

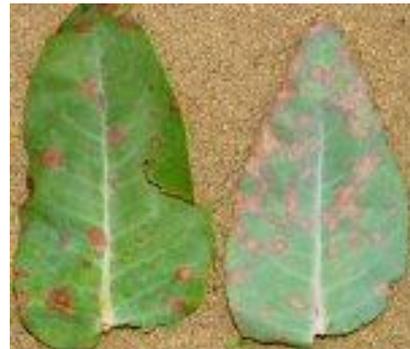
## USING DNA SEQUENCE DATA TO CHARACTERISE FUNGAL PATHOGENS OF TREES

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Just as humans, trees are susceptible to infection by many disease causing micro-organisms. A large and perhaps the majority of microbial pathogens from trees are fungi. These fascinating organisms can infect the roots, stems and leaves of trees resulting in a wide array of disease symptoms. In severe cases, fungi can also cause the death of infected trees. Some of the most important fungal leaf pathogens of trees, and more specifically *Eucalyptus* trees, are a group of fungi that belong to the fungal genus *Mycosphaerella*. Many *Mycosphaerella* species cause a leaf disease of *Eucalyptus* trees and the disease is collectively referred to as Mycosphaerella Leaf Disease (MLD). MLD often results in premature defoliation of *Eucalyptus* trees and it can ultimately retard tree growth. *Eucalyptus* trees are widely grown in intensively managed plantations sustaining substantial industries and in some cases MLD poses a significant threat to these valuable fibre farms.

*Mycosphaerella* species are morphologically very similar and this complicates identification of species. For this reason, comparisons of DNA sequence data for relevant gene regions, has become the definitive approach used to identify *Mycosphaerella* species. Through its links with forestry groups in many parts of the world, the Forestry and Agricultural Biotechnology Institute (FABI) at the University of Pretoria initiated a study to employ DNA sequence data to identify and characterise those species of *Mycosphaerella* causing MLD. For this study, four nuclear gene regions from the genome of *Mycosphaerella* species were targeted and sequenced. DNA sequence data from these gene regions were collated and analysed using evolutionary algorithms in computer software programmes. These



results have lead to the production of a comprehensive framework, based on DNA sequence data from several gene regions, which can be used to accurately identify *Mycosphaerella* species on *Eucalyptus*. Furthermore, DNA sequence data have allowed the group to identify new *Mycosphaerella* species causing MLD and to investigate the evolution of these fungi on their *Eucalyptus* hosts. Results of this study have been published in the journal, *Studies in Mycology* under the title “A multi-gene phylogeny for species of *Mycosphaerella* occurring on *Eucalyptus* leaves”.