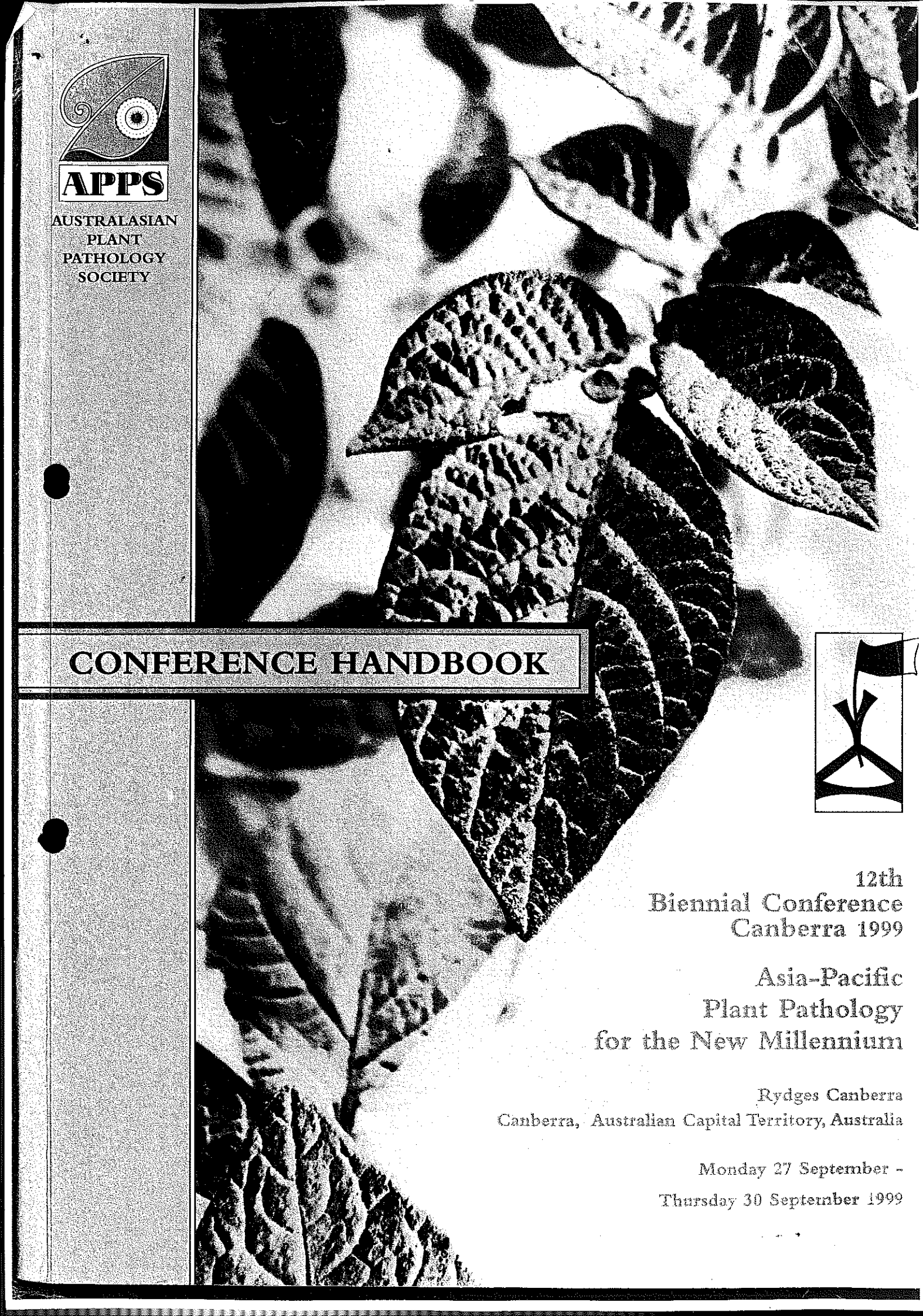

APPS

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DOES PHOSPHATE AFFECT THE EFFICACY OF THE FUNGICIDE PHOSPHITE IN CONTROLLING *PHYTOPHTHORA CINNAMOMI* IN *BANKSIA GRANDIS*?

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INTRODUCTION

Phytophthora cinnamomi isolates vary in their sensitivity to phosphite (1). *In vitro* studies of the Murdoch *Phytophthora* collection have identified phosphite tolerant and sensitive isolates (1).

The *in vitro* work of Griffith *et al.* (1993) found that phosphite sensitive *Phytophthora palmivora* isolates were inhibited at all phosphate concentrations, whereas tolerant isolates were only inhibited when phosphate was limiting (2). The aim of the current study was to investigate the interaction of phosphate and phosphite *in planta*. The ability of these two isolates to colonise *Banksia grandis* stems at four levels of phosphate, sprayed with 0 and 0.5% was assessed.

MATERIALS AND METHODS

Isolates The current study examined one phosphite tolerant (94-17) and one sensitive (80) *P.cinnamomi* isolate from the Murdoch *Phytophthora* collection.

Plant material Two year old *B.grandis* plants were potted into 4 soil phosphate levels, 0, 40, 80 and 120 mg P/L of potting mix. Plants were left to grow under glasshouse conditions for 6 months. At the time of inoculation stems were harvested and analysed for phosphorous (P) levels, to determine the concentration of P in the tissue.

Inoculation, spray and harvest Plants were underbark inoculated with mirracloth disks colonised with isolate 80 or 94-17. Lesion development was allowed to proceed for 5 days before the plants were sprayed with 0 and 0.5% phosphite and 0.25% Synertrol. Lesions were then left to develop for a further 7 days, before stems were harvested and plated onto NARPH selective medium, to determine total colonisation length.

RESULTS

The analysis of *B.grandis* stem tissue revealed the highest tissue concentrations of 2.83mg/g dry tissue at 40mg/L soil P (Table 1).

Table 1. Total P concentrations present in stem tissue of *B.grandis* at time of inoculation relative to the soil P concentrations.

Soil P levels (mg/L soil)	Tissue P concentration (mg/g dwt)	Standard error
0	1.77	0.25
40	2.83	0.02
80	1.62	0.19
120	1.03	0.30

The lowest colonisation by *P.cinnamomi* for phosphite treated or non treated plants occurred at the soil P concentration of 40mg/L soil, where tissue concentrations of P were at their highest (Fig.1). The lowest % inhibition of *P.cinnamomi* colonisation was in plants grown in soils amended with 40mgP/L soil for the tolerant isolate. For the sensitive isolate, the % inhibition remained relatively constant at all P levels (Fig.2).

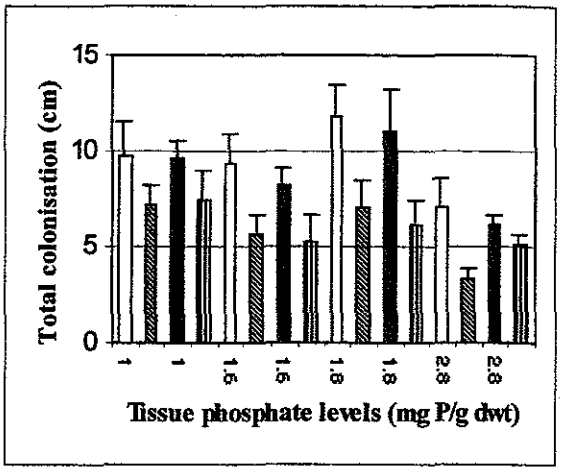

Figure 1. Total colonisation (cm) of *B.grandis* stems by *P.cinnamomi*. Open bars = isolate 80 sprayed with 0% phosphite, cross bars = isolate 80 sprayed with 0.5% phosphite. Closed bars = isolate 94-17, 0% phosphite, vertical bars = isolate 94-17 sprayed with 0.5% phosphite.

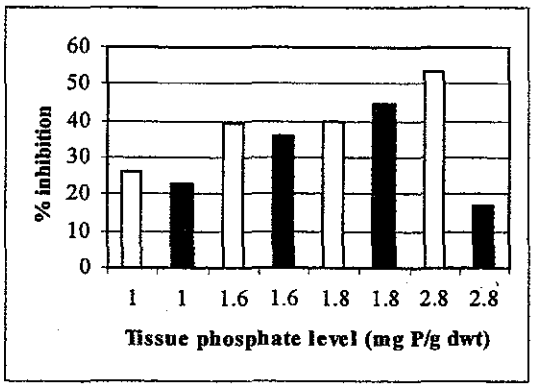

Figure 2. Percentage inhibition caused by the application of 0.5% phosphite. Open bars = isolate 80, closed bars = isolate 94-17.

DISCUSSION

It is interesting to note the colonisation by *P.cinnamomi* is slowest in tissue where P concentrations are at their highest (Figure1 &Table 1). More work needs to be conducted, using a larger number of isolates to evaluate this trend. The trends of sensitive and tolerant *P.palmivora* isolates found *in vitro* by Griffith *et al.* (see introduction), were reflected in the *in planta* results of this study.

REFERENCES

1. Wilkinson, C. (1997). Honours thesis Murdoch Uni.
2. Griffith, J., Coffey, M. and Grant, B. (1993). *Journal of General Microbiology*.**139**:2109-2116.