Citrus Planting Management

4 Orchard Establishment

Learner Guide

citrus academy
P.O. Box 461, Hillcrest, 3650
(031) 765-3410

citrus research international

Citrus Growers' Association OF SOUTHERN AFRICA
Grower levies working for you!

1st edition 2017

The content of this module is based on audio-visual material produced by the Citrus Academy.

Module scripting:
Mooipraatjies

Narrator:
Mariëtta Kruger

Audio-visual production:
Media World

Additional information sources:
Citrus Production Guidelines: Volume I – Citriculture: Establishment, *Citrus Research International*
Cultivar Fact Sheet, *Citrus Research International*
Citrus Academy production learning material:
- Enterprise Selection and Establishment
- Orchard Establishment
- Propagation

Project coordinator:
Citrus Academy (Jacomien de Klerk)

Produced by **In collaboration with** **With the support of**

Sponsored by

Contents

Introduction **4**

Tools and Equipment **4**
Measuring Tools 4
Planting Tools 4

Soil Preparation **5**

Windbreaks **6**

Irrigation Pipes **6**

Plant Material **6**

Planting Conditions **7**
Weather Conditions 7
Soil Conditions 7

Planting Procedure **7**

Young Tree Care **8**

Conclusion **8**

Introduction

Once they have been planted, citrus trees will be producing fruit for up to thirty years, and they need to produce enough fruit of good enough quality. You get a chance to plant an orchard only once in this time, and it is worth doing well. Once the planning has been done around what will be planted, where it will be planted, and how the orchard will be laid out and orientated, we need to start preparing the orchard and get the trees into the ground.

Tools and Equipment

First of all, let's look at the tools and equipment that we will need during planting.

Measuring Tools

We will need measuring tools to peg out the orchard so that the trees will be planted in the right places. For this we will need a theodolite or dumpy level; a measuring tape; a plant line or cable; and stakes.

Theodolites and dumpy levels are used to mark out straight lines and to measure right angles. We will use it to make sure that the rows are straight and run parallel to each other.

The measuring tape is used to measure the distance between rows and between trees, and plant lines or cables are put in place to mark the position of the rows. We also sometimes use lime to mark the rows. You can make notches in the plant line or cable to show where each tree will be planted in the row, and then put stakes in where the trees will be planted.

Planting Tools

We will then need planting tools for when we plant the trees. This includes a planting board, spades, forks and a water-cart. Make sure that you have enough tools at hand and that they are in a good condition before you start planting.

Straight after planting you might also need pruning shears, biodegradable twine and stem covers. Pruning shears are used to cut away damaged or unwanted shoots straight after planting. Twine is used to fasten the tree to a stake so that it is stable. Stem covers of paper or straw are put around the lower part of the stem to prevent suckers from developing and to protect the tree from herbicides. It also helps to protect the trees from sunburn in hot areas.

Planting Preparation

Soil Preparation

Planting preparation starts with the preparation of the soil. This is normally done about three to nine months before we start planting, depending on how much moisture there is in the soil.

To prepare the soil, we need to apply physical and chemical preparation methods, so that the tree roots can develop properly. The roots need to be able to grow through the soil and take up water and nutrients from it, which is easier to do if the soil has a good physical structure. The trees can now grow quickly and well, and start bearing fruit sooner.

Most soil has some sort of chemical imbalance that we need to do something about before we plant citrus trees. When we plan for a new planting, we dig profile pits and take soil samples, which we send to the lab to be analysed.

Qualified soil scientists advise us on what we need to work into the soil when we prepare it for planting, so that those chemical imbalances don't affect the trees once they are planted.

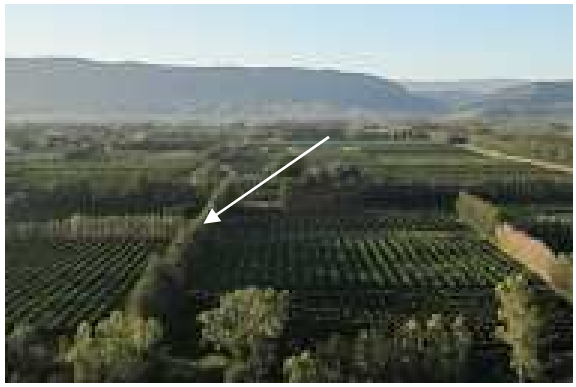
To prepare the soil, it is ripped or ploughed to a depth of between 60 and 100cm. This makes the soil deeper and helps the roots to develop well because it loosens the soil. It also assists in breaking up hard layers in the soil that might keep roots from developing, or cause water to dam up in the soil.

Sometimes we use soil from the area between the rows to make ridges on which the trees will be planted. We do this to increase the soil depth, and also allow water to drain better. Some growers even prefer to use ridges on deeper soil, because it forces tractors and other machinery to go only between rows.

We don't want tractors and machines to drive on soil above where tree roots are growing, because this compacts the soil and makes it more difficult for the roots to grow.

Once the soil has been ripped or ploughed it is important to keep tractors and trailers out of the orchard as much as possible so that the soil will not get compacted again. Tractors and trailers will be used for things like delivering trees and other supplies to the orchard once we are planting, but we need to be careful about where they drive. It is better to measure and peg out the orchard and clearly mark where the tree rows are going to be with agricultural lime. The vehicles can then stay on paths that will eventually become the areas between the rows.

Windbreaks



We now need to plant windbreak trees. These trees are planted on the borders of the orchard to protect the citrus trees against wind. Small fruit can get damaged by surrounding twigs and leaves if the orchard is exposed to wind, causing marks on the fruit that can mean that the fruit cannot be exported. Too much wind can also cause the soil to dry out faster and cause soil erosion, and it can damage the trees themselves.

Windbreaks must be planted well before the citrus trees so that they can protect the young trees from the start. The trees used for windbreaks must grow fast and be tall and strong. They should not require too much water, and they should also not be hosts to pest insects.

Irrigation Pipes

The next step is to install the irrigation system in the new orchard. Most irrigation systems have mainlines, sub-mainlines and mother-lines which bring the water to the orchard. These pipes are buried before we start planting a new orchard.

Once we have finished planting we can then immediately install the pipes and emitters by the trees.

Plant Material

As we get closer to the date when we start planting, the trees that were ordered from the nursery will be delivered to the farm. We need to be sure that the trees are healthy and strong when they arrive on the farm, and we need to look after them until they are planted.

At the nursery trees are grown in soil inside plastic bags, and this is how they will arrive at the farm.

The plants are watered well before they leave the nursery so that the soil won't dry out during transport to the farm. It is best to transport them in a closed vehicle so that they are protected from the heat and the wind, and from getting damaged.

When the trees arrive on the farm, put them in a safe place and water them. Make sure that the soil in the bags is kept moist until the trees are planted. The roots of the trees must not be allowed to dry out at any time.

Planting Conditions

It is now time to start planting the trees. Before we look at the best way to go about this, we need to think about the best conditions during planting. When the tree is moved from its bag and planted in the orchard it is a shock to the tree. It must recover from the shock before it can settle in the new soil and start growing. The more tree-friendly the conditions are when we plant, the less stress on the tree and the quicker it will settle and grow.

Weather Conditions

In terms of weather conditions, we must avoid planting in extreme temperatures. Remember that temperatures of above 39°C will damage trees, while the lowest temperature at which trees can grow is 13°C. Look to plant trees in the morning, with the temperature around the mid-twenties. Stop as soon as it gets too hot, and move the unplanted trees to a safe place where they are protected from the heat.

Rain during planting is mostly good, but if the soil becomes too wet you must stop planting and allow it to dry out a little before continuing. You don't want to plant in waterlogged soil.

Soil Conditions

The soil should also not be too hot or too cold when you plant trees in it. If the soil is too cold the tree can't absorb moisture and grow, and if the soil temperature is too high, it will dry out and cause moisture stress.

In short, when we plant the trees, the soil should be well prepared to a depth of about 60cm, well-drained, but wet enough so that the roots won't suffer moisture shock while not being so wet that clods start forming. The soil temperature should be above 20°C.

Planting Procedure

The time has now finally come to get the trees into the ground. We have our equipment at hand, the orchard has been pegged out, the irrigation supply lines have been installed, and we have made sure that the planting conditions are right.

- The first thing to do is to dig a hole for the tree just before you plant it. It is better to use a garden fork to make the hole – a spade might smear the soil on the inside of hole if it is too wet, which makes it more difficult for roots to penetrate. To know what size the hole should be, use the plastic planting bag that the tree is in as a guide. The hole should be just deep enough for the roots of the tree, but a little bit wider than the size of the planting bag. Make a little pile of soil in the bottom of the planting hole.
- Now take the tree from the bag. Shake about a quarter of the soil from the roots, so that at least a third of the roots will be in direct contact with the soil in the orchard after the tree is planted. We don't want to disturb the roots too much so that the tree is protected from transplant shock, but we do want the roots to settle into the new soil.
- If there is a knot of roots at the bottom of the plastic bag, loosen them and spread them out carefully. Place the tree on the pile of soil in the bottom of the hole and backfill the hole with soil.

- Move the tree around gently to make sure that the soil settles evenly around the roots, and to make sure that there are no air pockets around the roots. This will also help to embed the tree firmly in the soil. Gently tamp down the soil around the trunk and above the root-zone. Soil mustn't be heaped around the trunk, because this will make water run away from the root-zone.
- The base of the tree stem must be slightly above the soil surface. Ideally, you should just be able to see the place from where the first roots grow from the stem above the soil surface. We do this so that once the tree has settled, no part of the stem will be below ground level. If the stem is below ground level, there is a danger that the stem will get infected with phytophthora, which causes collar rot.
- Water the tree once it has been planted, and then tie it to a stake with twine. The stake should be about 1.5m long, and planted so that about a metre of it is above the ground. The stake will stay there for a year to help the tree grow straight. Lastly, fasten a stem cover around the bottom part of the stem.

Young Tree Care

Now that our trees are in the soil we can't just leave them alone and hope for the best. It is important that we care for these young trees. Looking after the irrigation of the trees is essential, as is making sure that pests, diseases and weeds are controlled in the young orchard. We also need to fertilise the young trees to make sure they have all the nutrients they need. It is also important to check that the stake remains in place for the first year, and that the stem protector is there to protect the tree against herbicides and to keep suckers from growing out. It will also protect the tree from the sun in hot areas. If you don't use stem protectors, you can paint the stems with whitewash, which is diluted PVA paint, to protect them against the sun.

When a tree is planted, its root volume is a lot smaller than its leaf area. It may seem strange to want to prune such a small tree, but if we do this to leave two or three well-spaced framework branches of twenty to thirty centimetres, it helps the tree to grow better. In windy areas, all the framework branches are even sometimes removed by topping the trees, so that the stem can have a chance to thicken first while the new framework branches grow. You must also remove suckers that grow below the framework branches and particularly at ground level by cutting them off with pruning shears, and never by breaking them off.

Conclusion

Planting new orchards can be a stressful process, because getting it right is so critical to the success of our farming operation. If we prepare for it properly and spend time ensuring that everything is in place before we start planting, we can take the stress out of the process, and we can give our new young trees the best chance of becoming productive, profitable members of the orchard.