

STUDIES ON FRUIT DROP IN MANGO VARIETIES

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Abstract: Studies on fruit set and fruit drop were carried out in Kerala Agricultural University on six varieties of mango during 2000-2001. The season of flowering in majority of the varieties was during December-January months except in Neelum in which it was during April-May. The number of inflorescence per square metre ranged from 23.6 to 7.0 and was the maximum in Prior and minimum in Alphonso and Neelum. In the case of percentage of bisexual flowers Alphonso had the maximum (44.39%) bisexual flowers and Muvandan had the minimum. Variation in length, breadth, colour and density of inflorescence was noticed among the varieties. Initial fruit set ranged from 5.39 to 8.45 fruits per inflorescence. Drop occurred to the tune of 50% during the initial 15 days and continued for 45 days. Maximum drop was noted in Alphonso (89.93%) and the minimum in H-151 (79.6%).

Key words: Bisexual flowers, flowering, fruit drop, inflorescence, *Mangifera indica* L.

INTRODUCTION

Mango, the choicest fruit of India, is rightly titled as the "King of fruits" because of its wide adaptability, high nutritive value, richness in variety, delicious taste, excellent flavour, attractive appearance and popularity among the masses. However, the performance of varieties is found to vary under different climatic conditions (Singh, 1978). Among several factors affecting the yield, the number of perfect flowers and the extent of fruit drop are very important. Under high humid conditions as prevailing in Kerala excessive fruit drop and low fruit retention are important factors that determine the final yield in mango, but no data are available on these aspects. Hence an experiment was conducted at the College of Horticulture, Trichur to assess the variation in fruit set and extent of drop in common varieties of mango.

MATERIALS AND METHODS

The present investigation was carried out in six mango varieties including two hybrids. The varieties included Alphonso, Prior, Muvandan, Neelum and hybrids Rama and H-151. Rama is a hybrid released from the Konkan Krishi Vidya Peeth, with parentage of Alphonso x Neelum and H-151 is the cross between Kalapady x Neelum from the District Agricultural Farm, Thaliparampa. The statistical design of the experiment followed was randomized block design. In each variety, 10 panicles were tagged at fully opened stage and the characters such as number of inflorescence per unit area, shape, size, colour, percentage of bisexual flowers etc. were noted. The density of flowers in the inflorescence was classified as per IBPGR descriptor as laxly, densely and medium. The percentage

of initial fruits set and subsequent drop were recorded at biweekly intervals in order to assess the intensity of fruit drop in each variety.

RESULTS AND DISCUSSION

Flowering started in all the varieties except in Neelum during December-January months (Table 1). In Neelum, flowering was observed during the month of April-May. Number of inflorescence per unit area ranged from 7.0 to 23.67 and a significant difference was noticed among the varieties. Prior recorded the maximum number of inflorescence intensity and was on par with H-151. Alphonso and Neelum had the minimum number of inflorescence per square metre. The number of male flowers ranged from 156 to 476, the maximum in Rama and H-151 and the minimum in Alphonso. Under coastal Karnataka conditions, Alphonso had 428 male flowers per panicle (Uthaiiah *et al.*, 1988). Mukherjee (1953) had reported that depending on the variety the total number of flowers in a panicle might vary from 1000 to 6000. The highest number of hermaphrodite flowers was noted in the hybrids Rama (141.6) and H-151 (140.8) and the lowest in Muvandan while rest all were on par with each other. The highest value for percentage of hermaphrodite flowers was noted in Alphonso (44.39%). In Ratna, H-151 and Neelum the values were almost the same. The lowest percentage of hermaphrodite flowers (15.77) was recorded in Muvandan

The length of inflorescence ranged from 16.8 to 33.6 cm and the maximum length was noticed in Rama, rest all were on par with each other. The breadth ranged from 13.4 to 23.0 cm. The maximum breadth (23.0 cm) was also noticed in Ratna. As per the classification based on the

Table 1. Inflorescence characters of mango varieties

Variety	Season of flowering	No. of inflorescence m ²	No. of male flowers	Hermaphrodite flowers / inflorescence	
				No.	%
Alphonso	Jan-Feb	10.30	(12.19) 156.00	67.00	44.39
Prior	Dec-Jan	23.67	(17.55) 312.80	97.20	32.19
Muvandan	Jan-Feb	18.33	(14.42) 211.20	33.20	15.77
Neelum	Apr-May	7.00	(15.02) 226.00	98.60	42.92
Ratna	Jan-Feb	18.67	(21.06) 476.00	141.60	34.15
H-151	Dec-Jan	20.30	(20.81) 441.00	140.80	33.08
CD (0.05)		4.36	8.14	77.70	19.17

Values in parentheses denote $\sqrt{x + 0.5}$ transformed values

Table 1. Inflorescence characters of mango varieties (continued)

Variety	Inflorescence length (cm)	Inflorescence breadth (cm)	Density of flowers/ inflorescence	Colour of rachis	Shape of inflorescence	Hairiness
Alphonso	16.80	13.40	Densely	Light red	Pyramidal	Slightly hairy
Prior	21.00	15.40	Densely	Light green	Broadly pyramidal	Hairy
Muvandan	"20.00"	15.40	Medium densely	Light red	Pyramidal	Absent
Neelum	22.00	16.20	Laxly	Green with red patches	Pyramidal	Absent
Ratna	33.60	23.00	Laxly	Dark red	Conical	Slightly hairy
H-151	24.80	18.40	Laxly	Light green	Pyramidal	Absent
CD (0.05)	14.66	11.45				

density of flowers in the inflorescence, H-151, Muvandan and Ratna fell into the group laxly flowered, whereas Prior and Alphonso were in the densely flowered group. Neelum had medium dense inflorescence. The colour of rachis ranged from light green to dark red. Alphonso and Muvandan had light red coloured inflorescence, light green colour was noticed in the case of Prior and H-151. Neelum had green with red patches and dark red coloured inflorescence was seen in Ratna. Conical to broadly pyramidal shapes could be noticed in the varieties. Alphonso, H-151, Neelum and Muvandan had inflorescence with pyramidal shape, whereas Prior had broadly pyramidal and Ratna, conical shaped inflorescence. Prior had hairy inflorescence and Alphonso and Ratna slightly hairy ones. Hairs were absent in H-151, Muvandan and Neelum.

The data on fruit drop was taken at biweekly intervals. Initial set ranged from 5.39 to 8.45 fruits per inflorescence (Table 2). In all the varieties maximum fruit drop was seen during the initial 15 days after fruit set. Naik and Rao

(1943) had opined that the first two weeks were the most important from the point of view of fruit shedding in mango. According to Thimmappaiah and Suman (1987) fruit set at 15th day ultimately determined the yield and was significantly correlated with retention and yield. The initial drop was due to the internal competition between large number of small fruits initially formed and some incompletely fertilized ovules also dropped. During the course of development there was a gradual reduction in the drop and it ceased by 45th day.

A significant difference could be noticed between the first, second and third fortnights after fruit set in terms of fruit drop. However, no particular pattern could be noticed between the sides of the trees in terms of fruit drop intensity. During the second fortnight of development, maximum drop was seen in Alphonso (28.54%) and minimum in H-151 (12.68%). During the third fortnight, drop intensity to the tune of 6.03 to 12.06 per cent could be noticed in the varieties. In the overall drop percentage, which ranged from 79.65 in H-151 to 89.93 in

Table 2. Intensity of fruit drop in mango varieties

Variety	Direction	Initial no. of fruits per inflorescence	Percent of fruit drop (days after fruit set)			Total drop %	% fruits retained	CD (0.05)
			15 days	30 days	45 days			
Alphonso	East	6.85	46.08	39.96	5.46	91.50	8.50	1.34
	West	3.40	46.28	27.17	14.65	88.10	11.90	2.36
	North	8.40	74.66	12.60	2.86	90.13	9.87	10.16
	South	6.45	42.75	34.42	12.82	89.99	10.01	2.13
	Total	6.28	52.44	28.54	8.95	89.93	10.07	
Rajapuri	East	4.25	63.75	19.44	0.00	83.19	16.80	2.23
	West	8.25	55.21	32.01	5.83	93.05	6.95	1.93
	North	8.80	53.29	31.95	6.69	91.92	8.08	2.88
	South	6.60	39.63	24.92	11.59	76.14	23.86	NS
	Total	6.98	52.97	27.08	6.03	86.08	13.92	
Muvandan	East	6.00	71.32	10.41	10.00	91.73	8.27	2.02
	West	3.29	47.21	29.16	9.72	86.14	13.86	3.63
	North	4.30	56.92	23.88	9.20	90.03	9.96	2.05
	South	7.95	41.46	36.11	13.43	90.99	9.01	1.47
	Total	5.39	54.23	24.89	10.59	89.72	10.28	
Neelum	East	4.90	52.00	19.18	7.82	79.00	21.00	1.96
	West	5.30	54.34	22.13	14.50	90.97	9.03	2.00
	North	6.45	55.65	15.28	12.23	83.16	16.84	1.93
	South	7.25	56.21	12.31	9.58	78.10	21.90	2.01
	Total	5.98	54.55	17.23	11.03	82.81	17.19	
Rajapuri	East	9.20	61.23	20.14	9.82	91.20	8.79	1.97
	West	9.36	62.28	19.08	3.82	85.14	14.85	1.77
	North	7.80	62.89	19.74	6.88	89.50	10.50	2.13
	South	7.42	40.49	29.06	16.14	85.67	14.32	1.62
	Total	8.45	56.72	22.01	9.17	87.88	12.12	
H-151	East	11.36	41.64	20.96	15.59	7.19	21.80	1.55
	West	5.40	49.99	12.18	10.13	68.49	31.50	2.30
	North	4.00	65.56	8.30	11.1	85.00	15.00	2.55
	South	6.30	66.23	9.30	11.40	86.93	13.07	2.00
	Total	6.77	55.86	12.68	12.06	79.65	20.34	
CD (0.05)					NS			

Alphonso, no significant difference could be noticed between the varieties. The percentage of fruits retained per inflorescence varied from 10.07 in Alphonso to 20.34 in H-151.

ACKNOWLEDGEMENT

This paper forms a part of the M.Sc.(Hort.) thesis of the first author submitted to the Kerala Agricultural University, 2002.

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