

MANGO CULTIVATION IN KENYA

by

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Common name: Mango

Scientific name: *Mangifera indica* L.

INTRODUCTION

Mango is an important cash crop in Kenya. It is produced for both local and export markets. Kenya exports mature mango fruits to the EU and the middle East countries and both mature and immature to the United Kingdom, the latter for chutney-making. Mango can be eaten fresh or processed into various products such as juices, dried fruit, chutney, pickled and jam. The fruit is an important source of vitamin A, fair in vitamin B and varying quantities of vitamin C. It also contains protein (0.5 %) and sugar (15 %).

CLIMATIC AND SOIL REQUIREMENT

Along the Coastal region of Kenya, mango undergo two main growth flushes, one in May to June and another November to December each year. However, in medium altitude areas (800-1600m a.s.l), the main growth flush occurs in May to June after the long rains. These growth flushes are followed by flowering about 3 months later.

Altitude and rainfall

Because mangoes are deep rooted, they are very tolerant to drought. Mangoes require water at flowering and fruit set to produce high yields. If mangoes are planted in a dry location, they should be irrigated continuously until the fruit is harvested and then the irrigation interval can be reduced. Temperatures of 24 – 30 °C is favourable for flowering. Pollen viability decrease at 35 °C. Mango does well at elevations from sea level (0 m a.s.l) to medium altitude (1600 m a.s.l). The optimum growth temperature is 25^o C. Mango can grow well in areas which receive rainfall as low as 650 mm per annum. However there should be a marked season with dry weather for flowering and fruiting.

Soil

Mango thrives well on a wide variety of soils, provided they are not too water logged, too alkaline or too shallow. A pH of 5.5 – 7.5 is preferred. Deep well drained, loam or clay is good.

Fertilization: Both Organic and inorganic fertilizers perform well. Mango require a constant supply of nitrogen. More fertilizer should be applied if mangoes are planted in sandy soil.

N.B. *Soil analysis to determine the type and rate of fertilizer to be applied must be done before any fertilizer use recommendation. Quantity of manure and fertilizer application is dependent on the fertility status of soil and age of the plant*

VARIETIES

There are two principal types of mangos: Indian and Indochinese. Varieties of the Indian type typically have monoembryonic (single embryo) seeds, highly coloured fruit and are subject to anthracnose disease. Those of the Indochinese type have polyembryonic seeds (multiple embryos) and fruit usually lack in coloration, but they may

have some resistance to anthracnose. There are some varieties, however, that do not fit clearly into either group.

Mango varieties grown in Kenya have for several years been classified into areas they thrive best.

Low altitude(0-800m a.s.l) commercial cultivars

	Variety	Description
1	Ngowe	The fruit is large and long with excellent flesh quality and fibre free. The colour is deep yellow
2	Boribo	Fruit is long and large but not as slender as Ngowe. The flesh is deep orange-red and fibre free.
3	Apple	Fruit is round in shape and ripen to a rich yellow orange to red colour. Excellent flavour.
4	Batawi	The fruit is very large, round and has a rich olive- green to purple maroon colour. The flesh has good texture, little fibre and good flavour.

Mid altitude (800-1600 ma.s.l) commercial cultivars

	Variety	Description
1	Haden	Tree spreading, fruit large and ovate. When mature the fruit is yellowish and almost covered with red. It has mild flavour and little fibre
2	Tommy Atkins	Tree full and dense, fruit is medium to large (500g) with thick skin, and turns purplish when mature
3	Kent	Tree spreading, fruit large and ovate (500-600g). Fruit is greenish yellow with red shoulder and fibreless
4	Vandyke	Tree upright. Fruit is relatively smaller with deep pinkish colour. The fresh is smooth and fibreless

Orchard Establishment

About 6 weeks before transplanting the taproot should be cut back to about 12 in (30 cm). This encourages feeder-root development in the field.

Dig holes 60 x 60 x 60 cm at a spacing ranging from 9 x 9 m to 13 x 13 m depending on growth characteristic of the individual variety and the type of soil. Closer spacing of 6 X 4 m or 5 X 5 m could be used however alternate plants should be removed when over crowding start to set in. Mix one debe (15 kg) of well decomposed manure and 120 g of DAP with top soil and return this to the hole. Plant the young tree into the hole and then press the soil around the stem firmly. Irrigation is necessary in absence of adequate rainfall for proper establishment of the young trees. Mulching around the tree is recommended to smother weeds and to conserve moisture.

Trees should be top-dressed with 250g of CAN per tree at the beginning of each rainy season after the trees attain a height of 1 m. However, the rate may vary depending on the soil fertility status. In the early years mangoes require high levels of nitrogen but after they begin to bear, the fertilizer should be higher in phosphate and potash.

NB: For site specific fertilizer recommendations soil analysis is recommended before planting. This service is available at National Agricultural Research Laboratories.

Orchard Management

Pruning

Mango trees are pruned to increase light penetration to the canopy so as to encourage flower bud formation and hence yield. They are also pruned to stimulate new growth, promote uniform annual bearing, and to control size during the dormant season.

Formative pruning is done by cutting the main shoot at 1m high. Three or four horizontal shoots which arise at wide angle to make a strong frame of the tree. Subsequent pruning is done to remove dead wood and to open the canopy.

Flower inducement

1. Potassium nitrate is sprayed at a rate of 2-3 kg/ha when the plants are dormant .
2. Plants are deprived water for a period of 1-2 months to induce stress and then irrigated regularly.
3. Ringing the branches or root pruning.

Crop Protection

Pests

Mango fruitfly (*Ceratitis spp*)

Symptoms

Causes premature ripening on the fruit. The flesh under the skin in the oviposition site becomes liquid due to secondary infections. Widespread fruit dropping is a common characteristic.

Control

Collect all fallen fruits, put them in a drum of water with one inch of oil for two weeks. Spray trees with either Lebaycid, Malathion, Dipterex or Dimethoate. Control is enhanced if the insecticide is mixed with an attract such as buminal, sugar or molasses.

Mango seed weevil (*Sternochetus (Cryptorhynchus) mangiferae*)

Symptoms

- Partly eaten embryos inside the husk of the seed.
- Small, white and legless grubs can be seen inside the husk. There are no outside signs of damage on the fruits.

Control

- Remove all fallen fruits and seeds from the field or market places and destroy them by either burning or burying.
- Spray biweekly with Malathion, Dimethoate, simicidin or Marshal until the fruits are about inch in diameter.
- Paint the trunk with white wash mixed with Dursban or Malathion during flowering to prevent the adult from climbing up the tree from their hibernation sites.

Gall midges

The adult oviposits on tender leaves. These are characterised by occurrence of numerous "pimples" on the upper surface of the leaves. As the leaves develop, the "pimples" become necrotic and the leaves may drop.

Control

Apply either Hostathion, Dimethoate, Diazinon, Lebaycid, Malathion, Dipterex or Folimat as soon as new shoots and leaves appear.

Scale Insects

A number of scale insects (both armoured and soft scales) e.g. Mango scale (*Aulacaspis tubercularis*) Newstead attack the mango. The feeding sites are either the fruits, leaves or both depending on the population density. In most cases, these are minor problems but occasionally lower the fruit quality and may warrant control.

Control

Apply either Hostathion Malathion, Diazinon or Dimethoate mixed with white mineral oil. The concentration of the latter should not exceed 2 % i.e. 400 ml in 20 litres of water. Higher concentrations are phytotoxic. Avoid application

of white mineral oil during the very hot periods of the day. Scales are also effectively controlled by use of D-C Tron Plus (Caltex oil) which acts by suffocating the pests

Diseases:

Anthracnose

This disease is caused by the fungus *Colletotricum gloeosporioides perr.* The principal source of infection is old infected twigs, on which the fungal spores are produced in abundance during damp weather.

Spores are principally splash dispersal. Thus rainy weather during blooming and early fruit set is particularly important in disease development.

Symptoms

The disease attacks all parts of the tree and is especially severe on flowers, young fruits and leaves.

It appears as small black spots on stems, leaves and flower stalks. On flowers and flower stalks, the infection spreads quickly and causes death of individual flowers or often the entire flower stalk. This causes flower abortion and reduces fruit set.

Young fruits are susceptible until they are about half developed. The affected skin areas are usually cracked and slightly depressed. The disease is particularly noticeable on poorly. The importance of this disease is particularly post harvest as on mature fruits the black spots enlarge and a black rot penetrates the flesh. Although the fruit is still edible, it looks unattractive and has reduced market value.

Control

Cultural

Prune dead branches and twigs to reduce disease reservoirs
Where feasible, fruits should be stored cool (10-12°C).

Chemical

The disease can be controlled by foliar sprays of copper based fungicides

Powdery mildew

This disease is caused by the fungus *oidium mangiferae Breth.* Spores are disposed by wind from neighbouring early infected trees and survive from season to season in dormant buds. Infection is favoured by cool, cloudy weather, but reduced by rainfall.

Symptoms

Infected flowers, flower stalks, young fruits and leaves are coated with the white, powdery growth of the fungus.

The flowers and young fruits turn brown and are shed. In severe attacks, the entire blossom panicle may be infected and the fruits fail to set.

Control

The only effective method of control is by use of foliar sprays with fungicides. Effective chemical include sulphur.

N.B. For chemical control, read the label attached to the pesticide container carefully and use the manufacturers recommended rate. This applies to all the above mentioned pest control products