The Pharma Innovation Journal 2020; 9(7): 389-391

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2020; 9(7): 389-391

www.thepharmajournal.com
Received: 20-05-2020
Accepted: 22-06-2020

Surbhi Goyal
Department of Horticulture, CoA, RVSKVV, Gwalior, Madhya Pradesh, India

Karan Vir Singh
Scientist, Department of Horticulture, CoA, RVSKVV, Gwalior, Madhya Pradesh, India

Vikas Mandloi
Ph.D. (Scholor), Department of Horticulture, CoA, RVSKVV, Gwalior, Madhya Pradesh, India

Devendra Vishvkarma
Ph.D. (Scholor), Department of Horticulture, CoA, RVSKVV, Gwalior, Madhya Pradesh, India

Corresponding Author:
Surbhi Goyal
Department of Horticulture, CoA, RVSKVV, Gwalior, Madhya Pradesh, India

Effect of foliar application of boron and GA_3 on yield and yield attributing parameters of guava (*Psidium guajava* L.) *cv.* Lalit

Surbhi Goyal, Karan Vir Singh, Vikas Mandloi and Devendra Vishvkarma

Abstract
An experiment entitled "Effect of foliar application of Boron and GA_3 on growth, yield and quality of guava (*Psidium guajava* L.) cv. Lalit" was conducted at University guava orchard, Department of Horticulture, College of Agriculture, Gwalior during *Mrig bahar* at 2016-17. The experimental was laid out in the randomized block design with three replications and total treatment combination nine. Result based on investigation study revealed that the highest value of yield and yield attributing parameters *i.e.*, Number of fruits per tree (243.91), Average fruit weight (181.67 g), Yield per tree (44.76 kg) and maximum benefit cost ratio of 1:4.7 was recorded with B_2G_2 followed by 1: 4.3 in B_2G_1 and 1: 3.9 in B_1G_2. Conclude that the best treatment combination B_2G_2 with respect of yield attributing characters and economics of treatments of guava.

Keywords: Foliar application, boron, GA_3, yield, yield attributing, guava, Lalit etc.

Introduction
Guava (*Psidium guajava* L.), the apple of the tropics, is one of the most popular fruit grown in tropical, sub-tropical and some parts of arid regions of India. The fruit are quite hardy and prolific bearer belongs to the family Myrtaceae. It is originated from tropical America and seems to have been growing from Mexico to Peru. The total area under its cultivation in India is 268.2 thousand ha with an annual production of 3668 thousand MT, productivity is 13.7 MT/ha, whereas in Madhya Pradesh, the area, production and productivity of guava is 22.4 thousand ha, 841.1 thousand MT and 37.6 MT/ha, respectively NHB, 2014 [4]. Guava claims superiority over several other fruits because of its commercial and nutritional values. It is a rich and cheap source of vitamin C and pectin (a polysaccharide substance). It ranks third in vitamin C content (260 mg/100 g) after barbados cherry and aonla Phandis, 1970 and Rathore, 1979 [5, 6]. Guava contains 2 to 5 times more vitamin C than fresh orange juice. Besides, it is an excellent source of pectin (0.5-1.8%) but has low energy (66 cal /100g). The ripe fruits contain 12.3-26.3% dry matter, 77.9-86.9% moisture, 0.51-1.02% ash, 0.10-0.70% crude fat, 0.82-1.45% crude protein and 2.0-7.2% crude fiber. Guava fruit is considered as one of the delicious fruits. It is pleasantly sweet and refreshingly acidic in flavor and emits sweet aroma. It is wholly edible along with the skin. Several delicious preserved products like Jam, Jelly, Cheese, Puree, Ice cream,canned fruit and Sherbat are prepared from ripe fruits of guava. Guava juice wine and guava pulp wine are also prepared from guava fruits. The seeds yield 3 to 13% oil, which is rich in essential fatty acid and can be used as salad dressing Adsule and Kalam, 1995 [1]. In some countries, the leaves are used for curing and also for dyeing and tanning.

Method and material
The present investigation entitled "Effect of foliar application of Boron and GA_3 on growth, yield and quality of guava (*Psidium guajava* L.) cv. Lalit." was conducted at University guava orchard, Department of Horticulture (Fruit Science), College of Agriculture, RVSKVV, Gwalior (M.P) during 2016-17. The experimental was laid out in the randomized block design with three replications and total treatment combination nine *viz.*, foliar spray of three levels of boron (0, 0.2 and 0.4%), three levels of GA3 (0, 50 and 100 ppm) were applied. Aqueous solutions of boron and GA_3 were sprayed at the time of full bloom. the sprays under treatment were done on rainy season crop (*Mrig bahar*) at full bloom stage in early morning with the

help of foot sprayer @ five liters per tree to ensure the maximum absorption of nutrients through the leaves. Each tree was sprayed thoroughly in such a way as to completely drench it with the spray solution.

Micronutrient solutions of boric acid (0.2 and 0.4%) were prepared by dissolving 8 g and 16 g and 30 g boric acid in four liters of supernatant lime water (by dissolving 100 g hydrated lime in tap water) Sidhu *et al.*, 1980 [8]. The solutions of plant growth regulator used i.e. GA_3 (50 ppm and 100 ppm) was prepared by weighing (50 mg and 100 mg) GA_3 separately with the help of digital balance. This was dissolved in 95% 10 ml alcohol, respectively. Thereafter, 1000 ml of distilled water was added to it and stirred with a glass rod, so that GA_3 would thoroughly mix with distilled water. The observation was recorded of yield and yield attributing parameters *i.e*., Number of fruits per tree (243.91), Average fruit weight (181.67 g), Yield per tree (44.76 kg) selected under each plant within each treatment.

Results and discussion

A. Yield and yield attributes

Data pertaining to number of fruits per tree are presented in Table 1-3. It is clear from data that effect of different treatments was very striking on number of fruits per tree. Number of fruits per tree ranged from 108.33 to 243.91. The maximum number of fruits per tree 243.91 was noted in treatment B_2G_2 (Boron @ 0.4% and GA_3 @ 100 ppm) followed by 230.57 in B_1G_2 (Boron @ 0.2% and GA_3 @ 100 ppm). The minimum (108.33) number of fruits per tree was noted in B_0G_0.

The highest average fruit weight 181.67 g was recorded in treatment B_2G_2 (Boron @ 0.4% and GA_3 @ 100 ppm) followed by 178.65 g in B_1G_2 (Boron @ 0.2% and GA_3 @ 100 ppm). The minimum (133.21 g) average fruit weight was noted in B_0G_0.

The highest yield per tree 44.76 kg was recorded in treatment B_2G_2 (Boron @ 0.4% and GA_3 @ 100 ppm) followed by 41.28 kg in B_1G_2 (Boron @ 0.2% and GA_3 @ 100 ppm). The minimum (14.45 kg) yield per tree was noted in B_0G_0.

The data pertaining to various yield attributing parameters of the guava plant viz; number of fruits per plant, average weight per fruit, and yield per plant are significantly increased by the various sprays of GA_3. The maximum number of fruits per plant, maximum weight of fruit and the maximum fruit yield per plant were recorded under the treatment G_2 (GA_3 @ 100 ppm), which were the significantly superior to the other levels of GA_3, followed by G_1 (GA_3 @ 50 ppm) whereas, minimum number of fruits per plant, average weight of fruit and yield per plant were recorded under control (G_0). Increase in fruit weight may be attributed to the strengthening of middle lamella and consequently cell wall, which later may have increased the free passage of solutes to the fruits. Srivastava *et al*; (1973) [10] confirmed the effective role of GA_3 in increasing fruit weight. Biswas *et al*; (1988) [2] reported that the increased fruit weight following GA_3 application might be due to greater size of fruit and certain changes in metabolism of fruit which reflected in more accumulation of water and enhanced deposition of soluble solids. The same was also seen by Kumar (2013) [3], Singh (2008) [9] and Sukla (2011) [7].

Economies of different treatment

Data pertaining to number of fruits per tree are presented in Table 4. The maximum benefit cost ratio of 1:4.7 was recorded with B_2G_2 followed by 1: 4.3 in B_2G_1 and 1: 3.9 inB_1G_2. It makes sure that the increasing concentration of boron and GA_3 shows maximum benefit cost ratio, while the lower benefit cost ratio was found under the control (B_0G_0).

Table 1: Effect of boron, GA_3 and their combinations on number of fruits per tree

Treatments	Number of fruits per tree			
	G_0	G_1	G_2	Mean
B_0	108.33	157.08	206.95	157.45
B_1	138.46	196.58	230.57	188.54
B_2	199.04	223.20	243.91	222.05
Mean	148.61	192.29	227.14	
	B	G	B x G	
S.Em.	8.45	8.45	14.64	
$CD_{at\ 0.5\%}$	25.33	25.33	NS	

Table 2: Effect of boron, GA_3 and their combinations on average fruit weight (g)

Treatments	Average fruit weight (g)			
	G_0	G_1	G_2	Mean
B_0	133.21	145.20	165.62	148.01
B_1	138.53	148.45	178.65	155.21
B_2	142.29	164.76	181.67	162.91
Mean	138.01	152.80	175.31	
	B	G	B x G	
S.Em.	2.50	2.50	4.33	
$CD_{at\ 0.5\%}$	7.50	7.50	NS	

Table 3: Effect of boron, GA_3 and their combinations on yield per tree (kg)

Treatments	Yield per tree (kg)			
	G_0	G_1	G_2	Mean
B_0	14.45	22.81	34.22	23.83
B_1	19.18	29.19	41.28	29.88
B_2	28.33	36.81	44.76	36.63
Mean	20.65	29.60	40.09	
	B	G	B x G	
S.Em.	1.09	1.09	1.89	
$CD_{at\ 0.5\%}$	3.27	3.27	NS	

Table 4: Economics of various treatments

	Common cost ₹	Treatment cost ₹	Total cost ₹	Yield/tree (kg)	y/ha (kg)	Income ₹	Profit ₹	b:c
B_0G_0	55000	0	55000	14.45	4003.30	120098.9	65098.89	1.2
B_0G_1	55000	4653.6	59653.6	19.18	5313.85	159415.4	99761.77	1.7
B_0G_2	55000	5429.2	60429.2	28.33	7846.45	235393.4	174964.2	2.9
B_1G_0	55000	2548.4	57548.4	22.81	6318.89	189566.7	132018.3	2.3
B_1G_1	55000	7202	62202	29.19	8084.43	242532.8	180330.8	2.9
B_1G_2	55000	7977.6	62977.6	36.81	10197.54	305926.1	242948.5	3.9
B_2G_0	55000	4542.8	59542.8	34.22	9480.25	284407.6	224864.8	3.8
B_2G_1	55000	9196.4	64196.4	41.28	11434.35	343030.6	278834.2	4.3
B_2G_2	55000	9972	64972	44.76	12284.53	368536	303564	4.7

Conclusion

Based on the findings of the experiment, it may be concluded that for better growth and development, efficient production of guava and maintenance of soil productivity, it is judicial to use different micronutrients with plant growth regulators with recommended dose of NPK. Application of micronutrients is one of the important management practices to improve soil productivity. Crop growth, development, yield and profit are important to a farmer. Soil health is also very important for sustainable production. Higher yield may also be achieved using plant growth regulators.

Furthermore, the present result on guava concludes that different treatments significantly increased various growth, yield and quality parameters in comparison to control. Besides it, higher concentrations all of boron and GA_3 helped more to achieve the desired value for different growth, yield and quality parameters. The best interaction of B2 (Boron @ 0.4%) and G_2 ($GA_{3\ @}$ 100 ppm) proved in increasing the characters which were studied. So, it may be recommended at farmer's level for profitable crop production without affecting the soil health. Thus, considering crop productivity, economic return and soil fertility together combined application of micronutrient and plant growth regulators may be helpful for sustainable crop production.

Acknowledgements

The corresponding authors are grateful thanks to Dr. R. Lekhi (Head of dept)and Department of Horticulture, College of Agriculture, Gwalior (M.P.) for providing necessary facilities to carry out the research work.

References

1. Adsule RN, Kadam SS. In: Handbook of Fruit Science and Technology Production, Composition, Storage and Processing (Eds. D.K. Salunkhe and S.S. Kadam), Marcel Dekker Inc., New York, 1995, 419-433.
2. Biswas BS, Ghosh SK, Ghosh B, Mitra SK. Effect of growth substances on fruit weight, size and quality of guava cv. L-49. Indian Agric. 1988; 32:245-48.
3. Kumar R, Shant L, Tiwari JP. Influence of zinc sulphate and boric acid spray on vegetative growth and yield of winter season guava (Psidium guajava L.) cv. Pant Prabhat. Pantnagar J Res. 2013; 8(1):135-138.
4. NHB. All India area, production and productivity of guava, 2014. WWW.nhb.gov.in.
5. Phandis NA. (Guava). In: A Text Book on Pomology Vol.II. Eds. T.K. Chattopadhyay, Kalyani Publishers, New Delhi, 1970.
6. Rathore DS. Guava. In: Chattopadhyay, T. K. ed. A Textbook on Pomology (Vol. II). Kalyani Publishers, New Delhi, 1979, 203.
7. Shukla AK. Effect of foliar application of calcium and boron on growth, productivity and quality of Indian gooseberry (Emblica officinalis). Indian J Agricl. Sci. 2011; 81(7):628-632.
8. Sindhu PC, Ahlawat VP, Nain AS. Effect of foliar application of urea and zinc sulphate on yield and fruit quality of grapes (Vitis vinifera L.) cv. Perlette. Haryana J Hort. Sci. 1999; 28(1-2):19-21.
9. Singh O. Effect of calcium nitrate and plant growth regulators on nutrient uptake by leaves and fruit quality of guava. Prog. Hort. 2008; 20(3-4):241-245.
10. Srivastava RP, Mishra RS, Bana DS, Verma VK. Effect of plant growth regulators on the drop, fruit size, maturity and quality of Peach, var. Alexander. Prog. Hort. 1973; 5(2):11-21.