Research Note

THE ASIAN JOURNAL OF HORTICULTURE
Vol. **6** | Issue 2 | December, 2011 | 546-548

Article history:
Received : 19.09.2011
Accepted : 15.11.2011

Effect of integrated nutrient management on yield and quality of Guava

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Abstract : An experiment was conducted to study the effect of different combinations of organic, inorganic manures and biofertilizers on yield and quality of guava at Department of Horticulture, Panjabrao Deshmukh Krishi Vidyapeeth, Akola during year 2010-11. The fruit yield in terms of number of fruits harvested per plant, fruit yield (kg/plant) was recorded maximum in plants which were treated with (487.5+243.75+281.25 g NPK + 50 kg FYM + 250 g *Azotobacter* + 250 g PSB/plant). Same treatment also showed the superior fruit quality traits evaluated in terms of fruit weight, fruit size, fruit volume.

Key words : Guava, INM

How to cite this article : Barne, Varsha G., Bharad, S.G., Dod, V.N. and Baviskar, M.N. (2011). Effect of integrated nutrient management on yield and quality of Guava, *Asian J. Hort.*, **6** (2) : 546-548.

Basically guava is a hardy crop even though it gives good response to manuring and fertilization. Like any other plants guava also requires different nutrient elements for proper growth and yield. Use of organic manures along with biofertilizers and inorganic fertilizers as a cheap source of available nutrient to plants has resulted in beneficial effects on growth, yield and quality of various fruit crops (Ram and Rajput, 2000). Hence, keeping all these point in view, the attempts were made to find out suitable combination of organic, inorganic manures and biofertilizers for obtaining higher yield and better fruit quality in guava.

An experiment was laid out in 2010-11 in Randomized Block Design with eleven treatments and three replications at Shivar Block, Central Research Station. The treatments were T_1 (650:325:375 g NPK + 50 kg FYM / plant), T_2 (487.5:243.75:281.25 g NPK + 50 kg FYM + 250 g *Azotobacter* / plant), T_3 (487.5 : 243.75:281.25 g NPK + 50 kg FYM + 250 g *Azospirillum* / plant), T_4 (487.5:243.75:281.25 g NPK + 50 kg FYM + 250 g *Azotobacter* + 250g PSB / plant), T_5 (487.5 : 243.75:281.25 g NPK + 50 kg FYM + 250 g *Azospirillum* + 250g PSB / plant), T_6 (650:325:375 g NPK + 15 kg vermicompost / plant), T_7 (487.5:243.75:281.25 g NPK + 15 kg vermicompost + 250 g *Azotobacter* / plant), T_8 (487.5:243.75:281.25 g NPK + 15 kg vermicompost + 250 g *Azospirillum* / plant) and T_9 (487.5:243.75:281.25 g NPK + 15 kg vermicompost + 250 g *Azotobacter* + 250g PSB / plant) , T_{10} (487.5:243.75:281.25 g NPK + 15 kg vermicompost + 250 g *Azospirillum* + 250g PSB / plant) and T_{11} (Control).

Half dose of nitrogen and full dose of potassium, phosphorous were applied on first week of July, 2010 and remaining half dose of nitrogen was applied one month after first dose *i.e.* second week of August, 2010. Fertilizer applied between the radial distances 200 to 260 cm away from trunk, 15-25 cm deep and then properly covered with soil. Biofertilizers were applied by mixing in FYM and Vermicompost one week after application of inorganic fertilizers.

For recording the fruit quality observations five mature fruits were randomly selected from each observational plant and same fruits were used for recording the various physico-chemical properties of guava.

The data regarding fruit yield presented in Table 1 clearly indicate that, number of fruits per plant and fruit yield per plant was significantly influenced by various treatments of organic, inorganic manures and

Table 1 : Effect of integrated nutrient management on fruit yield and quality of guava

Treatments	No. of fruits per plant	Fruit yield (kg/plant)	Fruit weight (g)	Length of fruit (cm)	Breadth of fruit (cm)	Fruit volume (cc)	TSS (^{0}B)	Total sugar (%)	Acidity (%)
T_1	143.00	24.45	191.10	7.74	7.60	181.80	10.01	7.32 (2.70)	0.330 (0.57)
T_2	146.00	26.56	215.44	8.02	7.79	190. 50	11.15	8.28 (2.87)	0.327 (0.57)
T_3	153.00	27.98	215.20	7.95	7.65	215.30	10.40	8.27 (2.87)	0.341 (0.58)
T_4	205.00	39.45	289.40	8.84	8.89	257.53	12.51	8.70 (2.94)	0.259 (0.50)
T_5	179.66	35.68	246.10	8.65	7.90	235.30	11.57	8.32 (2.88)	0.305 (0.55)
T_6	84.00	21.78	182.30	7.67	7.55	175.60	9.95	7.12 (2.66)	0.312 (0.55)
T_7	91.00	25.12	198.70	7.80	7.70	189.93	9.78	7.32 (2.70)	0.335 (0.57)
T_8	129.00	22.63	183.50	7.80	7.64	179.60	10.10	7.34 (2.70)	0.355 (0.59)
T_9	165.00	33.41	211.70	8.21	7.88	227.30	11.45	8.26 (2.87)	0.394 (0.62)
T_{10}	154.00	31.27	206.20	7.75	7.78	196.16	11.20	7.64 (2.76)	0.389 (0.62)
T_{11}	73.00	12.74	131.80	7.32	6.44	139.2	9.45	6.07 (2.46)	0.359 (0.59)
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. $\pm$	3.02	1.46	3.06	0.01	0.02	1.33	0.26	0.07	0.01
C.D. (P=0.05)	8.81	4.27	8.93	0.03	0.06	3.89	0.77	0.22	0.04

* Figures in parenthesis denote the square root transformation value

biofertilizers. The highest yield on number basis and weight basis (205.00 and 39.45 kg/plant, respectively) was recorded in treatment T_4 which was found at par with the treatment T_5. However, the control (T_{11}) treatment exhibited minimum fruit yield (73 fruit harvested plant^{-1} with 12.74 kg/plant).

The increased on number basis and weight basis might be attributed due to the fact that, increasing levels of nutrients in assimilating area of crop due to which the rate of dry matter production was enhanced. Similarly, due to rational partitioning of dry matter to economic sink, the yield attributes were improved. The above results are in conformity with the findings of Ram *et al*. (2007) and Shukla *et al.* (2009) in guava.

The superior physical fruit quality in respect of maximum fruit weight (289.40 g), fruit length (8.84cm), fruit breadth (8.89cm) and fruit volume (257.53 cc) were associated with the treatment T_4. However, minimum fruit weight (131.80 g) fruit length (7.32 cm), fruit breadth (6.44 cm) and fruit volume (139.2 cc) were recorded under the treatment T_{11} (control). Fruit weight and fruit size are highly correlated with dry matter content and balance level of hormones. Superior physical fruit quality may be due to fact that, organic manures and microbial fertilizers enhances the nutrient availability by enhancing the capability of plants to better solute uptake from rhizosphere, also these nitrogen fixers are known for accumulation of dry matter and their translocation as well as favour synthesis of different growth regulators . The above findings are in accordance with Athani *et al.* (2007) and Ram *et al.* (2007) in guava.

The chemical fruit quality in terms of maximum total soluble solids (12.51^{0}B), total sugar (8.70%) with minimum acidity (0.259%) were recorded with treatment T_4 whereas, lowest total soluble solid, total sugar and maximum acidity recorded in treatment T_{11} (Control). Application of nitrogen fixing bacteria with lower dose of inorganic fertilizers might have exhibited regulatory role on the absorption and translocation of various metabolites, in which carbohydrates are most important which affects the quality of fruits. During ripening of fruits the carbohydrates reserves of the root and stem are drawn upon heavily and hydrolyzed into sugars hence, results in better fruit quality. The results are in accordance in with Ram *et al*. (2007) in guava, Madhavi *et al*. (2008) in mango.

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