



PestSmart eLearning

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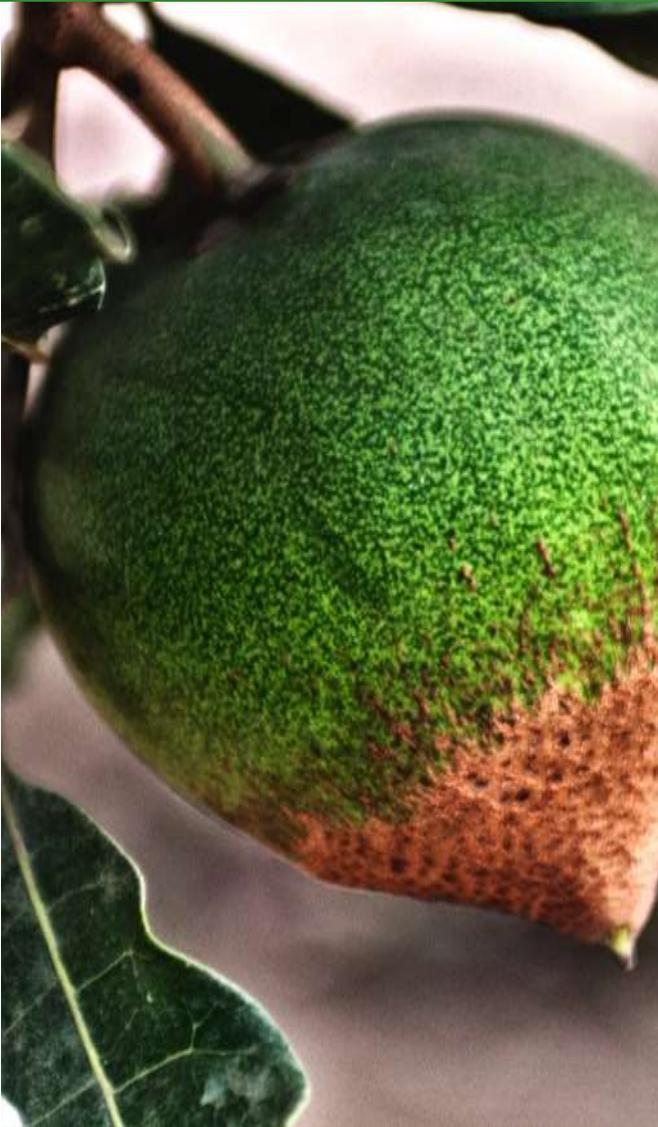
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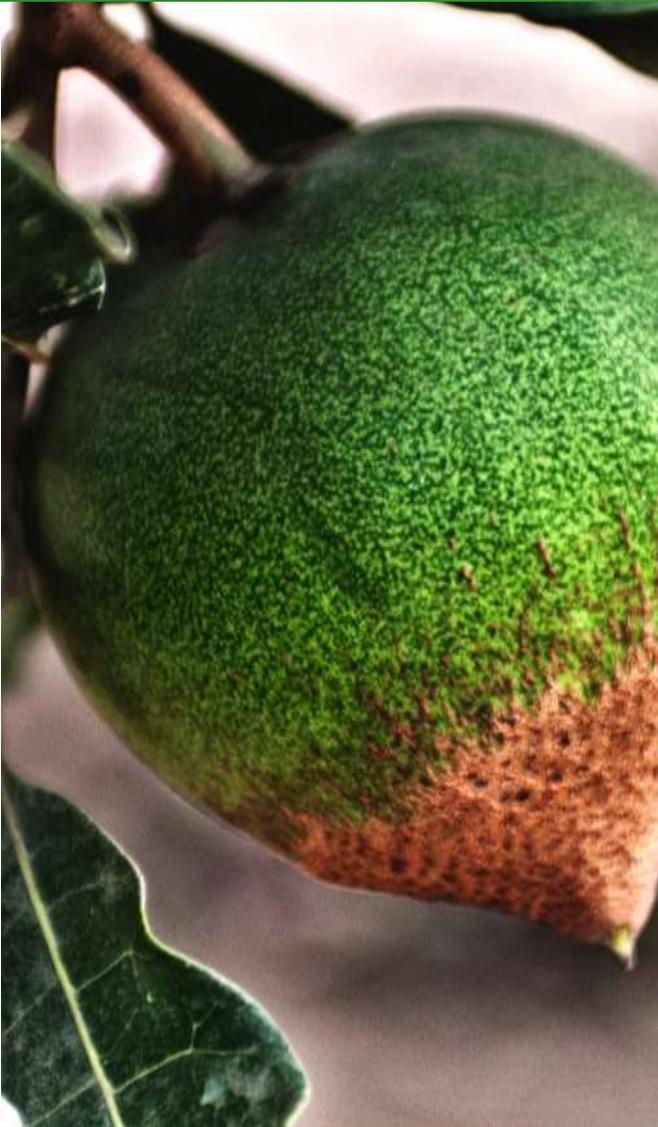
PestSmart is an eLearning course teaching plant diagnostics

- Based CABI's expertise in plant health and diseases, and extensive experience in training students and extension workers in 40+ countries over 15 years.
- Offering practiced and proven methodologies for diagnosis and identification of symptoms and causes of both biotic and abiotic plant health.
- Providing skills needed to identify new and emerging threats to crops, reducing risks to the food supply chain and improving productivity



The **PestSmart** course

- The eLearning modules consists of **5 modules** symptoms, insects and mites, causes, nutrient deficiencies, and finally diagnostics.
- *The Diagnostic Field Guide* supports diagnostic decisions by showing relationships between common symptoms and causes on plants
- *The Simulator App* supports and reinforces investigation and diagnosis skills through engaging gameplay and real time feedback to build confidence and competence in plant pest and disease diagnosis.



PestSmart in Numbers

The eLearning course contains:

- ✓ Over 15 hours of training, broken up into manageable 30 minute lessons
- ✓ More than 1000 high quality photos taken and verified by CABI scientists
- ✓ Over 400 knowledge check questions
- ✓ 5 modules and 22 lessons

The accompany e-book contains:

- ✓ 100 pages of learning material
- ✓ Over 400 images and reference tables

The app contains:

- ✓ 4 crop simulation and diagnostic scenarios
- ✓ Over 20 scenarios

PestSmart Diagnostic Course

Learn how to diagnose and control pests and diseases in the field. Using CABI's extensive knowledge and experience, we have developed PestSmart, an e-learning course with handy reference tools. PestSmart guides learners through identifying symptoms and causes of plant health problems, and introduces a methodology for field-based diagnosis.

Table of Contents



-  **Course introduction**
-  **Module 1: Symptoms**
-  **Module 2: Insects & Mites**
-  **Module 3: Causes**
-  **Module 4: Nutrient deficiencies**
-  **Module 5: Diagnostics**

Select a section from the Table of Contents

Module 1: Symptoms

Lesson 1: Marks and other features on leaves

Start

Leaf spot



The term "leaf spot" is a tricky one, as it can mean different things to different people. A spot on a leaf does not necessarily make it a leaf spot. There are many definitions of leaf spots, but in this course we have taken a very general view and consider it to be a brown area on a leaf with a dead area within it. However, even this definition can be challenged – for example should insect chewing be considered as leaf spots? In this course we suggest not.

Select each image to view in more detail.



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Symptom: leaf spot on taro.

There are four clear spots on this leaf and a few other marks. The four spots consist of a central brown area surrounded by a yellow ring. In three cases the brown central area has torn leaving a hole. Careful observation shows that there are rings within the brown zone.

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Symptom: leaf spot on taro.

Close up of a leaf spot. Note the rings of structure within the leaf spot and the dark (almost black) ring just inside the diffuse yellow halo which surrounds the spot.

Knowledge Check: Question 1



Which of these are considered to be a leaf spot?
Choose one, then **submit**.



A



B



C



D



Correct.

A is correct. This is a classic leaf spot; there is a dead centre and a clear border.

The following answers are not correct:

B: The material (dusty and white) is growing on the surface of the leaves.

C: The dusty orange pustules are bursting out from within the plant.

D: The crusty black growth is over the surface of these leaves.



Module 3: Symptoms

Lesson 1: Fungi Part 1

[Start](#)



Welcome to Module 3 Lesson 1: Fungi Part 1.

Fungi are a diverse group of organisms; most do not attack plants but fungal plant pathogens can be some of the most serious causes of lost yield in any cropping environment. Fungi can attack all plants and all parts of those plants. Some live in the soil and attack roots, whereas others attack the above-ground parts of the plant.

Most fungal plant pathogens are extremely specific with regard to the plants they can parasitize and they are usually unable to attack more than one species of plant. However, a few have a broad host range (i.e. they can attack a range of plants). All plant pathogenic fungi draw their nutrients from the host plants.

By studying this lesson you will:

- View symptoms of marks and other features on leaves, and disturbances to the shape or size of the plant, all caused by fungi
- For any one photograph learn which symptoms are typical of a fungal infection and, crucially, which are not typical, and the reasons why

Pustule – caused by fungi



Pustules are a common symptom almost always caused by fungi.

Some features seen in the photograph indicate a fungal cause, others not so.

Select For and Against to reveal which features are typical symptoms of a fungal infection and which are not.

NB: the photograph is of broad bean rust caused by *Uromyces viciae fabae*.

For

This rust is typical of that caused by fungi:

- There are very few pathogens that can produce pustules and only fungal pustules are brightly coloured
- They grow from within the leaf and burst out. They are almost always dusty with very little host reaction. Note the fungal pustules forming as white dots under the surface of the leaf

Against

- The pustules can drain the plant to such an extent that the leaf dies
- These dead regions can appear like infections from other pathogens

What else might a novice mistake the cause to be? Nothing, it is clearly fungal.

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Leaf spot – caused by fungi



Leaf spots are an extremely common symptom and determining the cause in the field is one of the most difficult aspects of plant pathology. Many aspects of the leaf spots need to be considered to determine the most likely cause.

Select a thumbnail image to find out more (then select the magnifying glass to view an image in high-res).



Leaf spot is a common symptom of fungal infection.

Some features seen in the photograph indicate a fungal cause, others not so.

Select For and Against to reveal which features are typical symptoms of a fungal infection and which are not.

NB: the photograph is of *Cercospora* leaf spot of lettuce caused by *Cercospora lactucae-sativae*.

For

Against



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Knowledge Check: Question 1



Complete the sentence (by selecting the one correct answer):

Fungal leaf spots:



- A. are often associated with the edge of leaves.
- B. will spread along leaf veins.
- C. usually have a clear darker border region.
- D. have a uniform appearance across their area.

Submit



The background image shows a close-up of several large, green, lobed leaves. Numerous small, red, oval-shaped insects, likely scale insects, are attached to the surface of the leaves. The leaves have prominent veins and are set against a blurred background of more foliage.

Module 5 Lesson 1: Easy Diagnosis Exercises

[Start](#)

Easy Diagnosis: Question 5



Choose the most appropriate diagnosis, then select submit.



Select image to view in more detail.

Discrete brown spots of dead areas on the leaf.
This symptom is best described as 'leaf spot'.

The leaf spots appear to be spreading from the edge of the leaf. This means the most likely cause of the symptom is:

- Mites
- Fungi
- Bacteria
- Nematodes

Submit



The background image shows a close-up of green leaves, some of which are covered in a white, powdery substance, likely a fungal infection such as powdery mildew. The leaves are in various stages of being affected, with some showing significant white coverage and others appearing relatively healthy.

Module 5 Lesson 2: Collaborating on a Diagnosis

[Start](#)

Collaborating: Question 1



Choose the most appropriate option, then select submit.



On inspection of this photograph one of your colleagues has provided a diagnosis of 'fungal leaf spot'.

Select the image to view it in more detail.

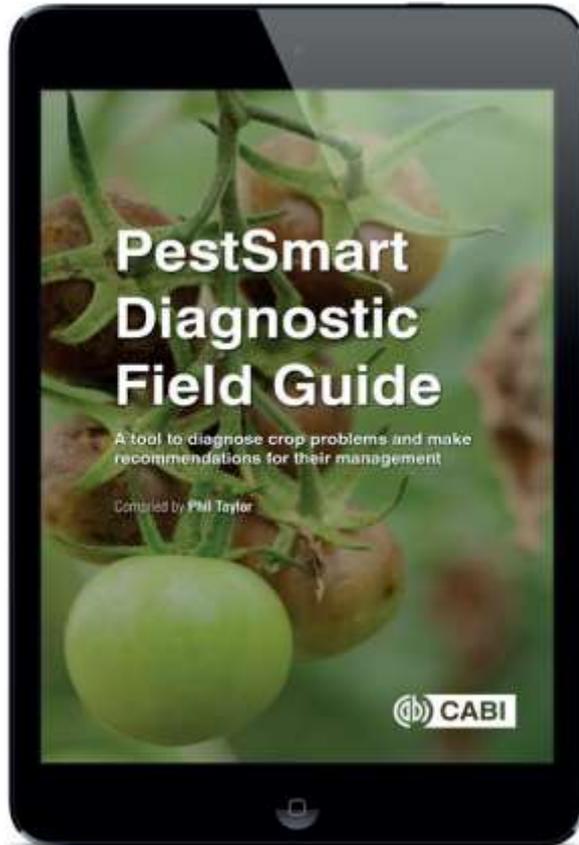
Which of the statements below do you most agree with?

- Agree with the diagnosis that the cause is definitely fungal
- Agree that the cause is probably fungal
- Whilst it is possible, it is unlikely that the cause is fungal
- The diagnosis is clearly incorrect and fungi could not cause these symptoms

Submit



PestSmart Diagnostic Field Guide



PestSmart Diagnostic Simulator App



Fun and interactive tool to test learning on plant diagnosis.



Linking symptoms to problems



TARGET AUDIENCE



Course can be used both as a *teaching aid* for instructors, *self-directed learning* for students or *continuing professional development programme* for practitioners

Users:

- Lecturers and students in Plant Sciences, Crop Science, Horticulture, Plant Health Sciences
- Extension officers
- Crop managers
- Plant quarantine officers
- Crop protection practitioners
- Plant pathologists
- Farmers and agronomists
- Agrochemical industry



Key Benefits

- Fast-track the field based experience of plant health professionals and students
- Enabling learners to go directly out into the field and apply their learning
- Course enable the learner to assess their own progress as they go
- Not restricted to growing seasons can be taught at any time of year
- Engaging youths in agriculture through gamification in learning

Future plans

- To cover other important topics in agricultural science
 - ***PestSmart Diagnostics (2018-19)*** – the diagnosis of plant disease ✓
 - ***PestSmart Management (2019-20)*** – recommendations for managing plant disease
 - ***Customized eLearning (2020-21)*** – other eLearning packages for elements of the core agricultural curriculum

CABI would welcome the opportunity to work with partners to test and roll-out the programme.

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 kiitos
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 terima kasih
 tak
thank you

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