Citrus Orchard Foreman Occupational Learning

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Work Scenario Guide

B6:
Planting

Qualification:	110667 – Occupational Certificate: Orchard and Vineyard Foreman
Work Scenario:	**B6: Planting**
Learning Area:	B: Lead the establishment of new citrus orchard
Scenario Description:	You need to oversee the planting of the citrus trees in your new orchard, to make sure they are planted properly, in the correct spacing, and are not damaged during the process.

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Content originator:
Citrus Academy

Occupational alignment:
Ukudla Namanzi (Pty) Ltd

Contents

Alignment Information

Qualification

The content of this learner guide is aligned to the following occupational qualification:

SAQA QUAL ID	**Qualification Title**			
110667	Occupational Certificate: Orchard and Vineyard Foreman			
Originator				
Development Quality Partner – AgriSETA				
Primary Or Delegated Quality Assurance Functionary		**NQF Sub-Framework**		
-		OQSF - Occupational Qualifications Sub-Framework		
QUALIFICATION TYPE	**FIELD**	**SUBFIELD**		
Occupational Certificate	Field 01 - Agriculture and Nature Conservation	Primary Agriculture		
Abet Band	**Minimum Credits**	**Pre-2009 NQF Level**	**NQF Level**	**Qual Class**
Undefined	147	Not Applicable	NQF Level 04	Regular-ELOAC

Modules

The content of this learner guide is aligned to the following modules of the occupational qualification above.

Module Code	Module Title	Level	Credits
Knowledge Modules			
611202-001-00-KM-01	Plant Structure and Physiology	4	5
611202-001-00-KM-02	Vineyard or Orchard Establishment	3	2
611202-001-00-KM-03	Vineyard or Orchard Manipulation Processes	3	8
611202-001-00-KM-04	Harvesting	3	4
611202-001-00-KM-05	Basic Principles of Plant Nutrition	4	4
611202-001-00-KM-06	Crop Protection	3	3
611202-001-00-KM-07	Assets in Horticultural Production	3	2
611202-001-00-KM-08	Farm Business Management and Farming Process Management	4	8
611202-001-00-KM-09	Human Resource Management and Processes	4	8
611202-001-00-KM-10	Overseeing Farming Resource Utilisation	4	8
Practical Skill Modules			
611202-001-00-PM-01	Organise, Allocate and Monitor Availability and Productive Use of Resources	4	5
611202-001-00-PM-2a	Set Team and Individual Performance Goals to Enhancing Team Performance	4	10
611202-001-00-PM-2b	Control Vineyard or Orchard Practices	4	10

611202-001-00-PM-03	Supply Accurate Daily Orchard or Vineyard and Production Information	4	10
Work Experience Modules			
611202-001-00-WM-01	Vineyard or Orchard Resource Optimisation	4	20
611202-001-00-WM-02	Skilled and Motivated Work Team Output	4	20
611202-001-00-WM-03	Daily Orchard or Vineyard and Production Information Availability	4	20

Learning Outcomes

The content of this learner guide is aligned to the following learning outcomes of the modules above.

Knowledge Topics	
Outcome Code	**Module Title**
KM-02-KT04	**Crop establishment**
IAC0403	The process of making planting holes is briefly described in terms of the specifications for a given crop
IAC0407	The correct application of crop establishment methods during the planting process is explained
KM-08-KT06	**Farm renewal strategy**
IAC0604	Methods and operations to be applied in the establishment of new orchards/vineyards are discussed
IAC0605	The aspects to be considered in the replacement of orchards/vineyards are evaluated
Practical Skills	

Chapter 1
Planting

learning outcomes

The content of this chapter is aimed at helping you to:

- Manage the planting of citrus trees.

1. Planting Conditions

Now that your land has been properly prepared for the planting, and you have the young trees from the nursery ready, you can begin to plant. Now, before we discuss the specifics of planting, we should discuss the conditions of the orchard where the planting is to take place.

Transplanting a tree from a bag or other medium into different soil (such as in the orchard) causes a 'shock' to the tree. The tree needs to recover and adapt to settle in the new growth environment. We discuss this 'root shock' in more detail later in this chapter. The more tree-friendly the conditions are under which the transplanting takes place, the less stress on the tree and the quicker it will settle and grow.

The two types of planting conditions that play an important role in post-planting tree development are weather conditions and soil conditions. We will discuss these in detail later in this chapter. Aside from the planting conditions, there are a few practices that you should implement to make the planting as successful as possible.

The main stress-limiting actions have to do with limiting the direct sunlight and heat of leaving the trees sitting in the orchard unplanted for extended periods. Therefore, you should try to plant only in the mornings, before it is too warm, and you should only transport enough trees that you can plant within half an hour to the orchard at a time. Further, the trees awaiting transport should be kept in a cool, shaded area.

2. Weather Conditions

Temperature is the single most important factor influencing the growth and production of a citrus tree after being planted, and is closely related to humidity. You need to carefully consider the effect of temperature on a newly planted tree when planning a planting. You should always avoid extreme temperatures when planting an orchard, including both hot and cold extremes.

Air temperatures above 39°C are considered damaging to the tree and it is generally believed that 13°C is the minimum temperature at which growth takes place. For this reason, planting should occur in the mornings, and should be suspended immediately if temperatures rise to unacceptable levels.

The air temperature influences the soil temperature, which plays a major part in nutrient and moisture uptake of the plant. The physical environment of the root system, including temperature, is in general far more stable than that in the canopy as it does not change as rapidly, or have such large daily or seasonal fluctuations.

The impact of rain during planting is mostly positive, except if the soil becomes saturated and water-logged. If this happens, planting should be stopped, and the soil must be allowed to dry out. Flooding soon after the establishment of an orchard can also lead to the plants being dislodged and washed away.

3. Soil Conditions

As we mentioned, soil temperature is influenced by air temperature. Planting should not start before the soil has warmed up sufficiently after winter to ensure good root growth and uptake of water and nutrients. On the other hand, temperatures that are too high should also be avoided as it could severely affect tree establishment and cause moisture stress, which can result in root shock and poor growth.

When planting, the soil should be moist enough to ensure that the roots do not suffer root shock, while being dry enough to prevent clods from forming when compacted around the roots. The soil should be well-drained, with a temperature above 20°C, and well-prepared up to a depth of at least 600mm. Finally, the soil should be at optimum pH and nutrient status.

4. Root Shock

Root shock is the result of transplanting a tree from between two growth mediums, such as when a tree is removed from its container and planted in the soil. Root shock is worsened if the tree is stressed during planting, and the more root shock can be avoided, the quicker the plant will adapt to the new growth environment.

In most instances, root shock is caused by poor moisture conditions that cause roots to dry out during the transport and pre-planting period. The feeder roots dry out first, and, in extreme cases, die back. The young plant then has to use energy to revitalise the root system, which leads to poor new root development. The resultant vegetative growth is weakened, and this can even result in the death of severely affected plants.

5. Planting

The necessary preparation for planting has now been made. You have the necessary equipment at hand, you have healthy young trees that have been well cared for, the planting area has been prepared, you have the ideal conditions for planting. The orchard can now be planted in line with the design, and with the correct tree and row spacing.

Firstly, planting holes should be dug, just prior to planting, using a garden fork or spade. It is better to use forks to make the holes, as spades may smear the insides of holes if the soil is slightly too wet, making it difficult for roots to penetrate the surrounding soil. Planting holes should be just large enough to accommodate the roots. In the case of bare-rooted trees, the planting hole is dug, to the depth of the roots, but the width of the hole should extend beyond the roots.

Next, you remove the tree from the container. If a bark medium has been used in the bag, shake about 25% of the medium from the roots to ensure that at least a third of the roots are in direct contact with the soil after planting. In this way, root disturbance will not be excessive, and the trees will not show any negative effects, such as root shock, after being transplanted into the soil. If a knot of roots has developed at the bottom of the plastic bag of container trees, you will need to spread these roots out to give the tree a larger root-zone.

Next, position the tree on a pile of soil placed in the bottom of the hole, and backfill the hole with soil. To avoid any air pockets around the roots and to keep the tree firmly embedded in the soil, gently agitate the trunk to ensure that the soil moves evenly around the roots. This will ensure that the moisture in the soil will be available to all the roots.

After backfilling, gently compact the soil by treading on the soil around the root-zone. This also ensures that the soil is not heaped around the trunk, which may cause water to run away from the root-zone.

After planting, the base of the tree stem should be slightly higher than the surrounding soil surface so that once the tree has settled no part of the stem is below ground level. Ideally,

the place where the first roots grow from the stem should just be visible above the soil surface. This reduces the possibility of infection of the stem with Phytophthora (collar rot).

To support and stabilise the tree against the wind, plant a stake of about 1.5m next to the tree with 1m of the stake extending above the ground level. Tie the tree to the stake with twine. This stake will remain in place during the first year of the development of the young tree. Finally, fasten a stem cover around the bottom part of the stem. The manner in which the stem cover is fastened will depend on the type being used.

6. Watering Newly Planted Material

Newly planted trees should be immediately watered by a water cart, after which the irrigation system should take over. In the absence of a permanent irrigation system, a basin which can hold 30 to 40 litres of water should be constructed around each tree immediately after planting.

Irrigation in the newly planted orchard must be installed immediately after the trees are planted and be operative within the same week. Irrigation must be applied directly to the root area at least once a week for the first four to six weeks.

It is important to supply water to the root-zone area without over-irrigating. With a permanent micro-irrigation system, the starter spreaders are used to supply water to the root-zone area, which is very small at this stage.

It is not advisable to wet too large an area initially, as this could lead to water-logging outside the root-zone, which will inhibit lateral root development. The starter spreaders are replaced with permanent spreaders six to eight months after planting once root development has taken place.

In the case of drip irrigation, one must ensure that the drippers deliver the water to the root-zone only in the required quantities. The volume delivered is increased as the roots grow and increase in volume.

summary

Chapter 1 – Planting

- The more favourable the conditions are under which a tree is transplanted, the more rapidly it will settle into its new environment and grow.
- Certain steps are taken to ensure that the conditions are favourable for transplanting, including planting only in the mornings, keeping trees in a cool, shady place before being transplanted, watering trees immediately after planting, and tying them to stakes for support.
- The conditions during planting that play a role in the subsequent development of the tree is the weather conditions, of which temperature is the most important, and soil conditions.
- The air temperatures must not be higher than 39°C and not lower than 13°C during planting.
- If it rains during planting, planting must be stopped if the soil becomes saturated.
- During planting, the soil should be moist but not saturated with water, above 20°C, well drained, well prepared, and at an optimal pH and nutrient level.
- Root shock is the result of the transplanting of a tree from one medium to another, and can be avoided by creating optimum growing conditions in the new growth medium.
- Planting holes are dug immediately prior to planting, the tree is removed from its container, the roots are spread if required, the trees is placed on a pile of soil at the bottom of the planting hole, and the hole is backfilled with soil.

- The tree is agitated gently to ensure that all the roots are in contact with the soil, after which the soil is compacted gently around the root-zone. The base of the tree stem must be slightly above the soil level.
- Trees are watered immediately after being planted, after which the irrigation system takes over.
- Sufficient water must be supplied to the root-zone without over-irrigating. Special micro-jets are used and the amount of water delivered by drippers is carefully controlled.

assessment activities

- ✓ **Activity P1**: Complete this activity to test your knowledge of planting.
- ✓ **Activity F1**: Complete this activity to test your knowledge of the entire module.