

PHYTOPHTHORA ROOT AND COLLAR ROT OF COLD TOLERANT EUCALYPTS



INTRODUCTION

Phytophthora root and collar rot is a serious disease on a wide variety of economically important plants. These include many commercially important forestry species. *Phytophthora cinnamomi* is the best known and most important species of *Phytophthora* associated with die-back and collar rot of eucalypts. This fungus has been reported from many parts of the world and the best known disease of trees is Jarrah (*E. marginata*) die-back in Western Australia. In South African plantations, the disease occurs scattered throughout or in small patches. Water logging and the resulting poor aeration of the soil predisposes the roots to infection.

HOST RANGE

Phytophthora cinnamomi has a wide host range including eucalypts, avocado, peaches and apples. This fungus is thus economically important

SYMPTOMS

The most obvious symptom on trees infected with *P. cinnamomi* is a general wilting of the leaves. This follows the rotting of the cambium of the roots. In this case the bark from these roots easily slips off the woody parts. If the root collar of the tree is infected and girdling occurs, the tree dies. When older trees are infected, growth and subsequent yield is negatively affected. Phytophthora root and collar rot may also lead to secondary causes of mortality such as where wind causes trees to fall over due to reduced root systems. This is common in three to four year old *E. smithii* trees.

BIOLOGY

Phytophthora spp. overwinter as oospores, chlamydospores, or mycelium in infected roots or these spores may also overwinter in soil. When conditions are favourable, the spores germinate to produce zoospores. The zoospores swim around in the soil water and infect roots of susceptible hosts with which they come in contact. More zoospores are produced during wet, cool weather and spread the disease to more plants. In dry, hot or too cold weather the fungus survives as oospores, chlamydospores

to a number of industries and considerable research has been conducted, particularly in the case of avocado, to prevent disease outbreaks. In South Africa, cold tolerant eucalypts, *Eucalyptus smithii*, *E. fraxinoides* and *E. fastigata*, are highly susceptible to this disease of which *E. fraxinoides* is the most susceptible. If trees less than two years of age are infected by this fungus, they are usually killed.



Discoloured infected woody tissue after inoculation.



Death of young *Eucalyptus smithii* caused by *P. cinnamomi*.



Typical symptoms of Collar Rot.

or mycelium until conditions become favourable once again for infection.

MANAGEMENT STRATEGIES

Phytophthora spp. have a motile stage in their life cycle and they commonly occur in irrigation water. They can therefore cause serious losses in eucalypts nurseries. The chemical treatment of water, particularly river water, is necessary to control the disease caused by the pathogen. Repeated use of media in the nursery can also cause outbreaks of the disease. The application of fungicides is recommended to control *Phytophthora* root rot in hosts other than eucalypts. If



Sporangia containing zoospores of *P. cinnamomi*.

these fungicides are used in eucalypt nurseries, phytotoxicity tests should first be done. The adage "prevention is better than cure" applies to this disease and sanitation practices should be routinely applied in nurseries.

If cold tolerant *Eucalyptus* spp. are planted, substantial losses can occur. The only safe approach currently is to avoid these species or to avoid sites that favour the disease. These sites may include those previously planted to other hosts of *P. cinnamomi*, for example, *Acacia* spp. At present, research is underway to identify disease tolerant families, so as to avoid the associated disease. This is based on the

fact that disease tolerance has been found in certain families of *E. marginata* and *P. radiata*. Species such as *E. fraxinoides* have excellent pulping and paper qualities, it is hoped that in future, they can be planted on large scale in the colder regions of our country.

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Back to [INDEX](#) of pamphlets...
