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Effect of N.P.K. and Vermicompost on growth, flowering and yield of guava (*Psidium guajava*) cv. Hisar safeda in Sri Ganganagar district in Rajasthan

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Abstract

An experiment entitled on “Effect of N.P.K. and Vermicompost on growth, flowering and yield of guava (*Psidium guajava*) cv. Hisar safeda conducted in spring during the year 2023-24 at the experimental field of Chak 1K Mirzewala Rajasthan 335038 District Sri Ganganagar. The plants were treated with eleven different treatments having three replication. Maximum plant height (54.33cm) was obtained from T7 while minimum plant height (35.33cm) from (T₁) control, Maximum growth of branch (24.33 cm) was obtained from T9 while minimum growth of branch (6.67 cm), highest length of branch (54.33 cm) was obtained from T11 while lowest length of branch (40.33 cm) was obtained from T₁ control, flowering parameters includes maximum number of flower per branch (38) was obtained from T9, minimum number of flower per branch (18) was obtained in T₁ with control, Maximum number of flower per plant (403.33) from T9 while minimum number of flower per plant (200) from T₁, yield parameters highest number of fruit per plant (86) from T₇, lowest number of fruit per plant (50) from T₁, highest number of fruit per branch (9.33) from T9, lowest number of fruit per branch (3.33) from T₁, maximum weight of fruit (114.33gm) was recorded with under T₅ minimum weight of fruit (94.66 gm) from T₃ and maximum weight of fruit per plant (14.66kg) from T₅ while minimum weight of fruit per plant (6.33kg) from T₁.

Keywords: Guava, Hisar safeda, N:P:K, Growth and vermicompost

Introduction

Guava (*Psidium guajava* L.), a member of family Myrtaceae, is one of the most important tropical or subtropical fruit crop popularly known as “Apple of Tropics”. It is popular fruit widely grown in the tropical and subtropical regions of the world. Guava tree is characterized by the smooth bark, greenish brown to brown in color and scaly, angular young shoots, numerous stamens, actinomorphic white flowers, inferior ovary and fruits are globose berries. The flesh is white, yellow, pink or red with embedded numerous many seeds. The genus ‘*Psidium*’ consists of about 150 species, out of which only 20 species produced edible fruits. Guava got domesticated due to its excellent adaptability to different climatic conditions, hardy nature and prolific bearing. It is the fourth most important fruit crop of India after mango, banana and citrus and it is believed to be introduced in India at a very early date. Guava has adopted in India so well that it appears to be an Indian fruit. India shares 4 percent of the world production of guava producing 3.82 million tons under 0.26 million hectares area with the productivity of 14.7 t ha⁻¹. Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh and Maharashtra are the major guava growing states in the country. Uttar Pradesh occupies first position in area and production of guava in India. In Rajasthan, guava is grown in an area of 4.10 thousands hectare with production of 42.50 million tons and productivity is 10.37 thousand tons per hectare (Anonymous, 2023) ^[1]. It is rich source of pectin, hence suitable for jelly making. It also contains the group of major antioxidants like polyphenols, carotenoids, omega-3 and omega-6 which belong to unsaturated group of fatty acids. The dietary fiber is one of the most important constituents of its seed. Hisar safeda this is the most famous variety grown in Uttar Pradesh for table purpose. Tree is medium in height (5.8-6.5m) with vigorous branching and dense foliage. Fruits are medium in size (180 g), round in shape with few seeds. Fruit is white fleshed with good keeping quality. The basic concept of integrated nutrient management (INM) is the adjustment of plant nutrient supply to

an optimum level for sustaining the desired crop productivity. It involves proper combination of chemical fertilizers, organic manure and bio fertilizers suitable to the system of land use and ecological, social and economic conditions. Vermicomposting is an ecofriendly natural fertilizer prepared from biodegradable organic wastes and is free from chemical inputs.

Vermicompost is rich in beneficial micro flora such as N fixers, P- solubilizers, cellulose decomposing micro-flora etc. It contains earthworm cocoons which increases the population and 3 Nutrient Management in Guava activity of earthworm in the soil and also contains valuable vitamins, enzymes and hormones like auxin, gibberellins etc. that enhances the decomposition of organic matter in soil, soil structure, texture, aeration, and water holding capacity and prevents soil erosion. It also improves nutrient status of soil both macro-nutrients and micronutrients, water retention capacity of soil because of its high organic matter content and promotes better root growth and nutrient absorption.

Materials and Methods

The present experiment entitled “Effect of N.P.K. and

Vermicompost on growth, flowering and yield of guava (*Psidium guajava*) cv. Hisar safeda was carried out at the horticulture farm of chak1K, Mirzewala, Sri Ganganagar spring season of the year 2024. The experiment was conducted at 1K, Mirzewala, Sri Ganganagar Rajasthan 335038, the study involved 4 years plants of guava, totaling 33 in numbers, spaced at regular intervals of 3 m*3 m. The experiment include 11 treatments with different dose of N:P:K (N.P.K.1. -200 g, 100 g, 120 g/plant, N.P.K.2.-150 g, 75 g, 90 g/plant, N.P.K.3. -100 g, 50 g, 60 g/plant,) and Vermicompost (Vermicompost (V1) - 3kg/plant) Vermicompost (V2) - 2.5kg/plant and Vermicompost (V3) – 2kg/plant) were applied twice in each treatment.

Results and Discussion

1. Plant Height (cm)

It is evident from the data presented in Table 1 that that maximum Plant height (54.33 cm) was noted in T₇treatment N.P.K.2RDF75%)+Vermicompost+2.5kgand whereas, minimum Plant height of(35.33 cm) of guava trees was recorded in T₁ treatment control.

Table 1: Effect of N.P.K. and Vermicompost on growth and flowering of guava (*Psidium guajava*) cv. Hisar safeda in Sri Ganganagar District in Rajasthan

Treatments	Plant Plant(cm)	Growth of Branch(cm)	Length of Branch(cm)	Number of flower per branch	Number of flowers per plant
T ₁ - Control	35.33	6.67	40.33	18.00	200
T ₂ -100% Recommendation dose of NPK	42.00	8.00	44.00	22.33	230.66
T ₃ - (RDF100%)+Vermicompost+3kg	54.00	10.66	50.10	35.33	333.67
T ₄ - RDF100%)+Vermicompost+2.5kg	49.66	14.33	48.00	37.66	316.67
T ₅ (RDF100%)+Vermicompost+2kg	50.33	13.66	51.00	34.00	302.00
T ₆ - (RDF75%)+Vermicompost+3kg	51.66	11.66	53.33	36.66	369.00
T ₇ - (RDF75%)+Vermicompost+2.5kg	54.33	16.00	53.66	35.00	366.00
T ₈ - (RDF50%)+Vermicompost+3kg	49.33	18.66	51.33	35.66	398.00
T ₉ -(RDF75%)+Vermicompost+2kg	50.00	24.00	52.33	38.00	403.33
T ₁₀ - (RDF50%)+Vermicompost+2.5kg	44.33	20.00	52.00	36.00	368.67
T ₁₁ - (RDF50%)+Vermicompost+2kg	51.33	19.33	54.33	28.66	329.67
S.Em. ±	1.516	0.676	1.337	1.484	2.491
CD (P=0.05)	4.502	2.007	3.971	4.409	7.400

2. Growth of branch

It is evident from the data presented in Table 1 that Maximum Growth of branch (24 cm) was noted in T₉ treatment N.P.K.2 (RDF75%)+Vermicompost+ 2kg and Whereas, minimum growth of branch of (6.67 cm) of guava trees was recorded in T₁treatment control.

3. Length of branch

It is evident from the data presented in Table 1 that maximum Length of branch of (54.33 cm) was noted In T₁₁ treatment N.P.K.3(RDF50%)+Vermicompost+2kg and Whereas, minimum lengthof branch of (40.33 cm) of guava trees was recorded in T₁ treatment control.The reason of increased vegetative growth characters was due to high photosynthesis activity in guava crop found by spray ofDifferent Dosages of N.P.K and Vermicompost.Similar findings were also observed by in guava, Mitra (2012)^[6] inguava.

4. Number of flowers per branch

It is evident from the data presented in Table 1 that maximum Number of Flowers per Branch of (38) was noted in T₉ treatment N.P.K. 2 (RDF75%) + Vermicompost+2 kg and whereas, minimum number of flowers per branch (18) of guava trees was

recorded in T₁ treatment control

5. Number of flowers per plant

MaximumNumber of Flowers Per plant of (403.333) was noted in T₉ treatment N.P.K. 2 (RDF 75%)+Vermicompost+2 kg whereas, minimum number of flowers per plant (200) of guava trees was recorded in T₁ treatment. This might be due to fact that the use of different dosages of N.P.K and Vermicompost improved the auxin and metabolic activities of plant and that finally enhance flowering attributes. Further, the finding of present study are in close agreement with finding of Bhadarge *et al.* (2022)^[2], and Sandhu (2024)^[7] *et al.* in guava.

6. Number of fruit per plant

It is evident from the data presented in Table 1 that maximum Number of fruit per plant of (86) was noted in T₇treatmentN.P.K.2 (RDF75%) +Vermicompost+2.5kg and whereas, minimum Number of fruit per plant (50) of guava trees was recorded in T₁ treatment. It was due to the reason that the increase in nitrogen content in guava resulted in higher protein content in guava. Vermicompost & N.P.K. are capable of supply adequate macro and micro plant nutrients which play major role in quality improvement through desirable enzymatic changes taking place during growth. Similar findings were also observed

by Dwivedi (2013) ^[3] in guava and Goswami *et al.* (2015) ^[4] in guava.

Table 2: Effect of N.P.K. and Vermicompost on yield of guava (*Psidium guajava*) cv. Hisar safeda in Sri Ganganagar District in Rajasthan

Treatments	Number of Fruit Per Plant	Number of Fruit Per Branch	Weight of Fruit (gm)	Weight of Fruit Per Plant (kg)
T ₁ - Control	50.00	3.33	70.00	6.33
T ₂ -100% Recommendation dose of NPK	60.33	4.00	80.67	7.00
T ₃ - (RDF100%)+Vermicompost+3 kg	83.00	7.66	112.66	12.33
T ₄ - (RDF100%)+Vermicompost+2.5 kg	79.00	8.00	109.66	13.67
T ₅ (RDF100%)+Vermicompost+2 kg	82.00	7.33	94.66	14.67
T ₆ - (RDF75%)+Vermicompost+3 kg	82.67	5.66	108.00	10.67
T ₇ - (RDF75%)+Vermicompost+2.5 kg	86.00	6.00	114.33	12.00
T ₈ - (RDF50%)+Vermicompost+3 kg	84.33	8.33	111.00	11.33
T ₉ - (RDF75%)+Vermicompost+2 kg	83.33	9.33	113.33	13.33
T ₁₀ - (RDF50%)+Vermicompost+2.5 kg	80.00	7.00	111.33	12.67
T ₁₁ - (RDF50%)+Vermicompost+2 kg	79.33	6.66	113.00	14.33
S.Em. ±	0.850	0.900	1.167	0.801
CD (P=0.05)	2.525	2.674	3.467	2.379

7. Number of fruit per branch

It is evident from the data presented in Table 2 that maximum Number of fruit per branch of (9.33) was noted in T₉ treatment N.P.K.2 (RDF75%) +Vermicompost+2kg and whereas, minimum Number of fruit per branch (3.33) of guava trees was recorded in T₄ treatment control.

8. Weight of fruit(gm)

It is evident from the data presented in Table 2 that maximum weight of fruit (114.33gm) was noted in T₇ treatment N.P.K.2 (RDF75%) +Vermicompost+2.5kg and whereas, minimum weight of fruit (70 gm) of guava trees was recorded in T₁treatment control.

9. Weight of fruit per plant (kg)

It is evident from the data presented in Table 2 that maximum weight of fruit/plant (14.66kg) was noted in T₅ treatment N.P.K.1(RDF100%)+Vermicompost+ 2kg and Whereas, minimum weight of fruit/plant (6.33kg) of guava trees was recorded in T₁treatment control.

Conclusion and Recordation

On the basis of results of obtained from present investigation, all the finding could be concluded that maximum increase of plant height, Number of Fruit per Plant&weight of fruit was observed at T₅ treatments i.e. application of N.P.K.2 (RDF75%) +Vermicompost+2.5 kg. The maximum growth of branch, number of flowers per branch & number of fruit per branch was observed in guava at T₇ treatments i.e. application of N.P.K.2(RDF75%)+Vermicompost+2 kg, Maximum weight of fruit/plant was recorded with under T₃ (i.e. N.P.K.1 (RDF100%)+Vermicompost+ 2 kg and Length of branch was noticed in T₉i.e.N.P.K.3(RDF50%)+Vermicompost+2kgas compared to all other treatments. Effect on number of flowers per plant of N.P.K and Vermicomposton growth, flowering and yield of guava (*Psidium guajava*) cv. Hisar safeda treatments had shown non-significant effect whole course of investigation.

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