Environment & Ecology 27 (4B) : 2013—2015, 2009
 ISSN 0970-0420

Elowering and Fruiting Behavior of Different Mango Cultivars under Jharkhand Condition

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Abstract

An experiment was conducted on healthy and bearing trees of 22 years old mango plants during 2002-03 to investigate the flowering and fruiting behavior of different mango (*Mangifera indica* L.) cultivars under Ranchi condition. Eleven cultivars were selected for the study in the experiment. These were Langra, Bombay, Mithua, Gulabkhas, Zardalu, Dashehari, Sipia, Fazli, Ketaki, Prabhashankar and Mahmood bahar. Langra was kept as check cultivar. Uniform cultural practices were given to all the plants. First flower opening was observed in Mithua (2/1), 100% flowering was found early in Gulabkhas (4/2), minimum period for 100% flower opening was recorded in Fazli (16 days). The check cultivar Langra recorded minimum male flower (74.41%), maximum male flower was recorded in Fazli (85.12%). Maximum perfect flower was obtained in Langra (28.59%). Maximum fruit set was observed in Zardalu (1.02%) and days taken in fruit maturity were recorded to be maximum in Fazli (136.33 days). Maximum fruit length (11.23 cm), fruit breadth (7.46 cm) and highest weight of fruits (220.13 g) were attained by Fazli. Highest volume of fruit (19,530 cc) and fruit yield (1.95 q per tree) were recorded in check cultivar Langra.
Key words : Flowering, Fruiting behavior, Mango varieties.

All the cultivated Indian mangoes belong to the single species *Mangifera indica.* Linn. which is the most important member of the family Anacardiaceae. Mango has been acknowledged as an excellent fruit liked by all. Mango (*Mangifera indica* L.), the most popular and choicest fruit is grown on large scale in Jharkhand with an area, production and productivity of 7.6 thousand hectare, 89.09 thousand tones and 11.9 t/ha respectively (1). There are hundreds of varieties in mango, out of which only a few happen to be of commercial importance. The most well known varieties throughout the country are Langra, Dashehari and Banganpalli. But none of the existing commercial varieties of mango could be called ideal types as these lacks in some desirable characters or the other.

Methods

The present investigation was conducted in the Department of Horticulture under Birsa Agricultural University, Kasnke, Ranchi during 2002-03 on healthy and bearing trees on 22 years old plants of mango. The soil of the orchard was loam, deep, well drained, low in nitrogen, low to medium in phosphorus, medium in potassium and deficient in calcium, boron and molybdenum. Eleven cultivars were selected for the study. In this study Langra was kept as check cultivar. The experiment was planned in randomized block design consisting of 11 treatments with three replications. One tree was considered as a single treatment in each replication. Flowering and fruiting behaviors of different mango varieties were observed as follows.

First flower opening, after the emergence of panicle a close observation on opening of flower was made on each day and the date was recorded for opening of first flower. Hundred percent flower opening, after the opening of first flower close observation was continued at weekly intervals till complete opening of flowers.

Male flower percent, number of flower per panicle were observed by selecting and tagging 10 panicles at random in all the four directions. Number of hermaphrodite flower was counted in the similar manner as the number of staminate flowers was counted and the average number per panicle was calculated.

$$\text{Sex ratio} = \frac{\text{Male flower}}{\text{Hermaphrodite flower}}$$

Table 1. Date of opening of flower (1st to 100%). 1 = Jan, 2 = Feb.

Cultivars	Year 2003 1st flower opening (date)	100% flower opening (date)	Flowering duration (days)
Bombay green	22/1	15/2	24
Mithua	2/1	23/2	21
Gulabkhas	17/1	4/2	17
Zardalu	21/1	9/2	19
Dashehari	27/1	17/2	21
Sipia	12/1	23/2	42
Fazli	24/1	9/2	16
Ketaki	8/2	27/2	20
Prabhashankar	23/1	11/2	19
Mahmood bahar	4/2	24/2	20
Langra (check)	31/1	22/2	23

Table 2. Sex of flower.

Cultivars	Male flower (%)	Hermaphrodite flower (%)
Bombay green	80.01	19.99
Mithua	73.93	26.07
Gulabkhas	74.37	25.63
Zardalu	78.18	21.82
Dashehari	72.80	27.20
Sipia	78.15	21.55
Fazli	85.12	14.88
Ketaki	78.39	21.59
Prabhashankar	75.46	24.54
Mahmood bahar	76.02	23.98
Langra (check)	71.41	28.59
SE ±	0.69	0.69
CD (5%)	2.05	2.02
CV (%)	4.55	5.10

Fruit set was recorded under natural conditions on 10 tagged panicle and average per panicle was calculated. Appearance of waxy coating, dots on the fruit, relative size of the fruit and skin color were under close observation for the assessment of maturity of fruit. Ten fruits from each cultivar were taken out at the time of harvesting and their size in two direction i.e., length, breadth in cm were recorded and average size of ten fruits was calculated and their volume was measured with water displacement method with the help of measuring cylinder. The average weight of ten fruits per plant which reached maturity was measured with the help of electronic balance.

Results and Discussion

Date of Opening of Flower (1st to 100%)

Table 1 reveals that the first flower opening was observed in Mithua (2/1) which was followed by Sipia (12/1), Gulabkhas (17/1), Zardalu (21/1) and Bombay green (22/1). The data of 100% flowering were considered as main factor demarcating the earliness or lateness. It was found early in Gulabkhas (4/2) followed by Zardalu (9/2), Fazli (9/2) and late in Mahmood bahar (24/2) and Ketaki (27/2). Minimum period for 100% flower opening was recorded in Fazli (16 days) followed by Gulabkhas (17 days) and Prabhashankar (19 days). Maximum period for 100% flower opening was recorded in Sipia (42 days) followed by Bombay green (24 days), Langra (23 days) and Dashehari (21 days). Similar work also has been reported by Bose and Mitra (2) on flowering period in mango.

Sex of Flower

Table 2 shows that the check cultivar Langra had minimum (71.41%) male flowers which was at par with Dashehari (72.80%), Mithua (73.93%) , Gulabkhas (74.37%), Prabhashankar (76.46%) and Mahmood bahar (76.02%) were next in order. Maximum male flower was recorded in Fazli (85.12%). Maximum perfect flower was obtained in Langra (28.59%) which was statistically at par with Dashehari (27.20%), Mithua (26.07%), Gulabkhas (25.63%) and Prabhashankar (24.54%) were next in order and were at par among themselves. Minimum perfect flower observed in Fazli (14.88%).

Percentage of Fruit Set

Table 3 shows that the check cultivar Langra had initial fruit set (26.29%) which was at par with the cultivar Sipia (29.32%), maximum initial fruit set occurred in Prabhashankar (34.31%) which was significantly superior to other cultivars. Dashehari (31.93%) which is at par with Sipia was next in order. Rest treatments showed average initial fruit set. Maximum fruit set was observed in Zardalu (1.02%) which was statistically at par with Sipia (0.98). In check cultivar Langra final fruit set was 0.68 which was statistically

Table 3. Percentage of fruit set.

Cultivars	Initial fruit set (%)	Final fruit set of hermaphrodite flower (%)	Fruit maturity (days)
Bombay green	23.45	0.62	126.00
Mithua	23.18	0.65	104.33
Gulabkhas	25.20	0.70	108.66
Zardalu	20.18	1.02	120.67
Dashehari	31.93	0.66	128.33
Sipia	29.32	0.98	125.67
Fazli	18.57	0.40	136.33
Ketaki	20.58	0.80	134.33
Prabhashankar	34.41	0.50	114.67
Mahmood bahar	29.81	0.56	136.00
Langra (check)	26.29	0.68	117.00
SE ±	1.04	0.04	2.78
CD (5%)	3.07	0.12	8.19
CV (%)	7.02	10.59	3.92

Table 4. Length, breadth, weight, volume and yield of fruit.

Cultivars	Fruit length (cm)	Fruit breadth (cm)	Weight of fruit (g)	Volume of fruit (cc)	Yield (g/ plant)
Bombay green	9.80	6.69	205.00	182.63	1.68
Mithua	8.97	6.29	158.70	138.81	1.32
Gulabkhas	8.93	6.12	145.03	143.46	1.36
Zardalu	10.17	6.23	182.97	156.74	1.36
Dashehari	8.80	5.23	111.17	99.55	1.76
Sipia	9.23	5.36	131.17	68.92	1.39
Fazli	11.23	7.46	220.13	194.50	0.93
Ketaki	8.10	5.24	90.60	60.55	1.11
Prabhashankar	10.30	6.29	180.43	149.00	1.50
Mahmood bahar	9.57	6.82	183.33	142.50	1.49
Langra (check)	8.99	6.89	204.93	195.30	1.95
SE ±	0.44	0.23	2.89	2.91	0.06
CD (5%)	1.29	0.69	8.53	8.59	0.17
CV (%)	8.01	6.41	3.04	4.19	6.76

at par with Gulabkhas (0.70%) and Ketaki (0.80%). There was significant difference among the cultivars. Days taken in fruit maturity were maximum in Fazli (136.33 days) and are statistically at par with Mahmood Bahar (136 days), Ketaki (134.33 days) and Dashehari (128.33 days). Minimum days taken in fruit maturity in cultivar Mithua (104.33 days) which is statistically at par with Gulabkhas (108.66 days). Check Langra cultivar, took 117 days in fruit maturity which was ranked fourth and was statistically at par with Zardalu (120.67 days). Pal et al. (3) also observed more or less similar results.

Length, Breadth, Weight, Volume and Yield of Fruit

Table 4 shows that the maximum fruit length (11.23 cm) was attained by Fazli which is statistically at par with Prabhashankar (10.3 cm) and Zardalu (10.17 cm). Maximum fruit breadth was observed in case of cultivar Fazli (7.46 cm) closely followed by Langra (6.89 cm). Cultivar Fazli (220.13 g) also had highest weight of fruits which was significantly superior to other cultivars. Similar results were obtained by Hoda and Yadav (4). Maximum volume of fruit (195.30 cc) was recorded in check Langra cultivar which was statistically at par with Fazli (194.5 cc). Bombay green (182.63 cc) ranked second. Minimum volume of fruit was observed in Ketaki (60.55 cc) and is statistically at par with Sipia (68.92 cc). Highest fruit yield 1.95 q/tree was obtained in cultivar Langra which was significantly superior to other cultivars. Dashehari (1.76) ranked second which was statistically at par with Bombay green (1.68). The lowest yield of 0.93 q/tree was obtained from cultivar Fazli, can be recorded as poor yielder.

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