Hass Avocado Farming

Comprehensive Guide For Kenya: From Planting to Marketing

Udongo Ni Mali

2018 Edition

Evans Mfani
Agribusiness Consultant at Richfarm Kenya

Contents

The Writers Forward

This guide is written to help farmers learn how to grow Avocado (especially the hass variety) for domestic and commercial purposes. It can also be used to help improve production for those who have been established orchards already.

It is a simple, easy to follow guide that provides step by step directions right from land preparation to post harvest operations. Details provided in this guide are purely based on practice and research.

This guide, despite providing information in modern intensive farming, has a bias on organic farming. It is the practice of Richfarm Kenya and the belief of the author that organic farming is not only sustainable but the ultimate solution to food security and environmental conservation.

Constant revision of the information and practices provided here will be done in subsequent publications to provide updated information. Your input, questions and suggestions will help us improve the content of this book. You can channel them through to Evans by phone on +254724698357 or email info@richfarmkenya.com. Further reading and research by the farmer is advised.

Regards,

Evans Nthiga.

Avocado Farming Guide

Introduction

A tree that has for a long time been cultivated in Africa without gaining much interest by commercial farms is now seemingly going to be the best earner in the fruit segment of the agriculture market. A rising awareness of healthy eating habits, the viability of agribusiness as a decent income generating activity and the recent giant entrants in the fruit market are some of the reasons for this change.

But most importantly, the opening up of the export market and the rise of well paying export companies that are buying directly from farmers is the fuel driving this industry: and it can only get better as avocado oil processing factories have started coming up.

By the year 2006 it had become apparent to Olivado, a New Zealand company, that the avocado supply in their country was both **uncertain** and **insufficient** to keep up with growing demand for extra virgin avocado oil within the country and internationally.

After considerable research in Australia and South America the company selected the Central Highlands of Kenya as the base for their **2nd avocado oil production plant**.

In 2007 they began a pilot project in a temporary facility near Nairobi, and within six months had sourced over **700 small-holder farmers**, and had them certified organic by Swiss organic certifier IMO.

In 2010 they built a factory in Murang'a, near Thika. With 1,350 small-holder farmers now certified organic and supplying them with avocados, they had a capacity in Kenya of **900MT of organic extra virgin avocado oil** per year.

Today, hass avocado farming in Murang'a County is one of the success stories and the legacy that the first governor of the county, Mwangi Wa Iria and the farmers there pride in. This can be replicated in most parts of the country since the tree, as shown later in this book, grows in a wide range of environmental conditions.

Varieties

There are many avocado varieties especially those native to Kenya. However, since this guide is focused on the agribusiness opportunity in avocado farming, we shall focus on the two varieties that are considered to be of economic value: the Hass and the Fuertes.

Hass:

The Hass avocado variety has a large fruit weighing 200 to 300 grams. The fruits are deep green with a rough skin that becomes dark purplish-black when ripe and breaks when gentle pressure is applied. When ready to serve, the fruit becomes white-green in the middle part of the inner fruit.

Hass avocado has a richer flavour, bigger size, longer shelf-life and a higher fruit yield compared to other varieties. In some areas this variety has all-year-round harvesting. This has made it the most commercially popular avocado variety worldwide. Its fruits are popular in high-end hotels due to their nutty taste resulting from the fruit's high oil content.

Fuerte

This is a hybrid of Guatemalan and Mexican cultivars with thin, smooth skinned green fruit of very good flavour. The fruit has a leathery skin that peels easily when ripe.

There are several strains of the Fuerte variety all which come in different shapes; the pear-shaped fruit is preferred in the export market. The fruits mature 5-6 months after flowering.

Fuerte trees are medium yielding, bearing small to medium fruits with high oil content. The trees are large and spreading and show significant tolerance to extreme cold and frost. Its leaves have a strong anise smell when crushed.

The fruit set of the tree Fuerte variety is irregular, as some trees never seem to have much fruit while others are productive, and it has a tendency to alternate in bearing, producing an adequate crop after every one season. Production is also significantly dependent on weather at fruit setting time, along with other factors.

Environmental requirements

Avocado farming in Kenya is done over a wide range of climatic conditions, with a 2,500m altitude above sea level being the most ideal.

Temperature

Hass Avocado grows and produces best in cool or warm areas with temperatures of between 15°C and 25°C - 7°C and a maximum of 30°C. Most varieties have little tolerance to extreme cold but generally, avocadoes produce bigger fruits in warm areas that in hot areas.

The sensitivity of trees to low temperature is influenced by a wide range of factors including:

- The age of the tree and stage of growth – young trees and those with young shoots are more adversely affected by cold.
- Growth vigour and health – plants that have vibrant growth are less affected.
- The duration and frequency of low temperature – Trees that often experience prolonged periods of cold weather develop resistance to cold.

Temperatures that are constantly above 36°C also have disastrous effects to any variety of avocados.

Rainfall

Avocado trees have significant tolerance to drought but thrive and produce most fruits in areas with well distributed rainfalls of between 1000-1600mm per year. In dry areas, irrigation can be used to meet the tree's water needs.

Too much rain during flowering leads to shedding of flowers resulting in significant reduction in production. A short period of dry weather of up to two months usually triggers flowering.

The avocado tree needs high relative humidity at flowering (70-80 per cent), then moderate levels during the fruit swelling stage. However, too much humidity encourages the proliferation of pests and diseases such as thrips, scales, cercospora spot, scab and anthracnose.

Soil

Avocado trees can grow successfully in a variety of soil types and in soil with acidic or alkaline pH levels. However, the tree grows better in deep sandy and loamy soils that are well drained. Avocados are more sensitive to water-logging than citrus hence soils should be well-drained. Poorly drained soils are associated with the presence of the Phytophthora fungi, which causes root or stem end rot.

The optimum pH is 5 to 7. Soils with high organic content support faster growth of trees and production of many and bigger fruits.

Wind

Due to the weight of the fruits and the fragile branches that carry them, strong wind easily breaks loaded branches. Hass avocados should be grown in areas with gentle wind. Wind breaker raw with closely planted trees can be used to protect an orchard in windy places.

Light

It is also important to ensure that your avocado trees get plenty of light. The trees should have at least 6 hours of full sunshine a day; avoid planting the trees in areas with too much shadow from buildings or other trees. However, it is noteworthy that intense radiation causes scorching of leaves and fruits.

Seedling Propagation

We chose to include this section because we believe that it is easy to propagate the avocado seedlings for oneself. It is also important to remember that the success or failure of an orchard largely depends on how well the propagating and growing of fruit trees has been done in the early stage.

Nursery preparation and care

The seeds to be used in propagation of new seedlings should be obtained from fruits harvested from selected tree (not picked from the ground). After removal of the fruit pulp, ensure that you plant the seeds as soon as possible in a nursery in order to avoid drying out.

At the nursery stage, infection of *Phytophthora cinnamoni* (avocado root rot) is common; to eliminate this fungus, seeds should be sunk in hot water at 50 °C for 30 minutes before planting.

Germination of the seed is hastened by removing the brown seed coats and cutting a thin slice from the apical and basal end of each seed before planting. The seed coat can be removed by wetting the seeds and allowing them to dry in the sun.

The seed should be placed in the soil with the large basal end down, just deep enough to cover the tips. The roots develop from this end.

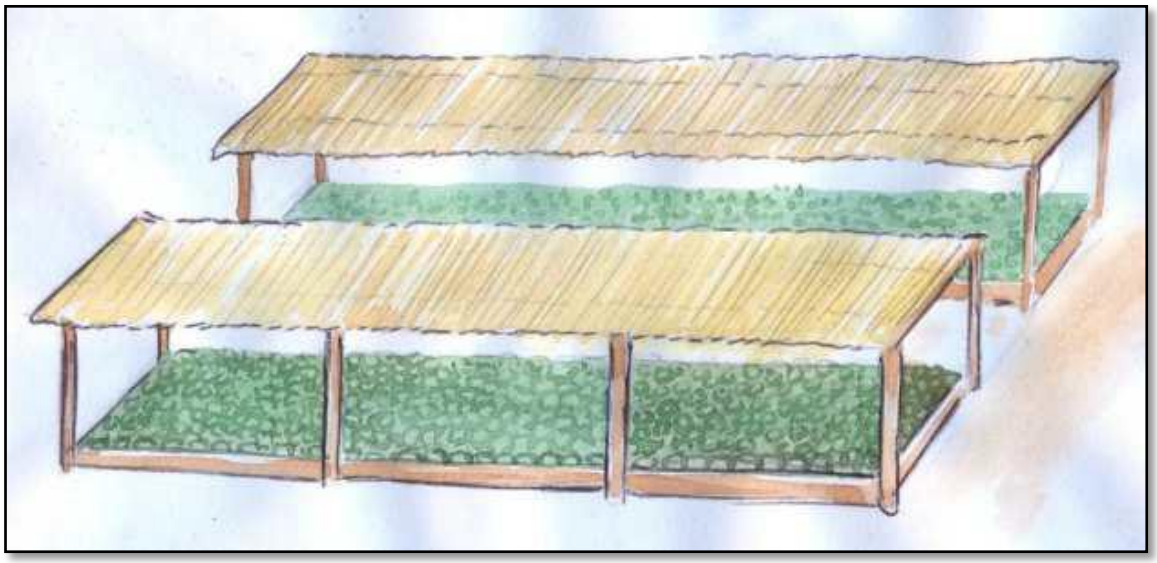
The roots and a young beautiful green shoot should develop between week 2 and week 6 after planting.

This method can be used to propagate trees with similar characteristics to the mother plant especially if the mother plant was not grafted. However, it is mostly used in propagating seedlings that are used as rootstock (the bottom plant) for grafting. The scion (the top plant) is then obtained from a mature mother plant with desired characteristics. Seedlings germinated from seeds should be ready for grafting after 5-6 months

Shade

In the nursery, seedlings are kept under **partial** shade; the best way to create this environment is by constructing a net house.

Where such nets are not available, a simple shade structure can be constructed by using poles to support a roof of wire mesh upon which a thin layer of thatching grass is spread.



The microclimate created using the shade net or the grass thatched structure protects the young avocado seedlings from sun scorching and excessive evaporation due to direct sunlight. This helps the young seedlings to harden off gradually before they get delivered for planting in the open field.

Grafting

Grafting is a horticultural technique in which parts of two different avocado plants are joined together. This method of propagation is used to obtain high quality seedlings.

In Kenya, the common practice is using local avocado varieties as the rootstock and the Hass or Fuerte as the scion. This is because local varieties are hardy, resistant and can adapt easily to various soil conditions. The farmer also gets to choose the best mother plant from which to obtain the scions.

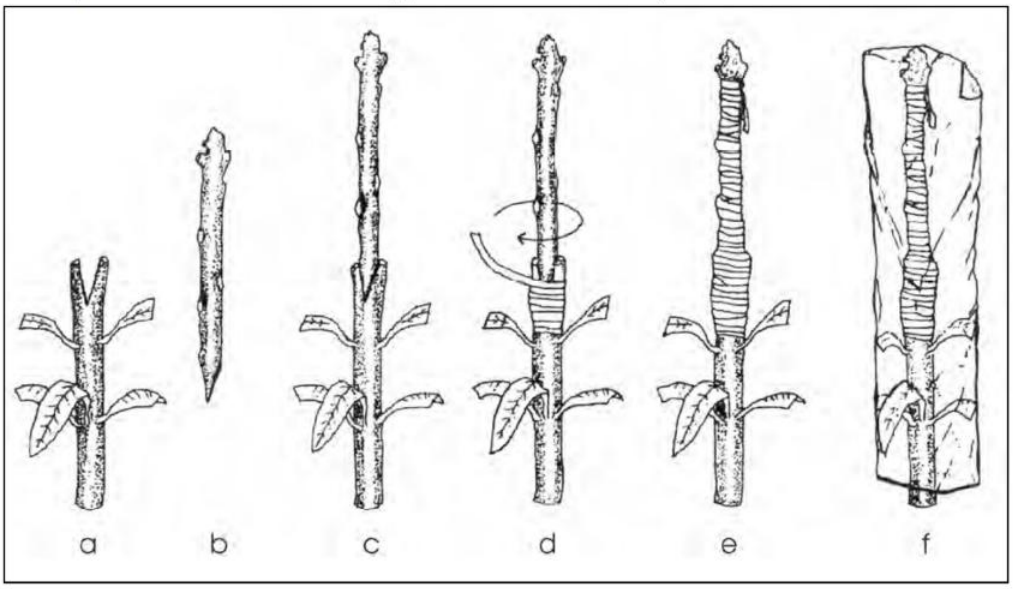
Grafting has the following main advantages:

1. It combines the quality of two plants: the rootstock material usually has disease and pest resistance, whereas the scion has better yield quantity and quality.
2. Grafting is the only simple way (apart from tissue culture) to obtain a plant with the desired characteristics of the mother plant. If propagation is carried out by seeds there is no guarantee that the desired characteristics will appear in the offspring.
3. When grafting is successful, the quality of the plants from which the scion is taken is enhanced by the vigour of the plant which serves as the rootstock.
4. With grafting, it is possible to obtain the scion (top part) from a mature plant, a technique which greatly shortens the maturity period of the resultant seedling. Such trees will fruit even in the second year.
5. Grafting can also be done to induce dwarfing. Most apple trees in modern orchards are grafted on to dwarf or semi-dwarf trees. This enables the trees to be planted at high density. As a result, the orchards have more fruit yield per unit of land, higher quality fruit, and reduce the danger of accidents by harvest crews working on ladders.

There are many grafting techniques (check our e-book ***Grafting Techniques for Fruit Trees***) but in this book, we shall discuss the cleft grafting technique which is the most effective for grafting avocados.

This technique is used to graft tree seedlings that are between 0.6cm and 1.2cm in diameter. The scion is made by cutting a long, gradually tapering wedge on the lower side of the selected shoot. This shoot should be young (just about a year).

The rootstock is prepared by cutting off the top part at about 20-30cm above the ground. A deep even split is then made long enough just to fit the wedge end of the scion. The scion is the carefully placed so that its cambium layer matches that of the rootstock.



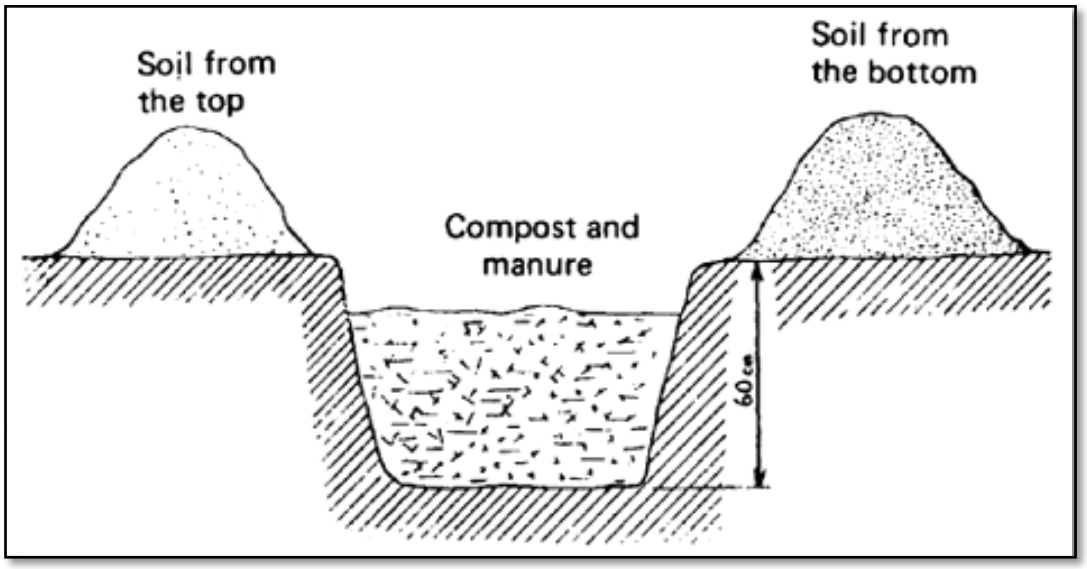
The grafted area is then wrapped using a stretchy rubber and covered to protect it from infections. The grafting should heal in about 3 weeks by which time new shoots would have emerged on the scion indicating that the grafting was successful.

Orchard Establishment and Care

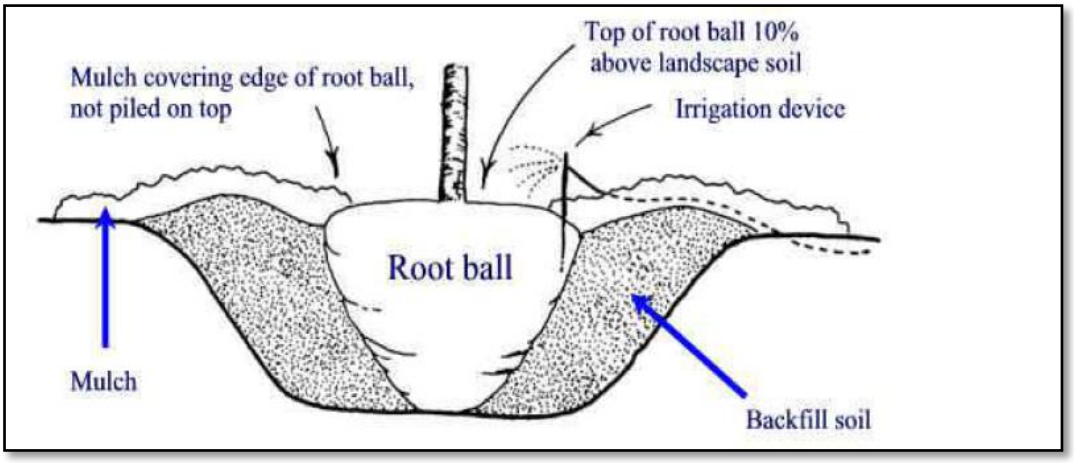
Unlike for other small crops, the most important bit in preparing an avocado field is making of the hole as opposed to ploughing and harrowing. However, ploughing or the use of herbicide to clear the planting field is necessary to keep it clean and free from pests.

Holes preparation and spacing

Prior to planting, a hole should be made such that it is 60cm x 60cm x 60cm in width, length and depth. The top soil should be placed in one pile and subsoil in a different one. The holes should be 5x5 metres apart.



The hole should then be refilled with a mixture of 50 % top soil and 50 % of well-rotten manure, compost or other decomposed organic matter. In case you are not using drip irrigation, be sure to leave sufficient space for watering using a horse pipe.



If this planting method is followed well, fertilizer application can be avoided during the first year of plant growth. If there is sufficient time, the hole should be allowed to settle for two-three weeks before planting for better results.

Transplanting

During transplanting you must ensure that you have removed the seedling bag (usually the black polythene bag) so that the roots can develop faster into the soil. However, if you are using the biodegradable seeding bags, you will not need to remove it.

Soil in the prepared hole is then removed to create room for the root ball. The plants are set into the holes and covered to the same depth that they were growing in the container.

If the soil has been well-prepared and is still loose at planting, big planting holes are unnecessary: simply mix the top soil around the planting area with manure or compost and drill a hole enough to accommodate the root ball.

A well-prepared orchard does not require extra fertiliser in the holes. Periodic addition of manure or compost is all that will be needed.

> **Please note that the addition of fresh manure, especially poultry manure, could be dangerous for the young tree since the roots could be easily burned. Avocado trees should be planted to the same depth as they were in the planting bag.**

Collar rot develops if the trees are planted too deep, while roots are burnt by the sun if the tree is planted too shallow. The trees should preferably be planted in a slightly raised position so that water cannot collect in the basin around the stem.

Tillage, weed control and cover crops

During the early years of an orchard it is desirable to plant a cover crop to protect and maintain the soil until the trees can cover it with shade. Such a crop must not, however, compete with the trees for nutrients and must be restricted to the space between the avocado rows.

The drip area of the tree must be free of grass and other weeds. If possible, this area should be covered with organic mulch. You can use plastic mulches for young trees, but irrigation management must then be very accurate so that the trees are not over-irrigated.

It is not proper to remove weeds around the trees by tilling, especially when the trees are young. This would most likely damage the shallow roots thereby adversely affecting the growth and production of the tree.

Fertilisation

You must be very careful when applying fertilizers to young trees since their roots could easily be burnt.

We recommend that you apply fertilizer three times in the first year giving each tree about 50 g of a mixture of urea and DAP. In the second year, double the doses. If your orchard is rain-fed, ensure that the application of fertilizers is done during the rainy season.

In the subsequent year, continue to apply fertilizers especially before flowering and during fruiting.

Remember, as we stated earlier, if you follow a proper application of animal or compost manure, there will be no need to use artificial fertilizers.

Irrigation

Young trees must be watered immediately after transplanting. Regular irrigation of young trees is also important to ensure uniform stands. Although over-irrigation is definitely harmful, too little water can also cause damage.

Symptoms of over- and under-irrigation are virtually identical. Unfortunately, there is no set amount of water needed per plant since the water requirements vary from place to place depending on the soil type, humidity of the area and the solar intensity. Therefore, regular examination of soil moisture in the subsoil is the only way to prevent over-irrigation.

Avocados are sensitive to moisture stress. In addition, in the nursery the trees would have been accustomed to regular water applications, which should continue in the field.

Pests and Disease Management

Pests

Fruit flies

Various species of fruit flies attack avocados. Some lay eggs under the skin of the fruit that is just beginning to ripen, but others attack young and old fruit. When the fruit reaches about the size of a golf ball a sting lesion appears as a slight puncture mark surrounded by a white exudate. As the fruit develops the lesion becomes dry and turns into distinct star-shaped crack on the skin surface.

Spray PENTAGON 50EC 10ml/20l or LEXUS 247SC 8ml/20l or PRESENTO 200SP 5g/20l

False coddling moth

After emerging from the egg, the young caterpillar tunnels into the fruit and a discoloration appears at the point of entrance. While inside they feed on the pulp, causing premature ripening and fruit drop.

Spray KINGCODE ELITE 50EC 10ml/20l or LEGACY 50EC 15ml/20l or SINOPHATE 750SP 20g/20l

Thrips

These are small, slender insects with two pairs of fringed wings which feed by sucking the plant sap.

They cause damage to the leaves and fruit and the affected parts become whitish or silvery and are usually covered by dark-coloured droppings.

Attacked fruits develop a leathery brown skin and feeding is most common on young fruits.

Spray ALONZE 50EC 5ml/20l or PROFILE 440EC 30ml/20l or DEFENDER 25EC 40ml/20l

Scales

These are small, stationary brown greenish insects commonly found sucking sap from avocado leaves.

The soft scales excrete large amounts of honeydew, which lead to the development of sooty mold on leaves, branches and fruit. The honeydew also attracts ants. Armored scales may encrust young twigs, leaves and fruit and do not produce honeydew.

Damage can be serious on young tress and small twigs may be killed. Although the presence of scales on the skin of fruit does not cause internal damage, it may lead to rejection of fruit, especially if grown for export.

Spray LOYALTY 700WDG 5g/20l or EMERALD 200SL 10ml/20l or LEXUS 247SC 8ml/20l

Use JAMBO CLEAN 100ml/20l to clean the sooty mold.

Spider mites

Attack by **spider mites** produces circular necrotic spots covered by dense webbing. As mite populations increase, feeding causes leaf distortion and eventual drop.

The growth of young trees is seriously affected and yields can be reduced significantly.

Spray ALONZE 50EC 5ml/20l or BAZOOKA 18EC 10ml/20l

Bugs

The adults and nymphs of the *coconut bug* feed on young and mature avocado fruit. Bug feeding causes necrotic bruise-like depressions. A hard lump develops, which can be easily removed when the fruit is peeled.

Helopeltis ***bugs*** prefer to feed on young plant tissue piercing the shoots, stems, leaves peduncles, petioles and fruits. Their feeding causes brown necrotic patches. Attacked leaves present angular lesion, which often drop out leaving holes as it attacked by biting insects. Feeding on young shoots causes dieback of the shoots, while on fruits, it causes a dark water-soaked mark around the feeding puncture, turning into a lesion with a light brown centre and black edge. The fruit may exude sap that forms a whitish deposit as it dries.

Stink bugs emit a characteristic unpleasant odour when disturbed and they usually feed on the developing fruit. The feeding punctures cause local necrosis resulting in fruit spotting, and deformation.

Spray LOYALTY 700WDG 5g/20l or EMERALD 200SL 10ml/20l or LEXUS 247SC 8ml/20l

Swarming leaf beetles

Swarms of this insect can cause severe damage to the new terminal growth. Damaged terminals have a burnt look and development in young trees can be severely retarded. Occasionally developing fruits are attacked.

Spray KINGCODE ELITE 50EC 10ml/20l or SINOPHATE 750SP 20g/20l or LEXUS 247SC 8ml/20l

Diseases

Avocado root rot (*Phytophthora cinnamomi*)

This disease can attack trees of any size and age. Leaves of infected trees are small, usually pale or yellow green, often wilted and fall prematurely giving the tree sparse appearance.

In advanced stages of the disease, branches die-back and fruit remains small and crop yield is drastically reduced. Feeder roots get blackened, decayed and die. The infected tree dies prematurely.

Drench soil with GEARLOCK TURBO 250WP 50g/20l or PYRAMID 700WP 100g/20l or CHANCETYL ELITE 800WDG 100g/20l

Anthracnose (*Colletotrichum gloeosporioides*)

This is a major post-harvest problem when fruit is at maturity stage. Infection takes place when fruit is still very young and the fungus stays dormant till the fruit ripens. The disease appears as sunken spots on the fruit and the spots are manifested as a rot, which can penetrate deep into the flesh. In wet weather, the spots may be covered with mass of slimy, salmon pink fungal spore mass.

The disease may develop very rapidly in storage if conditions are humid and warm.

Spray RANSOM 600WP 15g/20l or DUCASSE 250EC20ml/20l or EXEMPO CURVE 250SC 15ml/20l

Scab (*Sphaceloma perseae*)

The fungus readily infects young, succulent tissues of leaves, twigs and fruits.

Lesions appear as small dark spots, slightly raised, oval to elongate. These spots coalesce, giving a corky appearance to the surface of the fruits, impairing the appearance but not the internal quality of the fruit.

Fruits are only susceptible when young until about half size development.

Spray DUCASSE 250EC 2oml/20l or RANSOM 600WP 15g/20l or ABSOLUTE 375SC 10ml/20l

Cercospora leaf & fruit spot (*Pseudocercospora purpurea*)

This disease is primarily a problem to quality of fruits and the severity of infection varies from season to season and can cause significant losses.

On infection, lesions appear as small light-yellow spots on fruits and leaves, and later become reddish brown and eventually become hard and crack.

On leaves, the infected tissue becomes thin and brittle, and often drops out, leaving a ragged hole.

Spray EXEMPO CURVE 250SC 15ml/20l or RANSOM 600WP 5g/20l or DUCASSE 250EC 20ml/20l

Bacterial soft rot (*Erwinia carotovora*)

Infected fruit has a darkened metallic sheen externally. Internally, the flesh is grey to black and soft with a putrid smell.

Spray Copper-based fungicides like GREENCOP 500WP 50g/20l or TRINITY GOLD 425WP 50g/20l or COLONIZER 440wp 50g/20l

Stem end rot (*Dothiorella dominicana*, *Phomopsis* spp., *Botryodiplodia theobromae* & *Lasiodiplodia theobromae*)

A dark brown to black rot begins at the stem end as a dark brown ring and the rot proceeds towards the other end. This rot produces dark streaking of the water-conducting tissues, and this symptom distinguishes stem end rot from anthracnose.

Spray RANSOM 600WP 15g/20l or EXEMPO CURVE 250SC 15ml/20l or ABSOLUTE 375SC 10ml/20l

Nutrition

To obtain good growth and high fruit yields, it is important to supply the plants with necessary nutrients.

Basal and foliar fertilizers should be applied.

Basal fertilizers are absorbed by the plants through the roots and include DAP, CAN, NPK, UREA, among others. Farmyard manure could also be added, depending on the organic matter of the soil.

Foliar fertilizers are absorbed by the plants through the foliage and they supply both macro and micro nutrient elements. They include OPTIMIZER, DIMIPHITE, ZINC GOLD, LAVENDER, GATIT SERIES, VITABOR GOLD, among others.

Application of these fertilizers prevents nutritional deficiencies.

NOTE

- Whenever doing foliar sprays, it is advisable to mix the product (insecticide, fungicide, foliar fertilizer or herbicide) with INTEGRA 3ml/20l. This is a sticker, spreader, wetter and penetrant, which improves the efficacy of the respective product.
- Alternation of various chemicals (especially fungicides and insecticides) throughout a crop's season help in preventing resistance build-up by the pest, which could happen if only a single chemical was used.
- Timely application of products (fertilizers, insecticides, fungicides & herbicides) is very crucial.
- All basal fertilizers and manure should be mixed with HUMIPOWER, which adds organic matter, improves nutrient uptake, stimulates beneficial microbial activities and promotes electrochemical balance, among other benefits.

Maturity, Harvesting and Postharvest Handling

Grafted avocados will start flowering and fruiting in the second year. The fruits are ready for harvesting at 5-10 months after flowering. This depends on the variety and the ecological conditions of the region. In warmer areas, fruits mature faster.

It may not be easy to tell when the fruits are ready for harvesting unless they are of the varieties that change colour at maturity. For instance; dark-colour varieties are usually mature when they start to turn from green to dark colour, while green-colour varieties become smoother, may develop corky spots, and a yellow tint to skin and stem.

Clippers are used to harvest low hanging fruits and for those higher up, a long handled picking pole with a sharp "V" on the metal rim is used to cut the stem and a strong cloth bag to catch the fruit.

However, in commercial orchards, you can choose to prune the canopy in order to maintain the trees at a low height from which fruits can be handpicked. When this is done, a high density cropping should be done to ensure a high fruit yield per unit area.

Avocados do not ripen while they are still attached to the tree. If allowed to remain too long on the tree, the fruits may be blown down by wind and they will be bruised or broken by the fall.

Immature fruits do not ripen but become rubbery, shrivelled and discoloured. If picked when fully grown and firm, avocados ripen in 4-5 weeks at room temperature.

A ripe avocado fruit yields to a light pressure when gently squeezed and can be stored in the refrigerator for two to three days. Avocados are easily bruised or scratched and must be handled with care and are packed and padded in single or double-layer boxes or cartons for shipment.

Avocados ship well and are exported under refrigeration in surface vessels. The fruits are subject to chilling injury (dark-brown or gray discoloration of the mesocarp) in refrigerated storage and degree of susceptibility varies with the variety and stage at harvesting and length of time in storage. Most commercial varieties can be held safely at temperatures between 4-13ºC for at least two weeks. The best ripening temperature after removal from storage is 15ºC.

Marketing

With the opening of the export market for avocado, the prices for this fruit have gone up even in the local markets. While in the past a fruit sold for as little as Ksh.3, the current prices are at least Ksh.10 in the local markets.

The exporting companies are hungry for the fruits and are offering lucrative prices which has led to an increase in demand against diminishing supply. Kakuzi, the largest buyer and exporter of the Hass and Fuerte varieties of avocado in Kenya announced in its annual Avocado Small Holders Field Day in 2017 that it will be buying Hass Avocado fruits at between Ksh19 and 35 per piece depending on size.

Without a doubt, the best deals are offered by established exporters. Below is a list of exporters that you can successfully work with to get your avocadoes into the export market and enjoy lucrative prices and bonuses:

1. Kakuzi LTD, +254 722 205895 / +254 733 400026 / +254 722 205896 sodhiambo@lintonpark.co.ke
2. Selina Wamucii Fresh exporters, Serengeti Drive, Off Magadi Road, P.O. BOX 35037 – 00100 – Nairobi.
3. Sunripe LTD, P.O.Box: 41852 - 00100 Nairobi, Kenya. +254 722 822 151 / 733 600 212 info@sunripe.co.ke www.sunripe.co.ke
4. Homefresh Horticulture Export Ltd, P.O.Box 49804-00100 Nairobi, Kenya. Tel: +254 2 821074/76 Mobile: +254 723246133/ 724543549/ 704594749
5. Kenya Fresh Produce Exporters Limited, Adjacent to Mobil Plaza, Old North-Airport Road, Embakasi Nairobi, Kenya. Email: info@kenyafresh.co.ke Phone: +254 716 381 413

Important contacts:

1. Evans Nthiga, 0724698357 – Supplier of seedlings
2. Pius Rioba 0724076390 – Agronomist and consultant
3. Jane Lyomu 0735847672 – Agro-vet and plant protection specialist.

Other guides in this series

1. The Guide to Grapes Production in Kenya
2. The Strawberry Production Guide For Kenya
3. Passion Fruit Production Guide For Kenya
4. The Ultimate Pawpaw Production Guide
5. Garlic farming guide for Kenya
6. Chia seeds farming guide
7. Chives farming guide
8. Kiwi Fruit farming guide