

## **Disease cycle of *Austropuccinia psidii* on *Eucalyptus globulus* and *Eucalyptus obliqua* leaves of different rust response phenotypes**

### **ABSTRACT**

Myrtle rust poses a significant biosecurity threat to Australia with potential for long-term damaging impacts on native flora and plant industries. This study describes the disease cycle of *Austropuccinia psidii*, the myrtle rust pathogen, in *Eucalyptus globulus* and *Eucalyptus obliqua*, two commercially and ecologically important species from different sub-genera of *Eucalyptus*. Ontogeny and morphology of infection structures of *A. psidii* on plants of both *Eucalyptus* species with different rust response phenotypes, i.e. completely resistant, hypersensitive and highly susceptible, were investigated. Plants were inoculated with single-uredinium-derived urediniospores and examined by scanning electron microscopy. No differences between rust response phenotypes were observed in germination of urediniospores, formation of appressoria or length of germ tubes. The growth of germ tubes had no affinity towards stomata of either species. Histological observations indicated direct penetration by infection pegs through the leaf cuticle and no penetration beyond the epidermis on rust-resistant *E. obliqua*. *Eucalyptus obliqua* plants that were identified as susceptible to *A. psidii* at 3- and 6-months-old showed no disease when reinoculated with *A. psidii* at 12-months-old; this indicated possible early acquisition of adult plant resistance to *A. psidii* in this species. In the susceptible phenotype of *E. globulus* rust inoculation led to rapid colonization of leaf parenchyma cells with the disease cycle completed within 10 days. These findings provide valuable insights into host–pathogen interactions in the *Eucalyptus*–*A. psidii* pathosystem, which might be useful for the development of effective rust control strategies across *Eucalyptus* subgenera.