The Mango (Mangifera indica L)

BY

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INTRODUCTION

THE mango at its best is one of the finest tropical fruits of the old world. It is native to India and South East Asia where it has been grown for thousands of years. The great Moghul Emperors are known to have planted extensive mango groves, and one of the best varieties producing the biggest fruit is named after the Emperor Jehangir.

In South India there are large mango " topes " or orchards along the banks of rivers, but in Ceylon the trees are planted mostly in home gardens. Nevertheless, experimental plantings on orchard scale in the dry zone by the Department of Agriculture in recent years have shown promise, and as a result Island-wide interest is being taken in the commercial possibilities of mango cultivation in the dry-zone where land is readily available.

SOIL AND CLIMATIC REQUIREMENTS

Unlike many other fruit trees the mango will grow on a wide range of soils provided they are not too rocky, waterlogged, or shallow and infertile. It makes the best growth on deep, well drained, sandy loams, but for production of good crops the soil should not be very rich and clayey since the trees tend to run to leaf.

The mango is a tree of the plains, and its commercial cultivation is limited to elevations below 3,000 feet. Being a tropical fruit it is susceptible to frost damage. A long wet spell during blossoming period is detrimental to fruit set because of defective pollination and incidence of Anthracnose disease which causes the blossoms to shrivel up. Wet weather during ripening is harmful since it is liable to cause fruit rot and attract fruit flies.

VARIETIES

The mango—*Mangifera indica L*—belongs to the family Anacardiaceae which includes the cashew *Anacardium occidentale L* and Ambarella *Spondias cytherea* Sonn. There are several other species of *Mangifera* of which *Mangifera zeylanica—Etamba* is endemic to Ceylon. Although *Etamba* grows into a magnificent tree near water courses it is difficult to transplant and is too slow growing to be used commercially as a rootstock for mango.

Several hundreds of varieties of mango are known, but not many are of commercial importance. The best known commercial varieties are the Carabao and Pico in the Phillippines, Julie and Peter in the West Indies, the Kensington in Queensland, Haden in Florida, Sabre in South Africa,

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Netti in Burma, Mulgoba, Alphonso, *Neelam* and *Dilpassand* in India. The recommended varieties in Ceylon are the Jaffna (*Vellai colomban*), *Karutha colomban*, *Ambalavi*, Willard, *Neelam* and *Peterpassand*. The *Dilpassand*, which yields large attractive fruits, is highly productive in the Jaffna Peninsula where it grows to perfection under dry atmospheric conditions, but elsewhere the fruits tend to rot on the tree. The Rupee or *Polamba* is another variety producing large round fruits with delicious flavour which is commonly found in coconut estates in Kurunegala area. The trees take long to come into bearing and tend to crop in alternate years.

Many of the imported varieties such as Alphonso under trial in Ceylon have not been very productive and are not recommended for commercial planting. Their fruits are susceptible to internal breakdown under local conditions.

The Jaffna (*Vellai colomban*) mango is the most popular variety grown in Ceylon. Many of the trees in the wet zone are of seedling origin, but being from polyembryonic seeds in which the nucellar or vegetative embryos have developed at the expense of the sexual embryo produced by fertilization, thay have nearly all come true to type.

This variety is more tolerant of wet weather during flowering, and is able to set fruit more freely because of the relatively high percentage of perfect flowers in the inflorescence. In many of the shy bearing varieties such as Jehingir most of the flowers in the inflorescence are male flowers.

The fruits are of medium size, and do not develop an attractive colour on ripening, but the flesh is rich in colour, fibreless and of characteristic sweet flavour. It makes an excellent canned product. The *Karuthai Colomban* is another polyembryonic variety from Jaffna which is closely related to the *Vellai colomban* except that the fruits are slightly larger and develop an attractive orange red colour on ripening. The young foliage too is of darker green colour, and the trees grow into large size. This variety has done well on an orchard scale at Hingurakgoda where it produces a higher percentage of grade I fruit. Care is necessary in the selection of good strains since some tend to produce fibrous fruits in the wet season.

The Ambalavi is essentially a variety for the dry zone since the fruit fails to ripen properly in the wet areas. It has a prominent beak and acquires a reddish orange colour on ripening. Being mono embryonic, seedling trees show great variability and are generally inferior. The tree flowers more frequently than the other varieties and tends to produce two crops, the main one is May-June-July and the other in December-January.

The Willard is one of the few imported varieties which is highly productive in Ceylon. It was introduced from Mauritius by the late Sir Frank Stockdale when he was Director of Agriculture here. The tree is relatively small and ornamental in appearance. The fruits are medium small in size, and on ripening develop an attractive crimson blush on the side exposed to the sun. The flesh is firm, fibreless and very sweet in flavour. Unfortunately owing to the tendency of this variety to overbear a large

proportion of the fruits remain small, and are uneconomic to grade and sell. Fruit thinning has therefore to be rigorously practised soon after fruit set.

Neelam is a popular Indian variety which has been recently found to be productive both in the dry and wet zones. The fruit which is of medium size develops an attractive reddish orange colour on ripening, and is of excellent flavour and free from fibre. This variety is being multiplied for planting on a large scale.

Peterpassand is another Indian variety which has shown promise in the wet zone at the Experiment Station, Peradeniya. The tree bears regularly, but the fruits are inclined to be small and of yellow colour when ripe. The flesh is firm, fibreless and of delightful flavour.

PROPAGATION

Polyembryonic varieties such as Carabao, Netti, Jaffna and Kensington can be propagated from seed, but the seedling trees take long to come into bearing. Commercial propagation is best done by budding or grafting on sour (*Walamba*) or fibre (*Kohuamba*) mango stocks. The fibre mango being polyembryonic is preferable since the nucellar seedlings are all of uniform genetic make up for use as rootstocks. Budding by the 'H' method which is a form of the so called modified Forkert method gives good results both in the west and dry zones, but in the dry zone under irrigation cleft grafting is easier and gives high percentage 'take' on 3 to 4 months old seedling stocks.

In the 'H' method which is used successfully for the propagation of avocado, cacao, rambuttan and other fruits, with the exception of citrus for which the inverted T method is used, a horizontal cut and two vertical cuts in the form of an 'H' are made on the stock at a height of about 8 inches from ground level and the lower flap is peeled downwards and the upper flap slightly upwards. The scion bud-shield with the wood attached is cut from the current season's growth and held firmly in position over the panel made on the stock by replacing the peeled flaps of bark over it. The lower flap is trimmed back to expose the 'eye' of the scion bud. In the wet zone the scion bud shield is taken without the wood from the previous season's growth. The scion bud and the exposed tissues are tightly wound with good budding tape. Three weeks later the tape is unwrapped, and if the bud is green it is tied back leaving the 'eye' exposed. The stock is then cut back about 2 inches above the bud patch to force the scion bud to grow out.

Cleft grafting is relatively simple, and is done by inserting the lower end of the scion piece shaped as a wedge into a cleft made by cutting off the top of the stock. Care should be taken to see that the cambial surfaces of the stock and scion are in contact at least on one side. The budgrafting tape used for covering the exposed tissues is not removed till the scion has grown well. In the dry zone plantain fibre is used in place of budgrafting tape, and the scion piece is protected from sun scorch by tying two mango leaves round it.

Budgrafted trees are successfully established in bamboo pots after the tap roots have been severed *in situ* with a pruning secateur at a depth of about 9 inches six weeks in advance. Two cuts are made, and a piece of the tap root is removed before the soil mixed with leaf mould is put back to enable the cut end to calluse over and produce fibrous roots. This pre-treatment helps to reduce the shock of transplanting into pots.

Useless seedling mango trees in healthy vigorous condition are easily topworked to approved varieties by a method of sidegrafting developed recently (1).

PLANTING THE ORCHARD

Planting is best done with the early monsoon rains. Given an early start the young plants are able to stand the drought and produce good crops without irrigation. The spacing for most varieties is about 40 ft. × 40 ft., but Willard or *Ambalavi* which are relatively small could be planted closer at 35 ft. × 35 ft. Intercropping with Bombay cowpea, green gram and other leguminous crops could be carried out profitably for several years till the trees become crowded. Pruning is limited to removal of all stock growth, and light thinning out of the inside of the crown to let in more light and air.

MANURE

During the early years the trees may be given well rotted cattle manure at the rate of 4 to 5 baskets once a year, but trees in bearing may be given in addition bone meal at about 15 lb. per tree and wood ash at 10 lb. per tree.

HARVESTING AND GRADING

The main season for mango at Jaffna is from May to July or August with a small crop in December-January ; at Hingurakgoda from November-January with a small crop in June-July ; and in the wet zone from April to June. The fruits are graded according to size and best packed in single layer trays.

CONTROL OF PESTS AND DISEASES

The most serious pest of mango is the mango hopper with which is associated sooty mould. Trees severely attacked by the pest fail to set fruit. The pest is affectively controlled by dusting with a mixture of Gammexane and sulphur.

Anthracnose is a serious disease which attacks the inflorescence, young fruits and ripening fruits generally during wet weather. Spraying with Bordeax mixture (3–3–50) just before the flowers open, and again at weekly intervals twice or thrice is recommended as an effective control measure.

REFERENCES

1. Richards, A. V. — Top working of Mango in the Dry Zone. Tropical Agriculturist Vol CVI No. 4. 1950.