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RESEARCH ARTICLE :

Effect of inorganic nutrients and combine effect of inorganic and organic sources of nutrients on vegetative and reproductive growth of guava (*Psidium guajava* L.) cv. G-27

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SUMMARY : An experiment entitled "Studies on effect of inorganic nutrients and combine effect of inorganic and organic sources of nutrients on growth of guava (*Psidium guajava* L.) cv. G-27. Gwalior 27 was carried out during 2014-15 at University orchard farm, Department of Horticulture (Fruit Science), College of Agriculture, Gwalior (M.P.). The experiment was conducted in Randomized Block Design with three replications using cv. G-27 with thirteen treatments replicated thrice in a well established guava orchard. Application of nutrients irrespective of their sources and doses, markedly enhanced quality of guava fruits over untreated control. There were four levels of Nitrogen *i.e.*, 600 g, 450 g, 300 g and 150 g, four levels of Phosphorus *i.e.*, 400 g, 300g, 200g, 100g, four levels of Potash *i.e.*, 600 g, 450 g, 300 g and 150 g, plus 5 kg vermicompost and 10 kg FYM was applied per plant while the control plants received no fertilizer, inoculation and manure treatment.The morphological parameters of plant were significantly influenced by the integrated nutrient treatments. Results showed the maximum increase in tertiary shoot length (7.47 cm) shoot diameter (4.10 mm), and number of leaves per shoot (6.93) and reproductive parameters like No. of flower per Shoot (74.04), Fruit setting (93.20), Fruit drop (44.06), Fruit retention (70.43 at 90 days with the application of T_5 ($N_1P_1K_1V_1$) which was superior than control.

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BACKGROUND AND OBJECTIVES

Guava (*Psidium guajava* L.) is an economically important commercial fruit crop of tropical and sub-tropical climates. Its cultivation is getting popularity due to increasing international trade, better nutritional contents and processing of its value added products. Without proper management, continuous fruit production reduces nutrient reserves in the soil. Another issue of great concern is the sustainability of soil productivity, as land began to be intensively exhausted depletion decreases quality fruit

production and soil fertility and leads to soil degradation. On the other hand, continuous use of inorganic fertilizers as source of nutrient in imbalanced proportion is also a problem, causing inefficiency, damage to the environment and in certain situations, harms the plants themselves and also to human being who consumes them (Uma Shanker *et al.,* 2002). Organic manures like farmyard manure is bulky organic manure, which is a storehouse of major nutrients apart from containing considerable amount of macro and micronutrients, Secondly, the use of organic manures increase the organic matter content of the soil by increasing the water holding capacity. Biofertilizers on the other hand enrich the soil with beneficial micro-organisms; they have the ability to mobilize the nutritionally important elements from non-usable to usable form through biological processes resulting in enhanced production of various fruit crops (Dey *et al*., 2005). In order to meet balanced nutrient supply in guava, integrated nutrient management is the important alternative source, which is not only beneficial to maintain the soil health but also to sustain the fruit production. Keeping this in view the present investigation was carried out to study the impact of organic and inorganic fertilizers on growth and quality of guava cv. G-27.

RESOURCES AND METHODS

The present studies were conducted at University orchard farm, Department of Horticulture (Fruit Science), College of Agriculture, Gwalior (M.P.) during 2014 - 2015. The experiment was laid out in Randomized Block Design (RBD) with three replications. There were four levels of nitrogen *i.e.*, 600 g, 450 g, 300 g and 150 g., four levels of phosphorus *i.e.*, 400 g, 300g, 200g, 100g, four levels of potash *i.e.* 600 g, 450 g, 300 g and 150 g, 5 kg vermicompost and 10 kg FYM was applied to the per plants while the control plants received no fertilizer, inoculation and manure treatment. The methods employed during the course of investigation and materials utilized have great significance in the research programme.

The whole of the organic manure was applied as a basal dose on the onset of monsoon. Then required doses of fertilizers were applied in two split doses in the month of July and August. For application of manure and fertilizers the top soil around the tree (equal to the leaf canopy of the tree) was dug upto 30 cm and the fertilizers were uniformly mixed into the soil, which was then levelled. Irrigation was supplied immediately after fertilizer application. Observations on various morphological characters of plants *i.e.* vegetative and reproductive of guava fruits with different treatments application were recorded. Observation were recorded on vegetative attributes *viz.,* shoot length, shoot diameter and number of leaves per shoot guava plants with different treatments application were recorded.

OBSERVATIONS AND ANALYSIS

The data presented in Table 1 shows that shoot length, shoot diameter and number of leaves per shootwas significantly influenced by integrated nutrient management (INM). The maximum Shoot length (7.47 cm), shootdiameter (4.10 mm) and number of leaves per shoot (6.93) was found with the application of treatment T_5 ($N_1P_1K_1V_1$), which is at par with T_9, T_6, T_{10} and minimum number of fruits per tree was (4.08 cm) under T_0 (control).

The increase in vegetative growth of the plant by NPK attributed to the association of Nitrogen in the synthesis of protoplasm and in the primary manufacture of amino acids and increased auxin activities brought about by nitrogen fertilization. As a result meristematic activities increase which in turn increase the vegetative growth. The phosphorus is known to play an important role in

Table 1 : Effect of different treatment combination on vegetative parameters of guava

Treatments	Shoot length (cm)	Shoot diameter (mm)	Number of leaves per shoot
T_0	4.08	2.50	3.23
T_1	6.95	3.58	5.02
T_2	6.53	3.25	4.08
T_3	5.70	2.80	3.35
T_4	5.47	2.75	3.12
T_5	7.47	4.10	6.93
T_6	7.23	3.80	5.33
T_7	6.82	3.45	4.73
T_8	6.33	3.08	3.72
T_9	7.42	4.07	5.60
T_{10}	7.15	3.72	5.12
T_{11}	6.62	3.30	4.43
T_{12}	6.12	3.02	3.65
S.E.±	0.19	0.12	0.17
C.D. (P=0.05)	0.56	0.36	0.50

photosynthesis, besides being a constituent of nucleo proteins. It is required in the synthesis of starch, sucrose and protein which are responsible for growth. Thus, the fact that Phosphorus promoted the growth in the present study is understandable because phosphorus, which was applied, might have been utilized in the synthesis of starch, sucrose and proteins. The application of potassium also had significant effect on the morphological parameters. This significance may possibly be due to acceleration of the movement of assimilates by Potassium application. Similar results have also been reported by Sharma and Sharma (1992); Al-Qurashi (2005); Khattak *et al.* (2005) and Kumar *et al.* (2009) in guava.

The data presented in Table 2, revealed that fruit weight was significantly influenced by integrated nutrient management (INM) and the maximum number of flowers (74.04) was found under the treatment T_5 (N1P1K1V1) which was at par with T_9, T_6, T_{10}. The minimum no. of flowers (47.94) was found with control (T_0) followed by T_4 and T_3. The optimum dose of nutrient combinations (NPK) accelerates the metabolic activities of the plant by increasing the meristematic activities which in turn increases the vegetative growth and ultimately lead to increase flowering, maximum fruit setting per cent and maximum fruit retention per cent. Similar results have also been reported by Sharma and Sharma (1992), Zang and Xin (2000) and Uma Shankar *et al.* (2002) in guava.Application of organic manure and chemical fertilizers a significantly influenced the fruit drop in guava. Minimum fruit drop % (19.81%) and maximum fruit drop % (44.06 %) was recorded under control.This may be due to lack of availability of nutrients for uptake, which was also responsible for the poor vegetative growth, low production of flower shoots, poor fruit set and high fruit drop. Similar results have also been reported by Naik and Sri Haribabu (2007) in guava.

Data regarding fruit set (%) and fruit retention (%) presented in Table 2, revealed that fruit set (%) and fruit retention (%) was significantly influenced by integrated nutrient management (INM). The maximum fruit set (%) (93.20) and fruit retention (73.39) was found under the treatment T_5 (100% N1P1K1V1) which was at par with T_9, T_6 and minimumfruit set (%) (82.05) and fruit retention (%) (37.99)found under T_0 (control). The better reproductive growth due to organics might have reflected in increased production of flowers and resulted in higher per cent fruit set. By increased fruit set due to vermicompost could be attributed to the presence of B group vitamins, plant hormones and chemical exudates released during biological activity promoted by the vermicompost in the soil. Vermicompost has very 'high porosity', 'aeration', 'drainage' and 'water holding capacity and have a vast surface area, providing strong absorbability and retention of nutrients for longer period of time hence maximizing fruit setting percentage and maximum fruit retention percentage. Naik and Sri Haribabu (2007) and Singh *et al.* (2008) in guava, Verma *et al.* (2010) in apple and Mishra *et al.* (2011) in ber also reported similar results.

Table 2 : Effect of different treatment combination on reproductive parameters of guava

Treatments	No. of flower per shoots	Fruit set (%)	Fruit drop (%)	Fruit retention (%)
T_0	47.94	82.05	44.06	37.99
T_1	65.38	90.11	26.45	63.67
T_2	60.03	88.68	30.87	57.81
T_3	55.08	86.54	36.64	49.90
T_4	52.82	85.95	39.06	46.89
T_5	74.04	93.20	19.81	73.39
T_6	69.78	91.98	23.65	68.32
T_7	63.84	89.63	27.18	62.44
T_8	58.51	88.36	32.69	55.67
T_9	71.75	91.99	21.57	70.43
T_{10}	67.85	91.55	25.40	66.15
T_{11}	61.99	89.08	28.76	60.32
T_{12}	56.71	87.88	33.77	54.10
S.E. $\pm$	2.08	1.44	1.88	2.44
C.D. (P=0.05)	6.07	4.20	5.50	7.13

Conclusion :

The results of present experiment for the 15 years old guava cv. G-27 shows that the treatment T5 (N1P1K1V1) has been most appropriate integrated nutrient dose under agro-climatic conditions of Gwalior region for obtaining maximum vegetative and reproductive growth of guava.

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REFERENCES

Al-Qurashi, A.D.S. (2005). The effect of foliar fertilization of NPK on early growth and nutrient concentrations of guava

(*Psidium guajava* L.) plants. *Assiut J. Agril. Sci*. **36** (3): 121-128.

Dey, P., Rai, M., Nath, V., Das, B. and Reddy, N. N. (2005). Effect of biofertilizer on physico-chemical characteristics of guava (*Psidium guajava* L.) fruit. *Indian J. Agric. Sci.*, **75**(2): 95-96.

Khattak, M.R, Latif, Abdul, Bashir, Ahmad and Wazir, Muhammad (2005). Effect of different levels of nitrogen, phosphorus and potassium on the growth and yield of guava. *Sarhad J. Agric.*, **21** (2): 185-187.

Kumar, Dinesh, Pandey, V., Anjaneyulu, K. and Nath, Vishal (2009). Optimization of major nutrients for guava yield and quality under east coastal conditions. *Indian J. Hort.*, **66** (1): 18-21.

Mishra, S., Choudhary, M.R., Yadav, B.L. and Singh, S.P. (2011). Studies on the response of integrated nutrient management on growth and yield of ber. *Indian J. Hort.*, **68** (3): 318-321.

Naik, M.H. and Sri Haribabu, R. (2007). Feasibility of organic farming in guava (*Psidium guajava* L.). *Acta Hort.*, **735**: 365-372.

Sharma, D.P. and Sharma, R.G. (1992). Effect of foliar application of NPK on growth and yield of guava (*Psidium guajava* L.). *Adv. Plant Sci.*, **5**: 313-315.

Singh, Virendra, Dashora, L.K., Karatha, K.M., Ahalawat, T.R. and Barad, A.V. (2008). Growth, flowering, fruiting and yield of guava (*Psidium guajava*L.) cv. 'SARDAR' grown under high-density-planting system as influenced by various organic and inorganic sources*Asian J. Hort*., **3** (2): 382-385.

Uma Shankar, Pathak, R.A., Pathak, R.K. and Ojha, C.M. (2002). Effects of NPK on the yield and fruit quality of guava cv. Sardar. *Prog. Hort*., **34** (1): 49-55.

Verma, M.L., Sharma, Rakesh, Singh, Charan and Rathore, A. C. (2010). Influence of organic manuring on apple performance and soil properties in temperate zone of Himachal Pradesh. *Indian J. Soil Conservation*, **38** (3): 212-216.

Zang, Xiao Ping and Xin, Tao Lei (2000). The application of fertilizer for guava trees. *South China Fruits*, **29** (6): 29-31.