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Nanhe Lal Saroj
Department of Horticulture,
Babasaheb Bhimrao Ambedkar
University (A Central
University) Vidya –Vihar, Rae
Bareli Road, Lucknow, Uttar
Pradesh, India

RS Verma
Department of Horticulture,
Babasaheb Bhimrao Ambedkar
University (A Central
University) Vidya –Vihar, Rae
Bareli Road, Lucknow, Uttar
Pradesh, India

Som Prakash
Department of Horticulture,
Babasaheb Bhimrao Ambedkar
University (A Central
University) Vidya –Vihar, Rae
Bareli Road, Lucknow, Uttar
Pradesh, India

SS Verma
Department of Agriculture,
Barabanki U.P. India

Viplaw Kumar
Department of Horticulture,
Babasaheb Bhimrao Ambedkar
University (A Central
University) Vidya –Vihar, Rae
Bareli Road, Lucknow,
Uttar Pradesh, India

Correspondence
RS Verma
Department of Horticulture,
Babasaheb Bhimrao Ambedkar
University (A Central
University) Vidya –Vihar, Rae
Bareli Road, Lucknow, Uttar
Pradesh, India

Studies on the effect of foliar spray of micronutrient and plant growth regulators on physical parameter of guava (*Psidium guajava* L.) cv. Allahabad Safeda

Nanhe Lal Saroj, RS Verma, Som Prakash, SS Verma and Viplaw Kumar

Abstract

A field experiment was conducted during 2017 at Horticulture Research Farm-1, BBAU, Lucknow on 11- year- old guava plants, Studies on the effect of foliar spray of Micronutrient and plant growth regulators on physical parameter of guava (*Psidium guajava* L.) cv. Allahabad Safeda”, revealed that fruit set, fruit retention, fruit length, fruit width, fruit weight, fruit volume, specific gravity, fruit yield per plant (kg/plant) and yield (q/ha) were maximized when foliar spray was done with GA₃ 100 ppm, NAA 100 ppm, CaCl₂ (2%) and ZnSO₄ (1%) respectively.

Keywords: Guava, GA₃, NAA, CaCl₂, ZnSO₄ and physical parameters

Introduction

Guava (*Psidium guajava* L.) cv. Allahabad Safeda, the apple of the tropics, is one of the most popular fruits grown in tropical, sub-tropical and some parts of arid regions of India. Guava belongs to the family Myrtaceae. It has been in cultivation in India since 17th century and has originated in tropical America perhaps from Mexico to Peru and introduced in India by Portuguese. It can withstand drought up to some extent but only few degree of frost. The importance of guava is due to the fact that it is a hardy fruit and which can be grown in poor alkaline soil or poorly drained soils and pH 8.5, it can with stand to the maximum temperature at 46^oc and annual rainfall of less than 25 mm. Guava fruits are also used for preparation of jam, jelly, RTS, nectar etc. The guava bears flowers and fruits on current season growing twinges and highly cross pollinated crop and pollination occurs through honey bees and andirona insect, fruit of guava developed from inferior ovary on exhibited double sigmoid growth curve, fruit with many seed berry, the fruit take nearly 4-5 month from dark green to yellowish green. The common guava is a diploid 2n=22, but natural and artificial triploid (2n=33) and aneuploid exist triploid generally produce seedless fruit. In northern India guava plant bears flower twice or sometimes thrice in a year. The spring flowering is called “Ambe Bahar” June or monsoon flowering is called “Mrig Bahar” and third flowering which comes in October is called “Hast Bahar” Ambe Bahar fruit ripen from July to September and Mrig Bahar fruit ripen in from November to February, however, Hast Bahar fruit ripen in spring season, which also known as summer season crop.

Materials and methods

11- year- old uniform guava plants of Allahabad Safeda cultivar planted at 6x6 m a part growing in Horticulture Research Farm-1 of Babasaheb Bhimrao Ambedkar University Lucknow- 226025 were taken for the investigation. T₁ GA₃ 100 ppm, T₂ NAA 100 ppm, T₃ CaCl₂ 2% T₄ ZnSO₄ 1%, T₅ GA₃ 100 ppm + CaCl₂ 2%, T₆ GA₃ 100 ppm + ZnSO₄ 1%, T₇ NAA 100 ppm + CaCl₂ 2%, T₈ NAA 100 ppm + ZnSO₄ 1% along with T₀ Water spray. First spraying of micro nutrients and plant growth regulators were done before flowering (first week of August) and second after fruit set (second week of September) during 2017. The experiment was laid out in R.B.D. with three replication. Observations recorded to be fruit set, fruit retention, fruit length, fruit width, fruit weight, fruit volume, specific gravity, fruit yield per plant (kg/plant) and yield (q/ha). The data so obtained were analysed statically.

Results and discussion

A perusal of data in table.1 shows that significant response in the maximum number of fruit set (67.19 %) and maximum fruit retention (58.79 %) was noted with foliar spray of GA₃ 100 ppm

+ CaCl₂ 2% (T₅) followed by (62.51%, 54.01%) with foliar spray of GA₃ 100 ppm + ZnSO₄ 1% (T₆) in comparison to control (45.96 %, 38.56%) was recorded under control treatment (water spray T₀). These results corroborated the finding of Rubi Rani and Brahmachari (2004) [8] in mango, Kumar *et al.* (2013) [6] in guava and Byas (2014) [3] in ber which are in support of present findings.

The maximum length (7.72) width (7.25) weight (135.46) and volume (121.15) of fruit recorded with GA₃ 100 ppm + CaCl₂2% (T₅). The minimum length, width, weight and volume of fruit recorded with under control treatment (water spray.T₀). the increase in, length, width weight and volume of guava fruit by foliar spray might be due to rapid cell division, cell elongation, translocation of sugars and highest fruit size as well as fruit weight, which ultimately increase the yield of guava fruit. The increase in fruit weight by GA₃, NAA, ZnSO₄ and CaCl₂ spray might be due the accumulation of more food material in tree. The importance of the elements in improving the physiological activities of plant had been released but is not clear whether in influenced directly or in directly. The results are in close conformity.

The data pertaining to specific gravity of guava as presented in table 1 clearly indicated that the foliar application of growth regulators and nutrients significantly increased specific gravity of guava fruit. The maximum specific gravity (1.118) was noted with foliar spray of GA₃ 100 ppm + CaCl₂

2% (T₅). followed by foliar spray of GA₃ 100 ppm + ZnSO₄ 1% (T₆). The minimum specific gravity of guava fruit in comparison to control treatment (water spray T₀). The increase in volume and Specific gravity of guava fruits, application might be due to accumulation of more metabolites resulting higher weight at faster rate than increase in the volume of guava fruits. Similar results have been reported by Kumar *et al.* (2010) [5] in guava, Rachna and Singh (2013) [7] in ber, Kumar *et al.* (2013) [6] in guava and Byas (2014) [3] in ber.

The maximum fruit yield per plant and fruit yield quintal per hectare (62.06 and 171.91) was noted with foliar spray of GA₃ 100 ppm + CaCl₂ 2% (T₅) followed by (59.66 and 165.27) with foliar spray of GA₃ 100 ppm + ZnSO₄ 1% (T₆) while the minimum (46.81and 129.22) was recorded under control treatment (water spray T₀). The importance of this element in improving the physiological activities of plant had been released but it is not clear whether it influenced directly or indirectly. These activities improve size, width, length and weight of fruits which ultimately increased the yield of fruits, similarly micronutrients promotes growth hormones, starch formation and seed maturation, weight of fruit. These results are in quite conformity with the findings of Kumar *et al.* (2010) [5], Awasthi and Lal (2009) [2] in guava and Joon *et al.* (1984) [4] in ber.

Table 1: Effect of foliar spray of micronutrient and plant growth regulators on physical parameter of guava (*Psidium guajava* L.) cv. Allahabad Safeda”

Treatments	Fruit set (%)	Fruit retention (%)	Fruit length (cm)	Width (cm)	Fruit weight (gm)	Fruit volume (cm ³)	Specific gravity	Fruit yield per plant (Kg/plant)	yield (q./ha)
T ₀ Water spray	45.76	38.56	6.77	6.04	102.61	93.99	1.093	46.81	129.22
T ₁ GA ₃ 100 ppm	55.07	50.01	6.89	6.07	112.28	105.81	1.062	51.53	142.79
T ₂ NAA 100 ppm	56.17	53.21	7.67	6.57	121.11	109.67	1.063	55.12	152.74
T ₃ CaCl ₂ 2%	57.33	52.79	7.22	6.50	110.12	103.78	1.063	53.49	150.14
T ₄ ZnSO ₄ 1%	54.02	50.54	7.03	6.49	117.38	112.02	1.049	52.19	142.56
T ₅ GA ₃ 100 ppm + CaCl ₂ 2%	67.19	58.79	7.72	7.25	135.46	121.15	1.118	62.06	171.81
T ₆ GA ₃ 100 ppm + ZnSO ₄ 1%	62.51	54.01	7.43	7.23	125.75	115.22	1.092	59.66	165.32
T ₇ NAA 100 ppm + CaCl ₂ 2%	61.97	50.61	7.41	6.37	118.50	110.86	1.069	55.62	153.43
T ₈ NAA 100 ppm + ZnSO ₄ 1%	57.30	52.15	7.23	6.80	114.64	109.60	1.051	57.71	163.06
S.Em. ±	1.373	1.546	0.199	0.135	3.964	2.728	2.56	3.964	5.727
C.D. at 5%	4.150	4.675	0.601	0.408	11.986	8.249	8.79	11.986	17.319

Conclusion

The yield and physical parameters of fruit with respect fruit set, fruit retention, fruit length, fruit width, fruit weight, fruit volume, specific gravity, fruit yield per plant (Kg/plant) and yield (q/ha) were obtained maximum with the foliar spray of GA₃ 100 ppm + CaCl₂ 2%. Therefore, combined spray of GA₃ 100 ppm + CaCl₂ 2% (T₅) can be advocated to guava growers for serving higher yield and better of quality of fruits.

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