



## Raspberry rootrots in Victoria

W.S. Washington, Knoxfield

December, 1999

AG0163

ISSN 1329-8062

**A number of fungi have been shown to cause root rots of raspberry plants overseas. These include species of *Phytophthora*, *Armillaria*, *Verticillium*, *Fusarium*, *Pythium* and *Rhizoctonia*.**

In Victoria, however, only two fungi have been shown to cause root rots in raspberry. One of these diseases, white root rot, is caused by a species of *Vararia*. This disease was first recorded in Victoria in 1897. The other disease, phytophthora root rot, is caused by several species of *Phytophthora* and has only been known on raspberry in Victoria since 1984. Both diseases cause a similar root rot and dieback, but white root rot differs in that the below-ground parts of infected plants are covered with a characteristic white fungal growth. Despite some similarities, these two diseases show many important differences in their behaviour. These are discussed below.

### Host range and distribution

**White root rot** has been recorded from raspberry, loganberry, wild blackberry (*Rubus fruticosus* agg.) and once on plum. However, serious losses have only been recorded on raspberry. The raspberry cultivars known to be susceptible include Lloyd George, Malling Promise, and Willamette, but no evidence of resistant cultivars has been found.

The disease appears to be restricted mainly to the red mountain soils east of Melbourne, and has once been reported from Tasmania. It has not been recorded outside Australia, although a white root rot caused by different fungi has been reported from raspberry in New Zealand.

**Phytophthora root rot** of raspberry in Victoria is caused by *P. fragariae* var *rubi*, *P. cryptogea* and *P. rubi-idaei*, although the first species is the most important. The relative susceptibility of raspberry cultivars to disease caused by *P. fragariae* var *rubi* has not been determined. Tests by DPI with *P. cryptogea* found that all 12 cultivars of raspberry tested were infected by this pathogen, but a range of resistance to the disease was apparent. The cultivars Nootka, Chilcotin, Haida and Puyallup proved to be most resistant, while Glen Clova and Canby were the most susceptible.

Phytophthora root rot of raspberry has been recorded from plantings in southern and northern Victoria, and from

plantings in New South Wales, South Australia and Tasmania.

### Symptoms

**White root rot** causes yellowing and premature autumn colouring of plant foliage, followed by rapid wilting and dieback. When young plants are attacked, all the canes die simultaneously, but old bushes die gradually, a few canes at a time. The disease also causes a rotting of roots and canes below ground level. The most characteristic feature of this disease is that the affected parts below ground level are covered with a dense white to cream coloured mycelial mat. White fungal strands (rhizomorphs) develop on the surface of these parts.

Plants affected with **Phytophthora root rot** show similar symptoms to those caused by white root rot, but show no white mycelial mat. Some plants show a characteristic grey or brown discolouration extending upwards from the roots; this is easily seen when the outer bark is cut away.

### Economic importance

**White root rot** is an important disease of raspberry, which in some cases has spread rapidly and practically destroyed entire plantations in three to four years. However, the disease more often spreads slowly, killing only a few bushes each year.

**Phytophthora root rot** is most important during wet seasons which favour infection, and in high rainfall, poorly drained plantings. It has been found causing dieback in a number of raspberry plantings in Victoria, New South Wales, South Australia and Tasmania.

### Disease cycle

Little is known about the disease cycle of **white root rot** as few studies have been made of this disease. The causal fungus is known to require a food base before being capable of infecting healthy plants, and can probably survive in soil for several years on infected raspberry roots or canes.

The disease is most severe when soil moisture is low and soil temperatures are high. Spread from diseased plants to adjacent healthy plants occurs mainly via root contact, but cultivation may also spread infected root and cane

material. The disease can also be introduced to a site through infected planting material.

Similarly, little is known about the disease cycle of **Phytophthora root rot** of raspberry, as few studies have been made of the disease. However, it is known to be favoured by wet soil conditions. Thus it is likely that wet seasonal conditions, heavy, poorly drained soils, or soils that are over irrigated should favour disease.

The fungus can persist in soils for several years, and can spread in irrigation or drainage water, or through saturated soil. This disease can be introduced to a site through infected planting material and also in contaminated soil.

### Prevention measures

Root diseases are particularly difficult to control, and every effort should be made to prevent them becoming established in a planting.

The following factors are most important:

- Choose sites that are suitable for raspberry production. Pay particular attention to soil structure, ensuring that the soil is deep and well drained and that adequate irrigation water is available. Where such soils are not available, considerable effort will be needed to improve the soil to a suitable condition.
- Ensure that planting material is of the best quality available and where possible, free from disease. DPI operates a certification scheme for raspberries, and aims to meet these standards.

- Fumigate soils that have recently grown horticultural crops such as raspberries, tomatoes and potatoes with a suitable soil fumigant before planting raspberries.

### Control

In a planting that shows symptoms of dieback, the cause of the condition must first be established. Possibilities include drought, hot dry winds, waterlogging, weed competition, inadequate nutrition, foliar diseases, insect pests, nematodes and root rots. White root rot has quite distinctive symptoms (see above), but the presence of *Phytophthora* root rot or other diseases such as *Verticillium* wilt (common in raspberries in North America) is best confirmed by laboratory testing. Contact your local DPI office to arrange these tests.

Specific control measures for **white root rot**:

- Dig out and destroy infected plants and any plants immediately adjacent to these plants (to prevent spread of the disease)
- Fumigate replant sites where white root rot is present
- Provide adequate irrigation to prevent plants drying out.

Specific control measures for **Phytophthora root rot**:

- Avoid over irrigation, and improve soil structure and drainage e.g. plant into raised beds
- Plant more resistant cultivars.

For effective pest and disease control, correct diagnosis is essential. A commercial diagnostic service is available at the Institute for Horticultural Development. For further information, contact the Diagnostic Service. ph: 03 9210-9222 or fax 03 9800 3521.

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