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## Evaluation of medium to large sized varieties of mango

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### Abstract

A research experiment was conducted at the Fruit Research Station, Sakkarbag Farm, Junagadh Agricultural University, Junagadh during the year 2013-14 to 2015-16 to study the evaluation of medium to large sized mango varieties under Saurashtra Agro Climatic Conditions. The experiment was laid out in 12 year mango trees with Randomized Block Design and three replications. Total seven varieties were under taken for the evaluation which falls under medium to large sized fruits viz., Rajapuri, Langra, Jamadar, Jumbo kesar, Giriraj, Nileshan and Sonpari. On the basis of the results obtained from the present experiment it may be revealed that maximum plant height in Rajapuri and plant spread (E-W and N-S) in Sonpari was recorded. The maximum fruit length in Jumbo Kesar, fruit width, fruit weight, pulp weight were reported in Rajapuri, Jamadar recorded minimum stone weight. The minimum peel weight, maximum number of fruits per plant highest yield per plant and hectare were recorded in variety Sonpari. Sonpari also reported excellent quality parameters viz., total soluble solid, reducing sugar and non-reducing sugar. Minimum acidity was reported in variety Langra, Jambo Kesar and Sonpari.

From different varietal evaluation of medium to large sized mango varieties, it concluded that the mango variety Sonpari was found the best for commercial growing in South Saurashtra Agro Climatic Conditions for yield and quality.

**Keywords:** Evaluation, medium, large, varieties, mango

### Introduction

Mango (*Mangifera indica* L.) belongs to family Anacardiaceae is an important and the most popular fruit crop. It is commercially grown and popular in more than 80 countries worldwide. Mango market leaders in the world are India, Brazil, China, Thailand, Egypt, Indonesia, Mexico, Pakistan, Philippines and Vietnam. Among these countries, Asian countries are recognized as the top leaders in mango production. The production of the crop varies from small scale farming to large, highly organized orchards, where the best available technology is applied. Worldwide around 2000 mango varieties are found. Among these, majority varieties are cultivated in India. Its cultivation in India has been estimated to be 2.263 million ha with an annual production of 19.687 million MT with 8.7 t per ha productivity. Gujarat itself produces 13 lakh tons of mango which contributes around seven per cent in the country. Junagadh district produces 84120 tones mango produce from 21030 ha area (Anon., 2018) [1]. As an export fruit crop, mango earns the country foreign exchange while at the same time acts as a source of household income for the resources- poor farmer. The mango fruit is highly perishable, it's ripening hastened during hot summer months despite the importance of mango in India, 40-50 per cent of the fruit are lost during postharvest handling. Out of these 2000 varieties worldwide more than two hundred varieties exist in different parts of the Gujarat. Of these hundred varieties only about five to ten varieties are being commercially grown. Collection, conservation and evaluation of different small to medium sized varieties of Mango is one of the most important aspect of any varietal improvement programme. The attempts was made to conserve and evaluate the small to medium sized varieties of Mango for early fruiting, high yielding with better quality under South Saurashtra Agro Climatic Conditions.

Fruit size plays a very important role to fetch market prize. Minimum standards are sub consciously expected by the end users. Medium to large sized mango fruits plays a very important role to govern mango market. In various countries standard mango sizes are compulsory for the export. Not only this but size of mango fruit is very important for the physiological maturity and ripening. Ripening time and ripening habit might governed by mango size. Fruit size play very important role for the productivity or an orchard. Sometimes increased size of mango fruit may take more days for the maturity, so it can be said that medium to large sized mango varieties may get late entry for the play in the mango market.

Because of increased size obviously it remains for a longer period with the mother plant which favours to increase TSS and all sugars. So study in depth was conducted to study various physical chemical and yield characteristics.

### Materials and Methods

The research experiment entitled, Assessment of small to medium sized mango varieties was initiated at South Saurashtra Agro-climatic conditions to evaluate varietal characteristics and performance in this region. The work was carried out at Fruit Research Station, Junagadh Agricultural University, Junagadh falls under South Saurashtra Agro-climatic Zone during 2013 to 2015 in Randomized Block Design with three replications, and each treatment consist of eight trees.

The main objective was to distinguish the small to medium and medium to large sized mango fruits and to study fruit characteristics and quality parameters of mango fruit. For this research work 12 years old healthy trees of seven mango variety having small to medium sized fruit size were selected viz., Rajapuri, Langra, Jamadar, Jumbo kesar, Giriraj, Nileshan and Sonpari were selected.

Experimental material consisted of grafted mature and bearing trees of Rajapuri, Langra, Jamadar, Jumbo kesar, Giriraj, Nileshan and Sonpari. The trees were erect, medium in size; dome shaped and shoots medium to thick with spreading nature. These trees are spaced at 8 X 8 meter distance. Utmost care was taken while selecting the healthy and optimum productive trees of the uniform size, shape and age. Hand weeding was done as and when required in the orchard. Interculturing was done by power tiller as well as with the help of 'Kudali' and then basin was prepared. Physical application of any material or chemical was not necessary for the execution of this experiment. But naturally fallen temperature and accumulated degree days were the naturally applied treatments for trees of all three mango varieties. Well rotten Farm Yard Manure was applied @ 100 kg/ tree. Chemical fertilizers were applied to the tree to the tune of 750: 160: 750: N-P-K g. The manures and fertilizer were applied by preparing ring around the main trunk of the tree. Nitrogen was applied in the form of ammonium sulphate, phosphorus in the form of single super phosphate and potash in the form of muriate of potash. Half dose of nitrogen was applied @ 400 g per plant when fruits attain mustard size (February). Remaining dose of nitrogen, full dose of phosphorus and potash were applied at the time of onset of monsoon by preparing a ring of one meter diameter as basal dose during July. First irrigation was applied to the mango plants when fruits attained mustard size. Before the first irrigation withholding of irrigation water was done since withdrawal of monsoon. After the first irrigation, trees were irrigated as and when required at 8-10 days interval. The mango fruits were harvested when the skin of fruit shows powdery shining with small white dots on it. Another maturity indices taken in to considerations was when 2-3 fruits fallen down on ground naturally (known as *sankh* in vernacular language and '*tapka*' in Hindi) or fruit show fullness of shoulder. The fruits don't mature and ripe at the same time. So, it requires frequent hand pickings. The final yield per tree in kilogram was obtained by sum up the yield of all the pickings.

Soil samples were collected with the help of augor. The collected soil samples were analyzed at the department of

agriculture chemistry and soil science, JAU, Junagadh to know its chemical properties and soil nutrient status and depicted as follows.

**Table 1:** Physio-chemical properties of soils of experimental site.

EC (dsm-1)	pH	O.C. (%)	Phosphorus (kg ha-1)	Potash (kg ha-1)
0.37	8.02	1.17	117.76	1226.00

### Results and Discussion

In this experiment of medium to large sized mango fruit trees a wide range of variability in respect of various tree characters, Rajapuri recorded maximum plant height (6.06 m) which was at par with variety Giriraj and Sonpai. Similar results were reported by Barhate *et al.*, 2012<sup>[2]</sup> and Farheen *et al.*, 2017a<sup>[7]</sup>. Significantly the widest plant spread for N-S (6.01 m) and E-W (5.82 m) was recorded in Sonpari, whereas minimum plant spread for N-S (4.69 m) and E-W (4.43 m) were recorded in Langra variety of mango. Farheen *et al.*, 2019;<sup>[6]</sup> Sharma *et al.*, 1999<sup>[18]</sup> also evaluated important mango varieties and found the similar trend for plant height and plant spread.

Jumbo Kesar reported significantly the maximum fruit length (13.76 cm), which was found at par with variety Rajapuri, whereas minimum fruit length (9.53 cm) was found in Jamadar variety. Maximum fruit width (8.82 cm) was observed in variety Rajapuri. and minimum fruit width (6.98 cm) was observed in variety Jamadar. Results for fruit size recorded in this experiment were found in agreement with earlier research findings of Gurmani, 1989<sup>[9]</sup>; Kanzaria *et al.*, 2017<sup>[11]</sup> and Kumar, 2004<sup>[15]</sup>. The fruit size in terms of length and width varied singly and not collectively. This might be due to genetic makeup of individual mango genotype.

The variety Rajapuri was found the best in terms of fruit weight (490.90 g) as well as pulp weight (412.74 g), whereas minimum fruit weight (234.21 g) and pulp weight (181.5 g) were recorded in Jamadar. Findings of present investigation are in accordance with the findings achieved by (Bhad *et al.*, 2017; Disha *et al.*, 2018; Syed, 2009 and Uddini *et al.*, 2007)<sup>[3, 5, 20, 21]</sup>, they also conducted research on mango germplasm in different parts of country. However, the difference in weight of fruit might be due to genetic behavior of genotype. The variety Jamadar recorded minimum stone weight (25.46 g) which was at par with variety Sonpari. whereas minimum peel weight (21.64 g) was observed in variety Sonpari. Variability in pulp content and stone weight in all the mango cultivars did not find any trend but it was looking random, though similar results were documented by (Rajan *et al.* 2009; Kanzaria *et al.*, 2015a; Syed, 2009 and Zaied *et al.*, 2007)<sup>[17, 10, 20, 22]</sup>.

The maximum number of fruits per plant (124.67) were registered for variety Sonpari which was at par with Nileshan (121.56), whereas least number of fruits per plant were observed in variety Jumbo kesar (90.67). Significantly the highest fruit yield (57.00 kg/tree) and fruit yield (15.83 t/ha) were recorded in the variety Sonpari. and lowest yield was recorded in variety Jamadar (6.79 t/ha). The variation in fruits per plant and fruit yield were found different in various varieties, this might be due to climatic effect and area specific location. These findings were found in accordance with the findings made by Kanzaria *et al.*, 2015c<sup>[14]</sup> and Singh and Singh, 2004<sup>[19]</sup>.

Significantly the maximum Total Soluble Solids, total sugars, reducing sugars and non-reducing sugars contents were (20.33<sup>0</sup>B), (17.02%), (5.06%) and (12.23%), respectively were recorded in variety Sonpari, whereas minimum acidity (0.22%) was recorded in variety Sonpari. Variability with respect to TSS content in different varieties is varies from variety to variety was reported by (Bhuyan and Guha, 1995; Farheen *et al.*, 2017b; Kanzaria *et al.*, 2015a and 2015d and

Uddini *et al.*, 2007) [4, 8, 10, 12, 21]. Fruit acidity highly depends upon the genotype and local climatic condition, though genotype generally plays greater role in quality characters. Kumar, 2004 [15]; Meera *et al.*, 2017; Rajan *et al.*, 2009 and Uddini *et al.*, 2007) [16, 17, 21] also reported variation in different varieties of mango. They reported the higher Total Sugar, reducing sugar and non-reducing sugar mango variety and found suitable for table purpose.

**Table 2:** Evaluation of small to medium sized mango varieties for growth and fruit parameters

Treatment	Plant height (m)	Plant spread		Fruit length (cm)	Fruit width (cm)	Average fruit weight (g)	Pulp weight (g)	Stone weight (g)	Peel weight (g)
		E-W (m)	N-S (m)						
Rajapuri	6.06	5.69	5.91	13.02	8.82	490.90	412.7	43.62	27.22
Langra	4.47	5.29	5.15	11.66	8.35	368.16	302.0	39.21	23.62
Jamadar	4.89	4.43	4.69	9.53	6.98	234.21	181.5	25.46	23.08
Jumbokesar	5.56	5.48	5.36	13.76	8.39	413.49	379.9	45.56	32.52
Giriraj	5.84	5.54	5.53	10.76	7.49	269.06	205.9	33.96	23.97
Nileshan	4.52	4.85	5.00	9.64	8.15	306.20	241.2	32.88	23.67
Sonpari	5.88	5.82	6.01	10.13	8.61	429.53	400.9	27.51	21.64
S.Em.±	0.094	0.138	0.152	0.325	0.196	8.984	9.670	0.877	0.760
CD at 5%	0.27	0.40	0.44	0.93	0.56	25.79	27.76	2.516	2.18
C.V.%	5.29	7.84	8.48	8.70	7.24	7.51	9.56	7.420	9.09

**Table 3:** Evaluation of small to medium sized mango varieties for yield and quality parameters

Treatment	No. of Fruits	Fruit yield (Kg/Tree)	Fruit yield (t/ha)	TSS ( <sup>0</sup> B)	Acidity (%)	Total sugar (%)	Reducing sugar (%)	Non-reducing sugar (%)
Rajapuri	99.78	51.10	14.19	16.71	0.26	14.06	3.71	9.23
Langra	112.67	33.10	9.19	18.10	0.22	13.36	3.26	10.00
Jamadar	99.67	24.46	6.79	19.31	0.36	14.22	4.21	9.26
Jumbokesar	90.67	43.44	12.06	16.50	0.22	13.15	3.18	10.84
Giriraj	110.00	27.95	7.76	18.31	0.27	14.21	3.34	10.77
Nileshan	121.56	33.83	9.39	18.26	0.30	15.59	4.46	10.14
Sonpari	124.67	57.00	15.83	20.33	0.22	17.02	5.06	12.23
S.Em.±	7.444	2.599	0.721	0.383	0.007	0.772	0.443	0.536
CD at 5%	22.94	8.01	2.22	1.10	0.02	2.38	1.37	1.65
C.V.%	11.07	10.31	10.31	6.31	8.03	6.47	9.56	7.97



Rajapuri



Langra



Jamadar



Jumbo Kesar



Giriraj



Nileshan





Sonpuri

### Conclusion

On the basis of the results obtained from the present experiment it may be revealed that maximum plant height in Rajapuri and plant spread (E-W and N-S) in Sonpuri was recorded. The maximum fruit length in Jumbo Kesar, fruit width, fruit weight, pulp weight were reported in Rajapuri, Jamadar recorded minimum stone weight. The minimum peel weight, maximum number of fruits per plant highest yield per plant and hectare were recorded in variety Sonpuri. Sonpuri also reported excellent quality parameters *viz.*, total soluble solid, reducing sugar and non-reducing sugar. Minimum acidity was reported in variety Langra, Jambo Kesar and Sonpuri.

From different varietal evaluation of medium to large sized mango varieties, it concluded that the mango variety Sonpuri was found the best for commercial growing in South Saurashtra Agro Climatic Conditions for yield and quality.

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