AJH
eISSN- 0976-724X

THE ASIAN JOURNAL OF HORTICULTURE
Volume **10** | Issue 1 | June, 2015 | 177-180
Visit us -*www.researchjournal.co.in*

A CASE STUDY

DOI : 10.15740/HAS/TAJH/10.1/177-180

Article history :
Received : 30.04.2015
Accepted : 30.05.2015

Effect of integrated nutrient management on yield of sapota

■ **B.M. TANDEL, PRABHU NAYAKA[1], K.A. SHAH[1] AND C.K. TIMBADIA[1]**

Members of the Research Forum

Associated Authors:
[1]Krishi Vigyan Kendra, Navsari Agricultural Univeristy, NAVSARI (GUJARAT) INDIA

Author for correspondence :
B.M. TANDEL
Krishi Vigyan Kendra, Navsari Agricultural Univeristy, NAVSARI (GUJARAT) INDIA
Email : hariombhupi@gmail.com

ABSTRACT : Constraints in sapota production and their elucidation at farming communities were studied with the involvement of farmer's. In this regard demonstrations on sapota were conducted in 58 villages of Jallpore, Navsari and Gandevi taluks of Navsari in an area of about 529 ha with involvement of 2645 farmer's. These areas were grouped in to 10 clusters. Demonstrations were focused on the use bio-fertilizer along with organic manures in with recommended dose of fertilizer management practices. From the study found that over the years high yield of fruit was obtained through use of organic manure vermi compost along with bio-fertilizer than traditional method of fertilizer management. Among the ten clusters studied Manekpor cluster recorded with highest B: C ratio (6.18) and Gadat cluster recorded extension gap (2.8) and technology index (18.5) as compared to other clusters.

KEY WORDS : Sapota, INM, Bio-fertilizer, Bio-pesticide

HOW TO CITE THIS ARTICLE : Tandel, B.M., Nayaka, Prabhu, Shah, K.A. and Timbadia, C.K. (2015). Effect of integrated nutrient management on yield of sapota. *Asian J. Hort.*, **10**(1) : 177-180.

Sapota [*Manilkara achras* (Mill.) Fosberg] syn. (*Achras sapota* L.) is on important fruit of tropical and sub-tropical regions of the world. In India, it was introduced probably in 1898 and now it occupies a significant position among the fruit crops, as largest producer in the world. It is mainly grown in the humid tropical coastal region. In India, sapota is widely cultivated in the states of Karnataka, Gujarat, Andhra Pradesh, West Bengal, Maharashtra, Orissa, Pondicherry and Tamil Nadu with an annual production of 14.95 lakh MT. The medium black soil, warm and moist climate prevailing in this region are well suited for this crop. It is grown in Gujarat in 28,800 ha with an annual production of 309.9 thousand MT (Anonymous, 2012).

Due to continuous use of chemical fertilizer has hazards effect on overall soil health. This resulted in deterioration of soil physical and chemical properties resulting in stagnation in yield of crop and if the trend continues will have disastrous consequences (Hiwale *et al*., 2010). Use of organic matter along with bio-fertilizer in organic fertilizer as a cheap source of available nutrient to plant has resulted in beneficial effect on growth, yield and quality of various fruit crop (Ram and Rajput, 2000).

The continues use of inorganic fertilizers and scare use of organic manure has resulted in reduces crop yield, as against quality food produce through organic manures which has longer shelf-life and also fetch higher prices both in the domestic as well as global market. This type of farming has economic, environment and sustainability implication for the development of horticulture. Hence, keeping this in mind demonstration on use of bio fertilizer along with organic and in organic fertilizer was under taken with the following objectives :

- To increase the yield of sapota
- To maintain sustainability of sapota orchard
- Economic workout.

RESEARCH METHODS

Krishi Vigyan Kendra, Navsari is working in 92

Table A : Demonstrations and farmers practices

Sr. No.	Operations	Existing farmers practices	Improved practices on demonstractions
1.	Orchard management	Poor	Scientific management of orchard
2.	Planting method	Not proper	Square method
3.	Pruning	Not regularly	Regular interval
4.	Use of bio-fertilizer and bio-pesticide	Not regularly	Regular
5.	Fertilizer application	Imbalanced fertilizer application with low FYM application	1000-500-500 g NPK/plant FYM – 100 kg/plant
6.	Weed management	Hand weeding	Spraying
7.	Pest and disease management	Non- adoption of IPM and IDM practices	Adoption of IPDM practices

villages instead of 10 villages as a mandatory. In each and every village, Krishi Vigyan Kendra has made farmers group. About 200 farmers group are there in our operational villages. Each group consists of one leader through these leaders Krishi Vigyan Kendra disseminate new technologies to the other farmers field. These leaders are the hands of Krishi Vigyan Kendra to reach out the maximum area and people. Apart from this we worked with 9 co-operative societies of Navsari district. Krishi Vigyan Kendra, Navsari and co-operative societies together successfully implemented and completed the work. The present study area seems to huge and it unrealistic but combined effort of the co-opeartive societies, farmers leaders, field assistant and senior research fellowship we are able to reach out this much of area with regular interval.

The present study was conducted at Krishi Vigyan Kendra, Navsari, Gujarat, in the of the operational village area of Krishi Vigyan Kendra during the year 2012-13. The materials used for the study comprised of sapota cv KALIPATTI. Total in an area of about 529 ha with involvement of 2645 famers. Materials for the study with respect to demonstrations and farmers practices are given in Table A. Farmer's meetings were organized at village level to educate them regarding increase productivity and improve soil health for sustainable production by using organic manure vermi compost and bio-fertilizer. During the group meetings and trainings the scientist as well as field worker delivered lectures about the scientific cultivation of sapota. Krishi Vigyan Kendra, supplied biofertilizer (Azoto, PSB and KMB each at 100 ml/plant) and organic manure vermicompost (5 kg/plant) along with RDF (1000-500-500 g NPK/ plant). The data on the production cost and monetary returns were collected from demonstrations plots for working out the economic feasibility of sapota cultivation. Along with this data on local practices commonly adopted by the farmers were also collected. Recommended package of practices were followed sapota orchard. The technology gap, extension gap and technology index were calculated as suggested by Eswaraprasad *et al.* (1993) and Samui *et al.* (2000).

RESEARCH FINDINGS AND DISCUSSION

From the data presented in Table 1 it is inferred that demonstration yield of sapota is superior over control

Table 1 : Effect of INM on yield and technology index of sapota cultivation in Navsari district

Clusters	Area (ha.)	No. of farmers	Demon. yield kg/ha	Control yield kg/ha	% Increase yield	Extension gap t/ha	Technology gap t/ha	Technology index
Gadat cluster	95	475	16.3	13.5	26	2.8	3.7	18.5
Ajrai cluster	50	250	14.4	12.5	14	1.9	5.6	28
Gandevi cluster	50	250	15.8	12.6	20	3.2	4.2	21
Kharel cluster	50	250	14.8	11.6	17	3.2	5.2	26
Amalsad cluster	95	475	15.2	13.7	17	1.5	4.8	24
Abrama cluster	50	250	13.4	11.9	13	1.5	6.6	33
Vedchha cluster	50	250	15.4	12.8	16	2.6	4.6	23
Manekpor cluster	50	250	15.8	13.2	27	2.6	4.2	21
Panar cluster	21.2	106	14.8	12.3	25	2.5	5.2	26
Pathri cluster	17.8	89	13.6	11.5	15	2.1	6.4	32
Average	529	2645	14.95	12.56	19			

Table 2 : Effect of INM on economics of sapota cultivation in Navsari district

Cluster	Demonstration cost Rs./ha	Control cost Rs./ha	Gross return Rs./ha		Net return Rs./ha		CBR	
			Demo.	Control	Demo.	Control	Demo.	Control
Gadat cluster	34875	27125	244500	162000	209625	134875	6.01	4.97
Ajrai cluster	31250	25875	216000	150000	184750	124125	5.91	4.80
Gandevi cluster	34250	27500	237000	151200	202750	123700	5.92	4.50
Kharel cluster	30500	24750	222000	139200	191500	114450	6.28	4.62
Amalsad cluster	33500	27375	228000	164400	194500	137025	5.81	5.01
Abrama cluster	28750	23875	201000	142800	172250	118925	5.99	4.98
Vedchha cluster	33500	27500	231000	153600	197500	126100	5.90	4.59
Manekpor cluster	33000	25500	237000	158400	204000	132900	6.18	5.21
Panar cluster	34250	26750	222000	147600	187750	120850	5.48	4.52
Pathri cluster	29000	23750	204000	138000	175000	114250	6.03	4.81
Average	32287.5	26000	224250	150720	191962.5	124720	5.95	4.80

(traditional practices) yield. Potential yield of the sapota was 20 t/ha. Among the nine cluster studied, Gadat cluster resulted highest yield (16.3 kg/ha) followed by Gandevi and Manekpor cluster (15.8 kg/ha). The lowest yield was recorded in Abrama cluster (13.4 kg/ha). Yield of the demonstrations were further categorized in to technology and extension gaps.

The technology gap showed and it was highest in Abrama cluster (6.6 t/ha) as compared to Gadat cluster (3.7 t/ha). This could be due to lack of awareness about the scientific management of orchard, use of organic manure and bio-fertilizers. Hence, to narrow down the technological gap, it needs to educate the farmers more and more regarding nutritional management and other aspects through training, Khrdut shibir and field visit.

In advance higher extension gap of 2.8 t/ha was recorded in Gadat cluster compared to Abrama cluster (1.5 t/ha), which emphasized the needs to educate the farmers through various extension means for adoption effective integrated nutrient management to increase wider extension gap. It can be achieved through extensive extension activities as noticed in Gadat cluster.

The technology index shows the feasibility of the INM in sapota. The lower the value of technology index more is the feasibility. Table 1 revealed that the technology index was minimum in Gadat cluster (18.5 %) and 33 per cent for Abrama cluster. The economics of both demonstrations and control of sapota production under demonstrations were estimated and the results have been presented in Table 2. The economic analysis of the data over the year revealed that Manekpor cluster recorded highest B:C ratio (1:6.18) compared to other other cluster. Similar findings have been reported by Bhujbal *et al.* (2012); Chavan *et al.* (2009); Tandel and Patel (2009) and Patil (2006) and the results found were more or less similar to the present investigation.

Increasing the yield of sapota due to fact that, organic manures and microbial fertilizers enhances the nutrient availability by enhancing capacity of plants to the above findings are in accordance with Gawande *et al.* (1998) and Patel and Naik (2010).

The present study observed that wide yield and management gaps exist between research recommendation and farmer's practices. However, the yield levels under demonstrations this could be further improved by adopting recommended management practices. Hence, it can be concluded from the study that increased yield was due to adoption effective

integrated nutrient management and conducting demonstrations of proven technologies, yield potentials of crop can be increased to greater extent. This will subsequently increase the yield as well as the livelihood of the farming community.

REFERENCES

Anonymous (2012). National Horticulture Board, Ministry of Agriculture, GOI.

Bhujbal, D.S., Naik, D.M. and Kale, S.A. (2012). Effect of growth regulators on growth and yield of sapota [*Manilkara achras* (Mill.) Forsberg], *Asian J. Hort.*, **7**(2) : 351-353.

Chavan, S.R., Patil, M.B., Phad, G.N. and Suryawanshi, A.B. (2009). Effect of growth regulators on flowering and yield of sapota [*Manilkara achras* (Mill.) Forsberg]. *Asian J. Hort.*, **4** (1) : 119- 120.

Eswaraprasad, Y., Manohar Rao, M. and Vijayabhindana, B. (1993). Analysis of on farm and level of technology on oilseed and pulse crop in Northern Telengana zone of Andhara Pradesh. *Indian J. Agric. Econ.*, **48** : 351-356.

Gawande, S.S., Jitonde, D.J., Turkhede, A.B. and Darange, S.O. (1998). Effect of organic and inorganic fertilizers on yield and quality of sapota. *J. Soils & Crops*, **8** (1) : 58-60.

Hiwale, S.S., Apparao, V.V., Dandhar, D.G. and Bagale, B.G. (2010). Effect of nutrient replenishment through fertilizers in sapota cv. KALIPATTI. *Indian.J.Hort.*, **67** (2) : 274-276.

Patel, D.R. and Naik, A.G. (2010). Effect of pre-harvest traeatment of organic manures and in organic manures of fertilizers on post harvest shelf-life of sapota. cv. KALIPATTI, *Indian J. Hort.*, **67** (3) : 381-386.

Patil, M.B. (2006). Effect of growth and boron on yield and quality of sapota [*Manilkara achras* (Mill.) forsberg]. *J. Eco-Friendly Agric.*, **1** (2): 165-167.

Ram, R.A. and Rajput, M.S. (2000). Role of bio-fertilizer and manures in production of guava (*Psidium guavajava* L) cv. ALLAHABAD SAFEDA. *Haryana. J. Hort.Sci.*, **29** (3/4) : 193-194.

Samui, S.K., Maitra, S., Roy, D.K., Mondal, A.K. and Saha, D. (2000). Evaluation of front line demonstration on ground nut (*Arachis hypogeal* L). *J. Indian Soc. Coastal Agric. Res.*, **18** (2) : 180-183.

Tandel, Y.N. and Patel, C.B. (2009). Effect of scion stick storage on growth and success softwood grafts of sapota cv. KALIPATTI. *Asian J. Hort.*, **4** (1) : 198- 201.