Citrus Orchard Foreman Occupational Learning

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

Work Scenario Guide

H2:
Weed Control

Qualification:	110667 – Occupational Certificate: Orchard and Vineyard Foreman
Work Scenario:	**H2: Weed Control**
Learning Area:	H: Maintain neat, hygienic orchards
Scenario Description:	You need to plan and oversee weed control activities, including manual weed removal, monitoring, and chemical applications.

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Content originator:
Citrus Academy

Occupational alignment:
Ukudla Namanzi (Pty) Ltd

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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

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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-06-KT01	**Principles of integrated pest and disease management**
IAC0109	Weed control methods (mechanical or chemical) are described
IAC0110	Methods of monitoring efficacy of weed control methods are outlined
IAC0111	Resistance to weed control measures are explained and methods for avoiding resistance are discussed
Practical Skills	

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Chapter 1
Weed Identification and Monitoring

learning outcomes

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

- Identify weeds.
- Describe the different types of weeds.
- Monitor and scout for weeds.

1. What is a Weed?

A weed is any plant growing out of its proper place, in an area where you do not want it to grow. In your orchards, there will often be a variety of different fruit plants growing. This is because, after fruit harvest and during juvenile period, birds rest on the trees your orchard, and defecate the seeds from other types of fruit trees that they have eaten the fruit of onto the soil. Some plants, like mulberry, grow under the canopy or near the tree trunks, which makes them difficult to uproot.

These unwanted trees become a major problem in the orchards, as their roots and shoots get intermingled with the citrus trees' roots and shoots. This makes them difficult to get rid of, since some of the root portions will usually be left in soil after removing the plant. These roots re-sprout quickly, allowing the tree to regrow into more plants.

Not all weeds in the orchard have a negative impact on production. Strange as it may sound, there are advantages and disadvantages to some weeds in the orchard, which we'll discuss below:

2. Disadvantages of Weeds

The biggest disadvantage of weeds is that they reduce the economic yield of marketable fruits by competing with your citrus trees for the water, nutrition, light, space, and air, that they need to live. Some climbing weeds can climb into your trees' canopies and block the penetration of light completely, hindering properly development.

Some weeds are extremely competitive in nature, and can suppress the growth of your trees in early years of planting by competing for natural resources, leading to slow or weakened growth, or even death in very young trees.

Weeds may also compete with our trees by intercepting soil-applied chemicals, thereby reducing their effectiveness for your trees. Weeds also affect water distribution patterns, possibly making irrigation more difficult.

Further, weeds can make it more difficult to carry out orchard operations like fertilisation, irrigation, and harvesting by blocking the paths needed. Even worse, some weeds are dangerous to human or animal lives due to being poisonous, so they can present a real threat to your workers or livestock.

Weeds can also make disease or pest management more difficult, as they may act as alternate hosts to many serious pests/ diseases, allowing them to survive control attempts. Finally, weeds can increase fire hazard by adding additional fuel for fires when they die and

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dry, and they may also increase cold damage to our trees and fruit through radiation freezes.

3. Advantages of Weeds

As we mentioned, although weeds have many disadvantages and are usually eradicated, they do have some advantages too. Firstly, a big advantage of weeds is helping to manage soil erosion. In orchards where the slope/gradient of soil is more pronounced, some grassy weeds mitigate soil erosion due to mat-type growth. These weeds can also have fine roots which help with the faster penetration of rainwater by making the soil more porous. In arid irrigated areas, wind erosion is common and can be reduced by growing the correct type of weeds.

Weeds can also help with the improvement of soil fertility. Some weeds, particularly legumes, are helpful in improving the soil nitrogen by the addition of root nodules in the soil. Further, some weeds can be used as fodder for animals and some weeds are used as food for humans.

Finally, some weeds are extremely sensitive to toxins and can be used as pollution indicators. For example, bathu (Chenopodium album) is extremely sensitive to H2S2 and SO3. Water hyacinth (Eshornia) can be used to reclaim industrial effluents; as it can absorb heavy metals such as mercury, lead, iron, copper, and tin etc.

4. Weed Types

You can only manage weeds effectively if you know which weeds you are dealing with, so proper weed identification is very important in developing an effective management program. Weed species will vary with location, climate, season, soil type, previous site history, and current and past management programs; so, it is important that you know which weeds to look for in your area.

When identifying and categorising weeds, you should pay particular attention to key features like the shape and colour of the leaves, stems, seed, seed head, plant size, root system, and especially flowers (if present).

There are three categories of weeds that should be monitored in your orchards. These three categories are broadleaves, grasses, and sedges. The basic description of the three types and examples of them are shown below:

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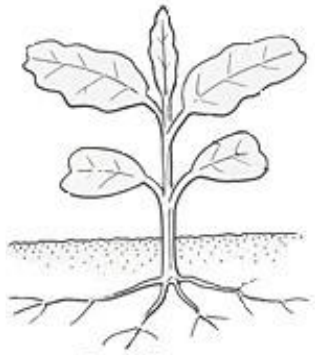
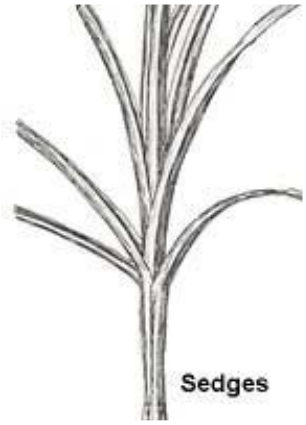
information

Types of Weeds (Leaves)

Broadleaves	Grasses	Sedges
Have leaves with net-like veins, display branching growth habits, and generally reproduce by seeds	Have narrow, strap-shaped leaves and rounded stems, are generally perennial, and reproduce by seeds and/or rhizomes or underground stems	Similar to grasses but have triangular stems. Sedges may reproduce by seeds, rhizomes, or tubers
 Broadleaves	 Grasses	 Sedges
Example: Dandelion	Example: Kweek	Example: Nut grass

Aside from three categories, weeds can be further classified as annual, biennial and perennial, based on their life cycles. The differences between the three categories are described below:

information

Types of Weeds (Lifecycle)

Annual Weeds	Biennial Weeds	Perennial Weeds
Weeds which complete their life cycle in one season and reproduce mainly through seeds.	Weeds which take two seasons to complete their life cycle. In the first season vegetative growth is completed and food is stored, in the second season flowering and seeding take place.	Weeds which take two or more seasons to complete their life cycle, and reproduce through rhizomes, stolons, root cuttings, suckers, or seeds.

5. Scouting

The cornerstone of any effective weed management programme is proper monitoring, and especially scouting. If you do not know which weeds you're dealing with, where they are, and how severe the infestation is, you cannot hope to treat them efficiently or effectively.

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You should scout for weeds in all areas in and near the orchard, including tree rows, row middles, water furrows, ditch banks, fence rows, and adjacent perimeter locations. Look for small, isolated weed patches and manage them before they spread to other areas of the orchard. Since weeds emerge all year long, schedule weed surveys throughout the year, especially a week or two after rains or soil disturbances.

You should keep scouting even if weeds are not easily visible or appear to be dead. Re-growth from perennial weeds is common, as they may appear dead but may be just temporally stunted. If you manage to identify weeds while they are still in their seedling or vegetative stage, proper control is much simpler and more effective, while being cheaper and less environmentally damaging.

The weed species present in your orchard will vary with season and location because weeds are typically not distributed uniformly, meaning that they do not spread out predictably or evenly throughout an orchard. When you are scouting for weeds, you must keep detailed records about the species, abundance, and location of any weeds you encounter.

6. Surveying and Mapping

To monitor effectively, you must first divide your farm and orchards into weed control areas. It is easiest to use natural or man-made boundaries, e.g., rivers, roads, and fences to define the area. Once you have created the areas, assign each of them a number or code for recordkeeping purposes.

Once you have created and named these areas, you must conduct a detailed weed survey. This survey must record all the weed species present, and any plant material (seeds, dead plants parts, etc.) from weeds even if the weeds aren't present currently. The survey or map should also include the surrounding terrain, such as access roads or steep slopes that will slow down weed control operations.

Next, you should estimate the percentage coverage of the weeds. For example, you may decide that 75-100% coverage is very dense, 50-75% is dense, 25-50% is medium density, 5-25% is sparse, and 0-5% describes a scattered or non-existent infestation. This will allow you to judge which areas are the most infested and need the most attention.

Based on these coverage estimates, you should divide control areas into high, medium, or low priority for control. You should base this decision on importance criteria, such as the threat to trees, weed coverage, various risk levels of different weeds, etc.

summary

Chapter 1 – Weed Identification and Monitoring

- A weed is defined as any plant growing out of its proper place, i.e., in an area where it is not wanted or desired.
- Not all weeds in the orchard though have a negative impact on production. There are advantages and disadvantages to some weeds in the orchard.
- There are three categories of weeds that should be monitored in Citrus orchards, namely broadleaves, grasses, and sedges.
- Weeds can be further classified as annual, biennial and perennial, based on their life cycles.
- Scouting is a vital part of any weed management programme.
- Weed monitoring is performed by having scouts frequently walk through orchards and record the weeds found as well as the stage at which the weeds are found.

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- To monitor effectively, you need to divide your farm into control areas and conduct a weed survey.

assessment activities

- ✓ **Activity P1**: Complete this activity to test your knowledge of weeds.

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Chapter 2
Weed Control

learning outcomes

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

- Control weeds.

1. Weed Control

As we have mentioned, weeds can have many negative effects on your citrus trees and your farm's productivity. Because of this, you must know how to properly control weeds, in a way that is safe, sustainable, and cost-effective. Integrated weed management forms part of other forms of integrated management, and is thus a part of the over-reaching Integrated Production Plan (IPP).

Trying to completely eradicate weeds is a difficult and costly proposition, so Integrated Weed Management approaches do not try to fully eradicate weeds. Instead, IWM tries to get weeds under control to a level which does not adversely affect the health of trees.

IWM programmes typically utilize a combination of control practices, each of which we will discuss in detail later in this chapter. Weed management can be an expensive part of the total citrus production program, but resources invested here can give you significant economic returns, and it is often unfortunately necessary to run a productive citrus farm at all.

Before we discuss the specifics of planning weed management practices, we should discuss the different types of weed control that form part of an integrated approach.

2. Methods of Weed Control

In the past, citrus growers used to prefer controlling weeds by ploughing the orchard with tractors. This is an easy and effective way to control weeds, but often the tools or body of the tractor would hit, bruise, or cut the citrus trees.

These tree injuries can become an entry point for diseases and pests, and may in severe cases cause the death of the citrus tree. The flow of nutrition through the trees' xylem and metabolites through the trees' phloem also gets disturbed, which leads to plant decline. Because of this, this control method is no longer recommended.

There are a few different types of weed control methods available to you, and IWM aims to combine several different types of control methods. The methods can be categorised as preventative, mechanical, biological, and chemical.

3. Preventive Methods

The best method of weed control is to prevent the weeds from growing in the first place. You can do this by controlling the entry of new weeds and weed seeds into your orchards. Firstly, when you purchase young trees from a nursery, you must ensure that the nursery and the trees are free from weeds. You must be particularly careful to check the propagation or nursery soil for weeds, as weeds can be transplanted to an orchard during planting.

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Do not use farmyard animal manure as fertiliser, as this may also contain weed seeds if the animals have eaten weeds. Further, weed seeds often get stuck in machinery and equipment, so you must ensure that machinery and equipment like tractors and trailers are clean and free of seeds.

You should also make sure that you keep water channels, paths, roads, and orchard boundaries clear of weeds. Even if they are not directly in the orchard, the seeds can spread through animals, wind, or water. By clearing those weeds before flowering takes place, you can prevent the infestation of weeds in the orchard.

4. Mechanical Methods

Mechanical methods involve hand pulling, hoeing, tillage, mowing and smothering weeds with non-living mulches. These tend to be highly effective methods of weed control, but can be demanding in terms of workers and time. If you decide to implement hand pulling or hoeing, you must be careful not to damage your trees.

After hoeing, the inter-row areas can be covered with black polythene (plastic film), which will prevent photosynthesis in the sprouting weeds and check further growth and reproduction. This polythene film will also limit the loss of moisture from plant basins and can help in moisture conservation. Ensure that any workers assigned to mechanically remove weeds are well trained in the specific types of weeds they are looking for, and are careful not to damage your trees.

5. Biological Methods

Biological control methods involve using living organisms, such as insects, pathogens, plants, and livestock. These organisms either eat the weeds (in the case of livestock or some insects), or kill the weeds through infection or competition (such as pathogens and parasite plants). These methods can be very effective and less environmentally damaging than other methods, but must be handled carefully so as to not upset the orchard ecosystem in unintended ways.

When selecting a biotic agent to control weeds, there are a few considerations. Firstly, the biotic agent should be host-specific, meaning that the agent should not attack any plant species other than those for which it is intended. You do not want to introduce an insect to control weeds and then find out that insect is eating your citrus trees.

Further, the biotic agent's introduction and multiplication should be easy. If you have to put a lot of effort and money into introducing and maintaining the biotic agent's presence, it probably is not cost-effective as a control method. The biotic agent should ideally be from an area that is climatically similar to the area where it is to be released, otherwise they may die off or leave the orchard.

Finally, the biotic agent should be of different feeding habits (in terms of which plant parts it targets) so that a weed is completely killed. As we mentioned before, some weeds can regrow from small parts of a root, so if the biotic agent only eats the leaves, this will probably not control most weeds. This will also avoid competition between two or more agents released for the same weed species.

6. Chemical Methods

A chemical used for killing or inhibiting the growth of plants is termed as an herbicide. Herbicides can be used to control weeds, but it is generally only recommended in extreme scenarios, as herbicides may negatively affect your trees.

To help reduce the likelihood of herbicide resistance development, you should rotate or mix herbicides with different modes of action. For more information regarding herbicide usage in

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orchards and for a list of herbicides registered for the use in South Africa in citrus orchard you can contact the CRI.

There are laws and regulations regarding maximum residue levels and chemical usage that may prohibit herbicide use. Herbicides may be classified into three groups depending upon their effect on the plant system, namely growth regulators, soil sterilants, and contact herbicides.

6.1. Growth Regulators

Growth regulators are also called growth modifiers, growth substances, translocated herbicides, or systemic herbicides. The herbicides can be absorbed by root or above ground parts and are translocated through the plant system. These herbicides are species specific. The concentration at which these are effective is also species specific.

This property of these chemicals makes it possible to use herbicides selectively, killing certain plants without significantly injuring the others, but be careful, excess application of these chemicals can be harmful to soil and other flora.

6.2. Soil Sterilants

Chemicals which can prevent the growth of green plants when present in soil are considered as soil sterilants. Some herbicides resist chemical decomposition and leaching. On the other hand, some herbicides get leached soon or can decompose easily. All these factors are depending upon climate, soil type and rate of use.

6.3. Contact Herbicides

Contact herbicides are active only on those parts of the weeds the herbicide comes into contact with. Hence, adequate spray coverage of the weeds is more critical than with systemic materials. These herbicides are effective on small annual weeds and usually only suppress growth of perennials. It should be noted that most organic herbicides are contact herbicides.

These herbicides may be selective or non-selective in nature. A selective contact herbicide will kill or suppress only those weeds it is selected for without significantly injuring other plants. A non-selective herbicide will kill or suppress all vegetation it comes in contact with it. Living plant tissue has no resistance to these herbicides.

7. Factors Affecting the Efficacy of Herbicides

The efficacy of herbicides is affected by multiple factors. Firstly, the type of soil determines the dose of herbicide that should be used to be effective in the control of weeds.

Soil colloids adsorb herbicides and make them non-available for action, so soils with more clay content need a higher dose of herbicides in comparison to sandy soils. Soils with high organic matter content also require higher doses of herbicides than soils with low organic matter. Herbicides that are absorbed may be released slowly rendering the chemical non-effective or less effective.

Climate, particularly temperature, also affects the effectiveness of herbicides. In warm climates, herbicides are more effective, even at somewhat lesser dosage rates than in cold regions. At the same time, an exceedingly elevated temperature may lead to volatilization of some of the herbicides. Wind also has a direct effect on evapotranspiration. Wind, particularly during summer, causes rapid drying of the spray solution on foliage which can result in reduced absorption.

Sunlight helps in higher and faster penetration of herbicides by stimulating stomatal opening. It increases photosynthesis which enhances the movement of herbicides from leaf to other

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parts of the plants. When solar radiation is exceedingly high, it causes the breakdown of herbicides in the presence of light, which is known as photodecomposition. Herbicides prone to decomposition needs to be sprayed in the evenings and should be incorporated immediately into the soil, e.g., bromacil.

High humidity generally favours foliar absorption of herbicides due to increased drying time of spray droplets on leaves. The enhanced stomatal opening and phloem transport is due to high humidity. Drought conditions cause reduced absorption and translocation of herbicides.

The use of fertilizer also influences the herbicide activity. Fertilization improves herbicide efficacy by increasing absorption and translocation, leading to higher metabolism of herbicides. Nitrogenous fertilizers increase the efficiency through higher absorption and translocation, where-as phosphorus fertilizers increase toxicity by enhancing its metabolism.

8. Improper Herbicide Use

As we mentioned, herbicides can be damaging to your trees, and need to be used carefully. Herbicides can move through the soil to groundwater if used improperly, contaminating the groundwater. Factors influencing the rate of herbicide movement in the soil include, but are not limited to, irrigation practices, rainfall, herbicide solubility, soil type, and organic matter.

You should be particularly careful to always read the product label carefully, as there may be certain restrictions or recommendations for their use. For example, products containing bromacil may be prohibited on deep, sandy, and ridge-type soils, and some product labels restrict the annual application of diuron in some areas of the country.

9. Planning Weed Control

Now that we have discussed the available control methods, we can discuss how you select an appropriate method and plan its implementation. To determine what control measures will be used, you should start by listing the required resources for each high priority control area. These resource requirements include the labour, herbicides, and equipment that will be needed to control the infestation.

Once you have listed these, evaluate the resources requirements, and decide based on which method is best suited to your situation. Factors such as available labour, agrochemicals, and equipment will affect what you are able to implement. Remember that IWM does not aim to eradicate all weeds, and that it is generally best to mix and match control methods.

One way to select the best method is to calculate the costs for different methods for the high priority control areas and decide on the most cost-effective and reliable method. When you are making this decision, remember that cheaper control methods might save money in the short run but might mean more spending or less revenue in the future if it becomes necessary in subsequent seasons to control the same infestation again.

Once you have decided on an appropriate control method, you need to draw up a control plan. This plan should ideally be divided up by season and should cover a whole year. The plan must also be flexible and allow adjustment as progress is made, since (if the plan works), the weed population will decrease and make certain control methods unnecessary.

The plan should include a budget for the resources such as labour, herbicides and equipment that will be required during the year. Do not plan to control too large an area; and budget 75% for follow-up control work and rehabilitation of previously cleared areas, 20% for initial control of a new area, and 5% for an emergency 'fire/flood fund' to cope with catastrophic occurrences, such as mass seed regeneration of wattle after fire, or loss of planted grass seed during heavy rains.

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Finally, allocate labour, herbicide, equipment, and transport resources to the high priority control areas. Draw up timetables for control operations that include contingency or "catch-up' times for use when operations have fallen behind due to climatic condition or labour disputes, etc.

10. Recordkeeping

Good recordkeeping is the backbone of any integrated management programme. You need to keep records of what control methods are implemented, and scouting records of weed populations before and after any control method implementation. These records will be used to determine the effectiveness of the weed control and monitoring plan, and to adjust the plan as needed.

The best way to keep sufficient records is to keep simple records of daily operations, such as the labour days, herbicide volumes and equipment that were required for each operation. This establishes standards or norms for the control work. Use the information in these records to adjust the plan of operations and budget for subsequent seasons.

summary

Chapter 2 – Weed Control

- Integrated weed management forms part of other forms of integrated management, and is a part of the Integrated Production Plan (IPP).
- Trying to completely eradicate weeds is not feasible, so IWM tries instead to get weeds under control to a level which does not adversely affect the health of trees.
- IWM programmes typically utilize a combination of control practices.
- Weed control methods can be categorised as preventative, mechanical, biological, and chemical.
- Preventative methods involve preventing weeds from getting into the orchard in the first place.
- Mechanical methods involve the physical removal of weeds, such as by hand.
- Biological methods involve the use of living organisms to eat or kill the weeds.
- Chemical methods involve the use of herbicides to kill weeds.
- Herbicides are defined as chemicals used for killing or inhibiting the growth of plants.
- Herbicides can be classified into three groups, namely growth regulators, soil sterilants, and contact herbicides, depending upon their effect on the plant system.
- Good recordkeeping is the backbone of any integrated management programme.

assessment activities

✓ **Activity P2**: Complete this activity to test your knowledge of weed control.

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Chapter 3
Alien Plant Species

learning outcomes

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

- Identify alien plant species.
- Eradicate alien plant species.

1. Alien Plant Species

Finally, we must discuss alien plant species. Alien plant species (also known as invasive species) are species of plant that are not native (not indigenous) to a particular place, and that harm the new environment they are introduced to. Invasive species can severely affect ecosystems, causing damage to biodiversity, environmental, and/or economic damage.

Alien plants can (and have) come to South Africa in many different ways. They can be brought over intentionally as garden plants or for farming or forestry, or unintentionally, such as in horse feed. Alien plant species grow well in South Africa because they have no natural enemies such as insects, animals and disease that would control them in their original countries.

Some alien plants spread less aggressively than others. The Department of Water Affairs has identified and categorised nearly 200 invader or alien plants in South Africa. These alien plants have detrimental effects on farming areas, indigenous bush, water supply, cause fires, and increase soil erosion.

If, while monitoring, a scout comes across invasive plant growth, you need to be able to identify the plant in question before you can determine what steps, if any, need to be taken. Alien plants are classified as follows, and common examples of all three categories are listed on the following pages.

information

Alien Plants Categories

Category 1 – Plants, or Declared Weeds	Category 2 – Plant Invaders	Category 3 – Plant Invaders
Alien plants that must be removed and destroyed immediately.	Alien plants that may be grown under controlled conditions only.	Alien plants that may no longer be planted, but that do not have to be removed.

2. Category 1: Plants, or Declared Weeds

Category 1 plants are prohibited, and will no longer be tolerated, neither in rural nor urban areas, except with the written permission of the executive officer or in an approved bio-control reserve. These plants may no longer be planted or propagated, and all trade in their

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seeds, cuttings or other propagative material is prohibited. They may not be transported or be allowed to disperse.

Below is a list of common Category 1 plants.

information

Category 1 Plants

Declared weeds – Category 1	
Common Name	**Botanical Name**
Triffid weed, Chromolaena	*Chromolaena Odorata*
Lantana	*Lantana Camara*
Pereskia, Barbados gooseberry	*Pereskia Aculeate*
Bugweed	*Solanum Mauritianum*
American bramble	*Rubus Cuneifolius*
Red sesbania	*Sesbania Punicea*
Mauritius thorn	*Caesalpinia Decapetala*
Inkberry	*Cestrum Laevigatum*
Balloon vine	*Cardiospermum Grandiflorum*
Field bindweed	*Convolvulus Arvensis*
Morning glory (perennial)	*Ipomoea Indica*
Madeira vine	*Anreda Cordifolia*
Water hyacinth	*Eichhornia Crassipes*
Brazilian pepper tree	*Schinus Terebinthifolius*
Yellow-flowered Mexican poppy	*Argemone Mexicana*
Montanoa tree daisy (spreading in area)	*Montanoa Hibiscifolia*
Camphor	*Cinnamomum Camphora*
Indian laurel	*Litsea Glutinosa*

3. Category 2: Plant Invaders

Category 2 plants have the proven potential of becoming invasive, but nevertheless have certain beneficial properties that warrant their continued presence in certain circumstances. CARA makes provision for Category 2 plants to be retained in specific areas demarcated for that purpose, but those occurring outside demarcated areas must be controlled. The exception is that Category 2 plants may also be retained or cultivated in biological control reserves, where the plants will serve as host plants for the breeding of biological control agents.

Below is a list of common Category 2 plants.

information

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Category 2 Plants

Declared invaders – Category 2	
Common Name	**Botanical Name**
Guava and hybrids	*Psidium Guajava*
Johnson grass	*Sorghum Halepense*
Leucaena	*Leucaena Leucocephala*
Castor oil bush	*Ricinus Communis*
Black wattle	*Acacia Mearnsii*
Silver wattle	*Acacia Dealbata*
Bluegum	*Eucalyptus Grandis*
Pine trees	*Pinus Patula/Elliottii*
Declared Invaders – Category 2 (Currently Recommended)	
Couch Grass, Kweek	*Cynodon Dactylon*
Perennial ryegrass	*Lolium Perenne*
Kikuyu	*Pennisetum Clandestinum*
Napier grass	*Pennisetum Purpureum*

4. Category 3: Plant Invaders

These plants are undesirable because they have the proven potential of becoming invasive, but most of them are nevertheless popular ornamentals or shade trees that will take a long time to replace. A few of them were placed into this category instead of into category 1 because they do not cause problems in all situations. In terms of Regulation 15 of CARA, Category 3 plants will not be allowed to occur anywhere except in biological control reserves, unless they were already in existence when these regulations went into effect.

The conditions on which these already existing plants may be retained are that they do not grow within 30 m from the 1:50 year flood line of watercourses or wetlands, that all reasonable steps are taken to keep the plant from spreading, and that the Executive Officer has the power to impose additional conditions or even prohibit the growing of Category 3 plants in any area where he has reason to believe that these plants will pose a threat to the agricultural resources.

Below is a list of common Category 3 plants.

information

Category 3 Plants

Declared Invaders – Category 3	
Common Name	**Botanical Name**
Syringa	*Melia Azedarach*
Peanut butter cassia	*Senna Didymobotrya*

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Morning glory (annual)	*Ipomoea Purpurea*
Jacaranda	*Jacaranda Mimosifolia*
Orange cotoneaster	*Cotoneaster Franchetii*
Loquat	*Eriobotria Japonica*
Australian silky oak	*Grevillea Robusta*
Common mulberry	*Morus Alba*

5. New or Unknown Plant Species

If any "unknown" or new plant species appear suddenly during monitoring operations, these weeds should initially be treated as "unwanted plant growth" and not necessarily as invasive species. It is also important to try and identify certain types of "new" plant species, as they might be an indication of soil degradation and might be emerging as "pioneer species."

Pioneer species of plants can only exist in poor soil conditions, and they are nature's way of trying to repair the nitrogen balance in the soil. If pioneer species are emerging in your orchards, it would be wise to report this immediately and contact a soil specialist for assistance.

6. Growth Regions

Alien plant species grow in many different regions in South Africa, and for ease of classification, South Africa has been divided into three sections, namely:

- Subtropical Region: KwaZulu-Natal, Mpumalanga, Limpopo, North-West Province, Gauteng
- Fynbos Region: Western and parts of Eastern Cape
- Arid Region: Northern Cape, parts of Eastern Cape, Free-State

Below, we list some of the common alien plants found in each of the three regions, as well as common control methods for them:

6.1. Subtropical Region

information

Alien Plants Commonly Found in Subtropical Regions

Category	Invader Plant Name	Control Measures
1	Bug Weed (Solanum mauritianum)	Saw, Hand-pull, Biocontrol, Herbicide
1	Sweet Prickly Pear (Opuntia ficus indica)	Biocontrol, Herbicide
1	Triffid Weed (Chromolaena odorata)	Saw, Hand-pull, Herbicide
1	Water hyacinth (Eichornia crassipes)	Hand-pull, Biocontrol, Herbicide
1	Lantana (Lantana camera)	Saw, Hand-pull, Biocontrol, Herbicide
1	Mauritius Thorn (Caesalpinia decapetala)	Biocontrol, Herbicide
2	Black wattle (Acacia mearnsil)	Saw, Hand-pull, Biocontrol, Herbicide

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2	Grey Poplar (Populas x canescens)	Saw, Hand-pull, Herbicide
3	Syringa (Melia azedarach)	Saw, Hand-pull, Herbicide

6.2. Fynbos Region

information

Alien Plants Commonly Found in Fynbos Regions

Category	Invader Plant Name	Control Measures
1	Lantana (Lantana camera)	Saw, Hand-pull, Biocontrol, Herbicide
1	Silky Hakea (Hakea sericea)	Saw, Biocontrol
1	Australian Myrtle (Leptospermum laevigatum)	Saw, Biocontrol
2	Grey Poplar (Populas x canescens)	Saw, Hand-pull, Herbicide
2	Black Wattle (Acacia mearnsil)	Saw, Hand-pull, Biocontrol, Herbicide
2	Australian Blackwood (Acacia melanoxylon)	Saw, Hand-pull, Biocontrol, Herbicide
2	Rooikrans (Acacia Cyclops)	Saw, Hand-pull, Biocontrol, Herbicide
2	Cluster Pine (Pinus pinaster)	Saw

6.3. Arid Region

information

Alien Plants Commonly Found in Arid Regions

Category	Invader Plant Name	Control Measures
1	Sweet Prickly Pear (Opuntia ficus indica)	Biocontrol, Herbicide
1	Oleander (Nerium oleander)	Saw
1	Stipa Trichotoma	Hand-pull, Herbicide
1	Queen of the Night (Cereus jamacaru)	Hand-pull, Biocontrol, Herbicide
1	Rosea Cactus (Opuntia rosea)	Biocontrol, Herbicide
2	Sisal (Agave sisalana)	Herbicide
2	Wild Tobacco (Nicotiana glauca)	Saw
2	Honey Mesquite (Prosopis glandulosa)	Saw, Herbicide

7. Clearing Alien Plant Species

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In the tables in the previous section, the control measures for the various alien species are stated. The methods for controlling alien plant species are similar to removing weeds. After identifying the area with invasive plants, as well as which invasive species you are dealing with, you should segment the area into manageable units.

Start with the first segmented area, and remove invasive plants using the appropriate measure stated in the tables above. If using herbicides, make sure that the personnel handling chemicals are trained to apply these chemicals and understand the precautionary measures.

As with weed removal, be careful not to remove all vegetation. Generally, you should remove the invaders but retain the indigenous plants to prevent weeds from taking over. Once all segments are cleared, the area must be maintained and monitored regularly to ensure that no re-growth occurs. Removed plant material can be used as compost or mulch, but be careful not to transport seeds to a new area and allow for re-growth.

summary

Chapter 3 – Alien Plant Species

- Alien, or invasive, plants are plant species that are not indigenous, and were introduced to South Africa.
- Invasive species can severely affect ecosystems, causing damage to biodiversity, environmental, and/or economic damage.
- Alien plants proliferate in South Africa because they do not have any natural enemies in their environment.
- Alien plants are categorised into three categories.
- Category 1 plants must be removed and destroyed immediately.
- Category 2 plants may be grown under controlled conditions only.
- Category 3 plants may no longer be planted, but do not have to be removed.
- Alien plant species grow in many different regions in South Africa, and for ease of classification, South Africa has been divided into three sections.
- These three sections are the subtropical region, the fynbos region, and the arid region.

assessment activities

- ✓ **Activity P3**: Complete this activity to test your knowledge of alien plant species.
- ✓ **Activity F1**: Complete this activity to test your knowledge of the entire module.

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