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Induction of flowering through pinching of post-monsoon vegetative flush in mango (*Mangifera indica* L.) cv. Alphonso

VP Damodhar, SS Gurav and VV Shinde

Abstract
Mango cv. Alphonso is the most important variety of Konkan, Maharashtra. Early induction of flowering is the prime objective of mango growers for better economics. The experiment, "Induction of flowering through pinching of post-monsoon vegetative flush in mango (*Mangifera indica* L.) was conducted with seven treatments to induce early flowering and harvest. Pinching treatments induces early flowering and harvesting during the year 2021-22.

Keywords: Pinching, vegetative flush, mango, early flowering, yield

Introduction
Mango (*Mangifera indica* L.) is considered the 'National fruit of India' and known as the 'King of fruits and cv. Alphonso called as 'King of all Mango varieties' in India. Alphonso is the choicest variety of Konkan mango growers. The Konkan region of Maharashtra contributes nearly 10 per cent of the total mango area in the country; occupying 1,11,715 ha under mango cultivation having an annual production of 3,53,066 MT with the productivity of mango in Konkan is about 3.16 MT ha^{-1} (Anon. 2018) [1]. World-famous Alphonso is the main variety of mango which is grown in this region.
Normally, rains cease in October, but due to climatic changes, they extended up to October and sometimes up to November. These climatic aberrations favour post-monsoon vegetative flush. This vegetative flush extends the flowering and ultimately mango season extends. This extended flowering gives late harvesting of fruits which affects the profitability of farmers.

Material and Methods
The experiment was conducted at Mango Research Sub-Centre, Rameshwar, Post- Vijaydurg Tal. Devgad Dist.- Sindhudurg (Maharashtra). It is a research Institute working under Dr. B. S. Konkan Krishi Vidyapeeth, Dapoli Dist. Ratnagiri (Maharashtra) during the season of 2021-22. Uniformly grown mango plants of variety Alphonso under uniform management practices were selected. The experiment was laid out in Randomized Block Design with seven treatments. Treatments were replicated three times, with a unit of two plants per treatment per replication. Treatment details are given below,

T_1 Control
T_2 Pinching of shoots (150 -200 shoots/tree) in the second fortnight of September
T_3 Pinching of shoots (150 -200 shoots/tree) in the First fortnight of October
T_4 Pinching of shoots (150 -200 shoots/tree) in the second fortnight of October
T_5 Pinching of shoots (150 -200 shoots/tree) in the first fortnight of November
T_6 Pinching of shoots (150 -200 shoots/tree) in the second fortnight of November
T_7 Pinching of shoots (150 -200 shoots/tree) in the first fortnight of December

Pinching is the removal post monsoon vegetative bud. Pinching was done on 150- 200 shoots per tree. In control, pinching was not performed. The observations were recorded on the date of emergence of flowering, flowering phases, flowering intensity (%), hermaphrodites flowers (%), retained fruits/panicle (%), date of commencement of harvesting, number of fruit per plant, fruit weight (g), yield per plant (kg) and yield per hectare (t). The data were analyzed by using statistical methods suggested by Panse and Sukhatme.

Result and Discussion

The data pertaining to flowering induction, flowering phases, the intensity of flowering and hermaphrodite flower (%) was depicted in Table 1. The 14 days early induction of flowering was recorded in treatment T_4 (pinching of shoots in the first fortnight of October) and T_5 (pinching of shoots in the first fortnight of November) as compared to Control (T_1). Pinching of shoots in the second fortnight of November (T_6) also induces 10 days of early flowering as compared to the control. In given all treatments there are three to four flowering phases were observed. Treatment T_5 recorded maximum flowering intensity (67.67%) which was significantly superior to the rest of the treatments followed by T_4 (59.00%). There was no significant difference found in hermaphrodite flowers (%) however, the maximum hermaphrodite flowers were recorded in T_4 (pinching of shoots in the first fortnight of Nov.).

Warang *et al.* (2019) [4] reported that girdling and removal of new shoots in mango cv. Alphonso was beneficial for the early induction of flowering and early harvesting. Pinching reduces the auxin synthesis at the apex of the branches, directing the transport of assimilates and cytokinins to the axillary buds of branches under flowering conditions, and induces the formation of axillary inflorescences. The mango produces flowers from December onwards depending upon environmental factors like night temperature and dry weather before flowering (Devi *et al* 2019) [2].

Table 1: Effect of shoot pinching on flowering in Alphonso mango

Sr. No.	Time of flowering induction	Flowering phases	The intensity of flowering (%)	Hermaphrodite flower (%)	Retained fruit/ panicle	Date of commencement of harvesting
T_1	25/01/2021	4	51.00 (46.91)*	10.50	0.77	03/05/2021
T_2	22/01/2021	4	52.33 (55.76)	9.83	0.78	23/04/2021
T_3	18/01/2021	3	57.67 (53.73)	8.50	0.76	28/04/2021
T_4	11/01/2021	4	59.00 (58.91)	10.83	0.76	15/04/2021
T_5	11/01/2021	3	67.67 (51.75)	9.33	0.81	23/04/2021
T_6	15/01/2021	4	53.33 (47.87)	8.60	0.71	20/04/2021
T_7	18/01/2021	3	55.00(45.96)	9.17	0.80	30/04/2021
	-	-	2.70	0.61	0.02	-
	-	-	8.30	N. S.	N. S.	-

(* Figures in parenthesis indicate Arcsine transformed value)

Sarkhosh *et al.* (2018) [3] showed that axillary bud development could be triggered by tip pruning of branches in Honey Gold and B74 mango cultivars in a subtropical climate. Early harvesting (17 days) was noticed under treatment T_4 (Pinching in the second fortnight of October) as compared to the control. The number of fruits retained per panicle was found to be non-significant. Fruit weight, number of fruits per tree, yield (kg/tree) and yield (t/ha) were found to be non-significant. Zaeneldeen (2014) [5] recommended spraying "Succary Abiad" mango trees by urea at 2% + GA3 at 50 ppm three times in November, December and January + pinching early removed panicles to improve productivity and fruit quality of succary mango.

Table 2: Effect of shoot pinching on fruiting and yield in Alphonso mango (Season 2020-21)

Treatments	Retained fruit/ panicle	Date of commencement of harvesting	Fruit weight (g)	No of fruits/ tree	Yield (kg/tree)	Yield (T/ha)
T_1	0.77	03/05/2021	234.00	71.67	16.77	1.68
T_2	0.78	23/04/2021	238.33	72.33	17.24	1.72
T_3	0.76	28/04/2021	239.33	69.67	16.69	1.67
T_4	0.76	15/04/2021	231.67	71.00	16.43	1.64
T_5	0.81	23/04/2021	240.33	68.00	16.36	1.64
T_6	0.71	20/04/2021	238.33	66.33	15.80	1.58
T_7	0.80	30/04/2021	232.00	70.33	16.27	1.63
SE ±	0.02	-	5.16	2.33	0.58	0.06
CD at 5%	N. S.	-	N. S.	N. S.	N. S.	N. S.

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