Original Research Article

Effect of integrated nutrient management on meadow orchardingof guava for better growth yield and quality.

Abstract

The present experiment was conducted at Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. Prayagraj during the session 2023 - 2024. The experiment was laid out in randomized block design with three replications, and the study consists of ~~Ten~~ten treatment combinations including control by using different Effect of integrated nutrient management on growth yield and quality of guava under meadow orcharding.The best treatment was T_9 (50% RDF + 10 Kg FYM + Azotobacter + VAM) &T_8 (50% RDF + 10 Kg FYM + VAM) which shows highest values in all the parameters *viz*., fruit weight (145.98 g), fruit diameter (8.00 cm), ~~Number~~ number fruit/tree (41.81),fruit yield/tree (6.02 kg), yield (t/ha) (30.09~~),)~~.All the treatments were significantly superior in their fruit yield and fruit growth of guava over control (T_0) and (T_9).

Key words:Guava, INM, *Psidium guajava*,

Introduction

Guava (*Psidium guajava* L.) also known as “apple of tropics” or “poor man’s apple” is one of the most popular fruit crops of tropical and sub-tropical climate. It belongs to the Myrtaceae family having chromosome number 2n= 22 and is native to Tropical America, extending from Mexico to Peru **(Radha and Mathew, 2007).** The plant was introduced by the Portuguese to the Indian subcontinent in the early 17th century **(Singh, 1995),** but at present, the major guava producing countries are India, China, Thailand, Pakistan, Mexico, Indonesia, Brazil, Bangladesh. However, due to its easy availability, a rich source of nutrients, and inexpensiveness of the fruit to the common man; it seems to be an Indian fruit **(Dinesh and Vasugi, 2010).**

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Guava is the fifth most important fruit in respect of area and production after mango, banana, citrus, and apple in India. The area under guava in India is about 0.27 million hectares, producing 4.10 million ton,and productivity of 13.7 million ton/hectare. In India, largest area and highest production under guava fruit is inUttar Pradesh and highest Productivity inAndhra Pradesh. It grows everywhere in India in the homestead gardens, even without or little care, but it is commercially cultivated in the states of Uttar Pradesh, Bihar, Madhya Pradesh, West Bengal, Punjab, Gujarat, Maharashtra, Karnataka, and Andhra Pradesh**(Anon. 2018-2019).**

Guava is an ideal fruit crop for nutritional security in India. It is the third richest source of Vitamin C (299 mg/100g) after Barbados cherry (1000-4000 mg/100g pulp) and Aonla (600 mg/100 g of pulp) **(Gupta, 2014),** contains 2 to 5 times more fiber (6.9%) containing fruit next to fig crop **(Muthukumar and Selvakumar, 2013).** Besides vitamin C, it is also a rich source of vitamin A, riboflavin (B2), thiamine (B1), calcium, a fair source of phosphorus, and a good source of iron. The fruit has a sweet aroma is wholly edible along with the skin and usually eaten raw both green and ripe (when it becomes fragrant). Seed contains 3 to 13 percent oil, which is rich in essential fatty acid and can be used as a salad dressing. Guava is consumed in different ways like jam, jelly, syrup, beverages, sauce, ice cream, butter, marmalade, chutney, and other products. In some countries, the leaves are used for treating diarrhea and also for drying and tanning.

Integrated nutrient supply/management (INM) aims at maintenance or adjustment of soil fertility and of plant nutrient supply to an optimum level for sustaining the desired crop productivity through optimization of benefit from all possible sources of plant nutrients in an integrated manner **(Roy and Ange, 1991).** It infuses long term sustainability in the productivity level because of availability of nutrients in soil for next season crop. It also minimizes the existing gap between the nutrient removal through continuous use of chemical fertilizers and supply through slow release of fertilizers **(Lata *et al.*, 2013).** Incorporation of organic fertilizers is a common practice and is instrumental in limiting the chemical interventions and helpful in minimizing the negative impact on the wider environment. Good quality farm yard manure, poultry manure, vermicompost, biofertilizers and green manures are the most valuable organic matter applied to the soil.

2. MATERIALS AND METHODS

This experiment was laid out during the August 2023 to March 2024 at Horticulture Research Farm, Department of Horticulture, Naini Agricultural Institute, Sam

Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.). The horticultureresearch farm is situated at 25^0 39" 42" N latitude, 81^0 67" 56" E longitude and at an altitude of 98 m above mean sea level. Six to sevenyearsolduniformtreesofguava(*Psidium guajava*L.)cv. Allahabad Safeda under meadow orcharding were selected for this study at Guava Orchard. The treatment consisted of T_0 - 100% RDF (NPK-180,90,90g), T_1- 75% RDF + 2.5 kg vermicompost, T_2- 50% RDF + 2.5 kg vermicompost, T_3 - 75% RDF + 10 kg FYM, T_4- 50% RDF + 10 kg FYM, T_5 (75% RDF + 10 kg FYM) + Micronutrient, T_6- 50% RDF + 10 kg FYM) + Micronutrient, T_7 - 50% RDF + 10 kg FYM + *Azotobacter*, T_8 -50% RDF + 10 Kg FYM + VAM, T_9 -50% RDF + 10 Kg FYM + *Azotobacter* + VAM.TheexperimentwaslaidoutinaRandomizedBlockDesignwith10treatmentsand replicatedthrice.Datarecordedondifferentaspectsoffruit crop,*viz.*,growth,yieldwere subjected to statistically analysis by analysis of variance method. (**Gomez and Gomez, 1976)** and economic data analysis mathematical method.

RESULTANDDISCUSSION:

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Fruit physical parameters

Fruit weight (g)

In data on fruitweightof guava as influenced by integrated nutrient management are summarized in Table 1.

The data reveals that the fruit weight of guava increased significantly by the application of integrated nutrient management under experimentation over the control. The maximum fruitweight(145.98 g) was recorded with treatments 9 (50% RDF + 10 Kg FYM + *Azotobacter* + VAM respectively, while the minimum fruit weight(118.63 g) was recorded under treatment 0 (control), respectively. Further, the interaction effect of integrated nutrient management significantly influenced the fruit weight in guava.

It may be due to increased the rhizosphere microbial activity and larger quantity of nutrients of the soil. **Ramana *et al.* (2014)**found that application of different fertilizers, organic manures and biofertilizer improve the vegetative growth, number of fruits and yield of guava cv. Sardar. The similar effect were found by **Rao *et al.* (2014) and Ray *et al.* (2014)**

Fruit Diameter (cm)

In data on fruitgirthof guava as influenced by integrated nutrient management are summarized in Table 1.

The data reveals that the fruit diameter of guava increased significantly by the application of integrated nutrient management under experimentation over the control. The maximum fruitdiameter(6.60 cm) was recorded with treatments 9 (50% RDF + 10 Kg FYM + *Azotobacter* + VAM respectively, while the minimum fruit diameter (5.30) was recorded under treatment 0 (control), respectively. Further, the interaction effect of integrated nutrient management significantly influenced the fruit diameter in guava.

It may be due to increased the rhizosphere microbial activity and larger quantity of nutrients of the soil. **Kumrawat*et al.*, (2018)** found that application of different fertilizers, organic manures and biofertilizer improve the vegetative growth, number of fruits and yield of guava cv. Sardar. The similar effect were found by **Jamwal *et al.* (2018) and Prabhu *et al.* (2018).**

Fruit shape

The data on fruit shape of guava as influenced by integrated nutrient management are summarized in table number 1

The best fruit shape was best recorded with treatment 9(50% RDF + 10 Kg FYM + *Azotobacter* + VAM).

Fruit colour

The data on fruit colour of guava as influenced by integrated nutrient management are summarized in table number 1.

The best fruit colour was best recorded with treatment 9(50% RDF + 10 Kg FYM + *Azotobacter* + VAM).

Yield Parameter

Number of fruits/plant

In data on number of fruits/plant of guava as influenced by integrated nutrient management are summarized in Table 2

The data reveals that the number of fruits/plant of guava increased significantly by the application of integrated nutrient management under experimentation over the control. The maximumnumber of fruits/plant (41.81) was recorded with treatments 9 (50% RDF + 10 Kg

FYM + *Azotobacter* + VAM respectively, while the minimumnumber of fruits/plant (20.92) was recorded under treatment 0 (control), respectively. Further, the interaction effect of integrated nutrient management significantly influenced the number of fruits/plant in guava.

Tiwari *et al.*, (2018)reported that the application of different fertilizers, organic manures and biofertilizers improve the vegetative growth, number of fruits and yield of guava cv. Sardar. Similar findings have been reported by **Porismita*et al.*, (2018).**

Yield/plant (kg)

In data on yield/plant of guava as influenced by integrated nutrient management are summarized in Table 2

The data reveals that the yield/plant of guava increased significantly by the application of integrated nutrient management under experimentation over the control. The maximumyield/plant (41.81) was recorded with treatments 9 (50% RDF + 10 Kg FYM + *Azotobacter* + VAM respectively, while the minimumyield/plant (20.92) was recorded under treatment 0 (control), respectively. Further, the interaction effect of integrated nutrient management significantly influenced the yield/plant in guava.

Sandhyarani *et al.*, (2022)found that application of different fertilizers, organic manures and biofertilizer improve the vegetative growth, number of fruits and yield of guava cv. Sardar. The similar effect were found by **Gupta *et al.*, (2019)**.

Yield (t/ha)

In data on yield (t/ha) of guava as influenced by integrated nutrient management are summarized in Table 2.

The data reveals that the yield (t/ha) of guava increased significantly by the application of integrated nutrient management under experimentation over the control. The maximumyield (t/ha) (41.81) was recorded with treatments 9 (50% RDF + 10 Kg FYM + *Azotobacter* + VAM respectively, while the minimumyield (t/ha) (20.92) was recorded under treatment 0 (control), respectively. Further, the interaction effect of integrated nutrient management significantly influenced the yield (t/ha) in guava.

Shubham *et al.*, (2020)found that application of different fertilizers, organic manures and biofertilizer improve the vegetative growth, number of fruits and yield of guava cv. Sardar. The similar effect were found by **Jaiprakash *et al.*, (2021) and Tyagi *et al.*, (2021).**

CONCLUSION

In the present investigation concluded that among the different treatment combinations the treatment T9 [50% RDF + 10 Kg FYM + *Azotobacter* + VAM) was superior in respect to fruit growth and yield parameters.

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Table 1. Effect of different levels Integrated Nutrient Management on fruit growth of Guava

Treatment Symbol	Treatment combinations	Fruit weight (g)	Fruit diameter (cm)	Fruit shape	Fruit colour
T_0	100% RDF (NPK-180,90,90g)	118.63	5.91	Oval	Dark green
T_1	75% RDF + 2.5 kg vermicompost	125.40	6.50	Oval	Dark green
T_2	50% RDF + 2.5 kg vermicompost	120.10	6.21	Oval	Dark green
T_3	75% RDF + 10 kg FYM	138.61	7.60	Round	Green
T_4	50% RDF + 10 kg FYM	135.30	7.55	Round	Green
T_5	(75% RDF + 10 kg FYM) + Micronutrient	129.81	6.88	Round	Green
T_6	(50% RDF + 10 kg FYM) + Micronutrient	131.90	6.95	Oval	Dark green
T_7	50% RDF + 10 kg FYM + *Azotobacter*	140.52	7.81	Round	Yellowish
T_8	50% RDF + 10 Kg FYM + VAM	142.85	7.90	Round	Yellowish
T_9	50% RDF + 10 Kg FYM + *Azotobacter* + VAM	145.98	8.00	Round	Yellowish
	F-test	**S**	**S**	-	-
	SEm(±)	3.94	0.24	-	-
	CD (p=0.05)	11.70	0.73	-	-

Table 2. Effect of different levels Integrated Nutrient Management on fruit yield of Guava

Treatment Symbol	Treatment combinations	Number of fruits/plant	Yield/plant (kg)	Yield (t/ha)
T_0	100% RDF (NPK-180,90,90g)	20.92	2.49	12.47
T_1	75% RDF + 2.5 kg vermicompost	25.71	3.27	16.37
T_2	50% RDF + 2.5 kg vermicompost	22.60	2.71	13.56
T_3	75% RDF + 10 kg FYM	35.31	4.89	24.47
T_4	50% RDF + 10 kg FYM	32.51	4.35	21.73
T_5	(75% RDF + 10 kg FYM) + Micronutrient	28.60	3.72	18.60
T_6	(50% RDF + 10 kg FYM) + Micronutrient	30.48	4.06	20.31
T_7	50% RDF + 10 kg FYM + *Azotobacter*	38.98	5.28	26.38
T_8	50% RDF + 10 Kg FYM + VAM	39.05	5.55	27.76
T_9	50% RDF + 10 Kg FYM + *Azotobacter* + VAM	41.81	6.02	30.09
	F-test	S	S	S
	SEm(±)	0.92	0.13	0.66
	CD (p=0.05)	2.72	0.39	1.95

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