Journal of Applied Horticulture, 27(3): 531-535, 2025
https://doi.org/10.37855/jah.2025.v27i03.96
Journal of Applied Horticulture
ISSN: 0972-1045

Mango breeding in India: Achievements and institutional contributions

Vineet Singh[1], Ashish Yadav[2], Sanket Kumar[1]*, Sampurna Nand Singh[1], Mohd. Haris Siddiqui[1], Vishambhar Dayal[2] and Shailendra Rajan[2]**

[1]*Department of Agriculture, Integral Institute of Agricultural Science and Technology (IIAST), Integral University, Lucknow, India.* [2]*Central Institute for Subtropical Horticulture, Rehmankhera, Kakori- 226101, India. **E-mail: srajanlko@gmail.com*

Abstract

Breeding of mango (*Mangifera indica* L.) in India has advanced from early selection of superior seedlings to a well-organized hybridization program, facilitating the development of high-productivity, high-quality cultivars for different agro-climatic regions. Major traits include regular bearing, dwarfing or semi-dwarfing habit for high-density orchards, fiber-free pulp with good total soluble solids (TSS), firmness to prevent damage or spoilage during transportation and storage, protracted shelf life, resistance/tolerance to diseases and pests. Breeding goals have lately focused mostly on varieties with a red blush, satisfying consumers' evolving tastes and the trendy export market's need for better eye appeal alongside firmness, storability and a sugar-acid ratio. Hybrids have been developed across various regions of India to enhance adaptation, increase productivity and improve stress resistance. Dramatic changes are anticipated in the near future, driven by genomics, precision phenotyping, and crop enhancement technologies, including bioactive compound enrichment, to develop the next generation of cultivars. Breeding programs have produced a new generation of field-established hybrids with the potential to improve orchard efficiency in both domestic and export markets. The review attempts to summarize progress in mango breeding in India, from selection to targeted crossing that combines red blush appeal, high TSS, firmness, and shelf life with regular bearing, compact canopies for high-density orchards, along with emerging genomics-driven, climate-resilient, nutrient-enriched cultivars adapted for diverse agroclimatic conditions and export markets.

Key words: Mango breeding, *Mangifera indica*, India, hybridization, productivity, quality, agro-climatic regions, regular bearing, dwarfing, semi-dwarfing, export markets

Introduction

Mango (*Mangifera indica* L.), known as the 'King of Fruits,' is integral to India's agricultural, cultural, and gastronomic heritage. As the world's largest producer, India boasts a diverse range of mangoes, from historic landraces to modern, developed cultivars (Rajan, 2021). Superior mango varieties have been developed to increase output, improve resilience to biotic and abiotic stressors, and lengthen shelf life (Rajan and Hudedamani, 2019). These enhancements address domestic demand while increasing India's export potential. In addition, their improvement has increased productivity (yield and fruit quality), thereby contributing to farmer income and the preservation of regional food traditions (Rajan and Yadav, 2021).

Mango varietal development in India began in the early 1920s, with the selection of superior types from seedling populations. This collection served as the nucleus for establishing research organizations to improve mango varieties through hybridization, selection, and breeding (Ram and Rajan, 2003). These advances have mitigated some cultivation challenges by focusing on sought-after traits such as early bearing, dwarfing, high taste quality, and shelf life.

Various varieties, including Amrapali and Mallika, as well as many others, suitable for high-density planting with improved supply chain processing, were developed by the Indian Agricultural Research Institute (IARI) in New Delhi to meet market demands both domestically and internationally. Hybrid breeding began at research institutes such as the Indian Institute of Horticultural Research (IIHR) in Bangalore, established in 1969, which has since worked to improve fruit quality through hybridization. For example, IIHR's hybrids are both high-yielding and better adapted, thus strengthening the industry across different locations (Iyer, 1991; Dinesh *et al*., 2016). The Central Institute for Subtropical Horticulture (CISH), founded in 1972 as the Central Mango Research Station, has been a significant contributor to this transformation. CISH has been leading the breeding effort since 1985 to develop hybrids for subtropical conditions with higher adaptability. The institution has developed hybrids that exhibit bright colors, an extended shelf life, and adaptability to varying climate conditions.

Hybridization efforts at the Andhra Pradesh Fruit Research Station, Kodur (since 1940), resulted in hybrids with large fruit size, firm pulp, and high TSS (Bhujanga Rao and Rangacharlu, 1958). They achieved considerable success in developing hybrids with large fruit, firm pulp, and high Brix values. The station focused on regional cultivars adapted to local conditions. The influence of regional centers, such as Sangareddy station in Telangana, became evident in the development of hybrids that produced regular-bearing, marketable varieties, underscoring the need to grow regionally adapted cultivars.

The combination of desirable traits, such as regular bearing, large fruit size, and golden-yellow skin, is an important objective in breeding programs under Gujarat conditions. Institutions like Anand Agricultural University have also contributed to increased

mango production in Gujarat by developing pest-resistant cultivars, especially those resistant to fruit flies, thereby making it more commercially viable. Similarly, regional universities, such as Indira Gandhi Krishi Vishwavidyalaya (IGKV) in Raipur, Chhattisgarh, and Tamil Nadu Agricultural University (TNAU), have also generated data on local germplasm evaluation and morphological and agronomic characterization in specific regions of these states to release location-specific varieties.

Mango breeding programs in India target different objectives across the nation, based on market needs and weather conditions. In northern India, particularly at IARI and CISH, breeding programs have focused on producing dwarf, red-peel hybrids that fruit regularly. Conversely, southern institutions such as IIHR and TNAU have emphasized characteristics that influence fruit quality, including enhanced flavor, pulp texture and resistance to physiological issues such as spongy tissue, as well as to tropical climates. In the West, such as Gujarat and Maharashtra, the focus has been on disease resistance, longer harvesting seasons and appropriate processing. Meanwhile, stations such as BAU and Telangana have been working to acclimate to the local climate and preferences by breeding large-fruited varieties with high TSS. The breeding programs in coastal Konkan are oriented toward high pulp recovery and regular crop bearing in wet conditions. These region-specific strategies collectively demonstrate a nationwide approach to enhancing mangoes that is diverse yet well-integrated, with a focus on productivity, quality, flexibility and market orientation.

Hybridization and selection have been used to overcome constraints and enhance market potential while maintaining climate adaptability. In this status paper, the entire progress in the creation of mango varieties in India has been studied, with a special focus on the role of research institutes in improving output, resilience and fruit quality.

Preference of red-peel mango breeds: Most current breeding programs prioritize red-peel mangoes due to their higher export demand and visual appeal. Even though Asian consumers traditionally prefer tasting premium-flavoured yellow or green varieties, such as those of the Alphonso and Kesar (Ram and Rajan, 2003), a shift in breeding priorities has been induced by the increasing interest in red-coloured fruits in India as well as by the changing global trends, such as the introduction of the yellow Ataulfo in the United States (Ledesma and Campbell, 2019). The red peel color has now been incorporated into the new hybrids, with extended shelf life and improved quality. The decline of traditional red-dominant cultivars such as 'Tommy Atkins' and 'Haden', alongside the increasing demand for premium-colored alternatives, underscores the strategic significance of peel color in breeding (Campbell and Ledesma, 2013; Rajan, 2021).

Institutional Contributions

IARI Leadership and Innovation: Since the inception of systematic mango hybridisation in 1961, the Indian Agricultural Research Institute (IARI) in New Delhi has spearheaded breeding methodologies (Singh *et al*., 1980) that have transformed India's mango breeding paradigm. The institute evolved Mallika and Amrapali, the nation's most popular hybrids, in 1972. Mallika, produced from Neelum × Dashehari, combined regular annual bearing habits with dwarf trees to provide uniform fruits weighing 350-400 g and yielding bright yellow, fiber-free pulp with total soluble solids above 18°Brix (Singh *et al*., 1972; Iyer and Schnell, 2009). Amrapali, a cross between Dashehari and Neelum, has a naturally compact canopy, cluster fruiting with 180-250 g fruits, a sweet aroma, and excellent keeping quality, making it perfect for high-density orchard systems.

Building on these early successes, IARI began a targeted breeding program in the early 2000s to produce export-quality, red-skinned mangoes with a longer shelf life. In 2012, crosses between Amrapali and the Florida selection 'Sensation' produced a group of promising hybrids known as Pusa Pratibha, Pusa Shreshth, Pusa Deepshikha and Pusa Arunima. These varieties have several exceptional characteristics, including medium fruit size (228-280 g), an elongated-oblong fruit form, an attractive red peel that blends into a yellow base color, and deep orange, fiber-free pulp. Total soluble solids range from 19 to 20.3°Brix, providing a balanced sweet-acid flavor profile. The ambient shelf life is 7 to 8 days, which is essential for distant markets. These hybrids exhibit semi-vigorous growth and consistent fruiting, making them suitable for 6 m × 6 m spacing, with yields averaging 12-14 t/ha in Delhi's agroclimatic conditions (IARI, 2025).

Pusa Arunima and Pusa Surya were introduced for cultivation in 2015. Pusa Arunima amalgamated the conventional fruit yield of Amrapali with the appealing skin hue of 'Sensation'. This hybrid produce medium-sized fruits with a pulp sugar concentration of 20° Brix and enhanced disease resistance. In 2021, Pusa Deepshikha (Hybrid 11-2) and Pusa Manohari (Hybrid 8-11) introduced further improvements, offering new benefits of mango breeding. Pusa Deepshikha produces a bright red-orange peel, achieves a 70% pulp recovery, has a Brix value of 18.7°, and yields 14 tons per hectare on semi-dwarf trees. In contrast, Pusa Manohari exhibits tolerance to mango malformation (10-15%), yields fruits weighing 223 g with a pulp Brix value of 20.4°, and achieves an annual productivity of up to 6.5 t/acre, making it suitable for medium-density plantations (Dinesh *et al*., 2016; IARI, 2025).

As IARI commemorates 50 years of research, it has developed important mango varieties such as Mallika and Amrapali, as well as current red-peel export cultivars. Their ongoing genetic research is helping to boost mango breeding. IARI is enhancing mango production, quality, and export potential by focusing on high-yielding cultivars for national and international markets, utilizing modern molecular techniques, and investigating mango genetics.

IIHR, Bangalore: Significant efforts have been made by the Indian Institute of Horticultural Research (IIHR), Bangalore, in mango breeding to generate promising hybrids with good fruit quality, yield, and adaptability (Iyer, 1991; Dinesh *et al*., 2016). Arka Aruna was bred at the Indian Institute of Horticultural Research (IIHR), Bangalore, as a cross between Banganapalli and Alphonso, a high-yielding hybrid with large fruit, non-fibrous pulp and pale yellow color and a dwarf plant stature. Arka Puneet (Alphonso × Banganapalli) from IIHR has a light yellow, attractive skin color, medium size, is free from spongy tissue, has good keeping quality, and has a balanced sugar-acid profile. Similarly, regular-bearing Arka Anmol (Alphonso × Janardhan Pasand) has smooth, yellow skin and is free of spongy tissue with

an attractive sugar-acid balance. Arka Neelkiran (Alphonso × Neelum) produces regular, medium-sized fruits with outstanding skin and pulp color, no spongy tissue, and semi-vigorous growth. Recently released Arka Udaya (Amrapali × Arka Anmol) produces 225-250 g oval fruits with firm, deep-orange, fiberless pulp, achieving over 70% pulp recovery, 21°Brix TSS, and a great shelf life, all from semi-vigorous plants. Arka Suprabhat, produced by the Indian Institute of Horticultural Research, is a double-cross hybrid of Amrapali (Neelum × Dashehari) and Arka Anmol (Alphonso × Janardhan Pasand). It also looks like Alphonso, but it performs better in regular bearing and lacks spongy tissue. It is suitable for high-density planting due to its small trees, making it more commercial (IIHR, 2025). The Central Horticultural Experiment Station in Bhubaneswar selected Arka Neelachal Kesari, a clonal selection of Gulabkhas. It has a medium-sized fruit (approximately 220 g), light-yellow sweet pulp, and a good ratio of sugar to acid (IIHR, 2025).

CISH, Lucknow: Founded in 1972 as the Central Mango Research Station, CISH is one of the earliest institutes in mango breeding. CISH has produced several superior mango hybrids of commercial importance, namely Ambika and Arunika. The fruit of Ambika (Amrapali × Janardhan Pasand) is medium-sized, with attractive orange-yellow flesh and a background of crimson blush. The pulp is thick, dark yellow, and has little fiber. Ambika TSS is 21 Brix. Its late-maturing nature extends its market availability, while its attractive appearance and high yield make it highly suitable for export (Negi *et al*., 1999). Another excellent hybrid, Arunika (Amrapali x Vanraj), has a small canopy, elegant orange-yellow fruits, and a relatively high TSS of 24.6° Brix. The Arunika variety was developed for its high textural strength, homogeneous plant habit, and adaptation to the northern plains and export markets (Negi *et al*., 1999; Rajan and Yadav, 2021).

Hybrids like Hybrid-1084 (Amrapali × Janardhan Pasand), Hybrid-949 (Amrapali × Vanraj), and Hybrid-1739 (Neelum × Tommy Atkins) have been identified to meet different maturity periods and climatic requirements. These types bring red peel, long storage life and regular bearing qualities to bear, widening the cultivation gamut in the context of an altered climate. CISH-M-2 (a hybrid of Dashehari and Chausa) is resistant to sooty mold and suitable for wet, humid conditions. The degree of delayed maturation in this cultivar also offers better marketing options than Dashehari (Negi *et al*., 1999). CISH also focused on improving mango quality by highlighting its nutritional benefits. Other varieties with health benefits that the institute found through genetic enhancement of their cultivars by adding bioactive molecules, such as mangiferin and lupeol, exhibit anti-cancer and anti-diabetic properties (Veena *et al*., 2019; Muralidhara *et al*., 2019). Recently, CISH released varieties such as Awadh Samriddhi (Hybrid-949) and Awadh Abhaya (Hybrid-1739) in 2025. The Awadh Abhaya possesses very late ripening, a long shelf life, a firm texture, and a pleasing color, which makes them apt for both domestic and foreign markets. For producers managing the impacts of climate change.

Dapoli and Vengurle: The Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth (KKV) has been instrumental in developing various mango varieties suited to the peculiarities of the Konkan region's agro-climatic conditions, with potential for higher yields, better quality, exportability, and consistent bearing in alternate years. Ratna, Sindhu, Konkan Ruchi, Suvarna, Konkan Raja, and Konkan Samrat are among the most notable types and hybrids developed. Ratna, developed in 1981 from a hybrid between Neelum and Alphonso, is prized for its consistent bearing, medium to large fruit size, high pulp quality, and appropriateness for fresh consumption and processing. The parthenocarpic cultivar Sindhu, which was launched in 1992, was produced at the Regional Fruit Research Station in Vengurle by backcrossing Ratna with Alphonso. Sindhu fruits weigh approximately 215 g and have a pulp-to-stone ratio of 26:1. The non-viable stone has a weighing of merely 6.7 g and a thickness of around 3 mm, constituting only 3.1% of the fruit's total weight. The stone is devoid of cotyledons and contains a diminutive, degenerated ovule (1.1g) within a gelatinous endocarp (Gunjate and Burondkar, 1993; Salvi *et al*., 2019). Konkan Ruchi (introduced in 1999) and other cultivars, including Suvarna and Konkan Raja, augment the region's mango production by enhancing fruit size, pulp recovery, adaptability, and yield consistency.

Bihar Agricultural University (BAU): The university, located in Eastern India, was founded in 1941 as the Fruit Research Station and is recognised for creating the nation's inaugural hybrid mango varieties, Prabha Shankar and Mahmood Bahar, marking a significant milestone in the history of mango breeding (Mallik, 1951; Ram and Rajan, 2003; BAU, 2025). The university has enhanced mango variety development through hybridisation methods tailored for Bihar's subtropical environment, continuing this heritage. Sabour Mango-2 (Langra × Amrapali) is a newly developed variety that is characterized by its uniformity in shape, rectangular fruit shape, bright yellow skin, orange-yellow flesh, high percentage of pulp (80 percent), total soluble solids (TSS) of approximately 20.5 Brix, and small stone size (BAU, 2025). Alfazli is an interbreed between Alphonso and Fazli, a mid-season crop, which is ready in June.

Telangana (Sangareddy station): Since its foundation, the Fruit Research Station in Sangareddy, part of the Sri Konda Laxman Telangana State Horticultural University, has been a prominent center for mango conservation and breeding. Several mango hybrids have been developed with specific desirable traits. Manjeera, a hybrid between Rumani and Neelum, bears round fruit with a hard, yellow pulp and a total soluble solids (TSS) content of approximately 19 °Brix. The other interesting hybrid is Swarna Jehangir (China Suvarnarekha x Jehangir). It is a late-ripening type, picked in June, with large fruits weighing up to 450g, a TSS of 19 °Brix, and a pulp content of approximately 77%. Neeluddin, a cross of 'Neelum' and 'Himayuddin', is a mid-season variety that produces large fruits averaging 435g.

Gujarat: In Gujarat, mango improvement has been greatly contributed by the Agricultural Experiment Station (AES) of Paria (Navsari Agricultural University). The center has produced a few commercially significant hybrids through hand-pollination of elite cultivars, with emphasis on fruit quality, increased production, disease resistance, and prolongation of the mango harvesting season. Four major releases include Neelphonso (Neelam × Alphonso), a moderately vigorous, late-bearing variety with 200 g apricot-yellow fruits, orange-yellow fiberless pulp, TSS >21.5%, good keeping quality, and resistance to spongy tissue and fruit fly; Neeleshwari (Neelam × Dashehari), a dwarf, round-canopied type producing 228 g oblong fruits with non-fibrous juicy pulp, ~19%

TSS, and good storage; Neeleshan Gujarat (Neelam × Baneshan), which produces large fruits with excellent keeping quality. These hybrids have greatly benefited the mango industry in Gujarat and nearby areas (Dinesh *et al*., 2016). Anand Agricultural University in Gujarat released Gujarat Mango 1 (Anand Rasraj) in 2022 for irrigated mango lands. Anand Agricultural University (AAU, 2022) reports that this variety outperforms established cultivars like as Kesar, Sonpari, and Dashehari.

GBPUA&T, Pantnagar: The Govind Ballabh Pant University of Agriculture and Technology (GBPUA&T) in Pantnagar has identified regionally adapted mango varieties for the Tarai and Himalayan foothills, most notably Pant Sinduri (early-maturing with red blush) and Pant Chandra (superior flavor, longer shelf life), which were released in 2004 (Dinesh *et al*., 2016).

Tamil Nadu (TNAU): TNAU has developed mango cultivars well-suited to the local environment of Tamil Nadu, such as PKM-1 (1981), PKM-2 (1990), and Paiyur-1 (1992). A clonal selection of Chinnaswarnarekha x Neelum called PKM-1 is a dwarf, regular-bearing variety with long, narrow fruits (250-300 g) and high transport quality. It is suitable for high-density planting. PKM-2, a hybrid of Neelum and Mulgoa, produces huge fruits (~681 g) with high pulp content, ample juice, pleasant flavor, very sweet taste, and good keeping quality—harvested mid-season in May. Paiyur 1, a clonal selection from Neelum, is dwarf and low-spreading, appropriate for 400 trees/ha high-density planting, yielding roughly 22.3 kg/tree after nine years. The medium to long, yellow fruits (150-200 g) have a great taste and good storage life.

Maharashtra (MPKV, Rahuri): The Mahatma Phule Krishi Vidyapeeth (MPKV) in Rahuri, Maharashtra, has launched two varieties adapted to the state's semi-arid environment. In 2014, Phule Abhiruchi (GKPM-5), a Totapuri x Kesar hybrid, was released, recommended and praised as a pickling variety with no spongy tissue or stone weevil damage. Sai Sugandh is a 1998 hybrid of Totapuri x Kesar with high-quality fruit.

National trends and impact: Hybrid mango cultivars are gaining popularity in India due to their regular bearing, higher yields, improved fruit quality and adaptability to high-density planting schemes. The development of hybrids, such as Amrapali, Mallika, Pusa Arunima, Ambika, Arunika, Ratna, and Sonpari, has promoted modern orchard management and encouraged farmers to replace traditional cultivars with high-performing varieties.

The network of research institutions has brought about this development. The efforts of organizations like the Indian Agricultural Research Institute, Indian Institute of Horticultural Research, Central Institute for Subtropical Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Bihar Agricultural University, Sri Konda Laxman Telangana State Horticultural University, Navsari Agricultural University, Anand Agricultural University, Govind Ballabh Pant University of Agriculture and Technology.

Most of these new cultivars are hybrids of characteristics that have become more sought after by farmers and markets: regular and consistent bearing, dwarf canopy growth that can be planted in high density, rich flavor and high total soluble solids (TSS), lack of physiological disorders like spongy tissue, and longer shelf life, which is more compatible with modern supply chains. Combined, these have enhanced the mango breeding pipeline in India and provided new opportunities in sustainable production and marketing. The strategic shift to attractive peel colors, particularly red blush, along with firmness and storability, reflects changing worldwide consumer preferences and export logistics, while maintaining the sugar-acid balance and processing compatibility valued in domestic markets.

Genomics and advanced phenotyping methods are being incorporated into mango breeding programs at select institutions across India. They focus on traits important for regional suitability, including heat tolerance, pest resistance, and suitability for high-density planting. These improvements are expected to reduce climate risks, enhance nutrition, and open new export markets.

Acknowledgement

All the authors thankfully acknowledge the Director, ICAR-CISH and Integral University for providing the necessary support for writing the review paper. The university provided MCN Lucknow Number-IU/R&D/2025-MCN0003490 for this review paper.

References

AAU, 2022. Gujarat Mango 1 (Anand Rasraj). Detailed variety release information. Available at: https://www.aau.in/gujarat-mango-1-anand-rasraj

BAU, 2025. Sabour. Institutional Distinctiveness. Retrieved from https://bausabour.ac.in/institutional-distinctiveness.aspx

Bhujanga, R.C. and V.S. Rangacharlu, 1958. Breeding new mango varieties in South India. *Indian J. Hortic*., 15: 173-183.

Campbell, R.J. and N. Ledesma, 2013. The changing face of cultivars for the Western Hemisphere. *Acta Hortic*., 992: 55-58.

Dinesh, M.R., K.V. Ravishankar and D. Sangma, 2016. Mango Breeding in India - Past and Future. *Indian J. Hortic.*, 11: 95-106. DOI: 10.24154/jhs. v11i1.95.

Gunjate, R.T. and M.M. Burondkar, 1993. Parthenocarpic mango developed through hybridisation. *Acta Hortic*., 341: 107-114.

IARI, 2025. FHT Achievements. https://iari.res.in/en/fht-achievements.php.

IIHR, 2025. Varieties. https://www.iihr.res.in/varietyi

Iyer, C.P.A. 1991. Recent advances in varietal improvement in mango. *Acta Hortic.,* 291: 109-132

Iyer, C.P.A. and R. J. Schnell, 2009. Breeding and genetics. In: *The Mango - Botany, Production and Uses, Breeding and Genetics,* Litz R.E. (ed.) CABI, Wallingford, UK, 2nd Ed, p. 67-96

Ledesma, N and R.J. Campbell, 2019. The status of mango cultivars, market perspectives and mango cultivar improvement for the future. *Acta Hortic*., 1244: 23-27.

Mallik, P.C. 1951. Morphology and biology of the mango flower. *Proc. Indian Sci. Congr.,*155

Muralidhara, B. M., G. L. Veena, S. Rajan, A. K. Bhattacharjee and U. Hudedamani, 2019. Profiling of major biochemical compounds for identification of nutritionally rich genotypes in mango. *J. Environ Biol.,* 40: 177-182.

Negi, S.S., S. Rajan, and Ram Kumar, 2000. Developing new mango varieties through hybridization. *Acta Hortic*., 509: 159-170.

Rajan, S. 2021. Mango: The King of Fruits. In: *The Mango Genome,* Springer, Cham. pp. 1-12.

Rajan, S. and A. Yadav, 2021. Mango hybrids and improved cultivars. *Indian Hortic.*, 66: 6-8.

Rajan, S. and U. Hudedamani, 2019. Genetic resources of mango: Status, threats, and future prospects. In: *Conservation and Utilization of Horticultural Genetic Resources,* Springer Singapore. p. 217-249.

Rajan, S., M. Srivastav and H. Rymbai, 2021. Genetic resources in mango. In: *The Mango Genome* Springer International Publishing Cham. pp. 45-73.

Ram, S. and S. Rajan, 2003. *Status Report on Genetic Resources of Mango in Asia-Pacific Region.* Int. Plant Genetic Resource Institute, New Delhi.

Salvi, B.R., R.S. Varadkar, and N.V. Dalvi, 2019. Recent developments in conventional mango breeding. *Asian. J. Agric. Rev*., 3: 30-42.

Singh R.N., D.K. Sharma and P.K. Majumder, 1980. An efficient technique of mango hybridization. Scientia Hortic., 12:299-301

Singh, R.N., P.K. Majumder, D.K. Sharma, and S.K. Mukherjee, 1972. Some promising mango hybrids. *Acta Hortic.,* 24:117-119

Veena, G.L., B.M. Muralidhara and S. Rajan, 2019. Genetic diversity of mango (*Mangifera indica*) bioactive components. *Indian J. Agric. Sci.*, 89: 2107-2110.

Received: April, 2025 ; Revised: May, 2025 ; Accepted: June, 2025