

MANGO BREEDING

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Mango is the most important commercial fruit of Kerala. Low yield, poor or medium quality, late maturity, susceptibility to adverse climatic conditions, pests and diseases are some of the undesirable characters which render the existing varieties unsuitable for commercial cultivation in the State. Among these perhaps the most serious is late maturity of fruits. Except a few indigenous varieties like Olour and Kurukkan all varieties grown in the State come to harvest late in the season. The solution to this problem lay in the breeding of new varieties. In recent years fairly comprehensive breeding work has been reported from Kodur (Andhra Pradesh) by Rao and Rangacharlu (1958) and Naik *et al* (1958), from Sabour (Bihar) by Sen *et al* (1946) and Saharanpur (Uttar Pradesh) by Singh (1954, 1957). This paper deals with the work on hybrid varieties at the Agricultural Research Station, Taliparamba (Kerala).

Materials and Methods

Breeding work was started at the Agricultural Research Station, Taliparamba in the year 1954-55 and continued till 1959-60. Forty seven trees in 12 varieties (Alphonso, Allumpur Baneshan, Survarnarekha, Mundappa, Himayuddin, Neelum, Kalapady, Bangalora, Kurukkan, Punchedarakalasa, Olour and Jahangir) were selected for crossing. A total number of 9633 crosses were made adopting the technique of hand pollination described by Naik and Mohan Rao (1943). The fruits when fully mature were harvested and allowed to ripen. Seeds were extracted and sown in specially prepared nursery beds or earthen pots. When the seedlings were 8 to 12 months old they were planted in permanent sites. A total number of 242 hybrids were obtained. They were planted with a spacing of 6 meters x 6 meters. The trees were regularly manured with green leaf or compost and chemical fertilizers. Of these, 217 hybrids in 34 parental combinations survived.

Growth measurements such as girth at a fixed point about 15 cm above the ground level, height and spread (North-South and East-West) were recorded every year. The year of commencement of flowering and fruiting, season of fruiting and yield in terms of number of fruits were also recorded. Detailed description of trees, leaf and fruit characters of the hybrids were recorded, Fruit quality was judged by organoleptic test.

Results and Discussion

Growth:-

The growth measurements of 15 year old hybrids indicated that some of the trees were more healthy and vigorous and others were medium to poor in growth. Even the progenies of the same parental combinations showed considerable variation in growth which was the result of heterozygosity of the parents. Some of the parents were found to influence the vegetative vigour of their progenies. The progenies involving Kalapady (medium to dwarf and moderately vigorous) showed only moderately vigorous growth, especially when it was used as a female parent. On the other hand Bannet Alphonso, Olour and Mundappa (medium to large and vigorous) imparted their vigour to the progenies. In respect of growth and shape of trees most of the hybrids showed more resemblance to graft plants than seedling plants.

Flowering and fruiting: Light flowering in a few hybrids planted in 1955 and 1956 was noticed in 1960. Eighteen hybrids started flowering in 4 to 6 years after planting. This early flowering of the hybrid seedlings indicates heterosis for earliness. Flowering in the other hybrids commenced in subsequent years.

Yield: Wide variation in respect of yield was noticed in different hybrids. The total number of fruits obtained from the hybrids for 5 years (1966 to 1970) ranged from 300 to 896.

Shape, size and quality of fruits: There were striking differences in the size and shape of fruits of various hybrids. Fruits entirely different in shape and size from either of the parents were quite common. Even the progenies of the same parental combination produced, fruits remarkably different from one another. Fruits also differed in other qualitative characters like sweetness, flavour, juiciness, fibre content, etc. While a few were superior to their parents in respect of most of these characters, a large majority were either having the same qualities or were inferior to their parents.

Season of bearing: Since evolution of varieties with good qualities and high yield of fruits and early maturity was the main objective of the hybridization programme, a detailed study of the time of flowering, development and maturity of fruits of all the hybrids was also made. Most of the hybrids were found to mature in mid or late season. The early maturing hybrids were mostly poor in quality and therefore were not suitable for commercial cultivation in Kerala. However a few hybrids maturing by about the mid-season (before the onset of heavy rains) bearing fruits of excellent quality and medium to heavy in bearing could be isolated.

Hybrid No. 45-16/173-Bennet Alphonso x Himayuddin, hybrid No. 56-262/173-Bennet Alphonso x Himayuddin, hybrid No 87-200/166- Kalapady x Allumpur Beneshan and hybrid No. 151 - 200/29 - Kalapady x Neelum are assessed as

promising on the basis of superior quality, medium to high yield and early maturity. Detailed description of the trees and fruit characters of the four hybrids are furnished in Appendix.

Summary

Breeding of mango was undertaken at the Agricultural Research Station Taliparamba, Kerala from 1954 to 1960 and 217 hybrids in 34 parental combinations were produced. From detailed studies conducted so far, four hybrids i.e. hybrid Nos. 45, 56, 87 and 151 were selected as promising for large scale cultivation under the climatic conditions of Kerala.

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Appendix

Description of four promising hybrids.

1. Hybrid No. 45

This is the progeny of a cross between Bonnet Alphonso (Tree No. 16) and Himayuddin (Tree No. 173). Fruit quality is very good and fruit resemble Himayuddin in shape.

Tree: Medium, moderately vigorous, spreading, productive; top dome shaped; trunk medium: shoots medium thick.

Leaves: Medium to large, spreading or out held, slightly reflexed on the mid-rib oval laceolate, strongly folded; margin wavy, venation moderately prominent, tip acuminate, base acute; immature growing leaves cinnamon brown.

Fruit: Medium to large (weight - 565 gr. length - 12 cm., major diameter - 9.5 cm., minor diameter - 8.5 cm), obliquely oval, base obliquely flattened; stalk inserted, squarely; cavity slight shoulder ending in a moderate curve, beak slight but distinct; sinus slight; apex broadly pointed; skin thin, smooth, orange; lenticels small and close-flesh slightly firm, fibreless, light yellow; flavour pleasant; taste very sweet; juice moderate.

Stone: Medium, oblong; covered with small soft fibres on the ventral side; veins forked and slightly raised.

Fruit quality: Very good; bearing mid-season, keeping quality medium.

2. Hybrid No. 59.

This also is the progeny of a cross between Bennet Alphonso (tree No. 262) and Himayuddin (tree No. 173). The fruit resembles Bennet Alphonso in shape but is more attractive. It derived the pink colouration on its shoulder from the female parent Bennet Alphonso. Fruit quality is excellent, bearing medium to heavy, mid-season and fruits mature by the second or third week of May.

Tree: Small, moderately vigorous, spreading, productive, top rounded; trunk medium; shoots medium thick.

Leaves: Medium to large, spreading, or outheld, slightly reflexed on the mid-rib, oval lanceolate, flat; margin entire; venation moderately prominent; tip acuminate, base acute.

Fruit: Medium (weight - 545 gr. length - 9.0 cm. major diameter - 10.0 cm, minor diameter - 7.5 cm), Cordate; base flattened; stalk inserted squarely; cavity shallow; shoulder rounded, beak a point; sinus absent; apex broadly pointed; skin membranous, smooth, light green with light pink colouration on the shoulder; lenticels medium, moderately distant; flesh buttery, fibreless, pink, melting in the mouth, flavour pleasant; taste very sweet, juice moderate.

Stone: Medium, oblong oval; covered with small fibres on the ventral side: veins parallel and raised.

Fruit quality: Very good; bearing mid-season, medium to heavy, keeping quality satisfactory.

3. Hybrid No. 87

This is the progeny of a cross between good quality, heavy and mid-season bearing Kalapady (tree No. 200) and choice fruiting but shy and mid-season bearing Allumpur Beneshan (tree No. 166). Though the fruit resembles Allumpur Beneshan in shape, it is smaller in size. Beak is prominent as that of Kalapady. It is sweet and prolific in bearing.

Tree: Medium, moderately vigorous, spreading, highly productive; top oval shaped; trunk medium; shoots medium thick.

Leaves: Small to medium, spreading or outheld, slightly reflexed on the mid-rib elliptic lanceolate, strongly folded; margin slightly wavy, venation moderately prominent; tip acuminate; base acute.

Fruit: Small (weight - 350 gr. length 10.5 cm major diameter 9.0 cm, minor diameter 7.5 cm), oblong reniform; base slightly flattend, stalk inserted squarely; cavity slight; shoulder rounded; beak a point; sinus deep; apex rounded; skin medium thick; smooth, coppery yellow; lenticels medium and close, flesh smooth, fibreless; flavour very pleasant, light camphor aroma, taste very sweet, melting in the mouth: juice moderate.

Stone: Small, oblong; covered with small fibres on the ventral side veins forked and raised.

Fruit quality: Good; bearing heavy, mid-season; keeping quality medium.

4. Hybrid No. 151

This is the progeny of a cross between Kalapady (tree No. 200) and heavy and regular but late season bearing Neelum (tree No. 29). While the fruit resembles Neelum in shape, quality is that of Kalapady. Fruit is small in size, bearing prolific, in clusters and mid-season. One of the desirable characters of this hybrid is that it does not get spoiled even if it matures in the rainy season.

Tree: Small, moderately vigorous, spreading, highly productive; top dome shaped; trunk medium; shoots medium thick.

Leaves: Medium to large, spreading or outstretched, slightly reflexed on the mid-rib, elliptic lanceolate, slightly folded; margin entire, venation moderately prominent.

Fruit: Small (weight - 200 gr. length 9.1 cm, major diameter 6.4 cm. minor diameter 6.1 cm.), oblong; base obliquely rounded; stalk inserted obliquely, cavity slight; shoulder falling abruptly; beak slight but distinct; sinus shallow; apex broadly pointed; skin thin coppery yellow; lenticels slight but close; flesh firm, fibreless; flavour pleasant; taste sweet not juicy.

Stone: Small, oblong, covered with short soft fibres on the ventral side, veins forked slightly depressed.

Fruit quality: Good, bearing heavy, in clusters, mid-season, keeping quality good.

സംഗ്രഹം

തദ്ദില്ലായ കർഷിക ഗവേഷണ കേന്ദ്രത്തിൽ 1954 മുതൽ 1960 വരെ നടത്തിയ പരീക്ഷണങ്ങളിൽ 45, 56, 87, 151 നമ്പർ സങ്കരവർഗ്ഗങ്ങൾ കേരളത്തിൽ വ്യാപകമായ തോതിൽ പ്രചരിപ്പിക്കാൻ പറ്റിയവയായി കണ്ടു.

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