

ASSOCIATION OF *Macrophomina phaeseoli* WITH A DISEASE
OF *Pinus pinaster* IN A DIEBACK SITE.

3.

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Introduction.

Since 1950, *Pinus pinaster* has been planted extensively on dieback areas and has generally grown well. During the summer of 1967 however, officers of the Mundaring Division observed patch dying of *P. pinaster* in a trial planting known as "The Dell".

The planting site is in the head of a shallow gully and is surrounded by jarrah forest affected by dieback. The *P. pinaster* was planted in 1956 on a shallow sandy gravel over massive ironstone. Two years later, *P. radiata* was planted on a lateritic silt in the moister portion of the gully. The site was ploughed but not fertilised.

At age 11 years, the *P. pinaster* ranged in height from 3' to over 25'. The stocking was variable, suggesting considerable losses during establishment. Canopy closure had not been attained. In contrast, the *P. radiata* had closed canopy on account of its better stocking and growth rates.

Mortality occurred during mid to late summer and approximately 50 *P. pinaster* and 6 *P. radiata* had died. The roots of dying trees were noticeably darkened (lesioned), including the larger roots of $\frac{1}{4}$ " to $\frac{1}{2}$ " in diameter. *P. cinnamomi* was recovered from soil samples. Though a considerable number of lesioned roots were plated, *P. cinnamomi* was not recovered.

Inspection of diseased roots revealed black fungal structures (pycnidia and sclerotia) embedded in the wood and bark tissues. These structures were plated and a fungus tentatively identified as *Macrophomina phaeseoli* was recovered.

This culture was compared with known isolates of *M. phaeseoli* and was similar to these in all respects.

Macrophomina phaeseoli.

This fungus is classified in the group Deuteromycetes (the imperfect fungi). This constitutes a group of fungi that reproduce by asexual means and whose sexual stage has either not been discovered or else no longer exists.

Small (approximately $1/32$ "), black pycnidia and sclerotia are usually formed in abundance on diseased tissues. The former contain colourless spores, the latter are made up of hard rounded masses of hyphae.

This pathogen can cause root and stem rot in a variety of woody hosts. Damage may be severe, particularly under hot and dry conditions. Fungal development is best at high soil temperatures (around 86°F).

The pathogen has been recovered from dying *P. pinaster* seedlings at the Wanneroo Research Nursery and from *P. pinaster* and *P. radiata* nursery stock in South Australia. The disease is commonly known as "charcoal or black root rot".

Control.

M. phaeseoli is generally regarded as a "weak" pathogen which requires the plant to be predisposed before it can gain entry. Control measures should therefore aim at improving the conditions for plant growth.

With nursery stock, the level of damage may be reduced by adequate watering, shading or fertilisation (particularly with minor elements). Fungicidal drenches and fumigation could also be used.

Under field conditions, adequate site selection, site preparation and fertilisation will reduce the incidence of this disease. These measures should result in improved growth, early canopy closure and a depression of soil temperatures.

Conclusion.

The possibility that *P. cinnamomi* is contributing to this disease cannot be excluded. However, it is unlikely that *P. cinnamomi* is the major cause and it is probably just one of a number of predisposing factors.

It is considered that *M. phaeseoli* is unlikely to become a serious pathogen under West Australian conditions unless the host species is planted "off site" or is subjected to some predisposing factor.

When unexplained mortalities occur, roots less than $\frac{1}{2}$ " should be excavated and examined for the presence of pycnidia and sclerotia (a 10X lens is quite suitable).

Appendix.

Known Hosts of *M. phaeseoli*.

Eucalyptus globulus	Pinus muricata
Eucalyptus robusta	Pinus pinaster
Cupressus macrocarpa	Pinus radiata
Pinus echinata	Pinus halepensis.