

Rapid bioassay for macadamia germplasm screening for tolerance to *Phytophthora* species

O. Jeff-Ego¹, O.A. Akinsanmi¹, B. Topp¹, J. Henderson², and A. Drenth¹

¹The University of Queensland, Queensland Alliance for Agriculture and Food Innovation;

²Department of Agriculture and Fisheries, 41 Boggo Road, Dutton Park, QLD 4102, Australia

o.jeffego@uq.net.au

In Australia, it's been established that *P. cinnamomi* causes trunk canker, gummosis, die back, necrotic roots rot and sometimes the eventual death of macadamia trees, however the range of susceptibility/tolerance of *Macadamia* species and cultivars has not been well established. The potential of other soil borne and aerial *Phytophthora* species as significant pathogens in macadamias has not been determined. Macadamia production area is expanding to new areas previously cultivated to other crops with known history of *Phytophthora*. Thus, macadamia trees may be subject to infections by new *Phytophthora* spp. and orchard replant problems. Reports of poor tree establishment and increasing reductions in yield are common in mature trees. In the absence of cultivars and rootstocks with acceptable levels of resistance to *Phytophthora* pathogens management practices have focused on mitigation through chemical control, but the effectiveness of control has been variable.

A key limitation of the study of *Phytophthora* infection in mature tree crops is the length of time it takes to develop in the field. Hence, the development of a rapid, reliable and robust bioassay will aid the screening of a large number of macadamia genotypes for their susceptibility to *Phytophthora* spp. Using the bioassay developed in this study, multiple *Phytophthora* species that are associated with macadamia ecosystems were examined for their aggressiveness on a range of macadamia genotypes including accessions of *Macadamia integrifolia* and *M. tetraphylla* cultivars 'HEAS 816', 'HEAS 344', 'HEAS 246', and 'H2'. The inoculation methods developed in this study were rapid and effective for testing varietal susceptibility to *Phytophthora* in macadamia. The results appeared promising for the bioassay as a useful tool for early and rapid screening of macadamia genotypes. Further studies will provide insights into the mechanism for resistance to *Phytophthora* species.