Identify and Report Common Pests and Diseases in Plant Propagation and Landscapes

Learner Workbook

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, and recording or otherwise, without the written permission of the copyright owners.

© AgriSETA.
Acknowledgements

Developed by

Lifestyle College

With special thanks to:

Tasha Tollman
Rick Smit from Dynamic Solution Synergies
## Contents Page

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PG NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Session Overview</td>
<td>4</td>
</tr>
<tr>
<td>The Unit Standard : Identify and report common pests and diseases in plant propagation and landscapes</td>
<td>7</td>
</tr>
<tr>
<td>Lesson 1 : What are plant pests?</td>
<td>13</td>
</tr>
<tr>
<td>Lesson 2 : What are plant diseases?</td>
<td>33</td>
</tr>
<tr>
<td>Lesson 3 : Preventing pests and diseases</td>
<td>50</td>
</tr>
<tr>
<td>Lesson 4 : Controlling pests and diseases</td>
<td>63</td>
</tr>
<tr>
<td>References</td>
<td>79</td>
</tr>
</tbody>
</table>
Purpose

The purpose of this study session is to equip you with the skills and knowledge necessary to recognise the presence of common pests and diseases in the horticultural and landscape environment and how to report these.

This study session forms part of the General Certificate in Horticulture, NQF level 1 and is aligned with the Unit Standard: Identify and Report Common Pests and Diseases in Plant Propagation and Landscapes, which carries 4 credits.

Who is it for?

This study session and unit standard form the knowledge base for people working with plants within the ornamental horticulture or landscaping industry and gives the learner the skills and knowledge necessary to:

- Identify pests and describe the consequences of their presence.
- Recognise the presence of a disease and describe their consequences.
- Apply preventative procedures to minimize pests and disease occurrence.
- Demonstrate an understanding of the methods to control pests and diseases that occur in the horticultural environment.
What's in it for you?

The skills acquired in this study session will equip you with the skills and knowledge necessary to identify and report common pests and diseases in plant propagation and landscapes. These skills and knowledge form the basis of your horticultural studies and help you to:

- Describe the factors that define a pest.
- Detail the different feeding habits of common pests that damage or destroy plants.
- Explain the consequences of the damage to plants, caused by pests.
- Name and describe ten common pests found in the workplace.
- Describe the signs/evidence of the presence of these pests and the plants they commonly attack.
- Describe the factors that define a disease and how they are spread.
- Explain the effects that diseases have on plants.
- Name and describe the ten common diseases found in the workplace.
- Describe the signs/evidence of their presence and the plants they commonly appear on.
- Describe the measures to be taken to prevent pest infestations.
- Explain the preventative procedures to minimize the occurrence of diseases in plants.
- Demonstrate the preventative procedures for deterring pests in the horticultural environment.
- Describe the methods to control pests.
- Describe the methods to control diseases.
What about assessment?

If you can answer all the knowledge questions in the summative assessment, you will receive credits for a competent rating on your assessments.

These credits contribute 1 unit standard and 4 credits towards the General Certificate in Ornamental Horticulture Learnership at NQF Level 1.

The laid down policies and procedures with regard to assessment, moderation, RPL and appeals govern this assessment.

You will be rated "Competent" or "Not Yet Competent" against the assessment criteria.
Unit Standard

<table>
<thead>
<tr>
<th>Title</th>
<th>Identify and report common pests and diseases in plant propagation and landscapes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>119708</td>
</tr>
<tr>
<td>Level</td>
<td>1</td>
</tr>
<tr>
<td>Credits</td>
<td>4</td>
</tr>
<tr>
<td>Field</td>
<td>Agriculture and Nature Conservation</td>
</tr>
<tr>
<td>Sub field</td>
<td>Horticulture</td>
</tr>
<tr>
<td>Issue date</td>
<td>2006-02-09</td>
</tr>
<tr>
<td>Learning assumed to be in place</td>
<td>Demonstrate knowledge of communication and Numeracy at Abet level 3.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific Outcomes</th>
<th>Assessment Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify pests and describe the consequences of their presence.</td>
<td>1.1. Describe the factors that define a pest.</td>
</tr>
<tr>
<td></td>
<td>1.2. Detail the different feeding habits of common pests that damage or destroy plants.</td>
</tr>
<tr>
<td></td>
<td>1.3. Explain the consequences of the damage to plants, caused by pests.</td>
</tr>
<tr>
<td></td>
<td>1.4. Name and describe ten common pests found in the workplace.</td>
</tr>
<tr>
<td></td>
<td>1.5. Describe the signs/evidence of the presence of these pests and the plants they commonly attack.</td>
</tr>
<tr>
<td>2. Recognise the presence of a disease and describe their consequences.</td>
<td>2.1. Describe the factors that define a disease and how they are spread.</td>
</tr>
<tr>
<td></td>
<td>2.2. Explain the effects that diseases have on plants.</td>
</tr>
<tr>
<td></td>
<td>2.3. Name and describe ten common diseases found in the workplace.</td>
</tr>
<tr>
<td></td>
<td>2.4. Describe the signs/evidence of their presence and the plants they commonly appear on.</td>
</tr>
</tbody>
</table>
GENERAL CERTIFICATE IN ORNAMENTAL HORTICULTURE LEVEL 1
Workbook:
Identify and Report Common Pests and Diseases In Plant Propagation and Landscapes

<table>
<thead>
<tr>
<th>Specific Outcomes</th>
<th>Assessment Criteria</th>
</tr>
</thead>
</table>
| 3. Apply preventative procedures to minimize pest and disease occurrence. | 3.1. Describe the measures to be taken to prevent pest infestations.  
3.2. Explain the preventative procedures to minimize the occurrence of diseases in plants.  
3.3. Demonstrate the preventative procedures for deterring pests in the horticultural environment. |
| 4. Demonstrate an understanding of the methods to control pests and diseases that occur in the horticultural environment. | 4.1. Describe the methods to control pests.  
4.2. Describe the methods to control diseases. |

**Embedded Knowledge**

Embedded knowledge is reflected within the assessment criteria of each specific outcome and must be assessed in its own right, through oral and written evidence. Observation cannot be the only assessment.
Critical Cross Field Outcomes

- Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made – specific outcome 1, 2, 3 and 4.
- Work effectively with others as a member of a team, group, organisation or community. Specific outcome embedded in the learning for this level of learner.
- Organise and manage oneself and one’s activities responsibly and effectively. Specific outcome 3.
- Collect, analyse, organise and critically evaluate information. Specific outcome 1, 2, 3 and 4.
- Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation. Specific outcome embedded in the learning for this level of learner.
- Use science and technology effectively and critically, showing responsibility toward the environment and health of others. Specific outcome 1, 2 and 4.
- Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation. Specific outcome 1, 2, 3 and 4.
Unit Standard Accreditation and Moderation Options

1. Internal moderation.
2. External moderation.
3. Moderation of assessment will be overseen by the relevant ETQA, according to the moderation guidelines in the relevant qualification the agreed ETQA procedures.
4. Internal assessment.
5. External assessment with the relevant registered/accredited industry body/ETQA.
6. An Assessor accredited by the relevant ETQA, will assess the Learner’s competency.
7. Formative and summative assessment of qualifying Learners against this unit standard should be in alignment with the requirements of the NSB.
8. Practical assessment activities will be used that are appropriate to the contents in which the qualifying Learners are working.
9. Assessment will include self and peer assessment, practical and oral assessment, observations, questions and answers, etc.
10. Direct observation is required in simulated or actual work conditions.
11. Reporting skills are demonstrated by effective communication, using verbal and/or writing skills.
12. Assessment is to be structured to include formative and summative component, as well as the submission of a Portfolio of Evidence.
13. The assessment should ensure that all the specific outcomes, critical cross field outcomes and embedded knowledge are assessed.
14. Specific outcomes must be assessed in their own right, through oral and practical evidence and cannot be assessed by observation only. Essential embedded knowledge must be assessed in their own right, through oral and practical evidence and cannot be assessed by observation only.

15. Special outcomes and essential embedded knowledge must be assessed in relation to each other.

16. If qualifying Learners are able to explain the essential embedded knowledge, but are unable to perform the specific outcomes, then they should not be assessed as competent.

17. If qualifying Learners are able to perform specific outcomes, but are unable to explain the essential embedded knowledge, they should not be assessed as competent.

18. Evidence of the specified critical cross-field outcomes should be found, both in performance and in essential embedded knowledge.

19. Assessment activities must be fair, so that all Learners have equal opportunities. Activities must be free of gender, ethnic or other bias.

20. This unit standard can be assessed together with any other relevant registered unit standard.
Who does what?

You are expected to actively take part in the lessons by:

- Asking questions.
- Planning and preparing for your training and assessment.
- Completing the assessment tasks that you are given.
- Telling your trainer when you need help or don’t understand.

Your learning will be supported in the following ways:

- Your trainer will provide you with all the necessary training material.
- Your trainer will manage the learning process during the training.
- The assessor will plan and prepare you for assessment, assess your competence and provide feedback to you and arrange any follow up assessments that may be necessary.
Lesson 1: What are Plant Pests?

Specific outcomes of this lesson:

Identify pests and describe the consequences of their presence.

After you have worked through Lesson 1, you should be able to:

- Describe the factors that define a pest.
- Detail the different feeding habits of common pests that damage or destroy plants.
- Explain the consequences of the damage to plants, caused by pests.
- Name and describe ten common pests found in the workplace.
- Describe the signs/evidence of the presence of these pests and the plants they commonly attack.

Introduction

Pests can be defined as anything that attacks and eats plants. In most cases, pests attack the youngest and newest growth of plants. So as you walk through any planting area, look at:

- The upper surface of plants leaves.
- The underside of the plants leaves, where most insects and their eggs are located.
- The point where leaves attach themselves to the stem of the plant.
And you will know that you have pests, if you find:

- Plant leaves chewed from the outside edges.
- Holes chewed in the leaves of plants.
- Wilting or discolouring of the plant’s leaves.
- Discoloured speckles on the leaves.
- Curled leaves.

Pests can be divided into two categories:

- **Chewing pests:**
  These pests chew the foliage of plants. Some examples of chewing pests are beetles, grasshoppers, cutworms and caterpillars.

- **Sucking pests:**
  These pests suck out the plant juices. Some examples of sucking pests are aphids, scale insects and mealy bugs.
Since it is not easy to tell the difference between chewing and sucking pests, you need to learn about each type of pest. Today we will be looking at the more common types of pests found in the garden and these are:

- Aphids – commonly called plant lice
- Whitefly
- Mealy bugs
- Australian bugs
- Scale
- Red spider mite
- Caterpillars and worms
- Beetles
- Grasshoppers
- Fruit flies
- Slugs and snails
- Psylla

It is also important to know the difference between harmful insects and beneficial insects, so that you do not destroy your friends instead of your enemies. The best-known beneficial insects are:

- Ladybirds, which eat aphids and mealy bugs,
- Praying-mantis which eats grasshoppers and mosquitoes
- Spiders which catch harmful insects.
- Pollinating insects like bees.
- Earthworms, which till the soil.
Your Turn...

<table>
<thead>
<tr>
<th>ACTIVITY 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the different feeding habits of common pests that damage or destroy plants.</td>
</tr>
</tbody>
</table>
### ACTIVITY 2

Describe the factors that define a pest and then go outside and collect some pests.
Common Plant Pests

<table>
<thead>
<tr>
<th>Pest</th>
<th>Description:</th>
</tr>
</thead>
</table>
| Ants                          | • Small insects which vary in size and colour and may be black, brown or reddish.  
|                               | • Found in large groups.                                                    |
| Aphids (commonly called plant lice) | • Small insects which vary in colours e.g. black, green, yellow, etc.  
|                               | • About 2 to 3 mm and may or may not have wings.                           |
|                               | • Woolly aphids have a white covering of wax and look a bit like cotton wool. 
|                               | • When squashed their body fluids are bright red.                          |
|                               | • Found in large groups.                                                    |
| Australian bug                | • Soft scaly, oval reddish-brown insects easily identified by the large white egg sack of ribbed white wax they carry |
| Beneficial Caterpillars       | • Caterpillars are part of the life cycle of butterflies and many indigenous plants are part of this life cycle. Do not destroy if you wish to attract birds and butterflies to your garden. |
| CMR or Fruit Beetle           | • Big, black and yellow beetle, most often seen during the summer months.   |
| Cutworm                       | • Hairless, dirty grey coloured worms found 20 to 50 mm below ground level in the surrounding area of young plants.  
|                               | • Active at night.                                                         |
| Fruit flies.                  |                                                                             |
## Identify and Report Common Pests and Diseases
### In Plant Propagation and Landscapes

<table>
<thead>
<tr>
<th>Pest:</th>
<th>Description:</th>
</tr>
</thead>
</table>
| Grass-hoppers     | - Medium sized fly.  
                    - The female is bright in colour.                                                                                                                                                                                                                                           |
| Lawn caterpillars | - Greenish brown caterpillars with darker brown stripes running the length of the body living just below the soil surface in lawns.  
                    - Active at night.  
                    - Sure evidence of lawn caterpillar is if you find them lying at the bottom of your swimming pool.                                                                                                                                                               |
| Lily borer        | - Larvae have yellow and black bands around their bodies.  
                    - Appears from September to April.                                                                                                                                                                                                                                        |
| Mealy bugs        | - Small, oval, flat insects about 6 to 8mm in size, covered with a loose mass of white waxy threads, like miniature tuffs of cotton wool.  
                    - Light pink mostly stationary insect.  
                    - Found at the base of leaves.                                                                                                                                                                                                                                          |
| Psylla.           | - Small active insect rarely seen.  
                    - Identification by damage the larvae make - bumps and dents on leaf surfaces.                                                                                                                                                                                        |
| Red spider mite.  | - A small mite with orange, brown or dark red oval body.  
                    - Top of leaf often turns yellow, then silver gray and later brown in colour.  
                    - Common in hot, dry conditions.                                                                                                                                                                                                                              |
<p>| Root Knot         |</p>
<table>
<thead>
<tr>
<th>Pest:</th>
<th>Description:</th>
</tr>
</thead>
</table>
| Nematodes (Eelworms)  | ▪ Nematodes are very small wormlike organisms that can only be seen through a microscope.  
|                       | ▪ Whitish, translucent, unsegmented bodies covered by a tough cuticle.  
|                       | ▪ Lives in the soil and soon after hatching the worms enter the roots of nearby plants, causing deformation and damage to the root system and consequently to plant health. |
| Rose Chafer (Christmas Beetle) | ▪ A medium sized, shiny brown, night flying beetle.  
|                       | ▪ Burrows into the ground during the day.                                                                                                      |
| Scale Insects         | ▪ Great variety of these stationary round or pear shaped insects. Some are flattish but many have a pronounced dome-like appearance.  
|                       | ▪ They may be grey, white, red, brown or purple in colour.  
|                       | ▪ Attaches firmly to stems and leaves.                                                                                                          |
| Slugs and snails.     | ▪ Snails have shells while slugs do not.  
|                       | ▪ Leave shiny trails.  
|                       | ▪ Active under damp conditions.                                                                                                                  |
| Whitefly              | ▪ Small four winged insects covered in a fine white powder.  
|                       | ▪ Swarm when disturbed.                                                                                                                        |
Your Turn...

ACTIVITY 3

See if you can identify the pests you collected.
Your Turn...

**ACTIVITY 4**

Draw pictures of ten common pests.

Next to your picture write down:

- The name of the pest.
- A short description of the pest.
What damage do these pests cause?

<table>
<thead>
<tr>
<th>Pests:</th>
<th>Warning Signs:</th>
<th>Damaged Caused:</th>
</tr>
</thead>
</table>
| Ants              | ▪ Ants feed off honeydew in exchange for the honeydew the ants protects the aphids by keeping natural predators such as ladybirds and birds at bay.  
▪ Seeing aphids or ants around plants. | ▪ Should honeydew become too much a secondary infection may occur which is called sooty mould. This is seen as a black fungus covering the leaf surface and leads to lack of photosynthesis, bad plant health and eventually leaf drop in plants. |
| Aphids (commonly called plant lice) | ▪ Plant preferences – Young tender shoots and most garden flowers, fruit trees, ornamental shrubs such as roses, grasses and strawberries.  
▪ Curled and yellowed plant foliage.  
▪ Cottony masses on the trunks and twigs of trees and shrubs. | ▪ Sucks sap out of the plant causing slowed down growth and wilting in the case of severe attack.  
▪ Excretes honeydew, which is a protein rich substance sought after by ants.  
▪ Should honeydew become too much a secondary infection may occur which is called sooty mould. This can be seen as a black fungus covering the leaf surface and leads to lack of photosynthesis, bad plant health and eventually leaf drop of the plant. |
| Australian bug    | ▪ Plant preferences – Nandina Domestica, Plumbago, Syzigium.  
▪ Open up plant foliage and on the stems and twigs of the plants you will see these bugs with their big white | ▪ Sucks the sap causing plant growth to be stunted and can lead to the eventual death of the plant. |
### General Certificate in Ornamental Horticulture Level 1

**Workbook:**
**Identify and Report Common Pests and Diseases**
**In Plant Propagation and Landscapes**

<table>
<thead>
<tr>
<th>Pests:</th>
<th>Warning Signs:</th>
<th>Damaged Caused:</th>
</tr>
</thead>
</table>
| **Beneficial Caterpillars** | ▪ Plant preferences – leaves of, for example the wild peach Kiggelaria africana.  
                               ▪ Leaves chewed from the outside edges.                                             
                               ▪ Holes chewed in leaves.                                                        | ▪ Can make plants look ugly.                                                     |
| **C.M.R. and Fruit Beetle** | ▪ Plant preferences – ripe fruit and rose petals.                               
                               ▪ Holes chewed into ripe fruit flower petals.                                     | ▪ Ugly looking plants and fruit.                                                 |
| **Cutworm**                 | ▪ Plant preferences.                                                           
                               ▪ Cuts the stem of young seedling plants at the surface, working quickly and invisibly at night. | ▪ Cuts the stem of young seedling plants at the surface and the stem and leaves are found toppled over. |
| **Fruit flies.**            | ▪ Fruit bearing plants.                                                       
                               ▪ Seldom seen but damage can be seen as spots on the fruit.                       | ▪ Stings and lays eggs in fruit.                                                 
                               ▪ Eggs hatch infesting fruit with white maggots.                                  | ▪ Inedible fruit.                                                               |
| **Grasshoppers**            | ▪ Plant preferences: ornamentals, vegetables and seedlings.                    | ▪ Although grasshoppers are very destructive during the swarming phase, single grasshoppers cause very little damage. |
                               ▪ Any chewed parts of plants.                                                    | ▪ May cause defoliation of plants.                                              |
| **Lawn caterpillars**       | ▪ Plant preferences – leaf blades and top growth of lawn grasses.              | ▪ Large yellow to brown patches in the lawn.                                   |
                               ▪ Leaves chewed from the outside edges.                                          |                                                                                |
                               ▪ Large yellow to brown patches in the lawn.                                    |                                                                                |

---

- AgriSETA
- Issue date: June 2006 Version 2
**Pests:**

<table>
<thead>
<tr>
<th>Pests</th>
<th>Warning Signs</th>
<th>Damaged Caused</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lily borer</td>
<td>- Place a damp towel on the lawn in the evening and you will find lawn caterpillars underneath in the morning.</td>
<td>- Causes wilting of the plant stem and eventually plant death.</td>
</tr>
<tr>
<td></td>
<td>- Plant preferences – Clivia, Crinum, and Boophane.</td>
<td>- Damage makes the plant vulnerable to disease.</td>
</tr>
<tr>
<td></td>
<td>- Feed in groups and tunnel into the leaves and soft stems of plants, which weaken the stem and often breaks it.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Larger larvae move to the base of the leaves and may feed on bulbs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Wilting stems even through plants have had enough water.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Small holes in the plants stem.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Around the stem of the holes you may see sap or sawdust that has been pushed out by the insect</td>
<td></td>
</tr>
<tr>
<td>Mealy bugs</td>
<td>- Plant preferences – monocots e.g. Palms and Draceanas plus many other plants – especially indoor plants.</td>
<td>- Sucks the plant sap causing plants to wither.</td>
</tr>
<tr>
<td></td>
<td>- The most obvious sign of mealy bug attack is the mealy bug themselves, with their white cotton wooly appearance. They gather in masses on the stems, branches and leaves of the plants they attack.</td>
<td>- Also secretes large amounts of honeydew and therefore black sooty mould can occur.</td>
</tr>
<tr>
<td>Psylla</td>
<td>- Plant preferences – Citrus, Cussonia, and Eyrithrina.</td>
<td>- No major harm caused to the plant, however they are often a carrier of diseases. Citrus Psylla - prevalent in citrus, can carry a virus-like organism that</td>
</tr>
<tr>
<td>Pests:</td>
<td>Warning Signs:</td>
<td>Damaged Caused:</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Red spider mite.</td>
<td>▪ Plant preferences – Roses&lt;br&gt;▪ Yellowing of the leaves – on closer inspection of the underside of the leaves the tiny insects will be seen moving around and you may notice a very fine reddish brown web here.</td>
<td>▪ Sucks the plant sap causing stunted plant growth.&lt;br&gt;▪ Heavily infected leaves turn brown and fall off.</td>
</tr>
<tr>
<td>Root Nematodes</td>
<td>▪ Roots grow abnormal growths on them called galls,&lt;br&gt;▪ Plants will recover poorly from the heat.&lt;br&gt;▪ Poor plant development and decay.</td>
<td>▪ Poor plant development and decay.&lt;br&gt;▪ Sickly or wilted plants.&lt;br&gt;▪ Stunted plant growth.</td>
</tr>
<tr>
<td>Rose Chafer (Christmas Beetle)</td>
<td>▪ Plant preferences - leaves and flower petals.&lt;br&gt;▪ Holes chewed into leaves and flower petals.&lt;br&gt;▪ Leaves chewed from the outside edges.</td>
<td>▪ Ugly looking plants.&lt;br&gt;▪ Loss of plant health – severe infestations can destroy most leaves on the plant, which in turn affects the plant health.</td>
</tr>
<tr>
<td>Pests:</td>
<td>Warning Signs:</td>
<td>Damaged Caused:</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Scale Insects</strong></td>
<td><img src="image" alt="List of points" /></td>
<td><img src="image" alt="List of points" /></td>
</tr>
<tr>
<td><strong>Slugs and snails.</strong></td>
<td><img src="image" alt="List of points" /></td>
<td><img src="image" alt="List of points" /></td>
</tr>
<tr>
<td><strong>Whitefly</strong></td>
<td><img src="image" alt="List of points" /></td>
<td><img src="image" alt="List of points" /></td>
</tr>
</tbody>
</table>
- 28 –
GENERAL CERTIFICATE IN ORNAMENTAL
HORTICULTURE LEVEL 1
Workbook:
Identify and Report Common Pests and Diseases
In Plant Propagation and Landscapes

Your Turn...

<table>
<thead>
<tr>
<th>ACTIVITY 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the signs/evidence of the presence of ten common pests and name the plants that they commonly attack.</td>
</tr>
</tbody>
</table>
**ACTIVITY 6**

Explain the consequences of the damage to plants caused by common pests.
Lesson Checkpoint

Now that you have worked through this lesson, please check that you are able to do all the specific outcomes and meet the assessment criteria:

- I can describe the factors that define a pest.
- I can detail the different feeding habits of common pests that damage or destroy plants.
- I can explain the consequences of the damage to plants, caused by pests.
- I can name and describe ten common pests found in the workplace.
- I can describe the signs/evidence of the presence of these pests and the plants they commonly attack.
GENERAL CERTIFICATE IN ORNAMENTAL HORTICULTURE LEVEL 1

Workbook:
Identify and Report Common Pests and Diseases In Plant Propagation and Landscapes

Notes:

AgriSETA
Issue date: June 2006 Version 2
Lesson 2 : What are Plant Diseases?

Specific outcomes of this lesson:

Recognise the presence of a disease and describe their consequences.

After you have worked through Lesson 2, you should be able to:

- Describe the factors that define a disease and how they are spread.
- Explain the effects that diseases have on plants.
- Name and describe ten common diseases found in the workplace.
- Describe the signs/evidence of their presence and the plants they commonly appear on.

What are Plant Diseases?

Plant diseases are caused by fungi, bacteria and viruses and are less visual than pests although in some cases are transmitted by pests. Whilst the symptoms of the plant disease can be seen, the disease/virus remains unseen.
Common Plant Diseases

<table>
<thead>
<tr>
<th>Plant Diseases:</th>
<th>Description:</th>
<th>Symptoms:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fungal Diseases</strong></td>
<td>Most plant diseases are caused by fungi.</td>
<td>The damage caused by fungi varies depending on the type of fungal disease.</td>
</tr>
<tr>
<td></td>
<td>Fungal diseases in plants are microscopic plants that take nourishment from the plant on which they live.</td>
<td>The following symptoms may show that the plant has a fungal disease of some kind:</td>
</tr>
<tr>
<td></td>
<td>Fungal diseases tend to spread over the entire plant slowly, occurring over weeks rather than days, whereas problems caused by viruses or bacteria spread quite quickly.</td>
<td>- Pale patches on leaves.</td>
</tr>
<tr>
<td></td>
<td>Fungal diseases increase rapidly during warm, wet weather. The spores are microscopic produced in large quantities and may be splashed onto other plants by rain or irrigation.</td>
<td>- Yellowing of leaves, especially round spots or irregular green spots that darken over time.</td>
</tr>
<tr>
<td></td>
<td><strong>Bacterial Diseases</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disease bacteria are microscopic organisms that cause trouble when they live in plants.</td>
<td>The following symptoms may show that the plant has a bacterial disease of some kind:</td>
</tr>
<tr>
<td></td>
<td>The bacteria that causes rot releases an enzyme that dissolves cell walls in leaves, stems and tubers.</td>
<td>- Rotted leaves, stems, branches or tubers.</td>
</tr>
<tr>
<td></td>
<td>Wilts are caused by bacteria</td>
<td>- Wilted leaves.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Large, irregularly shaped growths, called galls which can be seen near the soil.</td>
</tr>
</tbody>
</table>
### Plant Diseases:

<table>
<thead>
<tr>
<th>Description:</th>
<th>Symptoms:</th>
</tr>
</thead>
<tbody>
<tr>
<td>that block a plant’s vascular system.</td>
<td>line on roots or stems.</td>
</tr>
<tr>
<td>Crown gall occurs when bacteria invade through plant wounds or bruises, and then give off substances that promote abnormal growths in the plant.</td>
<td></td>
</tr>
</tbody>
</table>

### Viral Diseases

Viral Diseases are often sap transmitted and cannot be seen under a microscope because they are so small, but will transfer from one plant to another. Viruses are spread from plant to plant by:

- Insects, especially aphids, mealy bugs and whiteflies.
- Smokers can transmit a mosaic virus from their cigarettes.
- Cuttings taken from infected plants.
- Infected seeds.
- Handling of infected plants.

The following symptoms may show that the plant has a virus of some kind:

- Small, stunted foliage.
- Sudden death of a plant.
- Yellowing of leaves, especially irregular yellow spots on leaves.
- Mosaic yellow and green mottling pattern on leaves, stems or even blossoms.
- Dead areas on leaves.
- Puckered, rolled or very narrow leaves.
Your Turn...

**ACTIVITY 7**

Describe the factors that define a disease and how they are spread.
Your Turn...

<table>
<thead>
<tr>
<th>ACTIVITY 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go outside and see if you can find any diseased plants.</td>
</tr>
</tbody>
</table>
What damage do fungal diseases cause?

<table>
<thead>
<tr>
<th>Fungal Disease</th>
<th>Warning Signs:</th>
<th>Damaged Caused:</th>
</tr>
</thead>
</table>
| **Black Spot** | ▪ This is the most common type of disease found in the garden and affects roses in particular.  
▪ Black spots on leaves up to 6 mm in size. The spots seldom show on the undersides of the leaves. After a short time leaves turn yellow and drop off. | ▪ In severe cases leaves turn yellow and fall off, resulting in lack of efficient photosynthesis for plants and therefore, reduced plant vigour. |
| **Canker** | ▪ Brown or died branches.  
▪ Damage usually begins in branches nearest the ground and slowly progresses upwards.  
▪ Needles may drop immediately from infected branches.  
▪ White patches of pitch or resin along the bark of dead or dying branches. | ▪ Branches turn brown and die. |
| **Crown Rot** | ▪ Unpleasant smell.  
▪ Discoloured lower leaves.  
▪ Blackened roots covered with white fungal threads. | ▪ Death of the plant. |
### Fungal Disease: Warning Signs: Damaged Caused:

| Damping Off often referred to as root rot | Plant wilts and leaves turn yellow, appears as if plants need water. | Plant wilting, yellowing and death of seedlings due to the root rot. |
| Damping Off | Seedlings collapse after transplanting with no signs of visual pest damage. |
| Damping Off | Poor drainage or over-watering increases root rot problems caused by soil born pathogens. |
| Damping Off | May be caused by various pathogens such as Rhizoctonia, Phytophthera, and Botrytis. |

| Dollar Spot | Usually confined to fine grasses where a very high standard of cultivation, mowing and fertilizing is maintained particularly on bowling and putting greens. |
| Dollar Spot | Dollar spot forms tan or straw-coloured spots 30 – 90 mm in size often joining to make irregular patches. |
| Dollar Spot | Circular patterns of varying sizes on the lawn where the plants is affected. Leads to dying back of the grass if not treated. |

<p>| Leaf Spot | Affects many garden plants. |
| Leaf Spot | Tiny, irregular brownish spots with yellow halos on the leaves of plants which grow larger and eventually cover the whole leaf. |
| Leaf Spot | The centers of the dried spots may sometimes drop out giving a shot-hole appearance. |
| Leaf Spot | Plant health is affected. If unchecked will spread quickly causing leaves to die and fall off prematurely. |</p>
<table>
<thead>
<tr>
<th>Fungal Disease:</th>
<th>Warning Signs:</th>
<th>Damaged Caused:</th>
</tr>
</thead>
</table>
| Grey Mould (Botrytis)          | • A gray mould.  
• Ashy gray spots on buds scales and stems.  
• Brown areas on leaves and flowers.  
• Rose buds don’t open but turn brown and decay instead.  
• Strawberry fruit are susceptible to botrytis | • Plant death. |
| Mildew                        | There are two types of mildew. The most common and not so serious is powdery mildew and the other downy mildew which causes more damage although it is not so common.  
• Powdery mildew is common on roses, apple and peach trees, delphinium, sweet peas, grapes, cucumber, marrow and pumpkin, pawpaw trees and forms a white felt covering on the leaves and young shoots of these plants.  
• Downy mildew infects plants like Euonymus, onion, radish, melon, antirrhinum, mesembs, seedling cabbages and cauliflower and forms yellowish patches on the top surface of the leaves, while the underneath surface is coated with a whitish-grey down. | • Powdery mildew eventually stunts growth and causes plant death by smothering the plant as the felt layer becomes thicker, as well as by taking food form the plant.  
• Downy mildew causes plant death. |
### Fungal Disease: Rust

- Normally occurs on the underside of leaves e.g. Roses but on Aloes and Geraniums occurs on the upper surface of the leaves.
- Rusty brown dots on the foliage and stems of plants.
- Do not confuse rust with the reproduction organs of the fern.

- Causes premature defoliation.

### Fungal Disease: Sooty Mould

- Black sooty mould covering.

- Excludes sunlight, preventing food production from taking lace in the green part of the plant. If left unchecked, the plant will lose vigour and die.
What damage do bacterial diseases cause?

<table>
<thead>
<tr>
<th>Bacterial Disease:</th>
<th>Warning Signs:</th>
<th>Damaged Caused:</th>
</tr>
</thead>
</table>
| Crown Gall         | ▪ The best known and most easily recognised bacterial disease that occurs in gardens.  
                  | ▪ Causes tumours or globular swellings on the roots or on the trunk of the plant near the base of trees and shrubs like roses, almond, cherry, nectarine, peach, apricots, pear, pecan, poplar, quince, walnut. | ▪ Retarded growth, yellow foliage, roots, branches and the whole tree may die. |
What damage do viral diseases cause?

<table>
<thead>
<tr>
<th>Viral Disease:</th>
<th>Warning Signs:</th>
<th>Damaged Caused:</th>
</tr>
</thead>
</table>
| Virus         | - Viruses induce various different symptoms in different plants.  
               - Leaves – may have mosaic, mottling, concentric rings or patterns, streaks or brown necrotic areas. They may be curled, twisted, distorted or rosetted. Rose mosaic virus for example, shows as streaks, blotches and rings of light green, yellow, white, brown or black.  
               - Some viruses cause a mottling of the flower petals  
               - In some cases stunting and wilting can occur | - Plants generally produce poor quality flowers and fruit, if at all.  
               - Some cause stunting and wilting or even death of a plant |
### ACTIVITY 9

See if you can identify the plant diseases that you collected.
### ACTIVITY 10

Name and describe ten common diseases found in the workplace.
Your Turn...

**ACTIVITY 11**

Explain the effects that diseases have on plants.
### ACTIVITY 12

Describe the signs/evidence of the presence of disease and the plants they commonly appear on.
Lesson Checkpoint

Now that you have worked through this lesson, please check that you are able to do all the specific outcomes and meet the assessment criteria:

- I can describe the factors that define a disease and how they are spread.
- I can explain the effects that diseases have on plants.
- I can name and describe ten common diseases found in the workplace.
- I can describe the signs/evidence of their presence and the plants they commonly appear on.
Lesson 3 : Preventing Pests & Diseases

**Specific outcomes of this lesson:**

Apply preventative procedures to minimise pests and disease occurrence.

After you have worked through Lesson 3, you should be able to:

- Describe the measures to be taken to prevent pest infestation.
- Explain the preventative procedures to minimize the occurrence of diseases in plants.
- Demonstrate the preventative procedures for deterring pests in the horticultural environment.

### Preventing Pests

As you have already seen pests can be found all over the garden and you need to prevent them from injuring the plants and affecting the quality of the plants. Let’s take a look at ways in which you can prevent pest:

- **Control the amount of weeds in the planting area.**
  
  Weeds shelter pests and provide them with good hiding places and sources of food, so remove weeds as soon as you see them.
Check new plants for pests.

Sometimes new plants that are brought into the area can have pests on them, so always check new plants and if you find pests on them, keep the plants away from other plants while you control the pests.

Keep checking your plants for pests.

At some stage you will find pests in your landscape area, so you need to keep checking your plants for pests because the earlier you spot the pests, the easier it will be to control them. Because some insects have plant preferences, by knowing what pests prefer what plants and what type of damage these pests do, you will know what to look for. For example, look under the leaves of plants to find certain insects or below the bark on the potting medium for other pests like slugs that hide there in the day and come out at night. Try to set up a regular routine for checking your plants for pests.

Sticky insect traps are often used to catch pests in the area and are mainly used by growers of plants. These traps are often a sheet of plastic about 15cm wide by 20cm long and coated with a sticky insect trapping compound. These traps help you to spot what insects are in the area and are not a control method. They are very successful with the trapping of aphids, leaf miner, whiteflies and a few other pests.

If you find pests, report this to your supervisor, as per your workplace procedures.
Use preventative sprays.

A preventative spraying programme is very useful. Home gardeners seldom use preventative sprays unless they have fruit trees and want to make sure that certain pests do not spoil their fruit crop, for example fruit fly and codling moth.
<table>
<thead>
<tr>
<th>ACTIVITY 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe and demonstrate the measures to be taken to prevent pest infestations.</td>
</tr>
</tbody>
</table>
Preventing diseases

Whilst plant diseases are caused by:

- Fungi
- Bacteria
- Viruses

Disease may be further encouraged by unsuitable climate and soil, injury from fumes and sprays and by weather hazards, so to prevent diseases in your area:

- **Check new plants.**
  Carefully check all the plants you have brought plants to make sure that these plants are strong and healthy. Weak plants will be far more at risk to diseases than a strong, healthy plant. Remember a plant with diseases will infect your other plants in the area.

- **Grow plants that have been bred to be resistant to or tolerant of specific diseases.**

- **Build healthy soil.**
  A healthy soil maintains a balance between beneficial bacterial, fungi and other micro-organisms and those pathogens that can cause disease if allowed to multiply.
- Plant plants in the correct areas.
  The suitability of a plant to its location will be important to the vigour of the plant. The two main considerations are:

  **Aspect:**
  This refers to the plant’s location in terms of the amount of sun and shade it receives during the day throughout the year. Plants that are sun-loving will not grow well if placed in a shady position and they can be more at risk to diseases. Roses for example will be more susceptible to mildew if they are grown in a more shaded position.

  **Soil pH:**
  Some plants prefer a more acid soil and others a more alkaline soil. If a plant likes acid soil and it is grown in alkaline soil or the other way around, it will suffer and become at risk to diseases.

- Use compost.
  When certain plants decompose they produce contain fatty acids that are toxic to fungal disease and to certain bacterial diseases of plants. By simply piling up compost materials and leaving them to decompose you will suppress harmful root-invading fungi, which can cause diseases such as root rot and damping off.
Know your climate.
Rain may induce the rapid growth of fungi or bacteria, resulting in the rotting of fruits like strawberries, or the bacterial soft rot of various vegetables. Spells of light rain encourage the development of fungal diseases too. Fungus spores or bacteria may be carried for long distances during heavy rain accompanied by strong winds and may be splashed up from the soil from plant to plant.

Hail sometimes makes wounds in stems and fruit which allow easy entry for disease-producing organisms.

Even dust could encourage pests, for example, dust on citrus tree leaves favours the growth of scale insects.

Know your micro climate.
Within a region that has a particular climate, microclimates may occur. These are usually small pockets that experience different climatic conditions. For example areas protected by and up against a hill, an outcrop of trees or even a house may differ enough from the surrounding areas. This will make them more suitable to certain plants because of the amount of shade or difference in temperatures they exhibit. Shady micro climates will be cooler and often more moist.

Some micro climates may experience less frost or even no frost than the surrounding area and this could shelter some diseases.
Micro climates found in atriums and indoor environments are often more favorable to disease attack since there is little air movement. These poorly ventilated conditions are also ideal for diseases.

- **Plant properly.**
  Planting is one of the most important tasks in gardening. If a plant is not planted well it is not being given its maximum chance to thrive. The incorrect planting can affect the plant in several ways:
  - Planting the plant too deep will encourage disease to infect the resulting weakened plant
  - Damaging the roots at the time of planting will also weaken the plant
  - Leaving air pockets in the soil will also encourage secondary infection if the roots ailing.

- **Check your plants for diseases.**
  Regularly check your plants for diseases, for example, you will have to keep a look out for wilting, yellowing or even the presence of ants to give you a clue to what disease to look for. You will also need to become accustomed to what diseases are most common on specific plants

  If you find pests, report this to your supervisor, as per your workplace procedures.
Use a foliar spray.
A number of natural fungicides made from sulfur suspended in liquid soaps can be bought and used to prevent as well as control disease. Use this type of mixture as a preventive spray every two weeks during the early part of the growing season on those plants and shrubs that are vulnerable to fungal diseases.

Other preventative spraying
Roses are often sprayed with a fungicide on a regular basis in the garden to prevent mildew, especially in wet, rainy weather.

Use mulch:
Mulching reduces the spread of fungal and bacterial diseases that are often transported to the plant by rain splashing up from the soil.

Maintain a pest-free landscape and get rid of pests that transmit diseases.

Water plants before noon.
Watering plants before noon allows the plants to dry thoroughly before nightfall and denying these types of disease the moist, damp conditions they thrive in.
- Keep tools clean.
  Hoes, rakes, shovels, trowels, pruning equipment and other tools can carry fungal spores, bacteria and viruses and spread these pathogens to the plants in your yard. Keep a 5 gallon pail containing bleach solution (one part household bleach to four parts water) handy. Then, as a matter of routine, you can dip your tools in the solution to disinfect them after you’ve scraped off the soil.

- Keep the area clean and tidy.
  Fallen decaying leaves and twigs make good shelters for pests that hid out during the day and offer cozy spots where pests can settle down for the winter and wait for spring.

- Don’t work with plants when they are wet to avoid spreading fungal diseases which are easily transmitted by water.

- Don’t smoke while you are working with plants.
  Smoking can cause the tobacco mosaic virus on some plants.
### ACTIVITY 14

Explain the procedures/principles to minimize the occurrence of diseases in plants.
Lesson Checkpoint

Now that you have worked through this lesson, please check that you are able to do all the specific outcomes and meet the assessment criteria:

- I can describe the measures to be taken to prevent pest infestation.
- I can explain the procedures/principles to minimize the occurrence of diseases in plants.
- I can demonstrate the preventative procedures for deterring pests in the horticultural environment.
NOTES:
Specific outcomes of this lesson:

Demonstrate an understanding of the methods to control pests and diseases that occur in the horticultural environment.

After you have worked through Lesson 4, you should be able to:

- Describe the methods used to control pests.
- Describe the methods used to control diseases.

Treatment Methods

When controlling pests and diseases, you need to:

- Identify the pest or disease.
- Monitor the pests or disease.
- Determine level of injury the pest or disease will cause to the plant.
- Decide on the best control strategy.

There are many ways to control pests and diseases. The growing trend is use cultural and organic control methods, with chemicals being used as a last resort.

Let’s take a look at the different ways you can control pests and diseases.
### Natural Control & prevention:
- Removal and destruction of diseased plants.
- Crop rotation.
- Watering at correct time.
- Hand collection
- Removal by water.
- Weeds can act as a host.
- Maintenance of good air circulation
- Maintenance of healthy soil.

### Organic Control:
- Using organic traps or sprays.
- Companion planting.
- Plant plants that have been bred to be resistant to or tolerant of specific diseases.
- Maintain good hygiene.
- Crop rotation.

### Biological control:
All of the below methods are done under strict scientific controls.
- Using predators of insects to be released into the pest’s environment.
- Releasing parasites of pests into the area.
- Allowing certain diseases to destroy pests or plants
- Introducing beneficial animals into the area

### Chemical Control:
- Pesticides – insect control.
- Fungicides – fungal control

### Advantages:
- Environmentally friendly.
- Beneficial to wildlife.
- Concentrates on repelling pests rather than killing them.
- Cheap.
- Safe for you and

### Advantages:
- Use of nature’s remedies to combat pests and diseases with little effect on the environment.
- Man working with nature.
- Beneficial to wildlife.
- Concentrates on

### Advantages:
- Target specific – i.e. only the pest or disease being targeted is harmed.
- Very effective over large areas

### Advantages:
- Quick results.
- Mostly target specific.
your family. repelling pests rather than killing them.  
- Safe for you and your family.

<table>
<thead>
<tr>
<th>Disadvantages:</th>
<th>Disadvantages:</th>
<th>Disadvantages:</th>
<th>Disadvantages:</th>
</tr>
</thead>
</table>
| - Results may take longer to achieve. | - Results may take longer to achieve. | - Mostly done under scientific controlled conditions.  
- Expensive at this stage and mostly unavailable to the businesses or the public. (In some countries larvae of the Lady-bird bug are available to the consumer). | - Incorrect or over usage can:  
- Pose a health risk.  
- Pose a risk to pets and wildlife.  
- Be expensive.  
- Upset chemical balance.  
- Pollute ground water. |
Understanding Chemical Control

<table>
<thead>
<tr>
<th>Fungicides</th>
<th>Selective</th>
<th>Targets specific fungal diseases.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Broad spectrum</td>
<td>Able to control more than one fungal disease.</td>
</tr>
<tr>
<td>Pesticides can be broken down into two categories:</td>
<td>Contact</td>
<td>The chemical must make physical contact with the pests and is generally used for pests that are easy to reach.</td>
</tr>
<tr>
<td></td>
<td>Systemic/stomach poison</td>
<td>The chemical is absorbed by the plant and as the pest feeds it is poisoned and is generally used for pests that are not easy to reach i.e. on trees.</td>
</tr>
</tbody>
</table>

Both fungicides and pesticides are available either as:
- Premixed or
- Mix and dilute yourself.

With the mix and dilute varieties there is a risk of contact.

The premixed varieties have the following advantages:
- no wastage
- less chance of skin contact
- no excess to throw away
- easy to store
- Longer shelf life and are therefore considered to be better value for money.
All Chemicals are highly toxic, therefore before identification and removal of pests and diseases can take place we need to understand some basic application rules and follow precautionary measures to safeguard against poisoning:

- Apply strictly in accordance with package instructions.
- Always wear some form of protection when applying chemicals i.e. rubber gloves, long sleeved cotton shirt, long trousers, face mask, goggles. All of, which are necessary, to prevent exposure to the skin, eyes, nose and ears – all areas into which chemicals are easily absorbed.
- Do not smoke, drink or eat (including chewing gum) during application.
- Always mix and spray in a well-ventilated area.
- Store poisons out of reach of children, as many chemicals have the same appearance as soft drinks. Should swallowing occur take child immediately to the doctor together with the label of the product.
- Never throw a poison container away whole. Puncture or break it to avoid re-use by someone else.
- Keep pesticides in their original containers, do not decant.
- Excess mixture should be sprayed on plants and not poured down the drain.
- Consider weather conditions such as wind and rain before applying chemicals as this will have an impact on their effectiveness i.e. rain washes the poison away and wind blows the poison away.
- Best results will be achieved when application is made during early morning or late afternoon.
- To ensure chemical residue is completely removed, wash spraying equipment with warm water and soap after spraying.
- It is preferable to have two sets of spraying equipment – one for insect control, the other for plant control.
- In general try to limit the use of herbicides and pesticides and apply only when absolutely necessary.
Now that you understand the basics of pest and disease control, let’s take a look at how to control the pests and diseases that you have identified.

**Controlling Plant Pests**

<table>
<thead>
<tr>
<th>Pest:</th>
<th>Control Method Choices:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ants</td>
<td>▪ There are a variety of organic and chemical ant traps that can be set. Chemical control remains the main form of control</td>
</tr>
</tbody>
</table>
| **Aphids** *(commonly called plant lice)* | ▪ Remove by spraying with a strong jet of water.  
▪ Handpicking will help reduce the aphid population. Simply squeeze the pests in your fingers.  
▪ Grow nasturtiums within 10 to 15 feet of the plants you want to protect. Aphids are attracted to nasturtiums, so if these pests are in your area, they will show up on the nasturtiums, which you can then destroy.  
▪ Spray with a solution of soapy water – (10 ml dishwashing liquid in 2 liters of water).  
▪ Spray with any organic spray recommended in your workplace (for example: Spruzit, Neudosan, Bioneem, Ludwig’s Insect spray)  
▪ Spray with any chemicals recommended in your workplace (for example: Pirimor, Garden Gun, Rose Care). |
| Australian bug             | ▪ Remove by wiping the infected areas with a damp cloth.  
▪ If present on plant preferences, prune out infected parts of the plant as these plants recover easily.  
▪ Spray with any organic spray recommended in your workplace (for example: Spruzit).  
▪ Spray with any chemical spray recommended in your workplace (for example: Garden Gun, No Insect Outdoors). |
| Beneficial Caterpillars    | ▪ If you want to attract butterflies, leave them alone. |

AgriSETA  
Issue date : June 2006 Version 2
<table>
<thead>
<tr>
<th>Pest:</th>
<th>Control Method Choices:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Allow natural predators like birds to control the caterpillars.</td>
</tr>
<tr>
<td></td>
<td>• Hand pick and destroy.</td>
</tr>
<tr>
<td></td>
<td>• Use chemical control as recommended by workplace procedures</td>
</tr>
<tr>
<td>C.M.R. and Fruit Beetle</td>
<td>• Hand pick and destroy.</td>
</tr>
<tr>
<td></td>
<td>• Allow natural predators like birds to control the beetles.</td>
</tr>
<tr>
<td></td>
<td>• Use chemical spray as recommended by your workplace.</td>
</tr>
<tr>
<td>Cutworm</td>
<td>• Dig soil over before planting annuals and allow birds to feed.</td>
</tr>
<tr>
<td></td>
<td>• Spray with any organic spray recommended in your workplace (for example: Margaret Roberts Biological Caterpillar Insecticide).</td>
</tr>
<tr>
<td></td>
<td>• Spray with any chemical spray recommended in your workplace (for example: Dipterex). Various baits are mainly used in the control of cutworms such as Cutworm Bait.</td>
</tr>
<tr>
<td>Fruit flies.</td>
<td>• Organic and chemical baits are available for use in traps.</td>
</tr>
<tr>
<td></td>
<td>• Spray with Lebaycid alternating with Garden Ripcord from 80% petal drop.</td>
</tr>
<tr>
<td>Grass-hoppers</td>
<td>• Hand pick and destroy them.</td>
</tr>
<tr>
<td></td>
<td>• Trap them in a solution of one part molasses with ten parts of water. Pour this solution in a jar and bury it in the soil to its rim, leaving the top open. The grasshoppers will dive into the sweet solution and drown.</td>
</tr>
<tr>
<td></td>
<td>• Spray with any organic spray recommended in your workplace.</td>
</tr>
<tr>
<td></td>
<td>• Spray with any chemical spray recommended in your workplace.</td>
</tr>
<tr>
<td>Lawn caterpillars</td>
<td>• Allow birds like thrushes and hadedas to control.</td>
</tr>
<tr>
<td></td>
<td>• Place a heisan sack on sections of lawn at night –</td>
</tr>
<tr>
<td>Pest</td>
<td>Control Method Choices:</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Lily borer</strong></td>
<td>▪ Hand pick while small and kill.</td>
</tr>
<tr>
<td></td>
<td>▪ Hand pick several individuals and then drop them into a container of boiling water – allow to stew for a day or two and then pour this juice onto affected plants.</td>
</tr>
<tr>
<td></td>
<td>▪ Spray/drench with any organic spray recommended in your workplace (for example: Margaret Roberts Biological Caterpillar Insecticide).</td>
</tr>
<tr>
<td></td>
<td>▪ Spray with any chemical spray recommended in your workplace (for example: Garden RipCord, Scatter Kill for insects).</td>
</tr>
<tr>
<td><strong>Mealy bugs</strong></td>
<td>▪ Remove by hand by wiping the leaves with a damp cloth.</td>
</tr>
<tr>
<td></td>
<td>▪ Soak an ear bud in a solution of 50% water and 50% mentholated spirits and then remove by hand.</td>
</tr>
<tr>
<td></td>
<td>▪ Spray with a solution of soapy water. (10 ml dishwashing liquid in 2 litres of water).</td>
</tr>
<tr>
<td></td>
<td>▪ Spray with any organic spray recommended in your workplace (for example: Spruzit,).</td>
</tr>
<tr>
<td></td>
<td>▪ Spray with any chemical spray recommended in your workplace (for example: Garden Gun, No Insect Outdoors).</td>
</tr>
<tr>
<td><strong>Psylla.</strong></td>
<td>▪ Prune out affected parts of the plant.</td>
</tr>
<tr>
<td></td>
<td>▪ Spray with any chemical spray recommended in your workplace. Be sure to spray the undersides of the leaves.</td>
</tr>
</tbody>
</table>
### General Certificate in Ornamental Horticulture Level 1

**Workbook:**

Identify and Report Common Pests and Diseases
In Plant Propagation and Landscapes

---

<table>
<thead>
<tr>
<th>Pest:</th>
<th>Control Method Choices:</th>
</tr>
</thead>
</table>
| **Red spider mite.**   | - Water plants in the heat of the day to increase humidity.  
                        | - Spray the underside of the affected leaves with a sugar water solution. Take a vaporizer and mix lots of sugar and warm water until no sugar more sugar can be dissolved into the water.  
                        | - Use sugar water solution together with Red Spider Spray.  
                        | - Spray with any organic spray recommended in your workplace (for example: Ludwig’s Rose Spider Mite).  
                        | - Spray with any chemical spray recommended in your workplace. |
| **Root Nematodes**     | - Grow companion plants that will repel nematodes, for example French marigolds (*Tagetes patula*). The marigolds act as a trap crop. The nematodes enter their roots and once inside they seem to be unable to reproduce. The roots of some plants such as some mustards, grasses, rattlebox and wild chicory are also toxic to some nematodes.  
                        | - Spray/drench with any chemical spray recommended in your workplace. |
| **Rose Chafer**  
(Christmas Beetle) | - Place yellow buckets half filled with water and layer of oil on top of the water under a light at night. Collect them from the bucket in the morning and destroy them.  
                        | - Spray with any organic spray recommended in your workplace (for example: Bioneem).  
                        | - Spray with any chemical spray recommended in your workplace (for example: Karbadust). |
| **Scale Insects**      | - Remove by hand by wiping the infected parts with a damp cloth.  
                        | - Prune out infected part of plants and burn the scale.  
                        | - Spray with any organic spray recommended in your workplace (for example: Spruzit).  
<pre><code>                    | - Spray with any chemical spray recommended in your workplace (for example: Garden Gun). |
</code></pre>
<table>
<thead>
<tr>
<th>Pest:</th>
<th>Control Method Choices:</th>
</tr>
</thead>
</table>
| **Slugs and snails.** | ▪ Remove by hand and sprinkle with salt to destroy them.  
▪ Place dry egg shells or coarse sand around young plants.  
▪ Scatter snail bait used in your workplace or spray with Snailflo. |
| **Whitefly**          | ▪ Remove by spraying with a strong jet of water. Use a nozzle that will produce a fine spray of water and be sure to spray the undersides of leaves as well as the top surfaces.  
▪ Spray with wormwood spray. Pour 2 litres of boiling water over 300 grams of fresh Wormwood or Tansy. Steep for 15 minutes and strain. Use a 1 to 5 diluted mix.  
▪ Spray with any organic spray recommended in your workplace (for example: Margaret Roberts Organic Insecticide)  
▪ Spray with any chemicals recommended in your workplace (for example: Whitefly Insecticide, and No Insects Outdoors). Be sure to spray under the leaves. |
### ACTIVITY 15

Describe the methods that can be used to control pests.
### Controlling Plant Diseases

<table>
<thead>
<tr>
<th>Plant Disease:</th>
<th>Control Method Choices:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fungal Diseases</strong></td>
<td>- Grow varieties of plants that have been bred to be resistant to or tolerant of specific diseases.</td>
</tr>
<tr>
<td></td>
<td>- Use organic fungicides before the disease becomes a problem. Remember when you use a dust or a spray, only those parts of the plant that are actually coated with the fungicide are protected and so you should use some kind of sticker material in your spray mixture. Wash your hands after using these materials and thoroughly wash before eating any fruit or vegetables.</td>
</tr>
<tr>
<td></td>
<td>- Treatment of fungal disease varies, depending on the specific disease. In some case, you should simply remove the affected leaves. However, in most cases you should leave the plant alone and begin some control strategy using fungicidal sprays or dust as recommended in your workplace.</td>
</tr>
<tr>
<td><strong>Viral Diseases</strong></td>
<td>- Grow varieties of plants that have been bred to be resistant to or tolerant of specific diseases.</td>
</tr>
<tr>
<td></td>
<td>- Viral diseases cannot be cured. Remove and destroy the infected plants, even if the symptoms are mild. Do not place diseased plants in your compost pile and clean your hands and tools with a bleach solution made up of one part household bleach to four parts water.</td>
</tr>
</tbody>
</table>
### Bacterial Diseases

- Grow varieties of plants that have been bred to be resistant to or tolerant of specific diseases.
- Sometimes bacteria are carried on seed and they can be disinfected using steam treatment.

Bacterial diseases cannot be cured. All the infected plants must be removed immediately and put in the trash, even if they have only slight symptoms of the bacterial disease. Do not place diseased plants in the compost pile.
Your Turn...

<table>
<thead>
<tr>
<th>ACTIVITY 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the methods that can be used to control diseases.</td>
</tr>
</tbody>
</table>
Lesson Checkpoint

Now that you have worked through this lesson, please check that you are able to do all the specific outcomes and meet the assessment criteria:

- I can describe the methods used to control pests.
- I can describe the methods used to control diseases.
References

- Reader's Digest – Complete Guide to Gardening in South Africa – Volume 1, Second Edition
- Struik Publishers – The Layman’s Guide to Pests and Diseases by Devilliers and Schoeman – Published