

GENETIC DIVERSITY IN BAEL (*Aegle marmelos* Correa)

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Bael (*Aegle marmelos* Correa) is indigenous medicinal fruit of India and occupies an important position among the fruits because of its high therapeutical and nutraceutical and pesticidal values.



The tree is hardy in nature and can thrive well even wastelands. It grows wild in sub-Himalayan region, tracts of Central India, Sri Lanka, Pakistan, Bangladesh, Thailand and most of the South East Asian countries. In India, bael trees are available in almost all the states, but

Uttar Pradesh, Bihar, West Bengal, Madhya Pradesh, Orissa and Gujarat are main bael growing states. Bael belongs to the genus *Aegle* of family Rutaceae, and consists of 2-3 species amongst which one *i.e.* *A. marmelos* is cultivated. Most of the bael trees available in India are seedling type in origin, and because of predominance of seed propagation, there is a tremendous variability exists in its growth, flowering, fruiting behaviour and physico-chemical attributes in

terms of fruit weight, fruit size, fruit circumference, TSS, total sugar, vitamin C, acidity, phenols, and pulp, shell, fibre and seed content among the populations. In view of severe deforestation and fast genetic erosion of wild types, proper attention on its collection, evaluation and conservation of genetic diversity is felt needed. A few selections have been made by Agricultural Universities and ICAR Institutes, and few varieties have already been released, but still there is a large genetic variability unexploited in the various states of the country.

Extensive explorations conducted in various states indicate considerable genetic diversity in physical characters *viz.* fruit shape (spherical, semi spherical, flattened round, oval, elliptical, oblong and pyriform), weight (0.46-2.90 kg), fruit length (6.09-18.25cm), fruit circumference (28.68-51.18cm), shell thickness (1.6-3.2mm), seed number/ fruit (42-201), number of seed sacs (12.33-19.00), seed weight (0.14-0.25g), shell weight (109.82-390.57g) and pulp weight (0.28-1.69 kg), and physical composition of fruit *viz.*, pulp (37.34-68.83%),

shell (14.00-23.18%), fibre (2.00-4.12%), mucilage (12.00-19.82%) and seed content (1.22-3.84%), as also the chemical characters namely TSS in pulp (32.33-39.730Brix), TSS in mucilage (37.17-48.500 Brix), acidity (0.31-0.51%), vitamin C (12.02-22.39 mg/100g), total phenols (1692-2875 mg/100g) and total sugar (17.14-22.14%). Diversity also exhibits in vegetative growth; leaf size (length-8.12 - 14.25cm, width-5.04 - 8.23cm), leaf shape (various grades of oval to oblong), plant spread, bearing behaviour (shy to prolific bearer), maturity period (February to July), stem end cavity (shallow to deep) and flesh colour (creamy-yellow, whitish yellow, deep yellow, and lemon colour).

Ideal bael cultivars ought to have medium sized fruit (1.0-1.5kg), thin rind, minimum seed content, less fibre with dry seed cavity, low phenol, pleasant flavour acceptable aroma, less prone to fruit cracking, fruit drop, internal fruit rotting, oblong in shape and making for preserve and other post harvest products.

Germplasm collection and evaluation in bael is in progress since 1960, but still lot of genetic diversity is yet to be exploited. An

extensive survey in Uttar Pradesh, Gujarat and Rajasthan has been made during the years 2003-2011 and 31 genotypes were collected and established in the field at Central Horticultural Experiment Station (CIAH), Vejalpur, Panchmahals, Gujarat. Of 31 genotypes, Goma Yashi has been released and 5 promising lines, Jaunpur collection-1, Jaunpur collection-2, Jaunpur collection-3, Jaunpur collection-6, Panchmahals collection-5 and Jodhpur collection-1 have been identified promising in physico-chemical characteristics and these collections have been established in the field and are being evaluated for growth, flowering fruiting behaviour under rainfed conditions of semi-arid ecosystem.

Yet there is no organised orcharding of bael, although the cultivars are available. The variability indicates enormous possibility of selecting suitable genotypes for its commercial plantation. In Gujarat, farmers are demanding the planting materials of variety 'Goma Yashi' for its commercial plantation.

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Genetic diversity in bael genotypes