

10 20 30 40 50 60 70 80  
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ATGGCTAAAACCAAACAAATCAAAAATTTTACTTTGAAATTTTGGACCTCAACATCCTGCTGCTCATGGTGTTTTACGATT NC\_027974\_Sanionia  
ATGGCTAAAACCAAACAAATCAAAAATTTTACTTTGAAATTTTGGACCTCAACATCCTGCTGCTCATGGTGTTTTACGATT NC\_024515\_Climacium  
ATGGCTAAAACCAAACAAATCAAAAATTTTACTTTGAAATTTTGGACCTCAACATCCTGCTGCTCATGGTGTTTTACGATT NC\_031212\_Brachythecium  
ATGGCTAAAACCAAACAAATCAAGAATTTTACTTTGAAATTTTGGACCTCAACATCCTGCTGCTCATGGTGTTTTACGATT NC\_024520\_Atrichum  
ATGGCTAGAACCAAACAAATCAAGAATTTTACTTTAAATTTTGGACCTCAACATCCTGCTGCTCATGGTGTTTTACGATT NC\_024521\_Sphagnum  
ATGGCTAAAACCAAACAAATCAAAAATTTTACTTTGAAATTTTGGACCTCAACATCCTGCTGCTCATGGTGTTTTACGATT NC\_024516\_Hypnum  
ATAGCTAAAAGCAAACAAATCAAGAATTTTACTTTGAAATTTTGGACCTCAACATCCTACTGCTCATGGTGTTCACGATT KC\_784953\_Tetraphis  
ATGGCTAAAACCAAACAAATCAAAAATTTTACTTTGAAATTTTGGACCTCAACATCCTGCTGCTCATGGTGTTTTACGATT MF\_417767\_Mielichhoferia  
-----TCAATAATTTTACTCTGAATCTTGAACCTCAACATCCTGCTGCTCATAGGGTTTTACGATT NC\_024518\_Buxbaumia

Intron 1

90 100 110 120 130 140 150 160  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
AGTATTGGAATGAATGGAGAAGTTGTAGAACGCGCGGAACCGCATATTGGATTACTTCA GTGCGGCATGAAGCCGCT NC\_027974\_Sanionia  
AGTATTGGAATGAATGGAGAAGTTGTAGAACGCGCGGAACCGCATATTGGATTACTTCA GTGCGGCATGAAGCCGCT NC\_024515\_Climacium  
AGTATTGGAATGAATGGAGAAGTTGTAGAACGCGCGGAACCGCATATTGGATTACTTCA GTGCGGCATGAAGCCGCT NC\_031212\_Brachythecium  
AATATTAGAAATGAATGGAGAAGTTGTAGAACGCGCGGAACCGCATATTGGATTACTTCA GTGCGGCATGAAGCCGCT NC\_024520\_Atrichum  
AGTATTAGAAATGAATGGGAAGTTGTAGAACGTCGAGAACCGCATATCGGATTACTTCA GTGCGCACGAAGCCGCT NC\_024521\_Sphagnum  
AGTATTGGAATGAATGGAGAAGTTGTAGAACGCGCGGAACCGCATATTGGATTACTTCA GTGCGGCATGAAGCCGCT NC\_024516\_Hypnum  
AGTATCGGAA-----TGGAAAAGTTGTAGAACGCGCGGAACCGCATATTGGATCACTTCA GTGCGGCATGAAGCCGCT KC\_784953\_Tetraphis  
AGTATTAGAAATGAATGGAGAAGTTGTAGAACGCGCGGAACCGCATATTGGATTACTTCA GTGCGGCATGAAGCCGCT MF\_417767\_Mielichhoferia  
AGTATTAGAAATGAATGTGAAGTTGTAGAACGCGTGAATC-----ATTGGATTACTTCA GTGTGGCACGAAGCCGCT NC\_024518\_Buxbaumia

170 180 190 200 210 220 230 240  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
GACGCCGAGTCGGCA-TATCC---TATGCCGCTAGCTATGTCCTGCTTGTCCCCACCACGGGT-GGCGCGTGGAGGC AA NC\_027974\_Sanionia  
GACGCCGAGTCGGCA-TATCC---TATGCCGCTAGCTATGTCCTGCTTGTCCCCACCACGGGT-GGCGCGTGGAGGC AA NC\_024515\_Climacium  
GACGCCGAGTCGGCA-TATCC---TATGCCGCTAGCTATGTCCTGCTTGTCCCCACCACGGGT-GGCGCGTGGAGGC AA NC\_031212\_Brachythecium  
GACGCCGAGTCGGCA-TATCC---TATGCCGCTAGCTATGTCCTGCTTGTCCCCACCACGGGT-GGCGCGTGGAGGC AA NC\_024520\_Atrichum  
GACGCCGAGTCGGCG-TATCC---TATGCCGCTAGCTATGTCCTGCTTGTCCCTGGCACGGGT-GGCGGTGGAGGC AA NC\_024521\_Sphagnum  
GACGCCGAGTCGGCA-TATCC---TATGCCGCTAGCTATGTCCTGCTTGTCCCCACCACGGGT-GGCGCGTGGAGGC AA NC\_024516\_Hypnum  
GACGCCGAGTCGGCA-TATCC---TATGCCGCTAGCCATGTCCTGCTTGTTCCCAGCACGAGT-GGCGCGTGGAGGC AA KC\_784953\_Tetraphis  
AACGCTGAGTCCCCACTGTGG---TTGACTTACCCTGGGCTTT-CTTGGAAAAGGAAACGCGTCGGCGGGTCCCTGG--A MF\_417767\_Mielichhoferia  
GATGCCGAGTCGGCA-TATCTTATTATGCCGCTAGCTATGTTTTGCTTGTCTCGCA-----T-GACGCCCAAAGGC-- NC\_024518\_Buxbaumia

250 260 270 280 290 300 310 320  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
CTCCCGCTCATAAGCACCGGGCAAAA GGCGTTTTGTTGGCAACTCAA NC\_027974\_Sanionia  
CTCCCGCTCATAAGCACCGGGCAAAA GGCGTTTTGTTGGCAACTCAA NC\_024515\_Climacium  
CTCCCGCTCATAAGCACCGGGCAAAA GGCGTTTTGTTGGCAACTCAA NC\_031212\_Brachythecium  
CTCCCGCTCATAAGCACCGGGCAAAA GGCGTTTTGTTGGCAACTCAA NC\_024520\_Atrichum  
CTTTCCGCTCATAAGCACCGGGCAAAA GGCGTTTTGTTGGCAACTCAA NC\_024521\_Sphagnum  
CTCCCGCTCATAAGCACCGGGCAAAA GGCGTTTTGTTGGCAACTCAA NC\_024516\_Hypnum  
CTTTCCGCTCATAAGCACCGGGCAAAA GGCGTTTTGTTGGCAACTCAA NC\_024516\_Hypnum  
GTACC-CGTACGGGGCGC-ACGCGTATTCGCCGGGGTGATTATTACGA-----CCAGCCCC-TCCGCATCTTAG MF\_417767\_Mielichhoferia  
-TT-----GGCA-CGGGCAAAA-----CCCCTTTGTCGGGCA-TAAG NC\_024518\_Buxbaumia

330 340 350 360 370 380 390 400  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
GTGAGGCAAAATCGCTCAGGGGAAAGGGGGGAGAAGGTCGTGAAGGTGGCCTCGTTATCCACACTAGAGGTCTCGACAGAG NC\_027974\_Sanionia  
GTGAGGCAAAATCGCTCAGGGGAAAGGGGGGAGAAGGTCGTGAAGGTGGCCTCGTTATCCACACTAGAGGTCTCGACAGAG NC\_024515\_Climacium  
GTGAGGCAAAATCGCTCAGGGGAAAGGGGGGAGAAGGTCGTGAAGGTGGCCTCGTTATCCACACTAGAGGTCTCGACAGAG NC\_031212\_Brachythecium  
GTGAGGCAAAATCGCTCAGGGGAAAGGGGGGAGAAGGTTGTGAAGGTGGCCTCGTTATCCACACT-GGGGTCTCGATGGAG NC\_024520\_Atrichum  
GTGAGGCAAAATCGCTCAGGGGAAAGGGGGGAGAAGGTTGTGAAGGTGGCCTCGTTATCCACACTGGAGGTTTCAACAGAG NC\_024521\_Sphagnum  
GTGAGGCAAAATCGCTCAGGGGAAAGGGGGGAGAAGGTCGTGAAGGTGGCCTCGTTATCCACACTAGAGGTCTCGACAGAG NC\_024516\_Hypnum  
GTGAGGCGAATCGTCCGGGGGAAAGGAGGGGAGAAGGTCGTGAAGGTGGCCTCGTTATCCACACTGGAGAGATGAGTAAA- KC\_784953\_Tetraphis  
CACAG-----CGGAACGT-GTAA-CCGGCCTGAG-GTCC-CATTTCAACCGCCAAATTTAT MF\_417767\_Mielichhoferia  
GCGAATAAATCGCCAAAACAGAAAAGAAAGGAGAAGATCGTGAAGGTGGCCTCTCTTATCCA-----GGATCTCGATAGAG NC\_024518\_Buxbaumia

410 420 430 440 450 460 470 480  
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ATGAATAAGGGTATGTCA-ATACCACCACTGTGGTTGACTC-----ACCCTGGGCTTTCTTGGAAACGAGAACGC NC\_027974\_Sanionia  
ATGAATAAGGGTATGTCA-ATACCACCACTGTGGTTGACTC-----ACCCTGGGCTTTCTTGGAAACGAGAACGC NC\_024515\_Climacium  
ATGAATAAGGGTATGTCA-ATACCACCACTGTGGTTGACTC-----ACCCTGGGCTTTCTTGGAGACGAGAACGC NC\_031212\_Brachythecium  
ATGAGTGGGGGACTTGG-CGCCCCCACTGTGGTTGACTTACAGTCGACCCTGGGCTTTCTTGGAAACGAGAACGC NC\_024520\_Atrichum  
ATGAATAAGGGGACTTCA-GT-CCTCTACTGTGGTTGACTTCAAGCCAACTATTGGGGTTTCTCAGAAACGAGAACGC NC\_024521\_Sphagnum  
ATGAATAAGGGTATGTCA-ATACCACCACTGTGGTTGACTC-----ACCCTGGGCTTTCTTGGAAACGAGAACGC NC\_024516\_Hypnum  
TTAAATGGCGGATGGGACCGGGCTTGGCTTCCCTCTCACAGCCGATATAGTCGGGCTTTCTTGGAAACGAGAACGC KC\_784953\_Tetraphis  
TGTCTT-----TACAAT-GGGTAGGCTAACCAACAGGTACAGCC-----AAAACCTTAGGTCGAATAGGACG-GCACTA MF\_417767\_Mielichhoferia  
ATGAGCAGGGG----- NC\_024518\_Buxbaumia

490 500 510 520 530 540 550 560  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
GTCGGCGGGTCCTGGAGTGCCC GTCAAGGGGCGACGCGTATTCTACGGGGTGATTATCACGACCAG CCCCTCCGCAT NC\_027974\_Sanionia  
GTCGGCGGGTCTTGGAGTGCCC GTCAAGGGGCGCACGCGTATTCTACGGGGTGATTATCACGACCAG CCCCTCCGCAT NC\_024515\_Climacium  
GTTGGCGGGTCCTGGAGTGCCC GTCAAGGGGCGCACGCGTATTCTACGGGGTGATTATCACGACCAG CCCCTCCGCAT NC\_031212\_Brachythecium  
GTCGGCGGGTCTTGGAGTGCCC GTCAAGGGGCGCACGCGTATTCTACGGGGTGATTATCACGACCAG CCCCTCCGCAT NC\_024520\_Atrichum  
GTCGGCGGGTCTTGGAGTGCTC GTCAAGGATGACGCGTATTCTCCGGGGTGATTATCACGACCAGCCTTCTTCGCAT NC\_024521\_Sphagnum  
GTCGGCGGGTCTTGGAGTGCCC GTCAAGGGGCGCACGCGTATTCTACGGGGTGATTATCACGACCAG CCCCTCCGCAT NC\_024516\_Hypnum  
GTCGGCGGGTCTTGGAGTGCCC GTCAAGGGGCGCACGCGTATTCTACGGGGTGATTATCACGACCAG CCCCTCTGCAT KC\_784953\_Tetraphis  
CT GGCAAACTACTATCTAGCAAAGACACGAATCATGAAGGATAGAGCTTGCCTCAAAGCATACGGGA AAGTTCTAGCA MF\_417767\_Mielichhoferia  
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NC\_024518\_Buxbaumia

570 580 590 600 610 620 630 640  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
CTCGGCACAGCGGAACGTGTAACCGGCCCTAAGGTCCCATTT CAACCGCCAATTTATTGTCTTACAATGGGTAGGCTAA NC\_027974\_Sanionia  
CTCGGCACAGCGGAACGTGTAACCGGCCCTAAGGTCCCATTT CAACCGCCAATTTATTGTCTTACAATGGGTAGGCTAA NC\_024515\_Climacium  
CTCGGCACAGCGGAACGTGTAACCGGCCCTAAGGTCCCATTT CAACCGCCAATTTATTGTCTTACAATGGGTAGGCTAA NC\_031212\_Brachythecium  
CTCGGCACAGCGGAACGTGTAACCGGCCCTAAGGTCCCATTT CAATTGCCAATTTTTTGTCCCGGAATGGGTAGGCTAA NC\_024520\_Atrichum  
CTCGGCATAGCGGAACGTGTAACCGGCCCTGAGGTCTCATTT CAAC TTTAATTTGTTT --CTTGAAATGGGTAGGCTAA NC\_024521\_Sphagnum  
CTCGGCACAGCGGAACGTGTAACCGGCCCTAAGGTCCCATTT CAACCGCCAATTTATTGTCTTACAATGGGTAGGCTAA NC\_024516\_Hypnum  
CTCGGAACAGCGGAACGTGTAACCGGCCCTGGGGTCCCATCT CA ---CAATCTGTTGTCTTGAATGGGTAGGCTAA KC\_784953\_Tetraphis  
ACGGGAAACCGGAGGGAGAAACAGTAGAGCCGCAAGAGCATAACCGGAAGGTAA G C CAGGGA GGCTGGG TCA MF\_417767\_Mielichhoferia  
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NC\_024518\_Buxbaumia

650 660 670 680 690 700 710 720  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
CCACAAGG TACGAGCCAGAACCTTATA GGTCTGGGTAGGACGGCACTACTGGCAAATACTATCTAGCAAAGGCA NC\_027974\_Sanionia  
CCACAAGG TACGAGCCAGAACCTTATAAGTTCGGGTAGGACGGCACTACTGGCAAATACTATCTAGCAAAGGCA NC\_024515\_Climacium  
CCACAAGG TACGAGCCAGAACCTTATA GGTCTGGGTAGGACGGCACTACTGGCAAATACTATCTAGCAAAGGCA NC\_031212\_Brachythecium  
CTGCAAGG GACAAACCAGAACCTCA GGTCTGGGTAGGATGGCACTACTGGCAAATACTATCTAGCAAAGGCA NC\_024520\_Atrichum  
CCGTAAGG GACAAGCCAAAATATCA GGTCTGGGTAGGATGGCACTACTGGCAAATACTATCTAGCAAAGGCA NC\_024521\_Sphagnum  
CCACAAGG TACGAGCCAGAACCTTATA GGTCTGGGTAGGACGGCACTACTGGCAAATACTATCTAGCAAAGGCA NC\_024516\_Hypnum  
CCGCGAGGGGCGCAGCACCAGAACCTCA GGTCTGGGTAGGATGGCACTACTGGCAAATACTATCTAGCAAAGGCA KC\_784953\_Tetraphis  
TT TAAA --- ACCATACATTTTTCTA --- AATAGAGATGCGTGGGACAGAGGGCTCGTAGTACCTGCCT -AGCCT MF\_417767\_Mielichhoferia  
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NC\_024518\_Buxbaumia

730 740 750 760 770 780 790 800  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
CGAGTCGTGAAGGATAAAGCTTTCGTCAAAGGCATACGGAAAGATTCTAGCAACGAGGAAACCAGGGGAGGAA CCGGTA NC\_027974\_Sanionia  
CGAGTCGTGAAGGATAAAGCTTTCGTCAAAGGCATACGGAAAGATTCTAGCAACGAGGAAACCAGGGGAGGAA CCGGTA NC\_024515\_Climacium  
CGAGTCGTGAAGGATAAAGCTTTCGTCAAAGGCATACGGAAAGATTCTAGCAACGAGGAAACCAGGGGAGGAG CCGGTA NC\_031212\_Brachythecium  
CGAGCCTTAGGGGATAAAGGCTTCGTCAAAGGCATACGGAAAGATTCTAGCAACGAGGAAACCAGGGGA GAAAGCCGGTA NC\_024520\_Atrichum  
CAGCCCGGAG ---TAAAGCTTTCGTCAAAGGCATACGGAAAGATTCCAGCAACGAGGAAACCAGGGG GAA CCGGTA NC\_024521\_Sphagnum  
CGAGTCGTGAAGGATAAAGCTTTCGTCAAAGGCATACGGAAAGATTCTAGCAACGAGGAAACCAGGGG AGGAAACCGGTA NC\_024516\_Hypnum  
CAAGGGGCA ---GCGACTTTCGTCAAAGGCATACGGAAAGATTCTAGCAACGAGGAAACCAGGGGAGGAAACCAGGTA KC\_784953\_Tetraphis  
TTGTTTCGAG ---AACCATGTAAACGAAGAAA --GGAAG --TGCT GCT --GGAAGCGAAAGGAAAGAGGCCATA MF\_417767\_Mielichhoferia  
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NC\_024518\_Buxbaumia

810 820 830 840 850 860 870 880  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
GAGCTGCAAGAGCATAACCGGAA ---GGTCAAGCCAGGGAGGCGGGTCATTTAACGGAAGTGGAAGGTTTCGAATCAA NC\_027974\_Sanionia  
GAGCTGCAAGAGCATAACCGGAA ---GGTCAAGCCAGGGAGGCGGGTCATTTAACGGAAGTGGAAGGTTTCGAATCAG NC\_024515\_Climacium  
GAGCTGCAAGAGCATAACCGGAA ---GGTCAAGCCAGGGAGGCGGGTCATTTAACGGAAGTGGAAGGTTTCGAATCAA NC\_031212\_Brachythecium  
GAGCTACAAGAACATAACCGGAA ---AGTCAAGCCAGGGAGGCGGGTCATTTAACGGAAGTGGAAGGTTTCGAATAAG NC\_024520\_Atrichum  
GAGCTGCAAGAGCATAACCGGAA ---GGTCAAGTCAAGGGAGGCGAGGTCATTTAACGGAAGTGGAAGGTTTCGAATAAG NC\_024521\_Sphagnum  
GAGCTGCAAGAGCATAACCGGAA ---GGTCAAGCCAGGGAGGCGGGTCATTTAACGGAAGTGGAAGGTTTCGAATCAA NC\_024516\_Hypnum  
GAGCTGCAAGAGCATAACCGGAA ---GGTCAAGCCAGGGAGGCGGGTCATTTAACGGAAGTGGAAGGTTTCGAATAGA KC\_784953\_Tetraphis  
AATCAGCAGACTGACGCCCGCACCTTAGCAGTTCCGAGAAGACCGGCCT ---AATCCAGACTCTTT AGAAAT MF\_417767\_Mielichhoferia  
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NC\_024518\_Buxbaumia

890 900 910 920 930 940 950 960  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
GGCTGAAAGAAAAGGGGAGAAATAGATAGCTCGTAGGACCCCACTGTAGTTGAAACGC ---GGGGC -AAGACTGC NC\_027974\_Sanionia  
GGCTGAAAGAAAAGGGGAAATAGGTAGCTCGTAGGACCCCACTGTAGTTGAAACGC ---GGGGC -AAGACTGC NC\_024515\_Climacium  
GGCTGAAAGAAAAGGGGAAATAGGTAGCTCGTAGGACCCCACTGTAGTTGAAATGC ---GGGG -CAAGACTGC NC\_031212\_Brachythecium  
GGCTGAAAGAAAAGTGAATAGGTAGCTTATAGGACCCCACTGTAGTTGGGGCGTAGGACCATAGGGCC -AAGGCCGC NC\_024520\_Atrichum  
AGCTAGAAGAGGAAATGATAATAGGTAGCT ---GACCCCACTGTGGTTGGACTGTAGGGCCATAGGGCC -AAGGCCGC NC\_024521\_Sphagnum  
GGCTGAAAGAAAAGGGGAAATAGGTAGCTCGTAGGACCCCACTGTAGTTGAAACGC ---GGGGC -AAGACTGC NC\_024516\_Hypnum  
AGCTGGGGAGGCAGTAAAAATGGGTAGCTCGTAGGACC ---TGGTTGGAGCTAGGGCC -ATGGCCGGAAGGCC KC\_784953\_Tetraphis  
TAAGCCAGAAATGCGCAACTTTCAAGAAACGAAGGAGTCCGTTAATATTTGGTTCTGCTC -TAGCGCA TAAACCA MF\_417767\_Mielichhoferia  
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NC\_024518\_Buxbaumia

970 980 990 1000 1010 1020 1030 1040  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
-GGGTGTTGGAT-ACGACAGATGGCGCTGCCTAAACTTCATGGAAATCCATGAACT--AGGGAAACAAGCAGTCTCAAA NC\_027974\_Sanionia  
-GGGTGTTGGAT-ACGACAGATGGCGCTGCCTAAACTTCATGGAAATCCATGAACT--AGGGAAACAAGCAGTCTCAAA NC\_024515\_Climacium  
CGGTGTTGGAT-ACGACAGATGGCGCTGCCTAAACTTCATGGAAATCCATGAACT--AGGGAAACAAGCAGTCTCAAA NC\_031212\_Brachythecium  
AGGTTA-AGGGT-ACGACAGACAGCGCTGCCACACTTCATGGAAATCCATGAACT--GGAAGAAAAGCAGTCTCAAA NC\_024520\_Atrichum  
TGGTTG-ACAGT-ATGATAGACAGTGTCTGTCTGCACTTCATAGAAATGCATAAACTA-AAAGAAAACAAGCAGTCTCAAA NC\_024521\_Sphagnum  
-GGGTGTTGGAT-ACGACAGATGGCGCTGCCTAAACTTCATGGAAATCCATGAACT--AGGGAAACAAGCAGTCTCAAA NC\_024516\_Hypnum  
AGGGCGCAGCAT-ACGACAGACAGCGCTGTCTACACTTCATGAA--ATTCCATG-----AAAAAAGCAGTCTCGAA KC\_784953\_Tetraphis  
-GGCAGACGCTTTATTCCGAACCAGAGCT-TCATCAC-CCAAAAG-CGAAAATACTTCTGAAGTCAAAACTCAAC-CATT MF\_417767\_Mielichhoferia  
CAAGTTAGGGATATGACAGACAACGCTGCCTACACTTTTCCCTTTATGTAATCCACAAGT-AGAAAAGCAGTCTCAAA NC\_024518\_Buxbaumia

1050 1060 1070 1080 1090 1100 1110 1120  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
TTTGCGCATGCACATTTCCAAGCTACCAAAACGGCTGCAGAGCAT--AGCATATATATCTAT--TTTTTTTT-GCAG NC\_027974\_Sanionia  
TTTGCGCATGCACATTTCCAAGCTACCAAAACGGCTGCAGAGCAT--AGCATATATATCTAT--TTTTTTTT-GCAG NC\_024515\_Climacium  
TTTGCGCATGCACATTTCCAAGCTACCAAAACGGCTGCAGAGCAT--AGCATATATATCTAT--TTTTTTTT-GCAG NC\_031212\_Brachythecium  
TTTACGCATGCGCATTTTCCAAGCTACTAAAAAGGCTGCAGGGCGC--AGCGTATATATATA--TTCTTTTT-GCAG NC\_024520\_Atrichum  
ATGATGCATGCGCATTTTCTGAGCTACCAAAAGGGCCGCGAGGGCGC--AGCATATATATATA--TTTTTTTT-GCAG NC\_024521\_Sphagnum  
TTTGCGCATGCACATTTCCAAGCTACCAAAACGGCTGCAGAGCAT--AGCATATATATCTAT--TTTTTTTT-GCAG NC\_024516\_Hypnum  
TTTACGCATGCGCATTTTCCAAGCTACCAAAACGGCTGCAGGGCGC--AGCATATATATATATATATATTTTTCTCGCAG KC\_784953\_Tetraphis  
ATGACGC-TGCGCTCCTGGTTTGTATTAAAAATTAAGGGTAACTCAAGTTAGAGAGCCGTGTG-ATGGGT--GACC MF\_417767\_Mielichhoferia  
AATGCG-ATGCGCATTTTCCAAGCTACCAAAACGGCTGCAGGGTACA--AGCATATATATATATACATGTTTTTT--CAG NC\_024518\_Buxbaumia

1130 1140 1150 1160 1170 1180 1190 1200  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
GCTTCAGACCTTCTTT-ATTGAATCTCGGGCCACTGTAATAAATGG CGCGAGCCGTATGCGAGGAGACTTGCACGTAC NC\_027974\_Sanionia  
GCTTCAGACCTTCTTT-ATTGAATCTCGGGCCACTGTAATAAATGG CGCGAGCCGTATGCGAGGAGACTTGCACGTAC NC\_024515\_Climacium  
GCTTCAGACCTTCTTT-ATTCAATCTCGGGCCACTGTAATAAATGG CGCGAGCCGTATGCGAGGAGACTTGCACGTAC NC\_031212\_Brachythecium  
GCCTTAGGCTTTTTTTTATCGAATGTTAGGCCACTGTAATAAATGG CGCGAGCCGTATGCGGGGAGACTTGCACGTAC NC\_024520\_Atrichum  
GCCTCAGTCTCTTTTC--CGAATGTTGGGCCACTGTAACAAATGG CGTGAGCCGTATGCGGGGAGACTTGCACGTAT NC\_024521\_Sphagnum  
GCTTCAGACCTTCTTT-ATTGAATCTCGGGCCACTGTAATAAATGG CGCGAGCCGTATGCGAGGAGACTTGCACGTAC NC\_024516\_Hypnum  
GCCTCAGGCTTTTTTT-ATCGCATGTTGAGCCACTGTAATAAGTGG CGTGAGCCGTATGCGGGGAGACTTGCACGTAC KC\_784953\_Tetraphis  
ATCTCA--CACGGTTC-AGGGAGCATTTTATTATGTGATGCGAGTGA-AT-----GTGTACAGCATAGCTGGCATCAAT MF\_417767\_Mielichhoferia  
GCTTTTTTACCTGAAAAATTTTTT--GGATC---GTAATAAGTGTGTAATCTCT-GCAA-----TCTATTTCG NC\_024518\_Buxbaumia

Exon 2

1210 1220 1230 1240 1250 1260 1270 1280  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
GGTTCCTTAGGGGGG-TTCCGGCCGAAAGATCGGCGCCTACCCGAC--TAGAGGCACAGAAAAATTAATCGAGTATAAAAC NC\_027974\_Sanionia  
GGTTCCTTAGGGGGG-TTCCGGCCGAAAGATCGGCGCCTACCCGAC--TAGAGGCACAGAAAAATTAATCGAGTATAAAAC NC\_024515\_Climacium  
GGTTCCTTAGGGGGG-TTCCGGCCGAAAGATCGGCGCCTACCCGAC--TAGAGGCACAGAAAAATTAATCGAGTATAAAAC NC\_031212\_Brachythecium  
GGTTCCTTAGGGGGG-TTCCGGCCGAAAGACCGGCGCCTACCCAAAC--TAGAGGCACAGAAAAATTAATCGAGTATAAAAC NC\_024520\_Atrichum  
GGTTCCTTAGGGGGGTTTTTGGCCAAAAGACCGACGCCTACCCGAC--TAGAGGCACAGAAAAATTAATCGAGTATAAAAC NC\_024521\_Sphagnum  
GGTTCCTTAGGGAGG-TTCCGGCCGAAAGATCGGCGCCTACCCGAC--TAGAGGCACAGAAAAATTAATCGAGTATAAAAC NC\_024516\_Hypnum  
GGTTCCTTAGGGGGG-TTCCGGCCGAAAGACCGGCGCCTACCCGAC--TAGAGGCACAGAAAAATTAATCGAGTATAAAAC KC\_784953\_Tetraphis  
TAAATTTTGAC--TTTAT----- MF\_417767\_Mielichhoferia  
GGTTC-----AATCTAAAAATACATTTATTATAAAT NC\_024518\_Buxbaumia

Intron 2

1290 1300 1310 1320 1330 1340 1350 1360  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
TTATCTTCAAGCTTTACCTTATTTTGTATCG--TTTAGAGGGCGACCGGAAGTATCGAATGAACCTCTCCAGAATGGAG NC\_027974\_Sanionia  
TTATCTTCAAGCTTTACCTTATTTTGTATCG--TTTAGAGGGCGACCGGAAGTATCGAATGAACCTCTCCAGAATGGAG NC\_024515\_Climacium  
TTATCTTCAAGCTTTACCTTATTTTGTATCG--TTTAGAGGGCGACCGGAAGTATCGAATGAACCTCTCCAGAATGGAG NC\_031212\_Brachythecium  
GTATCTTCAAGCTTTACCTTATTTTGTATCG--TTTAGAGGGCGACCGGAAGTATCGAATGAACCTCTCTAAAATGGAG NC\_024520\_Atrichum  
GTACCTTCAAGCTTTACCTTATTTTGTATCG--TTTAGAGGGCGACTGTGAAGTACCAAAATGAACCTCTCCGAAAAGGAG NC\_024521\_Sphagnum  
TTATCTTCAAGCTTTACCTTATTTTGTATCG--TTTAGA----- NC\_024516\_Hypnum  
GTATCTTCAAGCTTTACCTTATTTTGTATCG--TTTAGAGGGCGACCGGAAGTATCGAATGAATTCCTCCAAAATGGAG KC\_784953\_Tetraphis  
----- MF\_417767\_Mielichhoferia  
ATA----- NC\_024518\_Buxbaumia

1370 1380 1390 1400 1410 1420 1430 1440  
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GTGCTGCAGAAACCCGCGAGCAAAAAGATACGACTAATCGACATATAGAAATATGGCGACGACGACAGCATGTCGTAAAAG NC\_027974\_Sanionia  
GTGCTGCAGAAACCCGCGAGCAAAAAGATACGACTAATCGACATATAGAAATATGGCGACGACGACAGCATGTCGTAAAAG NC\_024515\_Climacium  
GTGCTGCAGAAACCCGCGAGCAAAAAGATACGACTAATCGACATATAGAAATATGGCGACGACGACAGCATGTCGTAAAAG NC\_031212\_Brachythecium  
ATGCTGCAGAAACCCGCGAGCAAAAAGATACGACTGATCGACATATAGAAATATGGCGACGACGACAGCATGTCGTAAAAG NC\_024520\_Atrichum  
GTGCTGCAGATACCCGCGGCAAAAGCAGATATGACTAATCGACATATAGAAATATGACGACAACAACAGCATGTCGTAAAAG NC\_024521\_Sphagnum  
----- NC\_024516\_Hypnum  
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----- MF\_417767\_Mielichhoferia  
-----AGATGCGTTTAG----- NC\_024518\_Buxbaumia

1450	1460	1470	1480	1490	1500	1510	1520	
.... .... .... .... .... .... .... .... .... .... .... .... .... .... .... ....								
GAGATAACTGGGAATAGCCAACCCTTGGCCGTATCTTCAACTGCATCCTTGAGTGTCAGTCAAATGGAAAGTATCATGAA								NC_027974_Sanionia
GAGATAACTGGGAATAGCCAACCCTTGGCCGTATCTTCAACTGCATCCTTGAGTGTCAGTCAAATGGAAAGTATCATGAA								NC_024515_Climacium
GAGATAACTGGGAATAGCCAACCCTTGGCCGTATCTTCAACTGCATCCTTGAGTGTCAGTCAAATGGAAAGTATCATGAA								NC_031212_Brachythecium
GAGATAACTGGGAATAGCCAACCCTTAGCCTTATTTCTAACTGCATCCTTGAGTGTCAGTCAAAGTAAAGTATCGTGAA								NC_024520_Atrichum
AAGATAACTAG---AGCCAACCCTTGGTG-TATTTCCAACATCATTCTGAGTGTCAGTCAAAGTAAAGTATCGTGAA								NC_024521_Sphagnum
AAGATAACTGGGAATAGCCAACCC-----								NC_024516_Hypnum
-----								KC_784953_Tetraphis
-----								MF_417767_Mielichhoferia
-----ATAATGAA								NC_024518_Buxbaumia

1530	1540	1550	1560	1570	1580	1590	1600	
.... .... .... .... .... .... .... .... .... .... .... .... .... .... .... ....								
TGAGAGATGCCAGCGGAATGATCACCTGGGCGCGCTAGGCTAGAAAGAAAATAAGCTTCTCTT								NC_027974_Sanionia
TGAGAGATGCCAGCGGAATGATCACCTGGGCGCGCTAGGCTAGAAAGAAAATAAGCTTCTCTT								NC_024515_Climacium
TGAGAGATGCCAGCGGAATGATCACCTGGGCGCGCTAGGCTAGAAAGAAAATAAGCTTCTCTT								NC_031212_Brachythecium
TGAGAGATGCCAGCGGAATGATCACCCGACGCTGCTGGGCTAGGAGGAGAAAATAAGCTTACTCTTTATTCTTTGGCGTTC								NC_024520_Atrichum
TGAAAGATGCCAGCGGAATGATCACCCGACGCTGCTAGGCTAGGAGGAAAAAAGCTTGTCTTATTCTTTGGCCTTT								NC_024521_Sphagnum
-----								NC_024516_Hypnum
-----								KC_784953_Tetraphis
-----								MF_417767_Mielichhoferia
TGGATAATATTAGCAGA-----CTTT								NC_024518_Buxbaumia

1610	1620	1630	1640	1650	1660	1670	1680	
.... .... .... .... .... .... .... .... .... .... .... .... .... .... .... ....								
-----GTAACAAAGTA-----AGGCAAAAT								NC_027974_Sanionia
-----GGCAAGATAACAAAGTA-----AGGCAAAAT								NC_024515_Climacium
-----GGCAAGATAACAAAGTA-----AGGCAAAAT								NC_031212_Brachythecium
GTTTCGTAAGAGCAACAAGTAGAGCAGAAAAATAAAAAA-GGTCGAAAGCAAAAAAATAATCTAATCCCCAACAAAAAT								NC_024520_Atrichum
GTTTCATAGGGAGAAAAATAGAGCAAGAAAAAGAAAAAGGCGCAAGCGAAAAAAGAAATATCCC-----CAAAAT								NC_024521_Sphagnum
-----								NC_024516_Hypnum
-----								KC_784953_Tetraphis
-----								MF_417767_Mielichhoferia
-----GATCAAA-----								NC_024518_Buxbaumia

1690	1700	1710	1720	1730	1740	1750	1760	
.... .... .... .... .... .... .... .... .... .... .... .... .... .... .... ....								
ATTTTTTTTGCTGGCTTTCAGTTTTCTGAGTGCA-GCCTCCTCCTACAACGTCTTTCTTCTGTTGTCGAAGATCTGA								NC_027974_Sanionia
ATTTTTTTTGTGGCTTTCAGTTTTCTGAGTGCA-GCCTCCTCCTACAACGTCTTTCTTCTGTTGTCGAAGATCTGA								NC_024515_Climacium
ATTTTTTTTGTGGCTTTCAGTTTTCTGAGTGCA-GCCTCCTCCTACAACGTCTTTCTTCTGTTGTCGAAGATCTGA								NC_031212_Brachythecium
ATTTTTTTTGTGGCTTTCAGTTTTCTGAGTGCA-GCCTCCTCCTACAACGTCTTTCTTCTGTTGTCGAAGATCTGA								NC_024520_Atrichum
ATTTTTTTT-CTGGTTTGTATTTCTGGTTTA-GCCTCCCCCAACAACGTCTTTCTTCTGTTGTTGAAGATTTAA								NC_024521_Sphagnum
-----								NC_024516_Hypnum
-----								KC_784953_Tetraphis
-----								MF_417767_Mielichhoferia
-----								NC_024518_Buxbaumia

1770	1780	1790	1800	1810	1820	1830	1840	
.... .... .... .... .... .... .... .... .... .... .... .... .... .... .... ....								
GGCGAGTGACCCAGAGATAGAAAAGAGAACTACGATTCATATGAATATAGCAAAGCATCTGAAGCATAACTACACACTC								NC_027974_Sanionia
GGCGAGTGACCCAGAGATAGAAAAGAGAACTACGATTCATATGAATATAGCAAAGCATCTGAAGCATAACTACACACTC								NC_024515_Climacium
GGCGAGTGACCCAGAGATAGAAAAGAGAACTACGATTCATATGAATATAGCAAAGCATCTGAAGCATAACTACACACTC								NC_031212_Brachythecium
AGCGAGTGACCCAGAGATAGAAAAGAGAACTAGGATTCATATGAATATAGCAGAGCATCTAAAACATAACTACACACTC								NC_024520_Atrichum
AGCAAGTGACCCAGAGTTAAAAAGGAACTAGGATTCATATGAATATAGCAAACATCTAGAGCATAACTACACACTC								NC_024521_Sphagnum
-----								NC_024516_Hypnum
-----								KC_784953_Tetraphis
-----								MF_417767_Mielichhoferia
-----								NC_024518_Buxbaumia

1850	1860	1870	1880	1890	1900	1910	1920	
.... .... .... .... .... .... .... .... .... .... .... .... .... .... .... ....								
ATACGATCTTGTGAAAAGATAGGAGCATTCGGTGGAAACCGGTGAACCATAACATTTTTCTAGATAGAGATGCGTGGGACAG								NC_027974_Sanionia
ATACGATCTTGTGAAAAGATAGGAGCATTCGGTGGAAACCGGTGAACCATAACATTTTTCTAGATAGAGATGCGTGGGACAG								NC_024515_Climacium
ATACGATCTTGTGAAAAGATAGGAGCATTCGGTGGAAACCGGTGAACCATAACATTTTTCTAGATAGAGATGCGTGGGACAG								NC_031212_Brachythecium
ACACAATCTTGTAAAAGAGATAGGAGCATTCGGTGGAAACCGGTGAACCACATTTTTTATAGATAGAGATGTTGGGACAG								NC_024520_Atrichum
ACACAATCTTGTAGAGAGATAGGAGCATTTAGTGAACCAAGTGAACCACACATCCTTCTAGATAGA-TGCGTAGGACAG								NC_024521_Sphagnum
-----								NC_024516_Hypnum
-----								KC_784953_Tetraphis
-----								MF_417767_Mielichhoferia
-----								NC_024518_Buxbaumia

1930 1940 1950 1960 1970 1980 1990 2000  
 ....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
 AGGGCTCGTAGTACCTGCCAGCCTTTGCTTCGAGAACCATGTAAACGAAGAAAGGAAGTGTGCTGGAAAGCGGAAAG NC\_027974\_Sanionia  
 AGGGCTCGTAGTACCTGCCAGCCTTTGCTTTGAGAACCATGTAAACGAAGAAAGGAAGTGTGCTGGAAAGCGGAAAG NC\_024515\_Climacium  
 AGGGCTCGTAGTACCTGCCAGCCTTTGCTTTGAGAACCCCTGTGAACGAAGAAAGAAAGTGTGCTGGAAAGCGGAAAG NC\_031212\_Brachythecium  
 AGGGCTCGTAGTACCTGCCCT-GCCCTTCGCTCCGAGGACCATGTGAACGAAGAAAGGAAGTGTGCTGGAAAGCGGAAAG NC\_024520\_Atrichum  
 AGGGCTCGTAGTACCTGCCCT-ACCCTTTGCTTTGAGAACCATGTAAACGAAGAAAGGAAGTGTGCTGGAAAGCGGAAAG NC\_024521\_Sphagnum  
 ----- NC\_024516\_Hypnum  
 ----- KC 784953\_Tetraphis  
 ----- MF 417767\_Mielichhoferia  
 ----- NC 024518\_Buxbaumia

2010 2020 2030 2040 2050 2060 2070 2080  
 ....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
 AAAGGAGCCTAAGTCGGCAGACTGACGCCGCGCATTGAGCAGTTCGGAGAAG NC\_027974\_Sanionia  
 AAAGGAGCCTAAGTCGGCAGACTGACGCCGCGCATTGAGCAGTTCGGAGAAG NC\_024515\_Climacium  
 AAAGGAGCCTAAGTCGGCAGACTGACGCCGCGCATTGAGCAGTTCGGAGAAG NC\_031212\_Brachythecium  
 GAAGAAGCCTAAATCGGCGGACTAATGTCGCGCATTGAGCAGTTCGGAGAAGGCCGTTCAAAAACCCGAGGGGGAAAAA NC\_024520\_Atrichum  
 GAAGGGGCCTAAATCGGCGGACTGACGTCGCACACTTGTGAGCAGTTCGGAGAAGGCCGTTCAAAAAGGGAGGGGAAAAA NC\_024521\_Sphagnum  
 ----- NC\_024516\_Hypnum  
 ----- KC 784953\_Tetraphis  
 ----- MF 417767\_Mielichhoferia  
 ----- NC 024518\_Buxbaumia

2090 2100 2110 2120 2130 2140 2150 2160  
 ....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
 ACCAGCCTACTCCATACTCTTTAGAAAATAAGCCAGAATGCGCAACTTTTAAGAAACGAAGGAA NC\_027974\_Sanionia  
 ACCAGCCTACTCCATACTCTTTAGAAAATAAGCCAGAATGCGCAACTTTTAAGAAACGAAGGAA NC\_024515\_Climacium  
 ACCAGCCTACTCCATACTCTTTAAAAATAAGCCAGAATGCGCAACTTTTAAGAAACGAAGGAA NC\_031212\_Brachythecium  
 ATATATTTTTTTTCGAG-CCAGTCTACTCCATACTCTCTGAAAATAAGCCAGAATGACGACTTCCAGGAAACGAAAAAA NC\_024520\_Atrichum  
 ATTGATTTTTTTT-TACTCTATACCCTTCGAAGATGAAGCCAGAATGACGATTTCCAGGAAAGGAAGGAA NC\_024521\_Sphagnum  
 ----- NC\_024516\_Hypnum  
 ----- KC 784953\_Tetraphis  
 ----- MF 417767\_Mielichhoferia  
 ----- NC 024518\_Buxbaumia

2170 2180 2190 2200 2210 2220 2230 2240  
 ....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
 GTCGTTAATATTTGGTTC-----GTTTCGCTAGCGCATAAACCAGGCAGACGCTTTATTCGAACCAGAGC-TT- NC\_027974\_Sanionia  
 GTCCGTTAATATTTGGTTC-----GTTTCGCTAGCGCATAAACCAGGCAGACGCTTTATTCGAACCAGAGC-TT- NC\_024515\_Climacium  
 GTCGTTAATATTTGGTTC-----GTTTCGCTAGCGCATAAACCAGGCAGACGCTTTATTCGAACCAGAGC-TT- NC\_031212\_Brachythecium  
 GTCGTTAATATTTGGTTC-----GTTTCGCTAGCGCATAAACCAGGCAGACGCTTTATTCGAACCAGAGC-TT- NC\_024520\_Atrichum  
 GTCATTTGAATATTTGGGTTTGTGCGCTATTTGTTTGTGGCGCATAAACTAGGCAGGCACCTTTCTCAAACCAAACTTTG NC\_024521\_Sphagnum  
 ----- NC\_024516\_Hypnum  
 ----- KC 784953\_Tetraphis  
 ----- MF 417767\_Mielichhoferia  
 ----- NC 024518\_Buxbaumia

2250 2260 2270 2280 2290 2300 2310 2320  
 ....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
 CATCACCAGAAAGCGAAAAATCTTCTGAAGT-----C-GAAACTCAACCATTATGACGCTGCGCTCCTGGTTTG NC\_027974\_Sanionia  
 CATCACCAGAGGCGAAAAATCTTCTGAAGT-----C-GAAACTCAACCATTATGACGCTGCGCTCCTGGTTTG NC\_024515\_Climacium  
 CATCACCAGAAAGCGAAAAATCTTCTGAAGT-----C-GAAACTCAACCATTATGACGCTGCGCTCCTGGTTTG NC\_031212\_Brachythecium  
 TTATACCCAAAAGCAGAAATCTTTTGAAGT-----CAAAAATCAACCATTATGACGCTGCGCTCCTGGTTTG NC\_024520\_Atrichum  
 T-CATCTAGAAGC--TCTTATATGGAAGTACTTCTAAGGGCAAAAATCAACCATTATGACGCTGCGCTCCTGGTTTG NC\_024521\_Sphagnum  
 ----- NC\_024516\_Hypnum  
 ----- KC 784953\_Tetraphis  
 ----- MF 417767\_Mielichhoferia  
 ----- NC 024518\_Buxbaumia

2330 2340 2350 2360 2370 2380 2390 2400  
 ....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
 CTTATCTAAAATCTAAGGGTAACTCAAGTTAGAGAGCCGTGTGATGGGTGACCATCTCACACGGTTCGGGGAGCACTTTA NC\_027974\_Sanionia  
 CTTATCTAAAATCTAAGGGTAACTCAAGTTAGAGAGCCGTGTGATGGGTGACCATCTCACACGGTTCGGGGAGCACTTTA NC\_024515\_Climacium  
 CTTATCTAGAATCTAAGGGTAACTCAAGTTAGAGAGCCGTGTGATGGGTGACCATCTCACACGGTTCGGGGAGCACTTTA NC\_031212\_Brachythecium  
 GTTATTTCAAACCTAAGGGTAACTTAAAGTTGAGAGCCGTGTGATGGGTGACCATCTCACACGGTTCGAAAGAGCACTTTA NC\_024520\_Atrichum  
 GGGATTGAAAACCTGAGG-TAACTCAAGTTGAGAGCCGTGTGATGGGTGACCATCTCACACGGTTCGAGAGCACTTTT NC\_024521\_Sphagnum  
 ----- NC\_024516\_Hypnum  
 ----- KC 784953\_Tetraphis  
 ----- MF 417767\_Mielichhoferia  
 ----- NC 024518\_Buxbaumia

Exon 3  
2410 2420 2430 2440 2450 2460 2470 2480  
TTATGTGATGCGAGTGAATGTGTGCGGCATAGCTGGCATCAATTAATTTCTGACTCTATTTATGTTTCTATGATGGCC NC\_027974\_Sanionia  
TTATGTGATGCGAGTGAATGTGTGCGGCATAGCTGGCATCAATTAATTTCTGACTCTATTTATGTTTCTATGATGGCC NC\_024515\_Climacium  
TTATGTGATGCGAGTGAATGTGTGCGGCATAGCTGGCATCAATTAATTTCTGACTCTATTTATGTTTCTATGATGGCC NC\_031212\_Brachythecium  
TTATGTGATGCGAGTGAATGTGTACAGCATAGCTGGTATCAATTAATTTTCTGACTCTATTTATGTTTCTATGATGGCC NC\_024520\_Atrichum  
GTATGTAATGTAAGTAAATGTGTACAGCATAGCTGGCATTAATGAATTTTCTGACTCTATTTATGTTTCTATGATGGCC NC\_024521\_Sphagnum  
TTACGTTTCTATGATGGCC NC\_024516\_Hypnum  
KC 784953 Tetraphis  
TTATGTTTATATGATGGTC MF 417767 Mielichhoferia  
NC 024518\_Buxbaumia  
TTATAAGA

2490 2500 2510 2520 2530 2540 2550 2560  
CAAGAACATGCTTATTCCTTAGCTGTAGAGAAACCTTTGTAATTTGTGAGGTACCATTACGAGCTCAGTATATACGAGTGT NC\_027974\_Sanionia  
CAAGAACATGCTTATTCCTTAGCTGTAGAGAAACCTTTGTAATTTGTGAGGTACCATTACGAGCTCAGTATATACGAGTGT NC\_024515\_Climacium  
CAAGAACATGCTTATTCCTTAGCTGTAGAGAAACCTTTGTAATTTGTGAGGTACCATTACGAGCTCAGTATATACGAGTGT NC\_031212\_Brachythecium  
CAAGAACATGCTTATTCCTTAGCTGTAGAGAAACCTTTGTAATTTGTGAGGTACCATTACGAGCTCAGTATATACGAGTGT NC\_024520\_Atrichum  
CAAGAACATGCTTATTCCTTAGCTGTAGAGAAACCTTTGTAATTTGTGAGGTACCATTACGAGCTCAGTATATACGAGTGT NC\_024521\_Sphagnum  
CAAGAACATGCTTATTCCTTAGCTGTAGAGAAACCTTTGTAATTTGTGAGGTACCATTACGAGCTCAGTATATACGAGTGT NC\_024516\_Hypnum  
KC 784953 Tetraphis  
CAAGAACATGCTTATTCCTTAGCTGTAGAGAAACCTTTGTAATTTGTGAGGTACCATTACGAGCTCAGTATATACGAGTGT MF 417767 Mielichhoferia  
CAAGATCATAGCGCTTATGTAG NC 024518\_Buxbaumia

2570 2580 2590 2600 2610 2620 2630 2640  
ATTTGCGTGAATAAATCGAATTTTAAATCATTTACTTGTCTTAACTACTCATGCTATGGATGTGGGGGCATTAATCCCGT NC\_027974\_Sanionia  
ATTTGCGTGAATAAATCGAATTTTAAATCATTTACTTGTCTTAACTACTCATGCTATGGATGTGGGGGCATTAATCCCGT NC\_024515\_Climacium  
ATTTGCGTGAATAAATCGAATTTTAAATCATTTACTTGTCTTAACTACTCATGCTATGGATGTGGGGGCATTAATCCCGT NC\_031212\_Brachythecium  
ATTTGCGTGAATAAATCGAATTTTAAATCATTTACTTGTCTTAACTACTCATGCTATGGATGTGGGGGCATTAATCCCGT NC\_024520\_Atrichum  
ATTTGCGTGAATAAATCGAATTTTAAATCATTTACTTGTCTTAACTACTCATGCTATGGATGTGGGGGCATTAATCCCGT NC\_024521\_Sphagnum  
ATTTGCGTGAATAAATCGAATTTTAAATCATTTACTTGTCTTAACTACTCATGCTATGGATGTGGGGGCATTAATCCCGT NC\_024516\_Hypnum  
KC 784953 Tetraphis  
ATTTGCGTGAATAAATCGAATTTTAAATCATTTACTTGTCTTAACTACTCATGCTATGGATGTGGGGGCATTAATCCCGT MF 417767 Mielichhoferia  
NC 024518\_Buxbaumia

2650 2660 2670 2680 2690 2700 2710 2720  
TCCTGTGGCCCTTTTGAAGAGCGAGAAAAAATTTTGAATTTCTATGAAAGAGTTTCAGGAGCCAGGATGCATGCCAGTT NC\_027974\_Sanionia  
TCCTGTGGCCCTTTTGAAGAGCGAGAAAAAATTTTGAATTTCTATGAAAGAGTTTCAGGAGCCAGGATGCATGCCAGTT NC\_024515\_Climacium  
TCCTGTGGCCCTTTTGAAGAGCGAGAAAAAATTTTGAATTTCTATGAAAGAGTTTCAGGAGCCAGGATGCATGCCAGTT NC\_031212\_Brachythecium  
TCCTGTGGCCCTTTTGAAGAGCGAGAAAAAATTTTGAATTTCTATGAAAGAGTTTCAGGAGCCAGGATGCATGCCAGTT NC\_024520\_Atrichum  
TCCTGTGGCCCTTTTGAAGAGCGAGAAAAAATTTTGAATTTCTATGAAAGAGTTTCAGGAGCCAGGATGCATGCCAGTT NC\_024521\_Sphagnum  
TCCTGTGGCCCTTTTGAAGAGCGAGAAAAAATTTTGAATTTCTATGAAAGAGTTTCAGGAGCCAGGATGCATGCCAGTT NC\_024516\_Hypnum  
KC 784953 Tetraphis  
TCCTGTGGCCCTTTTGAAGAGCGAGAAAAAATTTTGAATTTCTATGAAAGAGTTTCAGGAGCCAGGATGCATGCCAGTT MF 417767 Mielichhoferia  
TTGATTGGCAGGTTAAATCTTTAATCCCAT

2730 2740 2750 2760 2770 2780 2790 2800  
ACATACGACCAGGCGGAGTTGCACAAGACATGCCCTTTGGGCTTAAGTGAAGATATTTTTCTATTTACACAACAATTTGCT NC\_027974\_Sanionia  
ACATACGACCAGGCGGAGTTGCACAAGACATGCCCTTTGGGCTTAAGTGAAGATATTTTTCTATTTACACAACAATTTGCT NC\_024515\_Climacium  
ACATACGACCAGGCGGAGTTGCACAAGACATGCCCTTTGGGCTTAAGTGAAGATATTTTTCTATTTACACAACAATTTGCT NC\_031212\_Brachythecium  
ACATACGACCAGGCGGAGTTGCACAAGACATGCCCTTTGGGCTTAAGTGAAGATATTTTTCTATTTACACAACAATTTGCT NC\_024520\_Atrichum  
ACATACGACCAGGCGGAGTTGCACAAGACATGCCCTTTAGGCTTAAGTGAAGATATTTTTCTATTTACACAACAATTTGCT NC\_024521\_Sphagnum  
ACATACGACCAGGCGGAGTTGCACAAGACATGCCCTTTGGGCTTAAGTGAAGATATTTTTCTATTTACACAACAATTTGCT NC\_024516\_Hypnum  
KC 784953 Tetraphis  
ACATACGACCAGGCGGAGTTGCACAAGACATGCCCTTTGGGCTTAAGTGAAGATATTTTTCTATTTACACAACAATTTGCT MF 417767 Mielichhoferia  
TGTGGTTGGCTTTAAGCGCAACCAT

2810 2820 2830 2840 2850 2860 2870 2880  
TCTCGTATTGATGAAATAGAAGAAATGTTAACCAACAATCGTATCTGGAACAACGATTAGTTGATATTGGTACTGTTAC NC\_027974\_Sanionia  
TCTCGTATTGATGAAATAGAAGAAATGTTAACCAACAATCGTATCTGGAACAACGATTAGTTGATATTGGTACTGTTAC NC\_024515\_Climacium  
TCTCGTATTGATGAAATAGAAGAAATGTTAACCAACAATCGTATCTGGAACAACGATTAGTTGATATTGGTACTGTTAC NC\_031212\_Brachythecium  
TCTCGTATTGATGAAATAGAAGAAATGTTAACCAACAATCGTATCTGGAACAACGATTAGTTGATATTGGTACTGTTAC NC\_024520\_Atrichum  
TCTCGTATTGATGAAATAGAAGAAATGTTAACCAACAATCGTATCTGGAACAACGATTAGTTGATATTGGTACTGTTAC NC\_024521\_Sphagnum  
TCTCGTATTGATGAAATAGAAGAAATGTTAACCAACAATCGTATCTGGAACAACGATTAGTTGATATTGGTACTGTTAC NC\_024516\_Hypnum  
KC 784953 Tetraphis  
TCTCGTATTGATGAAATAGAAGAAATGTTAACCAACAATCGTATCTGGAACAACGATTAGTTGATATTGGTACTGTTAC MF 417767 Mielichhoferia  
NC 024518\_Buxbaumia

2890 2900 2910 2920 2930 2940 2950 2960  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
CGCGCAGCAAGCTTTGGATTGGGGATTCTAGTGGTGTAAATGTTAAGAGGCTCAGGAGTATGCTGGGATTTGCGAAAATCAG NC\_027974\_Sanionia  
CGCACAGCAAGCTTTGGATTGGGGATTCTAGTGGTGTAAATGTTAAGAGGCTCAGGAGTATGCTGGGATTTGCGAAAATCAG NC\_024515\_Climacium  
CGCACAGCAAGCTTTGGATTGGGGATTCTAGTGGTGTAAATGTTAAGAGGCTCAGGAGTATGCTGGGATTTGCGAAAATCAG NC\_031212\_Brachythecium  
TGCACAGCAAGCTTTGGATTGGGGATTCTAGTGGTGTAAATGTTAAGAGGCTCAGGAGTATGCTGGGATTTGCGAAAATCAG NC\_024520\_Atrichum  
TGCACAGCAAGCTTTGGATTGGGGATTCTAGTGGTGTAAATGTTAAGAGGCTCAGGAGTATGCTGGGATTTGCGAAAATCAG NC\_024521\_Sphagnum  
CGCACAGCAAGCTTTGGATTGGGGATTCTAGTGGTGTAAATGTTAAGAGGCTCAGGAGTATGCTGGGATTTGCGAAAATCAG NC\_024516\_Hypnum  
-----  
TGCACAGCAAGCTTTGGATTGGGTTACTAGTGGTGTAAATGTTAAGAGGCTCAGGAGTATGCCGGGATTTGCGAAAATAAG MF\_417767\_Mielichhoferia  
-----  
-----AGGCTTTGGTCTGA-----TAGCATATCATGAGCATGATATATGTTATGGCGATCA----- NC\_024518\_Buxbaumia

2970 2980 2990 3000 3010 3020 3030 3040  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
CACCTTACGATGTGTATAACCAATTGATTTTCGATGTACCCGTAGGTACCAGAGGAGATTTGTTATGACC GTTATTGTATT NC\_027974\_Sanionia  
CACCTTACGATGTGTATAACCAATTGATTTTCGATGTACCCGTAGGTACCAGAGGAGATTTGTTATGACC GTTATTGTATT NC\_024515\_Climacium  
CACCTTACGATGTGTATAACCAATTGATTTTCGATGTACCCGTAGGTACCAGAGGAGATTTGTTATGACC GTTATTGTATT NC\_031212\_Brachythecium  
CACCTTACGATGTGTATAACCAATTGATTTTCGATGTACCCGTAGGTACCAGAGGAGATTTGTTATGACC GTTATTGTATT NC\_024520\_Atrichum  
CACCTTACGATGTGTATAACCAATTGATTTTCGATGTACCCGTAGGTACCAGAGGAGATTTGTTATGACC GTTATTGTATT NC\_024521\_Sphagnum  
CACCTTACGATGTGTATAACCAATTGATTTTCGATGTACCCGTAGGTACCAGAGGAGATTTGTTATGACC GTTATTGTATT NC\_024516\_Hypnum  
-----  
CACCTTACGATGTGTATAACCAATTGATTTTCGATGTACCCGTAGGTACCAGAGGAGATTTGTTATGACC GTTATTGTATT MF\_417767\_Mielichhoferia  
-----  
----- NC\_024518\_Buxbaumia

3050 3060 3070 3080 3090 3100 3110 3120  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
CGTATCGAAGAGATGCGACAAAGTATTCGAATCATTATGCAATGTCTTAATCAAATGCCATGATGATTAAAGCCGA NC\_027974\_Sanionia  
CGTATTGAAGAGATGCGACAAAGTATTCGAATCATTATGCAATGTCTTAATCAAATGCCATGATGATTAAAGCCGA NC\_024515\_Climacium  
CGTATCGAAGAGATGCGACAAAGTATTCGAATCATTATGCAATGTCTTAATCAAATGCCATGATGATTAAAGCCGA NC\_031212\_Brachythecium  
CGTATCGAAGAGATGCGACAAAGTATTCGAATCATTATGCAATGTCTTAATCAAATGCCATGATGATTAAAGCCGA NC\_024520\_Atrichum  
CGTATCGAAGAGATGCGACAAAGTATTCGAATCATTATGCAATGTCTTAATCAAATGCCATGATGATTAAAGCCGA NC\_024521\_Sphagnum  
CGTATCGAAGAGATGCGACAAAGTATTCGAATCATTATGCAATGTCTTAATCAAATGCCATGATGATTAAAGCCGA NC\_024516\_Hypnum  
-----  
CGTATTGAAGAGATGCGACAAAGTATTCGAATCATTATGCAATGTCTTAATCAAATGCCATGATGATTAAAGCCGA MF\_417767\_Mielichhoferia  
-----  
-----ATTATCGTAGA NC\_024518\_Buxbaumia

3130 3140 3150 3160 3170 3180 3190 3200  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
TGATCGTAAGCTATGTCCTCCCTCACGATCTCAAATGAAACAATCCATGGAATCTTTAATTCATCATTCAAACCTTTATA NC\_027974\_Sanionia  
TGATCGTAAGCTATGTCCTCCCTCACGATCTCAAATGAAACAATCCATGGAATCTTTAATTCATCATTCAAACCTTTATA NC\_024515\_Climacium  
TGATCGTAAGCTATGTCCTCCCTCACGATCTCAAATGAAACAATCCATGGAATCTTTAATTCATCATTCAAACCTTTATA NC\_031212\_Brachythecium  
TGATCGTAAGCTATGTCCTCCCTCACGATCTCAAATGAAACAATCCATGGAATCTTTAATTCATCATTCAAACCTTTATA NC\_024520\_Atrichum  
TGATCGTAAGCTATGTCCTCCCTCACGATCTCAAATGAAACAATCCATGGAATCTTTAATTCATCATTCAAACCTTTATA NC\_024521\_Sphagnum  
TGATCGTAAGCTATGTCCTCCCTCACGATCTCAAATGAAACAATCCATGGAATCTTTAATTCATCATTCAAACCTTTATA NC\_024516\_Hypnum  
-----  
TGATCGTAAGCTATGTCCTCCCTCACGATCTCAAATGAAACAATCCATGGAATCTTTAATTCATCATTCAAACCTTTATA MF\_417767\_Mielichhoferia  
-----  
-----TGATTTGATGGCGCTG NC\_024518\_Buxbaumia

3210 3220 3230 3240 3250 3260 3270 3280  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
CAGAAGGTTTTCTGTACCAAGCTTTCTTACCTATACTGCAGTAGAGGCACCTAAGGGGAAATTTGGTGTGTTTTTAGTC NC\_027974\_Sanionia  
CAGAAGGTTTTCTGTACCAAGCTTTCTTACCTATACTGCAGTAGAGGCACCTAAGGGGAAATTTGGTGTGTTTTAGTC NC\_024515\_Climacium  
CAGAAGGTTTTCTGTACCAAGCTTTCTTACCTATACTGCAGTAGAGGCACCTAAGGGGAAATTTGGTGTGTTTTAGTC NC\_031212\_Brachythecium  
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CAGAAGGTTTTCTGTACCAAGCTTTCTTACCTATACTGCAGTAGAGGCACCTAAGGGGAAATTTGGTGTGTTTTAGTC NC\_024521\_Sphagnum  
CAGAAGGTTTTCTGTACCAAGCTTTCTTACCTATACTGCAGTAGAGGCACCTAAGGGGAAATTTGGTGTGTTTTAGTC NC\_024516\_Hypnum  
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CAGAAGGTTTTCTGTACCAAGCTTTCTTACCTATACTGCAGTAGAGGCACCTAAGGGGAAATTTGGTGTGTTTTAGTC MF\_417767\_Mielichhoferia  
-----  
-----ACAGTAGAGGAA-----GTTTACATTC NC\_024518\_Buxbaumia

3290 3300 3310 3320 3330 3340 3350 3360  
....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|  
AGTAATGGAACCAATCGTCCTTATCGTTGTAAAATAAGAGCACCTGGTTTTGCTCATCTACAAGGGCTTGATTTTATGTC NC\_027974\_Sanionia  
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AGTAATGGAACCAATCGTCCTTATCATTGTAAAATAAGAGCACCTGGTTTTGCTCATCTACAAGGGCTTGATTTTATGTT MF\_417767\_Mielichhoferia  
-----  
AGT----- NC\_024518\_Buxbaumia



3370      3380      3390      3400      3410      3420      3430  
 .....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.  
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 CAAACATCACATGCTATCAGATGTTGTTACCATAAATGGTACTCAAGATATTGTTTTGGAGAGGTAGATAGATAG  
 -----  
 CAAACATCACATGCTATCAGATGTTGTTACCATAAATGGTATTCAAGATATTGTTTTGGAGAGGTAGATAGATAG  
 -----  
 -----TTTTCGCTGTCATTGATACTTCAAATG-----

NC\_027974\_Sanionia  
 NC\_024515\_Climacium  
 NC\_031212\_Brachythecium  
 NC\_024520\_Atrichum  
 NC\_024521\_Sphagnum  
 NC\_024516\_Hypnum  
 KC 784953 Tetraphis  
 MF 417767 Mielichhoferia  
 NC 024518\_Buxbaumia