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Studies on effect of pruning on reproductive shoots and yield of mango cv. ALPHONSO

■ **B. M. RODGE AND K. H. PUJARI¹**

Members of the Research Forum

Associated Authors:

¹Department of Horticulture,
College of Agriculture, Dr. B. S.
Konkan Krishi Vidyapeeth,
Dapoli, RATNAGIRI (M.S.) INDIA

Author for correspondence :

B.M. RODGE

Department of Horticulture,
College of Agriculture, Dr. B. S.
Konkan Krishi Vidyapeeth,
Dapoli, RATNAGIRI (M.S.) INDIA
Email : balasahebodge75
@gmail.com

ABSTRACT : The present investigation on studies on effect of pruning on reproductive shoots and yield of mango cv. ALPHONSO was carried out in the Department of Horticulture, College of Agriculture, Dr. B. S. Konkan Krishi Vidyapeeth, Dapoli, dist. Ratnagiri (M.S.), India, during 2007-2009. The indicated that the Smaximum length (28.82 cm) of reproductive shoot was recorded in 50% current season pruning method carried out in third week of October and the lowest length of reproductive shoots (4.66 cm) was observed in current season pruning method carried out in first week of December. The mean of two years data indicated that the maximum fruit yield (56.51 kg) per tree was observed in 50% current season pruning method carried out in third week of October and the lowest fruit yield (7.02 kg) per tree was recorded in past season pruning method carried out in first week of November.

KEY WORDS : Pruning, Shoot, Yield, Current season, Past season

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In India mango occupies an area of around 2.14 million hectares with production of 13.37 million metric tones (Anonymous, 2007), which accounts 40 per cent of global mango production. India contributes about 57 per cent of total area under mango. Other countries which follow India in mango production (mt) are China (3.67), Mexico (1.58), Thailand (1.80), Pakistan (1.67), Indonesia (1.47) and Philippines (0.95) (FAO, 2006). Productivity of mango is low in India as compared to Israel and South Africa (FAO, 2006). The main reasons of low productivity are alternate bearing, malformation, fruit drop and insect pest and disease attack. It is observed that there is heavy fruit-drop at various stages of fruit growth which is a serious problem in Konkan region and has become a limiting factor for increasing production in Alphonso mango. With this view, the attempts are there for being made to study on effect of pruning on induction of flowering behaviour of mango cv. ALPHONSO under the agro

climate condition of Konkan region.

RESEARCH METHODS

A field experiment was conducted during the year 2007-2008 and 2008-2009 at plot number 28 Department of Horticulture College of Agriculture, Dapoli dist. Ratnagiri. Dapoli situated on the West coast (Arabian Sea) of the Konkan region of Maharashtra. This place lies between 17°45', North latitude and 73°12', East longitudes and at an elevation of 250 meters above MSL. The climate of Dapoli is warm and humid with the average yearly rainfall 3500-4000 mm, mostly received from 1st June to 15th October. The average relative humidity is about 78 per cent, while average minimum and maximum temperatures are 18.5°C and 30.8°C, respectively. The soil was lateritic, fairly homogenous with good drainage and moderate acidic in reaction. The experiment was laid out in Factorial Randomized Block Design with three replications, seven treatments T₁ October (first week),

T₂ October (Third week), T₃ November (first week) T₄ November (Third week), T₅ December (first week), T₆ December (Third week), T₇ control. And three pruning methods M₁ 50 per cent current season growth, M₂ current season growth. M₃ past season growth. Two plants taken for each replication and after pruning 25 labels tagged on each plant. The application of manures and fertilizers was made in the first week of August in both the years. The 50 kg FYM and 1.5 kg N, 0.5 kg P₂O₅ and 1.0 kg K₂O. were applied per plant. The observations emergence of shoot after pruning (in days), number of reproductive shoot, length of reproductive shoot (cm), number of fruits per tree, fruit yield (kg). Statistical analysis was done as per standard procedure. Observations were recorded three months after pruning.

RESEARCH FINDINGS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under following heads :

Emergence of reproductive shoot (days) :

The data on effect of pruning on emergence of reproductive shoot in days are presented in Table 1. The data revealed that the highest days required for emergence of reproductive shoot were recorded in M₃ T₂ (114.50 days) followed by M₁T₂ (112.33 days) treatment and lowest days required for emergence of reproductive shoot were recorded in M₂T₅ (29.68 days) during the year 2007-2008. The year 2008-2009 the maximum days required for emergence of shoot were obtained in M₁T₂ (57.66 days) followed by M₁T₃ (50.66 days) and the lowest days required were observed in

M₁T₆ (16.00 days). The pooled data indicated that the maximum days required for emergence of shoots was observed in M₁T₂ (84.99 days) followed by M₁T₁ (67.41 days) treatment while lowest days required for emergence of reproductive shoots were observed in M₂T₅ (14.83 days).

Number of reproductive shoot:

The data on effect of pruning on number of reproductive shoot are presented in Table 2. The data revealed that the highest number of reproductive shoots were recorded in M₂T₁ (2.75) followed by M₃T₁ (2.70) and M₁T₃ (2.66) treatments and lowest reproductive shoots was recorded in M₂T₅ (0.40) during the year 2007-2008. The year 2008-2009 data indicated that the maximum number reproductive shoot was observed in M₁T₂ (2.16) followed by M₁T₃ (1.47) and lowest days required were recorded in M₁T₆ (0.47). The pooled data indicated that the maximum number of reproductive shoot was observed in M₁T₂ (2.27) followed by M₁T₃ (2.06) treatment and the lowest number of reproductive was observed in M₂T₅ (0.22) treatment. The similar results were obtained by the Swaroop and Ram (2001) who studied the effect of pruning on growth, flowering, fruiting and fruit quality of 21 years old mango cv. DASHEHARI grown in Pantnagar U.P. The numbers of panicles were more than the control in July- August pruning.

Length of reproductive shoot (cm):

The data on effect of pruning on length of reproductive shoot in cm are presented in Table 3. The data revealed that the highest length of reproductive shoot

Table 1 : Effect of season and method of pruning on days required for emergence of reproductive shoot (days) in mango cv. ALPHONSO												
Treatments/ Methods of pruning	2007-2008				2008-2009				POOLED			
	M ₁	M ₂	M ₃	Mean	M ₁	M ₂	M ₃	Mean	M ₁	M ₂	M ₃	Mean
T ₁	84.33	90.16	103.16	92.55	50.50	00.00	00.00	16.83	67.41	45.08	51.58	54.69
T ₂	112.33	112.16	114.50	113.00	57.66	00.00	00.00	19.22	84.99	56.08	57.25	66.11
T ₃	73.33	87.66	00.00	53.66	50.66	00.00	00.00	16.89	61.99	43.83	00.00	35.27
T ₄	77.33	98.00	00.00	25.78	36.66	00.00	00.00	12.22	56.99	49.00	00.00	35.33
T ₅	86.66	29.68	00.00	28.89	32.16	00.00	00.00	10.72	59.41	14.83	00.00	24.75
T ₆	51.33	00.00	00.00	17.11	16.00	00.00	00.00	5.33	33.66	00.00	00.00	11.22
T ₇	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	0	00.00	00.00	00.00
Mean	69.33	59.65	31.18	47.28	34.80	00.00	00.00	11.60	52.06	29.33	15.54	32.48
	Method	Treat.	Interac.		Method	Treat.	Interac.		Method	Treat.	Interac.	
S.E.±	13.61	7.85	13.61		2.26	3.45	5.98		2.62	4.00	6.94	
C.D. (P=0.05)	14.90	22.76	39.43		6.55	10.00	17.33		7.59	11.60	20.10	

Table 2 : Effect of season and method of pruning on number of reproductive shoots in mango cv. ALPHONSO

Treatments/ Methods of pruning	2007-2008				2008-2009				POOLED			
	M ₁	M ₂	M ₃	Mean	M ₁	M ₂	M ₃	Mean	M ₁	M ₂	M ₃	Mean
T ₁	2.30	2.75	2.70	2.58	1.14	00.00	00.00	0.38	1.72	1.37	1.35	1.48
T ₂	2.38	1.47	1.34	1.73	2.16	00.00	00.00	0.72	2.27	0.73	0.67	1.22
T ₃	2.66	1.76	0.71	1.71	1.47	00.00	00.00	0.49	2.06	0.88	0.36	1.10
T ₄	1.00	0.50	00.00	0.33	0.51	00.00	00.00	0.17	0.75	0.25	00.00	0.33
T ₅	2.46	0.40	00.00	0.82	1.06	00.00	00.00	0.35	1.76	0.22	00.00	0.66
T ₆	1.18	00.00	00.00	0.39	0.47	00.00	00.00	0.16	0.82	00.00	00.00	0.27
T ₇	1.46	1.46	1.46	1.46	00.00	00.00	00.00	0.00	0.73	0.73	0.73	0.73
Mean	1.99	1.19	0.88	1.28	0.97	00.00	00.00	0.32	1.44	0.59	0.44	0.82
	Method	Treat.	Interac.		Method	Treat.	Interac.		Method	Treat.	Interac.	
S.E. ±	0.11	0.17	0.29		0.06	0.10	0.17		0.06	0.10	0.17	
C.D. (P=0.05)	0.32	0.49	0.85		0.19	0.29	0.59		0.19	0.29	0.51	

Table 3 : Effect of season and method of pruning on length of reproductive shoot(cm) in mango cv. ALPHONSO

Treatments/ Methods of pruning	2007-2008				2008-2009				POOLED			
	M ₁	M ₂	M ₃	Mean	M ₁	M ₂	M ₃	Mean	M ₁	M ₂	M ₃	Mean
T ₁	35.90	33.68	31.81	33.80	17.14	00.00	00.00	5.71	26.52	16.84	15.91	19.76
T ₂	34.05	30.30	23.32	29.22	23.58	00.00	00.00	7.86	28.82	15.15	11.66	18.54
T ₃	29.99	23.94	00.00	17.98	21.02	00.00	00.00	7.01	25.51	11.97	00.00	12.49
T ₄	25.90	24.30	00.00	16.73	13.09	00.00	00.00	4.36	19.41	12.15	00.00	10.52
T ₅	25.38	9.32	00.00	11.57	12.64	00.00	00.00	4.21	19.06	4.66	00.00	7.91
T ₆	23.31	00.00	00.00	7.77	8.20	00.00	00.00	2.73	15.85	00.00	00.00	5.28
T ₇	24.31	24.31	24.31	24.31	00.00	00.00	00.00	0.00	12.16	12.16	12.16	12.16
Mean	28.40	20.83	11.34	20.19	13.66	00.00	00.00	4.55	21.04	10.41	5.67	12.38
	Method	Treat.	Interac.		Method	Treat.	Interac.		Method	Treat.	Interac.	
S.E.±	1.17	1.79	3.10		1.13	1.73	1.08		0.83	1.27	2.20	
C.D. (P=0.05)	3.40	5.19	8.99		3.29	5.03	8.71		2.41	3.68	6.36	

Table 4 : Effect of season and method of pruning on number of branches of reproductive shoot in mango cv. ALPHONSO

Treatments/ Methods of pruning	2007-2008				2008-2009				POOLED			
	M ₁	M ₂	M ₃	Mean	M ₁	M ₂	M ₃	Mean	M ₁	M ₂	M ₃	Mean
T ₁	24.99	25.97	22.74	24.57	14.18	00.00	00.00	4.73	19.75	12.98	11.37	14.70
T ₂	24.89	20.67	19.68	21.75	17.75	00.00	00.00	5.92	21.32	10.33	9.84	13.83
T ₃	23.43	21.64	6.48	17.18	16.79	00.00	00.00	5.60	20.11	10.82	3.24	11.39
T ₄	12.84	20.96	00.00	11.27	8.02	00.00	00.00	2.67	10.43	10.48	00.00	6.97
T ₅	14.94	4.35	00.00	6.43	6.92	00.00	00.00	2.31	10.93	2.17	00.00	4.37
T ₆	16.07	00.00	00.00	5.36	4.98	00.00	00.00	1.66	10.53	00.00	00.00	3.51
T ₇	20.47	20.47	20.47	20.47	00.00	00.00	00.00	0.00	10.23	10.23	10.23	10.23
Mean	19.66	16.29	6.98	15.29	9.80	00.00	00.00	3.27	14.75	8.14	4.95	9.28
	Method	Treat.	Interac.		Method	Treat.	Interac.		Method	Treat.	Interac.	
S.E.±	0.95	1.45	2.51		0.77	1.19	2.06		0.64	0.97	1.69	
C.D. (P=0.05)	2.75	4.21	7.29		2.55	3.44	5.97		1.85	2.83	4.90	

was recorded in M_1T_1 (35.90 cm) followed by M_1T_2 (34.05 cm) and lowest length of reproductive shoot was recorded M_2T_5 (9.32 cm) during the year 2007-2008. The 2008-2009 the maximum length of reproductive shoot was obtained in M_1T_2 (23.58 cm) followed by M_1T_3 (21.02 cm) and lowest length of reproductive shoot was recorded in M_1T_6 (8.20 cm). The pooled data indicated that the maximum length of reproductive shoot was noticed in M_1T_2 (28.82 cm) treatment and the lowest length of reproductive shoots was noticed in M_2T_5 (4.66 cm) treatment. The similar results obtained by the Swaroop and Ram (2001) revealed that the panicle length was also higher than the control.

Number of branches of reproductive shoot :

The data on effect of pruning on number of branches

of reproductive shoot are presented in Table 4. The data revealed that the highest number of branches of reproductive shoots were recorded in M_2T_1 (25.97 cm) followed by M_1T_1 (24.99) and M_1T_2 (24.89) which was at par with each other and lowest number of branches of reproductive shoot was recorded in M_2T_5 (4.35) during the year 2007-2008. The year 2008-2009 maximum number of branches of reproductive shoots was observed in M_1T_2 (17.75) followed by M_1T_3 (16.79) and lowest number of branches of reproductive shoots was recorded in M_1T_6 (4.98). The pooled data indicated that the maximum number of branches of reproductive shoots was observed in M_1T_2 (21.32) followed by M_1T_3 (20.11) and the lowest number of branches of reproductive shoots was observed in M_1T_5 (2.17) treatment.

Table 5 : Effect of season and method of pruning on number of fruits per tree in mango cv. ALPHONSO												
Treatments/ Methods of pruning	2007-2008				2008-2009				POOLED			
	M_1	M_2	M_3	Mean	M_1	M_2	M_3	Mean	M_1	M_2	M_3	Mean
T_1	249.33	230.83	155.67	211.94	102.83	00.00	00.00	52.50	176.08	115.42	77.83	123.11
T_2	267.66	195.67	160.00	207.78	137.00	00.00	00.00	45.67	202.33	97.83	80.00	126.72
T_3	98.33	72.50	00.00	56.94	70.66	00.00	00.00	23.55	83.50	36.25	00.00	39.92
T_4	107.33	64.66	00.00	57.33	47.66	00.00	00.00	15.89	77.67	32.33	00.00	36.67
T_5	130.00	36.00	00.00	55.33	54.83	00.00	00.00	18.28	92.42	18.00	00.00	36.81
T_6	57.83	00.00	00.00	19.28	26.66	00.00	00.00	8.89	42.25	00.00	00.00	14.08
T_7	123.50	123.50	123.50	123.50	00.00	00.00	00.00	00.00	61.57	61.57	61.57	61.57
Mean	147.71	103.30	62.73	104.58	62.80	00.00	00.00	23.54	105.14	51.65	31.36	62.72
	Method	Treat.	Interac.		Method	Treat.	Interac.		Method	Treat.	Interac.	
S.E.±	6.86	10.48	18.16		4.49	6.86	11.89		4.05	6.19	10.72	
C.D. (P=0.05)	19.88	30.37	52.61		13.02	19.89	34.46		11.74	17.94	31.07	

Table 6 : Effect of season and method of pruning on fruit yield (kg) in mango cv. ALPHONSO												
Treatments/ Methods of pruning	2007-2008				2008-2009				POOLED			
	M_1	M_2	M_3	Mean	M_1	M_2	M_3	Mean	M_1	M_2	M_3	Mean
T_1	65.30	56.47	39.72	53.83	31.48	00.00	00.00	10.49	48.39	28.24	19.86	32.16
T_2	71.44	54.56	39.38	55.13	41.27	00.00	00.00	13.76	56.51	27.28	19.69	34.49
T_3	25.13	18.15	3.54	15.61	20.87	00.00	00.00	6.96	23.00	9.07	2.02	11.36
T_4	26.83	6.85	00.00	11.23	14.25	00.00	00.00	4.75	20.57	3.42	00.00	8.00
T_5	32.37	9.24	00.00	13.87	16.18	00.00	00.00	5.39	24.28	4.56	00.00	9.61
T_6	14.61	00.00	00.00	4.87	7.94	00.00	00.00	2.65	11.28	00.00	00.00	3.76
T_7	29.87	29.87	29.87	29.87	00.00	00.00	00.00	0.00	14.93	14.93	14.93	14.93
Mean	37.93	25.02	16.07	22.07	18.85	00.00	00.00	6.28	28.42	12.50	8.07	16.33
	Method	Treat.	Interac.		Method	Treat.	Interac.		Method	Treat.	Interac.	
S.E.±	1.34	2.05	3.56		1.34	2.04	3.54		0.89	1.36	2.35	
C.D. (P=0.05)	3.90	5.96	10.33		3.88	5.93	10.27		2.57	3.93	6.82	

Number of fruits per tree :

The data on effect of pruning on number fruits per tree are presented in Table 5. The data revealed that the highest number of fruits per tree was recorded in M_1T_2 (267.66) followed by M_1T_1 (249.33) and lowest number of fruits per tree was recorded in M_2T_5 (36.00) during the year 2007-2008. The year 2008-2009 the maximum number of fruits per tree was observed in M_1T_2 (137.00) and lowest number of fruit per tree was recorded in M_1T_6 (26.66) treatment. The pooled data indicated maximum number of fruits per tree was observed in M_1T_2 (202.33) treatment and the lowest number of fruits per tree was observed in M_2T_5 (18.00) treatment. The present finding are in accordance Oosthyse and Jacobs (1997) reported that there was increase in number of fruits during pruning treatment and winter pruning recommended in sensation mango trees.

Fruit yield per tree (kg) :

The data on effect of pruning on fruit yield per tree in kg are presented in Table 6. The data revealed that the highest fruit yield per tree in was recorded in the treatment M_1T_2 (71.44 kg) followed by M_1T_1 (65.3 kg) and the lowest fruit yield per tree in was recorded in M_3T_3 (3.54 kg) during the year 2007-2008. The year 2008-2009 the highest fruit yield per tree was observed in M_1T_2 (41.27kg) and lowest fruit yield per tree was recorded in M_1T_6 (7.94 kg) followed by M_1T_1 (31.48kg) treatment. The pooled data indicated that the maximum fruit yield per tree was recorded in M_1T_2 (56.51 kg)

treatment and the minimum fruit yield per tree was observed in M_3T_3 (2.02 kg). The similar results were reported by Ram (1999) in Dashehari under Tarai condition. Rao and Shrihari (1998) in Alphonso under Dharwad condition and Shinde *et al.* (2002) in Alphonso at Dapoli condition.

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