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#### SV Sawant

Department of Horticulture,  
Zonal Agriculture Research  
Station, Shenda Park, Kolhapur  
Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Ahmednagar Maharashtra, India

#### KN Dabatonde

Department of Horticulture,  
Zonal Agriculture Research  
Station, Shenda Park, Kolhapur  
Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Ahmednagar Maharashtra, India

#### PN Gajbhiye

Department of Horticulture,  
Zonal Agriculture Research  
Station, Shenda Park, Kolhapur  
Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Ahmednagar Maharashtra, India

#### Correspondence

##### SV Sawant

Department of Horticulture,  
Zonal Agriculture Research  
Station, Shenda Park, Kolhapur  
Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Ahmednagar Maharashtra, India

## Performance of different varieties of mango under sub-montane zone of Maharashtra

SV Sawant, KN Dabatonde and PN Gajbhiye

#### Abstract

Sixteen Mango varieties studied at Zonal Agricultural Research Station, Sub-montane Zone, Shenda Park Farm, Kolhapur from 2015-16 to 2017 - 2018 on fourteen years old mango garden having cultivars like Karel, Ratna, Vellai Kolamban, Amrapalli, Alphanso, Dudhpedha, Sindhu, Kokan Ruchi, Kesar, Fernandin, Vanraj, Goa Mankur, Suvarnarekha, Pairi, Mallika and Creeping planted at spacing of 10 x 10 m to evaluate their performance for growth and yield parameters. Analysis of three years pooled data revealed that Pairi has significantly highest plant height (7.5m) and maximum tree spread in E-W (6.3 m) and N-S directions (7.6 m) amongst all the varieties of mango. The variety Keshar recorded highest number of fruits/ tree (201) and maximum yield of 43.28 kg/tree amongst all the varieties of mango. During early productive phase it can be concluded that among varieties Keshar was found to perform better than the rest of the varieties for better production.

**Keywords:** Mango, varieties, Performance, production, sub montane zone etc.

#### Introduction

Mango (*Mangifera indica* L.), a tropical and sub-tropical fruit, belongs to the family Anacardiaceae, which was originated in South Asia/Malayan archipelago and has been in cultivation for more than 4000 years (Mukherjee, 1949; Candole, 1984; Bose, 1985) [4, 3]. It is an important and popular fruit in the world for its excellent flavours, attractive colour, delicious taste, and high nutritive value. The fruit contains nearly 81 per cent moisture, 0.4 per cent fat, 0.6 per cent proteins, 0.8 per cent of fibers. It also contains nearly 17 per cent of carbohydrate. The fruit is rich with important minerals contains important minerals like Potassium, magnesium, Sodium, Phosphorus In addition to sumptuous tropical flavor, Mangos deliver a host of nutrients and make healthy eating a delightful sensory experience. Mangoes are an excellent source of vitamins A and C, both important antioxidant nutrients. Vitamin C promotes healthy immune function and collagen formation. Vitamin A is important for vision and bone growth. Mangoes are a good source of dietary fiber, therefore, it is associated with a reduced risk of some types of cancer, protecting against heart disease and cholesterol build up. Mangoes contain over 20 different vitamins and minerals.

Mango is the second important fruit crop of India after banana which is often referred as “King of Fruits” occupying an area of 2262 thousand hectares resulting in production of 19686 thousand MT (Anonymous, 2017) [1]. Maharashtra has area of 1, 57,700 hectare and production 51, 48, 700 MT but with a less productivity of 8.4 mt/ha. Reasons for low productivity in Maharashtra may be due to high spacing, lack of improved varieties and suitable package of practices for better yields. Most of the orchards with local types thereby getting low yields and low productivity. In order to boost the mango production and productivity in the state through horizontal and vertical area expansion, suitable cultivars are required and there is every need to assess the performance of different mango cultivars and hybrids as they require specific climate for their best performance. Therefore, the present study was taken up with sixteen varieties to increase the production and productivity of mango orchards in Maharashtra.

#### Materials and Methods

Studies were conducted on fourteen years old mango varieties/ hybrids with sixteen different types (like Karel, Ratna, Vellai colamban, Amrapalli, Alphanso, Dudhpedha, Sindhu, Kokan Ruchi, Kesar, Fernandin, Vanraj, Goa Mankur, Suvarnarekha, Pairi, Mallika and Creeping) during 2015-16, 2016-17 and 2017- 18 at the research farm of Zonal Agricultural Research Station, Sub-montane Zone, Shenda Park Farm, Kolhapur. The experiment was laid out in randomized complete block design (RCBD) with three replications in each variety / hybrid. The climate of the location is tropical, hot and humid. The soils of this region Entisols (Light and shallow). The spacing of 10 x 10 m was taken for planting.

The trees in the orchard were maintained by following uniform cultural practices during the entire experimental period. Pruning practices was strictly followed during the entire experimental period. Sixteen mango varieties and hybrids like Karel, Ratna, Vellai colamban, Amrapalli, Alphonso, Dudhpedha, Sindhu, Kokan Ruchi, Kesar, Fernandin, Vanraj, Goa Mankur, Suvarnarekha, Pairi, Mallika and Creeping were evaluated and data on various growth parameters like tree height, tree spread in terms of East – West and North – South directions, reproductive characters like number of fruits per tree, yield per tree were recorded. Fruits were randomly collected from marked trees at the time harvesting period and analysed. Total numbers of fruits per plant were recorded randomly five plants each varieties /hybrids. Plant height (m) was taken each year of sixteen varieties with five plants of each. Plant spread (m) measured in terms of East – West direction and also north – South directions. The average fruit yield was worked out in kg/tree by taking the average fruit yield of five plants each year. The data Collected each year was analyzed statistically by following Panse and Sukhatme (1961) [6].

### Result and Discussion

The present study was conducted to evaluate the morphological and physical attributes of Different mango varieties. Results of the study are presented in Table 1, 2, 3, and 4. The investigation revealed that growth and yield of mango varieties varied significantly for all the parameters.

**Table 1:** Plant height (m) of different mango varieties during (2015-16 to 2017- 2018)

S. No	Variety	Plant Height (m)			Pooled mean
		2016	2017	2018	
1.	Karel	2.42	2.53	2.63	2.53
2.	Vellai kolabman	4.92	3.33	4.21	4.15
3.	Amarpali	2.86	2.52	3.79	3.06
4.	Alphonso	3.62	3.22	3.92	3.59
5.	Dudhpedha	2.56	2.65	2.87	2.69
6.	Sindhu	4.12	3.93	4.02	4.02
7.	Kokan Ruchi	3.34	3.42	3.85	3.54
8.	Kesar	5.34	6.05	6.32	5.90
9.	Ratna	3.47	3.33	3.50	3.43
10.	Fernandin	4.29	5.35	8.86	6.17
11.	Vanraj	4.49	4.45	4.77	4.57
12.	Goa Mankur	4.02	4.12	4.24	4.13
13.	Suvarnarekha	3.85	3.86	3.96	3.89
14.	Pairi	7.61	7.16	7.88	7.55
15.	Mallika	4.49	4.31	4.66	4.49
16.	Creeping	3.68	4.15	4.18	4.00
C.D at 5%		0.14	0.82	0.13	1.05
S.E.±		0.04	0.27	0.04	0.36

Data of plant height recorded in table.1 revealed significant differences among the mango varieties. However the Pairi variety was found statistically superior with 7.5 m height among the all. Followed by Fernandin 6.17 m, Keshar 5.90 m was the next best variety to record the plant height. All these varieties had statistically significant. Mango variety karel recorded significantly lowest plant height (2.53 m) whereas, followed that Dudhpedha (2.60 m), Amarpali, Ratna, Kokan Ruchi, and Creeping. Similar results were reported by Aparna dhulipalla (2017).

**Table 2:** Plant spread (m) of different mango varieties during (2015-16 to 2017- 2018)

S. No	Variety	Plant Spread (m)						Pooled mean	
		2016		2017		2018		mean	mean
		E-W	N-S	E-W	N-S	E-W	N-S		
1.	Karel	2.12	2.49	2.26	2.42	2.53	2.63	2.30	2.50
2.	Vellaikolamban	2.13	3.05	3.06	4.92	3.33	4.21	2.80	4.10
3.	Amarpali	2.84	3.04	3.05	2.87	2.53	3.79	2.80	3.20
4.	Alphonso	2.14	3.23	3.06	3.62	3.22	3.92	2.80	3.60
5.	Dudhpedha	2.24	2.46	2.45	2.56	2.65	2.87	2.40	2.60
6.	Sindhu	3.73	3.72	3.75	4.13	3.93	4.02	3.80	4.00
7.	Kokan Ruchi	2.85	3.04	3.16	3.34	3.42	3.85	3.10	3.40
8.	Kesar	4.86	4.96	3.75	5.35	6.05	6.32	4.90	5.50
9.	Ratna	3.16	3.23	3.24	3.47	3.33	3.50	3.20	3.40
10.	Fernandin	3.44	3.86	4.57	4.29	5.35	8.86	4.50	5.70
11.	Vanraj	3.93	4.14	4.15	4.49	4.45	4.77	4.20	4.50
12.	Goa Mankur	3.77	3.87	3.88	4.02	4.13	4.25	3.90	4.00
13.	Suvarnarekha	3.67	3.76	3.74	3.85	3.86	3.96	3.80	3.90
14.	Pairi	4.74	7.45	6.85	7.61	7.16	7.88	6.30	7.60
15.	Mallika	4.05	4.36	4.16	4.49	4.31	4.66	4.20	4.50
16.	Creeping	3.40	3.53	3.48	3.68	4.15	4.18	3.70	3.80
C.D at 5%		0.74	0.39	1.13	0.82	0.13	0.62	0.78	0.78
S.E.±		0.24	0.12	0.37	0.27	0.04	0.20	0.26	0.26

From pooled data of three years shows that among the sixteen varieties of mango Pairi recorded significantly highest East-West plant spread to an extent of 6.30 m which was found statistically superior all over. Mango varieties Kesar (4.90 m) and Fernandin (4.50 m). East-West spread of the plants was ranged between 6.30 to 2.30 m. The lowest East-West spread of the plants was recorded in karel 2.30 m and followed in Dudhpedha (2.40 m), Amrapali, Vellai colanban and Alphonso (2.80 m).

In regard to North-South spread of the plant, variety Pairi had the highest spread to an extent of 7.60 m followed by mango varieties Farnandin (5.70 m), Kesar (5.50 m), Vanraj (4.50 m) recorded the North-South spread of the plant next to Pairi. The lowest North-South spread of the plant to the tune of 2.50 m was observed in mango variety Karel followed by Dudhpedha 2.60 m., Similar results were reported by Aparna dhulipalla (2017).

**Table 3:** Number of fruits per plant of different mango varieties during (2015-16 to 2017- 2018)

S. No	Variety	Number of Fruits /plant			Pooled mean
		2016	2017	2018	
1.	Karel	82	110	120	104
2.	Vellai kolabman	138	199	175	171
3.	Amarpali	174	102	189	155
4.	Alphonso	168	189	245	183
5.	Dudhpedha	114	114	207	145
6.	Sindhu	99	169	26	131
7.	Kokan Ruchi	116	166	225	169
8.	Kesar	168	218	226	201
9.	Ratna	116	138	219	158
10.	Fernandin	78	98	107	94
11.	Vanraj	111	155	256	174
12.	Goa Mankur	96	166	167	143
13.	Suvarnarekha	154	183	194	177
14.	Pairi	95	125	130	117
15.	Mallika	110	187	156	151
16.	Creeping	89	186	236	170
S.E.±		4.857	3.399	24.328	52.46
C.D at 5%		1.597	1.118	7.998	18.07

Pooled analysis from three years data recorded significantly highest number of fruits per tree was recorded in Keshar (201) followed by Alphonso (183), Suvarnrekha (177), Vanraj (174) and Vellai kolamban which were on par with each other. Similar results were reported by Gunjate *et al.*, (2009) [7]

density plantation in arid conditions of Gujarat (India). Acta. 2009; 820:463-468.

**Table 4:** Yield per plant (kg) of different mango varieties during (2015-16 to 2017- 2018)

S. No	Variety	Yield per plant (kg)			Pooled mean
		2016	2017	2018	
1.	Karel	6.89	7.81	8.68	7.79
2.	Vellai kolabman	16.85	17.74	18.83	17.81
3.	Amarpali	19.68	19.68	21.88	20.41
4.	Alphonso	39.75	43.55	42.47	42.55
5.	Dudhpedha	8.71	9.85	8.76	9.11
6.	Sindhu	18.58	26.49	27.37	24.15
7.	Kokan Ruchi	12.53	19.54	15.22	15.76
8.	Kesar	41.52	43.65	46.53	43.28
9.	Ratna	20.71	23.66	23.35	22.57
10.	Fernandin	14.68	13.50	13.33	13.84
11	Vanraj	29.70	31.63	33.58	31.64
12	Goa Mankur	18.43	18.71	20.28	19.14
13	Suvarnarekha	21.42	35.59	33.52	30.18
14	Pairi	13.44	15.87	17.67	15.66
15	Mallika	28.85	35.64	36.70	33.73
16	Creeping	23.61	25.61	26.40	25.21
C.D at 5%		0.315	0.278	5.064	3.80
S.E.±		0.104	0.091	1.665	1.31

Mango varieties were significantly varied in their yield potential (Table 4). Under the Sub montane zone of Kolhapur climate variety Keshar was statistically superior among the all. Keshar was the most productive variety with yield 43.28 (kg), Alphonso (42.55 kg) at par with Keshar. Followed by Mallika (33.73 kg), Vanraj (31.64 kg) and Suvarnrekha (30.18 kg). The data clearly indicate that lowest yield was recorded in karel (7.79) and followed in Dudhpedha (9.11). Kesar and Mallika were prolific bearers and more productive mango varieties in Gujrat region (Gunjate *et al.*, 2009) [7].

### Conclusion

It can be concluded that among sixteen varieties of Mango Keshar is the best performer under Zonal Agricultural Research Station, Sub-montane Zone, Shenda Park Farm, Kolhapur for cultivation with better quality production variety Alphonso at par with Keshar followed by, Vanraj, Suvarnrekha, Creeping, Sindhu and Ratna.

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