THE EFFECT OF PHOSPHITE (PHOSPHONATE) ON *PHYTOPHTHORA CINNAMOMI* ZOOSPORE PRODUCTION *IN PLANTA*

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INTRODUCTION

P. cinnamomi is a major pathogen in Western Australia's native vegetation. Phosphite is a cheap fungicide which is non-toxic to animals and has been shown to protect Western Australian plant species against *P. cinnamomi* (3). It is proposed to use phosphite in the *Eucalyptus marginata* forest and in rehabilitated minesites, to control spot infections of *P. cinnamomi* and to prevent the spread of the pathogen into non-infected plant communities.

Movement of zoospores downslope from an infected area via swimming and transport in surface and subsurface water is thought to be one of the main modes of spread by the pathogen (1). It is not known whether phosphite is able to inhibit or prevent *P. cinnamomi* from producing zoospores *in planta*. If the fungus is still able to produce large numbers of zoospores it may be capable of spreading even if an area has been sprayed with phosphite.

The aim of this experiment was to determine the effect of phosphite on the production of zoospores from *E. marginata* and *Banksia grandis* seedlings which were inoculated with *P. cinnamomi*.

MATERIALS AND METHODS

E. marginata and *B. grandis* seedlings were underbark inoculated using a Miracloth disc colonised with *P. cinnamomi*. Three days after inoculation the plants were sprayed with 0, 0.5 and 1% phosphite (Fosject 200, UIM Agrochemicals (Aust.) PTY. LTD.) containing 0.25% Synetrol Oil (Organic Crop Protectants, Australia). Two days after spraying the Miracloth discs were removed and the plants were placed in water tight vessels and flooded with deionised water to 1cm above the soil line. After 24 hours the water above the soil line was sampled and subsamples were plated onto selective agar. The number of zoospores that germinated on the agar were counted and the total number of zoospores produced was quantified. This procedure was repeated every second day for 14 days. Between flooding events the plants were left to drain freely.

Data was analysed using a nonparametric repeated measures analysis. The between plant and phosphite treatment effects were tested using Kruskal-Wallis analysis and the effect of time was analysed using the Friedman test (2).

RESULTS AND DISCUSSION

A novel technique was developed to quantify *P. cinnamomi* zoospore production from infected plants in the glasshouse. Spray application of phosphite (0, 0.5 and 1 %) on *B. grandis* and *E. marginata* seedlings colonised with *P. cinnamomi* significantly ($p=0.009$) reduced the production of zoospores (Figure 1). There was no significant ($p=0.268$) difference in the number of zoospores produced from *B. grandis*, a *P. cinnamomi* sensitive plant species and *E. marginata*, a moderately susceptible plant species. Zoospores were produced at all phosphite concentrations.

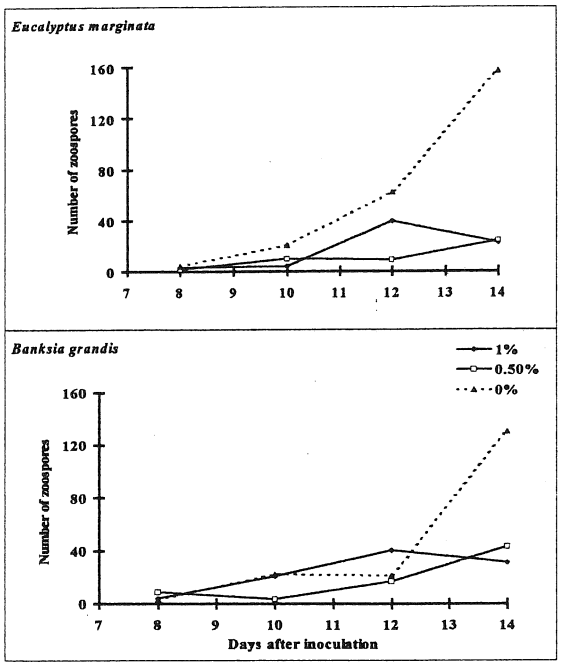

Figure 1. The effect of phosphite concentration on the number of zoospores produced in the water used to flood *Eucalyptus marginata* and *Banksia grandis* seedlings inoculated with *Phytophthora cinnamomi* (n=10).

The results from this experiment indicate that if an area is infected with *P.cinnamomi* and sprayed with phosphite the fungus may still be able to spread from the plant to non-infected areas. Thus, current hygiene procedures for areas containing *Phytophthora* must be maintained. This work will need to be repeated in the field to confirm the glasshouse results.

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