

## Exploring genetic variability in bael

**Bael is a cauliflorous and ramiflorous tree which is common in Goma Yashi and NB-16. Vivipary which was also observed in genotype CHESB-29 is of unusual occurrence in bael. High humidity and warm weather appears to be associated with the viviparous fruits in bael. The pollen of bael has been found to exert a direct influence on the size, shape and styler end cavity of fruit, and the speed of development of the fruit and on the time of ripening of the fruit of the asexually propagated bael plant. Such influence on fruit may be due to metaxenia effect in bael. Variations in number of petals and sepals, number of leaflets and thorns were also observed in different bael germplasm.**

**B**AEL tree (*Aegle marmelos*) produces fruits from the main trunk to one year old shoots in some of the germplasm. The flowers and fruits appeared on trunk, primary, secondary tertiary, fourth, fifth and sixth branches, and first, second, third, fourth, fifth and sixth year growth of growing shoots. Bael is a cauliflorous example of fruit tree. This character is bestowed by nature so that fruiting branches could bear the load of fruit till maturity. In general, cauliflorous blossoms are sturdy and well attached to stem and can withstand in aberrant climatic conditions.

### Cauliflory

Generally, woody flowering plants produce inflorescences on new growth and or young leafy shoots. A few, however, flower and fruit directly on their trunks or main branches. This phenomenon is known as cauliflory (from the latin words 'stem' and 'flower'), and plants themselves are considered cauliflorous.

### Metaxenia

Metaxenia is the effect of pollen on fruit shape and other fruit characteristics. Metaxenia may be able to be used to identify the best pollinizer parents to decrease fruit development period and increase yield in mixed cultivar plantings. This direct effect of the pollen on the parts of the fruit lying outside the *embryo* and *endosperm* is called metaxenia. The simplest and most probable theory to explain metaxenia is that the



Flowering on main trunk



Current season



One year old shoot



Two year old shoot



Three year old shoot



Four year old shoot



Five year old shoot



Six year old shoot



Seven year old shoot



Eight year old shoot



Nine year old shoot



Ten year old shoot



Fruiting on main trunk

Cauliflorous woody branches of bael





Metaxenia effect on fruit shape and ripening



Variations in leaf morphology

embryo or endosperm or both of them secrete hormones, or soluble substances analogous to them.

### Vivipary

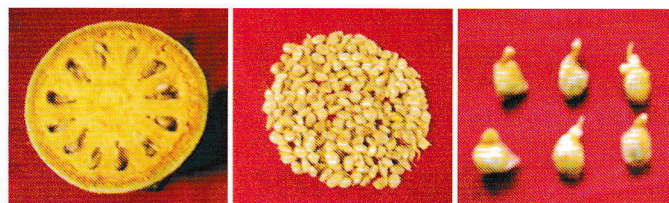
In vivipary, germination of seed takes place inside the fruits while still attached to the mother plant. Vivipary is noticed in some species of mangrove like *Rhizophora mangle*, *R. Mucronata*, *Bruguiera gymnorhiza*, *Kandelia reedi*, *K. candel*, *Ceriops decandra* (all belong to Rhizophoraceae) which it is considered as an aid to adaptation in wet ecosystem where germinated seeds after falling in mud establish itself and grows as a plant.

### Leaf

Results of study revealed that the bael showed considerable morphological variation with respect to shape, margin, base and apex of leaf. Leaves alternate, compound, trifoliate with one pair of shortly stalked opposite showing pulvinus leaflet, ovate or ovate lanceolate, crenate, acuminate and membranous, and midrib prominent beneath which is common in bael.

### Thorn

Bael tree armed with straight, sharp, axillary thorns, 2-5 cm long. Considerable variation in thorn, its number, size, shape was found in different in different genotypes. In some of the genotypes, thorn is small and stout, whereas in few genotypes, three thorns can be seen at a node. It



a. b. c.

Transverse section showing viviparous seed (a), Vivipary in extracted seed (b) and Showing vivipary in individual seed (c)



Variations in thorn pattern in genotypes under dryland conditions



Variations in flower organs in bael

can also be observed that the leaf convert into spine in pair in very few genotypes. Generally, two thorns at a node are common. Goma Yashi is thornless under rainfed dryland conditions of western India. In some of the genotypes, thorn may be seen in primary branches, but not at secondary or tertiary branches under dry land condition. However, it may vary in different agro-climatic conditions.

### Flower

Bisexual flowers are born in clusters and they are greenish white, axillary or terminal cymes. The calyx is shallow with 4 or 5 short sepals (tetramerous and pentamerous), broad teeth, pubescent outside. Petals are oblong oval, 4 or 5 were observed common and 6 or 7 rarely observed in flower and pale greenish white in colour. Stamens are numerous, hypogynous with short filaments. Flower bud emergence, flowering duration, time of anthesis, dehiscence of anther, stigma receptivity and pollen viability vary according to variety and locality.

For further interaction, please write to:

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