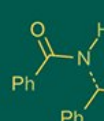


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Variability studies in mango (*Mangifera indica* L.) Under eastern Vidarbha zone

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Abstract

The present investigation entitled “Variability Studies in Mango under Eastern Vidarbha Zone” was undertaken during 2025-26 to assess the variability among indigenous mango genotypes and to identify promising genotypes for better yield and fruit quality. More than 250 local mango genotypes were surveyed from different locations of Gadchiroli district of Eastern Vidarbha, Maharashtra, out of which 33 superior genotypes were selected for detailed evaluation. The selected genotypes were evaluated under single plant analysis for physical, qualitative and biochemical fruit characters. Observations were recorded for Fruit characteristics such as fruit weight(g), fruit length(cm), fruit diameter(cm), skin colour of fruit, stone characteristics such as Stone length(cm), Stone width(cm), Stone thickness(cm), Stone weight(g), peel characters such as peel weight(g) and peel percentage (%), pulp characteristics such as pulp weight(g), pulp colour, pulp percentage (%), pulp: seed ratio, pulp aroma, shelf life (in days). Biochemical characteristics including total soluble solids (°Brix), Acidity (%), TSS: acidity ratio, reducing sugar (%), non-reducing sugar (%) and total sugar (%) were also studied. The data were analyzed using mean, range, standard deviation and coefficient of variation. The mango genotypes were collected from the twelve talukas of Gadchiroli district namely Gadchiroli itself, Dhanora, Chamorshi, Mulchera, Wadsa, Armori, Kurkheda, Korchi, Aheri, Sironcha, Etapalli, Bhamragad were selected for survey of superior types of Indigenous mango genotype. Considerable variability was observed among the 33 superior mango genotypes for most of the characters studied and fruit weight from 145.78 to 1539.98 g, Fruit length ranged from 7.15 to 28.39 cm, fruit diameter from 5.29 to 13.51 cm. The highest fruit length was recorded in GM-20 (28.39 cm), highest fruit diameter in GM-22 (13.51 cm) and maximum fruit weight in GM-29 (1539.98 g), followed by GM-20 (1235.16 g) and GM-23 (999.89 g). while shelf life ranged from 6 to 9 days, stone length ranged from 5.26 to 9.13 cm, stone width ranged from 2.91 to 6.45 cm, stone thickness ranged from 1.01 to 1.52 cm, stone weight ranged from 15.25 to 40.78 g, peel weight ranged from 20.98 to 279.89 g, peel percentage ranged from 3.12 to 29.49 %, pulp weight 84.02 to 1471.33 g, pulp percentage ranged from 55.62 to 95.54%, pulp: seed ratio ranged from 2.06 to 71.18. Among biochemical characters, TSS ranged from 5.87 to 21.34 °Brix, acidity ranged from 0.16 to 1.95% and TSS: acidity ratio ranged from 3.01 to 121.56. Reducing sugar ranged from 5.13 to 8.89%, non-reducing sugar from 2.60 to 6.31% and total sugar from 8.34 to 13.95%. The highest TSS was recorded in GM-9 (21.34 °Brix), highest TSS: acidity ratio in GM-5 (121.56), highest reducing sugar in GM-6 (8.89 %), highest non-reducing sugar in GM-20 (6.31 %), and highest total sugar in GM-18 (13.95 %). Overall, the study revealed substantial variability among the indigenous mango genotypes for important physical and biochemical fruit characters. The promising genotypes identified in the present investigation for genetic variability under eastern Vidarbha zone may serve as valuable genetic resources for selection, conservation and future mango breeding programs aimed at improving yield and fruit quality.

Keywords: Mango, genetic variability, mango genotypes, fruit quality, morphological characters, biochemical characters, Eastern Vidarbha Zone Maharashtra

Introduction

Mango (*Mangifera indica* L.) is one of the most important tropical fruit crops and is valued for its flavour, aroma, nutritional quality and diverse uses. India has a rich diversity of mango germplasm comprising commercial cultivars as well as numerous indigenous and seedling-origin types. Indigenous genotypes represent a valuable reservoir of variation for fruit size, pulp characteristics, and maturity behaviour and biochemical quality. Systematic characterization of such material is important for identifying useful genotypes, conserving

genetic resources and supporting future breeding and selection. Eastern Vidarbha, particularly Gadchiroli district, is known for locally maintained mango material, but systematic characterization of this diversity is comparatively limited. Therefore, the present study was undertaken to document variability among 33 indigenous mango genotypes and to identify genotypes showing desirable performance for selected fruit quality and traits.

2. Objectives

- To study the variability among indigenous mango genotypes under the Eastern Vidarbha zone.
- To identify promising mango genotypes based on important fruit and quality attributes.

3. Materials and Methods

The investigation was conducted during April to June 2026 using Ambia bahar fruits. Thirty-three indigenous mango genotypes were surveyed in Gadchiroli district of Maharashtra and evaluated at the laboratory of the Department of Fruit Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The genotypes were considered on a single-plant basis. Representative ripe fruits were used for recording observations. Fruit weight was recorded with a digital balance and fruit length and diameter were measured using a vernier caliper. Stone, peel and pulp were separated carefully and weighed individually. Stone percentage, peel percentage and pulp percentage were calculated from their respective weights in relation to fruit weight. Pulp: stone ratio was calculated as: Pulp weight (g) / Stone weight (g). Shelf life was recorded in days. Ripe fruit skin colour and pulp colour were recorded visually using the observed colour categories. Pulp aroma was evaluated organoleptically and classified according to intensity as mild, intermediate or strong. Total soluble solids (TSS) were measured using a hand refractometer and expressed as °Brix. Titratable acidity was determined by titration and expressed as percentage. TSS:Acidity ratio was calculated by dividing TSS by titratable acidity. Reducing and total sugars were estimated by the DNS-based procedure followed in the investigation, while non-reducing sugar was calculated using the correction procedure described in the thesis. Descriptive statistics comprising mean, range, standard deviation (SD) and coefficient of variation (CV) were used to summarize the observations.

4. Result and Discussion:

4.1 Physical fruit characters

Marked variability was observed for fruit size and weight. Fruit weight ranged from 145.78 to 1539.98 g with a mean of 277.52 g, while fruit length ranged from 7.15 to 28.39 cm with a mean of 13.36 cm. Fruit diameter varied from 5.29 to 13.51 cm with a mean of 7.78 cm. The highest fruit weight was recorded in GM-29 (1539.98 g), followed by GM-20 (1235.16 g) and GM-23 (999.89 g). GM-20 recorded the maximum fruit length (28.39 cm), whereas GM-22 recorded the maximum fruit diameter (13.51 cm). The CV values for fruit weight, length and diameter were 116.38, 28.99 and 27.01%, respectively, indicating particularly wide variation in fruit weight.

4.2 Stone and peel characters

Stone length, width and thickness ranged from 5.26–9.13 cm, 2.91–6.45 cm and 1.01–1.52 cm, respectively. Stone weight ranged from 15.25 to 40.78 g, with GM-28 recording

the minimum and GM-24 the maximum. Stone percentage ranged from 1.34 to 27.97%. Peel weight varied from 20.98 to 279.89 g, with the maximum in GM-20, whereas peel percentage ranged from 3.12 to 29.49%, with the maximum in GM-12. The comparatively high variability in peel weight (CV 96.03%) and stone percentage (CV 41.83%) indicates substantial differences among genotypes in fruit component composition.

4.3 Pulp characters, colour, aroma and shelf life

Pulp weight ranged from 84.02 to 1471.33 g with a mean of 206.03 g, while pulp percentage ranged from 55.62 to 95.54% with a mean of 66.79%. Pulp: stone ratio ranged from 2.06 to 71.18 and had a CV of 153.86%, representing the widest variability among the characters summarized. Qualitative variation was also observed in pulp colour: yellow was predominant in 20 genotypes, golden yellow in five, creamy white in five and deep orange in three. Pulp aroma intensity was intermediate in 20 genotypes, mild in 11 and strong in two genotypes (GM-9 and GM-14). Shelf life ranged from 6 to 9 days with a mean of 7.76 days.

4.4 Biochemical characters

TSS varied from 5.87 to 21.34 °Brix, with a mean of 16.48 °Brix; GM-9 recorded the highest TSS. Acidity ranged from 0.16 to 1.95%, with a mean of 0.81%, while the TSS:acidity ratio ranged from 3.01 to 121.56 with a mean of 34.06. The highest TSS:acidity ratio was recorded in GM-5. Reducing sugar ranged from 5.13 to 8.89%, with the highest value in GM-6. Non-reducing sugar ranged from 2.60 to 6.31%, with the highest value in GM-20. Total sugar ranged from 8.34 to 13.95%, with the highest value in GM-18. These results demonstrate useful diversity in sweetness-related and maturity-associated biochemical attributes.

4.5 Overall variability and promising genotypes

The coefficient of variation was highest for pulp: stone ratio (153.86%), followed by pulp weight (145.24%), fruit weight (116.38%), peel weight (96.03%) and TSS:acidity ratio (91.78%). Lower variability was recorded for stone thickness (12.37%), stone length (12.52%), pulp percentage (12.94%) and shelf life (13.68%). Based on individual trait performance, GM-29, GM-20 and GM-23 were notable for high fruit weight; GM-9 for TSS; GM-5 for TSS:acidity ratio; GM-6 for reducing sugar; GM-20 for non-reducing sugar; and GM-18 for total sugar. These should be regarded as trait-specific promising genotypes rather than universally superior genotypes.

5. Conclusion

The study revealed substantial variability among 33 indigenous mango genotypes of Eastern Vidarbha for physical, fruit component, qualitative and biochemical characters. Particularly large variation was observed in fruit weight, pulp weight, peel weight, pulp: stone ratio and TSS:acidity ratio. Variation in pulp colour and aroma intensity further demonstrated the diversity present in the material. Several genotypes showed desirable performance for individual fruit-quality traits and may be useful for further evaluation and conservation. Since the present study was based on single-plant observations, multi-season and replicated evaluation is recommended before making final cultivar, breeding or large-scale production recommendations.

Table 1: Variability in different mango genotype

Character	Mean	Range	SD	CV (%)
Fruit Weight(g)	277.52	145.78-1539.98	322.97	116.38
Fruit length (cm)	13.36	7.15-28.39	3.87	28.99
Fruit diameter (cm)	7.78	5.29-13.51	2.10	27.01
Stone Length (cm)	6.42	5.26-9.13	0.80	12.52
Stone Width (cm)	4.61	2.91-6.45	0.95	20.55
Stone Thickness (cm)	1.19	1.01-1.52	0.15	12.37
Stone weight (g)	26.65	15.25-40.78	7.26	27.24
Stone Percentage (%)	13.75	1.34-27.97	5.75	41.83
Peel Weight (g)	44.85	20.98-279.89	43.07	96.03
Peel Percentage (%)	19.46	3.12-29.49	5.12	26.33
Pulp Weight (g)	206.03	84.02-1471.33	299.24	145.24
Pulp Percentage (%)	66.79	55.62-95.54	8.64	12.94
Pulp: Stone Ratio	8.13	2.06-71.18	12.50	153.86
Shelf life(days)	7.76	6.00-9.00	1.06	13.68
TSS (°Brix)	16.48	5.87-21.34	4.34	26.32
Acidity (%)	0.81	0.16-1.95	0.46	57.74
TSS: Acidity ratio	34.06	3.01-121.56	31.26	91.78
Reducing Sugar (%)	7.26	5.13-8.89	1.10	15.10
Non-reducing Sugar (%)	4.16	2.60-6.31	1.08	26.04
Total Sugar (%)	11.42	8.34-13.95	1.68	14.75

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