

Powdery mildew (*Oidium mangiferae*)



- Occurs mainly on flowers and tender leaves
- In severe conditions, all infected leaves drop off with the flower stalks drying up
- The disease survives from season to season in dormant buds with infection being favored by cool and cloudy conditions

Control

- Apply Triadimefon 40g/20l (Bayleton 25 WP), Bupirimate 60ml/20l(Nimrod 25EC)

Fruitfly (*Bactrocera spp/Ceratitis spp*)



- Causes premature ripening, fruit dropping and rotting

Control

- Orchard sanitation by collection of fallen fruits
- Use of bio-control agents such as *Fopius arisanus* (supplied by ICIPE)
- Use fruit fly traps and pheromone traps

Mango seed weevil (*Sternochetus mangiferae*)



- Mango seed weevil is a quarantine pest
- Adult feeds on leaves, tender shoots or flower buds
- Small, white and legless grub eat through the seed with no visible signs of damage on the fruit

Control

- All fallen fruits and seeds should be removed from the orchard and destroyed by burning or burying

- Paint tree trunk with Chlorpyrifos (Dursban) at 40ml /1 L of water at onset of flowering and once monthly for three months

Harvesting

- The fruit takes about 5 months from blossoming until ripening
- The time of harvesting depends on variety and climatic conditions
- Fruit shape, size, skin and pulp color are used to determine maturity
- Harvest fruits with a 7-10cm stalk and later trim to 2-3mm length
- Avoid fruit damage during picking and packing

Yield

The first yield at the third year is about 500kg/ha increasing to an average of 15t/ha at the age of seven years

Utilization

Eaten fresh or processed to various products such as juices, jam, dried slices and mango leather



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MANGO PRODUCTION



Introduction

Mango (*Mangifera indica* L.) belongs to the family Anacardiaceae and is native to India from where it spread to other parts of the world. Climatic factors that have a great influence on production are temperature, rainfall and humidity. A dry period at the time of flowering and sufficient heat during the time of fruit ripening are important considerations for production. In Kenya it is grown in the drier areas of the coastal lowlands and mid-altitude areas. Varieties commonly grown at low altitude (0-700m a.s.l.) included Dodo, Ngowe, Boribo, Batawi and Apple. Improved varieties for medium altitude areas (around 1500m a.s.l.) include: Tommy Atkins, Kent, Haden, Van Dyke and Sensation. These varieties yield higher and have better fruit quality than the older ones. Mango is an important cash crop especially for small-scale growers. It is an important source of vitamins, minerals, energy and fiber. Production has been on the rise due to increased demand from the fresh market and processing industry. However, pest and disease damage are challenges to fruit yield and quality. Other constraints include inadequate quality planting material and high post-harvest losses. This brochure discusses recommended mango production practices.

Varieties

The most common varieties include Tommy Atkins, Kent, Haden, Van Dyke, Sensation, Ngowe, Boribo and Apple. They differ in maturity period, fruit shape, size, appearance and internal characteristics.

Van Dyke



A mid-season red fruit with scanty fibre

Tommy Atkins



An early-season red fruit with very sweet and fibreless flesh

Haden



An early-season red or yellow fruit with medium texture flesh and scanty fiber.

Boribo



Large oblong fruit, yellow-apricot when ripe and with a deep orange, good quality flesh which is virtually free of fibre.

Apple



The fruits are medium to large, nearly round in shape and have a rich yellow/orange to red colour when ripe. The juicy yellow flesh is of excellent flavour free from fibre.

Ngowe



The cultivar is also known as Lamu mango. The fruit is large and long with excellent flesh quality and is fibre-free. The colour is deep yellow when ripe.

Climatic and Soil Requirements

- **Temperature:** 24-28°C is most ideal
- **Rainfall:** 500-1500mm. Irrigation is necessary where rainfall is inadequate
- **Soil types:** Light sandy loam to red clays that are deep, well drained and fertile with a pH of 5.5-7.5
- **Suitable areas:** Coast, Nyanza, Central, Rift Valley and Eastern Counties

Mango Propagation

The recommended method of mango propagation is grafting.

Rootstock production

- Healthy seeds from mangoes that are true to type are suitable for use as rootstocks. Sabre and Peach are the recommended rootstock varieties
- Prepare a seed bed of 1m width and of convenient length filled with clean sand or well composted saw dust media to a depth of 30cm
- Push the de-husked seed 2-3cm into the planting media (curved side facing downwards) at a spacing of 1cm between seeds and 10cm between the rows
- Sowing seeds can also be done directly in bio-degradable pots
- Water the seed bed/pots 2-3 times per week depending on weather conditions
- Germination starts after 7 days and transplanting from seed-bed is done after 3-4 weeks

Transplanting

- Prepare transplanting media by mixing 10 parts of virgin forest soil, 3 parts well decomposed manure and 1-3 parts of clean river sand depending on soil texture, then add 300g phosphate fertilizer and mix thoroughly
- Fill perforated bio-degradable bags of 15cm by 25cm with the mixture
- Transplant rootstock seedlings from the nursery into the bags with cotyledon intact and place under shade
- Graft when rootstock seedlings attain pencil thickness at 20-25cm above the soil

Grafting

- This involves joining mango rootstock and a scion
- The rootstock is used as the new root system while the scion is the variety the grower wants to produce
- The scion should be from a healthy young wood (6-12 months old) that is just breaking from dormancy with 3-4 bud eyes
- Cut off the top part of the rootstock at 20-25cm above the soil and make a split of about 3cm
- Make a wedge on the scion and insert it into the rootstock and tie the union tightly with grafting tape
- Water the seedlings regularly avoiding the union part
- Seedlings are ready for transplanting into the field after 3-4 weeks

Orchard Establishment

- Clear the selected planting field of all tree stumps and root systems
- Dig holes (60 x 60 x 60cm spaced at 8 x 8m to 13 x 13m depending on variety) during the dry season, 1-2 months before transplanting
- Separate top and sub-soil
- Mix top soil with about 20kg of well decomposed manure and 120g of DAP or TSP and fill back into the hole
- Place the seedling in the hole, pressing the soil firmly around the base of the stem up to the level as was in the planting bag
- Mulch around the tree to conserve moisture and smother weeds
- Top dress with 150g of CAN at the beginning of each rainy season until the third year when the rate is adjusted
- Site specific nutrient requirement is guided by soil and leaf-tissue analysis

Pruning

- Formative pruning is required to shape the frame of the tree
- Cut main shoot at 1m height
- Remove weak branches and retain those that arise at a wide angle to make a strong framework
- Subsequent pruning is done to remove dead wood and overcrowding branches at the center of the tree

Fruit bearing

- Grafted mangoes start bearing about 3 years after planting (even at bud opening but should be let to bear after 3yrs)
- Remove any flowers produced before this period

Diseases and Pests

Anthracnose (*Colletotrichum gloeosporioides*)

- The disease appears as small black spots seen on fruits, flowers and leaves
- The disease causes excessive flower and fruit drop

Control

- Remove dead branches and twigs and burn to reduce disease reservoirs
- Store fruits at 10-12°C
- Apply Rodazim SC (Carbendazim 500SC) 40g/20l (insert the rates)