## SCOPE ITEM 5

# *EX SITU* CONSERVATION OF *PHYTOPHTHORA*- AND CANKER-THREATENED SPECIES OF WESTERN AUSTRALIAN NATIVE PLANTS

## PART B

# SUSCEPTIBILITY OF RARE AND THREATENED FLORA TO *PHYTOPHTHORA CINNAMOMI*

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## 1 INTRODUCTION

*Phytophthora cinnamomi* infection is a major threatening process affecting the viability and genetic diversity of populations of rare and endangered flora of south-western Australia. In 1992, the Threatened Flora Seed Centre (TFSC) was established by the Department of Conservation and Land Management as part of an integrated conservation strategy for the genebanking of threatened and rare flora.

While considerable progress has been made in the collection and storage of seed, little is known about the susceptibility of the stored taxa to *Phytophthora*. Current estimates of the susceptibility of rare taxa are usually of an empirical nature or based on observations of family susceptibility. However, species within susceptible families such as the Proteaceae, Papilionaceae and Myrtaceae, vary greatly in their sensitivity to *P. cinnamomi* infection (Shearer & Dillon, 1995; 1996). There is a need to systematically test taxa in the TFSC collection to determine their susceptibility to *Phytophthora* and thereby facilitate prioritisation of endangered species according to requirements for protection from the pathogen. Seeds in the TFSC collection are routinely tested for germination and are available for this work.

## 2 OBJECTIVES

This study is concerned with Scope Item No. 5 for the *Phytophthora* and *Diplodina* canker project (1997/98) and more specifically, with determination of the susceptibility of endangered flora (held in the TFSC) to *P. cinnamomi* in order to:

- rank the taxa in the TFSC according to susceptibility to *P. cinnamomi*;
- identify intra-specific variation in susceptibility to *P. cinnamomi* and the potential for selection of resistant individuals;
- determine intra-familial variation in susceptibility to *P. cinnamomi* between endangered species; and
- determine inter-familial variation in susceptibility to *P. cinnamomi.*

## 3 METHODS

Seedlings were established in pots as germinated seeds became available from the TFSC.

Specimens of *P. cinnamomi* were recovered from the vicinity of endangered flora. Appropriate isolates for inoculation of particular hosts were selected on the basis of origin and grown on pine plugs (8-15mm diam.; 20-30mm long) derived from young, debarked branches of *Pinus radiata.* After autoclaving, the plugs were inoculated with *P. cinnamomi* and incubated for one month at 25° C. Thick aerial mycelium covered the plugs by the end of three weeks. Pots were inoculated centrally with three plugs, located lengthwise on top of one another. Controls were non-inoculated pots for each species-isolate combination, and inoculated pots of susceptible *Banksia* spp. including *B. grandis* and the rare and endangered *B. brownii.*

Seedlings from 85 species in 15 families were established in pots as germinated seeds became available from the TFSC. In March, 1998, 17 species in 6 families were inoculated with *P. cinnamomi* (Table 1).

The periods of time between (a) inoculation and first appearance of a root collar lesion and (b) inoculation and plant mortality were recorded. Diseased tissue from dead plants was surface sterilised and incubated on selective agar to re-isolate and confirm the presence of the pathogen.

## 4 RESULTS

Results are not yet available as monitoring of plant death and infection are still continuing. A second inoculation trial will commence in spring, 1998.

**Table 1. Native flora included in pathogenicity tests with *Phytophthora***

| Family | No. of Species Planted | No. of Species Inoculated |
|---|---|---|
| Casuarinaceae | 2 | |
| Dilleniaceae | 1 | 1 |
| Epacridaceae | 1 | |
| Iridaceae | 1 | |
| Lamiaceae | 3 | 1 |
| Menyanthaceae | 2 | |
| Mimosaceae | 10 | 4 |
| Myoporaceae | 1 | |
| Myrtaceae | 24 | 2 |
| Papilionaceae | 12 | 2 |
| Pittosporaceae | 1 | |
| Proteaceae | 22 | 7 |
| Solanaceae | 1 | |
| Sterculiaceae | 3 | |
| Stylidiaceae | 1 | |
| Total | 85 | 17 |

# 5 OUTCOMES

The information gained from this study will address the current deficiency in knowledge of the susceptibility of endangered flora to *P. cinnamomi* infection and assist the prioritisation of taxa that require protection.

# 6 REFERENCES

**Shearer, B.L. & Dillon M.** (1995). Susceptibility of plant species in *Eucalyptus marginata* forest to infection by *Phytophthora cinnamomi*. *Australian Journal of Botany* **43**, 113-134.

**Shearer, B.L. & Dillon M.** (1996). Susceptibility of plant species in *Banksia* woodlands on the Swan Coastal Plain, Western Australia, to infection by *Phytophthora cinnamomi*. *Australian Journal of Botany* **44**, 433-445.

# CONTROL OF *PHYTOPHTHORA*

# AND *DIPLODINA* CANKER IN

# WESTERN AUSTRALIA

**FINAL REPORT**

**TO THE THREATENED SPECIES AND COMMUNITIES UNIT**

**BIODIVERSITY GROUP**

**ENVIRONMENT AUSTRALIA**

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