

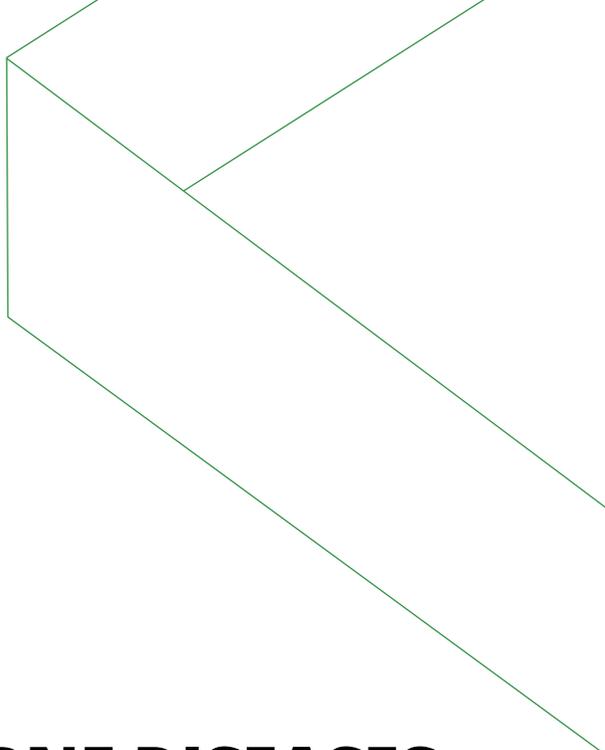


2019

# SOIL-BORNE DISEASES IN VEGETABLE CROPS

A practical guide to identification and control





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# **SOIL-BORNE DISEASES** IN VEGETABLE CROPS

A practical guide to identification and control



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## TABLE OF CONTENTS

Introduction			5
How to use this guide			6
<b>BRASSICAS</b>			
Beet cyst nematode	12	Fusarium wilt/Yellows	28
Black leg	16	Root-knot nematode	32
Clubroot	20	Sclerotinia rot (white mould)	36
Damping off/wirestem	24	Verticillium wilt	40
<b>CAPSICUM, CHILLI AND EGGPLANT</b>			
Bacterial wilt	46	Root-knot nematode	62
Damping off	50	Sclerotinia (white mould)	66
Phomopsis blight	54	Sclerotium rot	70
Pythium root rot	58	Verticillium wilt	74
<b>CARROT, CELERY, PARSNIP AND PARSLEY</b>			
Black canker	80	Leaf curl/ celery anthracnose	108
Black root rot	84	Root-knot nematode	112
Carrot scab	88	Root-lesion nematode	116
Cavity spot	92	Root rot complex	120
Crater rot	96	Sclerotinia (white mould)	124
Crown rot	100	Sclerotium rot	128
Damping off	104		

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GREEN BEANS AND PEAS			
Aphanomyces root rot	134	Pea wilt	154
Ashy stem blight (charcoal rot)	138	Pythium stem rot	158
Black root rot	142	Rhizoctonia root rot	162
Black spot (ascochyta blight)	146	Sclerotinia rot (white mould)	166
Fusarium root rot	150	Sclerotium rot	170
LETTUCE, ENDIVE AND ARTICHOKE			
Anthracnose (shot hole or ring spot)	176	Damping off	192
Black root rot	180	Lettuce big-vein disease/Mirafiori lettuce virus complex	196
Bottom rot	184	Sclerotinia rot (white mould)	200
Corky root rot	188	Root-knot nematode	204
PUMPKIN, SQUASH, ZUCCHINI AND CUCUMBER			
Charcoal rot	210	Gummy stem blight	226
Damping off	214	Root-knot nematode	230
Fusarium foot rot	218	Sclerotinia rot (white mould)	234
Fusarium wilt	222	Sclerotium rot	238
SPINACH, SILVERBEET AND BEETROOT			
Aphanomyces root rot/damping off	244	Damping off, root rot or vascular wilt	256
Beet cyst nematode	248	Root-knot nematode	260
Cercospora leaf spot	252		
SPRING ONIONS, LEEK AND GARLIC			
Damping off	266	Pink root	278
Fusarium basal rot	270	Stem and bulb nematode	282
Leaf blight	274	White rot	286
SWEET CORN			
Boil smut	292	Fusarium cob rot	300
Damping off	296	Head smut	304

## INTRODUCTION

Soil-borne diseases present an ongoing challenge to the Australian vegetable industry, with an estimated \$120 million in losses annually.

Soil-borne diseases may be caused by fungi, bacteria, water moulds, nematodes and viruses living in the soil. These pathogens are able to survive for long periods on plant debris, organic matter or sometimes as free-living organisms, i.e. not requiring a plant host. The ability to survive for long periods in the soil, and often having a wide host range, makes control of soil-borne diseases difficult.

There are many factors that influence how often and how seriously pathogens in the soil will impact on plant health. They include the plant genetics, environmental conditions, cultural practices and the types of other microbes present in the soil or root zone (see Figure 1).

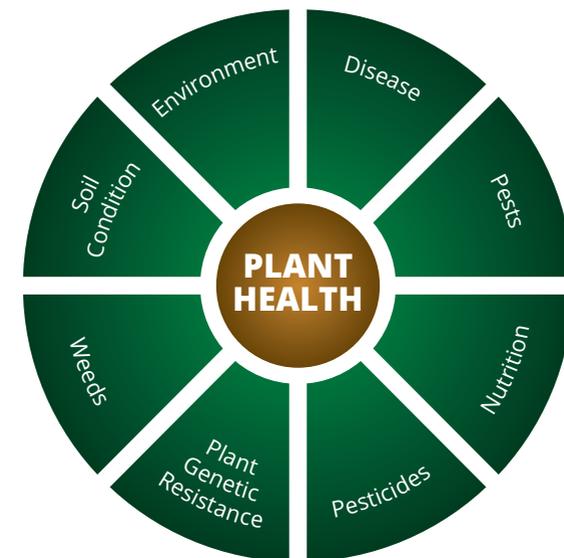


Figure 1. Factors contributing to plant health and resilience to soil-borne diseases.

Some of these factors are more easily controlled than others and knowing how to best manage them to optimise plant health can be very powerful in the fight against soil-borne diseases.

## HOW TO USE THIS GUIDE

The book is divided into chapters based on vegetable crop families.

**EACH CHAPTER WILL COVER**

1. How to identify the most common soil-borne diseases affecting vegetable crops in Australia and conditions which favour disease
2. Summary of the methods available for control

Details on where you will find this information are provided below

Chapters are divided by crop families and this will appear at the top and to the side of every page, along with the common, or everyday name of the disease.

**CROP FAMILY**  
**COMMON NAME**  
*Scientific name*

**WHAT SHOULD I LOOK FOR?**

Sometimes there are different common names for the same disease. To avoid confusion the scientific name - which is the same the world over - is also provided.

Here you will find images of typical symptoms of the disease to help with identification.

Description of symptoms and additional information to help in disease identification.

<p><b>WHERE WILL I SEE SYMPTOMS?</b></p> <p>STEM LEAVES</p>	<p><b>FAVOURABLE CONDITIONS FOR DISEASE DEVELOPMENT</b></p> <p>WET WARM WINDY</p> <p>• 15-20°C</p>
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The parts of the plant where you will see symptoms are shown here.

The environmental conditions which favour disease development are identified here.

Look here for further information on typical survival time, which varies depending on soil type, climate, etc.

**CROP FAMILY | COMMON NAME**

Here you will find images of typical symptoms of the disease to help with identification.

Some diseases are seen in large areas and others are scattered in pockets across the field. This section gives a clue on what you should expect to see in the field.

Description of symptoms and additional information to help in disease identification.

<p><b>DISTRIBUTION IN THE FIELD</b></p> <p><b>SCATTERED</b>          Individual/small patches of infected plants</p>	<p><b>HOW DOES IT SPREAD?</b></p> <p>FREE WATER WIND MOVEMENT OF CONTAMINATED SOIL CONTAMINATED PLANT DEBRIS</p>
<p><b>SURVIVAL TIME WITHOUT HOST</b>   More than 10 years</p>	

Soil-borne diseases can be spread by different mechanisms, which are summarized here.

Here you will find options for disease control divided into sections based on when the strategies for control are best applied.

**HOW DO I CONTROL IT?**

<p><b>FALLOW/COVER CROP</b></p>	<p><b>HOST-FREE ZONE</b> Control volunteer host plants and weeds</p> 	<p><b>FARM HYGIENE</b> Stop movement of contaminated soil, water, plants and equipment</p> 	<p><b>CHEMICAL FUMIGATION</b> Always use with care and as per label</p> 	<p>The fallow period refers to the time between crops when the field is typically bare. In vegetable production systems this period can be very short. Where possible, longer fallow periods can be useful in the fight against soil-borne disease and good management during this time is critical. Alternatively a cover crop or break crop (non-vegetable crop) may be grown to provide ground cover and improve soil health. If it does not act as a host to the disease, a cover crop can also be valuable in providing a break in the disease cycle and can help control soil-borne disease.</p>
<p><b>PLANTING PREPARATION</b></p>	<p><b>CROP SELECTION</b> Choose a resistant/less susceptible cultivar</p> 	<p><b>DRAINAGE</b> Plant on raised beds or well-draining soil</p> 	<p><b>SOIL SOLARISATION</b> Cover soil with a tarp and kill harmful pathogens</p> 	<p>Planting preparation is the period immediately leading up to planting. Typically this is referring to the 4 to 6 week period pre-planting but this will vary depending on the crop rotation system.</p>
<p><b>POST-PLANT</b></p>	<p><b>AVOID OVER IRRIGATION</b> Saturated soils favour disease development and spread</p> 	<p><b>CONTROL PESTS</b> Control insect pests that spread spores</p> 	<p><b>CHEMICAL TREATMENT</b> Treat plant with registered foliar fungicide</p> 	<p>Control of soil-borne diseases post-planting can be a challenge. While control options are often limited, some are presented here, as well as recommendations on where to go for the most current information.</p>

**HOST RANGE**

This section outlines some of the other plants that host this disease. This is an important consideration when planning crop rotations.