

TOPIC: IMPROVEMENT PRACTICES IN DESSERT FRUIT CROPS

Practices aiming at introducing, selecting or breeding of dessert crops with higher percentage of desirable traits and lower percentage of undesirable traits.

Why Improving Dessert Crops?

- **Improve on the desirable agronomic characters at the expense of undesirable ones:**
- **Production of disease- tolerant varieties:**
- **Production of crop types adapted to adverse environmental conditions:**
- **Production of crop varieties that are higher-yielding:**
- **Production of crop varieties adapted to modern cultivation technology:**
- **Production of crops with improved quality and processing characteristics:**

❖ ECONOMIC IMPORTANCE OF DESSERT FRUIT CROPS

- Reservoir of nutrients
- Industrial raw materials
- Sources of employment

- Ecological usefulness (the root and canopy check erosion thus ameliorate climate change)
- Sources of local herbs for therapy

❖ **PRINCIPLES OF CROP IMPROVEMENT**

A living cell has a nucleus inside which there are several thread-like bodies, the chromosomes. Along the chromosomes are located the unit of inheritance, the genes. It is the gene that determines the various characters of an individual.

METHODS OF IMPROVING DESSERT CROPS

Introduction.

In most parts of the world, farmers in a location only cultivate some species of particular crop that are resistant / tolerant to the prevailing infection / infestation but low-yielding. Farmers in another location may be cultivating another species of same crop which may be better in yield or quality characteristics but susceptible to the prevailing infections / infestations. Introductions of the crop's species with desired traits would bring about economic cultivation of the crop in both locations.

Selection.

This process of choosing the desired individuals for continued propagation while discouraging the propagation of unsuitable individuals is described as selection. The meiotic gamete formation and subsequent fertilization results in the production of a large number of different types of zygotes. From these pools of different individuals, the farmers make selections of individuals that will produce the best crops while discarding those that are of low productivity.

Cross-breeding.

In self-pollinated crops, natural processes will continue to produce the same type of individuals, though, the number of the offspring may be much, but the desirables among them may be few. Even, at times

under natural pollination, the number of individuals (zygotes) produced may not be sufficient for the farmer. It is therefore desirable in crop improvement to make deliberate pollinations from certain plants to others. This phenomenon is cross-breeding.

Improvement of asexually propagated dessert crops.

- Perpetuation of desirable characters.

Improvement of sexually propagated dessert crops.

- Mass selection
- Pure line selection
- Back crossing
- Hybrid breeding.

Comparison of an improved and an unimproved dessert crop varieties.

- Earliness
- Sensitivity to day length
- Plant growth habit
- Fruit location
- Disease tolerance
- Yield
- Seed coat texture
- Palatability

MANGO (*MANGIFERA INDICA*, L.)

Other Varieties Include:

M. castury

M. laurina

M. odorata

M. gebede, Miq.

Origin:

Mango is one of the oldest cultivated fruit trees. It probably originated from India or the Malaysian archipelago and its cultivation dates back a very long time. Mango has been cultivated in India for at least 4,000 years. Apparently, it was introduced into Africa around 10th century, by the Arabs, as far south as the Congo basin. The crop had been in West Africa since 16th century through the Portuguese and the Dutch.

Description

M. indica (2n=40), like other *Mangifera species* mainly present in Southwest Asia and Malaysia. It belongs to the family *Anacardiaceae*. The tree can grow up to 15-20 m and its trunk diameter can reach 1.50 m.

Vegetative growth of mango is different from that of other fruit trees and it follows a distinct pattern. Each flush is followed by a distinct period of dormancy. There are several flushes per year. Flushing in mango is irregular.

When the branches have accumulated sufficient reserves, the apical bud transforms into a flora bud. This happens only to 1-year-old shoot/flush.

The fruit is a drupe suspended on a long peduncle.

Production Regions:

Production of mango spread throughout the tropics, where it is grown for its fruit and as a shade and ornamental tree.

Environment:

Mango grows well in tropical regions with distinct dry and wet seasons. Mango produces very well within Latitude 2°N and 2°S of the equator.

The optimal temperature is between 23°C and 27°C (larger internodes and leaves are indicators of optimum temperature).

If the average annual rainfall is less than 700 mm, irrigation becomes inevitable in commercial mango production. Below this average, mango can be grown in a family orchard or backyard. Mango is resistant to strong winds because of its strong tap-root system.

Site selection:

The current status of vegetation and nearness to water source determine the cost of establishment and maintenance. It thrives in a wide variety of soils but, prefers deep, fairly light or medium soils. The pH must be between 5.5 and 7.5. Mango is sensitive to excess salts at very high concentrations.

Land preparation:

- Traces across regrown forest
- Selective felling of trees
- Cross cutting
- Packing

Field layout:

- Pegging in line with planting spacing and envisaged farming technology.
- Consideration is given to fire tracing.

Propagation:

Mango is propagated by seed (resulting in seedling) or grafting (resulting in ramets). Only the polyembryonic varieties are true-to-type (owing to the existence of nucellar embryos) and can be propagated by seeds.

Sowing:

Mango seeds (stones) are non-dormant. At the time of harvests, they are morphologically and physiologically matured.

For direct sowing on seed-bed, germination is better when the stone is hulled and the kernel extracted and sown. Sowing is done on seed-beds enriched with manure.

Grafting:

Mango is commonly propagated by side-grafting or whip and tongue grafting. The preparation of the graft is very important for its success. Many failed grafts would appear to be due to the scion's terminal bud being at the wrong developmental stage.

Planting:

The best time for planting is when the rains are steady. Plant spacing and density is influenced by-

- Climate
- Soil type and depth
- Rootstock and scion vigour
- Growth habit and ultimate tree-size
- Cultural practices like tree-size control practices, fertilizer and irrigation availability, current technology and necessity for orchard access by farm machinery.

The recommended spacing has been between 7 m x 7 m and 15 m x 15 m. High-density planting (HDP) (3 m x 2.5 m) has been tested with grafted trees.

Other plantation management operations include

- fertilizer application
- irrigation
- improvement of flowering

Harvest:

The best quality fruit is obtained at full maturity. The fruit left on the tree until this stage acquires the characteristics mango scent and flavour. Mango fruit for export must be harvested as soon as the green colour of the peel begins to turn.

Yield:

Yields of mango vary considerably. The crop is prone to the phenomenon of alternation, particularly in extensive cultivation. An average of 20 – 30 t/ha serve as a basis for productive varieties cultivation without extra irrigation, yields can range from 5 - 15t/ha.

Use:

- Mangoes rank among the best tropical fruits. They are eaten fresh, when they can be easily detached from the peduncle.
- The flesh (mesocarp) can be sliced length-wise and cross-wise. Small cubes, which detach easily on either side of the seed, are thus obtained.
- Mangoes are also of industrial purposes. Green mangoes are used in compotes and particularly for the manufacture of condiments. The ripe fruit ends up in desserts, sherbets and drinks. Freezing, unlike cooking, preserves the flavour.
- Bees are strongly attracted to the flowers. The wood is of relative importance. Various parts of the tree have several uses in popular medicine.
- As an ornamental tree near homes, mango has the disadvantage of attracting flies at fruiting time.

Marketing:

The crop's world market is growing rapidly. Mango is one of the most popular tropical fruits in Europe