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Effect of banana pseudo stems sap on yield in mango *var. kesar* (*Mangifera indica* L.) through on farm testing in Bharuch district of Gujarat

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Abstract

The present study was conducted by KVK, Bharuch during 2015 with seven on farm testing across five villages of Bharuch district of Gujarat. The results of on farm testing showed that farmers could increase the yield of mango to adoption of Banana pseudo sap improved production technology. From then on farm testing, it was observed that the increase number of fruit per plant (237.80), Average fruit weight (312.50 gm), yield per plant (74.03 kg per plant) and total yield (7.40 tone per hacter) was observed in treatment T₃ followed by number of fruit per plant (228.20), Average fruit weight (292.92 gm), yield per plant (66.84 kg per plant) and total yield (6.68 tone per hacter) in treatment T₂ as compared to farmers practice number of fruit per plant (188.60), Average fruit weight (234.46 gm), yield per plant (44.20 kg per plant) and total yield (4.42 tone per hacter). The increment in yield of Mango crop under on farm testing was due to improved and latest technology viz. Banana pseudo sap with recommended dose of fertilizers and plant protection measure.

Keywords: OFT, mango, banana pseudo stem sap, yield and economics

1. Introduction

Mango (*Mangifera indica* L.) belongs to the family Anacardiaceae, genus *Mangifera* and believed to have originated in the Indo-Burman region. It is considered as king of fruits and seems to be under cultivation for more over 9000 years in India. It is the choicest fruit among all the fruits for table purpose.

India is a thickly populated country and most of the residents of this country are vegetarian. The population being increased without check is the main handicap in our progress with the result of food shortage, malnutrition and poverty occurs. The solution for control of these problems may be only the major source of adopting intensive cultivation of fruit crops. The growing of fruit crop is the most intensive; most remunerative also may be adopted with large scale holders with gaining business. Apart from this fruits have an excellent dietary value and may be known as protected food as they contain many nutrients and play an important role during physiology of human digestion. The present status of increasing trends of fruits growing will not only provide means for solving the crisis of food hazard but also to earn lot of foreign exchange by exporting fresh fruits and allied products.

In Bharuch district the area under mango cultivation is 3126 hectares with annual production of 23757.6 M.T. (Anon., 2016-17). But mango grower farmers do not have the suitable techniques to increase the fruit yield of mango. Due to lack of awareness regarding new technology and improved cultivation practices farmers are facing heavy infestation of disease and insect pest in the crop causing low yield. By conducting farmer's field visit, it was observed that one of the important factors for low productivity of mango was not application of micronutrient, diseases problem and mealy bug, sucking pest & fruit fly. It was with this objective in view that the present study was initiated.

While separating fibers from the banana pseudostem, the liquid available is known as sap which contains good amount of essential macro and micronutrients as well as growth boosters. Salunkhe, (2010)^[2] analyzed the samples of banana pseudostem for its elemental composition and found that banana pseudostem contained macro elements in the range of 1.00 to 1.12 % N, 0.50 to 0.71 % P, 2.39 to 20.2 % K and micro nutrients in the range of 259 to 323.2 mg/kg Fe, 47.3 to 241.3 mg/kg Mn, 10.1 to 107.4 mg/kg Zn and 13.4 to 83.6 mg/kg Cu.

2. Material and Methodology

The on Farm trial was conducted for one year (2015-16) at farmer field, in five villages under supervision of Krishi Vigyan Kendra, Bharuch, on different farmer's fields in Bharuch district of Gujarat. Innovative and respective farmers from both the village are selected for conduction

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the trial to ensure their active participant. The experiment entitled "Effect of Banana Pseudo stem Sap on yield in Mango var. Kesar (Banana pseudostem sap) on 10 year old mango cv. "Kesar" tree. Three times treatments were applied at 20 days intervals starting from development of new flash on mango tree. Trees were sprayed till run-off with approximately of spray solution per tree by using tractor operated sprayer. The experiment consists of four treatment Ddifferent spraying concentration of Banana pseudo stem sap viz. T₁: Farmer practices, T₂: 1.5%, T₃: 2.0% and T₄: 2.5% along with other improved practices. Also recorded the yield parameters like total no. of fruits per plant, fruit weight (g), fruit yield (kg/plant), fruit yield (t/ha) and economic performance of On Farm Testing, the data on output were collected from OFTs as well as local plots from all selected

farmers and finally cost of cultivation, net returns with the benefit cost ratio was worked out by the formula given below.

$$B: C \text{ Ratio} = \frac{\text{Net Return}}{\text{Cost of cultivation}} \times 100$$

3. Result and Discussion

3.1 Comparison between OFTs and farmer's practices

The differences between on farm testing and farmers existing practice is shown in table 1. The farmer's practices include imbalance fertilizer application, and no adoption of plant protection measure. All these collectively resulted in low yield of mango in the district. However, in OFTs all the improved package of practices of mango was demonstrated.

Table 1: Details of mango under OFTs and Existing practices

Sr. No	Operation	Existing practices	Improved Practices of Demonstrated
1	Tillage	No tillage	Total three tillage before & after Kharif, season and November- December.
2	Irrigation	Irrigation given irregular	Irrigation given at fruit is pea stage and second irrigation at marble stage.
3	Fertilizer application	Imbalance application of fertilizer	Application of recommendation dose of fertilizer: FYM 100 kg/plant NPK @ 3.750:1.0:1.25 kg/plant
4	Micronutrient & Growth romance	No use	Banana Pseudo stem Sap
5	Pest Control	Non adoption of IPM practices	Spraying of Imidacloprid 5ml/10 liter water for sucking pest. Spraying of Acetamiprid 2gm/10 liter water for Mealy bug. Fruit fly trap @ 10 per hacter
6	Disease Management	Non adoption of IDM practices	Spraying of Wet table Sulphur 30gm/10 liter water for powdery mildew. Spraying of Carbendazim 5gm/10 liter water for anthracnose.

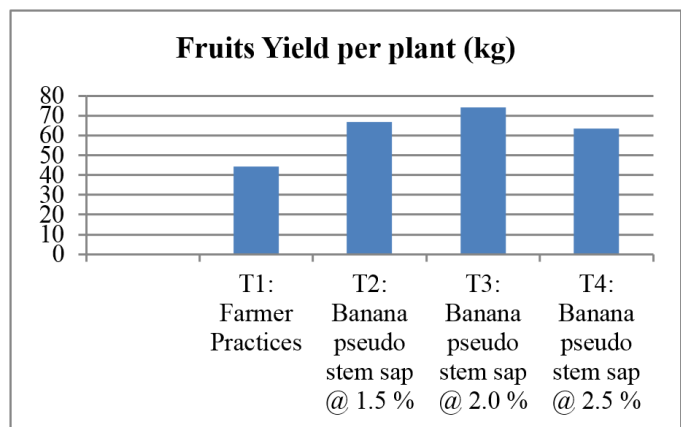
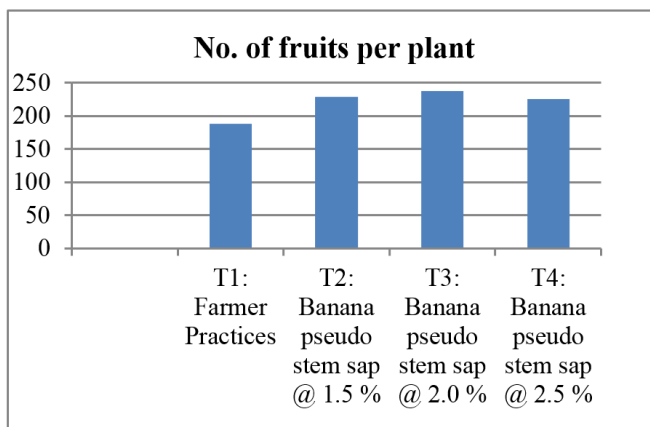
3.2 Performance of on farm testing

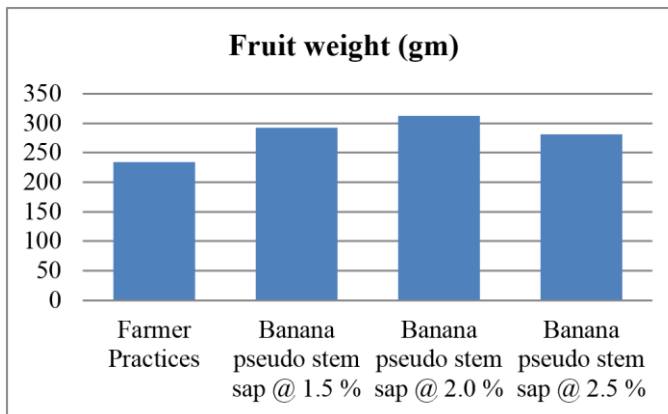
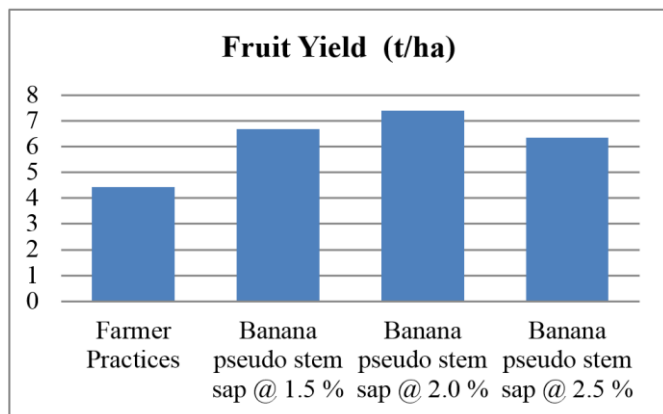
Banana Pseudo stem Sap along with RDF significant effect on the average fruit weight (gm), average number of fruit, yield per plant and yield per hacter attributes of mango in the 2015-16 (Table 2). Treatment T₃ (Banana pseudo stem sap @ 2.0 %) significantly improved, number of fruit per plant (237.80), yield per plant (74.03), average fruit weight (312.50 gm) and yield per hacter (7.40 t/ha) followed treatment T₂, number of fruit per plant (228.20), yield per plant (66.84), average fruit

weight (292.92 gm) and yield per hacter (6.68 t/ha), T₄ number of fruit per plant (225.80), yield per plant (63.58), average fruit weight (281.32 gm) and yield per hacter (6.35 t/ha) compared to treatment T₁ (Farmer practices), number of fruit per plant (188.60), yield per plant (44.20), average fruit weight (234.46 gm) and yield per hacter (4.42 t/ha). Similarly, yield enhancement in different crops was documented by Anonymous (2010)^[1], Salunkhe, J.R. (2010)^[2] and Bhatt *et al.* (2012)^[6].

Table 2: Effect of Banana pseudostem sap on yield in mango

Treatment	No. of fruits per plant	Fruits Yield per plant (kg)	Fruits weight (g)	Fruit yield (t/ha)
T ₁ : Farmer Practices	188.60	44.20	234.46	4.42
T ₂ : Banana pseudo stem sap @ 1.5 %	228.20	66.84	292.92	6.68
T ₃ : Banana pseudo stem sap @ 2.0 %	237.80	74.03	312.50	7.40
T ₄ : Banana pseudo stem sap @ 2.5 %	225.80	63.58	281.32	6.35
C.D.5 %	23.27	7.50	22.79	0.75
CV	7.67	8.76	5.90	8.75





Economic return

The inputs and outputs prices of commodities prevailed during the study of demonstration were taken for calculating net return and benefit: cost ratio (Table 3). The cultivation of mango under improved technologies gave higher net return

Rs. 1, 09,360/- with B:C ratio of 3.83 in T₃ as compared to farmer's practices net return Rs. 55,880/- with B:C ratio 2.71. This may be due to higher yield obtained under improved technologies compared to farmer's practice.

Table 3: Economic impact of Banana pseudostem sap in mango.

Economics of demonstration (Rs/ha)				Economics of check (Rs/ha)			
Gross cost	Gross Income (Rs./ha)	Net Return (Rs./ha)	BCR	Gross cost	Gross Income (Rs./ha)	Net Return (Rs./ha)	BCR
38640	148000	109360	3.83	32520	88400	55880	2.71

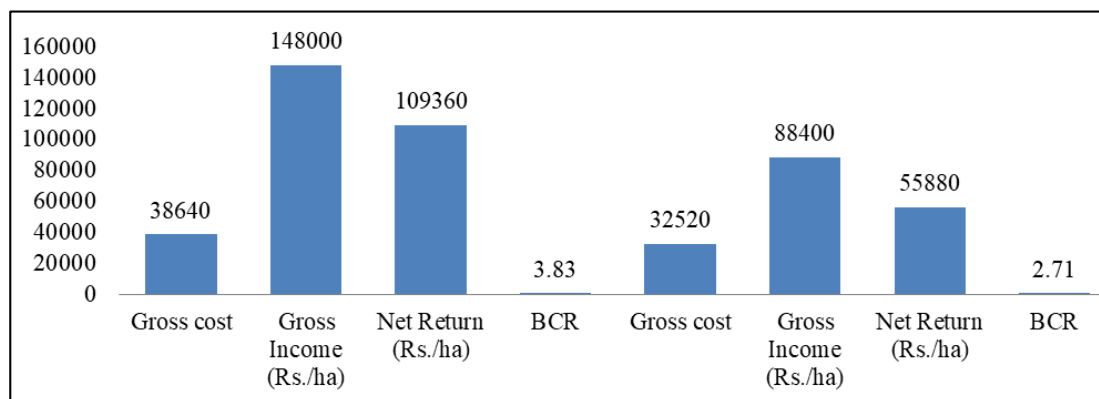


Fig: Economic Impact

4. Conclusion

From the results of the present investigation it can be concluded that spray of Banana pseudo stem sap were found best on the basis of flowering behavior and highest average fruit weight, number of fruit per plant, yield per plant and total yield per hacter was recorded in spray of Banana pseudo stem sap @ 2.0 % and lowest in farmer practices. Apart from higher yield at net profit, uptake of nutrient was also improved due to spraying of enriched banana sap. This will subsequently increase the income as well as the livelihood of the farming community. Farmers of different villages showed positive response for the planning and execution of this technology however more awareness about judicious use Banana pseudo stem sap. However horizontal spread of recommended and improved technologies may be achieved by the successful implementation of results of on farm testing (OFT) and various extensions activities like training programmes, Kisan gosthi, scientific visit and field day.

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