Appendix 1. List of species included in the study. Genbank accession numbers are given for each gene; multiple accessions per gene per taxa indicate clone sequences for nuclear genes, or intraspecific variation for the chloroplast (*rbcL*) gene. Sequences generated in this study are in italic font. Voucher for individuals sequenced are given.

| | | | | GenBank accession nunbers | | | | | | |
|-----------------------------------|--------------|----------|---------|---------------------------|------------------------|------------------------|------------------------|------------------------|---------------------------------------|--|
| Taxa | Tribe | Locality | Voucher | CAD5 | CHS | MS | MtN31 | PRK | rbcL | |
| Aethionema cordifolium | Aethionemeae | | | | | | | | AP009366 | |
| Aethionema grandiflora | Aethionemeae | | | | AF112082 | | | | AY167983 | |
| Aethionema saxatile | Aethionemeae | | | | | | | | AY483262 | |
| Arabidopsis arenosa | Camelineae | | | | AY612781 | | | | | |
| Arabidopsis halleri | Camelineae | | | | AJ619906 | | | | | |
| Arabidopsis lyrata ssp. Lyrata | Camelineae | | | FJ645063 | AJ619890 | FJ645118 - FJ645122 | FJ645194 - FJ645194 | FJ645209 - FJ645213 | AY174640, AY174651, AY174652 | |
| Arabidopsis thaliana | Camelineae | | | NM_119587.3 | NC_003076 | NM_120467 | NM_129653.4 | NM_102940.5 | ATU91966, AP000423, AY174632 | |
| Arabis glabra | Arabideae | | | | | | | | DQ310542 | |
| Arabis hirsuta | Arabideae | | | | | | | | AP009369 | |
| Arabis stelleri | Arabideae | | | | | | | | D88903 | |
| Armoracia rusticana | | | | | | | | | AF020323 | |
| Barbarea verna | Cardamineae | | | | | | | | AP009370 | |
| Barbarea vulgaris | Cardamineae | | | | AF112108 | | | | | |
| Boechera holboellii | Boechereae | | | FJ645074 | FJ645079 - FJ645083 | FJ645133 - FJ645137 | FJ645187 - FJ645190 | FJ645235 - FJ645238 | | |
| Boechera fendleri | Boechereae | | | | AF112090 | | | | | |
| Boechera Iyallii | Boechereae | | | | AF112099 | | | | | |
| Boechera parishii | Boechereae | | | | AF112101 | | | | | |
| Boechera stricta | Boechereae | | | | AY612784 | | | | | |
| Brassica juncea | Brassiceae | | | | | | | | AY167979 | |
| Brassica napus | Brassiceae | | | | | | | | AF267640 | |
| Brassica oleracea | Brassiceae | | | | AY228486 | | | | M88342 | |
| Brassica oleracea var botrytis | Brassiceae | | | | | | | | EU128739 | |
| Brassica rapa | Brassiceae | | | AC189325 | | | | | AY167977 | |
| Cakile maritima | Brassiceae | | | | | | | | AY167981 | |
| Capsella bursa-pastoris | Camelineae | | | FJ645064- FJ645066 | AY612785 | FJ645128 - FJ645132 | | FJ645218 - FJ645222 | AP009371, D88904 | |
| Capsella rubella | Camelineae | | | | AF112106 | | | | | |
| Cardamine amara | Cardamineae | | | | DQ209008 | | | | | |
| · | | | | | | | | | · · · · · · · · · · · · · · · · · · · | |

| | | | | GenBank accession nunbers | | | | | |
|--------------------------------|---------------|---|-----------|---------------------------|------------------------|------------------------|------------------------|------------------------|----------|
| Таха | Tribe | Locality | Voucher | CAD5 | CHS | MS | MtN31 | PRK | rbcL |
| Cardamine flexuosa | Cardamineae | | | | | | | | D88905 |
| Cardamine pensylvanica | Cardamineae | | | | | | | | AF020324 |
| Chamira circaeoides | Heliophileae | | | | | | | | AM234932 |
| Crucihimalaya mollissima | Camelineae | | | FJ645072 | FJ645084 - FJ645086 | FJ645138 - FJ645142 | FJ645182 - FJ645186 | FJ645227 - FJ645231 | |
| Crucihimalaya himalaica | Camelineae | | | | AY612786 | | | | D88902 |
| Crucihimalaya wallichii | Camelineae | | | | | | | | AP009372 |
| Draba nemorosa | Arabideae | | | | | | | | AP009373 |
| Erysimum capitatum | Camelineae | | | | | | | | AY167980 |
| Heliophila pubescens | Heliophileae | | | | | | | | AM234933 |
| Hornungia alpina | Descurainieae | | | | | | | | DQ310538 |
| Lepidium apetalum | Lepidieae | | | FJ645075 - FJ645078 | FJ645109 - FJ645112 | FJ645153 - FJ645157 | FJ645208 | FJ645242 - FJ645246 | |
| Lepidium africanum | Lepidieae | | | | | | | | AM234934 |
| Lepidium campestre | Lepidieae | | | | AF144534 | | | | |
| Lepidium virginicum | Lepidieae | | | | | | | | AP009374 |
| Lepidium virginicum | Lepidieae | | | | | | | | D88906 |
| Lobularia maritima | Lepidieae | | | | | | | | AP009375 |
| Nasturtium officinale | | | | | | | | | AP009376 |
| Neobeckia aquatica | | | | | | | | | AF020326 |
| Neslia paniculata | Camelineae | | | | | | | | DQ31054 |
| Olimarabidopsis cabulica | Camelineae | | | FJ645071 | AF144533 | FJ645148 - FJ645152 | FJ645191 - FJ645193 | FJ645214 - FJ645217 | |
| Olimarabidopsis pumila | Camelineae | | | | AF112092, AF112093 | | | | AP009368 |
| Pachycladon cheesemanii | Camelineae | Wye Creek, Otago, New Zealand | CHR559139 | | FJ645095 - FJ645096 | | | FJ645241 | |
| Pachycladon cheesemanii 6/1 | Camelineae | Diamond Lake, Otago, New Zealand | CHR537558 | | | FJ645160 | | FJ645234 | |
| Pachycladon enysii | Camelineae | Craigieburn Range, Canterbury, New Zealand | CHR573465 | | FJ645105 - FJ645106 | | | | |
| Pachycladon enysii | Camelineae | Craigieburn Range, Canterbury, New Zealand | CHR508422 | | | | | | EF015668 |

| | | | | GenBank accession nunbers | | | | | |
|-------------------------------------|------------|---|-----------|---------------------------|------------------------|------------------------|------------------------|-----------------------|----------|
| Taxa | Tribe | Locality | Voucher | CAD5 | CHS | MS | MtN31 | PRK | rbcL |
| Pachycladon enysii 1/1 | Camelineae | Mt. Starveall, Nelson, New Zealand | CHR504687 | | | FJ645163 - FJ645164 | | | |
| Pachycladon exilis | Camelineae | Awahokomo, Otago, New Zealand | CHR569959 | FJ645069 - FJ645070 | FJ645093 - FJ645094 | FJ645161 - FJ645162 | FJ645177 | FJ645233, FJ645240 | EF015667 |
| Pachycladon fastigiata | Camelineae | Serpentine Creek, Canterbury, New Zealand | CHR569960 | FJ645067 - FJ645068 | FJ645091 - FJ645092 | | FJ645171 - FJ645176 | FJ645232, FJ645239 | |
| Pachycladon fastigiata | Camelineae | Serpentine Creek, Canterbury, New Zealand | CHR225809 | | | | | | EF015666 |
| Pachycladon fastigiata 4/1 | Camelineae | Ohau Ski Field, Canterbury, New Zealand | CHR504679 | | | FJ645158 - FJ645159 | | | |
| Pachycladon latisiliqua | Camelineae | Mt. Peel, Nelson, New Zealand | CHR536760 | | | | | | EF015665 |
| Pachycladon latisiliqua 1/5 | Camelineae | Spinx Stream, Mt. Arthur's tablelands, Nelson, New Zealand | | | | FJ645167 - FJ645168 | | | |
| Pachycladon latisiliqua 8/1 | Camelineae | Mt. Owen, Tasman, New Zealand | CHR504668 | | FJ645097 - FJ645098 | | | | |
| Pachycladon novae- zelandiae | Camelineae | Old Man Range, Otago, New Zealand | CHR571397 | | | | | | DQ310545 |
| Pachycladon novae- zelandiae 2/1 | Camelineae | Ohau Ski Field, Canterbury, New Zealand | CHR504693 | | FJ645099 - FJ645100 | FJ645170 | | | |
| Pachycladon stellata | Camelineae | Yeo Stream, Marlborough, New Zealand | CHR533014 | | FJ645101 - FJ645102 | | | | |
| Pachycladon stellata | Camelineae | Yeo Stream, Marlborough, New Zealand | CHR514184 | | | | | | EF015664 |
| Pachycladon stellata 2/4 | Camelineae | Yeo Stream, Marlborough, New Zealand | CHR514183 | | | FJ645169 | | | |

| | | | | GenBank accession nunbers | | | | | | |
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| Таха | Tribe | Locality | Voucher | CAD5 | CHS | MS | MtN31 | PRK | rbcL | |
| Pachycladon wallii | Camelineae | Wye Creek, Otago, New Zealand | CHS470281 | | | | | | EF015663 | |
| Pachycladon wallii 1/1 | Camelineae | Eyre Creek, Southland, New Zealand | CHR504686 | | FJ645103 - FJ645104 | FJ645165 - FJ645166 | | | | |
| Physaria fendleri | Physarieae | | | | FJ645107 - FJ645108 | | FJ645203 - FJ645207 | FJ645247 - FJ645251 | | |
| Rorippa amphibia | Cardamineae | | | | AF144530 | | | | AF020327 | |
| Rorippa indica | | | | | | | | | D88907 | |
| Rorippa sylvestris | | | | | | | | | AF020328 | |
| Sisymbrium irio | Sisymbrieae | | | | AF144541 | | | | AY167982 | |
| Stanleya pinnata | | | | | | | | | AJ235809, AY483263 | |
| Transberingia bursifolia ssp. Bursifolia | Schizopetaleae | | | FJ645073 | FJ645087 - FJ645090 | FJ645143 - FJ645147 | FJ645178 - FJ645181 | FJ645223 - FJ645226 | | |
| Thellungiella spp. | Eutremeae | | | | FJ645113 - FJ645117 | FJ645123 - FJ645127 | FJ645199 - FJ645202 | FJ645252 - FJ645256 | | |
| Thlaspi arvense | Thlaspidieae | | | | AF144535 | | | | | |
| Turritis glabra | Camelineae | | | | AF112091 | | | | | |
| non Brassicaceae specie | es | | | | | | | | | |
| Apophyllum anomalum | | | | | | | | | AY483264 | |
| Capparis hastata | | | | | | | | | M95754 | |
| Capparis spinosa | | | | | | | | | AY167985 | |
| Cleome hassleriana | | | | | | | | | M95755 | |
| Crateva odora | | | | | | | | | AY167986 | |
| Emblingia calceoliflora | | | | | | | | | AF146014 | |
| Forchhammeria sp | | | | | | | | | AY483276 | |
| Forchhammeria trifoliata | | | | | | | | | AY483277 | |
| Geomitra clavigera | | | | | | | | | AF307488 | |
| Gymnosiphon aphyllus | | | | | | | | | AF307489 | |
| Gyrostemon sp | | | | | | | | | L22439 | |
| Gyrostemon tepperi | | | | | | | | | L22440 | |
| Moringa drouhardii | | | | | | | | | AF405249 | |
| Oligomeris linifolia | | | | | | | | | AY483272 | |
| Pentadiplandra brazzeana | 1 | | | | | | | | U38533 | |
| Podandrogyne chiriquensi | S | | | | | | | | AY483269 | |
| Polanisia dodecandra | | | | | | | | | AY167984 | |

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| Taxa | Tribe | Locality | Voucher | CAD5 | CHS | MS | MtN31 | PRK | rbcL |
| Reseda alba | | | | | | | | | M95756 |
| Reseda lutea | | | | | | | | | AY483273 |
| Tersonia cyathiflora | | | | | | | | | L22441 |
| Tirania purpurea | | | | | | | | | AY483279 |
| Tovaria pendula | | | | | | | | | M95758 |
| Maerua kirkii | | | | | | | | | AY483266 |
| Cadaba aphylla | | | | | | | | | AM234931 |

Appendix 2. Primers specific to either genome copies present in *Pachycladon*.

| Gene | Genome copy | Primer | Annealing T° | Direction | Sequence (5' -> 3') |
|------|-------------|----------|-----------------|-----------|---------------------------------|
| CAD5 | A | CAD5-2R | 62 °C | Reverse | CCT GAA CAC AAA AGA ATT GAC |
| CHS | A & B | CHS2R | | Reverse | ACT CCA ACC CTT CTC CTG TCG TGG |
| | A | CHS2-1F | 66 °C | Forward | CGC AGT CTC ATC TCT TTT TTC CC |
| | В | CHS1-1F | 60 °C | Forward | ACA CTC TCA TCT CCT TTC TCT TGG |
| MS | A & B | ms1f | | Forward | CCG TTG CTG ACC GGA GAG TTG |
| | A | ms2-3r | 60 °C | Reverse | CCT GTC AAG AAA CCA AAA GC |
| | В | ms1-3r | 60 °C | Reverse | CTG TCA AGA AAC CAA GTA AC |
| PRK | A & B | PRK3F | | Forward | ACC GAT ATA YAA CCA TGT CAC TGG |
| | A | PRK1-5R | 53 °C | Reverse | GCA ATG AGT CTA ATT GGT AAC |
| | В | PRK2-5R | 60 °C | Reverse | CCG ATA CCT GAG AGA AAG AAG C |
| | В | PRK2-5Rb | Sequencing only | Reverse | GAA TCT GTA TCA TTC AGC TGT TAC |