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Evaluation of Mango (*Mangifera indica* L.) cultivars on the basis of flowering and fruiting behaviour of fruit under faizabad condition

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Abstract

The main aim of the research was to investigate the flowering and fruiting behaviour of mango fruit. The earliest emergence of panicle was recorded in Bombay Green (31 Jan), whereas the minimum time for 50% flowering (12.67 days) and period of bud break to full bloom (22.33 days) were recorded in Gulab Khas. The maximum fruit set per shoot (3.83), fruit retention (5.80%) and fruit yield (127.63 Kg) along with the minimum fruit drop were recorded in Dashehari (94.20%). Overall it can be concluded on the basis of panicle emergence and period of bud break to full bloom of fruits, Bombay Green and Gulab Khas were observed as early variety whereas Dashehari as mid season variety to be found best under Faizabad condition. These cultivars possess high fruit retention, high yield and minimum fruit drop and its superior overall the varieties under this study.

Keywords: Mango, Fruit, Flower, Cultivars, Retention and Yield

Introduction

Mango (*Mangifera indica* L.) is also known as “King of fruits” and “National fruit of India”. It belongs to the family Anacardiaceae. The mango is indigenous to north-east India and north Myanmar in the foot-hills of the Himalayas, and is said to have originated in the Indo-Burma region. Mango is one of the most preferred, widely distributed, and broadly grown tropical fruit in the world. Mangoes are gaining commercial importance in all over the world and assume a leading position in among the fruits. Mango trees grow to an impressive size under favorable conditions. It may attain a height of 25 m. The trees are mostly evergreen, erect and its fruit is a large drupe. The fruit skin is smooth, thick and commonly yellow or greenish in color when matured. Mango fruit develops rapidly after fruit set and to be ready for harvesting within 13-20 weeks after flowering depending upon the variety and climatic condition. All the parts of its plant have various uses in India. Both ripe and unripe mangoes are used extensively by food processing industry to prepare a wide variety of products such as syrup, jam, squash, juice, cereal flakes and toffee etc., from ripe mango. Pickles, chutney, slices, amchur, candy, jam, jelly preserve, squash etc., from unripe mango. Although a tropical fruit, the mango grows equally well under semi-tropical conditions. The optimum growth temperature for mango is varied from 23.9-26.7 °C. In India, mango grows equally well both under low and heavy rainfall of 25 to 250 cm annually. Due to the long history of cultivation in this subcontinent, about a thousand cultivars of mango are known to exist in India. All these have originated as superior chance seedlings arising from natural crossing or gene mutation. These selections were later maintained true-to-type through asexual propagation. However, the International Check - list of mango cultivars comprising 793 cultivars from all over the world has been prepared by Pandey (1985) [17].

In Uttar Pradesh, the popular commercial cultivars are grown viz. Bombay Green, Dashehari, Fajri, Langra, Safeda Lucknow, Chausa, Ratual, Amarpalli and Malihabadi. These cultivars are gaining popularity due to attractive colour, pleasant flavour, taste, sugars, less fibres and pulpiness. Through these cultivars are grown all over the country but Uttar Pradesh is the leading producer of these cultivars. In general, the cultivars are location-specific and the commercial cultivars of one region do not do so well when grown in other areas. Uttar Pradesh is divided into 9 agro-climatic zones in which Faizabad comes under eastern plain zone, therefore, there is need to evaluate the recommend variety which can be successfully grown as well as prove to be profitable for this zone.

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Materials and Methods

The experiment was carried out at Main Experimental Station, Department of Horticulture, Narendra Deva University of Agriculture & Technology, Kumarganj, and Faizabad (U.P.) during the year 2015-16. The experiment on mango was conducted in Randomized Block Design (RBD) with twelve treatments. Each variety was replicated thrice and spaced at a distance of 10 × 10 m. Plants were of uniform in age (22 years) and received same cultural practices during the course of investigation. The Selected varieties were Dashehari, Banarasi Langra, Langra Kukori, Bombay Green, Nisar Pasand, Gulab Khas, Himsagar, Lucknow Safeda, Rataul, Gaurjeet, Samarbahist Chausa and Zardalu and used as treatments T₁, T₂, T₃, T₄, T₅, T₆, T₇, T₈, T₉, T₁₀, T₁₁ and T₁₂ respectively.

Flowering and Fruiting behaviour

Date of panicle emergence: Date of appearance of first Panicles were recorded on the tagged shoots.

Time of appearance of 50% flowering (days): It was recorded by visiting the experimental orchard every day after panicle emergence to when 50 per cent flowers on a panicle were opened.

Period of bud break to full bloom (days): Data on period of bud break to full bloom was recorded by counting the days

taken from emergence of first panicle to the three fourth flowers of the inflorescence were opened.

Number of fruit set per shoot: The number of fruit set per shoot was counted after fruit set at pea stage and average number of fruits per shoot was expressed as number of fruits per shoot.

Fruit drop (%): Total number of fruits at initial stage was counted and the number of fruits retained at maturity stage was noted. The percentage fruit drop was calculated with the help of formula given below.

$$\text{Fruit drop(\%)} = \frac{\text{No. of fruits at initial stage} - \text{No. of fruits retention at harvest}}{\text{No. of fruits at initial stage}} \times 100$$

Fruit retention (%): The total number of fruit retained up to maturity were counted on each selected branch and calculated by following formula:

$$\text{Fruit retention (\%)} = \frac{\text{No. of fruit retained up to maturity stage}}{\text{Total no. of fruits at initial stage}} \times 100$$

Fruit yield: The yield per tree was recorded at the time of fruit harvesting and expressed in kg/ tree.

Table 1: Data regarding flowering and fruiting behaviour of different cultivars of mango

Treatments	Date of panicle emergence	Time of 50 percent flowering (days)	Period of bud break to full bloom (days)	Average no. of fruit set/shoot	Fruit drop (%)	Fruit Retention (%)	Fruit Yield (kg/tree)
Dashehari	02-Feb	20.33	29.33	3.83	94.20	5.80	127.63
Banarasi Langra	09-Feb	21.33	30.67	2.67	98.01	1.99	98.52
Langra Kukori	07-Feb	20.67	28.33	2.83	97.75	2.25	104.73
Bombay Green	31-Jan	14.33	23.67	2.75	97.62	2.28	112.17
Gulab Khas	01-Feb	12.67	22.33	2.92	95.58	4.42	84.80
Nisar Pasand	08-Feb	16.67	26.00	3.17	94.97	5.03	96.27
Himsagar	04-Feb	15.33	24.67	3.08	97.76	2.24	79.30
Lucknow Safeda	10-Feb	18.67	27.00	3.00	95.30	4.70	88.53
Rataul	13-Feb	18.00	25.67	2.17	97.81	2.19	91.86
Gaurjeet	06-Feb	16.33	24.00	3.33	94.64	5.36	74.81
Samarbahist Chausa	15-Feb	19.67	30.33	1.75	98.83	1.17	107.83
Zardalu	11-Feb	17.33	26.67	2.08	98.25	1.75	93.12
S.Em. ±		0.84	0.92	0.26	0.53	0.53	1.62
C.D. at 5%		2.46	2.71	0.76	1.55	1.55	4.76

Result and Discussion

The results obtained from the present investigation as well as relevant discussion have been presented under following heads:

In the present experiment, data revealed that earlier emergence of panicle took place in cultivar Bombay Green (31 Jan) followed by Gulab Khas (01 Feb) and Dashehari (02 Feb). However, the later panicle emergence was observed in Samarbahist Chausa (15 Feb). These results are partially supported the findings of Sharma *et al.* (1970) and Anjum *et al.* (1999) [2]. It seems probable that the differences in time of panicle emergence of different cultivars of mango may be due to inherent character, temperature and photo periodism.

In this experiment, the cultivars also differed significantly in time of 50% flowering and period of bud break to full bloom. The mean value of cultivars regarding time of 50% flowering (17.61 days) was in the range of 12.67 days to 21.33 days.

Among the cultivars, the minimum time of 50% flowering was recorded in Gulab khas (12.67 days) which is at par with the Bombay Green (14.33 days) followed by Himsagar (15.33

days). Whereas, the cultivar Banarasi Langra (21.33 days) took the maximum time for the 50% flowering. The average value of period of bud break to full bloom (26.55 days) was for all cultivars with a range of 22.33 days to 30.67 days. Among the cultivars evaluated, the minimum period of bud break to full bloom was recorded in Gulab Khas (22.33 days) which is at par with the Bombay Green (23.67 days) followed by Gaurjeet (24.00 days). While, the cultivars Banarasi Langra (30.67 days) took the maximum period of bud break to full bloom. The similar trends are also reported by Kumar *et al.* (2003) [12]. The variations observed in might be due to the inherent character of the variety and the duration of flowering in different regions is mainly governed by the local climatic conditions.

A careful investigation of the data showed that there was significant variation in number of fruit set per shoot was observed in Dashehari (3.83) which was at par with the Gaurjeet (3.33) followed by Nisar Pasand (3.17). Whereas, the minimum number of fruit set per shoot was noted in Samarbahist Chausa (1.75). The minimum fruit drop was

measured in Dashehari (94.20%) followed by Gaurjeet (94.64%) and Nisar Pasand (94.97%). Whereas, the cultivar Samarbahist Chausa (98.83%) had the maximum fruit drop. The maximum fruit retention was recorded in Dashehari (5.80%) followed by Gaurjeet (5.36%) and Nisar Pasand (5.03%). Whereas, the minimum fruit retention was recorded in cultivars of Samarbahist Chausa (1.17%). Which were close those reported by Muhammad *et al.* (2002) and Anila *et al.* (2003) [1] The variations observed in number of fruit set per shoot, fruit retention and fruit drop may be attributed to the genetic nature of varieties and weather parameter. Significant variation in fruit yield was recorded among different cultivars of mango. The highest fruit yield was recorded in Dashehari (127.63 Kg) followed by Bombay Green (112.17 Kg) and Samarbahist Chausa (107.83 Kg). While, the minimum fruit yield was noted in Gaurjeet (74.81 Kg). These results are in agreement with reports of Yadav *et al.* (2010) [24] and Singh *et al.* (2013) [23]. The yield is a highly variable factor depending upon the cultivars and age of the plants, climatic conditions, incidence of the pests and diseases etc. It is really interesting to note that variety Dashehari gave higher yield than other variety may be due to "off year" season in last year and they reserves the carbohydrate synthesis that increase higher yield. In many varieties numbers of fruit increased but fruit yield decreased. This may be due to distribution and diversion of available food material in more number of fruits.

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