

***Phytophthora* in Australasia and the way forward in disease management**

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Abstract. Unlike the USA and Europe, Australasia has not in the last two years faced any unexpected developments in new *Phytophthora* diseases in forests and natural ecosystems. Consequently, we will focus on the way forward for disease management and examine the challenges that will need to be faced over the next few years to control the impact and rate of spread of this disease.

Measuring resistance in jarrah, *Eucalyptus marginata*, to *Phytophthora cinnamomi*: What factors change disease expression?

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Abstract. The interaction between *Eucalyptus marginata* (jarrah), the dominant and important timber species in jarrah forests, and *Phytophthora cinnamomi*, is not a co-evolved one. Jarrah appears to have a wide range of variability in resistance to *P. cinnamomi* in the forest. Jarrah clonal lines resistant (RR) and susceptible (SS) to the pathogen have been produced (1).

Our glasshouse mortality trial showed that the capacity of 73 isolates to cause disease ranged from killing all plants (59 days) to plants being symptomless (182 days) (2). Comparison of branch and root inoculations in situ confirmed that branches are a valid option for testing resistance of young jarrah (3). No jarrah clonal line maintained its resistance level in a series of experiments using different inoculation methods, different environmental conditions and when challenged by individuals from a large range of *P. cinnamomi* isolates (2-4). Even the most promising RR line had replicates that became diseased with time in various treatments.

To develop robust resistance, further screening work may be required using more isolates varying in their capacity to cause disease and a broader range of environmental conditions that favour the pathogen, particularly at 25-30°C (4). Jarrah trees are affected by many environmental conditions during their life cycle (500-1000 years). Consequently, clonal lines that survive such rigorous screening may be durably resistant and survive in disease impacted sites.

1. McComb *et al.* (1990). Selection and propagation of jarrah for dieback resistance- A progress report. *Combined Proceedings of the International Plant Propagators' Society* **40**, 86-90
2. Hüberli *et al.* (2001). Phenotypic variation in a clonal lineage of two *Phytophthora cinnamomi* populations from Western Australia. *Mycological Research*, **105**, 1053-1064.
3. Hüberli *et al.* Evaluation of resistance to *Phytophthora cinnamomi* in seed-grown trees and clonal lines of *Eucalyptus marginata* inoculated in lateral branches and roots. *Plant Pathology*. **51**, 435-442.
4. Hüberli *et al.* (2002). Temperature and inoculation method influence disease phenotypes and mortality of *Eucalyptus marginata* clonal lines inoculated with *Phytophthora cinnamomi*. *Australasian Plant Pathology*. **31**, 107-118.