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 *Hymenophyllumopsis* and the Cyatheaceae.
Abstract

1.0 INTRODUCTION

1.1 Tree Fern Clade

1.2 Dicksoniaceae

1.2.1 Dicksonia

1.2.2 Habitat and Distribution

1.2.3 Dicksonia in New Zealand

1.3 Cyatheaceae

1.3.1 Spore Morphology

1.3.2 Habitat and Distribution

1.3.3 Cyatheaceae in New Zealand

   Sphaeropteris

   Alsophila

1.4 Related Families

1.4.1 Morphological vs. Molecular Studies

1.5 Tree Fern Fossil Record

1.5.1 Dicksoniaceae

1.5.2 Dicksonia

1.5.3 Cyatheaceae

1.6 Aims

2.0 MATERIALS & METHODS

2.1 Sampling

2.1.1 Dicksonia

   Native Species

   Foreign Species

2.1.2 Cyatheaceae

   Native Species

   Foreign Species

2.1.3 Other Tree Ferns

2.1.4 DNA Sequences

2.2 DNA Extraction

2.3 DNA Sequencing Markers & PCR

2.3.1 Chloroplast DNA Markers

   rbcL

   rps4

   trnL-trnF spacer & trnL intron
2.3.2 Nuclear DNA Markers 29

ITS 29
18S 29

2.3.3 PCR Reactions 30
2.3.4 Sequencing Reactions 32
Sequencing Product Precipitation 33
2.3.5 Sequence Editing 33

2.4 AFLP 34
2.4.1 Restriction Digests 35
2.4.2 Ligations 35
2.4.3 PCR Steps 36
Pre-amplification 36
Selective Amplification 37
2.4.4 Polyacrylamide Gel Electrophoresis 37
Loading 39

2.5 Phylogenetic Analysis 40
2.5.1 Alignment 40
2.5.2 AFLP Analysis 41
2.5.3 Sequence Analysis 41
Algorithmic Methods 41
Global Optimality Methods 42
Quartet Methods 43
Molecular Clock Analysis 44

3.0 TREE FERN CLADE 46

3.1 Results 46
3.1.1 \textit{rbcl} Sequences 46
3.1.2 DNA Sequence Alignment 46
3.1.3 Usefulness of \textit{rbcl} Data for Tree Building 48
3.1.4 Choosing A Substitution Model for Tree Building 49
3.1.5 Outgroup Selection 50
3.1.6 Evolutionary Trees 51

3.2 Discussion 52
3.2.1 Rooting the Tree Fern Clade 54
3.2.2 Major Features of the Tree Fern Clade 55
3.2.3 Lineages 55
3.2.4 Familial Relationships 56
3.2.5 The Arborescent Habit 57

4.0 DICKSONIA 59

4.1 Results 59
4.1.1 DNA Extractions 59
4.1.2 PCR and Sequencing 60
\textit{rps4} 60
4.1.3 DNA Sequence Alignments
4.1.4 Misidentified Taxa
4.1.5 Usefulness of Sequence Data for Tree Building
4.1.6 Choosing A Substitution Model for Tree Building
4.1.7 Evolutionary Trees
4.1.8 *Dicksonia lanata* AFLP

4.2 *Dicksonia*
4.2.1 Three Lineages
4.2.2 Recent Speciation
4.2.3 *Lophosoria*

4.3 *Dicksonia lanata*
4.3.1 Two Species?
4.3.2 Origins of the Two Growth Forms

5.0 **CYATHEACEAE**

5.1 **Results**
5.1.1 DNA Extractions
5.1.2 PCR and Sequencing
5.1.3 DNA Sequence Alignments
5.1.4 Usefulness of Sequence Data for Tree Building
5.1.5 Choosing A Substitution Model for Tree Building
5.1.6 Evolutionary Trees

5.2 **Discussion**
5.2.1 New Zealand Cyatheaceae 91
Morphological vs. Molecular Data 93
Antiquity of the NZ Cyatheaceae 95
5.2.2 Hymenophyllopsis 95

Summary and Conclusions 97
The New Zealand Flora 98

REFERENCES 101

APPENDICES 106

APPENDIX 1 107
1.1 Geological Time Scale 107
1.2 Authorities 107

APPENDIX 2 109
2.1 Samples/Herbarium Vouchers 109
2.1.1 Dicksonia lanata Herbarium Vouchers 110
2.2 DNA Extraction 116
2.3 PCR & Sequencing 116
2.3.1 Primer Sequences (5' - 3') 116
2.3.2 PCR Reaction Cocktail 117
2.3.3 PCR Programs 117
2.3.4 Equipment 118
2.4 AFLP 119
2.4.1 Primer Sequences 119
2.4.2 PCR Reactions 119
2.4.3 PCR Programs 119

APPENDIX 3 121
3.1 rbcL DNA Sequence Alignment 121

APPENDIX 4 132
4.1 DNA Sequence Alignments 132
4.1.1 Dicksonia trnL-trnF spacer 132
4.1.2 Dicksonia and Cyatheaceae 18S 134
4.2 AFLP Gel Photos 139

APPENDIX 5 142
5.1 DNA Sequence Alignments 142
5.1.1 Cyatheaceae trnL-trnF spacer 142
TABLES

1.1 Dicksonia Species List 5
1.2 Comparative Morphology of NZ Cyatheaceae 13
1.3 Tree Fern Fossil Record 19
3.1 Summary of Data From rbcL Gene 47
3.2 Likelihood Ratio Test for rbcL Data 50
3.3 Molecular Clock Test for rbcL Data 50
3.4 Likelihood Ratio Test for Outgroups 51
4.1 Summary of DNA Sequence Marker Data for the Genus Dicksonia 64
4.2 Likelihood Ratio Tests on Sequence Data 68
4.3 Molecular Clock Test for 18S 68
4.4 Molecular Clock Test for tmL-tmF in Dicksonia 69
5.1 Summary of DNA Sequence Marker Data for the Cyatheaceae 85
5.2 Likelihood Ratio Tests for the Cyatheaceae 87
5.3 Molecular Clock Tests for the Cyatheaceae 87
5.4 Name Changes for NZ Cyatheaceae 92

FIGURES

2.1 Distribution of Dicksonia lanata 23
2.2 Arabidopsis thaliana Chloroplast Map 27
2.3 The Nuclear rDNA Region 29
3.1 rbcL Splits Graph for Tree Fern Clade 48
3.2 Quartet Puzzling Tree for Tree Fern rbcL Sequences 53
4.1 tmL-tmF Splits Graph for Dicksonia 66
4.2 18S Splits Graph 67
4.3 Quartet Puzzling Tree for Dicksonia tmL-tmF Sequences 70
4.4 Quartet Puzzling Tree for Dicksonia rbcL Sequences 71
4.5 Quartet Puzzling Tree for 18S Sequences 72
4.6 AFLP Splits Graph 74
5.1 Cyatheaceae tmL-tmF Splits Graph 86
5.2 Cyatheaceae tmL-tmF Puzzle Tree 89
5.3 Cyatheaceae rbcL Puzzle Tree 90
5.4 tmL-tmF Tree with Morphological Characters 94