Growth Regulators (PGR) on flowering and fruiting of Pomegranat (*Punica granatum* L.) cv. Bhagwa

flowers production (141.27) was recorded in T_0 Control. Maximum number of fruits (67.18) was observed in T_3 GA_3 100ppm, minimum number of fruits (44.02) was recorded in T_0 Control. Maximum fruit weight (g) (249.06) was observed in T_3 GA_3 100ppm, minimum fruit weight(g) (181.43) was recorded in T_0 Control. Maximum Diameter of fruit (cm) (9.41) was observed in T_3 GA_3 100ppm, minimum Diameter of fruit (cm) (6.63) was recorded in T_0 Control. Maximum yield (t ha^{-1}) (16.73) was observed in T_3 GA_3 100 ppm, minimum yield(t ha^{-1}) (7.99) was recorded in T_0 Control.

Conclusion

on the basis of result obtained in the present investigation it is concluded that the Plant growth regulators revealed that T_3 GA_3 100 ppm was to be most effective for obtaining superior plant height (m), Number of branches, Leaf area(cm^2), Number of flowers, number of fruits, fruit weight (g), Diameter of fruits(cm), yield (t ha^{-1}), and benefit cost ratio was found to be superior with T_3 GA_3.

References

Abdolali, H. and Gholamreza, A. 2010. Effect of some plant growth regulators on physiochemical characteristics of datepalm (*Phoenix dactylifera* L.) cv. Kabkab fruit. *American-Eurasian J. Agric. Envi. Sci.* 7(3): 277-288.

Ashutosh, A., Rajesh, T. and Singh, O. P. 2013. Effect of crop regulators on growth, yield and quality of guava. *Ann. Plant and Soil Res.* 15(1) : 54-57.

Bhati, B. S. and Yadav, P. K. 2003. Effect of foliar application of urea and NAA on the quality of ber (*Ziziphus mauritiana* Lam.) cv. Gola. *Haryana J. Hort. Sci.* 32(1): 32-33.

Borah, S. K. and Mohan, N. K. 1995. Regulation of flowering, yield and quality in pineapple (*Ananas comosus* L.) with plant growth regulators. *South Indian Hort.* 43(2) : 5-9.

Chavan, S. R., Patil, M. B., Phad, G. N. and Suryawanshi, A. B. 2009. Effect of growth regulators on flowering and yield of sapota [*Manilkara achras* (Mill.) Forsberg]. *The Asian J. Hort.* 4(1): 119-120.

Dutta, P., Kundu, S. and Ahmed, B. 2008. Effect of plant bioregulators on fruit quality and mineral composition of ripe mango cv. Himsagar. *Indian Agric.* 52(3): 107-111.

Ghosh S.N., Bera1 B., Roy S. and Kundu A. 2009. Effect of plant growth regulators in yield and fruit quality in pomegranate cv. Ruby. *J. Hortl. Sci.* 4 (2) : 158-160.

Ghosh, S. N., Bera, B., Ray, S. and Kundu, A. 2009. Effect of plant growth regulators in yield and fruit quality in pomegranate cv. Ruby. *J. Hort. Sci.* 4(2): 158-160.

Goswami, J. D., Patel, N. M., Bhadauria, H. S. and Wankhade, V. R. 2013. Effect of plant growth substances on growth, fruit setting and yield of pomegranate cv. Sindhuri. *Int. J. Agric. Sci.* 1(9) : 332-334.