

ANOTHER NEW? SPECIES OF PHYTOPHTHORA ON ALDER DOWN UNDER (AUSTRALIA).

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INTRODUCTION

In May 2003, a *Phytophthora* species was isolated from the trunks of dying *Alnus glutinosa* in a single location in a garden in Melbourne, Australia. Symptoms resembled those of the 'Alder Phytophthora' reported from Europe (Figure 1). A response was initiated to determine the threat this *Phytophthora* posed to Australian forestry and horticulture.



Figure 1. a) Dying *Alnus glutinosa*, in a garden in Melbourne, Australia May 2003, b) bleeding symptoms on the trunk and c) lesion under bark.

MORPHOLOGY

Sporangioophores of the pathogen were cymose or sympodially proliferating with primary sporangia papillate, 40-60 x 20-35µm, oogonia 24-34µm diameter, oospore 22-31µm diameter and oospore wall 2.5-4µm thick. Antheridia were predominantly paragnathous (Figures 2 a, b & c).

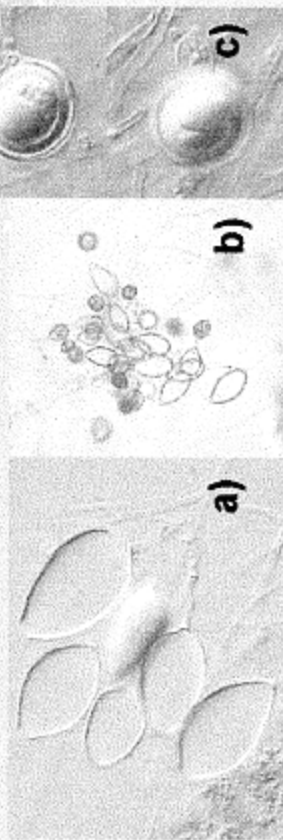


Figure 2. (a & b) Sporangioophores, and c) Oogonia/antheridia of an unknown species of *Phytophthora* isolated from the stem of dying *Alnus glutinosa* in Melbourne Australia.

KOCH'S POSTULATES

Stem inoculations of 12-month-old *Alnus glutinosa* seedlings with this unknown *Phytophthora* in a temperature controlled quarantine glasshouse (20-26°C), reproduced the lesions and bleeding symptoms and caused mortality of *A. glutinosa* (Figure 3). The *Phytophthora* was reisolated from the lesions thus proving pathogenicity and Koch's postulates.

Further seedling stem inoculations of *A. glutinosa*, *Pinus radiata*, *Eucalyptus globulus*, *E. nitens*, *E. regnans*, *E. obliqua*, *E. cladocalyx*, *E. viminialis*, *Corymbia maculata*, *Acacia mearnsii*, *Grevillea robusta*, *Citrus limon* and *C. sinensis* showed this pathogen to be selectively aggressive on alder, and only a very weak pathogen of the other tree species when compared to *Phytophthora cinnamomi* (Figure 4). *P. cinnamomi* was not pathogenic on *A. glutinosa*. Lesion development was difficult to observe on *P. radiata* seedlings, however no mortality was observed with the unknown *Phytophthora* whereas 100% mortality was recorded for *P. cinnamomi* inoculations.

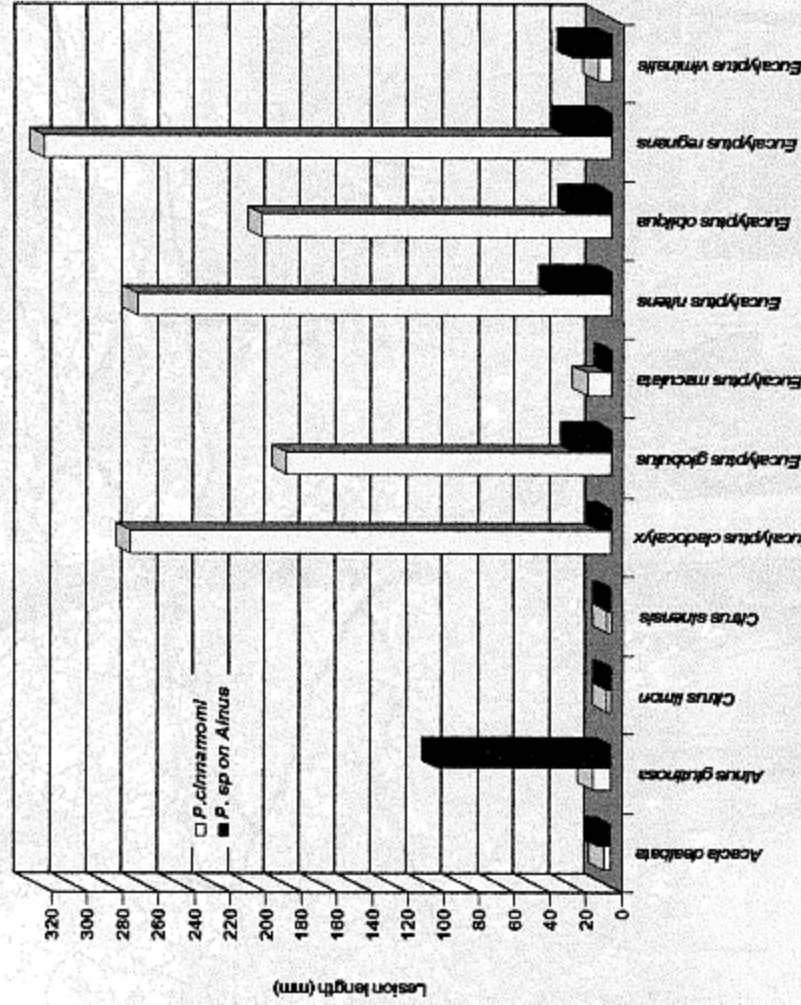


Figure 4. Lesion length after 3 weeks on various species stems inoculated with *Phytophthora cinnamomi* and an unknown *Phytophthora* sp. isolated from the stem of dying *Alnus glutinosa*. Control wounding produced no lesions.

SOIL TESTING

Stem and root sampling and plating onto selective agar was reliable in isolating this unknown *Phytophthora* from the trees. However soil tests using traditional pear and eucalypt cotyledon baiting failed to isolate it from soil surrounding the roots of the dying trees. Competition for the baits by *P. cinnamomi*, and the slower growth rate of this *Phytophthora* on agar, probably contributed to this result. Further baiting using alder leaves also failed to differentiate between the *Phytophthora* species.

This lack of differentiation makes surveys for this *Phytophthora* difficult where *P. cinnamomi* is widespread in the landscape.

CONCLUSION

Based on its morphology and rDNA ITS sequence, it is concluded that this is not the 'Alder *Phytophthora*' from Europe, and is probably a new species. However, it is unclear whether this species is native to Australia, or has been introduced along with its host.

While it appears that it has a very localised occurrence based on the lack of reports of dying alder in Melbourne, the restricted host pathogenicity compared to *P. cinnamomi* would suggest that it poses little threat to Australian forestry and horticulture. Further testing on other plant species is to continue.

PHYLOGENY

Initial PCR-RFLP tests suggested that this fungus was *P. capsici*, although it was morphologically different to published descriptions.

Subsequent DNA sequencing of the rDNA ITS region revealed that this appears to be an undescribed species, related to the *P. capsici* and *P. citrophthora* group (Figure 5).

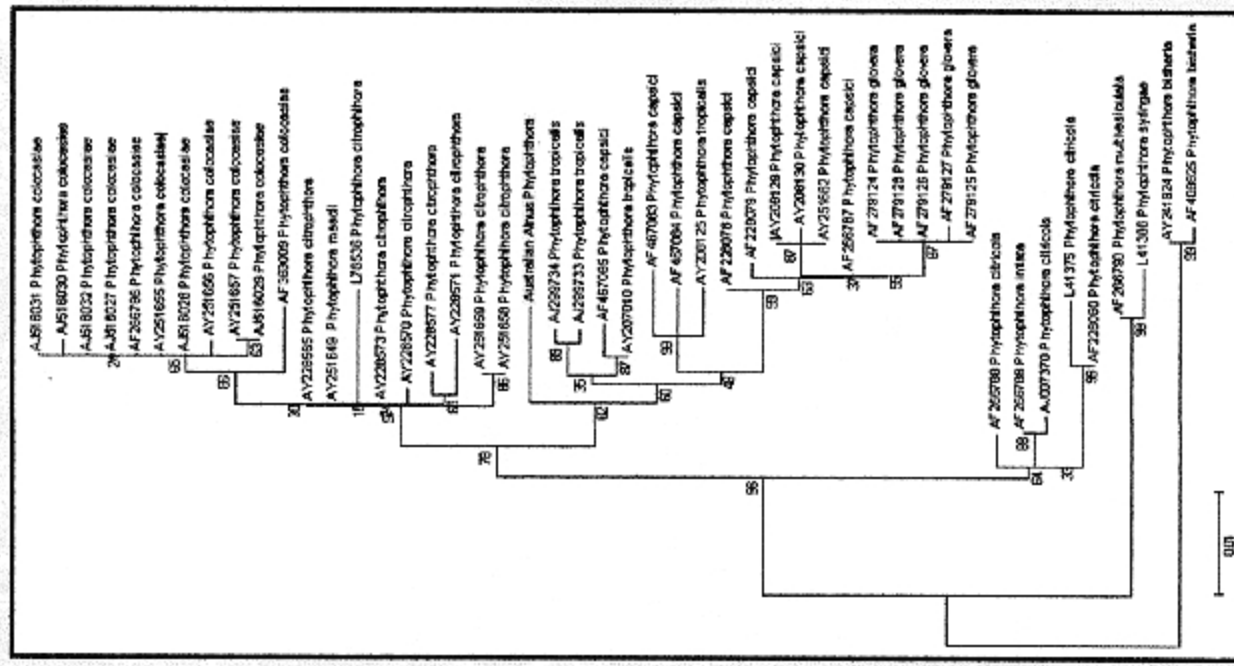


Figure 5. Phylogeny of an unknown species of *Phytophthora* isolated from the stem of dying *Alnus glutinosa* in Melbourne, Australia.

ACKNOWLEDGEMENTS

The Victorian Department of Sustainability and Environment, and Department of Primary Industries, are acknowledged for their financial support for this project. The following are also thanked for their assistance: Paul Clements, David Smith, David Beardseff, Greg King, Andrew Evans, Peter Merriman, James Wong, Jane Moran, Bill Washington, Martin Iffebalds, Andre Drenth and David Cooke. Finally, special thanks also to Lionel Wilson whose keen observations resulted in the discovery of this *Phytophthora*.

