



EFFECT OF DIFFERENT LEVELS OF NITROGEN, PHOSPHOROUS, POTASSIUM ON GROWTH, YIELD AND QUALITY OF GUAVA (*PSIDIUM GUAJAVA* L.) UNDER MEADOW SYSTEM PLANTING

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Abstract: The present experiment was carried out during December 2022 to March 2023 in Central horticulture research farm of Department of Horticulture, SHUATS, Prayagraj. The experiment was conducted in Randomized Block Design with 08 treatment replicated thrice. The experiment was conducted on eight years old Allahabad safeda guava trees planted at 2x1 m spacing. There were eight treatments of different levels of NPK viz. (T₀) control, (T₁) 100:50:50 g NPK/tree, (T₂) 150:75:75 g NPK/tree, (T₃) 200:100:100 g NPK/tree, (T₄) 250:125:125 g NPK/tree, (T₅) 300:150:150 g NPK/tree (T₆) 350:175:175 g NPK/tree, (T₇) 400:200:200 g NPK/tree in randomized block design. The application of NPK @ 400:200:200 g NPK/tree (T₇) produced superior growth, quality of the guava.

Keywords: Meadow orchard, N, P, K, growth, Yield etc.

1. Introduction

Meadow orchard system is a new concept of planting which has been developed for the first time in India at Central Institute for Subtropical Horticulture, Lucknow. The planting is done at 2.0 m (row to row) X 1.0 m (plant to plant), which gives a density of 5000 plants per hectare. Meadow orcharding gives higher yield as well as quality fruit production. Guava (*Psidium guajava* L.), is one of the most popular fruit grown in tropical, sub-tropical and some parts of arid regions of India. The basic principle for meadow orcharding is proper and regular training and pruning of the tree is to be done after harvesting of fruits to maintain the dwarf stature of the tree.

Uttar Pradesh produces best quality guava, and Allahabad has the distinct reputation for growing the best guava in the country as well as in the world.

It has been noticed that guava suffers severely from deficiency of micronutrients specially boron which reduce the quality of fruits. Guava fruits respond well to zinc, boron, potassium and molybdenum applications (Arora and Singh, 1999 and Singh and Chhonkar, 2008). However, very little work has been done on the application of these nutrients in guava trees. Deficiency of boron hinders the development of fruits. Fruits do not grow into big size, even those reaching a fair size do not ripen properly and become hard with brown corky skin. Sometimes there is cracking of such fruits.

There is an urgent need to find out appropriate dose of micronutrients and plant growth regulators for guava fruit crop to improve the productivity in this zone.

The plant growth regulators (PGR) act as messengers and are needed in small quantities at low concentration. Generally their site of action and biosynthesis are different. Plant growth regulators enhance the rapid changes in physiological and biochemical characters and improve crop

productivity. Gibberellic acid has been reported to influence vegetative growth, flowering, fruiting, and various disorders in many fruit crops.

2. MATERIALS AND METHODS

Climatic condition in the experimental site.

The area of Prayagraj district comes under subtropical belt in the south east of Uttar Pradesh, which experiences extremely hot summer and fairly cold winter. The maximum temperature of the location reaches up to 46°C-48°C and seldom falls as low as 4°C-5°C. The relative humidity ranges between 20 to 94%. The average rainfall in this area is around 1013.4 mm annually. However, occasional precipitation is also not uncommon during winter months.

The present investigation on the effect of different levels of N, P, K on growth, yield and quality of guava (*Psidium guajava* L.) under meadow system of planting. The experiment was conducted in Randomized Block Design (RBD) with one control and 8 treatments and three replications at the Central Research Farm of Department of Horticulture. Total no. of treatments was 7+1.

3. Result and Discussion

The maximum plant height was recorded in T₇ (400:200:200 g NPK/tree) with (204.96 cm) followed by T₆ ((350:175:175 g NPK/tree)) with (195.84 cm) and the minimum was recorded in T₁ (control) with (172.32 cm).

The maximum canopy spread was recorded in T₇ (400:200:200 g NPK/tree) with (192.40 cm) followed by T₆ ((350:175:175 g NPK/tree)) with (189.86 cm) and the minimum was recorded in T₁ (control) with (171.14 cm).

The maximum number of branches was recorded in T₇ (400:200:200 g NPK/tree) with (14.87) followed by T₆ ((350:175:175 g NPK/tree)) with (13.94) and the minimum was recorded in T₁ (control) with (10.89).

NPK/tree) with (60.88) cm² which were significantly superior over control T₀ (control) with (56.24) cm².

The maximum leaf area was recorded in T₇ (400:200:200 g NPK/tree) with (61.53) cm² followed by T₆ ((350:175:175 g NPK/tree)) with (60.88 cm²) and the minimum was recorded in T₁ (control) with (56.24) cm².

There was significant difference among the different treatments. Among the treatment applied the maximum fruit volume was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (61.53) cm³, followed by treatment T₆ (350:175:175 g NPK/tree) with (60.88) cm³ which were significantly superior over control T₀ (control) with (56.24) cm³.

There was significant difference among the different treatments. Among the treatment applied the maximum fruit weight was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (61.53) g, followed by treatment T₆ (350:175:175 g NPK/tree) with (60.88) g which were significantly superior over control T₀ (control) with (56.24) g.

There was significant difference among the different treatments. Among the treatment applied the maximum fruit diameter was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (6.72)

cm, followed by treatment T₆ (350:175:175 g NPK/tree) with (6.30) cm which were significantly superior over control T₀ (control) with (3.13) cm.

There was significant difference among the different treatments. Among the treatment applied the maximum number of fruits per branch was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (21.67), followed by treatment T₆ (350:175:175 g NPK/tree) with (19.67) which were significantly superior over control T₀ (control) with (13.67).

There was significant difference among the different treatments. Among the treatment applied the maximum number of fruits per plant was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (322.15), followed by treatment T₆ (350:175:175 g NPK/tree) with (274.28) which were significantly superior over control T₀ (control) with (149.01).

There was significant difference among the different treatments. Among the treatment applied the maximum fruit yield per plant was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (55.30) kg, followed by treatment T₆ (350:175:175 g NPK/tree) with (46.25) kg which were significantly superior over control T₀ (control) with (21.69) kg.

There was significant difference among the different treatments. Among the treatment applied the maximum TSS was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (12.17) °B, followed by treatment T₆ (350:175:175 g NPK/tree) with (11.81) °B which were

significantly superior over control T₀ (control) with (10.55)⁰B.

There was significant difference among the different treatments. Among the treatment applied the maximum Total sugar was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (8.84) %, followed by treatment T₆ (350:175:175 g NPK/tree) with (8.31) % which were significantly superior over control T₀ (control) with (5.61) %.

There was significant difference among the different treatments. Among the treatment applied the maximum Ascorbic acid was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (167.86) mg/100g, followed by treatment T₆ (350:175:175 g NPK/tree) with (166.12) mg/100g which were significantly superior over control T₀ (control) with (154.52) mg/100g.

There was significant difference among the different treatments. Among the treatment applied the minimum acidity was recorded in the treatment T₇ (400:200:200 g NPK/tree) with (0.205) %, followed by treatment T₅ (300:150:150 g NPK/tree) with (0.220) % which were significantly superior over control T₀ (control) with (2.66) %.

The maximum benefit cost ratio was recorded in treatment T₇ (400:200:200 g NPK/tree) with 2.84.



Table 1 Effect of different level of N, P, K, on Different parameters of the Guava.

Symbol	Plant height	Canopy spread	No. of Branches	Leaf area (cm ²)	Fruit volume (cm ³)	Fruit weight (g)	Fruit Diameter (cm)	No. of fruits/branch	No. of fruits/plant	Yield/Plant (kg)	TSS (°B)	Total Sugar	Ascorbic acid (mg/100g)	Acidity %
T ₀	172.32	171.14	10.89	56.24	150.77	56.24	3.13	13.67	149.01	21.69	10.55	5.61	154.52	0.266
T ₁	187.52	186.47	11.47	57.32	153.07	57.32	3.37	14.67	168.41	27.20	11.61	5.87	155.89	0.244
T ₂	192.14	186.58	12.47	57.67	155.93	57.67	3.73	16.67	208.15	34.08	11.05	6.44	160.52	0.233
T ₃	186.94	180.41	12.87	58.19	157.7	58.19	3.97	15.67	202.08	31.92	11.31	6.92	162.81	0.253
T ₄	187.30	185.5	12.50	59.65	158.66	59.65	5.04	17.67	219.01	34.41	11.4	7.14	163.62	0.233
T ₅	194.49	189.26	11.10	59.26	160.59	59.26	5.86	18.67	208.01	34.06	11.51	7.75	164.79	0.220
T ₆	196.84	189.86	13.94	60.88	164.54	60.88	6.30	19.67	274.28	46.25	11.81	8.31	166.12	0.231
T ₇	204.96	192.4	14.87	61.53	165.56	61.53	6.72	21.67	322.15	55.30	12.17	8.84	167.86	0.205
F-test	S	S	S	S	S	S	S	S	S	S	S	S	S	S
CD	7.07	5.32	1.652	2.042	2.521	2.042	0.924	0.782	2.624	5.462	1.314	1.052	2.065	0.026
SE(d)	3.31	2.56	0.892	1.021	1.351	1.021	0.461	0.351	1.321	2.651	0.658	0.524	0.982	0.012

4. Conclusion

On the basis of results obtained, It is concluded that the treatment **T₇ (400:200:200 g NPK/tree)** found to be best in terms of plant height, plant spread, Leaf area, number of branches, number of flower per plant, no of fruit per plant, Fruit volume, fruit diameter, fruit weight, number of fruit per branch, fruit yield per plant, T.S.S, acidity% and cost benefit ratio.

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