

Boxthorn rust (*Puccinia rapipes*): a potential biological control agent of African boxthorn (*Lycium ferocissimum*)

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Summary Suitability of the rust fungus *Puccinia rapipes* as a biocontrol agent for African Boxthorn (*Lycium ferocissimum*), a major environmental and agricultural weed in regional Australia, was assessed. Studies were undertaken to elucidate the life cycle, genetic and phenotypic diversity and host specificity of *P. rapipes*. Laboratory and field surveys indicate that the rust is macrocyclic and autoecious – i.e. produces all five spore stages on *L. ferocissimum*. Two accessions of the fungus have been purified and cultured in quarantine in Australia, representing the Eastern and Western Cape distributions of the rust in South Africa. Preliminary testing shows that both accessions are capable of infecting at least three provenances of the weed, from the ACT, South Australia and Western Australia, while field surveys in South Africa indicate that the rust can infect multiple haplotypes of the weed.

Further host testing of the native Australian Boxthorn (*L. australe*) and exotic goji berry (*L. barbarum*), alongside multiple haplotypes of *L. ferocissimum*, will be undertaken to elucidate the nature of the rust's host specificity. DNA-based molecular biology work will also be conducted to confirm the identity of all five spore stages of *P. rapipes* collected in the field in South Africa and to assess the genetic diversity of the fungus across its native range. Results of preliminary host-specificity testing and molecular characterisation will be used to make a preliminary assessment of the risk of significant impact on non-target plant species, before deciding if further testing working toward release of the fungus in Australia should proceed.

Keywords Biocontrol, plant pathogen, host specificity.