

3-O14-4

Australia: A continent without native powdery mildews?

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Purpose: In contrast to Eurasia and North America, the powdery mildews (Ascomycota, Erysiphales) are an understudied group in Australia, with over 900 species known globally, and less than 50 species recorded from Australia. Some of these records are doubtful as the identifications were presumptive, being based only on host plant-pathogen lists from overseas. Our goal was to provide the first comprehensive database of all the powdery mildew species present in Australia.

Methods: We compiled an up-to-date list of all the taxa known to occur in Australia based on published DNA barcode sequences and identified 117 freshly collected specimens, and 30 herbarium specimens based on morphology and DNA barcodes.

Results: Altogether, 39 species representing 10 genera were confirmed in Australia, including two genera and ten species newly recorded during the project. In Eurasia and North America the number of powdery mildew species is more than 10x higher. Interestingly, powdery mildew infections have been recorded on only eight native Australian plant species, and were caused by polyphagous taxa known to infect many other host plants.

Conclusions: Our data indicates that (i) the native Australian vegetation may have evolved without being exposed to native powdery mildews; and (ii) all the species of the Erysiphales that are present in Australia may have been introduced since the European colonisation of the continent.