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Research Article

Effect of Foliar Feeding of Borax, Zinc sulphate and Urea on Fruiting and Yield of Guava (*Psidium guajava* L.) Cvs. Lalit and Shweta under high density planting system

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Abstract

A field experiment entitled Effect of Foliar Feeding of Borax, Zinc Sulphate and Urea on Fruiting and Yield of Guava (*Psidium guajava* L.) Cvs. Lalit and Shweta under high density planting system were conducted at the Instructional farm, Krishi Vigyan Kendra, Jhalawar during August, 2015 to March, 2016. The experiment was consisting of 18 treatments having three levels of each Borax (0, 0.3 and 0.6 per cent), Zinc sulphate (0, 0.3 and 0.6 per cent) and two levels of Urea (0 and 1 per cent). The experiment was laid out in Factorial randomized block design with three replications. Among different doses of foliar spray of nutrients, borax @ 0.6 per cent, zinc sulphate @ 0.6 per cent and Urea @ 1 per cent were found significantly superior over control with respect fruiting characteristics, quality parameters and yield attributes of guava. In case of interaction effect of foliar spray of nutrients, the application of T_{17} treatment (borax @ 0.6 per cent, + zinc sulphate @ 0.6 per cent + urea @ 1 per cent) was found significantly superior over control. This treatment has given maximum increase in fruit set per cent, fruit retention per cent, number of fruits per tree, fruit yield per plant and estimated yield per hectare.

Keywords: Guava, Foliar Feeding, High density

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Introduction

Guava (*Psidium guajava* L.) "Apple of the tropics" is an important fruit crop of country, not because of large area and production but due to its wider edapho-climatic adaptability, hardly to various biotic and abiotic stresses, precocious and prolific bearing habit, quality fruit with high nutritive value, medicinal attribute, use both as fresh fruit and after processing in different value added products and considered as multipurpose tree due to its utility as a fruit, fuel, fodder, and it is highly remunerative crop. It is largely grown in warmer tropical countries of the world. The Portuguese introduced it in India in the 17th century. Guava is classified under genus *Psidium*, which consists of 150 species [1] but only *Psidium guajava* L. has been exploited commercially. It is popular in India due to its delightful taste, pleasant flavour, high palatability and digestive value. It has paramount importance as a source of ascorbic acid in human diet, content of which is three to five times more than that in fresh orange juice. It is a very rich source of vitamin C and A along with minerals like iron, calcium, and phosphorus. It also contains substantial quantities of carbohydrates, sugars and pectin. Owing to excellent taste and flavour, high nutritional value and wide availability at moderate price the fruit is often called as "Poor man's apple". The conventional products of guava are jelly, jam, pulp, concentrate, juice, cheese, toffee, dehydrated guava and canned guava.

The judicious supply of micronutrients not only increases the productivity but it also improves the quality of the produce [2]. As the foliar application is an effective method of nutrient management and required nutrients can be readily supplied as and when they are needed. It is an effective method for correcting the micronutrients deficiencies. Hence, in recent days it has been widely practiced in high valued fruit crops like grape, mango, banana, citrus and

pomegranate etc. It has been reported that the guava plant can readily absorb mineral nutrients sprayed on the foliage [3]. Spraying method using the correct strength have been great merit of simplicity and requires about 1 or 2 weeks to produce clear effects. Foliar application experiments conducted in India showed that guava has given good response to foliar application of different micronutrients. Use of different mixed and single micronutrients like, zinc sulphate, borax and urea through foliar application was found beneficial and the recommendations which have been suggested by different workers for different micronutrients appears to have profound influence on fruit quality through its influence on size, appearance, colour, soluble solids, sugar, acidity, pectin and vitamin contents [4, 5]. Foliar application of different micronutrients had increased the growth, yield and quality parameters in guava.

Zinc (Zn) is an essential micro element for plants. It is involved in many enzymatic reactions. For growth and development of plant, zinc is necessary. It is also involved in regulating the protein and carbohydrate metabolism [6]. Its availability to plants is reduced in high pH soils. Zinc is known to have an important role either as a metal component of enzymes or as a functional, structural or regulatory factor of a large number of enzymes. Boron is a heavy non-metal micronutrient. It is absorbed by plant in the form of boric acid (H_3BO_3). For translocation of sugar; reproduction of plants and germination of pollen grains boron is necessary. Its role has been observed in hormone movement and active salt absorption. It has also an important role in fruit quality. Boron has an effect on cell wall structure and also has a major effect on cell elongation (pollen tube) and root growth [7, 8].

Urea is an important organic fertilizer for the plants. It stimulates shoot growth, increase the number of flowers per shoot and also increased the fruit set, fruit retention, fruit diameter, improve the total soluble solid and acidity. Urea plays an important role for the synthesis of endogenous hormones [9].

During recent days, the consumers are becoming more and more health conscious and ready to pay more for quality fruits. Today, due to increased demand for quality produce the interest of growers in production of high quality fruits is increasing. Very little information is available about the foliar application of micronutrients for improving the growth, yield and quality of guava fruits under Jhalawar (Rajasthan) condition. Hence, considering the need, the present investigation "Effect of Foliar Feeding of Borax, Zinc Sulphate and Urea on Fruiting and Yield of Guava (Psidium guajava L.) Cvs. Shweta and Lalit under high density planting system" is planned with the objective to study the Effect of Borax, Zinc Sulphate and Urea on Fruiting and Yield of Guava Cvs. Shweta and Lalit.

Material and Methods

The present investigation entitled **"**Effect of Foliar Feeding of Borax, Zinc Sulphate and Urea on Fruiting and Yield of Guava (*Psidium Guajava* L.) Cvs. Lalit and Shweta under high density planting system" was conducted during the year 2015-2016. The present experiment was conducted at the instructional farm, Krishi Vigyan Kendra, Jhalawar. Four years old Guava Cvs. 'Lalit and Shweta' plants of uniform size and good bearing were selected at Instructional farm, Krishi Vigyan Kendra, Jhalawar for experimentation. For this experiment total 54 plants of each variety were selected during July, 2015 upto end of experiment. This experiment was laid out in Factorial Randomized Block Design (F-RBD) with three replications. The experiment comprised of 18 treatment combinations in each variety towards study of the Effect of Foliar Feeding of Borax, Zinc sulphate and Urea on Fruiting and Yield on Guava (*Psidium guajava* L.) Cvs. Lalit and Shweta under high density planting system . The treatments consisted of three different chemicals namely Borax, Zinc sulphate and Urea with three concentrations of Borax and Zinc sulphate and two concentration of Urea. The plain distilled water was sprayed on the plants under control. In this way total 18 treatment combinations for each variety was used in this experiment. The treatments were applied separately in both the varieties during first week of July, 2015 after selection of good uniform size and bearer plants.

The treatment details given below

- Spray of Borax (containing 17.5% B)
  - Borax- 0%
  - Borax- 0.3%
  - Borax- 0.6%

- Spray of Zinc sulphate (containing 20% Zn)
  - Zinc sulphate- 0%
  - Zinc sulphate- 0.3%
  - Zinc sulphate- 0.6%

- Spray of Urea (containing 46% N)
  - Urea- 0%
  - Urea- 1%

Treatment combinations

Thus treatment combinations are summarised here as under:

T_0 -	Zinc sulphate 0% + Borax 0% + Urea 0% (control)
T_1 -	Zinc sulphate 0% + Borax 0.3% + Urea 0%
T_2 -	Zinc sulphate 0% + Borax 0.6%+ Urea 0%
T_3 -	Zinc sulphate 0.3% + Borax 0% + Urea 0%
T_4 -	Zinc sulphate 0.3% + Borax 0.3% + Urea 0%
T_5 -	Zinc sulphate 0.3% + Borax 0.6% + Urea 0%
T_6 -	Zinc sulphate 0.6% + Borax 0% + Urea 0%
T_7 -	Zinc sulphate 0.6% + Borax 0.3% + Urea 0%
T_8 -	Zinc sulphate 0.6% + Borax 0.6% + Urea 0%
T_9 -	Zinc sulphate 0% + Borax 0% + Urea 1%
T_{10} -	Zinc sulphate 0% + Borax 0.3% + Urea 1%
T_{11} -	Zinc sulphate 0% + Borax 0.6%+ Urea 1%
T_{12}	Zinc sulphate 0.3% + Borax 0% + Urea 1%
T_{13}	Zinc sulphate 0.3% + Borax 0.3% + Urea 1%
T_{14} -	Zinc sulphate 0.3% + Borax 0.6% + Urea 1%
T_{15}	Zinc sulphate 0.6% + Borax 0% + Urea 1%
T_{16}-	Zinc sulphate 0.6% + Borax 0.3% + Urea 1%
T_{17}	Zinc sulphate 0.6% + Borax 0.6% + Urea 1%

All the treatments were applied in both the varieties separately.

Application of treatments

Spray of chemicals was done on 4 July 2015 under all treatments. Treatment application was done as per treatment for each plant taking 2 lit. volume of the spray solution per plant. Spraying was done in the early morning with a Aspee make knapsack battery operated sprayer. The control plants were sprayed with distilled water in the similar way.

To prepare 0.3% spray solution 3g Zinc sulphate and Borax was dissolve separately in 1 litre of water each, likewise for preparation of 0.6% solution of Zinc sulphate and Borax was prepared by dissolving 6g of each nutrients in one lit. water separately for preparation of 1% urea solution 10g urea was dissolve in one litre of water.

Observations Recorded

Fruit set per cent

Total number of flowers which set into fruits are counted and per cent fruit set was calculated on the basis of number of flowers emerged on the 10 tagged shoot in each direction of the tree.

Fruit retention per cent

Total numbers of fruit set present on the 10 tagged shoots were counted and then the total numbers of fruit were again counted on the same shoot at the time of fruit harvesting. The per cent fruit retention was calculated on the basis of initial number of fruit set.

Days taken to first harvesting

Number of days taken to first harvesting was counted from the date of treatment in each treatment.

Number of fruits per tree

The number of fruits per plant was counted at each harvest and total was calculated at last harvesting by summation of values of all pickings.

Yield per plant (kg)

Mature fruits were harvested periodically in each treatment separately and the weight was recorded with the help of single pan balance. Then the total yield (kg / plant) was calculated.

Estimated yield (tonnes/ha)

The yield of fruits per ha was calculated by multiplying the yield of fruits per plant with number of plant per ha i.e. 834 plants / ha (spacing 3×4 m).

Statistical Analysis

The data obtained during the experimentation were subjected to statistical analysis using analysis of variance technique [10]. The significance of the treatments was tested through 'F' test at 5 per cent level of significance. The critical difference CD was calculated to assess the significance of difference among the different treatments. The analysis of variance tables are presented in appendix at the end of this manuscript.

Result and Discussion

The data on fruit set per cent of guava as influenced by application of different chemicals shows that the fruit set per cent of guava increased significantly by the application of borax, zinc sulphate and urea on both the varieties under experimentation over control. The maximum fruit set per cent in variety Lalit (59.92), (60.51), (61.15) and in variety Shweta (58.27), (58.44), (59.57) were recorded with treatments B_3 (borax @ 0.6 per cent), Zn_3 (zinc sulphate @ 0.6 per cent), and U_2 (urea @ 1 per cent) respectively, while the minimum fruit set per cent in variety Lalit and in Shweta was recorded under control. The data in Table 2 reveal that the interaction effect of borax, zinc sulphate and urea was significantly influenced the fruit set per cent in guava. The maximum fruit set per cent (62.65) and (60.88) in Lalit and Shweta varieties respectively, were recorded with T_{17} (zinc sulphate @ 0.6 per cent + borax @ 0.6 per cent + urea @ 1 per cent) treatment which was found at par with T_{16} and T_{14} treatments. However, the minimum fruit set per cent in Lalit (54.16) and in Shweta (52.69) was recorded in control.

The data on fruit retention per cent of guava as influenced by application of different nutrients are presented in **Table 1** reveals which that the fruit retention per cent of guava increased significantly by the application of borax, zinc sulphate and urea over control in both the varieties under study. The maximum fruit retention per cent in variety Lalit (61.76), (62.25), (62.51) and in variety Shweta (59.70), (60.15), (60.50) were recorded with treatments B_3 (borax @ 0.6 per cent), Zn_3 (zinc sulphate @ 0.6 per cent), and U_2 (urea @ 1 per cent) respectively, while the minimum fruit retention per cent in variety Lalit and in Shweta was recorded under control. The data in **Table 2** reveal that the interaction effect of borax, zinc sulphate and urea was significantly observed on fruit retention per cent in guava. The maximum fruit retention per cent (64.36) and (62.42) in lalit and Shweta varieties respectively, were recorded with T_{17} (zinc sulphate @ 0.6 per cent + borax @ 0.6 per cent + urea @ 1 per cent) treatment which was closely followed by T_{16} and T_{14} treatments. However, the minimum fruit retention per cent in Lalit (58.20) and in Shweta (56.39) was recorded in control.

The increased in fruit set and fruit retention per cent of guava fruit due to application of borax, zinc sulphate and urea plays an important role in respiration, nitrogen and carbohydrate metabolism, in these process increased vegetative growth resulting in production of more food material which in turn may have for utilized better development of fruits [11]. The higher fruit set in response to higher concentration of micronutrients application is probably due to translocation of hormones, food substances and other factors stimulating fruit formation to the tissue of ovary in greater amount [3]. There is correlation between fruit drop and endogenous hormonal status and existence of high level of internal auxin that prevent fruit drop. Since high level of endogenous hormones might help in reduce the fruit drop. Zinc spray increased the fruit retention and auxin balance may lead to the prevention of fruit drop. By the foliar application of boron the fruit drop was reduce because boron plays an important role in translocation of carbohydrate and auxin synthesis to sink and increased pollen viability and fertilization [12].

Table 1 Effect of foliar feeding of Borax, Zinc sulphate and Urea on fruit set (%) and fruit retention (%) in Guava cvs. Lalit and Shweta under high density planting system

Treatments	Fruit set per cent		Fruit retention per cent	
	Lalit	Shweta	Lalit	Shweta
Borax (H_3BO_3)				
B_1	58.25 (72.23)	56.40 (69.29)	60.38 (75.54)	58.48 (72.64)
B_2	59.20 (73.70)	57.23 (70.62)	61.22 (76.78)	59.21 (73.76)
B_3	**59.92 (74.81)**	**58.27 (72.26)**	**61.76 (77.56)**	**59.70 (74.49)**
S.Em±	0.108 (0.166)	0.134 (0.215)	0.093 (0.128)	0.081 (0.117)
CD at 5%	0.311 (0.477)	0.386 (0.619)	0.267 (0.368)	0.233 (0.335)
Zinc sulphate ($ZnSO_4$)				
Zn_1	57.72 (71.39)	56.18 (68.93)	60.11 (75.13)	58.17 (72.15)
Zn_2	59.15 (73.64)	57.27 (70.70)	61.01 (76.47)	59.07 (73.55)
Zn_3	**60.51 (75.72)**	**58.44 (72.54)**	**62.25 (78.28)**	**60.15 (75.19)**
S.Em±	0.108 (0.166)	0.134 (0.215)	0.093 (0.128)	0.081 (0.117)
CD at 5%	0.311 (0.477)	0.386 (0.619)	0.267 (0.368)	0.233 (0.335)
Urea (NH_2CONH_2)				
U_1	57.10 (70.45)	55.02 (67.11)	59.73 (74.58)	57.76 (71.53)
U_2	**61.15 (76.71)**	**59.57 (74.34)**	**62.51 (78.67)**	**60.50 (75.74)**
S.Em±	0.088 (0.135)	0.110 (0.176)	0.076 (0.105)	0.066 (0.095)
CD at 5%	0.254 (0.389)	0.315 (0.506)	0.218 (0.301)	0.190 (0.274)

Figures in parenthesis are reconverted values

Table 2 Interaction effect of foliar feeding of Borax, Zinc sulphate and Urea on fruit set (%) and fruit retention (%) in Guava cvs. Lalit and Shweta under high density planting system

Treatments	Fruit set per cent		Fruit retention per cent	
	Lalit	Shweta	Lalit	Shweta
T_0 (Zn_0 B_0 U_0)	54.16 (65.72)	52.69 (63.25)	58.20 (72.23)	56.39 (69.35)
T_1 (Zn_1 B_2 U_1)	55.34 (67.65)	53.34 (64.34)	58.91 (73.34)	56.93 (70.23)
T_2 (Zn_1 B_3 U_1)	56.24 (69.12)	54.73 (66.66)	59.27 (73.88)	57.17 (70.61)
T_3 (Zn_2 B_1 U_1)	56.00 (68.73)	54.09 (65.59)	58.80 (73.16)	57.01 (70.35)
T_4 (Zn_2 B_2 U_1)	57.17 (70.61)	54.81 (66.78)	59.62 (74.43)	57.86 (71.70)
T_5 (Zn_2 B_3 U_1)	58.13 (72.12)	56.00 (68.73)	60.25 (75.37)	58.23 (72.27)
T_6 (Zn_3 B_1 U_1)	57.98 (71.89)	55.27 (67.54)	60.17 (75.25)	58.07 (72.03)
T_7 (Zn_3 B_2 U_1)	59.10 (73.62)	56.29 (69.20)	60.92 (76.38)	58.87 (73.27)
T_8 (Zn_3 B_3 U_1)	59.75 (74.62)	57.98 (71.89)	61.44 (77.15)	59.28 (73.91)
T_9 (Zn_1 B_1 U_2)	59.50 (74.24)	57.60 (71.29)	60.75 (76.13)	58.98 (73.44)
T_{10} (Zn_1 B_2 U_2)	60.25 (75.37)	58.96 (73.41)	61.59 (77.36)	59.61 (74.41)
T_{11} (Zn_1 B_3 U_2)	60.82 (76.23)	59.75 (74.62)	61.92 (77.84)	59.91 (74.87)
T_{12} (Zn_2 B_1 U_2)	60.59 (75.87)	58.98 (73.44)	61.54 (77.30)	59.64 (74.45)
T_{13} (Zn_2 B_2 U_2)	61.06 (76.58)	59.51 (74.26)	62.52 (78.71)	60.55 (75.82)
T_{14} (Zn_2 B_3 U_2)	61.96 (77.90)	60.25 (75.37)	63.32 (79.83)	61.16 (76.73)
T_{15} (Zn_3 B_1 U_2)	61.29 (76.93)	59.75 (74.62)	62.83 (79.15)	60.81 (76.22)
T_{16} (Zn_3 B_2 U_2)	62.28 (78.36)	60.47 (75.71)	63.78 (80.45)	61.44 (77.14)
T_{17} (Zn_3 B_3 U_2)	**62.65 (78.89)**	**60.88 (76.31)**	**64.36 (81.27)**	**62.42 (78.54)**
S.Em ±	0.2651 (0.4064)	0.3291 (0.5278)	0.2276 (0.3139)	0.1982 (0.2859)
C.D. at 5%	0.7619 (1.1679)	0.9458 (1.5169)	0.6542 (0.9022)	0.5696 (0.8216)

The data on days taken to first harvesting of guava as influenced by application of different nutrients presented in **Table 3** highlighted that the days taken to first harvesting of guava reduced significantly by the application of borax, zinc sulphate, and urea over control in both the varieties under study. The minimum days taken to first harvesting in variety Lalit (118.57), (117.00), (116.37) and in variety Shweta (121.78), (120.44), (119.44) were recorded with

treatments B_3 (borax @ 0.6 per cent), Zn_3 (zinc sulphate @ 0.6 per cent), and U_2 (urea @ 1 per cent) respectively, while maximum days taken to first harvesting in variety Lalit and in Shweta was recorded under control. From the data in **Table 4**, it can be observed that the interaction effect of borax, zinc sulphate and urea was significantly observed on days taken to first harvesting. The minimum days taken to first harvesting (113.33) and (116.00) in Lalit and Shweta varieties respectively, were recorded with T_{16} (zinc sulphate @ 0.6 per cent +borax @ 0.3 per cent + urea @ 1 per cent) treatment which was closely followed by T_{17} (borax @ 0.6 per cent + zinc sulphate @ 0.6 per cent + urea @ 1 per cent) treatment, having values of (114.33), (117.33). However, the maximum days taken to first harvesting in Lalit (125.00) and in Shweta (130.67) was recorded in control. It might be recorded due to early flowering and reduced maturity duration which could be attributed to enhancing effect of zinc in enzymatic reaction, cell division as well in growth [13, 14].

Table 3 Effect of foliar feeding of Borax, Zinc sulphate and Urea on Days taken to first harvesting (Maturity days) and Number of fruits per tree in Guava cvs. Lalit and Shweta under high density planting system

Treatments	Days taken to first harvesting (Maturity days)		Number of fruits per tree	
	Lalit	Shweta	Lalit	Shweta
Borax (H_3BO_3)				
B_1	120.17	124.17	163.67	159.50
B_2	119.56	122.94	168.73	164.11
B_3	**118.57**	**121.78**	**171.61**	**166.28**
S.Em±	0.355	0.277	0.690	0.755
CD at 5%	1.019	0.797	1.983	2.168
Zinc sulphate ($ZnSO_4$)				
Zn_1	121.41	125.56	160.61	156.50
Zn_2	119.89	122.89	169.32	163.11
Zn_3	**117.00**	**120.44**	**174.08**	**170.28**
S.Em±	0.355	0.277	0.690	0.755
CD at 5%	1.019	0.797	1.983	2.168
Urea (NH_2CONH_2)				
U_1	122.49	126.48	158.56	154.07
U_2	**116.37**	**119.44**	**177.45**	**172.52**
S.Em±	0.290	0.226	0.563	0.616
CD at 5%	0.832	0.651	1.619	1.771

The data in Table 3 narrate that the number of fruits per plant of guava increased significantly by the application of borax, zinc sulphate and urea on both the varieties under experimentation over control. The maximum number of fruits per plant in variety Lalit (171.61), (174.08), (177.45) and in variety Shweta (166.28), (170.28), (172.52) were recorded with treatments B_3(borax @ 0.6 per cent), Zn_3 (zinc sulphate @ 0.6 per cent), and U_2 (urea @ 1 per cent) respectively, while the minimum fruits per plant in variety Lalit and in Shweta were recorded under control. The data in Table 4 reveal that the interaction effect of borax, zinc sulphate and urea was significant on number of fruits per plant in guava. The maximum number of fruits per plant (189.68) and (184.00) in Lalit and Shweta varieties respectively, were recorded with T_{17} (zinc sulphate @ 0.6 per cent +borax @ 0.6 per cent + urea @ 1 per cent) treatment which was closely followed by T_{16} and T_{15} treatments. However, the minimum number of fruits per plant in Lalit (145.67) and in Shweta (144.67) was recorded in control. The increase in number of guava fruits by application of nutrient treatments may be due to increased fruit set, fruit retention and reduced fruit drop as a result of boron, zinc and urea spray could give higher number of fruits and consequently the yield [15].

The data in **Table 5** indicated that yield kg/tree and tonnes/ha of guava increased significantly with the application of borax, zinc sulphate and urea in both the varieties under experimentation over control. Highest yield kg/tree and tonnes/ha in variety Lalit (17.78 kg/tree and 14.81 tonnes/ha), (18.92 kg/tree and 15.76 tonnes/ha), (19.59 kg/tree and 16.32 tonnes/ha) and in variety Shweta (16.55 kg/tree and 13.79 tonnes/ha), (17.73 kg/tree and 14.77 tonnes/ha), (18.32 kg/tree and 15.26 tonnes/ha) were recorded with treatments B_3(borax @ 0.6 per cent), Zn_3 (zinc sulphate @ 0.6 per cent), and U_2 (urea @ 1 per cent) respectively, while minimum yield in variety Lalit and in Shweta was recorded under control.

Table 4 Interaction effect of foliar feeding of Borax, Zinc sulphate and Urea on Days taken to first harvesting (Maturity days) and number of fruits per tree in Guava cvs. Lalit and Shweta under high density planting system

Treatments	Days taken to first harvesting (Maturity days)		Number of fruits per tree	
	Lalit	Shweta	Lalit	Shweta
T_0 (Zn_0 B_0 U_0)	125.00	130.67	145.67	144.67
T_1 (Zn_1 B_2 U_1)	124.33	128.33	153.67	150.33
T_2 (Zn_1 B_3 U_1)	124.11	128.00	155.67	151.67
T_3 (Zn_2 B_1 U_1)	123.33	127.33	157.98	151.00
T_4 (Zn_2 B_2 U_1)	124.00	126.67	161.65	155.00
T_5 (Zn_2 B_3 U_1)	122.67	126.00	164.32	156.33
T_6 (Zn_3 B_1 U_1)	121.00	125.00	157.68	155.33
T_7 (Zn_3 B_2 U_1)	120.00	124.33	164.02	160.33
T_8 (Zn_3 B_3 U_1)	118.00	122.00	166.37	162.00
T_9 (Zn_1 B_1 U_2)	119.00	123.33	166.00	160.00
T_{10} (Zn_1 B_2 U_2)	118.33	122.00	170.33	165.00
T_{11} (Zn_1 B_3 U_2)	117.67	121.00	172.33	167.33
T_{12} (Zn_2 B_1 U_2)	117.33	120.67	172.65	167.67
T_{13} (Zn_2 B_2 U_2)	116.33	119.00	177.98	172.33
T_{14} (Zn_2 B_3 U_2)	115.67	117.67	181.32	176.33
T_{15} (Zn_3 B_1 U_2)	115.33	118.00	182.02	178.33
T_{16} (Zn_3 B_2 U_2)	**113.33**	**116.00**	184.70	181.67
T_{17} (Zn_3 B_3 U_2)	114.33	117.33	**189.68**	**184.00**
S.Em ±	0.8688	0.6793	1.6904	1.8482
C.D. at 5%	2.4968	1.9525	4.8584	5.3117

Table 5 Effect of foliar feeding of Borax, Zinc sulphate and Urea on yield and estimated yield in Guava cvs. Lalit and Shweta under high density planting system

Treatments	Yield (kg/plant)		Estimated yield (tonnes/ha)	
	Lalit	Shweta	Lalit	Shweta
Borax (H_3BO_3)				
B_1	15.54	14.70	12.95	12.25
B_2	16.79	15.77	13.99	13.14
B_3	**17.78**	**16.55**	**14.81**	**13.79**
S.Em±	0.258	0.196	0.215	0.163
CD at 5%	0.742	0.562	0.618	0.468
Zinc sulphate ($ZnSO_4$)				
Zn_1	14.69	13.75	12.23	11.46
Zn_2	16.50	15.54	13.74	12.95
Zn_3	**18.92**	**17.73**	**15.76**	**14.77**
S.Em±	0.258	0.196	0.215	0.163
CD at 5%	0.742	0.562	0.618	0.468
Urea (NH_2CONH_2)				
U_1	13.81	13.03	11.51	10.85
U_2	**19.59**	**18.32**	**16.32**	**15.26**
S.Em±	0.211	0.160	0.176	0.133
CD at 5%	0.606	0.459	0.505	0.382

The data in **Table 6** reveal that the interaction effect of borax, zinc sulphate and urea was significantly observed on fruit yield in kg/tree and tonnes/ha in guava. The fruit yield of (23.90 kg/tree and 19.91 tonnes/ha), (22.06 kg/tree and 18.38 tonnes/ha) in Lalit and Shweta varieties respectively, recorded maximum with T_{17} (borax @ 0.6 per cent + zinc sulphate @ 0.6 per cent + urea @ 1 per cent) treatment which was closely followed by T_{16} and $T_{15.}$ However, the

minimum fruit yield in Lalit (11.40 kg/tree and 9.50 tonnes/ha) and in Shweta (10.88 kg/tree and 9.06 tonnes/ha) was recorded in control. The fruit yield was increased due to combined application of higher concentration of the nutrients. It might be due to significant increase in the fruit length, fruit diameter, fruit weight and volume which might be attributed to their stimulatory effect on plant metabolism and production of auxins [16, 17].

Table 6 Interaction effect of foliar feeding of Borax, Zinc sulphate and Urea on yield and estimated yield in Guava cvs. Lalit and Shweta under high density planting system

Treatments	Yield (kg/plant)		Estimated yield (tonnes/ha)	
	Lalit	Shweta	Lalit	Shweta
T_0 (Zn_0 B_0 U_0)	11.40	10.88	9.50	9.06
T_1 (Zn_1 B_2 U_1)	12.46	11.94	10.38	9.95
T_2 (Zn_1 B_3 U_1)	13.02	12.39	10.84	10.32
T_3 (Zn_2 B_1 U_1)	12.71	12.12	10.58	10.10
T_4 (Zn_2 B_2 U_1)	13.87	13.08	11.56	10.89
T_5 (Zn_2 B_3 U_1)	14.70	13.63	12.24	11.36
T_6 (Zn_3 B_1 U_1)	14.16	13.47	11.79	11.22
T_7 (Zn_3 B_2 U_1)	15.65	14.59	13.03	12.15
T_8 (Zn_3 B_3 U_1)	16.37	15.14	13.63	12.61
T_9 (Zn_1 B_1 U_2)	16.09	14.89	13.40	12.40
T_{10} (Zn_1 B_2 U_2)	17.05	15.78	14.20	13.15
T_{11} (Zn_1 B_3 U_2)	18.11	16.64	15.09	13.86
T_{12} (Zn_2 B_1 U_2)	17.77	16.76	14.80	13.96
T_{13} (Zn_2 B_2 U_2)	19.39	18.23	16.15	15.19
T_{14} (Zn_2 B_3 U_2)	20.56	19.43	17.13	16.19
T_{15} (Zn_3 B_1 U_2)	21.14	20.10	17.61	16.74
T_{16} (Zn_3 B_2 U_2)	22.33	21.00	18.60	17.49
T_{17} (Zn_3 B_3 U_2)	**23.90**	**22.06**	**19.91**	**18.38**
S.Em ±	0.6325	0.4789	0.5269	0.3989
C.D. at 5%	1.8179	1.3764	1.5143	1.1466

Plate 1 A Panoramic view of experimental site of Lalit

Plate 2 A Panoramic view of experimental site of shweta

Conclusion

On the basis of results obtained from the field experiment entitled "Effect of Foliar Feeding of Borax, Zinc Sulphate and Urea on Fruiting and Yield of Guava (*Psidium guajava* L.) cvs. Shweta and Lalit under high density planting system" It may be concluded that the foliar feeding of different chemicals were found beneficial for fruiting and yield of Guava (*Psidium guajava* L.) cvs. Shweta and Lalit especially under Agro-climatic zone-V of Rajasthan i.e. in Jhalawar condition. Among the different levels of nutrients, higher dose (Borax @ 0.6 per cent, Zinc sulphate @ 0.6 per cent and Urea @ 1 per cent) was found superior over control on most of the fruiting and yield characteristics of guava. However, among different interaction treatments, T_{17} treatment (borax @ 0.6 % + zinc sulphate @ 0.6 % + urea @ 1 %) was found significantly superior over control. This treatment has given maximum increase in fruit set per cent, fruit retention per cent, number of fruits per tree, fruit yield per plant and estimated yield per hectare. Therefore, based on the present research it may be concluded that, in guava the foliar feeding of borax @ 0.6 % + zinc sulphate @ 0.6 % + urea @ 1 % improve the fruiting, yield and quality of guava.

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