

Research Report

Open Access

## Varietal Performance on Pomological Characters of Different Varieties of Mango (*Mangifera indica*) at Sarlahi, Nepal

Kiran Thapa<sup>1</sup>✉, Manish Thapa<sup>2</sup>, Ganga Dulal<sup>1</sup>, Randhir Paudel<sup>1</sup>, Susma Adhikari<sup>1</sup>, Arati Chapai<sup>1</sup>, Sonam Kumari Kalwar<sup>3</sup>

<sup>1</sup> College of Natural Resource Management, Bardibas, Mahottari, 45700, Nepal

<sup>2</sup> Himalayan College of Agricultural Science and Technology, Kathmandu, 44600, Nepal

<sup>3</sup> College of Natural Resource Management, Kapilakot, Sindhuli, 45909, Nepal

✉ Corresponding author: [kiranthapa1517@gmail.com](mailto:kiranthapa1517@gmail.com)

International Journal of Horticulture, 2024, Vol.14, No.3 doi: [10.5376/ijh.2024.14.0019](https://doi.org/10.5376/ijh.2024.14.0019)

Received: 07 Apr., 2024

Accepted: 28 May, 2024

Published: 30 Jun., 2024

**Copyright** © 2024 Thapa et al., This is an open access article published under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### Preferred citation for this article:

Thapa K., Thapa M., Dulal G., Paudel R., Adhikari S., Chapai A., and Kalwar S.K., 2024, Varietal performance on pomological characters of different varieties of mango (*Mangifera indica*) at Sarlahi, Nepal, International Journal of Horticulture, 14(3): 163-168 (doi: [10.5376/ijh.2024.14.0019](https://doi.org/10.5376/ijh.2024.14.0019))

**Abstract** Pomological characteristics of 10 mango varieties were studied during February-June, 2023. Distinct variation were found among the studied varieties. Significant variation were observed in term of fruit length, fruit width, fruit weight, seed length, seed width, seed weight, seed thickness, epidermal thickness ranging from 7.27 cm to 14.02 cm, 4.97 cm to 7.64 cm, 121 gm to 346 gm, 6.03 cm to 12.23 cm, 2.8 cm to 4.23 cm, 22.7 gm to 37.9 gm, 1.56 cm to 2.16 cm and 0.113 cm to 0.333 cm respectively. Among the studied varieties, Variety Nam Dok Mai has the longest fruit (14.02 cm) and longest seed (12.23 cm). Mallika has largest fruit width (7.64 cm) and largest seed width (4.23 cm). Maximum fruit weight (346 gm) was found in Kalkatiya and Mallika. Maximum seed weight (41 gm) was found in Baramasi. Maximum seed thickness (2.16 cm) was recorded in variety Kalkatiya whereas Bombay has maximum epidermal thickness (0.333 cm).

**Keywords** Mango (*Mangifera indica*); Pomological characteristic; Epidermal

## Introduction

Mango (*Mangifera indica* L.) is one of the choicest tropical fruit in the world belonging to the family Anacardiaceae and is also considered as the king of fruit due to its unique flavor, taste and scent (Shirin et al., 2013). The common habitats of Nepalese mango diversity are tropical plain home gardens, river gorge locations, and subtropical valley (Subedi et al., 2021). Mango is mainly grown in the frost-free areas with very few rainfalls during the time of flowering (Humayun and Babu, 2002). The fruit characteristics are different for different plants. It varies between species and even among the varieties. Mango fruit can take three to six months to mature, with temperature being the biggest impact. In warmer climates, fruits ripen earlier and grow more quickly. The maturity period is also influenced by the mango variety, with types being categorized as early, mid, or late season (Bally, 2002). Temperature is one of the most significant environmental elements affecting the fruiting of mangoes, among others such as rainfall, relative humidity, water stress, and photoperiod (Geetha et al., 2016).

Mango grows in almost all area of Madesh province but good quality grafted mangoes of known varietal identity are mostly grown in Sarlahi district. Moreover, research on the performance of pomological characters of those varieties grown in that area are rare. So, it is necessary to assess the performance of the superior varieties grown in that area. Therefore, an attempt was made to study the pomological characters of 10 varieties in the mango orchard of Tropical Horticulture Center, Sarlahi district, Madesh province, Nepal.

## 1 Materials and Methods

### 1.1 Experiment material

The current study was carried out in a pre-existing orchard at the Tropical Horticulture Centre located in the Sarlahi district of Madesh Province, from February to June 2023. The research focused on evaluating ten different mango varieties. These varieties included Amrapali, Bombay, Baramasi, Kalkatiya, Dasherri, Nam Dok Mai, Jarda, Malda, Mallika, and Neelam (Figure 1). Each variety was carefully selected to represent a diverse range of mango

characteristics and growth patterns, providing a comprehensive assessment of their performance under the local climatic and soil conditions. This approach aimed to identify the most suitable varieties for cultivation in this region, enhancing both yield and quality.



Figure 1 Fruits of different varieties of mango

### 1.2 Experimental design

The experiment was laid out in a Randomized Complete Block Design (RCBD), with three replications for each variety, where each replication unit is represented by a single tree. To ensure accuracy and representativeness of the experiment, a total of 30 trees were randomly selected and tagged, with 3 trees from each variety.

When the fruits reached the physiological maturity stage, one fruit from each selected tree was harvested for measuring pomological characteristics. The measured indicators included fruit length, fruit width, fruit weight, seed length, seed width, seed thickness, and epidermal thickness (Figure 2). In addition, to comprehensively evaluate the performance of each variety, other important traits such as fruit appearance, color, flavor, and maturity time were also recorded. The collection and analysis of these data will help determine the adaptability and superior traits of different mango varieties under local climatic and soil conditions, providing a scientific basis for mango cultivation in the region.

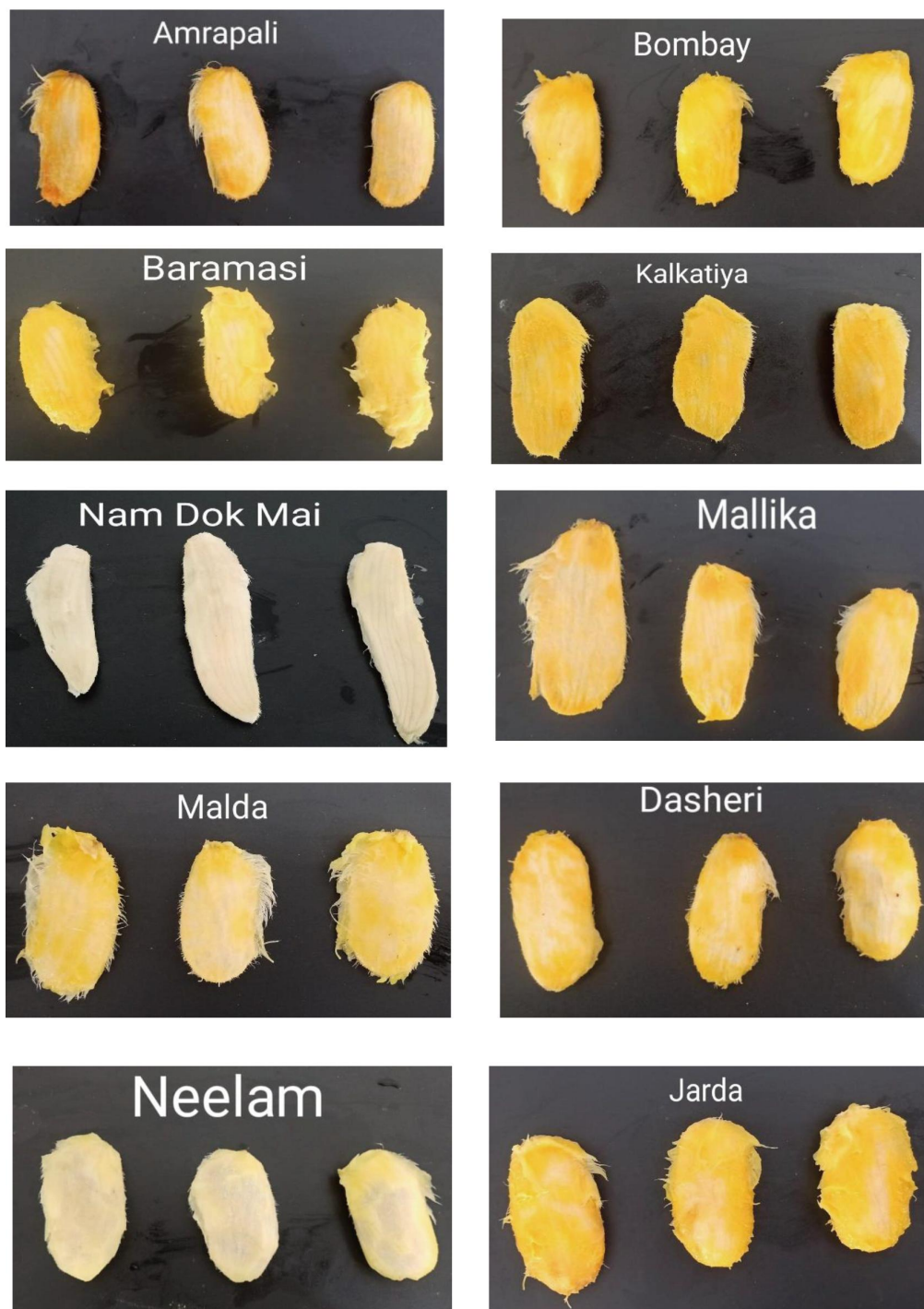


Figure 2 Seeds of different varieties of mango

### 1.3 Data collection

Pomological data for all the 10 varieties were determined according to the method of Neupane et al. (2023). Length, width and thickness of both fruit and seed, epidermal thickness were measured using analog linear vernier caliper of model 150 manufactured by Bharat tools Company.

Weight was measured using portable digital weighing balance of Mettler-Toledo GmbH Company. Length of the fruit and seed were taken from base to the tip while width and thickness were taken from the broadest middle part. Length, width and thickness were measured in centimeter (cm) and weight was measured in gram (gm).

## 2 Results and Discussion

Results of this research showed that maximum fruit length (14.02 cm) and maximum seed length (12.23 cm) was recorded in variety Nam Dok Mai, maximum fruit width (7.64 cm) and maximum seed width (4.23 cm) was seen in variety Mallika, maximum fruit weight (346 gm) was recorded in varieties Kalkatiya and Mallika whereas minimum fruit length (7.27 cm) and minimum seed length (6.03 cm) was found in Jarda, minimum fruit width (4.97 cm), minimum seed width (2.8 cm) and minimum fruit weight (121 gm) was recorded in Dasherri (Table 1; Table 2).

These findings are consistent with the results of Islam et al. (2019). In the research of Islam et al. (2019), fruit length, width and weight of Amrapali were 11.1 cm, 7.13 cm, and 229.33 gm, respectively, which is almost similar to the findings of this research.

Table 1 Fruit length, fruit width and fruit weight of different varieties of mango

| Treatment     | Fruit length (cm) | Fruit width (cm) | Fruit weight (gm) |
|---------------|-------------------|------------------|-------------------|
| Amrapali      | 8.99              | 6.15             | 195               |
| Bombay        | 8.43              | 6.31             | 183               |
| Baramasi      | 9.85              | 5.94             | 228               |
| Kalkatiya     | 11.01             | 8                | 346               |
| Dasherri      | 7.62              | 4.97             | 121               |
| Nam Dok Mai   | 14.02             | 6.22             | 281               |
| Jarda         | 7.27              | 5.68             | 135               |
| Malda         | 8.53              | 6.27             | 232               |
| Mallika       | 10.76             | 7.64             | 346               |
| Neelam        | 7.72              | 5.9              | 151               |
| f-probability | <0.001***         | <0.001***        | <0.001***         |
| CV %          | 8.2               | 5.5              | 20.8              |
| S.Em±         | 0.38              | 0.16             | 15.92             |

Note: \*, \*\*, \*\*\* represent significance at 5%, 1% and 0.1% respectively

Table 2 Seed length, seed width, seed weight, seed thickness and epidermal thickness of different varieties of mango

| Treatment     | Seed length (cm) | Seed width (cm) | Seed weight (gm) | Seed thickness (cm) | Epidermal thickness (cm) |
|---------------|------------------|-----------------|------------------|---------------------|--------------------------|
| Amrapali      | 7.18             | 3.09            | 27.8             | 1.8                 | 0.113                    |
| Bombay        | 6.49             | 3.34            | 30.6             | 2.09                | 0.333                    |
| Baramasi      | 7.89             | 3.13            | 41               | 2.08                | 0.153                    |
| Kalkatiya     | 8.72             | 3.92            | 30.5             | 2.16                | 0.207                    |
| Dasherri      | 6.44             | 2.8             | 22.7             | 1.91                | 0.147                    |
| Nam DokMai    | 12.23            | 3.06            | 27.3             | 1.56                | 0.163                    |
| Jarda         | 6.03             | 3.33            | 31.9             | 2.05                | 0.157                    |
| Malda         | 6.65             | 3.57            | 32.3             | 1.94                | 0.177                    |
| Mallika       | 8.62             | 4.23            | 37.9             | 1.78                | 0.153                    |
| Neelam        | 6.26             | 3.48            | 23               | 1.71                | 0.263                    |
| f-probability | <0.001***        | <0.001***       | 0.0021**         | 0.0092**            | <0.001***                |
| CV %          | 10.3             | 6.8             | 14.3             | 8.5                 | 12.4                     |
| S.Em±         | 0.35             | 0.08            | 1.21             | 0.04                | 0.01                     |

Note: \*, \*\*, \*\*\* represent significance at 5%, 1% and 0.1% respectively



Maximum seed weight (41 gm) was recorded in variety Baramasi, minimum seed weight (22.7 gm) was seen in Dasher. Variety Kalkatiya has maximum seed thickness (2.16 cm) whereas minimum seed thickness (1.56 cm) in Nam Dok Mai. Maximum epidermal thickness (0.333 cm) in Bombay but minimum epidermal thickness (0.113 cm) was recorded in Amrapali (Table 2). In a study by Saheda et al. (2019), the Dasher, Neelam, and Mallika varieties showed similar results to this research regarding fruit length, fruit width, fruit weight, and seed weight.

### 3 Concluding Remarks

This study provides a detailed analysis of the pomological characteristics of ten mango (*Mangifera indica*) varieties grown in the Sarlahi district of Nepal, revealing significant differences in fruit and seed dimensions and weights. These findings offer valuable insights for breeders, enabling them to utilize the variability of desirable genotypes to develop superior mango varieties. Additionally, the results provide farmers with the necessary information to select the most suitable varieties based on specific traits, thereby improving yield and quality.

Although the scope of this study is somewhat limited, the results highlight the diversity of mango varieties and their performance under different environmental conditions. This underscores the importance of expanding the research scope and further analyzing environmental impacts. Future research should include a wider range of varieties and regions to obtain more comprehensive data and conclusions, thereby providing a more solid scientific foundation for mango cultivation and breeding. Particularly, experiments conducted under various climatic and soil conditions will enhance the understanding of how these factors affect mango growth and quality, guiding agricultural practices and policy-making.

Furthermore, considering the impact of climate change on agriculture, future studies should also focus on the resilience and adaptability of mango varieties to ensure stable yields and high-quality fruits under variable climatic conditions. By comprehensively addressing these factors, this study not only provides practical guidance for current mango cultivation but also offers important scientific insights for future agricultural development and variety improvement.

---

#### Authors' contributions

Kiran Thapa carried out the original draft writing, investigation, conceptualization, methodology, and data collection and analysis. Manish Thapa contributed to the investigation, conceptualization, and data collection. Ganga Dulal was involved in the writing review and editing, and methodology. Randhir Paudel participated in the writing review and editing, and methodology. Susma Adhikari took part in the writing review and editing, and formal analysis. Arati Chapai engaged in the writing review and editing, methodology, and drafting of the manuscript. Sonam Kumari Kalwar contributed to the writing review and editing, and conceptualization. All authors read and approved the final manuscript.

#### Acknowledgement

Special gratitude to Tropical Horticulture Center, Sarlahi and Agriculture and forestry university, Bharatpur, Nepal for providing necessary assistance during this research work.

#### Conflict of Interest Disclosure

The authors affirm that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

#### References

- Bally I.S.E., 2006, *Mangifera indica* (mango). Species profiles for pacific island agroforestry, 1-25.
- Geetha G.A., Shivashankara K.S., and Reddy Y.T.N., 2016, Varietal variations in temperature response for hermaphrodite flower production and fruit set in mango (*Mangifera indica* L), South African Journal of Botany, 106: 196-203.  
<https://doi.org/10.1016/j.sajb.2016.07.011>
- Humayun M., and Babu R.S., 2002, Studies on fruit-bud differentiation in mango (*Mangifera indica* L.) under South Indian conditions. Journal of Applied Horticulture, 4(1): 27-29.  
<https://doi.org/10.37855/jah.2002.v04i01.08>

- Islam S.R., Karuna K., Kumari A., Mankar A., and Ahmad F., 2019, Varietal Characterization and quality assessment of mango hybrid and their parents through morphological and biochemical markers. International Journal of Current Microbiology and Applied Sciences, 8(4): 697-706.  
<https://doi.org/10.20546/ijcmas.2019.804.075>
- Neupane C., Pereira M., Koirala A., and Walsh K.B., 2023, Fruit Sizing in Orchard: a review from Caliper to machine vision with deep learning, Sensors, 23(8): 3868.  
<https://doi.org/10.3390/s23083868>  
PMid:37112207 PMCID:PMC10144371
- Saheda M.D., Bala Hussaini B.M.G., Balakrishna M., 2019, Study of Physico-Chemical characters of mango varieties/hybrids in kodur agro-climatic conditions, International Journal of Pure & Applied Bioscience, 7(4): 128-137.  
<https://doi.org/10.18782/2320-7051.7334>
- Shirin F., Zuberi M.I., and Ghosh G.P., 2013, Fruit characteristics of some locally important mango (*Mangifera indica* L.) cultivars at Chapai Nawabganj District, Bangladesh, 3(11): 96-103.
- Subedi A., Bajracharya J., Joshi B., Kc H.B., Gupta S., Regmi H., Baral K., Shrestha P., Thagunna P., Tiwari R., and Sthapit B., 2021, Ecogeographic and genetic diversity analyses of mango (*Mangifera indica* L.) in Nepal, In Proc. 4<sup>th</sup> National workshop on Horticulture, 2: 4.

---

**Disclaimer/Publisher's Note**



The statements, opinions, and data contained in all publications are solely those of the individual authors and contributors and do not represent the views of the publishing house and/or its editors. The publisher and/or its editors disclaim all responsibility for any harm or damage to persons or property that may result from the application of ideas, methods, instructions, or products discussed in the content. Publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.