

## Mango Cultivars, Wild Genotypes and Their Importance in India

**T.P. Rathour\***

Department of Fruit Science, Faculty of Horticulture, Bidhan Chandra Krishi Vishwavidyalya, Mohanpur, Nadia-741252, West Bengal, India

ARTICLE ID: 27

### Abstract

The mango (*Mangifera indica* L.) is one of India's most significant tropical fruits, with attempts at development dating back to the early twentieth century. It belongs to the family Anacardiaceae and has a chromosome number is  $2n=4x=40$ . *M. indica*, which originated in India, has a high level of variation within the nation. Extensive surveys have discovered numerous important wild species, several of which are included on the IUCN Red List. The conservation and evaluation of these species, as well as the vast seedling variety, require attention since they may be a source of essential features.

### Introduction

Mango (*Mangifera indica* L.) originated in north-eastern India, along the Indo-Myanmar border, and in Bangladesh, where it may still be found as a wild tree with very tiny fruits. It is also reported to exist near Nepal, Bhutan, and Sikkim in the lower Himalayan region (Dinesh *et al.* 2016). According to Mukherjee (1953), mango has been cultivated for at least 4000 years, with over 1000 kinds grown throughout this time. The genus *Mangifera* belongs to the order Sapindales in the family Anacardiaceae (Cashew or Poison ivy family), division: Mangnoliophyta, class: Mangnoliopsida, Sub-class: Rosidae, Order: Sapindales and Genus *Mangifera*. In a recent classification of mango total 60 edible species of genus *Mangifera*. *M. indica* is the most significant species in the genus, producing the most delectable tropical fruit, the mango. It is linked to *M. longipes* Griff. and *M. sylvatica* Roxb (Dinesh *et al.* 2016). The subgenus *Mangifera* is divided into 4 sections *Mangifera* Ding Hou (34 species), *Rawa* Kosterm (9 species), *Euantherae* Pierre (3 species) and *Marchandara* Pierre (1 species). *Mangifera similis* produced stone-free (seedless), *Mangifera pajang* has the largest size fruit (20 cm diameter) and can be peeled like a banana, *Mangifera magnifica* is fibreless species, *Mangifera altissima* is resistant to mango leaf hoppers, *Mangifera odorata* producing highest TSS (21.7 °B) content fruits and *Mangifera*

*casturi* is purple and black colour fruit-bearing species. The five species present in India, *M. sylvatica*, *M. khasiana*, *M. andamanica*, *M. indica*, and *M. camptosperma*, are distinct from one another (Dinesh *et al.* 2016).

Mango (*Mangifera indica* L.) is India's most important fruit crop, with significant socioeconomic significance. It is renowned as the "King of Fruits" because of its wonderful flavour and high vitamin and mineral content. Its reference to ancient Indian scriptures demonstrates its extended era of cultivation. Ancient Indians treasured mango not just for sentimental or religious reasons, but also for its economic and cultural relevance in their civilization. Mughal monarchs encouraged planting the best varieties: Akbar the Great's Lakhi Bagh (one lakh tree) is well-known in history. Ain-I-Akbari, an encyclopaedia produced in 1590 AD, provides a thorough insight of mango at the time. However, study with defined goals began at the beginning of the past century (Dinesh *et al.* 2016). Mango is high in vitamins A and C and flavonoids, carotenes, glucosides, sterols, terpenes, aromatic acids, essential oils, fatty acids, and phenolics. It is a highly nutritious fruit that contains the majority of the vital chemicals required by the human body.

Mangiferin, a polyphenolic antioxidant and glucosyl xanthone, has powerful antioxidant, anti-lipid peroxidation, immunomodulatory, cardiotoxic, hypotensive, wound healing, antidegenerative, and anti-diabetic properties. Various components of the plant are used to treat diarrhea, dysentery, anaemia, asthma, bronchitis, cough, hypertension, insomnia, rheumatism, toothache, leucorrhoea, haemorrhage, and piles, as well as as an antiseptic, astringent, diaphoretic, stomachic, vermifuge, tonic, laxative, and diuretic. Abscesses, broken horn, rabid dog or jackal bite, tumor, snakebite, stings, datura poisoning, heat stroke, miscarriage, anthrax, blisters, mouth wounds, tympanitis, colic, diarrhea, glossitis, indigestion, bacillosis, bloody dysentery, liver disorders, excessive urination, tetanus, and asthma are all treated with all parts.

### **The outcome of research in mango improvement**

With advancements in hybridization methods, numerous enhanced cultivars from diverse locations have been released in India. (Misra *et al.*, 2011). The adoption of these in various situations is determined by the interplay of genotype and environment. Some examples are shown below.

#### **Amrapali**

This is the product of DashehariX Neelum. Plants are little and bear on a regular basis. Fruits weigh around 180-250g on average, desert variety is sweet to taste, and has a high-keeping quality (Dinesh *et al.* 2016).

### **Mallika**

IARI, New Delhi, introduced this hybrid of Neelum and Dashehari. It has a high proclivity towards the regular bearing. Fruits measure around 350-400g on average and have a deep yellow pulp, high TSS, pleasant odor, consistent fruit size, and reasonable keeping quality (Singh *et al.*, 1972).

### **Konkan Ruchi**

Neelum X Alphonso is the parentage of this hybrid. It produces medium-sized fruits. This cultivar was produced by Konkan Krishi Vidyapeeth, Dapoli, specifically for pickle-making.

### **Konkan Raja**

This is a hybrid produced by Konkan Krishi Vidyapeeth, Dapoli, from the parentage Bangalora X Himayuddin. It grows compactly and yields large-sized fruits (616g) in bunches. It tastes delicious, and the immature fruits may be used to make salads. The pulp percentage is rather high (83%), and the TSS (16.8°Brix) is good. It bears on a regular basis.

### **Sindhu**

This is a cross between the offspring of Ratna and Alphonso that was released by Fruit Research Station, Vengurla. Fruits are borne in clusters and weigh around 150-220g on average. The pulp is a rich golden colour with a healthy sugar: acid ratio. Fruits are practically seedless, with a very thin stone, except for fruits weighing more than 200g, which have a well-developed seed.

### **Ratna**

This is a hybrid created by Fruit Research Station, Vengurla, from the cross NeelumX Alphonso. It bears regularly and produces medium-sized fruits weighing around 250g on average. The pulp is orange in hue and lacks spongy tissue or fiber.

### **Pusa Arunima, Pusa Shreshth and Pusa Deepsikha**

These cultivars are coming from the parentage Amrapali X Sensation, which was issued by the Indian Agricultural Research Institute in New Delhi. The fruits of Pusa Arunima are medium-sized, with an appealing skin color, and the pulp is rich yellow with a

TSS of roughly 20°Brix(Singh *et al*, 1972). The trees of Pusa Shresth are semi-vigorous and give fruit on a regular basis, with elongated fruits and beautiful crimson skin and when mature, the pulp is orange in color, fiberless, and firm, with a reasonable sugar:acid ratio and consistent fruit size.(228g). It has high levels of beta-carotene and ascorbic acid. Pusa Deepsikha (Hybrid 11-2) has regularity in bearing.

### **Alphanso 900**

Alphonso, this is a pick from the variety. It is an early bearer with uniform-size fruits of outstanding quality, acceptable flavor, decent sugar:acid balance, appealing fruit color, and a long shelf-life, making it suited for processing. This type was created by Konkan Krishi Vidyapeeth in Dapoli.

### **Sai Sugandh**

This cultivar matures late, in June. It has semivigorous fruits with large lenticels and a beak. Fruits are medium in size and of high quality, however, they are vulnerable to anthracnose. This cultivar was created by Konkan Krishi Vidyapeeth in Dapoli.

### **Arunika**

This is a cross between Amrapali and Vanraj created by the Central Institute of Subtropical Horticulture in Lucknow. This variety's fruits are appealing, with a red-blush color, a high TSS (24°Brix), and a high concentration of carotenoids. The pulp is firm. It is a regular bearer, and the plants are dwarf in nature.

### **Ambika**

This is a cross between Amrapali and JanaradhanPasand established by the Central Institute of Subtropical Horticulture in Lucknow. This variety's fruits are medium in size, with a small sinus and beak and a widely pointed apex. The peel is both smooth and firm. The fruit is brilliant yellow with a strong crimson flush. The pulp is solid and has little fiber. This variety's TSS is 21° Brix. It is a late-maturing cultivar.

### **Pusa Pratibha**

This is a hybrid of the Dashehari X Amrapali cross created by the Indian Agricultural Research Institute in New Delhi. It is a dependable cultivar with an appealing fruit form, bright-red skin, and orange flesh. It has rectangular, uniform-sized fruits with a favorable sugar:acid ratio. The plants are only moderately vigorous.

### **Pant Sinduri**

This is a clonal selection of 'Dashehari' from Pantnagar's Govind Ballabh Pant University of Agriculture and Technology. The trees are medium in height and have a circular top canopy. Yellow fruit with a pink shoulder. The average weight of the fruit is 200g. The fruit pulp is golden and has a lovely scent. Total soluble solids range from 16 to 18%, with a maximum yield of 150kg per tree. Fruits ripen between the last week of May and the first week of June.

### **Pusa Surya**

This is a selection from the Eldon variety produced by the Indian Agricultural Research Institute in New Delhi. It produces medium-sized fruits with crimson skin (similar to 'Sensation').

### **Pant Chandra**

This is a clonal selection of 'Dashehari' from Pantnagar's Govind Ballabh Pant University of Agriculture and Technology. The plants are tall and have an upright growth style. At maturity, the fruit remains green. It grows in the middle of the year. Fruits can weigh up to 150g. Fruit pulp is reddish-yellow in color, with a total soluble solids content of 18% and a nice aroma.

### **Pusa Lalima**

This is a hybrid of the Dashehari X Sensation cross created by the Indian Agricultural Research Institute in New Delhi. The plants are semi-vigorous and bear on a regular basis, with appealing rectangular fruits with the bright-red peel on a yellowish green background, orange flesh, and excellent sugar:acid mixture

### **Pusa Peetamber**

This is a cross between Amrapali and Lal Sundari created by the Indian Agricultural Research Institute in New Delhi. The plants are semi-vigorous, bearing regularly, and have lovely oblong fruits. When the fruits mature, they turn a uniform yellow. It has a nice sugar-to-acid ratio and uniform-sized fruits.

### **PKM-1**

This is a hybrid from the Horticultural Research Station at Periyakulam. Chinnaswarnarekha X Neelum is its parentage. It bears regularly and yields high-quality fruits in bunches.

### **PKM-2**



This is a hybrid from the Horticultural Research Station at Periyakulam. It is a result of the parentage Neelum X Alphonso. It bears regularly and yields high-quality fruits in bunches.

#### **KMH-1 (Kodur Mango Hybrid-1)**

Fruit Research Station, Kodur, released this hybrid. Cherukurasam X Khader is the parentage. Plants are semi-dwarf and bear on a regular basis; fruits are fibreless with a high Brix value and low acidity.

#### **Neeluddin**

This is from the Neelum X Himayuddin parentage, which was produced at the Fruit Research Station in Sangareddy, Andhra Pradesh. It is a mid-season cultivar that matures between May and June. It features a medium percentage of excellent blooms and a moderate blooming intensity. Fruits are huge, with an average weight of 435g with TSS and acidity levels of 18o Brix and 0.46%, respectively.

#### **Neelphanso**

This descends from the Neelum X Alphonso parentage produced by the Agricultural Experimental Station, Navasari, Agricultural University, Paria, Gujarat. It has a low blooming rate. Fruits are huge and of high quality, but have a low pulp content.

#### **Neelgoa**

This is a hybrid produced at the Fruit Research Station in Sangareddy, Andhra Pradesh, from the cross Neelum X Mulgoa. It has a high blooming intensity and a high percentage of flawless blooms. The fruit resembles a 'Banganapalli' in shape. It is semi-vigorous and yields somewhat. Fruits are medium in size, of decent quality, and have a high pulp content.

#### **Neeswari**

This is from the Neelum X Dashehari parentage, which was produced by the Agricultural Experimental Station, NAU, Paria, Gujarat. It matures in May and is a mid-season variety. It is a robust grower with a modest yield. The fruits are medium in size and quality, with a high pulp content. The fruits resemble 'Langra' in appearance.

#### **Niranjan**

This is an off-season bearing selection from the 'Royal Special' variety. 'Niranjan' blooms three times a year. (August, October and December). The intensity of flowering is



greatest in December. It has a modest overall blooming intensity and a moderate percentage of flawless blooms. The fruits are spherical and have a low pulp content. Gujarat Agricultural University released this variety.

#### **Aurumani**

Fruit Research Station, Kodur released this hybrid from the Rumani X Mulgoa cross. It produces a lot of tasty fruits. It has a high yield and somewhat hard pulp.

#### **Sonapari**

This is a hybrid produced by the Agricultural Experimental Station, Navasari, Agricultural University, Paria, Gujarat, from the cross Alphonso X Baneshan. The fruits are spherical and weigh around 550g. When mature, the peel turns golden-yellow, with a TSS of around 19.3°Brix.

#### **Swarna Jehangir**

This is a hybrid created at the Fruit Research Station in Sangareddy from the cross-China Suvarnarekha X Jehangir. It matures in June and is a late variety. Fruits can weigh up to 450g. The fruit's TSS is 19° Brix, its acidity is 0.58%, and its pulp content is around 77%.

#### **Manjeera**

This was made available by the Fruit Research Station in Sangareddy. RumaniX Neelum are the parents. It bears consistently and yields spherical fruits with solid flesh. The fruit pulp is yellow, with a TSS of around 19° Brix.

#### **Neeleshan Gujrat**

This is a hybrid from the parentage Neelum X Baneshan produced by the Agricultural Experimental Station, NAU, Paria, Gujarat. It is a mid-season cultivar that ripens in May. It is semi-vigorous and yields little.

#### **Arka Udaya**

This is a cross between Amrapali and Arka Anmol. The fruits are oval in shape and weigh 225 to 250g; the pulp is deep orange in color, firm, and fiberless. TSS is 21°Brix, and pulp recovery is greater than 70%. Fruits have a long shelf life. It has a semi-vigorous growing habit and blooms late in the season.

#### **Arka Neelkiran**



The Indian Institute of Horticultural Research in Bangalore created this. It comes from the Alphonso X Neelum ancestry. It bears regularly, has medium-sized fruits free of spongy tissue, has nice pulp color, and great skin color, and the tree is semi-vigorous.

#### **Arka Anmol**

The Indian Institute of Horticultural Research in Bangalore created this. Alphonso X Janardhan Pasand is the parentage. It bears regularly and has fruits with a consistent yellow skin hue. It is devoid of spongy tissue, has a high keeping quality, and a favourable sugar-acid ratio.

#### **Neeleshan**

This was created at the Sangareddy Fruit Research Station in Andhra Pradesh. It is a cross between Neelum and Baneshan. It is a mid-season cultivar with oval-shaped fruits that can weigh up to 400g. The TSS is 18.2o Brix, and the pulp content is 72%.

#### **Sabri**

This is a cross between Gulabkhas X Bombay Green which was produced in Bihar Agricultural University, Sabour, and Bhagalpur. It is a semi-vigorous plant with limited production potential. The fruits are little but of high quality, with a TSS of 19-20o Brix.

#### **Subhash**

This is a collection of 'Zardalu' seedlings. It grows in the middle of the year. Ripe fruits are bright yellow, similar to 'Zardalu,' and have the form of 'Langra' fruit. Fruits are medium in size, weighing an average of 220g. The fruits' TSS and acidity are 24o Brix and 0.29%, respectively. The pulp content is 76%.

#### **Al Fazli**

This is from the parentage Alphonso X Fazli, which was released by Sabour Fruit Research Station. It is better than Fazli and lacks spongy tissue. Fruits have a sweet flavour.

#### **Jawahar**

This is a cross between Gulabkhas and Mahmood Bahar created by Bihar Agriculture University, Sabour. (Bihar). It grows in the middle of the year. Fruits are medium in size and weigh an average of 215g. The pulp is light yellow in color, sweet to taste, has a good flavor, and remains firm even after ripening. The total sugars, acidity, and pulp percentage are 22.5o Brix, 0.14%, and 79.5%, respectively.

#### **Arka Puneet**





The Indian Institute of Horticultural Research in Bangalore created this. Alphonso X Banganapalli is the parentage. It has an appealing fruit skin color, medium-sized fruits that are devoid of spongy tissue, excellent keeping quality, and a sugar-acid mix.

#### **Arka Aruna**

The Indian Institute of Horticultural Research in Bangalore created this. It is the offspring of Banganapalli X Alphonso. It bears regularly; the pulp is devoid of fibre or spongy tissue, pale-yellow in color, relatively firm, and ideal for creating mango bars. The fruit is rather huge. Plants are little in stature.

#### **Menaka**

'Menaka' is a seedling from the 'Gulabkhas' variety. It is a regular-bearing, late-maturing type with appealing fruits with a deep-red basal area. Pulp is a rich yellow fruit with a sweet and pleasant flavour that is low in fibre and firm. The fruit is oblong-oblique in form. The average fruit weight is 300g, the TSS is 20o Brix, the acidity is 0.14%, and the pulp content is 75%.

#### **Sundar Langra**

This is a cross between Sardar Pasand X Langra. It bears regularly and the fruit resembles 'Langra' in form and size. Fruits are medium in size and taste sweet (Hoda and Ramkumar, 1993).

#### **Arka Neelanchal Keshari**

This is a cultivar from the Central Horticultural Experiment Station in Bhubaneswar. It is a clonal selection from the 'Gulabkhas' variety. Fruits are medium-sized, with an average weight of 220g per fruit; pulp is light-yellow, pleasant to taste, and of high quality, with a good sugar-acid balance.

#### **Mahmood Bahar**

This is a hybrid produced by Bihar Agricultural University, Sabour, Bhagalpur, from the cross Bombay Green X Kalapadi. It's a mid-season cultivar with fruits that mature in May. It is semi-vigorous and yields somewhat. Fruits are average in size and flavour.

*Mangifera similis* produced stone-free (seedless), *Mangifera pajang* has the largest size fruit (20 cm diameter) and can be peeled like a banana, *Mangifera magnifica* is fibreless species, *Mangifera altissima* is resistant to mango leaf hoppers, *Mangifera odorata* producing

highest TSS (21.7 °B) content fruits and *Mangifera casturi* is purple and black colour fruit-bearing species.

#### Different species of mango and their importance:

<i>Mangifera similis</i>	Produced stone-free (seedless)
<i>Mangifera pajang</i>	Has the largest size fruit (20 cm diameter) and can be peeled like a banana
<i>Mangifera magnifica</i>	Is fibreless species
<i>Mangifera altissima</i>	Is resistant to mango leaf hoppers
<i>Mangifera odorata</i>	Producing highest TSS (21.7 °B) content fruits
<i>Mangifera casturi</i>	Is purple and black colour fruit-bearing species

#### Reference

- Dinesh, M.R., Ravishankar, K.V. and Donald Sangma 2016. Mango breeding in India-past and future. *J.Hortl. Sci.*, 11(1): 1-12
- Mukherjee, S.K. 1953. The mango - its botany, cultivation, uses and future improvements, especially as observed in India. *Econ. Bot.*, 7:130
- P Kalita; 2014. An overview of *Mangifera indica*: Its Importance and Pharmacological Actions. *Pharma Tutor.*, 2(12);72-76
- Singh, R.N., Majumder, P.K., Sharma, D.K. and Mukherjee, S.K. 1972. Some promising mango hybrids. *Acta Hort.*, 24:117-119
- Hoda, M.N. and Ram Kumar. 1993. Improvement of mango. Proc. National Seminar on irregular bearing in mango - Problem and strategy (July 12-13, 1991), Pusa. Pratan Kamal Printing Press, Muzaffarpur, Bihar, India, pp. 34-35