

Mango Fruit Size Diversity found in Konkan

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South Asia in its entirety contains more than 500 different species of fruits, and the Indian subcontinent itself is home to over 300 of them (Malik *et al.* 2010). This vast reservoir of genetic resources is a vital asset for future global food and nutritional security as well as maintaining ecosystem. Mango (*Mangifera indica* L.) is a keystone species in homestead gardens across India (Mannambeth *et al.* 2015).

In India, mango is grown throughout the length and breadth of the country except temperate and arid zone. Mango plays an important economic role in India as a cash crop, sold domestically and internationally. It has also penetrated and influenced the country's culinary, religious and ethnic culture for thousands of years. Furthermore, this fruit exhibits a startling array of diversity, with over 1000 recognized varieties of the *M. indica* species alone in India (Dinesh *et al.* 2012) along with various wild mango species (Ganguli *et al.* 2018). India is homeland for enormous mango biodiversity as more than 1300 named (unrecognized) mango varieties and huge number of non-descript local types found in different mango growing states. Konkan region on the West Coast of Maharashtra is one of the biggest mango growing belts in the country. A biodiversity survey carried out by the Centre for Environment Education (CEE) has documented and photographed 205 varieties of mangoes in the Western Ghats in Maharashtra. (Fig. 1) (Dutta 2014).

Since 1972, the Regional Fruit Research Station (RFRS), Vengurle of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth (DBSKKV), Dapoli in Maharashtra under the All India Coordinated Research Project (AICRP) on mango, undertook the work of collection, conservation and evaluation of mango germplasm. Currently the mango block in this center is occupied by more than 350 mango germplasm. This includes more than 40 leading commercial mango varieties representing all parts of the country. Besides, there are more than 20 mango

hybrids developed by different research institutes in India. Germplasm is also enriched with more than 50 seedling selections of *rayval* (Local) types, more than 15 poly embryonic mango varieties viz. Movandan, Poutan, Bappakai, Olour, Velai Collamban, Karottha Kolmban, M 13-1, M 4/9 for root stock and 4 clones of Alphonso including Alphonso 900 are also conserved in systematically laid out mango germplasm block. This research station enriched its germplasm with leading exotic commercial varieties, mostly of Floridian origin such as Tommy Atkins, Keitt, Kent, Palmer, Lily and Oustin; Maya from Israeli origin, Kensington pride from Australian origin and Kingphonso from Hongkong. This entire germplasm belongs to single edible mango species – *Mangifera indica*. Based on their characteristic features they have been further classified into different groups such as tropical (Benganpalli, Alphonso, Totapuri and Black Kolamban), subtropical (Chausa, Langra, Dashehari), poly-embryonic (Velai Kolamban), mono-embryonic (Alphonso), vigorous (Shahbuddin), dwarf (Amrapali), regular bearing (Neelum), alternate bearing (Alphonso), table purpose (Alphonso), juice purpose (Pairi), red skin coloured (Vanraj, Chandrama, Tommy atkins), green skin coloured (Amrapali, Black Kolamban), early season (Alphonso, Manglar), late season (Neelum) and off season bearer (Bajrang, Royal Special). Varieties at the RFRS, Vengurle showing special characters are shown in Table 1.

Diversity in size and shape of mango fruits

Size and shape of mango fruit has been a point of attraction for mango lovers over the ages. Most of the varieties listed in mango nomenclature showed that naming is predominantly based on their size, shape, taste, aroma and liking of various Kings or Emperors. The shape of mango varies from oblong, elliptic, roundish, ovoid, obovoid and cylindrical with the fruit weight ranging from 20 g to 810 g recorded by Center for Environmental Education, Pune whereas at RFRS, Vengurle it is recorded from a range of 130 g in cultivar Bitki to 1300 g in Kingphonso. Many times giant coconut-sized fruits of Hathizul, Fakira, Gadhemar break after falling to ground. Classification of diversity

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Fig. 1. Mango Diversity in the Western Ghats. (Source: Center for Environmental Education, Pune (www.ceeindia.org))

in mango on fruit weight basis at RFRS, Vengurle is given in Table 2 and typical examples representing the entire range are shown in Fig. 2. This astounding array of size and shape in such an important fruit holds a key promise to its varietal improvement in future. At the same time it is a challenge to evolution biology to decipher the reasons behind this diversity.

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Table 1. Varieties observed with special characters at Regional Fruit Research Station, Vengurle.

Sr. No.	Varieties	Special characters
1	Sunnukulu, Najukpasand	Short upright leaves on tree
2	Hybrid 50, Croton, Sunnukulu	Dwarf canopy
3	Velai Kolamban	Dwarfing Rootstock for Alphonso
4	M 13-1	Salt tolerant Rootstock
5	Kurukkan	Rootstock for Calcareous soil
6	Dudhpedha (26 °Brix)	Highly sweet pulp
7	Karel	Highly sour pulp
8	Konkan Raja, Totapuri, Rumani	Salad purpose less sour (less acidity)
9	Black Kolamban	Banana type skin peeling
10	Sindhu**	Thin seeded parthenocarpic
11	Karel, Konkan Ruchi	Pickle type
12	Sindhu, Amrapali, Sindura	Cluster bearing
13	Alphonso, Banganpalli	High keeping quality

**Gunjate and Burondkar (1993)

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Table 2. Diversity in mango fruit weight at RFRS, Vengurle.

Weight of fruit (g)	Name of the mango variety
Less than 150	Bitki
150 -200	Creeping, Dudhpedha. Kaju
200-250	Sindhu, Hilario, Amrapali, Neelum, Alphonso, Xavier
250-300	Shabir, Terpentine, Kobari, Miranjio, Baramahi, Fernandin, Dophasla, Jamadar, Shabir, Najuk Pasand, Rajuman, Suvarnarekha, Pahutan, Maya, Bappakai, Black Kolamban, Pairi, Korutha Kolamban, Olour, Mankur, Royal Special, Kesar
300-350	Mankurad, Mallika, Kala hapus Real, Ostin, Yakuti, Kodur Goa, Ratna, Goa Mankur, Kaeanjio
350-400	Kiett, Mahmooda Behar, Malgoa, Vat ganga, Banglora, Konkan Ruchi, Karel, Kalank Goa, Swarn Jahangir, Allampur Baneshan, Musharad Shashthi
400-450	Chrukarasam, Chinna Suvarnrekha, Ladvio, Padiri, Pedar Bam, Pulihora, Sannakalu
450-500	Fakira, Badami Model, Kala Gandras, Palmer, Bangalore Goa, Totapuri Red Small
500-600	Badai Goal, Lily, Kala Hapus, Totapuri, Vanraj, Hemlet, Himayuddin, Kulas
601-700	Neeleshan, Banarasi Batali, Chotta Jehangir, Konkan Raja, Panchadara Kallash, Banarasi Hapus, Rajapuri, Amlet
> 1000	Israeli Hybrid, Salim, Kingphonso, Fakira, Gadhemar, Hathizul, Chandrama

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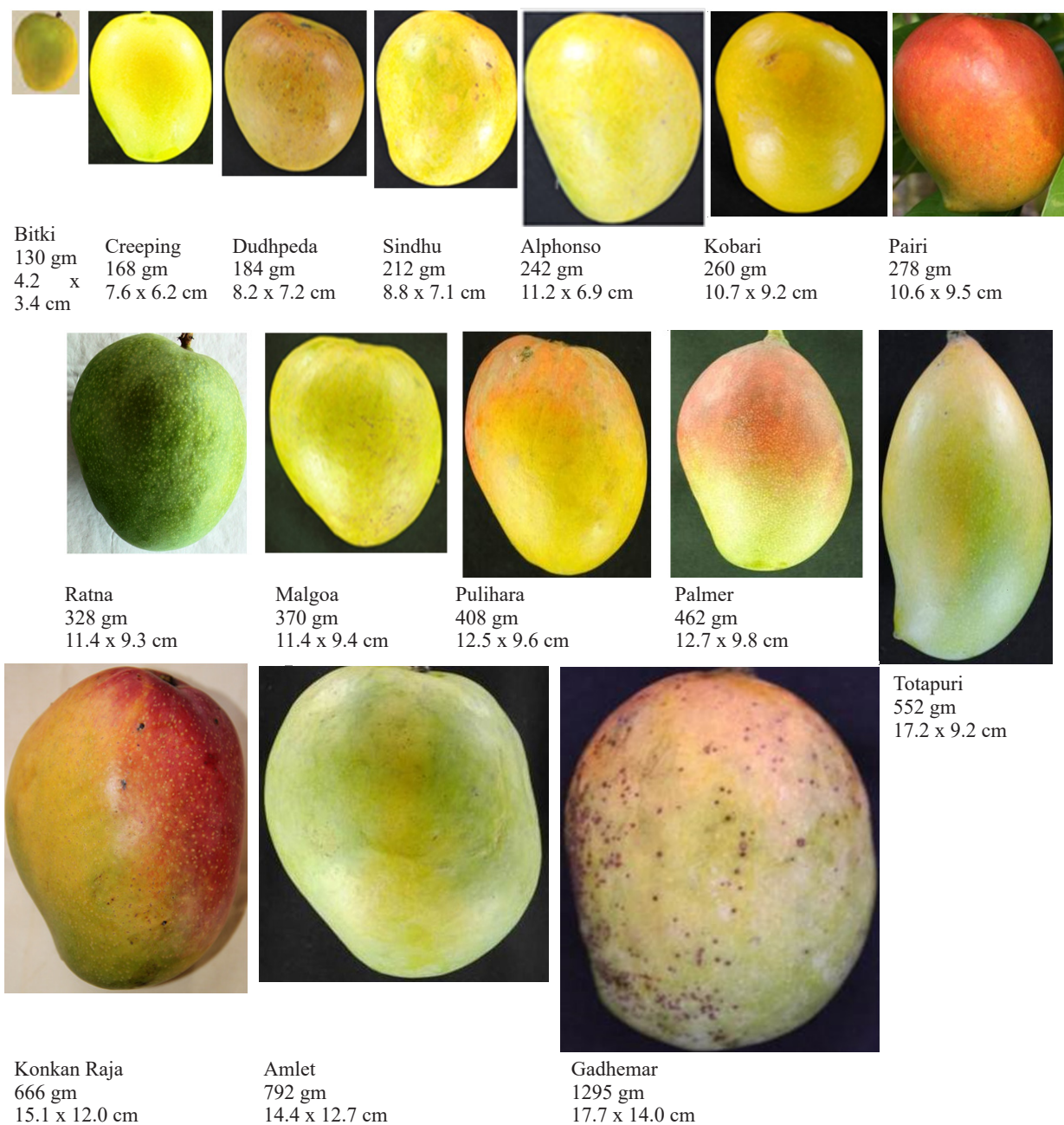


Fig. 2. Diversity of fruit weight and size in mango varieties grown in Regional Fruit Research Station, Vengurle. (Source: Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (www.dbskkv.org). Scale: 1 ≈ 4.