

**MOLECULAR STUDIES
ON THE
NEW ZEALAND
TREE FERNS**

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Abstract

Molecular phylogenetic studies have been performed on the New Zealand tree fern genera *Alsophila*, *Dicksonia* and *Sphaeropteris*, using DNA sequencing techniques and Amplified Fragment Length Polymorphism (AFLP). Three DNA sequence markers were used, two chloroplast: *rbcL*, *trnL-trnF* spacer, and one nuclear: *18S*. Using a combination of *rbcL* sequences obtained in this study and previously published sequences from GenBank an overall phylogeny for the tree fern clade is proposed. This phylogeny suggests that the currently recognised families may need revision. Phylogenetic analysis of molecular markers in *Dicksonia* suggests a three way genetic split within the genus, which corresponds, to three observed spore morphologies. AFLP studies on populations of *Dicksonia lanata*, which possesses two distinct growth forms, shows evidence of a weak genetic split, although probably not sufficient to warrant the separation of two species. Studies on the Cyatheaceae genera *Alsophila* and *Sphaeropteris* have confirmed observations on the evolution of the New Zealand species based on morphology, and have also suggested a heretofore unknown relationship between the South American fern genus *Hymenophyllopsis* and the Cyatheaceae.

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