FLORA

DIEBACK – PLANT PATHOGEN

by Roger Armstrong, Kevin Vear and Frank Podger

SINCE 1921 it has been evident that an increasing number of patches of formerly healthy jarrah forest has become afflicted with a lethal disease now known as "jarrah dieback".

It wasn't until 1964 that the role of the fungal plant pathogen *Phytophthora cinnamomi* as the cause of dieback was established. Since then it has been isolated in a wide variety of vegetation types in the southwest.

P.cinnamomi is a soil-borne fungus of foreign origins. It almost certainly entered Western Australia for the first time on soil around the roots of cultivated plants, shortly after European settlement in 1827. Until the effective implementation by Australia of quarantine regulations over the import of exotic soil and plant products there must have been innumerable introductions at many points of entry around the continent and its redistribution within the country over a period of some 150 years.

P.cinnamomi has now extended its largely unfettered colonisation of the southwest by human movement of infested soils. This epidemic of colonisation has produced a complex mosaic of infested and uninfested areas.

Infested sites are very widely distributed over some 20% or more of the natural vegetation in areas throughout that part of the Southwest Land Division which receives mean annual rainfall in excess of 800mm and occur sporadically at lower rainfall.

Within the 600-800mm rainfall zone the occurrence of *P.cinnamomi* is also widespread but much less extensive. In this zone severe damage to native vegetation is largely confined to water-gaining sites or to years of abnormally high summer rains. In these circumstances localised patches of the vegetation may periodically suffer severe damage with intervals of recovery during dryer periods.

In areas receiving <600mm, dieback due to *P.cinnamomi* is restricted to circumstances where localised hydrological effects, such as the shed from granite bosses or rising ground water tables associated with upslope land clearance in the catchment, cause effective rainfall to substantially exceed the regional patterns.

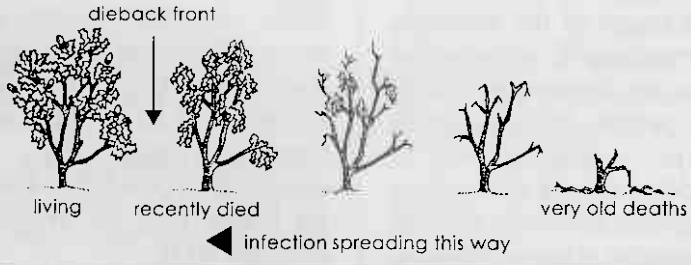
There is no record of *P.cinnamomi* in regions receiving <400mm.

The effect of *P.cinnamomi* upon the health of plant communities, and upon the species in them, varies greatly. In many places, where environmental factors favour the pathogen and plant communities contain many susceptible species, lethal root-disease destroys the structure of many native communities, reduces their floristic diversity, decimates their primary productivity and destroys habitat for dependant native fauna. In other places where environmental factors and susceptibility of the flora do not favour disease development the pathogen causes little damage at all. Unfortunately the extent of susceptible communities in vulnerable environments is much greater than that of communities which occur in environments which are inherently unfavourable to the pathogen.

As landowners with vegetation on your properties that may be susceptible to dieback, you should be aware of some of the basic symptoms of the disease and the risks that need to be managed to minimise the chance of the disease affecting your remnant vegetation.

There are many other organisms and stochastic events that can result in the death of plants. Frost, herbicide drift, insect attack, fire and other fungi are just a few. Determining if the death of plants is associated with *P.cinnamomi* is a specialised task that takes many years of experience to become accomplished at. However, a few simple observations will help you decide if you need help (see table).

An experienced person has knowledge on what species of plants are more susceptible to disease than



Likely to be *P.cinnamomi*	Less likely to be *P.cinnamomi*
More than one species of plant dying.	Only one species of plant dying
In a moisture gaining site	On an upslope well drained soil
Plants have continued to die over time	Borer holes or insect frass evident around plant
Plants do not recover from looking sick	Plants looked sick but some are recovering
All of the plant appears to be dying	Only a small part of the plant is dying

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others and the impact that the pathogen is likely to have on those plants in various environmental situations. Assistance may be available at your local CALM office.

The pathogen can be introduced to your property via infested soil or infected plant material. Common routes for these materials to enter the property are as dirt and mud on machinery, gravel used to surface tracks etc and as infested plant seedling stock. Simple precautions associated with vehicle cleanliness and ensuring that seedlings come from nurseries accredited by the Nursery Industry Assoc. will minimise this risk. The pathogen will also move down hill in soil water. Any infested areas above your remnant in the landscape represent a source of the pathogen that could spread to, and affect your remnant.

Once an area becomes infested the native vegetation may be able to be protected from the ravages of the disease by treating it with a Phosphite solution. This can either be applied by injection into larger trees or as a foliar spray over smaller shrubs. Phosphite is available commercially under a number of product names and enquiries at your local nursery of rural retailer will guide you to the appropriate product.

If you have remnant containing susceptible vegetation, you must be aware that access to this area by dirty machinery, water from infested sites or infested plant material could lead to the infection and death of plant species within the remnant. This will affect the commercial, aesthetic and biodiversity values of your remnant. Constant vigilance and care is required to minimise the risk of introducing *P.cinnamomi.*

All the authors have extensive experience in Phytophthora Dieback management. Roger Armstrong is Senior Environmental Officer at CALM Bunbury, Kevin Vear is Dieback Coordinator at CALM Crawley, and Frank Podger is an Environmental Consultant specialising in plant disease.