

## Management Practices followed by Mango Growers for Early Flowering and Fruiting in Satara District

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### ABSTRACT

India is second largest producer of vegetables and fruits in the world. Mango (*Mangifera indica* L.) is one of the oldest and most popular fruits of the tropical world having delightful flavour and taste. Maharashtra is fruit bowl of India. Mango is one of the important fruit crop of Maharashtra accounting 4.77 lakh ha area with 3.31 lakh MT production. However, the productivity in Maharashtra is very low (7.0 t/ha) as compared to the national average. Major fruits crops grown in Satara District are grapes, bananas, mango, coconut, papaya, guava, Strawberry, etc. Keshar is the dominant and premier export quality variety of Satara District. More than 90 percent Area is under Keshar variety of Mango. In Satara District, mango is grown on 4200 ha. (DSAO, Satara). The major problem is Low productivity 2.5 to 3.0 t/ha as compared to National productivity 6.5 t/ha and Late Flowering and late fruiting is the major constraint in getting good price for the produce. Mango fruits harvested in May end fetched less price and were damaged by fruit flies during pre monsoon shower. So As per Mahatma Phule Krishi Vidyapeeth recommendation on application of Paclobutrazole assessment trials were started in the year 2019-20 in joint collaboration with the ATMA, Satara. As results were positive in the aspects of mango production, price and economic improvement in terms of monetary returns. As this technology is beneficial to farmers but higher price of the Paclobutrazol is a major constraint in adoption. For large scale adoption State Agriculture Department and ATMA should provide financial assistance for purchasing inputs.

**Key Words:** Paclobutrazole, Mango Early Flowering

### INTRODUCTION

India is second largest producer of vegetables and fruits in the world. Mango (*Mangifera indica* L.) is one of the oldest and most popular fruits of the tropical world having delightful flavour and taste. India is the leader sharing 65 per cent of the world's mango production. Currently, mango is cultivated on an area of 2.317 million hectares with a total production of 20.386 million tonnes in India. The average productivity of India is 8.6 metric tonnes per hectare which is comparatively low against 35-40 metric tonnes per hectare realized in Israel and 25 metric tonnes in Brazil. Moreover, the productivity of India declined from 8.1 t/ha (1991-92) to 6.6 t/ha (2010-11) (Anonymous 2021). Despite India's share of 65 per cent in the world's mango production, it's share

in world's fresh mango market is just 5.25 per cent in terms of quantity and 3.5 per cent in terms of value, which are very meagre considering the total production. All the mango importing countries are considering India as a source of quality mangoes due to its varietal wealth and availability.

Maharashtra is fruit bowl of India. The area under fruit crops in Maharashtra is increasing day by day due to implementation of various orchard plantation schemes by central as well as state government. Mango is one of the important fruit crop of Maharashtra accounting 56790.00 ha. area with 798.99(000 MT) production with productivity 14.07 MT/Ha. In India, among the different mangoes growing states, Uttar Pradesh leads in Area (279.25(000 ha.)), Production 4806.65(000MT)) and productivity with 17.21 MT/ha followed by

Punjab with productivity 17.19 MT/ha and Rajasthan 17.14 MT/ha. However, the productivity in Maharashtra is very low (14.07 MT/ha) as compared to the national average (Anonymous 2021).

The major reasons for low productivity in mango are long gestation period, alternate bearing habit, dominance of vegetative phase over reproductive phase, Therefore, the project aims at increasing the productivity of mango by standardizing application rate of Growth regulators in the farmers field.

Satara district is located in the western part of Maharashtra. It is bound by Pune district to the north, Solapur district to the east, Sangli district to the south and Ratnagiri district to the west. Raigad district lies to its north-west. Satara district is situated in the river basins of Bhima and Krishna.

With diverse cropping pattern, the district can be segregated into three broad regions, viz., the Hilly tracts in the West comprising Mahabaleshwar, Jaoli, Patan and parts of Satara, Wai and Karad talukas; Irrigated areas of Wai, Satara,, Karad and part of Koregaon talukas in the central region and the drought-prone talukas of Khandala, Koregaon (East), Khatav and Man in the east. The climate of the district is characterized by dry atmosphere except during monsoon. Major fruits crops grown in Satara District are grapes, bananas, mango, coconut, papaya, guava, Strawberry, etc. Keshar is the dominant and premier export quality variety of Satara District. More than 90 percent Area is under Keshar variety of Mango. In Satara District, mango is grown on 4200 ha (Anonymous, 2021). (Area, Production and Productivity Report of Satara in 2021 of DSAO, Satara). The major problem is Low productivity 2.5 to 3.0 t/ha as compared to National productivity 6.5 t/ha and Late Flowering and late

fruiting is the major constraint in getting good price for the produce.

**Need of Study:** Most of the Mango (var.Keshar) growers are facing the following problems:

- a) Late Flowering followed by late fruiting thereby fetching lower prices.
- b) Sun Scald on fruits developing in late summer.
- c) Marketing problems due to late harvesting and early rains.

**Advantages of Paclobutrazol:**

- 1) Earliest flowering.
- 2) Higher fruitset.
- 3) More number of fruits per plant
- 4) Higher yield as compared to other treatments.
- 5) Remunerative price for early harvested fruits.

**Objectives of the Study**

- 1) To study the knowledge and adoption of Mango grower regarding early induction of flowering and fruiting
- 2) To assess the benefits accrued by Mango Growers due to treatment.
- 3) To identify problems faced by farmers during treatment

## METHODOLOGY

The present study was conducted in Satara District of Maharashtra State. The list of mango growers was obtained from primary survey and data obtained by google sheet survey. Accordingly, 130 respondents were selected for the present study. The data was collected through a specially designed interview schedule from 130 respondents. The data were analyzed, tabulated and interpreted with suitable statistical instruments like frequency, percentage and average.

Number of farmers participated in survey	130
Variety	Kesar
Technology	Application of Paclobutrazol (23% ) for early flowering in Mango variety keshar has been applied for the study

Despite of its important contribution to the region, mangoes are still (at least most of them) farmed in non-commercial way. They are farmed in traditional way, that is mango trees are planted, and then farmers just wait for several years for production, without applying agricultural intensification or new technology to the crop.

This technology is based on the principle that flowering and fruiting of trees can be stimulated in certain conditions and the conditions can be manipulated to suit to the growth of the trees. It is an old practice recommended and adopted by mango growers of Konkan region for Alphonso mango. But climate and soil of Satara district under which mango variety Keshar is grown is totally different from Konkan region. When preliminary survey was conducted we came to know that mango fruits harvested in May end fetched less price and were damaged by fruit flies during pre monsoon shower. So As per Mahatma Phule Krishi Vidyapeeth recommendation on application of Paclbutrazole assessment trials were started in the year 2019-20 in joint collaboration with the ATMA, Satara. As results were positive in the aspects of mango

production, price and economic improvement in terms of monetary returns, the trials were continued for next two years. During the study period following extension activities were conducted.

- 1) Method Demonstration on application of Paclbutrazol.
- 2) Radio Talk delivered through All India Radio, Satara
- 3) Two Trainings were conducted on pruning, Paclbutrazol application and management of fruit fly in cost effective way.
- 4) Conducted workshop on Export of Mango. Exporters interacted with farmers during workshop.
- 5) With the help of State Agril Department, Farmers were registered on Mangonet portal and were issued phyto-sanitary certificate.
- 6) Success story of farmers was telecasted on Doordarshan Sahyadri Channel and published in Shetkari magazine.

### RESULTS AND DISCUSSION

Results obtained are presented in following tables.

*Table 1  
Distribution of respondents according to Number of Mango trees*

Sr. No	Number of Mango Trees	No. of Respondents	Percentage %
1	Upto 100 Trees	76	58.46
2	101 to 200 Trees	18	13.85
3	201 to 300 Trees	05	3.85
4	301 to 400 Trees	05	3.85
5	401 to 500 Trees	09	6.92
6	Above 500 Trees	17	13.07
	<b>Total</b>	<b>130</b>	<b>100.00</b>

The data revealed that more than half (58.46 %) of farmers were having up to 100 mango trees followed by 13.85 per cent of farmers having mango

trees around 200. Only 13.07 per cent of farmers had mango trees above 500.

*Table 2  
Distribution of respondents according to spacing between Mango trees followed by farmers*

Sr. No	Spacing of Mango Trees in Meters	No. of Respondents	Percentage %
1	10 X 10	56	43.08
2	5 X 5	39	30.00
3	3 X 3	16	12.30
4	3 X 2	19	14.62
	<b>Total</b>	<b>130</b>	<b>100.00</b>

The data pertaining to the spacing of Mango trees followed by Mango growers of Satara district, it was revealed that about 43.08 per cent of farmers having traditional spacing of 10 X 10 meter followed by 30.00 per cent of farmers having spacing of 5 X 5 meter. The high density plantation spacing was seen negligible. Mango orchards which were recently planted have adopted high density planting system.

*Table 3  
Distribution of respondents according to age of Mango trees*

Sr. No	Age of Mango Trees in years	No. of Respondents	Percentage %
1	Upto 5 years	49	37.69
2	6 to 10 years	41	31.54
3	11 to 15 years	18	13.85
4	16 to 20 years	15	11.54
5	Above 20 years	7	5.38
<b>Total</b>		<b>130</b>	<b>100.00</b>

As the age of the Mango tree is major factor to be considered for the Paclobutrazol treatment, it must be considered. The perusal of Table shows that considerable number of Farmers (37.69%) has mango trees of age up to five years followed by 31.54 per cent farmers having mango trees of age up to 10 years.

*Table 4  
Distribution according to knowledge of respondents regarding Paclobutrazol Treatment in Mango*

Sr. No	Treatment Particulars for Knowledge	No. of Respondents N=130	Percentage %
1	Ring method application of FYM in month of May	123	94.63
2	Application of Chemical fertilizers as per Recommended Dose of Fertilizer (RDF)	67	51.54
3	Application of Paclobutrazol in August	80	61.54
4	Application of Paclobutrazol 23% a.i. @ 3.25 ml/mtr as per canopy diameter of the tree .	62	47.69

From the above data regarding knowledge, it was revealed that majority of farmers (94.63%) have knowledge of ring method of application of FYM in the month of May, followed by 61.54 per cent of farmers had knowledge of application of Paclobutrazol treatment in August. More than half of the respondents 51.54 per cent were have knowledge of application of chemical fertilizers as per RDF. Only 47.69 per cent of respondents have knowledge about Application of Paclobutrazol 23 per cent a.i. @ 3.25 ml/mtr as per canopy diameter of the tree.

*Table 5  
Distribution of respondents according to Adoption of Paclobutrazol Treatment in Mango*

Sr. No	Treatment Particulars for Knowledge	No. of Respondents N= 130	Percentage
1	Ring method application of Farm Yard Mannure in month of May	50	38.46
2	Application of Chemical fertilizers as per Recommended Dose of Fertiliser	57	43.85
3	Application of Paclobutrazol 23% a.i. @ 3.25 ml/mtr as per canopy diameter of the tree .	54	41.54

While considering the adoption of the Paclobutrazol Treatment in Mango majority of farmers 43.85 per cent were followed the application of chemical fertiliser as per RDF followed by

41.54per cent of farmers applied the Paclobutrazol 23% a.i. @ 3.25 ml/ mtr as per canopy diameter of the tree.

**Table 6**  
*Economics of the respondents due to Paclobutrazol Treatment in Mango*

Treatment details	Source of Technology	Yield in Tonne/ha.	Net Return in Rs./ ha	BC Ratio
No application of growth retardants	Farmers practice	8.4 t/ha	52, 996/ha	1.76
Application of Paclobutrazol 23% a.i. @ 3.25 ml/ mtr as per canopy diameter of the tree.(Krishidarshani 2017 published by Mahatma Phule Krishi Vidyapeeth, Rahuri)	Mahatma Phule Krishi Vidyapeeth, Rahuri	10.25 t/ha	1,27,496/ha	2.04

The economics in above table shows, the Application of Paclobutrazol 23% a.i. @ 3.25 ml/mtr as per canopy diameter of the tree yields about 10.25 t/ha. over 8.4 tn/ha of farmers practice. Also it has

been observed that farmers who have adopted University recommendations got higher B:C ratio as compared to farmers practice.

**Table 7**  
*Benefits of Respondents due to Paclobutrazol treatment*

Sr. No	Benefits of Respondents	Traditional Method (Farmers Practice)	Application of Paclobutrazol(MPKV Recommendation)
1	Flowering period	Second Fortnight of January	First fortnight of December
2	Harvesting period	Second fortnight of May	Last week of March to 1st week of April
3	Market Rates	---	Got additional remunerative Rate of Rs. 24/-kg more than traditional method as fruits were harvested and marketed earlier than the farmers practice.
4	Export of the fruits	---	Seven farmers have exported their fruits to UK through exporter

Flowering and harvesting period of Mango was advanced by one month in compared to farmer regular practice, which resulted into additional remunerative Rate of Rs. 24/- per kg more than

traditional method, as fruits were harvested and marketed earlier than the farmers practice. Also the some farmers were able to export their produce to foreign countries for better price.

**Table 8**  
*Distribution of respondents according to Constraints faced by Mango growers in application of Paclobutrazol*

Sr. No	Constraints faced by Respondents	No. of Respondents N= 130	Percentage
1	Higher Price of Paclobutrazol	101	77.69
2	Treatment of Paclobutrazol application is tedious	93	71.54
3	Farmers misconceptions (Regular treatment leads to mortality of plants)	76	58.46
4	Lack of proper knowledge	85	65.38



There are some Constraints faced by Mango growers in application of Paclobutrazol. Majority of farmers 77.69 per cent reported higher price of Paclobutrazol as major constraint followed by 71.54 per cent of the farmers who found the Paclobutrazol application is tedious. About 65.38 per cent of the respondents have lack of proper knowledge of treatment.

### **CONCLUSION**

After the study entitled “Management Practices followed by Mango Growers for Early Flowering and Fruiting in Satara District” by considering the knowledge and adoption of respondents, it has been observed that less than fifty

per cent farmers were adopted the technology. As this technology is beneficial to farmers but higher price of the Paclobutrazol is a major constraint in adoption as reported by 78 per cent of farmers, also about 72 per cent farmers reported that Paclobutrazol application treatment is tedious.

After study relation to cost-benefit ratio, it is recommended that to increase the adoption of this technology ATMA, Agril. Department in collaboration with KVKs by organising method demonstrations and trainings, farmers should be made aware and encourage about the technology. For large scale adoption State Agriculture Department and ATMA should provide financial assistance for purchasing inputs.

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