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RESEARCH ARTICLE

STUDY ON MORPHO-PHYSICAL FLORAL CHARACTERS OF MANGO (MANGIFERA INDICA) VARIETIES IN SARLAHI, NEPAL

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ABSTRACT

Floral characteristics of 27 mango varieties were studied during February-May, 2024. Distinct variations were found among the studied varieties. Significant variation were observed in term of number of male flower per inflorescence, number of hermaphrodite flower per inflorescence, length of inflorescence and width of inflorescence ranging from 57 to 1737, 7 to 461, 19 cm to 40.6 cm, 6.4 cm to 25.7 cm respectively. The result disclosed that in all varieties flowers were of pentamerous type and inflorescence position were found terminal. The number of male flower per inflorescence were highest in Bombay (1737). In term of number of hermaphrodite flowers per inflorescence, chausa has highest number (461). In overall, male flower per inflorescence were more than hermaphrodite flower per inflorescence across all varieties except Amrapali, Jarda and Chausa. Ratna has the longest inflorescence (40.6 cm) and widest inflorescence (25.7 cm). From the study, it can be inferred that chausa will have more fruit set as it has more hermaphrodite flowers but seeing the overall floral character Ratna is more superior as it has longest and widest inflorescence and second highest in term of number of hermaphrodite flower among the studied varieties. The findings of the study will be beneficial for breeding purposes while developing new varieties of superior quality.

Keywords

Mangifera indica, Inflorescence, Morpho-Physical, Hermaphrodite

1. INTRODUCTION

Mango (*Mangifera indica*) is one of the choicest tropical fruit and is considered as the king of fruit due to its unique taste, flavor and scent (Thapa et al., 2024). It belongs to the family Anacardiaceae. Tropical plain home gardens, river gorge locations, and subtropical valley are the common habitats of Nepalese mango diversity (Subedi et al., 2021). Mango is mainly grown in warm area of terai region and prefers little rainfall during the time of flowering (Humayun and Babu, 2002). Due to its strong reliability on environment, mango exhibits wide variation in flowering and fruiting (Saheda et al., 2019). Flowering of mango is crucial factor in the productivity of mango. In tropical fruits like mango, stems that have spent enough time in rest since the previous flush are able to induce flowers. The most important factor influencing flowering is the time since the last flush (Ramírez and Davenport, 2010). Initiation is the first step for mango to flower which involves cell division and elongation. Mango trees passes through four unique periods of flowering: Swelling of the apical bud, panicle elongation, panicle growth and flowering then fruit set (Lemos et al., 2018). The floral characteristics are different for different plants and varies between species and even among varieties (Thapa et al., 2024) .Variety, tree age, and environmental condition are the crucial factors affecting the variability of flowering in mango (Palanichamy et al., 2011).

In Nepal mango is grown in all most all region of terai but good quality grafted mangoes of known varietal identity are mostly grown in sarlahi district of madesh province. Moreover, research on the floral performance of those varieties grown in that area are rare. So, it is necessary to assess the floral performance of the superior varieties grown in that area. Therefore, an attempt was made to study the floral characters of 27 varieties in the mango orchard of Tropical Horticulture Center, Sarlahi district, Madesh province, Nepal.

2. MATERIALS AND METHODS

2.1 Experiment material

The research was conducted on 27 varieties of mango in pre-established orchard of Tropical Horticulture Centre, Sarlahi district, Nepal during February-May, 2024. Varieties used in research are Malda, Bombay, Amrapali, Dasheri, Mallika, Kalkatiya, Jarda, Neelam, Baramasi, Fazili, Chausa, Anbarratol, Ratna, Haden, Sukhtara, Swarnarekha, Kent, Dockmai, Kishanbhog, Chapra malda, Cipia, Sukul, Samarbais, Jarmarey, Abhyat, Bathuwa, Amandasheri.

2.2 Experimental design

The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications per variety, where a single tree represents a unit of replication. A total of 81 randomly selected tree (3 of each variety) were tagged for data collection. When inflorescence were full bloomed they were plucked for taking morpho-physical characters such as Inflorescence color and arrangement, flower type, inflorescence length and width, number of male and hermaphrodite flowers per inflorescence.

2.3 Data collection

From 27 varieties, floral data were recorded according to Varietal

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Performance on Flowering of different varieties of mango (*Mangifera indica*) at Sarlahi, Nepal (Thapa et al., 2024). The length of the inflorescence was measured from base to the tip while width of the inflorescence was measured from the broadest part of the base of the inflorescence. Male and hermaphrodite flowers were counted manually using forceps.

3. Results and Discussion

Among the studied varieties, wide variation was noticed in term of color and arrangement of the inflorescence. All the varieties have pentamerous type of flower at terminal position. The inflorescence color of the varieties varied from light green to green with red patches. Malda, Dasheri, Jarda, Anbarratol, Sukhtara, Swarnarekha, Chapra malda, Jarmarey exhibited light green colored inflorescence. Amrapali, Baramasi, Haden, Cipia, Amandasheri showed green color of inflorescence. Fazili, Chausa, Kishanbhog, Bathuwa exhibited green with red patches colored inflorescence and crimson colored inflorescence was seen in Bombay, Mallika, Kalkatiya, Neelam, Ratna, Kent, Sukul, Samarbais, Abhyat whereas Nam Dok Mai exhibit yellowish green colored inflorescence (Figure 1, figure 2).

Figure 1: Inflorescence of different varieties of mango

Figure 2: Inflorescence of different varieties of mango

Table 1: Morphological characters of flower of different varieties of mango

Varieties	Color of inflorescence	Inflorescence Arrangement	Inflorescence position	Flower Type
T1: Malda	Light green	Pyramidal	Terminal	Pentamerous
T2: Bombay	Crimson	Pyramidal	Terminal	Pentamerous
T3: Amrapali	Green	Pyramidal	Terminal	Pentamerous
T4: Dasheri	Light green	Broadly Pyramidal	Terminal	Pentamerous
T5: Mallika	Crimson	Pyramidal	Terminal	Pentamerous
T6: Kalkatiya	Crimson	Conical	Terminal	Pentamerous
T7: Jarda	Light green	Conical	Terminal	Pentamerous
T8: Neelam	Crimson	Broadly Pyramidal	Terminal	Pentamerous
T9: Baramasi	Green	Pyramidal	Terminal	Pentamerous
T10: Fazili	Green with red patches	Pyramidal	Terminal	Pentamerous
T11: Chausa	Green with red patches	Pyramidal	Terminal	Pentamerous
T12: Anbarratol	Light green	Pyramidal	Terminal	Pentamerous
T13: Ratna	Crimson	Broadly Pyramidal	Terminal	Pentamerous
T14: Haden	Green	Pyramidal	Terminal	Pentamerous
T15: Sukhtara	Light green	Conical	Terminal	Pentamerous
T16: Swarnarekha	Light green	Pyramidal	Terminal	Pentamerous
T17: Kent	Crimson	Pyramidal	Terminal	Pentamerous
T18: Nam Dok Mai	Yellowish green	Conical	Terminal	Pentamerous
T19: Kishanbhog	Green with red patches	Pyramidal	Terminal	Pentamerous
T20: Chapra Malda	Light Green	Pyramidal	Terminal	Pentamerous
T21: Cipia	Green	Pyramidal	Terminal	Pentamerous
T22: Sukul	Crimson	Pyramidal	Terminal	Pentamerous
T23: Samarbais	Crimson	Broadly Pyramidal	Terminal	Pentamerous
T24: Jarmarey	Light Green	Pyramidal	Terminal	Pentamerous
T25: Abhyat	Crimson	Conical	Terminal	Pentamerous
T26: Bathuwa	Green with red patches	Pyramidal	Terminal	Pentamerous
T27: Amandasheri	Green	Conical	Terminal	Pentamerous

Malda, Bombay, Amrapali, Mallika and Baramasi exhibit pyramidal shaped Inflorescence, Kalkatiya, Jarda, Nam Dok Mai showed conical shaped inflorescence and broadly pyramidal shaped inflorescence was seen in Dasheri and Neelam. Similar findings were also reported by (Thapa et al., 2024). Varieties Fazili, Chausa, Anbarratol, Haden, Swarnarekha, Kent, Kishanbhog, Chapra malda, Cipia, Sukul, Jarmarey, Bathuwa exhibits pyramidal shaped inflorescence, Ratna, Samarbais showed broadly pyramidal inflorescence, Sukhatra, Abhyat and Amandasheri exhibits conical shaped inflorescence (Table 1).

Table 2: Number of male and hermaphrodite flower per inflorescence, inflorescence length (cm), Inflorescence width (cm) of different varieties of mango

Varieties	Number of Male Flowers per inflorescence	Number of Hermaphrodite Flowers per inflorescence	Length of the inflorescence (cm)	Width of the inflorescence (cm)
T1: Malda	521	166	26.6	11.8
T2: Bombay	1737	56	29.2	16.2
T3: Amrapali	294	305	24.9	19
T4: Dasheri	415	258	27.5	24
T5: Mallika	1131	52	30.3	16.6
T6: Kalkatiya	285	168	22.8	12.7
T7: Jarda	150	206	28.3	11.5
T8: Neelam	606	93	27.3	14.2
T9: Baramasi	214	110	30.8	14.2
T10: Fazili	1157	206	33.4	21.6
T11: Chausa	140	461	35.5	18.7
T12: Anbarratol	845	40	22.6	17.5
T13: Ratna	1100	330	40.6	25.7
T14: Haden	326	123	29.5	16.4
T15: Sukhtara	659	140	25.7	13.6
T16: Swarnarekha	400	7	27.2	13.4
T17: Kent	925	69	26.7	17.6
T18: Nam Dok Mai	368	191	30.5	13.5
T19: Kishanbhog	616	150	26.2	14.8
T20: Chapra Malda	626	133	19.3	10.2
T21: Cipia	791	171	29.4	20.2
T22: Sukul	650	54	28.5	17.3
T23: Samarbais	940	138	34.6	22.7
T24: Jarmarey	830	111	23.7	13.1
T25: Abhyat	209	188	32.3	14.8
T26: Bathuwa	57	145	19	8.6
T27: Amandasheri	300	96	16.9	6.4
S.Em±	25.62	18.94	1.00	0.877
CV%	21.6	25.84	7.02	5.24

The result showed that maximum number of male flower per inflorescence were found in Bombay (1737) and lowest in Bathuwa (57). In term of number of hermaphrodite flower per inflorescence, maximum number was found in Chausa (461) and lowest in swarnarekha (7). Ratna exhibit maximum inflorescence length (40.6 cm) and maximum inflorescence width (25.7 cm) whereas Amandasheri has least inflorescence length (16.9 cm) and least inflorescence width (6.4 cm) (Table 2).

4. Conclusion

This study provides a detailed analysis of the floral characteristics of 27 mango varieties grown in Sarlahi, Nepal, revealing significant differences in inflorescence length, width and arrangement and number of male and hermaphrodite flowers. These findings offer breeders the opportunity to develop improved varieties using the variability of desirable genotypes and assist farmers in selecting varieties based on desirable traits. Although the study's scope is limited, the results demonstrate the diversity of mango varieties and their performance under specific environmental conditions, highlighting the importance of expanding the research scope and further analyzing environmental impacts. Future research should include a wider range of varieties and regions to provide a more comprehensive scientific basis for mango cultivation and breeding.

Authors' Contributions

Kiran Thapa: Writing-original draft, Investigation, conceptualization, Methodology, Data collection and analysis. Pawan Pyakurel: Investigation, conceptualization, Data collection. Poojan Adhikari: Writing-review and editing, Methodology, Formal analysis. Susma Adhikari: Writing-review and editing, Methodology, Formal analysis. Kabita Bhat: Writing-review and editing. Abhishek Shrestha: Conceptualization, Methodology. Rupesh Chaudhary: Writing-review and editing, Data collection.

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