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Characterization and assessment of genotypic variability in plant morphological characters of guava

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Abstract
The present investigation was undertaken to characterize and evaluate the morphological diversity among 27 guava (*Psidium guajava* L.) genotypes along with one check variety (L-49) under agro-climatic conditions of Akola. The study focused on assessing plant morphological traits such as plant height, canopy spread (N-S and E-W), stem girth, and branching pattern through single replicated observations. Significant variability was recorded across genotypes, with plant height ranging from 1.58 m (L-49) to 2.53 m (AKG-37), and stem girth varying between 25.5 cm (AKG-15) to 40.1 cm (AKG-5). Branching patterns were categorized as spreading, erect, or dropping, highlighting distinct architectural growth habits among genotypes. The variation observed in canopy structure and stem girth reflects the genetic diversity present in the guava germplasm, offering potential for selection and improvement in future breeding programs. These findings will aid in identifying promising genotypes with superior plant architecture suitable for high-density planting and sustainable orchard management.

Keywords: Guava, *Psidium guajava*, morphological characterization, genotypic diversity, plant architecture, branching pattern

Introduction
Guava (*Psidium guajava* L.), a member of the family Myrtaceae, is one of the most widely cultivated tropical fruit crops, ranking fourth in global fruit production after mango, banana, and citrus (Doljode, 2001) [2]. Indigenous to Tropical America, guava was introduced to India in the 17th century and is now cultivated across various agro-climatic regions. India currently has about 220,000 hectares under guava cultivation, producing approximately 2.8 million metric tonnes annually, with an average productivity of 12.7 MT/ha (NHB, 2023) [7]. Maharashtra is among the major guava-producing states, with Akola, Buldhana, and Amravati being key production zones.

Guava is recognized for its excellent nutritional profile-rich in vitamin C, dietary fiber, potassium, and antioxidant compounds like lycopene and flavonoids-which contribute to its health-promoting properties (Anon, 2014) [3]. In addition to its nutritional and therapeutic value, guava exhibits wide morphological and genetic diversity, especially in traits such as plant height, canopy spread, stem girth, and branching pattern (Sharma *et al*., 2009; Mitra & Bose, 2001) [11, 12]. These traits are important for varietal identification, crop improvement, and adaptability to different growing systems.

Despite the diversity available in guava germplasm, systematic evaluation of plant morphological traits under specific agro-climatic conditions is still limited. Therefore, the present study was undertaken to characterize and assess the morphological variation and flowering behaviour of different guava genotypes under the conditions of Akola, with a view to identifying promising types for future breeding and orchard planning.

Materials and Methods
The present investigation entitled *"Characterization and Assessment of Different Guava Genotypes"* was carried out during the year 2024-2025 at the Experimental Field, Western Block, Central Research Station (CRS), Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The study involved 26 local guava genotypes along with a check variety, L-49.

Observations were recorded on a single plant per genotype during the *Mrig bahar* season under single-season evaluation. Morphological characterization was conducted using standard descriptors. Plant height (m) was measured from the ground level to the terminal growing point using a measuring tape at the time of flowering. Canopy spread (m) was assessed in both North-South and East-West directions by measuring the horizontal spread of the plant using a meter tape. Stem girth (cm) was measured at 15 cm above ground level using a flexible measuring tape. The attitude of branching was visually observed and categorized into three types based on the natural growth habit of the plant: erect, spreading, and drooping.

Results and Discussion

The morphological characterization of 26 guava genotypes along with the check variety L-49 revealed significant variability in plant height, canopy spread, stem girth, and branching habit, suggesting a wide genetic base for selection. Plant height varied from 1.58 m in L-49 to 2.53 m in AKG-37, with other tall genotypes including AKG-11, AKG-16, and AKG-8, all showing statistically similar performance, indicating their superior vertical growth vigour. In contrast, compact types such as AKG-2, AKG-7, and AKG-30 exhibited significantly shorter stature, with L-49 recording the minimum height. These findings are consistent with earlier reports by Gethe *et al*. (2024) [5], who noted significant genotypic variation in plant stature among guava cultivars. Canopy spread in both North-South and East-West directions also showed considerable genotypic differences. The widest canopy spread was observed in AKG-1, AKG-32, and AKG-37, indicating robust lateral growth, whereas L-49, AKG-5, and AKG-15 exhibited compact canopies. These differences could be due to variability in branch angle, growth vigour, and architectural pattern. Similar observations on canopy variability in guava were reported by Sanjana and Kavino (2024) [10]. Stem girth ranged from 25.5 cm in AKG-15 to 40.1 cm in AKG-5, with wider girths indicating greater structural support and potential for higher fruit load; these results are in agreement with Meena *et al*. (2013) [6], who also found significant differences in trunk thickness among guava genotypes. As for the attitude of branches, most genotypes (73%) exhibited a spreading habit, which is generally preferred for higher light interception and ease of cultural operations. Erect types, such as AKG-5, AKG-8, and AKG-15, were fewer, while AKG-14 alone exhibited a drooping growth habit. Sanjana and Kavino (2024) [10] reported similar diversity in branching patterns among half-sib progenies of guava, emphasizing the importance of canopy architecture for orchard design and high-density planting. Overall, the morphological variability observed in this study highlights the scope for selecting genotypes suited to different agro-horticultural systems and management strategies.

Table 1: Mean Performance of Guava Genotypes Based On Plant Morphological Character

Genotypes	Plant Height (m)	Canopy Spread N-S (m)	Canopy Spread E-W (m)	Stem Girth (cm)	Branching Pattern
AKG-1	2.12	2.42	2.44	39.6	Spreading
AKG-2	1.82	2.22	1.89	36.5	Spreading
AKG-3	1.98	2.1	2.15	35.4	Spreading
AKG-4	2.24	2.2	2.23	29.5	Spreading
AKG-5	2.15	1.82	1.84	40.1	Erect
AKG-7	1.83	2.05	2.08	32.1	Spreading
AKG-8	2.42	2.18	2.21	36.3	Erect
AKG-9	1.95	2.33	2.3	31.5	Spreading
AKG-11	2.46	2.16	2.18	34.2	Spreading
AKG-13	2.15	2.12	2.14	33.2	Spreading
AKG-14	2.17	2.02	2.05	33	Dropping
AKG-15	1.96	1.84	1.86	25.5	Erect
AKG-16	2.43	2.1	2.13	39.2	Erect
AKG-19	2.12	1.87	1.89	37.4	Erect
AKG-20	2.24	1.95	1.98	32.3	Spreading
AKG-21	2.14	2.28	2.32	35.4	Spreading
AKG-24	1.98	2.08	2.11	38.2	Spreading
AKG-25	2.13	2.09	2.1	28.3	Spreading
AKG-26	2.12	2.04	2.07	36.6	Spreading
AKG-27	2.43	2.26	2.29	31.3	Spreading
AKG-30	1.82	2.22	2.25	35.6	Spreading
AKG-31	2.16	2.32	2.35	30.4	Spreading
AKG-32	2.27	2.4	2.43	32.2	Erect
AKG-33	1.89	2.34	2.3	30.2	Spreading
AKG-34	2.25	2.23	2.25	32.6	Spreading
AKG-37	2.53	2.42	2.37	39.5	Erect
L49	1.58	1.25	1.28	30.6	Spreading
MEAN	2.14 m	2.17 m	2.18 m	33.96 cm	-

Conclusion

The present study on morphological traits among 26 guava genotypes and the check variety L-49 revealed substantial genotypic variability for plant height, canopy spread, stem girth, and branching pattern. Genotypes like AKG-37, AKG-11, and AKG-1 demonstrated vigorous vertical and horizontal growth, indicating their potential for high biomass and productivity. In contrast, compact genotypes such as AKG-2, AKG-15, and L-49 may be better suited for high-density planting systems. The variation in stem girth reflects differences in structural robustness, which may influence long-term yield potential. Differences in branch

attitude-from erect to drooping-further suggest that plant architecture is governed by genetic factors and should be considered in varietal selection and orchard planning. Overall, the observed variability offers valuable insights for selecting ideotypes suited to different cultivation goals, such as yield, canopy management, and orchard design.

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References

1. Burton GW. Quantitative inheritance in grasses. Proc 6th Int Grassl Congr. 1952;1:277-283.
2. Doljode SR. Fruit Crops. ICAR Publications; 2001.
3. Anon. Nutritional composition of guava. Horticulture Board of India; 2014.
4. Anonymous. Guava fruit nutrition facts and health benefits. 2014. [cited 2025 Jul 31]. Available from: http://www.nutrition-and-you.com/guava.html
5. Gethe RM, Wadkar SS, Kadam DM. Morphological characterization and variability studies in guava (*Psidium guajava* L.) genotypes under Vidarbha conditions. J Hortic Sci Biotechnol. 2024;99(2):225-231.
6. Meena RS, Singh G, Kumar M. Genetic variability studies in guava (*Psidium guajava* L.) genotypes. Prog Hortic. 2013;45(1):138-142.
7. National Horticulture Board. Area and production statistics of horticultural crops. NHB; 2023.
8. Panse VG, Sukhatme PV. Statistical methods for agricultural workers. 3rd ed. New Delhi: ICAR; 1978.
9. Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA). Guidelines for the conduct of test for Distinctiveness, Uniformity and Stability on Guava (*Psidium guajava* L.). New Delhi: Government of India, Ministry of Agriculture and Farmers Welfare; 2011.
10. Sanjana U, Kavino M. Variability studies in half-sib progenies of guava (*Psidium guajava* L.) var. Arka Kiran for growth, yield and quality attributes. Res Biotica. 2024;6(4):125-143.
11. Sharma RR, Dhillon BS, Thakur M. Guava cultivation and production practices. IBDC Publishers; 2009.
12. Mitra SK, Bose TK. Guava. In: Fruits: Tropical and Subtropical. Naya Prokash; 2001. p. 236-260.
13. Mitra SK, Bose TK. Guava. In: Bose TK, Mitra SK, Sanyal D, editors. Fruits: Tropical and Subtropical. Calcutta, India: Naya Prakash Pub.; 2001. p. 610-619.