



E-ISSN: 2278-4136

P-ISSN: 2349-8234

www.phytojournal.com

JPP 2020; 9(2): 2051-2053

Received: 08-01-2020

Accepted: 12-02-2020

Siddanth Jain KDr. B. S. Konkan Krishi
Vidyapeeth, Dapoli, Ratnagiri,
Maharashtra, India**KV Malshe**Dr. B. S. Konkan Krishi
Vidyapeeth, Dapoli, Ratnagiri,
Maharashtra, India**RG Khandekar**Dr. B. S. Konkan Krishi
Vidyapeeth, Dapoli, Ratnagiri,
Maharashtra, India**CD Pawar**Dr. B. S. Konkan Krishi
Vidyapeeth, Dapoli, Ratnagiri,
Maharashtra, India**PS Sawant**Dr. B. S. Konkan Krishi
Vidyapeeth, Dapoli, Ratnagiri,
Maharashtra, India**Corresponding Author:****Siddanth Jain K**Dr. B. S. Konkan Krishi
Vidyapeeth, Dapoli, Ratnagiri,
Maharashtra, India

Effect of fertilizer levels on yield, economics and nutrient dynamics in sapota [*Manilkara achras* (Mill.) Forsberg] cv. Kalipatti

Siddanth Jain K, KV Malshe, RG Khandekar, CD Pawar and PS Sawant

Abstract

The experiment was carried out at Farm of Department of Horticulture, College of Horticulture, Dapoli, Dist. Ratnagiri, Maharashtra during the year 2018 in 40 years old sapota (cv. Kalipatti) orchard to study the effect of fertilizer levels on yield of sapota and nutrient status. The application of treatment T₄ i.e. 6 Kg each NPK + 400 Kg FYM Tree⁻¹ Year⁻¹ in three splits i.e., 1/3 in June, 1/3 in September and 1/3 in January resulted in significantly highest yield per hectare (4.09 ton) with maximum net return (Rs. 38605.47/ ha) and B /C ratio (1.23) during experimentation. The significantly highest available N (229.36 Kg/ha) analysed in treatment T₃ i.e. 4.5 Kg each NPK+ 300 Kg FYM Tree⁻¹ Year⁻¹ in two splits i.e., 1/2 in June and 1/2 in September, and maximum available P and K (59.27 and 581.36 Kg/ha respectively.) were recorded with treatment T₄ i.e. 6 Kg each NPK + 400 Kg FYM Tree⁻¹ Year⁻¹ in three splits i.e., 1/3 in June, 1/3 in September and 1/3 in January.

Keywords: Sapota, Kalipatti, yield, economics, nutrient status

Introduction

Sapota [*Manilkara achras* (Mill.) Forsberg. Syn *Acharas sapota* L.] is a evergreen, major tropical fruit, popularly known as 'chiku' in India. Sapota fruit is a fleshy berry, variable in shape, size and weight (75 to 150 g). The fruit when fully ripen is delicious and eaten as dessert fruit. The pulp is sweet and melting. The fruit skin can also be eaten since it is richer than the pulp in nutritive value.

In sapota, 'Kalipatti' is the leading variety of Maharashtra, Gujarat and North-Karnataka states (Chundawat and Bhuva, 1982) having dark green leaves, spreading habit and oval fruit of outstanding quality. The fruit is fleshy berry, variable in shape, size and weight (75-150g) with 1 or 2 seeds per fruit. The skin is thin, rusty brown somewhat scurfy looking like Iris potato and the pulp soft, melting, crumbling with a sandy or granular texture. Immature fruits are astringent, while ripe fruits are sweet and tasty.

The application of organic and inorganic sources of nutrient may be helpful in increasing the vegetative as well as reproductive growth of sapota, which may ultimately result in better production of good quality fruits. Being an irrigated crop, the split application of fertilizers may be helpful for improving nutrient use efficiency and expected yield. Keeping this fact in view the present investigation "Effect of fertilizer levels on yield of sapota [*Manilkara achras* (Mill.) Forsberg] cv. Kalipatti." was carried out.

Material and Methods

The experiment was carried out at Farm of Department of Horticulture, College of Horticulture, Dapoli, Dist. Ratnagiri, Maharashtra during the year 2018 in 40 years old sapota (cv. Kalipatti) orchard planted at 12.5m X 12.5m. The uniformly grown trees were selected and the experiment was laid in RBD design comprising five replications and four treatments viz. 1.5 Kg Each NPK + 100Kg FYM Tree⁻¹Year⁻¹ in June month (T₁), 3 Kg each NPK + 200Kg FYM Tree⁻¹ Year⁻¹ in June. (Recommended dose – check- T₂), 4.5 Kg each NPK+ 300 Kg FYM Tree⁻¹ Year⁻¹ in two splits i.e. 1/2 in June and 1/2 in September (T₃) and 6 Kg each NPK + 400 Kg FYM Tree⁻¹Year⁻¹ in three splits i.e., 1/3 in June, 1/3 in September and 1/3 in January (T₄). Each treatment was imposed on two trees in every replication. The recommended cultural practices were adopted for management of orchard. The matured fruit were harvested periodically from each treatment separately and weight was recorded and converted on hectare basis. The soil properties of the experimental plot were studied prior and after the experiment following the standard procedures. The economics of each treatment was calculated.

The data obtained was analysed statistically as per the method suggested by Panse and Sukhatme (1985) [6].

Results and Discussion

The data on yield and economics of sapota fruits cv. Kalipatti as influenced by the fertilizer levels presented in Table 1 indicate that application of graded dose of fertilizers significantly enhanced the productivity of trees by increasing the yield per hectare. The significantly maximum yield/ha (4.09t) was recorded in T₄ which was followed by T₃ (3.12 t/ha), T₂ (2.19 t/ha) and lowest yield (1.32 t/ha) was recorded

in T₁. The significant increase in fruit yield and yield attributing parameters in sapota with application of graded dose of NPK along with organic manure may be due to vigorous shoot growth and higher retention percentage. The beneficial role of graded dose of fertilizers along with organic manure in improving soil physical, chemical and biological properties is well known which intern helps in better nutrient absorption by plant and resulting in higher yield. Similar effects were recorded in sapota by Dalal *et al.* (2004) [3], Hebbara *et al.* (2006) [4], Satisha *et al.* (2014) [7], Meena (2016) [5] and Cheena *et al.* (2018) [1].

Table 1: Yield and Economics of sapota cv. Kalipatti as influence by different doses of fertilizers

Treatments	Yield (t/ha)	Expenditure incurred (Rs/ha)	Gross return (Rs/ha)	Net profit (Rs/ha)	B:C ratio
T ₁ (1.5 Kg Each NPK + 100Kg FYM Tree ⁻¹ Year ⁻¹ in June)	1.32	56132.52	66000.00	9867.48	1.18
T ₂ (3 Kg each NPK +200Kg FYM Tree ⁻¹ Year ⁻¹ in June)	2.19	92260.29	109400.00	17139.71	1.19
T ₃ (4.5 Kg each NPK+ 300 Kg FYM Tree ⁻¹ Year ⁻¹ in two splits i.e., ½ in June and ½ in September)	3.12	128866.88	156000.00	27133.12	1.21
T ₄ (6 Kg each NPK + 400 Kg FYM Tree ⁻¹ Year ⁻¹ in three splits i.e., ⅓ in June, ⅓ in September and ⅓ in January)	4.09	165894.53	204500.00	38605.47	1.23
Range	1.32 – 4.09				
Mean	2.68				
SEm ±	0.01				
CD @ 5%	0.03				

Table 2: Effect of fertilizers on chemical properties of soil before experiment and after harvest in sapota cv. Kalipatti

Treatments	pH	EC (dSm ⁻¹ at 25°C)	Organic Carbon (%)	Available Nitrogen (Kg/ha)	Available Phosphorous (Kg/ha)	Available Potassium (Kg/ha)
T ₁	5.65	0.14	16.00	215.46	53.18	549.22
T ₂	5.67	0.15	16.20	224.60	55.10	556.64
T ₃	5.66	0.15	16.12	229.36	57.57	577.60
T ₄	5.63	0.14	16.30	227.60	59.27	581.36
Range	5.63	0.14	16.00	215.46	53.18	549.22
	–	–	–	–	–	–
Mean	5.65	0.14	16.16	224.25	56.28	566.21
SEm ±	0.01	0.003	0.07	0.42	0.47	0.49
CD @ 5%	NS	NS	NS	1.29	1.46	1.51
Before experiment	5.68	0.13	15.6	219.52	54.60	560

The data presented in Table 1 revealed that the treatment T₄ resulted maximum net return (Rs. 38605.47/ ha) and B /C ratio (1.23) during experimentation. It was followed by T₃ (net return Rs. 27133.12 / ha and B /C ratio 1.21), T₂ (net return Rs. 17139.71/ha and B /C ratio 1.19) and minimum in T₁ (net return Rs. 9867.48/ha and B /C ratio 1.18).

Initial value of pH (5.68), EC (0.13 dSm⁻¹), OC (15.16%) and available NPK (219.52, 54.60, 560 Kg/ha respectively) presented in Table 2. Further, it revealed that the different fertilizer treatments has non-significant effect on pH, EC and Organic Carbon of soil and their average values are 5.65, 0.14 dSm⁻¹, 16.12 per cent, respectively after harvest. However the available N,P and K was significantly influenced due to fertilizer treatments.

The higher available N was estimated in T₃ (229.36 Kg/ha) which is significantly maximum and it was followed by T₄ (227.60 Kg/ha) and T₂ (224.60 Kg/ha) the lowest (215.46 Kg/ha) was in T₁. The available P was calculated significantly maximum in T₄ (59.27 Kg/ha) and it was followed by T₃ (57.57 Kg/ha) and T₂ (55.10 Kg/ha) the lowest (53.18 Kg/ha) was in T₁. The estimated value of available K was significantly higher in T₄ (581.36 Kg/ha) and it was followed by T₃ (577.60 Kg/ha) and T₂ (556.64 Kg/ha) the lowest (549.22 Kg/ha) was in T₁. The application of higher dose of nutrients in graded form improved the fertility status of soil.

The results are supported by findings of Shivakumar, *et al.* (2012) [8] in papaya.

From the present investigation it is inferred that the application of fertilizer dose of 6 Kg each NPK + 400 Kg FYM Tree⁻¹ Year⁻¹ in three splits i.e., ⅓ in June, ⅓ in September and ⅓ in January (T₄) has enhanced yield by 86.75 percent over recommended dose with Highest Benefit: Cost ratio.

References

- Cheena J, Soujanya B, Dr. Vijaya M. Studies on the effect of integrated nutrient management on growth and yield of sapota (*Achras sapota* L.) cv. Kalipatti. Int. J Chemical Studies. 2018; 6(4):352-355.
- Chundawat BS, Bhuva HP. Performance of some cultivars of sapota (*Achras sapota* L.) in Gujarat. Haryana J of Hort. Sci. 1982; 11:154-159.
- Dalal SR, Gonge VS, Jogdande ND, Moharia, Anjali. Response of different levels of nutrients and PSB on fruit yield and economics of sapota. PKV Research Journal. 2004; 28:126-128.
- Hebbara M, Ganiger VM, Reddy BGM, Joshi VR. Integrated nutrient management in sapota (*Manilkarazapota*) using vermicompost to increase yield

- and quality. *Indian Journal of Agricultural Science*. 2006; 76:587-590.
5. Meena HR. Integrated Nutrient Management in Sapota cv. 'Kalipatti'. A thesis submitted to Maharana Pratap University of Agriculture and Technology, Udaipur, 2016.
 6. Panse VG, Sukhatme PV. Statistical methods for agricultural workers. ICAR, New Delhi, 1985, 145-155.
 7. Satisha GC, Prakash Patil, Shirol AM, Ganeshamurthy AN. Integrating fertilizer N rates with organics on soil-available nutrients and yield of sapota under semi-arid conditions of Karnataka. *J Hortl. Sci*. 2014; 9(2):172-178.
 8. Shivakumar BS, Dharmatti PR, Channal HT. Effect of organic cultivation of papaya on yield, economics and soil nutrient status. *Karnataka Journal of Agricultural Science*. 2012; 25(4):488-492.