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Scott, P.M., Jung, T., Shearer, B.L., Barber, P.A. and Hardy, G.E.St.J. (2008) *Potential role of Phytophthora species in Eucalyptus gomphocephala (tuart) decline*. In: Third International Workshop on Phytophthora/Pythium and Related Genera, Ninth International Congress of Plant Pathology, 23 - 24 August, Turin, Italy.

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Phytophthora and *Eucalyptus gomphocephala* (tuart) woodland decline in southwest Western Australia

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The ecologically important endemic woodland species *Eucalyptus gomphocephala* (Tuart) (Fig. 1), is in severe decline. Many trees have died over large areas in the last decade.



Fig 1. Dead and declining *Eucalyptus gomphocephala* (Tuart)

The potential of phosphite, nutrient and insecticide treatments to reverse the decline in tuart health were assessed as methods for (a) controlling the decline, and (b) diagnosing possible causal agents. Phosphite has been successfully used to control *Phytophthora* diseases elsewhere. Phosphite stem injection resulted in improved crown health and vigor, indicated by a change in the the percentage crown health (Fig. 2).

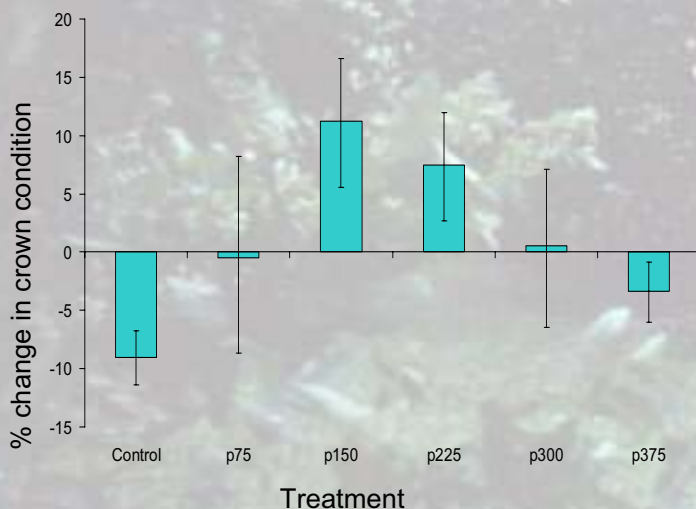


Fig 2. Percentage change in crown condition (Grimes 1978) 1 year after phosphite application at O (control), 75, 150, 225, 300 and 375 mg phosphite per cm circumference. Vertical bars represent two standard errors of the mean.

A *Phytophthora citricola* – like species has been isolated from the soil and fine roots of declining *E. gomphocephala* at numerous sites. Sequence analysis using primers ITS4 and DC6 indicates the putative pathogen is similar to an undescribed taxon that is widely distributed in south-western Australia and is pathogenic to *E. marginata* (Shearer et al. 1988). The isolate morphologically resembles *Phytophthora citricola* (Fig. 3).



Fig 3. (a) Sporangia and (b) oospore of the *Phytophthora* isolated from declining tuart woodland. Bar equals 50 µm

Preliminary under bark inoculation trials indicate that the *Phytophthora* isolates from the Tuart woodland produce lesions larger than the control in both *E. gomphocephala* and *E. marginata* (Fig. 4) over six weeks.

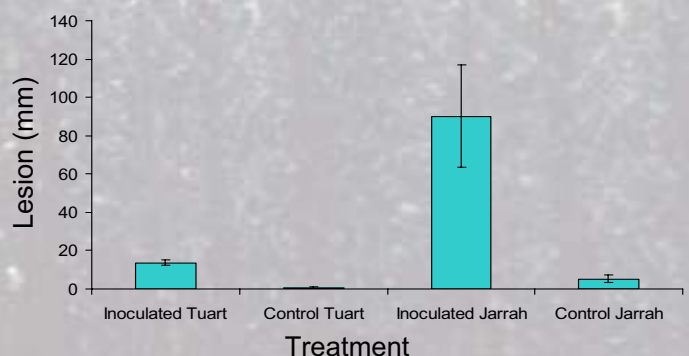


Fig 4. Lesion growth in *Eucalyptus gomphocephala* (Tuart) and *E. marginata* (Jarrah) under bark inoculated with *Phytophthora* sp. from tuart woodland or sham inoculated (control). Vertical bars represent two standard errors of the mean.

Research is underway to: (a) confirm the organism's phylogeny with morphological and molecular techniques, (b) determine the susceptibility of *E. gomphocephala* using soil inoculation and (c) develop strategies to reverse the decline and restore impacted areas.

Reference:

Grimes (1978) *Technical paper no. 7. Queensland forest service, Brisbane, Australia.*
Shearer et al (1988) *Plant Disease* 72, 121-126