Int.J.Curr.Microbiol.App.Sci (2020) *9*(11): 2181-2185

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 9 Number 11 (2020)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2020.911.259

Effect of Nitrogen, Potash and Boron on Plant Growth, Flowering, Fruit Drop and Fruit Setting of Pomegranate (*Punica granatum*) cv. Bhagwa

Kuldeep* and V. M. Prasad

Department of Horticulture, Sam Higginbottom University of Agriculture, Technology & Sciences Allahabad (U.P), India

**Corresponding author*

Keywords

Guava, Fruit quality, Boric Acid, Zinc sulphate

Article Info

Accepted:
20 October 2020
Available Online:
10 November 2020

A B S T R A C T

The present investigation entitled "Effect of Nitrogen, Potash and Boron on plant growth, flowering, fruit drop and fruit setting of Pomegranate (*Punica granatum*) cv. Bhagwa" was carried out at the field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during the year 2019-20. The present experiment was conducted in Randomized Block Design having 10 treatments which were replicated 3 times. The biometrical observations were recorded on three randomly selected plants of each treatment to assess the effect of treatments on growth and flowering of Pomegranate. The observation revealed that with application of N 1% + K 1% + B 0.50 gave maximum plant height (3.01 m), plant spread (239 cm^2), number of leaves (653.53), number of branches (15.17), length of Internodes (22.03 cm), stem diameter (4.04 cm), leaf area (7.07 cm^2), plant canopy (1.99 cm^2), number of flowers/plant (73.12), better fruit Set (68.71%) and chlorophyll content (21.40) among the treatments. It may be concluded that boron and Potash with nitrogen may be used for obtaining flower and fruit setting with higher chlorophyll content.

Introduction

Pomegranate (*Punica granatum* L.) belongs to the family Punicaceae, subclass Rosidae and order Myrtales, is the only known genus of the family. India is one of the largest producers of Pomegranate in the world. In India, pomegranate is commercially cultivated in Maharashtra and Karnataka. During 2018-19 pomegranate was cultivated over 161.04 thousand ha land with an annual production of1914.16thousand tonnes in India At present, Maharashtra with an area of 99.41 thousand ha is the leading state with the production of 1582.95 thousand tonnes Pomegranate annuall. Other major Pomegranate growing states are Karnataka, Gujarat and Andhra Pradesh. In recent years, Pomegranate cultivation has also been started in Rajasthan, Orissa, Chhattisgarh, Uttarakhand and Madhya Pradesh at small scale. Pomegranate is currently ranked 10th in terms of fruit consumed annually in the world.

Pomegranate is a high value crop, mostly used as fresh fruit, and up to some extent for

processing purposes. It has a long shelf life and is an ideal fruit for long distance transport and prolonged storage. Entire tree of Pomegranate is of great economic importance. Apart from its demand for fresh fruits and juice, the processed products like wine and candy are also gaining importance in world trade. All parts of pomegranate tree have great therapeutic value and use in leather and dying industry.

Demand in the international market has widened the scope for earning higher dividends from this crop. Pomegranate seeds are used as a spice known as *anardana*, most notably in Indian and Pakistani cuisine. Dried whole seeds can often be obtained in ethnic Indian subcontinent markets.

These seeds are separated from the flesh, dried for 10–15 days, and used as an acidic agent for chutney and curry preparation. Ground *anardana* is also used, which results in a deeper flavoring in dishes and prevents the seeds from getting stuck in teeth. Seeds of the wild Pomegranate variety known as *daru* from the Himalayas are regarded as quality sources for this spice.

Materials and Methods

The present investigation entitled "Effect of Nitrogen, Potash and Boron on plant growth, flowering, fruit drop and fruit setting of Pomegranate (*Punica granatum*) cv. Bhagwa" was carried out at the field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during the year 2019-20. The present experiment was conducted in Randomized Block Design having 10 treatments which were replicated 3 times. Treatment combination namely T_1(K 1%),T_2 (B 0.25%),T_3 (B 0.50%),T_4 (K 1% + B 0.25%),T_5 (K 1% + B 0.50%),T_6 (N 1% + K 1%),T_7 (N 1% + B 0.25%),T_8 (N 1% + B 0.50%),T_9 (N 1% + K 1% + B 0.25%), T_{10} (N 1% + K 1% + B 0.50%). The biometrical observations were recorded on three randomly selected plants of each treatment to assess the effect of treatments on growth and flowering of Pomegranate. Observations are recorded on plant height, plant spread, number of leaves, number of branches, length of Internodes, stem diameter, leaf area, plant canopy, number of flowers/plant, fruit Set and chlorophyll content.

Results and Discussion

Effect of Nitrogen, Potash and Boron on plant growth, flowering, fruit drop and fruit setting of Pomegranate Table 1 represented the growth and development of pomegranate as influence by micronutrient treatments. It was found that maximum plant height was recorded in T_{10}: N 1% + K 1% + B 0.50 (T_{10}) gave maximum plant height (3.01 m).The maximum tree height might be due to the increased nutrient availability due to the application of B and the minimum tree height might be due to without spray of nutrients needed for the growth of the plant. Similar findings were reported by Sabo*et al.*, (2013), Gill *et al.*, (2015) and Shaaban (2019).

The treatment T_{10}: N 1% + K 1% + B 0.50 (T_{10}) gave maximum plant spread (239 cm^2). The maximum plant spread may be due to the increase in shoot length and number of leaves which might have occurred due to higher nutrient availability supporting higher accumulation of photosynthesis in the plant body.

While, the minimum values of plant spread in control treatment may be due to poor availability of nutrients. These results are in conformity with the results reported by Ghosh *et al.*, (2012), Prasad *et al.*, (2003), Rao and Subramanyam (2009), Dhillon *et al.*, (2011) in Pomegranate.

Table.1 Effect of different levels of nitrogen and phosphorus on growth and development of pomegranate plants

Treatments	Plant height (m)	Plant Spread (cm^2)	Number of leaves per plant	Number of branches per plant	Length of Internodes (cm)	Stem diameter (cm)	Leaf area (cm^2)	Plant Canopy (cm^2)	Number of flowers/plant	Flowers drop %	Fruit Set %	Chlorophyll content
T_1	2.96	199	565.12	11.81	20.41	3.85	5.64	1.83	61.80	45.72	54.28	19.50
T_2	2.90	202	552.51	11.38	19.90	3.80	5.32	1.78	65.67	44.51	55.49	19.34
T_3	2.97	191	556.80	11.56	19.93	3.84	5.59	1.81	68.55	41.49	58.51	19.46
T_4	2.94	244	572.95	11.87	20.65	3.87	5.77	1.84	68.66	39.35	59.33	19.57
T_5	2.96	194	589.56	12.34	20.67	3.87	6.37	1.84	69.62	38.66	60.65	19.65
T_6	3.00	171	608.14	14.59	21.49	3.97	6.65	1.95	68.02	40.67	62.49	19.71
T_7	2.94	201	606.03	12.39	20.86	3.90	6.43	1.87	70.34	38.47	61.53	20.39
T_8	3.01	237	640.21	13.52	20.95	3.96	6.44	1.93	70.91	37.51	61.34	20.62
T_9	2.93	242	644.10	15.07	21.78	4.01	7.02	1.98	71.38	34.06	65.94	20.68
T_{10}	2.94	237	653.53	15.17	22.03	4.04	7.07	1.99	73.12	31.29	68.71	21.40
F- test	S	S	S	S	S	NS	S	NS	S	S	S	S
S. Ed. (±)	0.41	1.26	1.00	0.29	0.47	0.14	0.30	0.09	1.17	0.88	1.36	0.45
C. D. at 5%	0.83	2.65	2.10	0.61	0.98	0.29	0.63	0.19	2.45	1.85	2.85	0.94

The maximum number of leaves (653.53) attributed due to the easy availability of required quantity of nutrients and improved soil conditions due to the addition of N and B, while the lower values of these traits in control treatment attributed due to non-availability of required quantum of nutrients. Among the treatments applied T_{10}: N 1% + K 1% + B 0.50% produced better number of branches (15.17).

The maximum stem diameter (4.04 cm) may be due to the increase in shoot length and number of leaves which might have resulted in the production of more quantum of carbohydrates and subsequently their translocations towards the stem. The treatments applied T_{10}: N 1% + K 1% + B 0.50% produced maximum leaf area (7.07 cm^2) and plant canopy (1.99 cm^2). It has been well documented that the beneficial effect of inorganic fertilizers help in improving the soil health in terms of nutrient availability as well as by improving the soil physical and biological conditions thereby, increasing the nutrient availability for the growth processes of the plant. The present findings are in accordance with the report of Anusree *et al.*, (2018), Zhi and Yao-xiang (2010), Reddy *et al.,* (2012), Sheikh and Manjula (2009).and Vishwakarma *et al.*, (2017) in the orchards cultivating Bhagwa variety of 3-7 years old and fruiting season during hasta bahar. Among the treatments applied T_{10}: N 1% + K 1% + B 0.50% was found maximum number of flowers/plant (73.12), better fruit Set (68.71%) and chlorophyll content (21.40).The higher chlorophyll content due to combined application of N, K and boron may be attributed to their stimulatory effect of plant metabolism. On the present investigation conducted in pomegranate, was found that with application of T_{10}: N 1% + K 1% + B 0.50 (T_{10}) gave maximum plant height (3.01 m), plant spread (239 cm^2), number of leaves (653.53), number of branches (15.17), length of Internodes (22.03 cm), stem diameter (4.04 cm), leaf area (7.07 cm^2), plant canopy (1.99 cm^2), number of flowers/plant (73.12), better fruit Set (68.71%) and chlorophyll content (21.40) among the treatments. It may be concluded that boron and Potash with nitrogen may be used for obtaining flower and fruit setting with higher chlorophyll content.

References

Anusree, T., Suma, R., Nagaraja, M.S. and Nekha, T. (2018). A survey study to assess soil and leaf major nutrient status in relation to pomegranate yield. *Int.J.Curr.Microbiol.App.Sci* 7(9): 2597-2605.

Dhillon, W.S., Gill, P.P.S. and Singh, N.P. (2011). Effect of nitrogen, phosphorus and potassium fertilization on growth, yield and quality of pomegranate 'Kandhari'. *Acta Hortic,* 890, 327-332.

Gill B. S., Khehra, Savreet, Kaur, Gurpinder and Singh, Sukhdev (2015). Effect of inorganic fertilizers on the plant growth and fruit quality in phalsa (*Grewia asiatica* D.C.). *Adv. Res. J. Crop Improv.*, 6(2): 100-104.

Ghosh, S.N., Bera, B., Roy, S. and Kundu, A. (2012). Integrated nutrient management in pomegranate grown in laterite soil. *Indian J. Hortic*. 69 (3): 333-337.

Prasad, R. N.; Mali, P. C. (2003). Effect of different levels of nitrogen on quality characters of pomegranate fruit cv. Jalore seedless. *Scientific Horticulture* 8: 35-39.

Rao, K. D. and Subramanyam, K. (2009). Effect of nitrogen fertigation on growth and yield of pomegranate var. mridula under low rainfall zone. *Agric. Sci. Digest,* 29 (2)54-56.

Reddy, P.A. and Prasad, D.M. (2012). Effect of Plant Growth Regulators on Fruit Characters and Yield of Pomegranate (*Punica granatum* L.) cv. Ganesh.

International Journal of Plant, Animal and Environmental Sciences. 2 (2): 91-93.

Sabo, M.U, Wailare, M.A, Aliyu, M, Jari, S, And Shuaibu, Y. M. (2013). Effect of NPK fertilizer and spacing on growth and yield of watermelon (*Citrillus lanatus* L.) in Kaltungo Local Government area of Gombe State, Nigeria. *Scholarly Journal of Agricultural Science* 3(8), 325-330.

Shaaban, M.M. (2019). Assessment of the Yield and Fruit Quality of Manfalouty and Higazy Pomegranate Cultivars under the Influence of Gibberellic Acid and Micronutrients. *Asian Journal of Agricultural Research. 1*3 (1): 6-12.

Sheikh, M.K. and Manjula, N. (2009). Effect of split application of N and K on growth and fruiting in Ganesh Pomegranate (*Punica granatum), The Asian Journal of Horticulture*, 4(1): 91-94.

Vishwakarma, G., Yadav, A.L., Yadav, D.K. and Srivastava, D. (2017). Effect of integrated nutrient management on vegetative growth, yield and yield attributing characters of bael (*Aegle marmelos* Correa) cv. Narendra Bael-9. *Journal of Pharmacognosy and Phytochemistry*. SP1: 495-498.

Zhi Liang, Yao-Xiang Zou (2010). Effect of Balanced Fertilization on Pomegranate Tree in Southern Area of Xinjiang. Xinjiang Agricultural Sciences. S665.4

How to cite this article:

Kuldeep and Prasad, V. M. 2020. Effect of Nitrogen, Potash and Boron on Plant Growth, Flowering, Fruit Drop and Fruit Setting of Pomegranate (*Punica granatum*) cv. Bhagwa. *Int.J.Curr.Microbiol.App.Sci*. 9(11): 2181-2185. doi: https://doi.org/10.20546/ijcmas.2020.911.259