References

Archer, C., Browning, J., and Gordon-Gray, K. D. (1997). Studies in Cyperaceae in southern Africa 31: a third species of *Cyathocoma*, *C. bachmannii*. *South African Journal of Botany* **63**, 167–171.

Barrett, M., Donoghue, M. J., and Sober, E. (1991). Against consensus. *Systematic Zoology* **40**, 486–493.

Barros, M. (1969). Cyperaceae. In 'Flora Patagonica'. Vol. II. (Ed. M. N. Correa.) pp. 38–92. (Coleccion Cientifica Del Inta: Buenos Aires.)

Baum, D. A., Sytsma, K. J., and Hoch, P. C. (1994). A phylogenetic analysis of *Epilobium* (Onagraceae) based on nuclear ribosomal DNA sequences. *Systematic Botany* **19**, 363–388.

Bayer, R. J., and Starr, J. R. (1998). Tribal phylogeny of the Asteraceae based on two non-coding chloroplast sequences, the *trn*L intron and *trn*L/*trn*F intergenic spacer. *Annals of the Missouri Botanical Garden* **85**, 242–256.

Belbin, L. (1993a). 'PATN Pattern Analysis Package'. (CSIRO Division of Wildlife and Ecology: Canberra.)

Belbin, L. (1993b). 'PATN Pattern Analysis Package. Technical Reference'. (CSIRO Division of Wildlife and Ecology: Canberra.)

Bell, A. D. (1991). 'Plant Form. An Illustrated Guide to Flowering Plant Morphology'. (Oxford University Press: Oxford.)

Bell, C. D., and Patterson, R. W. (2000). Molecular phylogeny and biogeography of Linanthus (Polemoniaceae). *American Journal of Botany* **87**, 1857–1870.

Bentham, G. (1878). 'Flora Australiensis: a Description of the Plants of the Australian Territory'. Vol. 7. (L. Reeve and Co.: London.)

Bentham, G. (1883). Cyperaceae. In 'Genera Plantarum'. Vol. 3. (Eds G. Bentham and J. Hooker.) pp. 1037–1073. (L. Reeve and Co.: London.)

Blake, S. T. (1940). Notes on Australian Cyperaceae 3. *Proceedings of the Royal Society of Queensland* **51**, 32–50.

Blaser, H. W. (1941). Studies in the morphology of the Cyperaceae. I. Morphology of flowers. B. Rhynchosporoid genera. *American Journal of Botany* **28**, 832–838.

Blaser, H. W. (1944). Studies in the morphology of the Cyperaceae. II. The prophyll. *American Journal of Botany* **31**, 53–64.

Boeckeler, O. (1874). Die Cyperaceen des Königlichen Herbariums zu Berlin. *Linnaea* **38**, 223–544.

Boeckeler, O. (1879). Beitrag zur Kenntniss der Cyperaceen des tropischen Afrika. *Flora* **62**, 561–574.

Bremer, K., and Wanntorp, H. E. (1978). Phylogenetic systematics in botany. *Taxon* **27**, 317–329.

Briggs, B. G., Marchant, A. D., Gilmore, S., and Porter, C. L. (2000). A molecular phylogeny of Restionaceae and allies. In 'Monocots: systematics and evolution'. (Eds K. L. Wilson and D. A. Morrison.) pp. 661–671. (CSIRO: Melbourne.)

Brouat, C., Gielly, L., and McKey, D. (2001). Phylogenetic relationships in the genus *Leonardoxa* (Leguminosae: Caesalpinioideae) inferred from chloroplast *trn*L intron and *trn*L-*trn*F intergenic spacer sequences. *American Journal of Botany* **88**, 143–149.

Brower, A. V. Z. (1999). Delimitation of phylogenetic species with DNA sequences: A critique of Davis and Nixon's population aggregation analysis. *Systematic Biology* **48**, 199–213.

Brower, A. V. Z., Desalle, R., and Vogler, A. (1996). Gene trees, species trees, and systematics: a cladistic perspective. *Annual Review of Ecology & Systematics* **27**, 423–450.

Brown, R. (1810). 'Prodromus Florae Novae Hollandiae et Insulae Van Diemen'. (Johnson: London.)

Browning, J. (1994). Floret position in *Costularia* (Cyperaceae): a new interpretation. *Nordic Journal of Botany* **14**, 653–655.

Browning, J., and Gordon-Gray, K. D. (1995a). Studies in Cyperaceae in southern Africa 27: a contribution to knowledge of spikelet morphology in *Epischoenus* and the relationship of this genus to *Schoenus*. *South African Journal of Botany* **61**, 147–152.

Browning, J., and Gordon-Gray, K. D. (1995b). Studies in Cyperaceae in southern Africa. 28: Spikelet morphology in *Rhynchospora gracillima* ssp. *subquadrata*. *South African Journal of Botany* **61**, 319–324.

Browning, J., and Gordon-Gray, K. D. (1996a). Studies in Cyperaceae in southern Africa. 29: *Costularia natalensis*, an endangered species. *South African Journal of Botany* **62**, 155–159.

Browning, J., and Gordon-Gray, K. D. (1996b). Studies in Cyperaceae in southern Africa. 30: aspects of the relationship between *Cyathocoma* and *Costularia*. *South African Journal of Botany* **62**, 250–257.

Browning, J., and Gordon-Gray, K. G. (1999). Studies in Cyperaceae in southern Africa. 33: a new monotypic genus, *Capeobolus*. *South African Journal of Botany* **65**, 218–222.

Browning, J., and Guthrie, I. (1994). Studies in Cyperaceae in southern Africa 22: spikelet structure in African species of *Carpha* R.Br. *South African Journal of Botany* **60**, 148–151.

Bruhl, J. J. (1991). Comparative development of some taxonomically critical floral/inflorescence features in Cyperaceae. *Australian Journal of Botany* 39, 119–127.

Bruhl, J. J. (1995). Sedge genera of the world: relationships and a new classification of the Cyperaceae. *Australian Systematic Botany* **8**, 125–350.

Bruhl, J. J., Watson, L., and Dallwitz, M. J. (1992). Genera of Cyperaceae: interactive identification and information retrieval. *Taxon* **41**, 225–234.

Bull, J. J., Huelsenbeck, J. P., Cunningham, C. W., Swofford, D. L., and Waddell, P. J. (1993). Partitioning and combining data in phylogenetic analysis. *Systematic Biology* **42**, 384–397.

Burger, W. C. (1975). The species concept in *Quercus*. *Taxon* **24**, 45–50.

Celakovský, L. (1887). Ueber die ährchenartigen Partialinflorescenzen der Rhynchosporen. *Berichte. Deutsche Botanische Gesellschaft* **5**, 148–152.

Chase, M. W., and Hills, H. H. (1991). Silica gel: an ideal material for field preservation of leaf samples for DNA studies. *Taxon* **40**, 215–220.

Chase, M. W., Soltis, D. E., Olmstead, R. G., Morgan, D., Les, D. H., Mishler, B. D., Duvall, M. R., Price, R. A., Hills, H. G., Qiu, Y. L., et al. (1993). Phylogenetics of seed plants: an analysis of nucleotide sequences from the plastid gene *rbc*L. *Annals of the Missouri Botanical Garden* **80**, 528–580.

Chermezon, H. (1922). Sur quelques Cypéracées nouvelles de Madagascar. *Bulletin de la Société Botanique de France* **69**, 719–725.

Chermezon, H. (1935). Cypéracées récoltées par M. Humbert au Congo belge oriental. *Bulletin de la Société Botanique de France* **82**, 334–346.

Clarke, C. B. (1894). Cyperaceae. In 'Conspectus Flora Africa'. Vol. 5. (Eds T. Durand and H. Schinz) pp. 526–692. (Friedlaender and Klincksieck: Berlin and Paris.)

Clarke, C. B. (1897–1898). Cyperaceae. In 'Flora Capensis'. Vol. 7. (Ed. W. T. Thiselton-Dyer.) pp. 149–310. (L. Reeve and Co.: London.)

Clarke, C. B. (1901). Cyperaceae (praeter Caricinas) Chilenses. *Beiblatt zu den Botanischen Jahrbüchern* **30**, 39–41.

Clarke, C. B. (1902). Cyperaceae. In 'Flora of Tropical Africa'. Vol. 8. (Ed. W. T. Thiselton-Dyer.) pp. 266–524. (L. Reeve and Co.: London.)

Clarke, C. B. (1904). Cyperaceae. In 'Plantae novae vel minus cognitae ex Herbario Horti Thenensis'. Vol. 2. (Ed. E. d. Wildeman.) pp. 37–41, t. ix–x. (Veuve Monnom: Bruxelles.)

Clarke, C. B. (1905). Cyperaceae. *Botanische Jahrbücher für Systematik* **35**, 77–83.

Clarke, C. B. (1908). New genera and species of Cyperaceae. *Bulletin of Miscellaneous Information, Kew* **Add. Ser. 8**, 1–196.

Clarke, C. B. (1909). 'Illustrations of Cyperaceae'. (Williams & Norgate: London.)

Clegg, M. T., Gaut, B. S., Learn, G. H., and Morton, B. R. (1994). Rates and patterns of chloroplast DNA evolution. *Proceedings of the National Academy of Sciences of the United States of America* **91**, 6795–6801.

Clegg, M. T., and Zurawski, G. (1992). Chloroplast DNA and the study of plant phylogeny: present status and future prospects. In 'Molecular Systematics of Plants'. (Eds P. S. Soltis, D. E. Soltis, and J. J. Doyle.) pp. 1–13. (Chapman and Hall: New York.)

Costin, A. B., Gray, M., Totterdell, C. J., and Wimbush, D. J. (1979). 'Kosciusko Alpine Flora'. (CSIRO/ Collins Australia: Melbourne/Sydney.)

Cracraft, J. (1983). Species concepts and speciation analysis. In 'Current Ornithology'. (Ed. R. F. Johnston.) pp. 159–187. (Plenum Press, Plenum Publishing Corporation: New York.)

Crisp, M. D. (1991). Contributions towards a revision of *Daviesia* Smith (Fabaceae: Mirbelieae). II. The *D. latifolia* group. *Australian Systematic Botany* **4**, 229–298.

Cronquist, A. (1981). 'An Integrated System of Classification of Flowering Plants'. (Columbia University Press: New York.)

Cunningham, C. W. (1997). Can three incongruence tests predict when data should be combined. *Molecular Biology & Evolution* **14**, 733–740.

Curtis, W. M. (1984). New species of Tasmanian monocotyledons in the families Juncaceae, Centrolepidaceae and Cyperaceae. *Brunonia* **7**, 297–307.

Curtis, W. M., and Morris, D. I. (1994). 'The Student's Flora of Tasmania.' Vol. 4B. (St. David's Park Publishing: Hobart.)

Dahlgren, R. (1980). A revised system of classification of the angiosperms. *Botanical Journal of the Linnean Society* **80**, 91–124.

Dahlgren, R. M. T., Clifford, H. T., and Yeo, P. F. (1985). 'The Families of the Monocotyledons'. (Springer-Verlag: Berlin.)

Dallwitz, M. J., Paine, T. A., and Zurcher, E. J. (1999). 'The DELTA System: DELTA Editor'. (CSIRO Division of Entomology: Melbourne.)

Darwin, C. (1859). 'On the Origin of Species by Means of Natural Selection'. (Murray: London.)

Davis, J. I., and Nixon, K. C. (1992). Populations, genetic variation, and the delimitation of phylogenetic species. *Systematic Biology* **41**, 421–435.

de Queiroz, A. (1993). For consensus (sometimes). *Systematic Biology* **42**, 368–372.

de Queiroz, A., Donoghue, M. J., and Kim, J. (1995). Separate versus combined analysis of phylogenetic evidence. *Annual Review of Ecology & Systematics* **26**, 657–681.

de Queiroz, K., and Donoghue, M. J. (1988). Phylogenetic systematics and the species problem. *Cladistics* **4**, 317–338.

de Queiroz, K., and Poe, S. (2001). Philosophy and phylogenetic inference: A comparison of likelihood and parsimony methods in the context of Karl Popper's writings on corroboration. *Systematic Biology* **50**, 305–321.

del Moral, R. (1980). On selecting indirect ordination methods. *Vegetatio* **42**, 75–84.

Donoghue, M. J. (1985). A critique of the biological species concept and recommendations for a phylogenetic alternative. *Bryologist* **88**, 172–181.

Doyle, J. J. (1995). The irrelevance of allele tree topologies for species delimitation, and a non-topological alternative. *Systematic Botany* **20**, 574–588.

Dyer, R. A. (1976). 'The Genera of Southern African Flowering Plants'. Vol. 2. (The Department of Agricultural Technical Services: Pretoria.)

Eernisse, D. J., and Kluge, A. G. (1993). Taxonomic congruence versus total evidence, and amniote phylogeny inferred from fossils, molecules, and morphology. *Molecular Biology & Evolution* **10**, 1170–1195.

Edgar, E. (1970). Cyperaceae. In 'Flora of New Zealand'. Vol. 2. (Eds L. B. Moore and E. Edgar.) pp. 167–285. (A. R. Shearer, Government Printer: Wellington.)

Eiten, L. T. (1976). Inflorescence units in Cyperaceae. *Annals of the Missouri Botanical Garden* **63**, 81–112.

Eldenäs, P. K., and Linder, H. P. (2000). Congruence and complementarity of morphological and trnL-trnF sequence data and the phylogeny of the African Restionaceae. *Systematic Botany* **25**, 692–707.

Faith, D. P., and Cranston, P. S. (1991). Could a cladogram this short have arisen by chance alone?: on permutation tests for cladistic structure. *Cladistics* **7**, 1–28.

Faith, D. P., and Norria, R. H. (1989). Correlation of environmental variables with patterns of distribution and abundance of common and rare freshwater macroinvertebrates. *Biological Conservation* **50**, 77–98.

Farris, J. S., Albert, V. A., Källersjö, M., Lipscomb, D., and Kluge, A. G. (1996). Parsimony jackknifing outperforms neighbor-joining. *Cladistics* **12**, 99–124.

Farris, J. S., Kallersjo, M., Kluge, A. G., and Bult, C. (1994). Testing significance of incongruence. *Cladistics* **10**, 315–319.

Felsenstein, J. (1985). Confidence limits on phylogenies: an approach using the bootstrap. *Evolution* **39**, 783–791.

Gandoger, M. (1919). Sertum plantarum novarum. *Bulletin de la Société Botanique de France* **66**, 286–307.

Genes Codes Corporation, Inc. (1995). 'Sequencher™ 3.1.1. The complete software solution for sequencing DNA'. (Genes Codes Corporation, Inc.: Ann Arbor, Michigan.)

Gielly, L., and Taberlet, P. (1994). The use of chloroplast DNA to resolve plant phylogenies: noncoding versus *rbc*L sequences. *Molecular Biology & Evolution* **11**, 769–777.

Gielly, L., and Taberlet, P. (1996). A phylogeny of the European gentians inferred from chloroplast *trn*L (UAA) intron sequences. *Botanical Journal of the Linnean Society* **120**, 57–75.

Gilmore, S., Weston, P. H., and Thomson, J. A. (1993). A simple , rapid, inexpensive and widely applicable technique for purifying plant DNA. *Australian Systematic Botany* **6**, 139–148.

Givnish, T. J., and Sytsma, K. J. (1997). Homoplasy in molecular vs. morphological data: the likelihood of correct phylogenetic inference. In 'Molecular evolution and adaptive Radiation'. (Eds T. J. Givnish and K. J. Sytsma.) pp. 56–97. (Cambridge University Press: New York.)

Goetghebeur, P. (1986). Genera Cyperacearum. Een bijdrage tot de kennis van de morfologie, systematiek en fylogenese van de Cyperaceae-genera. Doctoral Thesis, Rijksuniversiteit Gent.

Goetghebeur, P. (1998). Cyperaceae. In 'The Families and Genera of Vascular Plants: Flowering Plants, Monocotyledons'. Vol. 4. (Ed. K. Kubitzki.) pp. 141–190. (Springer: Berlin.)

Goldman, N., Anderson, J. P., and Rodrigo, A. G. (2000). Likelihood-based tests of topologies in phylogenetics. *Systematic Biology* **49**, 652–670.

Goldman, N., and Whelan, S. (2000). Statistical tests of gamma-distributed rate heterogeneity in models of sequence evolution in phylogenetics. *Molecular Biology and Evolution* **17**, 975–978.

Goldstein, P. Z., and DeSalle, R. (2000). Phylogenetic species, nested hierarchies, and character fixation. *Cladistics* **16**, 364–384.

Golenberg, E. M., Clegg, M. T., Durbin, M. L., Doebley, J., and Ma, D. P. (1993). Evolution of a noncoding region of the chloroplast genome. *Molecular Phylogenetics and Evolution* **2**, 52–64.

Gordon-Gray, K. D. (1995). 'Cyperaceae in Natal'. (Aurora Printers: Pretoria.)

Gu, X., Fu, Y.-X., and Li, W.-H. (1995). Maximum likelihood estimation of the heterogeneity of substitution rate among nucleotide sites. *Molecular Biology and Evolution* **12**, 546–557.

Guédès, M. (1979). 'Morphology of Seed-Plants'. (Strauss & Cramer: Vaduz.)

Gunckel, H. (1971). Revision sistematica de las especies Chilenas de la subfamilia de las Rhynchosporoides de las Ciperaceas. *Annales del Museo de Historia Natural Valparaiso* **4**, 15–52.

Haines, R. W. (1967). Prophylls and branching in Cyperaceae. *Journal of the East Africa Natural History Society and National Museum* **26**, 51–70, Plates I–IX.

Haines, R. W., and Lye, K. A. (1977). Studies in African Cyperaceae. 15. Amphicarpy and spikelet structure in *Trianoptiles solitaria*. *Botaniska Notiser* **130**, 235–240.

Haines, R. W., and Lye, K. A. (1983). 'The Sedges and Rushes of East Africa'. (East African Natural History Society: Nairobi.)

Hamlin, B. G. (1956). Key to the genera of Cyperaceae in New Zealand. *Tuatara* **6**, 27–38.

Harden, G. J. (1993). Glossary of botanical terms. In 'Flora of New South Wales'. Vol. 4. (Ed. G. J. Harden.) pp. 293–396. (University of NSW: Sydney.)

Harris, D., and Rogers, D. S. (1999). Species limits and Phylogenetic relationships among populations of *Peromyscus furvus*. *Journal of Mammalogy* **80**, 530–544.

Harris, J. G., and Harris, M. W. (1994). 'Plant Identification Terminology: An Illustrated Glossary'. (Spring Lake Publishing: Spring Lake, Utah.)

Hasegawa, M., Kishino, H., and Yano, T. (1985). Dating the human-ape split by a molecular clock of mitochondrial DNA. *Journal of Molecular Evolution* **22**, 160–174.

Hilliard, O. M. (1987). 'Grasses, Sedges, Restiads and Rushes of the Natal Drakensberg'. (University of Natal Press: Pietermaritzburg.)

Hilliard, O. M., and Burtt, B. L. (1987). The botany of the southern Natal Drakensberg. *Annals of Kirstenbosch Botanic Gardens* **15**.

Hillis, D. M., and Huelsenbeck, J. P. (1995). Assessing molecular phylogenies. *Science* **267**, 255–256.

Hillis, D. M., Mable, B. K., Larson, A., Davis, S. K., and Zimmer, E. A. (1996). Nucleic acid IV: sequencing and cloning. In 'Molecular Systematics'. (Eds D. M. Hillis, C. Moritz, and B. K. Mable.) pp. 321–381. (Sinauer Associates, Inc.: Sunderland.)

Holmgren, P. K., and Holmgren, N. H. (1990, updated 28 Nov. 2001, accessed Jan. 2002). The New York Botanical Garden: Index Herbariorum. http://www.nybg.org/bsci/ih/ih.html.

Holttum, R. E. (1948). The spikelet in Cyperaceae. *Botanical Review* **14**, 525–541.

Hooker, J. D. (1847). 'Flora Antarctica'. (Reeve: London.)

Hooker, J. D. (1853). 'Flora Novae-Zelandiae'. (Lovell Reeve: London.)

Hooker, J. D. (1860). 'Flora Tasmaniae'. (Lovell Reeve: London.)

Hooker, J. D. (1867). 'Handbook of the New Zealand Flora'. (Reeve and Co.: London.)

Hooper, S. S. (1973). Cyperaceae, keys to tribes and genera. In 'The Families of Flowering Plants'. (Ed. J. Hutchinson.) pp. 862–871. (Clarendon Press: Oxford.)

Huelsenbeck, J. P., and Bull, J. J. (1996). A likelihood ratio test to detect conflicting phylogenetic signal. *Systematic Biology* **45**, 92–98.

Huelsenbeck, J. P., and Crandall, K. A. (1997). Phylogeny estimation and hypothesis testing using maximum likelihood. *Annual Review of Ecology & Systematics* **28**, 437–466.

Huelsenbeck, J. P., Swofford, D. L., Cunningham, C. W., Bull, J. J., and Waddell, P. J. (1994). Is character weighting a panacea for the problem of data heterogeneity in phylogenetic analysis. *Systematic Biology* **43**, 288–291.

Hutchinson, J. (1926). 'The Families of Flowering Plants I. Dicotyledons. Arranged According to a New System Based on Their Probable Phylogeny'. (Macmillan: London.)

Hutchinson, J. (1934). 'The Families of Flowering Plants II. Monocotyledons. Arranged According to a New System Based on Their Probable Phylogeny'. (Macmillan: London.)

Jones, T. R., Kluge, A. G., and Wolf, A. J. (1993). When theories and methodologies clash: a phylogenetic reanalysis of the North American ambystomatid salamanders (Caudata: Ambystomatidae). *Systematic Biology* **42**, 92–102.

Kelchner, S. A. (2000). The evolution of non-coding chloroplast DNA and its application in plant systematics. *Annals of the Missouri Botanical Garden* **87**, 482–498.

Kelchner, S. A., and Clark, L. G. (1997). Molecular evolution and phylogenetic utility of the chloroplast rpl16 intron in *Chusquea* and the Bambusoideae (Poaceae). *Molecular Phylogenetics & Evolution* **8**, 385–397.

Kern, J. H. (1959). Florae Malesianae precursores XXII. *Cladium* and *Machaerina* (Cyper.). *Acta Botanica Neerlandica* **8**, 263–268.

Kern, J. H. (1962). A new look at some Cyperaceae mainly from the tropical standpoint. *Advancement of Science* **19**, 141–148.

Kern, J. H. (1974). Cyperaceae. In 'Flora Malesiana'. Vol. 7. (Ed. C. G. G. J. Van Steenis.) pp. 435–753. (Noordhoff: Leyden.)

Kidd, K. K., and Ruano, G. (1995). Optimizing PCR. In 'PCR 2: A Practical Approach'. (Eds M. J. McPherson, B. D. Hames, and G. R. Taylor.) pp. 1–22. (Oxford University Press: Oxford.)

Kitching, I. J., Forey, P. L., Humphries, C. J., and Williams, D. W. (1998). 'Cladistics'. (Oxford University Press: Oxford.)

Kluge, A. G. (1989). A concern for evidence and phylogenetic hypothesis of relationships among *Epicrates* (Boidae, Serpentes). *Systematic Zoology* **38**, 7–25.

Kluge, A. G., and Wolf, A. J. (1993). Cladistics: what's in a word? *Cladistics* **9**, 183–199.

Koyama, T. (1961). Classification of the family Cyperaceae 1. *Journal of the Faculty of Science, University of Tokyo* **8**, 37–148.

Koyama, T. (1969). Delimitation and classification of the Cyperaceae—Mapanioideae. In 'Current Topics in Plant Science'. (Ed. J. E. Gunckel.) pp. 201–228. (Academic Press: New York.)

Kubitzki, K. (1998). Conspectus of families treated in this volume. In 'The Families and Genera of Vascular Plants: Flowering Plants, Monocotyledons'. Vol. 4. (Ed. K. Kubitzki.) pp. 1–4. (Springer: Berlin.)

Kükenthal, G. (1938). Vorarbeiten zu einer Monographie der Rhynchosporoideae. *Feddes Repertorium* **44**, 1–32.

Kükenthal, G. (1939a). Vorarbeiten zu einer Monographie der Rhynchosporoideae. 4. *Feddes Repertorium* **46**, 13–32.

Kükenthal, G. (1939b). Vorarbeiten zu einer Monographie der Rhynchosporoideae. 5. *Feddes Repertorium* **46**, 65–76.

Kükenthal, G. (1939c). Vorarbeiten zu einer Monographie der Rhynchosporoideae. 6. *Feddes Repertorium* **47**, 101–119.

Kükenthal, G. (1939d). Vorarbeiten zu einer Monographie der Rhynchosporoideae. 7. *Feddes Repertorium* **47**, 209–216.

Kükenthal, G. (1940a). Vorarbeiten zu einer Monographie der Rhynchosporoideae. 8. *Feddes Repertorium* **48**, 49–72.

Kükenthal, G. (1940b). Vorarbeiten zu einer Monographie der Rhynchosporoideae. 9. *Feddes Repertorium* **48**, 195–250.

Kükenthal, G. (1942). Vorarbeiten zu einer Monographie der Rhynchosporoideae. 13. *Feddes Repertorium* **51**, 139–193.

Kükenthal, G. (1944). Vorarbeiten zu einer Monographie der *Rhynchosporideae*. 15. *Feddes Repertorium* **53**, 187–219.

Kükenthal, G. (1952). Vorarbeiten zu einer Monographie der *Rhynchosporideae*. 20. *Botanische Jahrbuecher fuer Systematik* **75**, 451–497.

Kukkonen, I. (1986). Special features of the inflorescence structure in the family Cyperaceae. *Annales Botanici Fennici* **23**, 107–120.

Kukkonen, I. (1994). Definition of descriptive terms for the Cyperaceae. *Annales Botanici Fennici* **31**, 37–43.

Kunth, C. S. (1837). 'Enumeratio Plantarum'. (Colla: Stuttgart.)

Lawrence, G. H. M. (1951). 'Taxonomy of Vascular Plants.' (The Macmillan Company: New York.)

Lee, B. Y., Levin, G. A., and Downie, S. R. (2001). Relationships within the spiny-fruited umbellifers (Scandiceae subtribes Daucinae and Torilidinae) as assessed by phylogenetic analysis of morphological characters. *Systematic Botany* **26**, 622–642.

Legender, L., and Legender, P. (1983). 'Numerical Ecology'. (Elservier Scientific Publ. co.: Amsterdam.)

Leighton, F. M., Levyns, M. R., and Gerstener, J. (1947). Plantae Novae Africanae Ser. 27. *Journal of South African Botany* **13**, 53–58.

Levyns, M. R. (1943). A revision of *Trianoptiles* Fenzl. *Journal of South African Botany* **9**, 21–26.

Levyns, M. R. (1947). *Tetraria* and related genera, with special reference to the flora of the Cape Peninsula. *Journal of South African Botany* **13**, 73–93.

Levyns, M. R. (1950). Cyperaceae. In 'Flora of the Cape Peninsula'. (Eds R. S. Adamson and T. M. Salter.) pp. 97–132. (Juta: Cape Town.)

Levyns, M. R. (1959). A revision of *Epischoenus* C.B.Clarke. *Journal of South African Botany* **25**, 69–82.

Lewis, P. (2000, updated 2 July 2001, accessed 14 Aug. 2001). Frequently Asked Questions (FAQ): Answers. http://paup.csit.fsu.edu/paupfaq/faq.html.

Li, J. (2001). Disturbance ecology in temperate pastures on the New England Tablelands of NSW, Australia: herbaceous vegetation, *Eucalyptus blakelyi* and the environment in relation to anthropogenic influences. Ph.D thesis, University of New England, Armidale.

Linnaeus, C. (1735). 'Systema Naturae'. (Theodorum Haak: Leiden.)

Linnaeus, C. (1751). 'Philosophia Botanica'. (Kiesewetter: Stockholm.)

Linnaeus, C. (1753). 'Species Plantarum'. Vol. 2. (Laurentii Salvii: Stockholm.)

Linnaeus, C. (1754). 'Genera Plantarum'. (Laurentii Salvii: Stockholm.)

Lledo, M. D., Crespo, M. B., Cox, A. V., Fay, M. F., and Chase, M. W. (2000). Polyphyly of *Limoniastrum* (Plumbaginaceae): evidence from DNA sequences of plastid *rbc*L, *trn*L intron and *trn*L-F intergene spacer. *Botanical Journal of the Linnean Society* **132**, 175–191.

Lockhart, P. J., Steel, M. A., Hendy, M. D., and Penny, D. (1994). Recovering evolutionary trees under a more realistic model of sequence evolution. *Molecular Biology & Evolution* **11**, 605–612.

Lowrey, T. K., Quinn, C. J., Taylor, R. K., Chan, R., Kimball, R. T., and De Nardi, J. C. (2001). Molecular and morphological reassessment of relationships within the *Vittadinia* group of Astereae (Asteraceae). *American Journal of Botany* **88**, 1279–1289.

Luckow, M. (1995). Species concepts: assumptions, methods, and applications. *Systematic Botany* **20**, 589–605.

Maddison, W. P., and Maddison, D. D. (1992). 'MacClade. Analysis of phylogeny and character evolution.' (Sinauer Associates, Inc.: Sunderland.)

Mayr, E. (1969a). The biological meaning of species. *Botanical Journal of the Linnean Society* **1**, 311–320.

Mayr, E. (1969b). 'Principles of Systematic Zoology'. (McGraw-Hill: New York.)

McDade, L. A. (1995). Species concepts and problems in practice: insight from botanical monographs. *Systematic Botany* **20**, 606–622.

McDade, L. A., and Moody, M. L. (1999). Phylogenetic relationships among Acanthaceae: Evidence from noncoding *trn*L-*trn*F chloroplast DNA sequences. *American Journal of Botany* **86**, 70–80.

McGillivray, D. J. (1973). Michel Gandoger's names of Australian plants. *Contributions from the New South Wales National Herbarium* **4**, 319–359.

Meeuse, A. D. J. (1975). Interpretative floral morphology of the Cyperaceae on the basis of the anthoid concept. *Acta Botanica Neerlandica* **24**, 291–304.

Metcalfe, C. R. (1971). 'Anatomy of the Monocotledons. V. Cyperaceae'. (Clarendon Press: Oxford.)

Michener, C. D., and Sokal, R. R. (1957). A quantitative approach to a problem in classification. *Evolution* **11**, 130–162.

Minchin, P. R. (1987). An evaluation of the relative robustness of techniques for ecological ordination. *Vegetatio* **69**, 89–107.

Miyamoto, M. M., and Fitch, W. M. (1995). Testing species phylogenies and phylogenetic methods with congruence. *Systematic Biology* **44**, 64–76.

Moore, D. M. (1983). 'Flora Tierra del Fuego'. (Nelson: Oswestry.)

Mora, L. E. (1960). Beiträge zur Entwicklungsgeschichte und vergleichenden Morphologie der Cyperaceen. *Beitraege zur Biologie der Pflanzen* **35**, 253–341.

Muasya, A. M., Bruhl, J. J., Simpson, D. A., Culham, A., and Chase, M. W. (2000). Suprageneric phylogeny of Cyperaceae: a combined analysis. In 'Monocots: Systematics and Evolution'. (Eds K. L. Wilson and D. A. Morrison.) pp. 593–601. (CSIRO: Melbourne.)

Muasya, A. M., Simpson, D. A., and Chase, M. W. (2002). Phylogenetic relationships in Cyperus L. s.l. (Cyperaceae) inferred from plastid DNA sequence data. *Botanical Journal of the Linnean Society* **138**, 145–153.

Muasya, A. M., Simpson, D. A., Chase, M. W., and Culham, A. (1998). An assessment of suprageneric phylogeny in Cyperaceae using *rbc*L DNA sequences. *Plant Systematics and Evolution* **211**, 257–271.

Muasya, A. M., Simpson, D. A., Chase, M. W., and Culham, A. (2001). A phylogeny of Isolepis (Cyperaceae) inferred using plastid rbcL and trnL-F sequence data. *Systematic Botany* **26**, 342–353.

Mueller, F. J. H. (1855). 'Definitions of Rare or Hitherto Undescribed Australian Plants'. (Goodhugh & Trembath: Melbourne.)

Mueller, F. (1875). Cyperaceae. *Fragmenta Phytographiae Australiae* **9**, 23–40.

Murphy, D. J., Udovicic, F., and Ladiges, P. Y. (2000). Phylogenetic analysis of Australian *Acacia* (Leguminosae: Mimosoideae) by using sequence variations of an intron and two intergenic spacers of chloroplast DNA. *Australian Systematic Botany* **13**, 745–754.

Myers, G. S. (1952). The nature of systematic biology and of a species description. *Systematic Zoology* **1**, 106–111.

Myllys, L., Kallersjo, M., and Tehler, A. (1998). A comparison of SSU rDNA data and morphological data in Arthoniales (Euastomycetes) phylogeny. *Bryologist* **101**, 70–85.

Napper, D. (1964). Cyperaceae of East Africa II. *Journal of the East African National Historical Society and Coryndon Museum* **24**, 23–46.

Nees, C. G. (1832). Cyperaceae capenses ecklonianae. *Linnaea* **7**, 491–537.

Nees, C. G. (1834). Uebersicht der Cyperaceengattungen. *Linnaea* **9**, 273–306.

Nees, C. G. (1835). Cyperaceae Capensis. *Linnaea* **10**, 129–270.

Nees, C. G. (1846). Cyperaceae. In 'Plantae Preissianae sive enumeratio plantarum'. Vol. 2. (Ed. C. Lehmann.) pp. 72–94. (Sumptibus Meissneri: Hamburg.)

Nei, M., Takezaki, N., and Sitnikova, T. (1995). Assessing molecular phylogenies. *Science* **267**, 253–255.

Nelmes, E. (1953). Notes on Cyperaceae: 31. The African genus *Coleochloa*. *Kew Bulletin* **8**, 373–381.

O'Brien, M. M., Quinn, C. J., and Wilson, P. G. (2000). Molecular systematics of the *Leptospermum* suballiance (Myrtaceae). *Australian Journal of Botany* **48**, 621–628.

Ohwi, J. (1944). Cyperaceae Japonicae II. A synopsis of the Rhynchosporoideae and Scirpoideae of Japan, Including the Kuriles, Saghalin, Korea and Formosa. *The Memoirs of the College of Science, Kyoto Imperial University, Series B* **18**, 1–182.

Ohwi, J. (1965). 'Flora of Japan'. (Smithsonian Institution: Washington, D.C.)

Olmstead, R. G. (1995). Species concepts and plesiomorphic species. *Systematic Botany* **20**, 623–630.

Olmstead, R. G., and Palmer, J. D. (1994). Chloroplast DNA systematics: a review of methods and data analysis. *American Journal of Botany* **81**, 1205–1224.

Oxelman, B., Backlund, M., and Bremer, B. (1999). Relationships of the Buddlejaceae s.l. investigated using parsimony jackknife and branch support analysis of chloroplast ndhF and rbcL sequence data. *Systematic Botany* **24**, 164–182.

Palmer, J. D., Jansen, R. K., Michaels, H. J., Chase, M. W., and Manhart, J. R. (1998). Chloroplast DNA variation and plant phylogeny. *Annals of the Missouri Botanical Garden* **75**, 1180–1206.

Pax, F. (1886). Beiträge zur Morphologie und Systematik der Cyperaceen. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* **7**, 287–318.

Pax, F. (1887). Cyperaceae. In 'Die natürlichen Pflanzenfamilien II'. (Eds A. Engler and K. Prantl.) pp. 98–126. (Leipzig: Engelmann.)

Pennington, R. T. (1996). Molecular and morphological data provide phylogenetic resolution at different hierarchical levels in Andira. *Systematic Biology* **45**, 496–515.

Pfeiffer, H. (1927). *Oreobolus* R.Br., eine merkwürdige Cyperaceengattung. *Feddes Repertorium* **23**, 339–352.

Pfeiffer, H. (1931). Decas Cyperacearum criticarum vel emendatarum III. *Feddes Repertorium* **29**, 171–186.

Philippi, F. (1881). 'Catalogus Plantarum Vascularium Chilensium'. (Imprenta Nacional: Santiago de Chile.)

Philippi, R. A. (1857–58). Plantarum novarum Chilensium. *Linnaea* **29**, 80.

Phillips, E. P. (1951). 'The Genera of South African Flowering Plants'. Vol. 25. (Government Printer: Pretoria.)

Prakash, N. (1986). 'Methods in Plant Microtechnique' (handbook). (The University of New England: Armidale.)

Quicke, D. L. J. (1993). 'Principles and Techniques of Contemporary Taxonomy'. (Blackie Academic and Professional: London.)

Radford, A. E., Dickison, W. C., Massey, J. R., and Bell, C. R. (1974). 'Vascular Plant Systematics'. (Harper & Row: New York.)

Raynal, J. (1971). Quelques notes morphologiques sur les Cypéracées. *Mitteilungen Botanischen Staatssammlung München* **10**, 589–603.

Reid, C., and Arnold, T. H. (1984). Notes on African plants: a new species of *Carpha* from the Natal Drakensberg, South Africa. *Bothalia* **15**, 139–142.

Richards, J. H. (2002). Flower and spikelet morphology in sawgrass, *Cladium jamaicense* Crantz (Cyperaceae). *Annals of Botany* **90**, 361–367.

Roalson, E. H., Columbus, J. T., and Friar, E. A. (2001). Phylogenetic relationships in Cariceae (Cyperaceae) based on ITS (nrDNA) and trnT-L-F (cpDNA) region sequences: Assessment of subgeneric and sectional relationships in Carex with emphasis on section Acrocystis. *Systematic Botany* **26**, 318–341.

Rogstad, S. H. (1992). Saturated NaCl-CTAB solution as a means of field presevation of leaves for DNA analyses. *Taxon* **41**, 701–708.

Rohlf, F. J. (1967). Correlated characters in numerical taxonomy. *Systematic Zoology* **16**, 109–126.

Rohlf, F. J. (1970). Adaptive hierarchical clustering schemes. *Systematic Zoology* **19**, 58–82.

Sanderson, M. J., and Kim, J. (2000). Parametric phylogenetics? *Systematic Biology* **49**, 817–829.

Sang, T., Crawford, D. J., and Stuessy, T. F. (1997). Chloroplast DNA phylogeny, reticulate evolution, and biogeography of *Paeonia* (Paeoniaceae). *American Journal of Botany*, 1120–1136.

Schönland, S. (1922). Introduction to South African Cyperaceae, Botanical Survey of South Africa, Memoir No. 3. *Union of South Africa*, 1–70.

Schultze-Motel, W. (1964). Reihe. Cyperales. In 'A. Engler's Syllabus der Pflanzenfamilien'. Vol. 2. (Ed. H. Melchior.) pp. 602–607. (Gebrüder Borntraeger: Berlin.)

Seberg, O. (1986). *Schoenoides*, a new genus of Cyperaceae from Tasmania. *Willdenowia* **16**, 181–186.

Seberg, O. (1988a). Leaf anatomy of *Oreobolus* R.Br. and *Schoenoides* Seberg. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* **110**, 187–214.

Seberg, O. (1988b). Taxonomy, phylogeny, and biogeography of the genus *Oreobolus* R.Br. (Cyperaceae), with comments on the biogeography of South Pacific continents. *Botanical Journal of the Linnean Society* **96**, 119–195.

Sennblad, B., Endress, M. E., and Bremer, B. (1998). Morphology and molecular data in phylogenetic fraternity: the tribe Wrightieae (Apocynaceae) revisited. *American Journal of Botany* **85**, 1143–1158.

Shimodaira, H., and Hasegawa, M. (1999). Multiple comparisons of log-likelihoods with applications to phylogenetic inference. *Molecular Biology & Evolution* **16**, 1114–1116.

Simpson, D. (1995). Relationships within Cyperales. In 'Monocotyledons: Systematics and Evolution'. Vol. 2. (Eds P. J. Rudall, P. J. Cribb, D. F. Cutler, and C. J. Humphries.) pp. 497–509. (Whitstable Litho Printers Ltd.: Whitstable, Kent.)

Simpson, G. G. (1961). 'Principles of Animal Taxonomy'. (Columbia University Press: New York.)

Smith, J. F. (2000). Phylogenetic signal common to three data sets: combining data which initially appear heterogeneous. *Plant Systematics & Evolution* **221**, 179–198.

Sneath, P. H. A. (1957). The application of computers to taxonomy. *Journal of General Microbiology* **17**, 201–226.

Sneath, P. H. A., and Sokal, R. R. (1973). 'Numerical Taxonomy'. (W. H. Freeman and Company: San Francisco.)

Sokal, R. R. (1973). The species problem reconsidered. *Systematic Zoology* **22**, 360–374.

Sokal, R. R., and Rohlf, F. J. (1995). 'Biometry'. (W. H. Freeman and Company: New York.)

Steele, K. P., and Vilgalys, R. (1994). Phylogenetic analyses of Polemoniaceae using nucleotide sequences of the plastid gene *mat*K. *Systematic Botany* **19**, 126–142.

Steudel, E. G. (1855). 'Synopsis Plantarum Glumacearum, Cyperaceae'. (Metzler: Stuttgart.)

Stevens, P. F. (2000). Botanical systematics 1950–2000: change, progress, or both? *Taxon* **49**, 635–659.

Stuessy, T. F. (1990). 'Plant Taxonomy: The Systematic Evaluation of Comparative Data'. (Columbia University Press: New York.)

Sullivan, J., Swofford, D. L., and Naylor, G. J. P. (1999). The effect of taxon sampling on estimating rate heterogeneity parameters of maximum-likelihood models. *Molecular Biology & Evolution* **16**, 1347–1356.

Swofford, D. L. (2000). 'PAUP*. Phylogenetic Analysis Using Parsimony (*and Other Methods). Version 4'. (Sinauer Associates: Sunderland, Massachusetts.)

Swofford, D. L., Olsen, G. J., Waddell, P. J., and Hillis, D. M. (1996). Phylogenetic inference. In 'Molecular Systematics'. (Eds D. M. Hillis, C. Moritz, and B. K. Mable.) pp. 407–514. (Sinauer Associates, Inc.: Sunderland.)

Taberlet, P., Gielly, L., Pautou, G., and Bouvet, J. (1991). Universal primers for amplification of three non-coding regions of chloroplast DNA. *Plant Molecular Biology* **17**, 1105–1109.

Takhtajan, A. (1969). 'Flowering Plants: Origin and Dispersal. Translated by C. Jeffrey'. (Oliver & Boyd.: Edinburgh.)

ter Braak, C. J. F., and Prentice, I. C. (1988). A theory of gradient analysis. *Advances in Ecological Research* **18**, 271–317.

ter Braak, C. J. F., and Smilauer, P. (1998). 'CANOCO 4'. (Centre for Biometry Wageningen: Wageningen.)

Thiele, K. (1993). The holy grail of the perfect character: the cladistic treatment of morphometric data. *Cladistics* **9**, 275–304.

Thompson, J. (1981). A key to the plants of the subalpine and alpine zones of the Kosciusko region. *Telopea* **2**, 219–297.

Thompson, J., and Gray, M. (1981). A check-list of the subalpine and alpine species found in the Kosciusko region of New South Wales. *Telopea* **2**, 299–346.

Thompson, J. D., Gibson, T. J., Plewniak, F., Jeanmougin, F., and Higgins, D. G. (1997). The Clustal-X windows interface-flexible strategies for multiple sequence alignment aided by quality analysis tools. *Nucleic Acids Research* **25**, 4876–4882.

Thomson, J. A. (2002). An improved non-cryogenic transport and storage preservative facilitating DNA extraction from 'difficult' plants collected at remote sites. *Telopea* **9**, 755–760.

Thorne, R. F. (1976). A phylogenetic classification of the angiospermae. *Evolutionary Biology* **9**, 35–106.

Toyama, S. (1980). 'The Flora of Nagasaki Prefecture'. (The Biological Society of Nagasaki Prefecture: Nagasaki Prefecture.)

Thunberg, C. P. (1794). 'Prodromus Plantarum Capensium, quas in Promontorio Bonae Spei Africes'. (Joh. Edman: Upsaliae.)

Vane-Wright, R. I., Schulz, S., and Boppré, M. (1992). The cladistics of *Amauris* butterflies: congruence, consensus and total evidence. *Cladistics* **8**, 125–138.

Webb, L. J., Tracey, J. G., Williams, W. T., and Lance, G. N. (1967). Studies in the numerical analysis of complex rain-forest communities. I. A comparison of methods applicable to site/ species data. *Journal of Ecology* **55**, 171–191.

Weberling, F. (1989). 'Morphology of Flowers and Inflorescences'. Trans. R. J. Pankhurst (Cambridge University Press: Cambridge.)

Wikström, N., Kenrick, P., and Chase, M. (1999). Epiphytism and terrestrialization in tropical *Huperzia* (Lycopodiaceae). *Plant Systematics and Evolution* **218**, 221–243.

Wiley, E. O. (1978). The evolutionary species concept reconsidered. *Systematic Zoology* **27**, 17–26.

Williams, W. T., and Lance, G. N. (1968). The choice of strategy in the analysis of complex data. *Statistician* **18**, 31–43.

Wilson, K. L. (1981). Revision of the genus *Mesomelaena* (Cyperaceae). *Telopea* **2**, 181–195.

Wilson, K. L. (1986). Alpine species of Cyperaceae and Juncaceae. In 'Flora and Fauna of Alpine Australasia, Ages and Origins'. (Ed. B. A. Barlow.) pp. 471–488. (CSIRO: Melbourne.)

Wilson, K. L. (1993). Cyperaceae. In 'Flora of New South Wales'. Vol. 4. (Ed. G. J. Harden.) pp. 293–396. (University of NSW: Sydney.)

Wilson, K. L. (1994a). Cyperaceae. In 'Flora of Victoria'. Vol. 2. (Eds N. G. Walsh and T. J. Entwisle.) pp. 238–356. (Inkata: Melbourne/Sydney.)

Wilson, K. L. (1994b). New taxa and combinations in the family Cyperaceae in eastern Australia. *Telopea* **5**, 589–625.

Yang, Z. (1994a). Estimating the pattern of nucleotide substitution. *Journal of Molecular Evolution* **39**, 105–111.

Yang, Z. (1994b). Maximum likelihood phylogenetic estimation from DNA sequences with variable rates over sites: approximate methods. *Journal of Molecular Evolution* **39**, 306–314.

Yang, Z., Goldman, N., and Friday, A. (1994). Comparison of models for nucleotide substitution used in maximum-likelihood phylogenetic estimation. *Molecular Biology and Evolution* **11**, 316–324.

Yen, A. C., and Olmstead, R. G. (2000a). Molecular systematics of Cyperaceae tribe Cariceae based on two chloroplast DNA regions: *ndh*F and *trn*L intron-intergenic spacer. *Systematic Botany* **25**, 479–494.

Yen, A. C., and Olmstead, R. G. (2000b). Phylogentic analysis of *Carex* (Cyperaceae): generic and subgeneric relationships based on chloroplast DNA. In 'Monocots: Systematics and Evolution'. (Eds K. L. Wilson and D. A. Morrison.) pp. 602–609. (CSIRO: Melbourne.)

Yoder, A. D., Irwin, J. A., and Payseur, B. A. (2001). Failure of thr ILD determine data combinability for slow lories phylogeny. *Systematic Biology* **50**, 408–424.

Zurawski, G., Clegg, M. T., and Brown, A. D. H. (1984). The nature of nucleotide sequence divergence between barley and maize choloplast DNA. *Genetics* **106**, 735–749.

Appendices

Appendix 1. Voucher specimens (used in phenetic and cladistic analyses presented in Chapter 3 and Chapter 4) with their abbreviations and collection localities (the first collector, collection number, date of collection, herbarium abbreviation and sheet number are given; type specimens are in bold). Genera and species are in alphabetical order, except that the outgroups (*Rhynchospora* and *Scleria*) are listed at the end. Six specimens labelled as *Carpha* cf. *bracteosa*, four specimens labelled as *Carpha* cf. *nitens*, six specimens labelled as *C. perrieri* and one specimen (*B. Sonnenberg 458*, NU) labelled as *C. schlechteri* were treated as *Carpha* cf. *bracteosa, C. ulugurensis, C. capitellata* and *C. glomerata* respectively in cladistic analyses (Chapter 4) based on the results of the phenetic analyses (Chapter 3). "—" indicates the absence of information.

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
1	*Capeobolus brevicaulis*		NE 80079	Route 323 between Riversdale and Ladismith, Eastern Cape, S. Africa	J. J. Bruhl 1720	6 Dec. 1996
2	*Capeobolus brevicaulis*		NE 80081	East of Dradovw Pass Langeberg, Western Cape, S. Africa	J. J. Bruhl 1736	11 Dec. 1996
3	***Carpha alpina***	*Car_alpi*	BM 000092170	Table Mt, Tasmania, Australia	R. Brown 6020	Mar.–Apr. 1804
4	*Carpha alpina*	*Car_alpi*	BM 000092173	Mt Cook Dist., South Island, New Zealand	J. D. Lovis 1077	12 Jan. 1956
5	*Carpha alpina*	*Car_alpi*	BM 000092174	Lillburn, South Island, New Zealand	J. D. Lovis 931	20 Dec. 1955
6	*Carpha alpina*	*Car_alpi*	CANB 107745	Mt Giluwe, Southern Highlands Dist., Papua	R. Schodde 1827	14 Aug. 1961
7	*Carpha alpina*	*Car_alpi*	CANB 147508	Mt Dickson, Goilala Subdist, Papua	T. G. Hartley 12996	11 Feb. 1964
8	*Carpha alpina*	*Car_alpi*	CANB 183330	Mt Wilhelm, Eastern Highlands Dist., New Guinea	M. M. J. v. Balgooy 88	26 Apr. 1965
9	*Carpha alpina*	*Car_alpi*	CANB 241321	Mt Wilhelm, New Guinea	G. Hope ANU10766	1970
10	*Carpha alpina*	*Car_alpi*	HO 100424	Mt Inglis, Tasmania, Australia	A. Moscal 1955	24 Feb. 1983
11	*Carpha alpina*	*Car_alpi*	HO 100425	Un-named Mt, 3km southeast of Federation Peak, Southwest Tasmania, Australia	A. Moscal 2108	8 Mar. 1983
12	*Carpha alpina*	*Car_alpi*	HO 125977	Walls of Jerusalem, Tasmania, Australia	A. Moscal 1376	18 Jan. 1983
13	*Carpha alpina*	*Car_alpi*	HO 143800	Abbotts Lookout, Southwest Tasmania, Australia	A. Moscal 10336	23 Mar. 1985
14	*Carpha alpina*	*Car_alpi*	HO 24161	Mt Wellington, Tasmania, Australia	W. M. Curtis *s.n.*	Mar. 1944
15	*Carpha alpina*	*Car_alpi*	HO 24169	Mt Wellington, Tasmania, Australia	E. Rodway *s.n.*	Jul. 1926
16	*Carpha alpina*	*Car_alpi*	HO 326461	West Coast Region, Tasmania, Australia	S. J. Jarman 244	3 Feb. 1985
17	*Carpha alpina*	*Car_alpi*	HO 328073	Ben Lomond Region, Tasmania, Australia	A. M. Gray 676	28 Mar. 1986

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
18	*Carpha alpina*	*Car_alpi*	HO 409964	Central Highlands, Tasmania, Australia	A. M. Buchanan 13611	28 Feb. 1994
19	*Carpha alpina*	*Car_alpi*	HO 411185	Mt Counsel, Southwest Tasmania, Australia	S. J. Jarman *s.n.*	13 Mar. 1986
20	*Carpha alpina*	*Car_alpi*	HO 91834	Mt Sprent, Southwest Tasmania, Australia	J. Kirkpatrick *s.n.*	Dec. 1981
21	*Carpha alpina*	*Car_alpi*	K *s.n.*	Mt Dickon, Goilala Subdistr., Central Distr., Papua	T. G. Hartley 12996	11 Feb. 1964
22	*Carpha alpina*	*Car_alpi*	MEL 2066107	Arthur's Pass, South Island, New Zealand	T. Kirk *s.n.*	—
23	*Carpha alpina*	*Car_alpi*	MEL 252110	Bogong High Plains, Victoria, Australia	J. Goodger J63	4 Feb. 1997
24	***Carpha alpina***	*Car_alpi*	MEL 49294	Van Diemen's Land [Mt Wellington], Tasmania, Australia	R. Brown *s.n.*	—
25	*Carpha alpina*	*Car_alpi*	MEL 522763	Cradle Mt National Park, Tasmania, Australia	J. H. Willis *s.n.*	9 Jan. 1977
26	*Carpha alpina*	*Car_alpi*	MEL 658311	Ben Lomond National Park, Tasmania, Australia	S. J. Forbes 1399	4 Feb. 1983
27	*Carpha alpina*	*Car_alpi*	MEL 693734	Alpine- Bogong High Plains, Victoria, Australia	R. J. Adair 1620	26 Feb. 1982
28	*Carpha alpina*	*Car_alpi*	NE 70799	Hartz Mountains National Park, Tasmania, Australia	K. L. Wilson 6643	26 Feb. 1986
29	*Carpha alpina*	*Car_alpi*	NE 70800	Derwent Bridge, Tasmania, Australia	K. L. Wilson 6312	15 Feb. 1986
30	*Carpha alpina*	*Car_alpi*	NE 71803	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1878A	15 Feb. 2000
31	*Carpha alpina*	*Car_alpi*	NE 71826	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1886	15 Feb. 2000
32	*Carpha alpina*	*Car_alpi*	NE 71849	Mt William Saddle, Tasmania, Australia	J. J. Bruhl 1897B	19 Feb. 2000
33	*Carpha alpina*	*Car_alpi*	NE 72986	West of Snowy River, 1km from Snowy River bridge, Kosciuszko National Park NSW, Australia	X. Zhang 13	24 Jan. 2000
34	*Carpha alpina* (type of ***Carpha tasmanica***)	*Car_alpi*	NSW 120927	Mt Wellington, Tasmania, Australia	A. H. S. Lucas *s.n.*	Jan. 1901
35	*Carpha alpina*	*Car_alpi*	NSW 462089	Bogong National Park, Victoria, Australia	E. H. Norris 356	7 Feb. 1985
36	*Carpha alpina*	*Car_alpi*	NSW 462091	Kosciuszko, NSW, Australia	J. Thompson 2947	10 Feb. 1978
37	*Carpha alpina*	*Car_alpi*	NSW 462093	Kosciuszko, NSW, Australia	L. A. S. Johnson 7566	11 Feb. 1973
38	*Carpha alpina*	*Car_alpi*	NSW 462094	Tongariro National Park, North Island, New Zealand	C. B. Trevarthen *s.n.*	26 Jan. 1950
39	*Carpha alpina*	*Car_alpi*	NSW 462095	Mt Anglem, Stewart Island, New Zealand	R. Melville 6372	17 Feb. 1962
40	*Carpha alpina*	*Car_alpi*	NSW 462097	Mt Albert Edward, Goilala Subdist., Central Dist., Papua	J. Croft LAE61353	20 Jun. 1974

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
41	*Carpha alpina*	*Car_alpi*	NSW 462100	Mt Wilhelm, Chimbu Prov., Papua New Guinea	P. Goetghebeur 3544	5 Jul. 1980
42	***Carpha angustissima***	*Car_angu*	B 100000959	Volcan Karisimbi (Au N.-E. du lac Kivu), Zaire	H. Humbert 8586	Jul. 1929
43	***Carpha angustissima***	*Car_angu*	B 100000961	Massif du Kahuzi (W. du Lac Kivu), Zaire	H. Humbert 7722	Feb. 1929
44	*Carpha angustissima*	*Car_angu*	EA *s.n.*	Mgahinga-Muhavura Saddle, Kigezi, Uganda	J. W. Purseglove 2199	Sep. 1946
45	*Carpha angustissima*	*Car_angu*	EA *s.n.*	Gahinga-Muhavura Saddle, Kigezi, Uganda	K. A. Lye 5289	24 Apr. 1970
46	*Carpha angustissima*	*Car_angu*	K *s.n.*	Kigezi Dist., Western Prov., Uganda	H. U. Stauffer 793	15 Nov. 54
47	*Carpha angustissima*	*Car_angu*	K *s.n.*	Muhenria Mgahenga Saddle, Kigezi, Uganda	J. W. Purseglove P2199	Sep. 1964
48	*Carpha angustissima*	*Car_angu*	K *s.n.*	Gahinga- Muhavura saddle, Bufumbira County, Kigezi, Uganda	K. A. Lye 5289	24 Apr. 1970
49	*Carpha angustissima*	*Car_angu*	K *s.n.*	Crater of Gahinga Mts, Bufumbira County, Kigezi, Uganda	A. B. Katende K207B	24 Apr. 1970
50	*Carpha angustissima*	*Car_angu*	P 00199386	Mt Kahuzi, Prov. Kivu, Zaire	G. Troupin 14282	29 Dec. 71
51	*Carpha borbonica*	*Car_borb*	K *s.n.*	Bourbon [Réunion]	I. B. Balfour *s.n.*	Oct. 1875
52	*Carpha borbonica*	*Car_borb*	NSW *s.n.*	Plaine des Cafres, Ile Bourbon [Réunion]	Richard 6601	1937
53	*Carpha bracteosa*	*Car_brac*	K *s.n.*	Somerset West, Stellenbosch Div., S. Africa	P. N. Parker *s.n.*	25 Oct. 1942
54	***Carpha bracteosa***	*Car_brac*	K *s.n.*	Worcester Div., Cape, S. Africa	H. Bolus 2867	1873
55	*Carpha bracteosa*	*Car_brac*	K *s.n.*	Mitchel's Pass, Wercester Dist., Cape, S. Africa	R. Schlechter 8970	11 Sep. 1896
56	*Carpha bracteosa*	*Car_brac*	NU *s.n.*	Jakkalsvlei, Jonkershoek, Stellenbosch Dist., Cape Prov., S. Africa	H. C. Taylor 5988	14 Oct. 64
57	*Carpha bracteosa*	*Car_brac*	PRE *s.n.*	Franschoek Dist., Cape Prov., S. Africa	P. v. d. Merwe 1199	16 Aug. 62
58	*Carpha bracteosa*	*Car_brac*	PRE *s.n.*	Stellenbosch Dist., Cape Prov., S. Africa	H. C. Taylor 5220	26 Sep. 1963
59	*Carpha bracteosa*	*Car_brac*	PRE *s.n.*	Uniondale Div., South Western Cape, S. Africa	E. E. Esterhuysen 10611	5 Nov. 1944
60	*Carpha capitellata*	*Car_capi*	K *s.n.*	Cape Infanta, S. Africa	Levyns 8391	Oct. 1947
61	*Carpha capitellata* (syntype of ***Asterochaete tenuis***)	*Car_capi*	K *s.n.*	Zuurberg Range, Alexandria Div., S. Africa	Drège 1840	—

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
62	*Carpha capitellata*	*Car_capi*	K *s.n.*	Herm ans dorf Div., S. Africa	H. G. Fourcade 4476	Oct. 1930
63	*Carpha capitellata*	*Car_capi*	K *s.n.*	Sumpfige Stellen bei Komgha, Komgha Div., S. Africa	H. G. Flanagan 920	Aug. 1893
64	*Carpha capitellata* (syntype of ***Asterochaete tenuis***)	*Car_capi*	K *s.n.*	Zuurberg Ranga, Alexandria Div., S. Africa	Drège 1840	—
65	*Carpha capitellata*	*Car_capi*	MEL 1543862	Humidis, S. Africa	L. MacOwan 351	—
66	*Carpha capitellata*	*Car_capi*	NU *s.n.*	Cairesi Ranch, Inyanga, Rhodesia, Zimbabwe	E. A. Robinson 1976	21 Nov. 1956
67	*Carpha capitellata*	*Car_capi*	NU *s.n.*	Mt Sheba Nature Reserve, Transvaal, S. Africa	H. Getliffe 56	Oct. 1975
68	*Carpha capitellata*	*Car_capi*	PRE *s.n.*	Lydenburg Dist., Transvaal, Cape, S. Africa	C. Reid 1807	3 Dec. 1992
69	*Carpha capitellata*	*Car_capi*	PRE *s.n.*	Hopewell, Bathurst Dist. Cape Prov., S. Africa	J. P. H. Acocks 23507	30 Oct. 1964
70	*Carpha capitellata*	*Car_capi*	PRE *s.n.*	Swartberg, South Cape, S. Africa	M. F. Thompson 2282	7 Jan. 1975
71	*Carpha* cf. *bracteosa* (syntype of ***Carpha bracteosa***)	*Car_cf_b*	K *s.n.*	Boschberg, Somerset Div., Cape, S. Africa	L. MacOwan 2187	Dec. 74
72	*Carpha cf. bracteosa*	*Car_cf_b*	K *s.n.*	Mt Thomas, Eastern Prov., S. Africa	R. Storey 36820	11 Nov. 1948
73	*Carpha cf. bracteosa* (syntype of ***Carpha bracteosa***)	*Car_cf_b*	K *s.n.*	Boschberg, Somerset West Div., Cape, S. Africa	L. MacOwan 1616	Sep. 1871
74	*Carpha cf. bracteosa*	*Car_cf_b*	NE 66170	Hogsback, Eastern Cape, S. Africa	B. Sonnenberg 301	24 Nov. 1994
75	*Carpha cf. bracteosa*	*Car_cf_b*	NU *s.n.*	Robertson Falls, Rocky River Banks, Eastern Cape Prov., S. Africa	B. Sonnenberg 336	26 Nov. 1994
76	*Carpha cf. bracteosa*	*Car_cf_b*	NU *s.n.*	Hogsback, Eastern Cape, S. Africa	B. Sonnenberg 301	24 Nov. 1994
77	*Carpha cf. nitens*	*Car_cf_n*	K *s.n.*	Roches Plates Path., Riviere des Remparts, Réunion	C. Barclay 1251	20 Nov. 1968
78	*Carpha cf. nitens*	*Car_cf_n*	K *s.n.*	Roches Plates Path, Riviere des Remparts, Réunion	C. Barclay 501	16 Nov. 1967
79	*Carpha cf. nitens*	*Car_cf_n*	K *s.n.*	Bourbon [Réunion]	I. B. Balfour *s.n.*	Oct. 1875
80	*Carpha cf. nitens*	*Car_cf_n*	PRE *s.n.*	Piton de la Fournaise, Volcano, Plaine des Sables, Réunion	H-J. Schlieben 10904	9 Nov. 1966
81	*Carpha curvata*	*Car_curv*	HO 122194	Central Highlands, Tasmania, Australia	A. M. Buchanan 9948	5 Feb. 1987

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
82	*Carpha curvata*	*Car_curv*	HO 411849	Hamilton Range, Southwest Tasmania, Australia	S. J. Jarman *s.n.*	29 Jan. 1977
83	*Carpha curvata*	*Car_curv*	HO 412117	Hamilton Range, Southwest Tasmania, Australia	S. J. Jarman *s.n.*	26 Feb. 1986
84	*Carpha curvata*	*Car_curv*	HO 443230	Elliot Range, Tasmania, Australia	S. J. Jarman *s.n.*	15 Jan. 1985
85	*Carpha curvata*	*Car_curv*	HO 53801	Mt Hesperus, Southwest Tasmania, Australia	A. V. Ratkowsky *s.n.*	6 Feb. 1982
86	*Carpha curvata*	*Car_curv*	HO 91835	Mt Sprent, Southwest Tasmania, Australia	J. Kirkpatrick *s.n.*	Dec. 1981
87	*Carpha curvata*	*Car_curv*	NE 71839	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1892i	16 Feb. 2000
88	*Carpha curvata*	*Car_curv*	NE 71843	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1894	16 Feb. 2000
89	*Carpha curvata*	*Car_curv*	NE 71844	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1895	16 Feb. 2000
90	*Carpha curvata*	*Car_curv*	NE 71845	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1896A	16 Feb. 2000
91	***Carpha curvata***	*Car_curv*	NSW *s.n.*	Mt Eliza Plateau, East of Lake Pedder, Tasmania, Australia	J. Davies s.n.	25 Jan. 1982
92	*Carpha discolor* ms	*Car_disc*	K *s.n.*	Hex River Mts., Worcester Div., Cape Prov., S. Africa	E. Esterhuysen 14866	18 Dec. 1949
93	*Carpha eminii*	*Car_emin*	EA *s.n.*	Mt Ruwenzori, Toro, Uganda	K. A. Lye 1249	30 Dec. 1968
94	*Carpha eminii*	*Car_emin*	K *s.n.*	Mt Ruwenzori, Uganda	O. Hedberg 598	30 Mar. 1948
95	*Carpha eminii*	*Car_emin*	K *s.n.*	Mt Ruwenzori, Uganda	J. W. Purseglove P270	Aug. 1938
96	*Carpha eminii*	*Car_emin*	K *s.n.*	Mt Ruwenzori, Uganda	F. Utaucock 109	Aug. 1931
97	*Carpha eminii*	*Car_emin*	K *s.n.*	Mt Ruwenzori, Uganda	O. Hedberg 435	24 Mar. 1948
98	*Carpha eminii*	*Car_emin*	K *s.n.*	Mt Ruwenzori, Uganda	R. W. Haines 277	30 Dec. 1968
99	*Carpha eminii*	*Car_emin*	K *s.n.*	Mt Ruwenzori, Uganda	G. F. Roveridge 120	25 Dec. 1961
100	*Carpha eminii*	*Car_emin*	K *s.n.*	Mt Ruwenzori, Toro, W. Prov., Uganda	H. O. Osmaston 3210	31 Jul. 1953
101	*Carpha filifolia*	*Car_fili*	K *s.n.*	Oshoek, Wakkerstroom Dist., Transvaal Prov., S. Africa	N. J. Devenish 1067	14 Nov. 1963
102	*Carpha filifolia*	*Car_fili*	K *s.n.*	Oshoek, Wakkerstroom Distr., Transvaal Pro., S. Africa	N. J. Devenish 1821	3 Nov. 1979
103	*Carpha filifolia*	*Car_fili*	NU 3500279	Highmoor Forest Reserve, Mpendhle Dist., Natal, S. Africa	O. M. Hilliard 16258	6 Jan. 1983
104	*Carpha filifolia*	*Car_fili*	NU 3500280	Sani Pass, Underberg Dist., Natal, S. Africa	Hilliard & Burtt 9788	22 Mar. 1977
105	*Carpha filifolia*	*Car_fili*	NU 3500282	Cobham Forest Reserve, Underberg, Natal, S. Africa	O. M. Hilliard 12609	16 Feb. 1979

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
106	*Carpha filifolia*	*Car_fili*	NU 3500296	Sehlabathebe National Park, Lesotho, S. Africa	C. Schwabe 0171	5 Jan. 1990
107	*Carpha filifolia*	*Car_fili*	NU 3500299	Sehlabathebe National Park, Lesotho, S. Africa	J. Browning 696	25 Jan. 1995
108	*Carpha filifolia*	*Car_fili*	PRE *s.n.*	Oshoek, Wakkerstroom Dist. Transvaal, S. Africa	N. J. Devenish 1067	14 Nov. 1963
109	*Carpha filifolia*	*Car_fili*	PRE *s.n.*	Sehlabathebe National Park, Lesotho, S. Africa	F. K. Hoener 2138	10 Jan. 79
110	*Carpha glomerata*	*Car_glom*	NU *s.n.*	Farm Etheldale, Port shepstone Dist., Natal, S. Africa	C. J. Ward 7196	5 Sep. 71
111	*Carpha glomerata*	*Car_glom*	NU *s.n.*	Verlorenvlei, Clanwilliam, Western Cape, S. Africa	J. Browning 803	24 Jan. 1996
112	*Carpha glomerata*	*Car_glom*	NU *s.n.*	Rocky River Banks, Robertson Falls, Eastern Cape Province, S. Africa	B. Sonnenberg 387	26 Nov. 1994
113	*Carpha glomerata*	*Car_glom*	NU *s.n.*	Vernon Crookes Nature Reserve, Port Shepstore, Natal, S. Africa	J. Browning 228	1 Oct. 1989
114	*Carpha glomerata*	*Car_glom*	NU *s.n.*	Port Elizabeth to Storms River Road, past Humansdrop turn off, S. Africa	F. Getliffe 1142	12 Feb. 1982
115	*Carpha glomerata*	*Car_glom*	PRE *s.n.*	Riversdale- Langekloof, Cape, S. Africa	T. H. Arnold 1041	Oct. 75
116	*Carpha glomerata*	*Car_glom*	PRE *s.n.*	Kogelberg forest reserve, Cape, S. Africa	C. Boucher 911	21 Nov. 1969
117	*Carpha glomerata*	*Car_glom*	PRE *s.n.*	Uitenhage, Cape, S. Africa	T. H. Arnold 1065	Oct. 1975
118	*Carpha nitens*	*Car_nite*	K *s.n.*	Brulé-Sentier de la Roche Ecrite, Réunion	M. J. E. Coode 4186	25 Nov. 1973
119	*Carpha nitens*	*Car_nite*	K *s.n.*	Rampe de la Grande Montée, Réunion	C. Barclay 1966	22 Nov. 1970
120	*Carpha nitens*	*Car_nite*	K *s.n.*	Piton Fougeres east of Dos D'ane, Réunion	C. Barclay 1920	21 Nov. 1970
121	*Carpha nivicola*	*Car_nivi*	CANB 478753	Kosciuszko, NSW, Australia	M. Gray 6201	6 Mar. 1968
122	*Carpha nivicola*	*Car_nivi*	CBG 8001431	Kosciuszko, NSW, Australia	B. Barnsley 1287	19 Feb. 1980
123	*Carpha nivicola*	*Car_nivi*	MEL 1578959	Koscuiusko, NSW, Australia	M. G. Corrick 10667	17 Feb. 1990
124	*Carpha nivicola*	*Car_nivi*	MEL 2066099	Koscuiusko, NSW, Australia	J. H. Willis *s.n.*	5 Feb. 1964
125	*Carpha nivicola*	*Car_nivi*	MEL 2066100	Bogong High Plains, Victoria, Australia	M. L. Cupper 08	6 Feb. 1996
126	*Carpha nivicola*	*Car_nivi*	MEL 649163	Bogong High Plains, Victoria, Australia	R. J. Adair 1644	1 Mar. 1982
127	*Carpha nivicola*	*Car_nivi*	NE 66025	Kosciuszko, NSW, Australia	J. J. Bruhl 146	8 Feb. 1986
128	*Carpha nivicola*	*Car_nivi*	NE 70655	Kosciuszko, NSW, Australia	J. J. Bruhl 1872	23 Dec. 1999

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
129	*Carpha nivicola*	*Car_nivi*	NE 70795	Kosciuszko, NSW, Australia	J. Thompson 4500	28 Feb. 1983
130	*Carpha nivicola*	*Car_nivi*	NE 72987	Kosciuszko, NSW, Australia	X. Zhang 14	24 Jan. 2000
131	*Carpha nivicola*	*Car_nivi*	NSW 19610	Kosciuszko, NSW, Australia	L. A. S. Johnson *s.n.*	18 Jan. 1951
132	*Carpha nivicola*	*Car_nivi*	NSW 248289	Kosciuszko, NSW, Australia	A. N. Rodd 1613	19 Mar. 1974
133	*Carpha nivicola*	*Car_nivi*	NSW 462102	Kosciuszko, NSW, Australia	A. C. Gray 5035	24 Feb. 1961
134	*Carpha perrieri*	*Car_perr*	B 100000970	Massif de l'Andringitra, Madagascar	H. Humbert 3878	27 Nov.–8 Dec. 1924
135	***Carpha perrieri***	*Car_perr*	K *s.n.*	Massif d'Andringitra, Madagascar	Perrier de la Bâthie 14555	Feb. 1922
136	*Carpha perrieri*	*Car_perr*	K *s.n.*	Massif de l' Andohahelo, Madagascar	H. Humbert 6146	21–22 Oct. 1928
137	***Carpha perrieri***	*Car_perr*	P 00199383	Massif d'Andringitra, Madagascar	Perrier de la Bâthie 14555	Feb. 1922
138	*Carpha perrieri*	*Car_perr*	P 00199389	Massif du Tsaratauaue, Madagascar	P. Morat 2307	Nov. 1966
139	*Carpha perrieri*	*Car_perr*	P 00199390	Massif de l' Andohahelo, Madagascar	H. Humbert 6146	21–22 Oct. 1928
140	*Carpha rodwayi*	*Car_rodw*	HO 121972	Southwest of Nevada Peak, Tasmania, Australia	P. Collier 4562	25 Feb. 1990
141	*Carpha rodwayi*	*Car_rodw*	HO 24187	Mt Field, Tasmania, Australia	W. D. Jackson *s.n.*	10 Feb. 1960
142	*Carpha rodwayi*	*Car_rodw*	HO 30509	Mt Field National Park, Tasmania, Australia	A. T. Dobson 77245	26 Feb. 1977
143	*Carpha rodwayi*	*Car_rodw*	NE 71815	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1881A	15 Feb. 2000
144	*Carpha rodwayi*	*Car_rodw*	NE 71834	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1890	16 Feb. 2000
145	***Carpha rodwayi***	*Car_rodw*	NSW *s.n.*	Eliza Plateau, South-west Tasmania, Australia	J. B. Davies *s.n.*	4 Feb. 1982
146	***Carpha schlechteri***	*Car_schl*	BOL 63205	Koude Bokkeveld Skurfde-bergen Pone Gydoum, S. Africa	R. Schlechter 10010	17 Jan. 1897
147	*Carpha schlechteri*	*Car_schl*	BOL 63206	Elands Kloof, Ceres Div., Cape Prov., S. Africa	M. R. Levyns 8098	13 Dec. 46
148	***Carpha schlechteri***	*Car_schl*	K *s.n.*	Koude Bokkeveld, Gydow, S. Africa	R. Schlechter 10010	17 Jan. 1897
149	*Carpha schlechteri*	*Car_schl*	NU *s.n.*	Cederberg, Kromriviere, Worcester, Western Cape, S. Africa	J. Browning 823	29 Jan. 1996
150	*Carpha schlechteri*	*Car_schl*	NU *s.n.*	Pine Forests, Witelsbosch SAFCOL Forests, Eastern Cape Prov., S. Africa	B. Sonnenberg 458	1 Feb. 1996
151	*Carpha schlechteri*	*Car_schl*	PRE *s.n.*	Elands Kloof, Ceres Div., Cape Prov., S. Africa	R. Levyns 8098	Dec. 1964

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
152	***Carpha schlechteri***	*Car_schl*	PRE *s.n.*	Koude Bokkeveld, Scurfdebergen Pone Gydow, S. Africa	R. Schlechter 10010	17 Jan. 1897
153	*Carpha schoenoides*	*Car_scho*	BM 000092177	Mainland, opposite Puerto Eden, Chile	E.J.Godley 755a	21 Dec. 1958
154	***Carpha schoenoides***	*Car_scho*	BM 000092178	Tierra del Fuego	Banks & Solander *s.n.*	Jan. 1769
155	*Carpha schoenoides*	*Car_scho*	K *s.n.*	Bahía Aguirre, Tierra del Fuego, Argentina	D. M. Moore 1835	14 Feb. 1968
156	*Carpha schoenoides*	*Car_scho*	K *s.n.*	Osorno, Chile	W. J. Eyerdam 10586A	1–3 Feb. 1958
157	*Carpha schoenoides*	*Car_scho*	K *s.n.*	Orange Harbor, & C., Fuegia, Chile	U. S. South Pacific Exploring Expedition *s.n.*	1838–42
158	*Carpha schoenoides*	*Car_scho*	MO 1626156	Rio Azopardo, Tierra del Fuego	P. Dusén *s.n.*	6 Mar. 1896
159	*Carpha schoenoides*	*Car_scho*	MO 2150322	Río Varela, Tierra del Fuego	D. M. Moore 1925	17 Feb. 1968
160	*Carpha schoenoides*	*Car_scho*	NY *s.n.*	Cordillera Pelade, Chile	A. Hollermayer 1334	22 Jan. 1924
161	*Carpha schoenoides*	*Car_scho*	NY *s.n.*	Osorno, Chile	W. J. Eyerdam 10586A	1–3 Feb. 1958
162	*Carpha schoenoides*	*Car_scho*	P00132670	Valdivia, Cordillera Pelada, Chile	Philippi 981	—
163	*Carpha ulugurensis* ms	*Car_ulug*	EA *s.n.*	Uluguru Mt, Lukwangule-plateau, Tanzania	T. Pócs 3766	8 Dec. 1969
164	*Carpha ulugurensis* ms	*Car_ulug*	K *s.n.*	Ulugurus, Luckwangule Plteau, Tanzania	G. M. Bruce 742	30 Jan. 1935
165	*Carpha ulugurensis* ms	*Car_ulug*	K *s.n.*	Luckwangule Plteau, Morogoro Dist., Ulugurus, Tanzania	S. Bidgood 232	14 Mar. 1986
166	*Costularia elongata*		K *s.n.*	Bourbon [Réunion]	M. Boivin 998	1847–1852
167	*Costularia elongata*		K *s.n.*	Bourbon [Réunion]	I. B. Balfour *s.n.*	Oct. 1875
168	*Costularia pilisepala*		K *s.n.*	Mt Kinabalu, Sabah, Borneo	W. L. Chew 4966	20 Apr. 1964
169	*Costularia pilisepala*		K *s.n.*	Mt Kinabalu, Sabah, Borneo	M. S. Clemens 51062	14 Dec. 1933
170	*Costularia pilisepala*		K *s.n.*	Hollandia and Vicinity, Dutch New Guinea	L. J. Brass 8802	Jun.–Jul. 1938
171	*Cyathochaeta avenacea*		NSW 364042	Kalamunda National Park, Darling, WA, Australia	K. L. Wilson 8912	17 Nov. 1994
172	*Cyathochaeta avenacea*		NSW 462122	Warren Dist., WA, Australia	M. D. Crisp 5351	21 Jan. 1979
173	*Cyathochaeta clandestina*		CANB 511559	Walpole, WA, Australia	B. J. Lepschi BJL3682	25 Oct. 1997
174	*Cyathochaeta clandestina*		NE 66021	Albany, WA, Australia	J. J. Bruhl 707	10 Sep. 1988

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
175	*Cyathochaeta clandestina*		NSW 462121	Scott R. Plain, WA, Australia	K. L. Wilson 3038	21 Oct. 1979
176	*Cyathochaeta diandra*		NE 66023	Mt Coolum, Qld, Australia	J. J. Bruhl 229	16 Apr. 1986
177	*Cyathochaeta diandra*		NE 72997	South Coast, NSW, Australia	X. Zhang 24	26 Jan. 2000
178	*Cyathochaeta diandra*		NSW 462124	Bodalla, NSW, Australia	K. L. Wilson 2300	10 Feb. 1979
179	*Cyathocoma hexandra*		BOL 102565	Die Nock, Uniondale Div., S. Africa	E. Esterhuysen 13596	15 Jan. 1947
180	*Cyathocoma hexandra*		BOL 102566	Zitzikamma, S. Africa	H. G. Fourcade 1007a	Nov. 1920
181	*Cyathocoma hexandra*		NE 66175	Witelsbosch SAFCOL Forests, Eastern Cape, S. Africa	B. Sonnenberg 484	2 Feb. 1996
182	*Cyathocoma hexandra*		NU *s.n.*	Cape Pennisula	C. J. Ward 1060	Dec. 1949
183	*Cyathocoma hexandra*		NU *s.n.*	Pine Forests, Witelsbosch SAFCOL Forests, Eastern Cape Prov., S. Africa	B. Sonnenberg 477	1 Feb. 1996
184	*Cyathocoma hexandra*		PRE *s.n.*	Montibus Pone French Hoek, Western Region, S. Africa	R. Schlechter 10280	12 Feb. 1897
185	*Gahnia aspera*		NE 51153	Bolivia Range, North Coast, NSW, Australia	J. B. Williams	7 Jan. 1984
186	*Gahnia aspera*		NE 70161	North Western Slopes, NSW, Australia	K. L. Wilson 9386	22 Feb. 1996
187	*Gahnia aspera*		NE 72072	Wingen Maid Nature Reserve, NSW, Australia	J. H. Hosking 1734	9 Aug. 1999
188	*Gahnia sieberiana*		NE 51150	Gibraltar Range National Park, North Coast, NSW, Australia	J. B. Williams	12 Feb. 1974
189	*Gahnia sieberiana*		NE 62751	Northern Tablelands, NSW, Australia	J. T. Hunter 1554	21 Jan. 1995
190	*Gymnoschoenus sphaerocephalus*		NE 65497	North Coast, NSW, Australia	P. R. Williams 213	23 Jan. 1995
191	*Gymnoschoenus sphaerocephalus*		NE 72981	New England National Park, Northern Tablelands, NSW, Australia	X. Zhang 8	13 Dec. 1999
192	*Gymnoschoenus sphaerocephalus*		NSW 262708	Melaleuca Airstrip. Tasmania, Australia	K. L. Wilson 8408	1 Apr. 1992
193	*Mesomelaena graciliceps*		NSW 364509	Cape Le Grand National Park Eyre, WA, Australia	K. L. Wilson 9193	30 Nov. 1994
194	*Mesomelaena graciliceps*		NSW 462119	Cape Riche, WA, Australia	K. L. Wilson 2942	16 Oct. 1979
195	*Mesomelaena graciliceps*		NSW 462120	Ambergate, WA, Australia	K. L. Wilson 3056	22 Oct. 1979
196	*Mesomelaena tetragona*		NSW *s.n.*	c. 2km south of Mogumber, WA, Australia	K. L. Wilson 2722	3 Oct. 1979
197	*Mesomelaena tetragona*		NSW *s.n.*	1km west of Bremer Bay township, WA, Australia	K. L. Wilson 2918	16 Oct. 1979

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
198	*Mesomelaena tetragona*		NSW *s.n.*	Badgingarra National Park, WA, Australia	K. L. Wilson 2702	2 Oct. 1979
199	*Oreobolus distichus*		NE 50965	Northern Tablelands, NSW, Australia	J. B. Williams *s.n.*	22 Nov. 1986
200	*Oreobolus distichus*		NE 70653	Kosciuszko, NSW, Australia	J. J. Bruhl 1870	23 Dec. 1999
201	*Oreobolus distichus*		NE 72990	Kosciuszko, NSW, Australia	X. Zhang 17	24 Jan. 2000
202	*Oreobolus distichus*		NE 72992	Kosciuszko, NSW, Australia	X. Zhang 19	25 Jan. 2000
203	*Oreobolus distichus*		NSW 462112	Gippsland, Victoria, Austraslia	R. Melville 3102	25 Jan. 1953
204	*Oreobolus oxycarpus*		NSW 462114	Kosciuszko, NSW, Australia	K. L. Wilson 974	13 Feb. 1975
205	*Oreobolus oxycarpus*		NSW 462115	Lake Tali Karng, Victoria, Austraslia	A. C. Beauglehole 41161	9 Jan. 1973
206	*Oreobolus oxycarpus*		NSW 462117	Mt Lloyd, Tasmania, Australia	A. Moscal 9623	13 Feb. 1985
207	*Oreobolus pumilio*		NE 70651	Kosciuszko, NSW, Australia	J. J. Bruhl 1869b	23 Dec. 1999
208	*Oreobolus pumilio*		NE 71809	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1879	15 Feb. 2000
209	*Oreobolus pumilio*		NE 72985	Kosciuszko, NSW, Australia	X. Zhang 12	24 Jan. 2000
210	*Oreobolus pumilio*		NSW 462116	Kosciuszko, NSW, Australia	J. Thompson 2680	26 Jan. 1977
211	*Ptilothrix deusta*		NE 56828	North Western Slopes, NSW, Australia	S. M. Capararo 3	7 Feb. 1993
212	*Ptilothrix deusta*		NE 65013	North Western Slopes, NSW, Australia	J. B. Williams *s.n.*	4 Oct. 1990
213	*Ptilothrix deusta*		NE 70548	Single National Park, Nouthern Tablelands, NSW, Australia	X. Zhang 1	12 Nov. 1999
214	*Ptilothrix deusta*		NE 70663	Northern Tablelands, NSW, Australia	L. M. Copeland 2037	3 Nov. 1999
215	*Schoenoides oligocephalus*		HO 102690	Lake Picone, Southwest Tasmania, Australia	A. Moscal 977	12 Apr. 1982
216	*Schoenoides oligocephalus*		HO 144781	Moonlight Ridge, Southwest Tasmania, Australia	A. M. Buchanan 11305	3 Jan. 1989
217	*Schoenoides oligocephalus*		HO 47874	Mt Eliza Plateau, Tasmania, Australia	J. B. Davies *s.n.*	20 Jan. 1982
218	*Schoenoides oligocephalus*		HO 60127	Mt Hesperus, Southwest Tasmania, Australia	A. V. Ratkowsky *s.n.*	6 Feb. 1982
219	*Schoenoides oligocephalus*		NE 71832	Mt Field National Park, Tasmania, Australia	J. J. Bruhl 1889A	16 Feb. 2000
220	*Schoenus andinus*		BM 000092164	Orange harbor, & C., Fuegia, Chile	U.S. South Pacific Exploring Expedition *s.n.*	1938–42

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
221	*Schoenus andinus*		BM 000092165	Rio Azopardo, Tierra del Fuego	P. Dusén 612	2 Mar. 1896
222	*Schoenus andinus*		K *s.n.*	Prov. Rio Negro, Argentina	S. Laegaard 12532	18–19 Dec. 1978
223	*Schoenus andinus*		NY *s.n.*	Lago Nahuelhuapi, Patagonia	G. Ljungner 887	4–5 Feb. 1934
224	*Schoenus antarcticus*		BM 000092162	Cordillera San Pedro, N. Chile	E. J. Godley 487b	14 Nov. 58
225	*Schoenus antarcticus*		BM 000092163	Pueto Eden, Wellington I., Southern Chile	E. J. Godley 651a	12 Dec. 58
226	*Schoenus antarcticus*		P00132666	Baie Orange Plages, Chile	Hyades 884	15 May 1883
227	*Schoenus maschalinus*		NE 37917	Mt Lindesay, Qld, Australia	A. G. Floyd 773	21 Nov. 1977
228	*Schoenus maschalinus*		NSW 247917	West Coast, Tasmania, Australia	K. L. Wilson 6363	17 Feb. 1986
229	*Schoenus maschalinus*		NSW 422022	Nouth Coast, NSW, Australia	S. J. Griffith Kattang 7a	18 Nov. 1995
230	*Schoenus paludosus*		NE 42442	Bundjalung National Park, North Coast, NSW, Australia	S. J. Griffiths *s.n.*	30 Apr. 1983
231	*Schoenus paludosus*		NE 52083	Crowdy Bay National Park, North Coast, NSW, Australia	S. J. Griffiths s.n.	4 Mar. 1988
232	*Schoenus paludosus*		NSW *s.n.*	Port Curtis, Queensland, Australia	J. R. Clarkson 952	10 Jul. 1977
233	*Schoenus rhynchosporoides*		MO 1211234	Potrero de coigue Valdivia, Chile	—	Jan. 1861
234	*Schoenus rhynchosporoides*		BM 000092179	Coid. Chaihuin, Valdivia, Chile	H. Gunckel 3017	3–5 Jan. 1932
235	*Schoenus rhynchosporoides*		BM 000092180	Milinka, Chile	A. Guagardo *s.n.*	1873
236	*Schoenus rhynchosporoides*		NY *s.n.*	Puerto Aysén, Chile	R. Santesson 1224	9 Nov. 1940
237	*Schoenus rhynchosporoides*		NY *s.n.*	Cordillera Pelade, Chile	A. Hollermayer 1323	25 Feb. 32
238	*Schoenus turbinatus*		NE 21695	Central Tablelands, NSW, Australia	K. G. Griffiths *s.n.*	10 Oct. 1957
239	*Schoenus turbinatus*		NE 42453	North Coast, NSW, Australia	S. J. Griffiths s.n.	6 May 83
240	*Schoenus turbinatus*		NE 63101	Central Coast, NSW, Australia	J. T. Hunter 2357	10 Jan. 1995
241	*Schoenus turbinatus*		NE 71936	North Coast, NSW, Australia	K. L. Wilson 9772	24 Sep. 1999
242	*Tetraria capillaris*		NSW 279525	Central Coast, NSW, Australia	V. Klaphake 643	27 Oct. 1992
243	*Tetraria capillaris*		NSW 462110	Otway Plain, Victoria, Austraslia	D. E. Albrecht 5079	30 Nov. 1992

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
244	*Trianoptiles capensis*		BOL 63221	Riverlands, Malmeshung Dist. Cape Prov., S. Africa	E. Esterhuysen 34668	30 Sep. 1977
245	*Trianoptiles capensis*		BOL 63222	Rondeolei, Malinesburg Dist., Cape Prov., S. Africa	E. Esterhuysen 34749	26 Oct. 1977
246	*Trianoptiles capensis*		BOL 63225	Elands Kloof, Bredasdrop Div., S. Africa	M. R. Levyns 9775	10 Oct. 1951
247	*Trianoptiles capensis*		BOL 63226	Schuster's River, Cape Pennisula	M. R. Levyns 9994	2 Nov. 1952
248	***Trianoptiles capensis***		K *s.n.*	Table Mt, Cape Div., S. Africa	U. J. Ecklon 854	—
249	*Trianoptiles solitaria*		BOL 102568	Rondebosch, Cape Pennisula Dist., Cape Prov., S. Africa	E. Esterhuysen 29741	—
250	*Trianoptiles solitaria*		BOL 63233	Kenilworth, Cape Peninsula	E. Esterhuysen 33995	3 Oct. 1975
251	*Trianoptiles solitaria*		BOL 63234	Brackenfel, Cape Div., S. Africa	J. P. H. Acock 4746	24 Oct. 1933
252	***Trianoptiles solitaria***		K *s.n.*	Cape Peninsula	W. Dod 3348	—
253	*Trianoptiles solitaria*		NSW 462123	Melbourne, Victoria, Australia	V. Stajsic 706	7 Nov. 1992
254	*Trianoptiles stipitata*		BOL 102569	Brackenfel, Cape Div., S. Africa	J. P. H. Acock 4745	24 Oct. 1933
255	*Trianoptiles stipitata*		BOL 63228	Sleenbas Dam, Cape, S. Africa	M. R. Levyns 7678	17 Nov. 1944
256	*Trianoptiles stipitata*		BOL 63229	Bains Kloof, Wellington, S. Africa	M. R. Levyns 7641	27 Oct. 1944
257	*Trianoptiles stipitata*		BOL 63230	Kraaifontein, S. Africa	M. R. Levyns 7663	30 Oct. 1944
258	*Trianoptiles stipitata*		BOL 63231	Bokbakisi Nei, Cape, S. Africa	N. S. Pillans 4874	—
259	*Tricostularia pauciflora*		NSW 404649	Kanangra Boyd National Park, NSW, Australia	R. G. Coveny 17484	11 Jan. 1997
260	*Tricostularia pauciflora*		NSW 462108	Anglesea, Victoria, Australia	V. Stajsic 110	22 Dec. 1990
261	*Tricostularia undulata*		NSW 462105	Beetle Springs, Northern Territory, Australia	P. K. Latz 112885	29 Jan. 1989
262	*Tricostularia undulata*		NSW 462106	Macadam Range, Northern Territory, Australia	G. J. Leach 4179	22 Feb. 1994
263	*Rhynchospora brownii*		NE 003929	Murson Creek, Boonoo Boonoo to Wilson's Downfall, NSW, Australia	M. Gray 3757	9 Jan. 1956
264	*Rhynchospora brownii*		NE 059312	Entrance sth Boonoo Boonoo National Park, 35km NE Tenterfield, NSW, Australia	J. A. Baker 50	10 Feb. 1994
265	*Rhynchospora brownii*		NSW 421945	North Coast, NSW, Australia	V. Klaphake 1328	19 Jan. 1997

Appendix 1. (Continued)

No.	Taxon	Abbreviation in phenetic analyses	Herbarium abbreviation & number	Location	Collector & Number	Date of Collection
266	*Rhynchospora corymbosa*		NE 057505	S of Mission Beach, 2km N of Wongaling Creek, Qld, Australia	J. J. Bruhl 1132	19 Dec. 1992
267	*Rhynchospora corymbosa*		NE 068833	3km S Brunswick Heads, Pacific Hwy, NSW, Australia	V. Klaphake	20 Jan. 1998
268	*Rhynchospora corymbosa*		NE 070003	Dr. Mays Crossing, Elliot Rv, c. 10 km S Bundaberg, Qld, Australia	J. Hodgon 57	1 Feb. 1999
269	*Scleria levis*		NSW 462103	Bible Camp Billabong, Northern Territory, Australia	C. R. Dunlop 7592	8 Dec. 1987
270	*Scleria levis*		NSW 462104	Jabiru, Northern Territory, Australia	C. Dunlop 3380	26 Feb. 1973
271	*Scleria mackaviensis*		NE 050614	Ramornie, NSW, Australia	K. L. Wilson 5824	30 Dec. 1983
272	*Scleria mackaviensis*		NE 060058	W of Wreck Ck. coastal walk, Edmund Kennedy National Park, Qld, Australia	J. J. Bruhl 539	7 Jun. 1985
273	*Scleria mackaviensis*		NE 062836	Attunga SF, c. 15km NW of Tamworth on Manilla Rd, NSW, Australia	J. T. Hunter 2614	2 Feb. 1995

Appendix 2. Ninety-four annotated characters listed in DELTA format (Dallwitz et al. 1999) for cladistic analyses in Chapter 4. Of these, only the 54 variable characters were used for phenetic study of *Carpha* in Chapter 3, because 40 characters and some character states indicated by asterisks were constant for all specimens of *Carpha*.

#1. Rhizome <whether present>/

1. present/
2. absent/

#2. *Lifeform/

1. perennial/
2. annual/

'Perennial plants have old dead culms and/or rhizomes, whereas annuals have only the aged early leaves of the current year's growth at the base' (Bruhl 1995, p. 135).

#3. Plant <height from ground level to top of plant, including inflorescence>/

cm high/

This character is measured from the base to the highest point of the plant including leaves, inflorescence and involucral bracts.

#4. Culms <shape in cross-section>/

1. triangular/
2. *narrow-elliptical or fusiform/
3. subcircular to circular/

Narrow-elliptical or fusiform is scored for species with compressed culms.

#5. Fertile node number <see Reid and Arnold 1984>/

Fertile node number refers to the number of nodes within an inflorescence with distinct internodes. If the inflorescence is a terminal head, the node number is treated as 1.

#6. Sterile node number <cauline leaves; see Reid and Arnold 1984>/

Sterile node number refers to the number of nodes at which cauline leaves grow. In *Carpha* and its relatives this character is equivalent to cauline leaf number.

#7. *Leaf sheath <colour>/

1. reddish <includes red to dark red, cf. *Schoenus andinus, S. rhynchosporoides, S. antarcticus*>/
2. brownish <includes yellow-green to brown>/

#8. *Ligule <whether present>/

1. present/
2. absent/

#9. *Ligule <whether ciliate>/

1. ciliate/
2. glabrous/

#10. *Contraligule <whether present; see Harden 1993>/

1. absent/
2. present <cf. *Scleria levis*>/

#11. Pseudopetiole <whether present>/

1. present/
2. absent/

#12. Leaf blade <whether curling; see Curtis 1984>/

1. curled for at least one third of its length/
2. with only tips curled/
3. not curled/

The 'curling' refers to loosely coiled leaf blades. In some specimens more than one third of the leaf blade distally is conspicuously curled as it dries (e.g. *Carpha curvata*), while only the tip of the leaf curls in some other specimens (e.g. some specimens of *C. alpina*).

#13. *Leaf blades <whether spirally twisted>/

1. spirally twisted <e.g. leaves of *Cyathochaeta diandra, C. avenacea* and some of *C. clandestina*>/
2. not spirally twisted/

#14. Leaf <whether rigid>/

1. rigid <cf. *Oreobolus* and *Carpha rodwayi*>/
2. not rigid/

#15. *Leaf blades with a median stomate-less longitudinal band adaxially between two faint or obvious veins <Wilson 1993, cf. *Oreobolus distichus*>/

1. present/
2. absent/

#16. Leaf blade <shape; cross-section at mid-third>/

1. V-shaped/
2. thinly crescentiform or flat <includes shallowly corrugate>/

3. thickly crescentiform <includes sub-triangular, thickly V-shaped and subhemispherical>/
4. circular <includes subcircular>/

#17. <Mature> longest leaf blade <length>/

cm long/

The longest leaf blade excluding leaf sheath but including any pseudopetiole. In a pilot study, 5–10 leaves were randomly selected and measured, for which a mean was calculated. This approach led to measurement of leaves of different ages, rendering the character dubious. Also, scoring longest leaf blade length is more repeatable.

#18. <Mature> leaf blade <maximum width>/

mm wide/

The maximum width of the widest leaf is measured. The rationale for using a single widest measurement follows that of character 17.

#19. Involucral bract sheath <colour>/

1. reddish <includes red to dark red, cf. *Schoenus andinus, S. rhynchosporoides, S. antarcticus*>/
2. brownish <includes yellow-green to brown>/

#20. Involucral bracts <shape>/

1. linear-lanceolate <i.e. leaf-like>/
2. ovate <i.e. bract-like>/

Leaf-like involucral bracts mean involucral bracts that have the same shape as leaves. Most species have leaf-like involucral bracts in this study. However, the involucral bracts of *Carpha bracteosa* and *Gymnoschoenus sphaerocephalus* are ovate without long apices and shorter than or as long as the heads of spikelets, while involucral bracts of *Carpha* cf. *bracteosa* and *Mesomelaena tetragona* are ovate at the bases with long, green, leaf-like apices and much longer than the heads of spikelets. The lowest involucral bract of *Mesomelaena graciliceps* and *Ptilothrix deusta* is ovate at the base with a long, green, leaf-like apex, while the next involucral bract in these species is ovate without a long apex.

#21. <Ovate> involucral bracts <shape>/

1. without long apices/
2. with long, green, leaf-like apices/

#22. Proximal involucral bract <length, including sheath>/

cm long/

Measured from the node at which the lowest involucral bract originates to the tip of the bract, i.e. length includes bract sheath, and apex or apical appendage.

#23. Proximal involucral bract blade <maximum width>/

mm wide/

#24. Inflorescence <length>/

cm long/

Measured from the lowest fertile node to the tip of the uppermost spikelet, but excludes any longer involucral bracts.

#25. *Spikelets <whether all enclosed by involucral bracts>/

1. all enclosed by involucral bracts <cf. *Cyathochaeta clandestina*, *Mesomelaena graciliceps*, *Mesomelaena tetragona* and *Ptilothrix deusta*>/
2. not all enclosed by involucral bracts/

#26. Spikelets <whether densely clustered>/

1. densely clustered/
2. not densely clustered/

'Spikelets densely clustered' refers to spikelets that are crowded together so that the cluster cannot be seen through. If any gap can be seen between spikelets, they are considered loosely clustered.

#27. Heads <number per inflorescence; see Clarke 1897–1898>/

This character refers to head-like structures formed by crowded spikelets, e.g. in *Carpha glomerata*. If an inflorescence is head-like, number of heads per inflorescence is 1.

#28. Heads <shape>/

1. ovoid/
2. oblong or ellipsoid/
3. *globose/
4. obovoid <includes obconical or fan-shaped>/

#29. <Spikelet> pedicel <length; spikelet pedicel is enclosed by primary involucral bract sheaths>/

mm long/

There are two kinds of pedicels in *Carpha* and relatives. In one kind, spikelets grow at the lowest few nodes of an inflorescence and spikelet pedicels are enclosed by primary involucral bract sheaths, so their pedicels are usually markedly long. The other kind is where spikelets do not grow directly at the lower nodes of the

inflorescence and their pedicels are not enclosed by primary involucral bract sheaths, so their pedicels are usually very short. The former kind of pedicel was measured for this character. The latter kind, here called secondary pedicels, was measured for the next character (character 30).

#30. <Spikelet> secondary pedicel <length; spikelet pedicel is not enclosed by primary involucral bract sheaths>/

mm long/

#31. Spikelet <number per inflorescence>/

per inflorescence/

Spikelet number per inflorescence was obtained by direct count. Most specimens examined in this study bore only one inflorescence. Where more than one inflorescence was present, the largest inflorescence was counted. Where the spikelets are dense and compacted, the value is approximate.

#32. *Basal spikelets <whether present>/

1. present/
2. absent/

Plants of *Trianoptiles* are amphicarpic, i.e. have spikelets at the base of the plant, close to ground level as well as aerial spikelets (Levyns 1943). All the other spikelet characters in this list refer to aerial spikelets.

#33. *Male only spikelets <whether present>/

1. absent/
2. present/

#34. <Female-fertile> spikelets <length, excluding pedicel>/

mm long/

Length is measured from the base of a mature spikelet to the tip, excluding pedicel and any style or stamens which exceed the glumes. The tip of a spikelet is not equal to the tip of the uppermost glume because lower glumes of spikelets exceed the uppermost glume in some species. Bisexual spikelets are measured for species which only have bisexual spikelets and for species which have bisexual spikelets and male spikelets (e.g. *Coleochloa schweinfurthiana*). Female-only spikelets are measured for species which have separate male and female spikelets (e.g. *Scleria levis*).

#35. Glumes <colour>/

1. reddish <includes red to dark red, cf. *Schoenus andinus, S. rhynchosporoides*>/
2. brownish <includes yellow green to brown>/

#36. *Glumes <arrangement>/

1. spiralled/

2. distichous/

Glume arrangement in Cyperaceae is usually divided into spiralled, subdistichous and distichous. *Carpha* and relatives mostly have distichous glumes, or sometimes somewhat subdistichous. It is difficult to distinguish subdistichous and distichous in this group, so subdistichous and distichous arrangements are both treated as distichous.

#37. *Lower glumes relative length to upper glumes within a spikelet/

1. shorter than upper glumes/

2. longer than upper glumes/

In most species of Schoeneae, the spikelet has a few lower glumes that are shorter than the upper ones. However, in some species the lower glumes are longer than the upper glumes, e.g. in *Gahnia aspera, Oreobolus distichus, O. oxycarpus, O. pumilio,* and some specimens of *Cyathocoma hexandra* (*R. Schlechter 10280*, PRE) and *Schoenoides oligocephalus* (NE *71832*).

#38. Glumes <number>/

Includes any proximal sterile glumes and any distal empty glume, but excludes the bract subtending the spikelet.

#39. Glumes <whether persistent>/

1. all persistent/

2. proximally persistent, distally deciduous/

3. *all deciduous/

#40. Proximal sterile glumes <number>/

Members of the study group usually have a few empty proximal glumes.

#41. Uppermost glume <whether sterile>/

1. sterile <see Figs 2.2, 2.3a,d, 2.4d, 2.5d>/

2. fertile <see Figs 2.2, 2.3a-b>/

#42. Proximal fertile glume <length, including any awn>/

mm long/

#43. Proximal fertile glume <maximum width>/

mm wide/

Measured by flattening out glume.

#44. Second fertile glume <length, including any awn>/

mm long/

#45. Second fertile glume <maximum width>/

mm wide/

Measured by flattening out glume.

#46. *Third fertile glume <length, including any awn>/

mm long/

#47. *Third fertile glume <maximum width>/

mm wide/

Measured by flattening out glume.

#48. 'Rachilla' <whether elongated above fertile nodes>/

1. elongated above fertile nodes <see Figs 2.2, 2.3d, 2.4a-d, 2.5a, 2.6b-d>/
2. not elongated above fertile nodes <see Figs 2.2, 2.3a, 2.5c-d>/

In some species, the 'rachilla' is markedly longer above each fertile node than above sterile nodes. If the internode above a fertile node is more or less the same length as internodes above sterile nodes, the 'rachilla' is considered to be not elongated.

#49. 'Rachilla' <whether adnate to fertile glume base>/

1. adnate to fertile glume base <see Figs 2.4a-b, 2.5a>/
2. not adnate to fertile glume base/

#50. *Bisexual flowers <whether present>/

1. absent/
2. present/

#51. *Female-only flowers <whether present>/

1. absent/
2. present/

#52. Male-only flowers <whether present>/

1. present/
2. absent/

#53. Flowers <number per female-fertile spikelet>/

Including all kind of flowers (bisexual, male and female flower) in spikelet.

#54. *Perianth <whether present>/

1. present/
2. absent/

#55. *Perianth members <number>/

#56. *Perianth whorls <number>/

With high magnification, the number of perianth whorls per flower of most taxa can be easily distinguished. Generally, perianth members are in one whorl if a plant has three perianth members, and in two whorls if a plant has six perianth members although some exceptions exist (e.g. *Cyathocoma hexandra*, which has six perianth members in one whorl). In a few cases (e.g. *Schoenus andinus, Cyathochaeta*), it is difficult to distinguish inner and outer perianth whorls. Where inner and outer perianth whorls cannot be distinguished, they are treated as being one.

#57. Perianth members <whether inner whorl and outer whorl more or less equal in length>/

1. inner whorl more or less equal in length to outer whorl/
2. inner whorl much longer than outer whorl/

#58. *Perianth members <whether more or less equal in length within a whorl>/

1. more or less equal in length within a whorl/
2. obviously unequal in length within a whorl/

Sampled species have almost the same length for all perianth members within each whorl except in species of *Cyathochaeta* (*C. diandra*, *C. avenacea* and *C. clandestina*) and *Coleochloa schweinfurthiana*.

#59. <Maximum> perianth <length>/

mm long/

Perianth length is measured from the base to the top of the longest member.

#60. *Perianth members <type>/

1. bristles/
2. scales/

For most species, the form of the perianth can be distinguished according to Bruhl's (1995, p. 170) definition: 'Scales are generally much wider than thick. Bristles are rounded in transection or linear in lateral view'. However, in some species, e.g. *Tricostularia undulata* and *Carpha eminii,* perianth members are not rounded in transverse section and are not much wider than thick. Bentham (1878) described perianth members of *Tricostularia undulata* as hypogynous bristles while Kern (1974) called them scales. In this study, scales are defined as much wider than thick. Bristles are defined as rounded to elliptic in transverse section and linear to linear-triangular in lateral view.

#61. *Perianth members <whether glabrous>/

1. not glabrous (scabrous or with some hairs)/

2. glabrous/

#62. Perianth bristles <whether plumose>/

1. plumose/

2. scabrous/

#63. <Plumose> perianth trichomes <maximum length>/

mm long/

Longest plumose perianth trichome is measured for this character.

#64. <Plumose> perianth scabrous zone <maximum length>/

mm long/

A plumose perianth member has a scabrous zone of variable length at the top. The longest zone is measured.

#65. *Perianth members <whether trifid>/

1. trifid/

2. not divided/

#66. *Perianth scales <whether twisted at maturity>/

1. twisted <cf. *Mesomelaena*>/

2. not twisted/

#67. *Perianth scales <whether with a dense tuft of hairs on the adaxial surface>/

1. with a dense tuft of hairs on adaxial surface (cf. *Trianoptiles stipitata*)/

2. without a dense tuft of hairs on the adaxial surface/

#68. *Perianth members <whether base fused into a band>/

1. base fused into a band <cf. *Cyathocoma hexandra*>/

2. base not fused into a band/

'A band' is the same as 'a frill or cup' described by Archer et al. (1997).

#69. *Perianth members <whether forming a disc at the base of the fruit>/

1. absent/

2. present/

In *Scleria*, there is a disc at the base of the fruit, usually falling with the mature fruit.

#70. *Perianth <whether persistent on spikelet>/

1. persistent on spikelet/

2. deciduous from spikelet/

#71. *Stamens <number per flower>/

#72. *Stamen filaments <whether persistent on fruit>/

1. persistent on fruit/

2. not persistent on fruit/

#73. *Anthers <colour>/

1. green–yellow/

2. red–brown/

In the study group, species have anthers that are either yellow to green or red to brown. Although yellow and green or red and brown anthers can be distinguished in fresh material, anther colour can change after processing, for example, greenish yellow can fade to yellow and red can fade to brown or red-brown, so only two states green–yellow and red–brown are used for this character.

#74. Anther <length>/

mm long/

Measured from the base to the top of anther excluding apical appendage.

#75. Anther apical appendage <length>/

mm long/

#76. Anther apical appendage <width>/

mm wide/

The greatest width of the anther apical appendage was measured.

#77. Stigmas <number>/

#78. *Style base <whether enlarged>/

1. enlarged/

2. not enlarged/

#79. *Style base <whether persistent>/

1. persistent/

2. deciduous/

#80. <Persistent> Style base <length>/

mm/

Measured on mature nuts.

#81. <Persistent> Style base <maximum width>/

mm/

#82. Fruit <number per spikelet>/

per spikelet/

#83. *Fruit <shape in the broadest lateral view>/

1. elliptic/
2. obovate/
3. ovate/
4. subcircular to circular/
5. lanceolate to narrow-oblong/

#84. *Fruit <shape in cross-section>/

1. trigonous/
2. subcircular to circular/
3. biconvex/
4. crescentiform <cf. species of *Cyathochaeta*>/

#85. *Fruit <colour at maturity>/

1. white/
2. red/
3. brown <includes pale brown to dark brown>/

#86. *Fruit <whether with tapered apex>/

1. with a tapered apex <Wilson 1993; cf. *Oreobolus oxycarpus*>/
2. without a tapered apex/

#87. *Fruit <whether with loose outermost layer>/

1. with loose outermost layer <cf. *Gymnoschoenus sphaerocephalus*; see Wilson 1993>/
2. without loose outermost layer/

#88. Fruit <epidermis whether reticulate; Figs 6.3 d, 6.6 b, d>/

1. reticulate/
2. not reticulate/

'Reticulate' is the same as Kükenthal's (1939c, 1939d,) 'tessellated'.

#89. *Fruit <epidermis whether rugose, Bruhl 1995>/

1. rugose/
2. not rugose/

#90. Fruit <epidermis whether punctulate; Fig. 6.3 a, b>/

1. punctulate/
2. not punctulate/

#91. Fruit <length>/

mm long/

Fruit length is measured from base to top of body excluding stalk and persistent style base.

#92. Fruit <maximum diameter>/

mm in diameter/

#93. *Gynophore <whether present>/

1. present <cf. *Mesomelaena;* Wilson 1981>/

2. absent/

#94. Fruit stalk <length>/

mm long/

Appendix 3. Morphological data used in phenetic analyses of *Carpha* (Chapter 3). Voucher information presented is herbarium abbreviation and sheet number where available, otherwise herbarium abbreviation with the first collector and number (see Appendix 1 for detailed collecting information). Column numbers refer to the character numbers in Appendix 2. Constant characters and character states (indicated by asterisks in Appendix 2) have been removed. Each column in the data matrix represents one state for multistate characters and states are in the same order as that in Appendix 2. Binary characters occupy one column where no polymorphism occurs within taxa, and two columns where polymorphisms exist. –9999 = missing and inapplicable value.

Species	Voucher	Characters/character states										
		1	3	4	4	5	6	11	12	12	12	14
C. alpina	BM 000092170	1	29	0	1	3	0	0	0	0	1	0
C. alpina	BM 000092173	1	22	0	1	2	1	0	0	1	1	0
C. alpina	BM 000092174	1	6.5	0	1	2	0	0	0	1	1	0
C. alpina	CANB 107745	1	16	0	1	2	0	0	0	1	0	0
C. alpina	CANB 147508	1	19	0	1	2	0	0	0	0	1	0
C. alpina	CANB 183330	1	32	0	1	2	0	0	0	1	0	0
C. alpina	CANB 241321	1	14	0	1	2	1	0	0	1	0	0
C. alpina	HO 100424	1	7.5	0	1	2	0	0	0	1	1	0
C. alpina	HO 100425	1	7.5	0	1	3	0	0	0	0	1	0
C. alpina	HO 125977	1	9	0	1	2	0	0	0	0	1	0
C. alpina	HO 143800	1	11.5	0	1	2	0	0	0	1	1	0
C. alpina	HO 24161	1	17	0	1	3	0	0	0	1	1	0
C. alpina	HO 24169	1	35	0	1	2	1	0	0	1	1	0
C. alpina	HO 326461	1	11	0	1	2	0	0	0	1	1	0
C. alpina	HO 328073	1	11	0	1	2	0	0	0	0	1	0
C. alpina	HO 409964	1	28	0	1	3	0	0	0	0	1	0
C. alpina	HO 411185	1	18	0	1	2	1	1	0	1	1	0
C. alpina	HO 91834	1	10	0	1	2	1	0	0	0	1	0
C. alpina	K, T. G. Hartley 12996	1	22	0	1	3	0	0	0	0	1	0
C. alpina	MEL 2066107	1	18.5	0	1	2	0	0	0	0	1	0
C. alpina	MEL 252110	1	25	0	1	3	0	0	0	0	1	0
C. alpina	MEL 49294	1	22	0	1	3	0	0	0	1	1	0
C. alpina	MEL 522763	1	23	0	1	2	0	0	0	0	1	0
C. alpina	MEL 658311	1	17	0	1	2	1	0	0	1	1	0
C. alpina	MEL 693734	1	19	0	1	3	1	1	0	1	1	0
C. alpina	NE 70799	1	25	0	1	2	0	0	0	1	0	0
C. alpina	NE 70800	1	27	0	1	3	1	0	0	1	1	0
C. alpina	NE 71803	1	14	0	1	1	0	0	0	1	1	0
C. alpina	NE 71826	1	33	0	1	2	0	0	0	1	1	0
C. alpina	NE 71849	1	32.5	0	1	2	1	0	0	1	1	0
C. alpina	NE 72986	1	6.5	0	1	1	0	0	0	0	1	0
C. alpina	NSW 120927	1	6.5	0	1	2	0	0	0	0	1	0
C. alpina	NSW 462089	1	16	0	1	4	0	0	0	0	1	0
C. alpina	NSW 462091	1	10.5	0	1	3	0	0	0	1	1	0
C. alpina	NSW 462093	1	15	0	1	3	0	0	0	0	1	0
C. alpina	NSW 462094	1	24	0	1	3	0	0	0	0	1	0
C. alpina	NSW 462095	1	18.5	0	1	4	0	0	0	1	1	0
C. alpina	NSW 462097	1	17.5	0	1	3	0	0	0	0	1	0
C. alpina	NSW 462100	1	30.5	0	1	2	1	0	0	1	1	0
C. angustissima	B 100000959	1	34	0	1	2	0	0	0	0	1	0
C. angustissima	B 100000961	1	47	0	1	3	0	0	0	0	1	0
C. angustissima	EA, J. W. Purseglove 2199	1	49	0	1	4	0	0	0	0	1	0
C. angustissima	EA, K. A. Lye 5289	1	40	0	1	3	1	0	0	0	1	0
C. angustissima	K, K. A. Lye 5289	1	39	0	1	4	0	0	0	0	1	0
C. angustissima	K, A. B. Katende K207B	1	44	0	1	3	0	0	0	0	1	0
C. angustissima	K, H. U. Stauffer 793	1	40	0	1	3	0	0	0	0	1	0
C. angustissima	K, J. W. Purseglove P2199	1	45	0	1	4	0	0	0	0	1	0
C. angustissima	P 00199386	1	32	0	1	4	0	0	0	0	1	0
C. borbonica	K, I. B. Balfour *s.n.*	1	29	0	1	3	2	0	0	0	1	0
C. borbonica	NSW, Richard 6601	1	42	0	1	3	1	0	0	0	1	0
C. bracteosa	K, P. N. Parker *s.n.*	1	70	0	1	5	1	0	0	0	1	0
C. bracteosa	K, H. Bolus 2867	1	46	0	1	4	1	0	0	0	1	0
C. bracteosa	K, R. Schlechter 8970	1	34	0	1	3	1	0	0	0	1	0
C. bracteosa	NU, H. C. Taylor 5988	1	51	0	1	4	1	0	0	0	1	0
C. bracteosa	PRE, E. E. Esterhuysen 10611	1	39	0	1	3	1	0	0	0	1	0
C. bracteosa	PRE, H. C. Taylor 5220	1	31.5	0	1	3	0	0	0	0	1	0

Species	Voucher	Characters/character states										
		1	3	4	4	5	6	11	12	12	12	14
C. bracteosa	PRE, P. v. d. Merwe1199	1	53.5	0	1	3	2	0	0	0	1	0
C. capitellata	K, Levyns 8391	1	62	0	1	3	1	0	0	0	1	0
C. capitellata	K, H. G. Fourcade 4476	1	42	0	1	2	1	0	0	0	1	0
C. capitellata	K, H. G. Flanagan 920	1	23	0	1	3	1	0	0	0	1	0
C. capitellata	K, Drège 1840	1	45	0	1	3	0	0	0	0	1	0
C. capitellata	K, Drège 1840	1	48	0	1	3	1	0	0	0	1	0
C. capitellata	MEL 1543862	1	48	0	1	3	0	0	0	0	1	0
C. capitellata	NU, E. A. Robinson 1976	1	39	0	1	4	0	0	0	0	1	0
C. capitellata	NU, H. Getliffe 56	1	33	0	1	2	1	0	0	0	1	0
C. capitellata	PRE, C.Reid1807	1	41	0	1	2	0	0	0	0	1	0
C. capitellata	PRE, J. P. H. Acocks 23507	1	41	0	1	2	2	0	0	0	1	0
C. capitellata	PRE, M. F. Thompson 2282	1	44	0	1	3	1	0	0	0	1	0
C. cf. *bracteosa*	K, L. MacOwan 2187	1	59	0	1	4	1	0	0	0	1	0
C. cf. *bracteosa*	K, R. Storey 36820	1	35	0	1	1	0	0	0	0	1	0
C. cf. *bracteosa*	K, L. MacOwan 1616	1	65.5	0	1	3	1	0	0	0	1	0
C. cf. *bracteosa*	NE 66170	1	67	0	1	2	1	0	0	0	1	0
C. cf. *bracteosa*	NU, B. Sonnenberg 301	1	70	0	1	2	1	0	0	0	1	0
C. cf. *bracteosa*	NU, B. Sonnenberg 336	1	61	0	1	2	1	0	0	0	1	0
C. cf. *nitens*	K, C. Barclay 1251	1	23	0	1	4	0	0	0	0	1	0
C. cf. *nitens*	PRE, H-J. Schlieben 10904	1	37	0	1	3	1	0	0	0	1	0
C. cf. *nitens*	K, C. Barclay 501	1	16.5	0	1	4	0	0	0	0	1	0
C. cf. *nitens*	K, I. B. Balfour *s.n.*	1	38	0	1	5	1	0	0	0	1	0
C. curvata	HO 122194	1	32	0	1	4	0	0	1	0	0	0
C. curvata	HO 411849	1	26	0	1	4	1	0	1	0	0	0
C. curvata	HO 412117	1	37	0	1	4	0	0	1	0	0	0
C. curvata	HO 443230	1	30	0	1	4	1	0	1	0	0	0
C. curvata	HO 53801	1	28	0	1	4	1	0	1	0	0	0
C. curvata	HO 91835	1	41	0	1	3	0	0	1	0	0	0
C. curvata	NE 71839	1	19	0	1	3	0	0	1	1	0	0
C. curvata	NE 71843	1	18	0	1	2	1	0	1	0	1	0
C. curvata	NE 71844	1	41	0	1	3	1	0	1	0	0	0
C. curvata	NE 71845	1	33	0	1	2	1	0	1	0	0	0
C. curvata	NSW, J. Davies *s.n.*	1	27	0	1	2	1	0	1	0	0	0
C. discolor	K, E. Esterhuysen 14866	1	35	0	1	2	0	0	1	0	0	0
C. eminii	EA K. A. Lye 1249	1	62.5	0	1	4	0	0	0	0	1	0
C. eminii	K, H. O. Osmaston 3210	1	44	0	1	3	1	0	0	0	1	0
C. eminii	K, O. Hedberg 598	1	109	0	1	6	1	0	0	0	1	0
C. eminii	K, F. Utaucock 109	1	66	0	1	4	1	0	0	0	1	0
C. eminii	K, O. Hedberg 435	1	51	0	1	4	1	0	0	0	1	0
C. eminii	K, J. W. Purseglove P270	1	90	0	1	5	0	0	0	0	1	0
C. eminii	K, R. W. Haines 277	1	53	0	1	3	1	0	0	0	1	0
C. eminii	G. F. Roveridge 120	1	100	0	1	4	2	0	0	0	1	0
C. filifolia	K, N. J. Devenish 1067	0	54	0	1	2	0	0	0	0	1	0
C. filifolia	K, N. J. Devenish 1821	0	36.5	0	1	1	0	0	0	0	1	0
C. filifolia	NU 3500296	0	36	0	1	1	0	0	0	0	1	0
C. filifolia	NU 3500280	0	43	0	1	1	0	0	0	0	1	0
C. filifolia	NU 3500299	0	38	0	1	2	0	0	0	0	1	0
C. filifolia	NU 3500282	0	70	0	1	2	0	0	0	0	1	0
C. filifolia	NU 3500279	0	43	0	1	1	0	0	0	0	1	0
C. filifolia	PRE, F. K. Hoener 2138	0	42	0	1	1	1	0	0	0	1	0
C. filifolia	PRE, N. J. Devenish 1067	0	54	0	1	2	0	0	0	0	1	0
C. glomerata	NU, B. Sonnenberg 387	1	-9999	1	0	9	-9999	0	0	0	1	0
C. glomerata	NU, J. Browning 803	1	140	1	0	6	1	0	0	0	1	0
C. glomerata	NU, C. J. Ward 7196	1	171	1	0	6	3	0	0	0	1	0
C. glomerata	NU, F. Getliffe 1142	1	107	1	0	5	2	0	0	0	1	0

Species	Voucher	Characters/character states										
		1	3	4	4	5	6	11	12	12	12	14
C. glomerata	NU, J. Browning 228	1	200	1	0	6	3	0	0	0	1	0
C. glomerata	PRE, C. Boucher 911	1	122	1	0	7	3	0	0	0	1	0
C. glomerata	PRE, T. H. Arnold 1065	1	122	1	0	7	3	0	0	0	1	0
C. glomerata	PRE, T. H. Arnold 1041	1	122	1	0	4	3	0	0	0	1	0
C. nitens	K, M. J. E. Coode 4186	1	52	0	1	1	5	0	0	0	1	0
C. nitens	K, C. Barclay 1966	1	41	0	1	4	2	0	0	0	1	0
C. nitens	K, C. Barclay 1920	1	41	0	1	5	2	0	0	0	1	0
C. nivicola	CANB 478753	1	25	0	1	1	1	0	0	0	1	0
C. nivicola	CBG 8001431	1	8	0	1	1	0	0	0	0	1	0
C. nivicola	MEL 1578959	1	22	0	1	1	0	0	0	0	1	0
C. nivicola	MEL 2066099	1	14	0	1	2	0	0	0	0	1	0
C. nivicola	MEL 2066100	1	22	0	1	3	0	0	0	0	1	0
C. nivicola	MEL 649163	1	35	0	1	3	0	0	0	0	1	0
C. nivicola	NE 66025	1	8	0	1	1	0	1	0	0	1	0
C. nivicola	NE 70655	1	40	0	1	1	0	0	0	0	1	0
C. nivicola	NE 70795	1	14	0	1	1	0	0	0	0	1	0
C. nivicola	NE 72987	1	13	0	1	2	0	0	0	0	1	0
C. nivicola	NSW 19610	1	8.5	0	1	2	0	0	0	0	1	0
C. nivicola	NSW 248289	1	24.5	0	1	3	0	0	0	0	1	0
C. nivicola	NSW 462102	1	29	0	1	3	0	0	0	0	1	0
C. perrieri	B 100000970	1	32	0	1	2	0	0	0	0	1	0
C. perrieri	K, Perrier de la Bâthie 14555	1	51	0	1	3	0	0	0	0	1	0
C. perrieri	K, H. Humbert 6146	1	33	0	1	3	1	0	0	0	1	0
C. perrieri	P 00199383	1	57	0	1	3	1	0	0	0	1	0
C. perrieri	P 00199390	1	44	0	1	3	1	0	0	0	1	0
C. perrieri	P 00199389	1	19	0	1	3	1	0	0	0	1	0
C. rodwayi	HO 121972	1	7	0	1	2	1	1	0	0	1	1
C. rodwayi	HO 24187	1	7	0	1	2	0	1	0	0	1	1
C. rodwayi	HO 30509	1	7	0	1	1	0	1	0	0	1	1
C. rodwayi	NE 71815	1	11.5	0	1	1	0	1	0	0	1	1
C. rodwayi	NE 71834	1	11	0	1	2	0	1	0	0	1	1
C. rodwayi	NSW, J. B. Davies *s.n.*	1	7.5	0	1	2	0	1	0	0	1	1
C. schlechteri	BOL 63205	1	122	1	0	6	2	0	0	0	1	0
C. schlechteri	BOL 63206	1	121	1	0	6	2	0	0	0	1	0
C. schlechteri	K, R. Schlechter 10010	1	105	1	0	4	2	0	0	0	1	0
C. schlechteri	NU, B. Sonnenberg 458	1	127	1	0	5	1	0	0	0	1	0
C. schlechteri	NU, J. Browning 823	1	128	1	0	7	1	0	0	0	1	0
C. schlechteri	PRE, R. Schlechter 10010	1	104	1	0	5	2	0	0	0	1	0
C. schlechteri	PRE, R. Levyns 8098	1	88	1	0	5	2	0	0	0	1	0
C. schoenoides	BM 000092177	1	32	0	1	3	0	0	0	0	1	0
C. schoenoides	BM 000092178	1	23	0	1	3	0	0	0	0	1	0
C. schoenoides	K, D. M. Moore 1835	1	30	0	1	2	0	0	0	0	1	0
C. schoenoides	K, W. J. Eyerdam 10586A	1	21	0	1	2	0	0	0	0	1	0
C. schoenoides	K, US. S. P. E. Expedition *s.n.*	1	28	0	1	3	0	0	0	0	1	0
C. schoenoides	MO 1626156	1	30	0	1	2	0	0	0	0	1	0
C. schoenoides	MO 2150322	1	19	0	1	2	0	0	0	0	1	0
C. schoenoides	NY, A. Hollermayer 1334	1	42	0	1	3	0	0	0	0	1	0
C. schoenoides	NY, W. J. Eyerdam 10586	1	27.5	0	1	2	0	0	0	0	1	0
C. schoenoides	P 00132670	1	18	0	1	1	0	0	0	0	1	0
C. ulugurensis	EA, T. Pócs 3766	1	83	1	0	6	1	0	0	0	1	0
C. ulugurensis	K, G. M. Bruce 742	1	83	1	1	5	1	0	0	0	1	0
C. ulugurensis	K, S. Bidgood 232	1	88	1	1	5	1	0	0	0	1	0

Species	Characters/character states														
	16	16	16	16	17	18	19	20	21	21	22	23	24	26	26
C. alpina	0	1	0	0	15	1.2	0	1	-9999	-9999	15	1.5	16	0	1
C. alpina	0	1	0	0	12	2	0	1	-9999	-9999	10	1.7	12	0	1
C. alpina	0	1	0	0	4.5	1.4	0	1	-9999	-9999	1.5	1.3	4.3	0	1
C. alpina	0	1	0	0	7	1.1	0	1	-9999	-9999	5.5	0.8	6.5	0	1
C. alpina	0	1	0	0	10	1.1	0	1	-9999	-9999	7.3	1	9.5	0	1
C. alpina	0	1	0	0	10	1.2	0	1	-9999	-9999	5	0.6	6	0	1
C. alpina	0	1	0	0	4.5	1	0	1	-9999	-9999	1.7	0.7	1.9	0	1
C. alpina	0	1	0	0	3.3	0.9	0	1	-9999	-9999	3	0.7	3.5	0	1
C. alpina	0	1	0	0	5	0.9	0	1	-9999	-9999	2.5	0.7	4	0	1
C. alpina	0	1	0	0	4	0.9	0	1	-9999	-9999	2.4	0.9	4.5	0	1
C. alpina	0	1	0	0	4	0.7	0	1	-9999	-9999	2.8	0.5	4.5	0	1
C. alpina	0	1	0	0	8.5	0.9	0	1	-9999	-9999	4.5	0.8	8	0	1
C. alpina	0	1	0	0	16	1.1	0	1	-9999	-9999	13.5	1.2	14	0	1
C. alpina	0	1	0	0	4.5	1	0	1	-9999	-9999	2.5	0.5	4	0	1
C. alpina	0	1	0	0	7.5	1.5	0	1	-9999	-9999	6.5	1	7.8	0	1
C. alpina	0	1	0	0	15	1.2	0	1	-9999	-9999	7	0.6	10.5	0	1
C. alpina	0	1	0	0	3.2	0.9	0	1	-9999	-9999	1.9	0.6	2.5	0	1
C. alpina	0	1	0	0	6	0.7	0	1	-9999	-9999	3.1	0.4	3	0	1
C. alpina	0	1	0	0	9.5	1.3	0	1	-9999	-9999	6.3	1	8	0	1
C. alpina	0	1	0	0	10	1.3	0	1	-9999	-9999	7	0.9	7	0	1
C. alpina	0	1	0	0	7	1.5	0	1	-9999	-9999	8	1.3	15	0	1
C. alpina	0	1	0	0	13	1.6	0	1	-9999	-9999	12	1	10.7	0	1
C. alpina	0	1	0	0	18	1.1	0	1	-9999	-9999	14	1	9.5	0	1
C. alpina	0	1	0	0	9	1.7	0	1	-9999	-9999	8	1.1	6.5	0	1
C. alpina	0	1	0	0	5.5	1.5	0	1	-9999	-9999	6	1	10	0	1
C. alpina	0	1	0	0	10	1	0	1	-9999	-9999	5	0.6	3.5	0	1
C. alpina	0	1	0	0	15	1.7	0	1	-9999	-9999	6.5	1.4	8	0	1
C. alpina	0	1	0	0	6	1.2	0	1	-9999	-9999	3	1	2.8	0	1
C. alpina	0	1	0	0	17	1.4	0	1	-9999	-9999	12	1.2	8	0	1
C. alpina	0	1	0	0	17	1.2	0	1	-9999	-9999	7.5	1.1	5	0	1
C. alpina	0	1	0	0	5.5	1.8	0	1	-9999	-9999	3.7	1.3	2.5	0	1
C. alpina	0	1	0	0	5.5	1.1	0	1	-9999	-9999	4	1	3.5	0	1
C. alpina	0	1	0	0	10.5	2	0	1	-9999	-9999	7.5	1.5	8	0	1
C. alpina	0	1	0	0	6	1.7	0	1	-9999	-9999	3.8	0.8	4.4	0	1
C. alpina	0	1	0	0	8	1.5	0	1	-9999	-9999	6.2	1	7.5	0	1
C. alpina	0	1	0	0	13	1.2	0	1	-9999	-9999	7.7	1.9	7.3	0	1
C. alpina	0	1	0	0	6	1.4	0	1	-9999	-9999	5	0.9	6.5	0	1
C. alpina	0	1	0	0	10.5	1.3	0	1	-9999	-9999	4	0.8	3.2	0	1
C. alpina	0	1	0	0	13	1.2	0	1	-9999	-9999	5	0.8	4	0	1
C. angustissima	1	1	0	0	26	0.7	0	1	-9999	-9999	14	0.8	6	0	1
C. angustissima	1	1	0	0	29	1.2	0	1	-9999	-9999	25	1.2	29	0	1
C. angustissima	1	1	0	0	25	1.6	0	1	-9999	-9999	23	1.5	35	0	1
C. angustissima	1	1	0	0	22	1.4	0	1	-9999	-9999	17	0.9	15	0	1
C. angustissima	1	1	0	0	34	1.3	0	1	-9999	-9999	24	1	24	0	1
C. angustissima	1	1	0	0	28	1.3	0	1	-9999	-9999	17	1.1	23.5	0	1
C. angustissima	1	1	0	0	22.5	1.2	0	1	-9999	-9999	19	1.2	20.5	0	1
C. angustissima	1	1	0	0	24	1.5	0	1	-9999	-9999	18	1.1	27	0	1
C. angustissima	1	1	0	0	27	1.3	0	1	-9999	-9999	29	1.5	28	0	1
C. borbonica	0	1	0	0	12	0.9	0	1	-9999	-9999	4.5	1.3	7	1	0
C. borbonica	0	1	0	0	39	1.1	0	1	-9999	-9999	12	1.4	9	1	0
C. bracteosa	1	0	0	0	35	3.8	0	0	1	0	25	5.8	38	1	0
C. bracteosa	1	0	0	0	19	4	0	0	1	0	14.5	5	21	1	0
C. bracteosa	1	0	0	0	24	3	0	0	1	0	8.5	5	15	1	0
C. bracteosa	1	0	0	0	29	3.2	0	0	1	0	10.5	5	18	1	0
C. bracteosa	1	0	0	0	25	3	0	0	1	0	8.5	5	10.5	1	0
C. bracteosa	1	0	0	0	24	3.8	0	0	1	0	18	4	19	1	0

Species	Characters/character states														
	16	16	16	16	17	18	19	20	21	21	22	23	24	26	26
C. bracteosa	1	0	0	0	30	3	0	0	1	0	14	4	25	1	0
C. capitellata	1	0	0	0	35.5	5	0	1	-9999	-9999	19	5	31	1	0
C. capitellata	1	0	0	0	36	2	0	1	-9999	-9999	6	3.2	7.5	1	0
C. capitellata	1	0	0	0	19.5	2.6	0	1	-9999	-9999	10.5	3	12	1	0
C. capitellata	1	0	0	0	29	4	0	1	-9999	-9999	17	4.5	24	1	0
C. capitellata	1	0	0	0	30	3.5	0	1	-9999	-9999	15	3.5	17	1	0
C. capitellata	1	0	0	0	33	3.4	0	1	-9999	-9999	18	3	19.5	1	0
C. capitellata	1	0	0	0	32	2.7	0	1	-9999	-9999	22	2.7	28	1	0
C. capitellata	1	0	0	0	27	3	0	1	-9999	-9999	9	2.7	8.5	1	0
C. capitellata	1	0	0	0	27	1.5	0	1	-9999	-9999	15	1.6	14.5	1	0
C. capitellata	1	0	0	0	20	2.5	0	1	-9999	-9999	4	2.3	5	1	0
C. capitellata	1	0	0	0	19	3.5	0	1	-9999	-9999	10.5	4	17.5	1	0
C. cf. *bracteosa*	0	0	1	1	35	2.5	0	0	0	1	17	4.6	9.5	1	0
C. cf. *bracteosa*	0	0	1	1	32	2	0	0	0	1	10	3.3	4.5	1	0
C. cf. *bracteosa*	0	0	1	1	35	2	0	0	0	1	5	4.3	3	1	0
C. cf. *bracteosa*	0	0	1	1	42	2	0	0	0	1	14	4.5	6	1	0
C. cf. *bracteosa*	0	0	1	1	58	2.3	0	0	0	1	21	5	11.5	1	0
C. cf. *bracteosa*	0	0	1	1	40	1.5	0	0	0	1	10	6	7	1	0
C. cf. *nitens*	1	0	0	0	19.5	4.2	0	1	-9999	-9999	15	3.3	23	1	0
C. cf. *nitens*	1	0	0	0	25	2.8	0	1	-9999	-9999	9	2	12	1	0
C. cf. *nitens*	1	0	0	0	10	3	0	1	-9999	-9999	8.5	2.5	9.5	1	0
C. cf. *nitens*	1	0	0	0	26	4.7	0	1	-9999	-9999	21	4.5	36	1	0
C. curvata	0	1	0	0	24	1.7	0	1	-9999	-9999	15.5	1.5	16.5	0	1
C. curvata	0	1	0	0	16	1.4	0	1	-9999	-9999	5	1.5	3.5	0	1
C. curvata	0	1	0	0	35	1.8	0	1	-9999	-9999	14	2	20	0	1
C. curvata	0	1	0	0	32	1.3	0	1	-9999	-9999	12	1	9	0	1
C. curvata	0	1	0	0	46	1.8	0	1	-9999	-9999	11	1.6	14	0	1
C. curvata	0	1	0	0	30	2.2	0	1	-9999	-9999	15.5	1.5	14	0	1
C. curvata	0	1	0	0	14	1.6	0	1	-9999	-9999	8.5	1.1	7	0	1
C. curvata	0	1	0	0	15	1.8	0	1	-9999	-9999	10	1.2	7	0	1
C. curvata	0	1	0	0	54	2	0	1	-9999	-9999	17	1.1	13.5	0	1
C. curvata	0	1	0	0	17	1.5	0	1	-9999	-9999	8	1.4	9.5	0	1
C. curvata	0	1	0	0	24	1.9	0	1	-9999	-9999	11.5	2.5	7	0	1
C. discolor	0	0	1	0	17	1.6	1	1	-9999	-9999	8	1	15	1	0
C. eminii	1	0	0	0	38	1.7	0	1	-9999	-9999	25	1.7	38	0	1
C. eminii	1	0	0	0	29	1.6	0	1	-9999	-9999	11	1.5	10	0	1
C. eminii	1	0	0	0	75	3	0	1	-9999	-9999	69	3	61	0	1
C. eminii	1	0	0	0	51	2.6	0	1	-9999	-9999	18	2	16.5	0	1
C. eminii	1	0	0	0	40	2.2	0	1	-9999	-9999	23	2.7	22	0	1
C. eminii	1	0	0	0	75	4.8	0	1	-9999	-9999	44	4	45	0	1
C. eminii	1	0	0	0	32	2	0	1	-9999	-9999	17	1.2	14	0	1
C. eminii	1	0	0	0	58	3	0	1	-9999	-9999	29	2.6	27	0	1
C. filifolia	0	0	1	1	32	0.8	0	1	-9999	-9999	8	2	2.5	1	0
C. filifolia	0	0	1	1	31	0.8	0	1	-9999	-9999	5	1.8	2	1	0
C. filifolia	0	0	1	1	20	0.5	0	1	-9999	-9999	5	1.5	2.5	1	0
C. filifolia	0	0	1	1	39	0.5	0	1	-9999	-9999	4.5	1.8	2	1	0
C. filifolia	0	0	1	1	30	0.7	0	1	-9999	-9999	10.5	2	2.3	1	0
C. filifolia	0	0	1	1	34	0.6	0	1	-9999	-9999	7	2	2	1	0
C. filifolia	0	0	1	1	17	0.7	0	1	-9999	-9999	5	1.5	2	1	0
C. filifolia	0	0	1	1	31	0.6	0	1	-9999	-9999	6.9	1.5	3	1	0
C. filifolia	0	0	1	1	31	0.7	0	1	-9999	-9999	10	2	5.5	1	0
C. glomerata	1	0	0	0	-9999	-9999	0	1	-9999	-9999	47.5	19	98	1	0
C. glomerata	1	0	0	0	54	13	0	1	-9999	-9999	21	13	62	1	0
C. glomerata	1	0	0	0	104	14	0	1	-9999	-9999	24	12	52	1	0
C. glomerata	1	0	0	0	40	18	0	1	-9999	-9999	25	16	41	1	0

Species	Characters/character states														
	16	16	16	16	17	18	19	20	21	21	22	23	24	26	26
C. glomerata	1	0	0	0	-9999	18	0	1	-9999	-9999	23	12.5	44	1	0
C. glomerata	1	0	0	0	-9999	20	0	1	-9999	-9999	21	14	37.5	1	0
C. glomerata	1	0	0	0	-9999	24	0	1	-9999	-9999	29	22	59	1	0
C. glomerata	1	0	0	0	46	20	0	1	-9999	-9999	29	14	60	1	0
C. nitens	1	0	0	0	43	3.5	0	1	-9999	-9999	27	3.3	38	0	1
C. nitens	1	0	0	0	22	4.7	0	1	-9999	-9999	10.5	3.3	18	0	1
C. nitens	1	0	0	0	31	4.2	0	1	-9999	-9999	16.5	2.7	18	0	1
C. nivicola	0	1	0	0	10.5	2	0	1	-9999	-9999	3.5	1	2.5	0	1
C. nivicola	0	1	0	0	6	2.4	0	1	-9999	-9999	3	1.5	2.7	0	1
C. nivicola	0	1	0	0	10	2.2	0	1	-9999	-9999	6.5	1.6	4	0	1
C. nivicola	0	1	0	0	7	2.3	0	1	-9999	-9999	3.8	1.6	3.5	0	1
C. nivicola	0	1	0	0	12	2.4	0	1	-9999	-9999	5.8	1.8	3.5	0	1
C. nivicola	0	1	0	0	20	2.5	0	1	-9999	-9999	9	2	4.5	0	1
C. nivicola	0	1	0	0	6	2.8	0	1	-9999	-9999	4.5	1.8	3	0	1
C. nivicola	0	1	0	0	23	2.8	0	1	-9999	-9999	9.5	1.9	4.2	0	1
C. nivicola	0	1	0	0	5	1.9	0	1	-9999	-9999	2.7	1.2	2	0	1
C. nivicola	0	1	0	0	5.5	2.2	0	1	-9999	-9999	5.5	1.3	6.3	0	1
C. nivicola	0	1	0	0	5.3	2.1	0	1	-9999	-9999	3	1.2	2.5	0	1
C. nivicola	0	1	0	0	9	2.5	0	1	-9999	-9999	8	1.5	10.5	0	1
C. nivicola	0	1	0	0	14.5	2.5	0	1	-9999	-9999	7.5	1.5	3.5	0	1
C. perrieri	1	0	0	0	21	1.5	0	1	-9999	-9999	6	1.5	7	1	0
C. perrieri	1	0	0	0	25	3.3	0	1	-9999	-9999	17.5	3.2	32	1	0
C. perrieri	1	0	0	0	23	5.3	0	1	-9999	-9999	9	5.7	14	1	0
C. perrieri	1	0	0	0	24	4	0	1	-9999	-9999	12	3.5	19	1	0
C. perrieri	1	0	0	0	27	3.9	0	1	-9999	-9999	7.5	4	13	1	0
C. perrieri	1	0	0	0	16	2.6	0	1	-9999	-9999	5	2.4	5.8	1	0
C. rodwayi	0	1	0	0	2.5	1.5	0	1	-9999	-9999	2	2	2.8	0	1
C. rodwayi	0	1	0	0	3	1.2	0	1	-9999	-9999	2	1.5	3	0	1
C. rodwayi	0	1	0	0	4	1.3	0	1	-9999	-9999	1.7	1.6	2	0	1
C. rodwayi	0	1	0	0	2.5	1	0	1	-9999	-9999	2	0.9	2.8	0	1
C. rodwayi	0	1	0	0	3.5	1.5	0	1	-9999	-9999	2.6	1.2	3.7	0	1
C. rodwayi	0	1	0	0	4	1.6	0	1	-9999	-9999	2	1.5	2.5	0	1
C. schlechteri	1	0	0	0	40.5	5.8	0	1	-9999	-9999	17.5	4.5	59	1	0
C. schlechteri	1	0	0	0	41	8	0	1	-9999	-9999	15	4.5	40	1	0
C. schlechteri	1	0	0	0	56	6	0	1	-9999	-9999	18	3.2	35	1	0
C. schlechteri	1	0	0	0	58	7	0	1	-9999	-9999	-9999	7.5	48	1	0
C. schlechteri	1	0	0	0	57	8	0	1	-9999	-9999	33	6	54.5	1	0
C. schlechteri	1	0	0	0	46	4.5	0	1	-9999	-9999	12.5	2.5	37	1	0
C. schlechteri	1	0	0	0	43	5.3	0	1	-9999	-9999	15	3	36.5	1	0
C. schoenoides	0	1	0	0	13	1	0	1	-9999	-9999	9.5	1	6	0	1
C. schoenoides	0	1	0	0	14	1.2	0	1	-9999	-9999	12	1.2	7	0	1
C. schoenoides	0	1	0	0	16	1.3	0	1	-9999	-9999	10.5	1.1	10	0	1
C. schoenoides	0	1	0	0	8	0.9	0	1	-9999	-9999	7.5	1	10	0	1
C. schoenoides	0	1	0	0	15	1.3	0	1	-9999	-9999	14	1	9.5	0	1
C. schoenoides	0	1	0	0	14	1.2	0	1	-9999	-9999	11	1	7	0	1
C. schoenoides	0	1	0	0	8	0.9	0	1	-9999	-9999	4.5	0.8	3	0	1
C. schoenoides	0	1	0	0	20	1.6	0	1	-9999	-9999	9	1.4	7	0	1
C. schoenoides	0	1	0	0	11	1	0	1	-9999	-9999	7	0.9	9	0	1
C. schoenoides	0	1	0	0	13.5	1.2	0	1	-9999	-9999	7.5	1	3.8	0	1
C. ulugurensis	1	0	0	0	65	5.5	0	1	-9999	-9999	24	4.5	35	1	0
C. ulugurensis	1	0	0	0	34	3.2	0	1	-9999	-9999	17	3	26	1	0
C. ulugurensis	1	0	0	0	37	5	0	1	-9999	-9999	13.5	4.6	25	1	0

Species	Characters/character states														
	27	28	28	28	29	30	31	34	35	38	39	39	40	41	41
C. alpina	1	0	0	1	10	1.5	25	9	0	5	1	0	3	0	1
C. alpina	1	0	0	1	10	2	18	9.5	0	5	1	0	3	0	1
C. alpina	1	0	0	1	4.5	1	11	10	0	5	1	0	3	0	1
C. alpina	1	0	0	1	15	4	6	9.5	0	5	1	0	3	0	1
C. alpina	1	0	0	1	12	2	9	12	0	6	1	0	4	0	1
C. alpina	1	0	0	1	6.5	2.5	6	9	0	5	1	0	3	0	1
C. alpina	1	0	0	1	4	2	4	9.5	0	5	1	0	3	0	1
C. alpina	1	0	0	1	9.5	4	7	9	0	5	1	0	3	0	1
C. alpina	1	0	0	1	7	0.7	3	10.5	0	6	1	0	4	0	1
C. alpina	1	0	0	1	7	2	14	9.2	0	5	1	0	3	0	1
C. alpina	1	0	0	1	20	1.5	6	9	0	6	1	0	4	0	1
C. alpina	1	0	0	1	5	2	15	10.8	0	6	1	0	4	0	1
C. alpina	1	0	0	1	20	1.8	22	9	0	6	1	0	4	0	1
C. alpina	1	0	0	1	10	1.5	4	9.5	0	6	1	0	4	0	1
C. alpina	1	0	0	1	55	2.5	8	10.1	0	5	1	0	3	0	1
C. alpina	1	0	0	1	16	4	8	10.3	0	6	1	0	4	0	1
C. alpina	1	0	0	1	10	3	3	9.5	0	6	1	0	4	0	1
C. alpina	0	-9999	-9999	-9999	7	3	4	10	0	5	1	0	3	0	1
C. alpina	1	0	0	1	40	3	7	11.5	0	6	1	0	4	0	1
C. alpina	1	0	0	1	13	3.5	13	10	0	6	1	0	4	0	1
C. alpina	1	0	0	1	12	2	7	10.8	0	5	1	0	3	1	1
C. alpina	1	0	0	1	12.5	2.5	18	9.5	0	5	1	0	3	0	1
C. alpina	1	0	0	1	45	3	26	9.5	0	6	1	0	4	0	1
C. alpina	1	0	0	1	4.5	2	24	11	0	5	1	0	3	0	1
C. alpina	1	0	0	1	14	3	7	10	0	5	1	0	3	0	1
C. alpina	1	0	0	1	15	2	15	9.5	0	5	1	0	3	0	1
C. alpina	1	0	0	1	25	2	14	10.7	0	5	1	0	3	0	1
C. alpina	0	-9999	-9999	-9999	12	2.5	7	8.3	0	6	1	0	4	0	1
C. alpina	1	0	0	1	45	2	19	10.5	0	6	1	0	4	0	1
C. alpina	1	0	0	1	23	3	15	10.1	0	7	1	0	5	0	1
C. alpina	1	0	0	1	12	2.5	10	9.7	0	6	1	0	4	0	1
C. alpina	1	0	0	1	15	3	8	8.8	0	6	1	0	4	0	1
C. alpina	1	0	0	1	10	2.5	11	10.3	0	5	1	0	3	0	1
C. alpina	1	0	0	1	20	2	6	10	0	6	1	0	4	0	1
C. alpina	1	0	0	1	5.5	2	12	9.4	0	5	1	0	3	0	1
C. alpina	1	0	0	1	7	4	15	12.5	0	5	1	0	3	0	1
C. alpina	1	0	0	1	23	3.5	8	9.7	0	5	1	0	3	0	1
C. alpina	1	0	0	1	14	2	7	10	0	5	1	0	3	0	1
C. alpina	1	0	0	1	15	2.5	9	10.1	0	5	1	0	3	0	1
C. angustissima	0	-9999	-9999	-9999	17	3	12	6.1	0	5	0	1	3	1	0
C. angustissima	0	-9999	-9999	-9999	18	1.5	27	5.7	0	5	0	1	3	1	0
C. angustissima	0	-9999	-9999	-9999	50	3	23	6.1	0	5	0	1	3	1	0
C. angustissima	0	-9999	-9999	-9999	70	3.5	15	5.8	0	5	0	1	3	1	0
C. angustissima	0	-9999	-9999	-9999	90	3	14	5.9	0	5	0	1	3	1	0
C. angustissima	0	-9999	-9999	-9999	40	12	24	6	0	5	0	1	3	1	0
C. angustissima	0	-9999	-9999	-9999	20	1.5	20	5.7	0	5	0	1	3	1	0
C. angustissima	0	-9999	-9999	-9999	30	4	33	6.5	0	5	0	1	3	1	0
C. angustissima	0	-9999	-9999	-9999	45	3	35	5.1	0	5	0	1	3	1	1
C. borbonica	0	-9999	-9999	-9999	10	1.5	16	5.2	0	5	0	1	3	1	1
C. borbonica	0	-9999	-9999	-9999	0	0.5	55	5.5	0	6	0	1	4	0	1
C. bracteosa	4	1	0	0	0	0.5	300	7.4	0	5	0	1	3	1	0
C. bracteosa	3	1	0	0	0	0.4	200	6	0	5	0	1	3	1	0
C. bracteosa	4	1	0	0	0	0.6	200	5.4	0	5	0	1	3	1	0
C. bracteosa	8	1	0	0	0	0.2	100	6.3	0	5	0	1	3	1	0
C. bracteosa	3	1	0	0	0	0.9	140	6	0	5	0	1	3	1	0
C. bracteosa	4	1	0	0	12	1	150	5.9	0	5	0	1	3	1	0

Species	Characters/character states														
	27	28	28	28	29	30	31	34	35	38	39	39	40	41	41
C. bracteosa	7	1	0	0	0	0.5	200	5.3	0	5	0	1	3	1	0
C. capitellata	3	1	0	0	10	0.5	100	6.8	0	5	0	1	3	1	0
C. capitellata	2	1	0	0	0	1	130	6.3	0	5	0	1	3	1	0
C. capitellata	3	1	0	0	0	0.5	120	6	0	5	0	1	3	1	0
C. capitellata	5	1	0	0	0	0.2	300	5.7	0	5	0	1	3	1	1
C. capitellata	5	1	0	0	15	0.5	130	6	0	5	0	1	3	1	1
C. capitellata	3	1	0	0	0	0.3	110	6.7	0	5	0	1	3	1	0
C. capitellata	4	1	0	0	9	1	110	6.6	0	5	0	1	3	1	0
C. capitellata	3	1	0	0	0	0.2	150	6.2	0	5	0	1	3	1	0
C. capitellata	2	1	0	0	0	1.3	60	5.8	0	5	0	1	3	1	0
C. capitellata	2	1	0	0	0	0.7	50	6.4	0	4	0	1	2	1	0
C. capitellata	3	1	0	0	0	1	100	5	0	5	0	1	3	1	0
C. cf. *bracteosa*	0	0	1	0	0	2	60	6.1	0	5	0	1	3	1	0
C. cf. *bracteosa*	0	0	1	0	0	1	25	6.5	0	5	0	1	3	1	0
C. cf. *bracteosa*	0	0	1	0	0	0.5	18	8	0	5	0	1	3	1	0
C. cf. *bracteosa*	0	0	1	0	2.5	2	100	7.5	0	6	0	1	4	1	0
C. cf. *bracteosa*	2	0	1	0	3.5	3	80	7	0	5	0	1	3	1	0
C. cf. *bracteosa*	2	0	1	0	0	2	40	7	0	5	0	1	3	1	0
C. cf. *nitens*	3	0	1	0	3	0.5	130	5.5	0	5	0	1	3	0	1
C. cf. *nitens*	3	0	1	0	10	1	38	5.3	0	5	0	1	3	1	0
C. cf. *nitens*	4	0	1	0	0	0.7	100	5.1	0	5	0	1	3	0	1
C. cf. *nitens*	5	0	1	0	0	0.6	300	5.1	0	5	0	1	3	1	0
C. curvata	1	0	1	1	12	1.5	14	9.9	0	5	1	0	3	0	1
C. curvata	1	0	1	1	8	2	15	10	0	5	1	0	3	0	1
C. curvata	2	0	1	1	10	3	21	10.3	0	5	1	0	3	0	1
C. curvata	1	0	1	1	23	6	15	10	0	5	1	0	3	0	1
C. curvata	1	0	1	1	10	3.5	34	10.5	0	5	1	0	3	0	1
C. curvata	1	0	1	1	39	2	30	10.5	0	6	1	0	4	0	1
C. curvata	1	0	1	1	30	2	15	11	0	6	1	0	4	0	1
C. curvata	1	0	1	1	12	2	23	8.5	0	5	1	0	3	0	1
C. curvata	1	0	1	1	20	3	20	11	0	5	1	0	3	0	1
C. curvata	1	0	1	1	20	2	20	9.5	0	6	1	0	4	0	1
C. curvata	1	0	1	1	15	2	28	9	0	5	1	0	3	0	1
C. discolor	2	1	0	0	0	1	40	10.1	1	6	-9999	-9999	4	1	0
C. eminii	0	-9999	-9999	-9999	7	2	60	7	0	4	0	1	3	1	0
C. eminii	0	-9999	-9999	-9999	25	2	27	5.9	0	4	0	1	3	1	0
C. eminii	0	-9999	-9999	-9999	5	2.5	75	7.7	0	5	0	1	3	0	1
C. eminii	0	-9999	-9999	-9999	5	2	74	8	0	4	0	1	3	1	0
C. eminii	0	-9999	-9999	-9999	6	2	130	6.6	0	4	0	1	3	1	0
C. eminii	0	-9999	-9999	-9999	7	3	120	8	0	4	0	1	3	1	0
C. eminii	0	-9999	-9999	-9999	10	2.5	40	8	0	4	0	1	3	1	0
C. eminii	0	-9999	-9999	-9999	10	2	100	7.6	0	4	0	1	3	1	0
C. filifolia	1	0	0	1	0	2	25	10	0	5	0	1	3	1	0
C. filifolia	1	0	0	1	0	1.3	18	10	0	5	0	1	3	1	0
C. filifolia	1	0	0	1	4	1	15	8.5	0	5	0	1	3	1	0
C. filifolia	1	0	0	1	1	1.5	10	9	0	4	0	1	2	1	0
C. filifolia	1	0	0	1	0	1.8	9	8.2	0	5	0	1	3	1	0
C. filifolia	2	0	0	1	0	1.5	14	9	0	5	0	1	3	1	0
C. filifolia	1	0	0	1	0	1.5	18	9.5	0	5	0	1	3	1	0
C. filifolia	1	0	0	1	3.7	1	19	8.5	0	4	0	1	2	1	0
C. filifolia	1	0	0	1	2	1	21	9	0	5	0	1	3	1	0
C. glomerata	55	1	0	0	0	0.2	2500	7.7	0	6	0	1	3	0	1
C. glomerata	21	1	0	0	3.5	0.5	500	9	0	6	0	1	3	0	1
C. glomerata	45	1	0	0	0	0.5	800	8	0	6	0	1	3	0	1
C. glomerata	11	1	0	0	0	0.1	1000	8.5	0	6	0	1	3	0	1

Species	Characters/character states														
	27	28	28	28	29	30	31	34	35	38	39	39	40	41	41
C. glomerata	28	1	0	0	0	0.3	1500	8	0	6	0	1	3	0	1
C. glomerata	25	1	0	0	0	0.1	1000	6.2	0	6	0	1	3	0	1
C. glomerata	48	1	0	0	0	0.1	3000	8	0	6	0	1	3	0	1
C. glomerata	50	1	0	0	0	0.5	1400	0.8	0	6	0	1	3	0	1
C. nitens	0	-9999	-9999	-9999	5	1	125	6.6	0	7	0	1	4	0	1
C. nitens	0	-9999	-9999	-9999	13	1.5	120	6	0	6	0	1	4	1	0
C. nitens	0	-9999	-9999	-9999	2	1	100	6.5	0	5	0	1	3	1	1
C. nivicola	1	0	0	1	6	1	10	16	0	5	1	0	3	0	1
C. nivicola	1	0	0	1	6	2	10	19	0	6	1	0	4	0	1
C. nivicola	1	0	0	1	4	2.5	9	14.5	0	5	1	0	3	0	1
C. nivicola	1	0	0	1	6.5	2.5	14	18	0	5	1	0	3	0	1
C. nivicola	1	0	0	1	10	2.5	13	15	0	5	1	0	3	0	1
C. nivicola	1	0	0	1	5	2.5	25	15	0	5	1	0	3	0	1
C. nivicola	1	0	0	1	10	1.5	16	17	0	5	1	0	3	0	1
C. nivicola	1	0	0	1	10	2.5	15	18	0	6	1	0	4	0	1
C. nivicola	1	0	0	1	3	1.5	11	16	0	5	1	0	3	0	1
C. nivicola	1	0	0	1	25	1.5	13	15.5	0	6	1	0	4	0	1
C. nivicola	1	0	0	1	11	2	9	13.5	0	5	1	0	3	0	1
C. nivicola	1	0	0	1	10	3	23	14	0	5	1	0	3	0	1
C. nivicola	1	0	0	1	5	2	16	15.5	0	5	1	0	3	0	1
C. perrieri	2	1	0	0	0	0.8	30	8	0	5	0	1	3	1	0
C. perrieri	3	1	0	0	0	0	50	7.3	0	5	0	1	3	1	0
C. perrieri	3	1	0	0	0	0.7	300	6.5	0	5	0	1	3	1	1
C. perrieri	3	1	0	0	0	0.2	110	6.9	0	5	0	1	3	1	0
C. perrieri	3	1	0	0	0	0.5	200	7.2	0	5	0	1	3	1	1
C. perrieri	3	1	0	0	0	0.4	80	6	0	5	0	1	3	1	0
C. rodwayi	1	0	0	1	10	1.5	5	11.3	0	5	1	0	3	0	1
C. rodwayi	1	0	0	1	18	3	4	11.5	0	5	1	0	3	0	1
C. rodwayi	1	0	0	1	8	3	5	10.5	0	5	1	0	3	0	1
C. rodwayi	0	-9999	-9999	-9999	14	3	4	10.5	0	5	1	0	3	0	1
C. rodwayi	1	0	0	1	1.4	1.5	9	10.5	0	5	1	0	3	0	1
C. rodwayi	1	0	0	1	10	2.3	4	11	0	5	1	0	3	0	1
C. schlechteri	9	1	0	0	0	0.7	400	4.5	0	5	0	1	3	1	0
C. schlechteri	20	1	0	0	0	0.5	500	4.9	0	6	0	1	4	1	0
C. schlechteri	11	1	0	0	0	0.7	120	4.6	0	7	0	1	4	0	1
C. schlechteri	10	1	0	0	0	0.5	300	7.5	0	6	0	1	3	0	1
C. schlechteri	13	1	0	0	0	0.4	400	5	0	5	0	1	3	1	0
C. schlechteri	6	1	0	0	0	0.2	250	4	0	5	0	1	3	1	0
C. schlechteri	10	1	0	0	5	1.3	240	4.3	0	5	0	1	3	1	0
C. schoenoides	0	-9999	-9999	-9999	20	3	9	8.8	0	6	1	0	3	0	1
C. schoenoides	0	-9999	-9999	-9999	15	3	6	9	0	5	1	0	3	1	0
C. schoenoides	0	-9999	-9999	-9999	40	1	6	9	0	6	1	0	3	0	1
C. schoenoides	1	0	0	1	11	4	5	9.7	0	6	1	0	3	0	1
C. schoenoides	0	-9999	-9999	-9999	40	3.5	5	9.5	0	5	1	0	3	1	0
C. schoenoides	0	-9999	-9999	-9999	15	6	6	9	0	5	1	0	3	1	0
C. schoenoides	1	0	0	1	6	3	4	9.5	0	5	1	0	3	1	0
C. schoenoides	0	-9999	-9999	-9999	30	3	5	10	0	6	1	0	3	0	1
C. schoenoides	1	0	0	1	25	2	4	9.5	0	6	1	0	3	0	1
C. schoenoides	1	0	0	1	19	2	7	8.2	0	6	1	0	3	0	1
C. ulugurensis	6	0	1	0	0	1	300	5.7	0	5	0	1	3	1	0
C. ulugurensis	5	1	1	0	0	0.5	300	6	0	5	0	1	3	1	0
C. ulugurensis	6	0	1	0	0	1	300	6	0	5	0	1	3	1	0

Species	Characters/character states														
	42	43	44	45	48	49	52	53	57	59	62	62	63	64	74
C. alpina	8	1.5	-9999	-9999	0	0	0	1	0	8.6	1	0	1.1	1.8	2.5
C. alpina	8.5	1.1	-9999	-9999	0	0	0	1	0	9.5	1	0	1	1.2	2.6
C. alpina	9	1.2	-9999	-9999	0	0	0	1	0	9.3	1	0	1	1.5	2.2
C. alpina	8.6	1.8	-9999	-9999	0	0	0	1	0	9.4	1	0	1.5	1.5	1.7
C. alpina	10.5	1.8	-9999	-9999	0	0	0	1	0	11.8	1	0	1.2	1.8	-9999
C. alpina	8.3	1.2	-9999	-9999	0	0	0	1	0	9.1	1	0	1.2	1.6	2.6
C. alpina	9.1	1.5	-9999	-9999	0	0	0	1	0	9.3	1	0	1.5	1.3	-9999
C. alpina	7.5	2	-9999	-9999	0	0	0	1	0	7.8	1	0	2	1.1	2.2
C. alpina	9	1.5	-9999	-9999	0	0	0	1	0	9.5	1	0	1.2	1.5	-9999
C. alpina	8.3	1.7	-9999	-9999	0	0	0	1	0	8.7	1	0	1.5	1.7	-9999
C. alpina	8.3	1	-9999	-9999	0	0	0	1	0	8.2	1	0	1.6	1.5	2.5
C. alpina	9.5	1.5	-9999	-9999	0	0	0	1	0	9.5	1	0	2	1.2	2.2
C. alpina	8.2	1.5	-9999	-9999	0	0	0	1	0	7.7	1	0	1.5	1.1	-9999
C. alpina	8	1.3	-9999	-9999	0	0	0	1	0	8	1	0	1	2.2	-9999
C. alpina	9.5	1.6	-9999	-9999	0	0	0	1	0	10.3	1	0	1.3	1.8	2.1
C. alpina	8.6	1.6	-9999	-9999	0	0	0	1	0	9	1	0	1.6	1.2	2.1
C. alpina	8.3	1.6	-9999	-9999	0	0	0	1	0	9.8	1	0	1.2	2	-9999
C. alpina	7	1	-9999	-9999	0	0	0	1	0	8.8	1	0	0.8	1.5	2.1
C. alpina	9.9	1.8	-9999	-9999	0	0	0	1	0	10.8	1	0	1	1.3	-9999
C. alpina	9.1	1.6	-9999	-9999	0	0	0	1	0	8.3	1	0	1	1	-9999
C. alpina	9.5	1.2	-9999	-9999	0	0	0	1.5	0	9.5	1	0	2	1.2	-9999
C. alpina	8.3	1.5	-9999	-9999	0	0	0	1	0	7.8	1	0	1.7	1.3	2.2
C. alpina	8	1.4	-9999	-9999	0	0	0	1	0	8.1	1	0	1	0.9	2.1
C. alpina	10	2	-9999	-9999	0	0	0	1	0	9.6	1	0	2	1.2	2.9
C. alpina	9.3	1.5	-9999	-9999	0	0	0	1	0	9	1	0	2	1.4	-9999
C. alpina	8.6	1.5	-9999	-9999	0	0	0	1	0	8.8	1	0	2	1.5	2.3
C. alpina	10.2	2	-9999	-9999	0	0	0	1	0	9.5	1	0	2.5	1	-9999
C. alpina	7.3	1.7	-9999	-9999	0	0	0	1	0	7.5	1	0	1.2	1	2.1
C. alpina	9	1.8	-9999	-9999	0	0	0	1	0	8.5	1	0	1.5	1.2	-9999
C. alpina	8.6	1.4	-9999	-9999	0	0	0	1	0	8.5	1	0	1.5	1.1	2.4
C. alpina	9.3	1.7	-9999	-9999	0	0	0	1	0	10	1	0	1.5	1.5	2.5
C. alpina	8.2	1.7	-9999	-9999	0	0	0	1	0	7.7	1	0	2	1.5	1.1
C. alpina	9.5	2	-9999	-9999	0	0	0	1	0	10.2	1	0	2	1.9	2.5
C. alpina	8.8	1.8	-9999	-9999	0	0	0	1	0	8.9	1	0	1.4	1.5	2.3
C. alpina	8.7	1.8	-9999	-9999	0	0	0	1	0	8.7	1	0	1.7	1.1	-9999
C. alpina	10.1	2	-9999	-9999	0	0	0	1	0	11.5	1	0	1.7	1	2.5
C. alpina	8.8	1.6	-9999	-9999	0	0	0	1	0	8.2	1	0	1.1	0.8	-9999
C. alpina	9.3	1.6	-9999	-9999	0	0	0	1	0	10	1	0	1.5	1	2.7
C. alpina	9.9	2.1	-9999	-9999	0	0	0	1	0	10.5	1	0	1.6	1.3	-9999
C. angustissima	5.4	1.7	3	0.6	1	1	0	2	1	1.8	0	1	-9999	-9999	1.6
C. angustissima	5.2	1.8	3.5	1	1	1	0	2	1	4	0	1	-9999	-9999	2.2
C. angustissima	5.1	1.5	4.7	1.3	1	1	0	2	1	3	0	1	-9999	-9999	2
C. angustissima	5.2	1.8	4.3	1	1	1	0	2	1	3.2	0	1	-9999	-9999	1.5
C. angustissima	5.2	1.9	4.4	1.1	1	1	0	2	1	3.5	0	1	-9999	-9999	1.6
C. angustissima	5.5	1.7	4.4	0.8	1	1	0	2	1	2.6	0	1	-9999	-9999	1.5
C. angustissima	5.3	1.2	3.6	1	1	1	0	2	1	3.5	0	1	-9999	-9999	1.8
C. angustissima	5.5	2	5	1.4	1	1	0	2	1	3	0	1	-9999	-9999	1.6
C. angustissima	4.6	1.1	1.8	0.5	1	1	0	1.5	1	4.1	0	1	-9999	-9999	2.3
C. borbonica	4.8	1.5	4.5	1	1	1	0	1.5	1	1.8	0	1	-9999	-9999	-9999
C. borbonica	4.6	1.3	-9999	-9999	1	1	0	1	1	2.5	0	1	-9999	-9999	1.5
C. bracteosa	6.2	2.5	6.5	2.3	1	1	0	2	1	3.4	0	1	-9999	-9999	2.7
C. bracteosa	5.5	2.2	4.8	1.3	1	1	0	2	1	2.6	0	1	-9999	-9999	2
C. bracteosa	4.5	2	4.2	1.2	1	1	0	2	1	2.6	0	1	-9999	-9999	2.3
C. bracteosa	5.5	1.5	5.5	1	1	1	0	2	1	2.7	0	1	-9999	-9999	2.2
C. bracteosa	5.5	1.8	5.2	1.5	1	1	0	2	1	2.7	0	1	-9999	-9999	2.6
C. bracteosa	5.5	2	5.5	2	1	1	0	2	1	3.5	0	1	-9999	-9999	2.5

Species	Characters/character states														
	42	43	44	45	48	49	52	53	57	59	62	62	63	64	74
C. bracteosa	5	2	4.5	1	1	1	0	2	1	1.7	0	1			2.9
C. capitellata	5.5	2.1	5.5	1.5	1	1	0	2	1	2.9	0	1	-9999	-9999	2.4
C. capitellata	6	2	5.3	1.2	1	1	0	2	1	3	0	1	-9999	-9999	2.5
C. capitellata	5.4	2	5	1.2	1	1	0	2	1	2.3	0	1	-9999	-9999	2.7
C. capitellata	5.4	1.8	5.3	1.1	1	1	0	1.5	1	1.8	0	1	-9999	-9999	2.3
C. capitellata	5.7	1.5	5	1.2	1	1	0	1.5	1	1.5	0	1	-9999	-9999	2.5
C. capitellata	6	1.6	5.9	1.5	1	1	0	2	1	2.2	0	1	-9999	-9999	2.8
C. capitellata	5.8	1.8	5	1	1	1	0	2	1	2.4	0	1	-9999	-9999	2.2
C. capitellata	5.6	2	4.4	1	1	1	0	2	1	2.8	0	1	-9999	-9999	2.7
C. capitellata	5.3	1.6	4.7	1.2	1	1	0	2	1	3.1	0	1	-9999	-9999	2.2
C. capitellata	5.9	2	5.4	1.5	1	1	0	2	1	3.1	0	1	-9999	-9999	2.8
C. capitellata	4.4	1.7	4.2	1.5	1	1	0	2	1	2.1	0	1	-9999	-9999	2.3
C. cf. *bracteosa*	5	1.8	5	1.7	1	1	0	2	1	3	0	1	-9999	-9999	2
C. cf. *bracteosa*	6.2	1.9	4.7	0.9	1	1	0	2	1	3.1	0	1	-9999	-9999	2.5
C. cf. *bracteosa*	6.6	2	5.5	1.8	1	1	0	2	1	3.7	0	1	-9999	-9999	2.7
C. cf. *bracteosa*	6.7	2	5.7	1.6	1	1	0	2	1	3.2	0	1	-9999	-9999	2.3
C. cf. *bracteosa*	6.1	2	5.3	1.2	1	1	0	2	1	3.5	0	1	-9999	-9999	2.2
C. cf. *bracteosa*	6.5	2	6	1.5	1	1	0	2	1	3	0	1	-9999	-9999	2.2
C. cf. *nitens*	5	1	-9999	-9999	1	1	0	1	1	4.3	0	1	-9999	-9999	1.4
C. cf. *nitens*	4.8	1.5	3.2	0.6	1	1	0	2	1	3.5	0	1	-9999	-9999	1.9
C. cf. *nitens*	4.5	1.2	-9999	-9999	1	1	0	1	1	3.5	0	1	-9999	-9999	1.7
C. cf. *nitens*	4.3	1.2	-9999	-9999	1	1	0	1	1	4.2	0	1	-9999	-9999	1.4
C. curvata	9.2	1.4	-9999	-9999	0	0	0	1	0	8.5	1	0	0.6	1.7	-9999
C. curvata	9.5	1.5	-9999	-9999	0	0	0	1	0	8.9	1	0	0.7	2	3.6
C. curvata	8.4	1.9	-9999	-9999	0	0	0	1	0	9.1	1	0	0.6	1.6	-9999
C. curvata	8.5	1.6	-9999	-9999	0	0	0	1	0	7.8	1	0	0.6	1.7	2.8
C. curvata	10.1	1.8	-9999	-9999	0	0	0	1	0	10.5	1	0	0.7	2.6	4.2
C. curvata	9.8	1.3	-9999	-9999	0	0	0	1	0	9.2	1	0	0.7	2.5	4.3
C. curvata	9.5	2	-9999	-9999	0	0	0	1	0	9	1	0	0.6	2	2.8
C. curvata	7.9	1.7	-9999	-9999	0	0	0	1	0	7.8	1	0	0.5	1.6	4.1
C. curvata	10.1	2	-9999	-9999	0	0	0	1	0	9.1	1	0	0.5	2.5	4.3
C. curvata	8.5	2	-9999	-9999	0	0	0	1	0	9.5	1	0	1	2.5	3.2
C. curvata	8.2	1.5	-9999	-9999	0	0	0	1	0	9.5	1	0	0.9	2.3	2.3
C. discolor	9.6	1.7	9	1.2	0	0	0	2	1	10.5	1	0	0.4	5.5	3.7
C. eminii	6.5	1.5	-9999	-9999	0	0	0	1	1	6	0	1	-9999	-9999	3.8
C. eminii	5.5	1	-9999	-9999	0	0	0	1	1	5	0	1	-9999	-9999	1.4
C. eminii	7.2	1.5	-9999	-9999	0	0	0	1	1	3.2	0	1	-9999	-9999	4
C. eminii	7	1.4	-9999	-9999	0	0	0	1	1	5.5	0	1	-9999	-9999	3.5
C. eminii	6	1.5	-9999	-9999	0	0	0	1	1	4.6	0	1	-9999	-9999	3.7
C. eminii	7.5	1.1	-9999	-9999	0	0	0	1	1	5.4	0	1	-9999	-9999	3.5
C. eminii	7.5	1.4	-9999	-9999	0	0	0	1	1	6.7	0	1	-9999	-9999	4
C. eminii	7	1.2	-9999	-9999	0	0	0	1	1	5	0	1	-9999	-9999	3.5
C. filifolia	9	2.4	8	1.2	1	1	0	2	1	7.8	0	1	-9999	-9999	4
C. filifolia	9.5	2	7.1	1.1	1	1	0	2	1	4.9	0	1	-9999	-9999	4
C. filifolia	7.7	1.9	6.5	1.1	1	1	0	2	1	4.1	0	1	-9999	-9999	3.5
C. filifolia	7.9	2.1	6.5	1.2	1	1	0	2	1	4.5	0	1	-9999	-9999	2.9
C. filifolia	7.2	1.4	4.3	1	1	1	0	2	1	3	0	1	-9999	-9999	2.8
C. filifolia	8	2	6.5	1.1	1	1	0	2	1	4	0	1	-9999	-9999	-9999
C. filifolia	8.3	2	7.2	1.3	1	1	0	2	1	5.5	0	1	-9999	-9999	3.3
C. filifolia	7.7	2	6.7	1.3	1	1	0	2	1	4.4	0	1	-9999	-9999	2.7
C. filifolia	8.6	2.2	7	1	1	1	0	2	1	6.5	0	1	-9999	-9999	-9999
C. glomerata	6.2	2	6	1.5	1	1	0	2	0	3.8	0	1	-9999	-9999	3.1
C. glomerata	6.5	1.8	6.5	1.5	1	1	0	2	0	3.6	0	1	-9999	-9999	2.4
C. glomerata	6	2.8	6	2	1	1	0	2	0	3.3	0	1	-9999	-9999	3.6
C. glomerata	7.3	2	7	1.6	1	1	0	2	1	3.2	0	1	-9999	-9999	3

Species	Characters/character states														
	42	43	44	45	48	49	52	53	57	59	62	62	63	64	74
C. glomerata	6.2	2	7	2	1	1	0	2	0	3.7	0	1	-9999	-9999	2.7
C. glomerata	5.8	2.5	5.8	1.8	1	1	0	2	1	3.3	0	1	-9999	-9999	3
C. glomerata	6.8	2	6	1.5	1	1	0	2	1	3.1	0	1	-9999	-9999	3
C. glomerata	7.5	2.1	5.8	1.5	1	1	0	2	1	3.4	0	1	-9999	-9999	4
C. nitens	5.4	2	5.1	1.2	1	1	0	2	1	2.5	0	1	-9999	-9999	1.5
C. nitens	5	2	4.5	1.3	1	1	0	2	1	3.2	0	1	-9999	-9999	1.7
C. nitens	5	1.4	5	1	1	1	0	1.5	1	3	0	1	-9999	-9999	1.5
C. nivicola	15	2.4	-9999	-9999	0	0	0	1	0	14.5	1	0	1.6	1.7	3
C. nivicola	17	2.6	-9999	-9999	0	0	0	1	0	16.5	1	0	1.2	1.7	-9999
C. nivicola	13.7	3	-9999	-9999	0	0	0	1	0	14	1	0	1.7	1.5	3.4
C. nivicola	16.2	2.5	-9999	-9999	0	0	0	1	0	15.5	1	0	1.6	1.6	3.3
C. nivicola	13.6	3.1	-9999	-9999	0	0	0	1	0	14.1	1	0	1.7	0.8	-9999
C. nivicola	14	2.2	-9999	-9999	0	0	0	1	0	1.6	1	0	2.1	1.5	-9999
C. nivicola	16	2.1	-9999	-9999	0	0	0	1	0	15	1	0	1.5	2.3	4
C. nivicola	1.6	3	-9999	-9999	0	0	0	1	0	14	1	0	1.5	1	2.6
C. nivicola	15	2	-9999	-9999	0	0	0	1	0	13	1	0	1	1	-9999
C. nivicola	13.5	2.5	-9999	-9999	0	0	0	1	0	14	1	0	1.5	2.5	2.7
C. nivicola	12.7	2	-9999	-9999	0	0	0	1	0	14	1	0	1.6	2.1	-9999
C. nivicola	12.5	2	-9999	-9999	0	0	0	1	0	15	1	0	2	1.7	3.6
C. nivicola	13.5	2.8	-9999	-9999	0	0	0	1	0	13.8	1	0	1.6	1.2	-9999
C. perrieri	6.7	2.2	6.5	1.5	1	1	0	2	1	2.7	0	1	-9999	-9999	2.5
C. perrieri	6.8	2	6.3	1.5	1	1	0	2	1	2.6	0	1	-9999	-9999	3
C. perrieri	5.9	1.4	5.1	1.2	1	1	0	1.5	1	2	0	1	-9999	-9999	2.6
C. perrieri	6.5	2.3	5.6	1.7	1	1	0	2	1	3.5	0	1	-9999	-9999	3
C. perrieri	6.5	2	5.6	1.1	1	1	0	1.5	1	3	0	1	-9999	-9999	2
C. perrieri	5.6	2	4.5	1	1	1	0	2	1	3.2	0	1	-9999	-9999	2.8
C. rodwayi	10.8	1.1	-9999	-9999	0	0	0	1	0	13	1	0	1.5	1.8	-9999
C. rodwayi	10.5	1.9	-9999	-9999	0	0	0	1	0	10.7	1	0	1.7	2.5	3.2
C. rodwayi	9	1	-9999	-9999	0	0	0	1	0	9.8	1	0	1	2.4	3.3
C. rodwayi	9.6	1.5	-9999	-9999	0	0	0	1	0	10.5	1	0	0.9	2.7	2.9
C. rodwayi	9.8	1.3	-9999	-9999	0	0	0	1	0	10.5	1	0	1.1	2.6	2.9
C. rodwayi	10.5	1.3	-9999	-9999	0	0	0	1	0	11	1	0	1.5	1.5	-9999
C. schlechteri	3.8	1.8	3.8	1.5	0	0	1	2	1	2.4	0	1	-9999	-9999	1.3
C. schlechteri	3.6	1.8	4.3	1.5	0	0	1	2	1	3	0	1	-9999	-9999	1.8
C. schlechteri	4	1.5	4	1.5	0	0	1	2	0	2.6	0	1	-9999	-9999	-9999
C. schlechteri	6.8	2	5.5	1.8	1	1	0	2	0	3.6	0	1	-9999	-9999	-9999
C. schlechteri	4.2	1.2	4	0.5	0	0	1	2	0	2.8	0	1	-9999	-9999	2.5
C. schlechteri	3.5	1.5	3.3	1	0	0	1	2	1	2.3	0	1	-9999	-9999	-9999
C. schlechteri	3.7	1.8	3.4	1.4	0	1	1	2	1	3.2	0	1	-9999	-9999	1.7
C. schoenoides	7.3	1.8	7.5	1	0	0	0	2	0	9	1	0	0.7	2	3.1
C. schoenoides	8	2.4	7.1	1.2	0	0	0	2	0	7	1	0	0.8	2	-9999
C. schoenoides	7.7	2.1	6.6	1.3	0	1	0	2	0	6.5	1	0	0.8	1.5	2.3
C. schoenoides	8.3	2.2	7.1	1	0	0	0	2	0	9	1	0	1	1.5	-9999
C. schoenoides	8.5	2	6.8	1	0	0	0	2	0	7.5	1	0	0.7	1	-9999
C. schoenoides	8.3	2.3	7.5	1	0	0	0	2	0	8.2	1	0	0.7	1.5	-9999
C. schoenoides	8	1.7	7	1	0	0	0	2	0	8.5	1	0	0.8	1.5	-9999
C. schoenoides	7.7	2.2	5.7	1	0	0	0	2	0	7.5	1	0	0.8	1.5	-9999
C. schoenoides	8.5	2	7.8	1	0	0	0	2	0	9.8	1	0	1	1.6	1.4
C. schoenoides	7.5	2	6.5	0.9	0	0	0	2	0	8	1	0	0.8	2.5	2.1
C. ulugurensis	5.2	1.5	4.3	1	1	1	0	2	1	2.4	0	1	-9999	-9999	2
C. ulugurensis	5	1.8	4.1	1.1	1	1	0	2	1	2.8	0	1	-9999	-9999	1.7
C. ulugurensis	5.1	1.8	4.7	1.3	1	1	0	2	1	2.8	0	1	-9999	-9999	1.5

Species	Characters/character states										
	75	76	77	80	81	82	88	90	91	92	94
C. alpina	0.05	0.1	3	3.1	0.3	1	0	1	2.7	1	0.5
C. alpina	0.1	0.1	3	3.5	0.3	1	0	1	3.1	1.1	0.5
C. alpina	0.1	0.1	3	5	0.4	1	0	1	3	1	0.5
C. alpina	0.15	0.1	3	4.3	0.2	1	0	1	3	1	0.3
C. alpina	-9999	-9999	3	5	0.3	1	0	1	3.3	0.8	0.5
C. alpina	0.1	0.1	3	3.2	0.2	1	0	1	2.8	0.9	0.6
C. alpina	-9999	-9999	3	3.1	0.3	1	0	1	3.5	1	0.3
C. alpina	0.1	0.1	3	3.6	0.2	1	0	1	2.5	0.9	0.5
C. alpina	-9999	-9999	3	3.6	0.2	1	0	1	2.8	1.1	0.5
C. alpina	-9999	-9999	3	2.8	0.3	1	0	1	2.6	0.8	0.5
C. alpina	0.1	0.05	3	4.5	0.2	1	0	1	2.7	0.9	0.5
C. alpina	0.05	0.05	3	4	0.3	1	0	1	3	1	0.5
C. alpina	-9999	-9999	3	3	0.3	1	0	1	2.3	0.9	0.5
C. alpina	-9999	-9999	3	3	0.2	1	0	1	3	1	0.4
C. alpina	0.1	0.1	3	3	0.3	1	0	1	3	1	0.4
C. alpina	0.1	0.1	3	4.6	0.3	1	0	1	2.7	0.8	0.5
C. alpina	-9999	-9999	3	4.7	0.3	1	0	1	3	1	0.5
C. alpina	0.1	0.05	3	2.8	0.15	1	0	1	2.2	0.5	0.4
C. alpina	-9999	-9999	3	5.5	0.35	1	0	1	3	0.8	0.5
C. alpina	-9999	-9999	3	3.4	0.3	1	0	1	3.4	0.9	0.5
C. alpina	-9999	-9999	3	5	0.3	1.5	0	1	3.2	1	0.5
C. alpina	0.15	0.1	3	3.3	0.3	1	0	1	2.7	1.1	0.5
C. alpina	0.1	0.1	3	3.9	0.2	1	0	1	2.7	0.8	0.5
C. alpina	0.15	0.1	3	3.5	0.2	1	0	1	3.1	1.1	0.6
C. alpina	-9999	-9999	3	3.6	0.3	1	0	1	3.1	1	0.6
C. alpina	0.1	0.05	3	5	0.2	1	0	1	2.9	0.9	0.4
C. alpina	-9999	-9999	3	4.1	0.3	1	0	1	3	1	0.6
C. alpina	0.15	0.1	3	3.1	0.3	1	0	1	2.8	0.9	0.5
C. alpina	-9999	-9999	3	4	0.3	1	0	1	2.9	0.9	0.5
C. alpina	0.05	0.05	3	3	0.2	1	0	1	2.7	0.9	0.5
C. alpina	0	0	3	4	0.4	1	0	1	3.1	0.9	0.4
C. alpina	0.3	0.1	3	3	0.3	1	0	1	2.5	0.9	0.6
C. alpina	0.05	0.1	3	4.4	0.3	1	0	1	3.4	0.9	0.5
C. alpina	0.1	0.1	3	3.3	0.25	1	0	1	3.3	0.9	0.4
C. alpina	-9999	-9999	3	4.8	0.3	1	0	1	3	1	0.4
C. alpina	0.1	0.1	3	4	0.2	1	0	1	3.2	0.9	0.4
C. alpina	-9999	-9999	3	3.9	0.3	1	0	1	3.2	1.2	0.6
C. alpina	0.2	0.1	3	4.2	0.3	1	0	1	3.4	1	0.6
C. alpina	-9999	-9999	3	3.9	0.3	1	0	1	3.4	1	0.6
C. angustissima	0.15	0.15	3	0.8	0.3	2	1	1	2.8	1	0
C. angustissima	0.15	0.15	3	0.9	0.3	2	1	1	2.6	1.1	0
C. angustissima	0.1	0.1	3	0.9	0.2	2	1	1	2.9	0.9	0
C. angustissima	0.1	0.1	3	0.7	0.2	2	1	1	2.6	0.9	0
C. angustissima	0.05	0.1	3	1	0.15	2	1	1	2.8	0.9	0
C. angustissima	0.03	0.05	3	0.9	0.15	2	1	1	2.6	0.9	0
C. angustissima	0.05	0.1	3	1	0.3	2	1	1	2.9	0.9	0
C. angustissima	0.05	0.1	3	0.9	0.2	2	1	1	2.8	0.8	0
C. angustissima	0.1	0.1	3	1.1	0.2	1.5	1	1	2.7	1	0
C. borbonica	-9999	-9999	3	0.6	0.15	1.5	1	0	1.9	0.8	0
C. borbonica	0.1	0.1	3	-9999	-9999	1.5	1	0	-9999	-9999	0
C. bracteosa	0.2	0.1	3	0.8	0.2	2	1	0	2.5	1.3	0
C. bracteosa	0.1	0.05	3	0.9	0.2	2	1	0	2.3	1	0
C. bracteosa	0.15	0.1	3	0.7	0.2	2	1	0	2.3	0.8	0
C. bracteosa	0.15	0.1	3	1	0.2	2	1	0	2.2	1	0
C. bracteosa	0.3	0.05	3	0.7	0.15	2	1	0	2.5	1	0
C. bracteosa	0.1	0.1	3	0.7	0.2	2	1	0	2.7	1	0

Species	Characters/character states										
	75	76	77	80	81	82	88	90	91	92	94
C. bracteosa	0.2	0.15	3	0.5	0.15	2	1	0	2.6	1.1	0
C. capitellata	0.1	0.1	3	0.7	0.2	2	1	0	2.7	1.4	0
C. capitellata	0.15	0.1	3	0.5	0.2	2	1	0	2.2	1.2	0
C. capitellata	0.15	0.1	3	-9999	-9999	2	1	0	-9999	-9999	0
C. capitellata	0.1	0.1	3	0.3	0.2	1.5	1	0	2.1	1.1	0
C. capitellata	0.1	0.1	3	0.5	0.2	1.5	1	0	2.2	1.1	0
C. capitellata	0.1	0.1	3	0.4	0.2	2	1	0	2.5	1.3	0
C. capitellata	0.07	0.07	3	0.3	0.2	2	1	0	2	0.9	0
C. capitellata	0.1	0.1	3	0.7	0.15	2	1	0	2.1	0.8	0
C. capitellata	0.1	0.1	3	0.5	0.15	2	1	0	2.3	1	0
C. capitellata	0.1	0.1	3	0.7	0.3	2	1	0	2.5	1.2	0
C. capitellata	0.1	0.1	3	0.3	0.3	2	1	0	-9999	-9999	0
C. cf. *bracteosa*	0.3	0.1	3	0.9	0.15	2	1	1	2.8	1	0
C. cf. *bracteosa*	0.1	0.1	3	-9999	-9999	2	1	1	-9999	-9999	0
C. cf. *bracteosa*	0.2	0.1	3	0.9	0.2	2	1	1	3	1.1	0
C. cf. *bracteosa*	0.2	0.1	3	1.5	0.3	2	1	1	3	1	0
C. cf. *bracteosa*	0.25	0.1	3	1.4	0.2	2	1	1	3	0.9	0
C. cf. *bracteosa*	0.2	0.1	3	1.9	0.2	2	1	1	3.5	1	0
C. cf. *nitens*	0.1	0.1	3	0.7	0.2	1	1	0	2	0.6	0
C. cf. *nitens*	0.1	0.07	3	0.3	0.2	2	1	0	2.7	1	0
C. cf. *nitens*	0.1	0.1	3	0.5	0.15	1	1	0	1.7	0.8	0
C. cf. *nitens*	0.1	0.1	3	0.6	0.2	1	1	0	2	0.9	0
C. curvata	-9999	-9999	3	3.7	0.2	1	1	1	3	0.9	0.3
C. curvata	0.1	0.1	3	3.1	0.2	1	1	1	3.5	1.1	0.3
C. curvata	-9999	-9999	3	-9999	-9999	1	1	1	-9999	-9999	-9999
C. curvata	0.1	0.1	3	-9999	-9999	1	1	1	-9999	-9999	-9999
C. curvata	0.1	0.1	3	2.7	0.2	1	1	1	3.4	1	0.4
C. curvata	0.15	0.15	3	4.2	0.2	1	1	1	3.1	1	0.4
C. curvata	0.1	0.1	3	-9999	-9999	1	1	1	-9999	-9999	-9999
C. curvata	0.15	0.1	3	2.5	0.4	1	1	1	2.8	0.9	0.5
C. curvata	0.1	0.1	3	2.8	0.2	1	1	1	3	1.2	0.3
C. curvata	0.1	0.1	3	3.5	0.3	1	1	1	3.1	0.9	0.3
C. curvata	0.1	0.1	3	2.7	0.2	1	1	1	2.8	0.8	0.5
C. discolor	0.3	0.1	3	-9999	-9999	2	-9999	-9999	-9999	-9999	0
C. eminii	0.1	0.1	3	1.8	0.2	1	1	1	2.9	0.9	0
C. eminii	0.1	0.1	3	-9999	-9999	1	1	1	-9999	-9999	0
C. eminii	0.2	0.1	3	2	0.2	1	1	1	2.8	0.8	0.2
C. eminii	0.15	0.1	3	1.3	0.15	1	1	1	3	0.9	0
C. eminii	0.2	0.1	3	1.2	0.2	1	1	1	3	0.8	0
C. eminii	0.1	0.1	3	-9999	-9999	1	1	1	-9999	-9999	-9999
C. eminii	0.15	0.1	3	2.3	0.2	1	1	1	3	0.8	0
C. eminii	0.2	0.15	3	-9999	-9999	1	1	1	-9999	-9999	0
C. filifolia	0.2	0.1	3	1.7	0.2	2	1	1	4.3	1.1	0
C. filifolia	0.15	0.1	3	1	0.2	2	1	1	3.9	1	0
C. filifolia	0.2	0.1	3	1.5	0.3	2	1	1	3.7	0.8	0.1
C. filifolia	0.1	0.1	3	0.5	0.2	2	1	1	3.5	0.8	0
C. filifolia	0.15	0.1	3	0.6	0.4	2	1	1	3.5	0.9	0
C. filifolia	-9999	-9999	3	1	0.2	2	1	1	3.5	0.8	0
C. filifolia	0.15	0.1	3	0.9	0.2	2	1	1	3.8	0.9	0
C. filifolia	0.2	0.1	3	1.2	0.2	2	1	1	3.8	0.9	0
C. filifolia	-9999	-9999	3	1	0.15	2	1	1	4.1	1	0
C. glomerata	0.2	0.07	3	0.4	0.2	2	1	0	3.2	1.1	0
C. glomerata	0.2	0.07	3	1	0.3	2	1	0	3	1	0
C. glomerata	0.2	0.07	3	0.3	0.1	2	1	0	3	1	0
C. glomerata	0.25	0.1	3	0.5	0.1	2	1	0	2.8	0.9	0

Species	Characters/character states										
	75	76	77	80	81	82	88	90	91	92	94
C. glomerata	0.3	0.1	3	0.3	0.1	2	1	0	3	0.9	0
C. glomerata	0.3	0.1	3	0.3	0.2	2	1	0	3.4	1.1	0
C. glomerata	0.25	0.07	3	0.3	0.1	2	1	0	2.6	1	0
C. glomerata	0.3	0.1	3	0.5	0.15	2	1	0	2.5	1	0
C. nitens	0.1	0.1	3	0.7	0.2	2	1	0	1.7	0.7	0
C. nitens	0.1	0.1	3	0.6	0.15	2	1	0	1.5	0.7	0
C. nitens	0.1	0.1	3	0.8	0.1	1.5	1	0	1.6	0.7	0
C. nivicola	0.1	0.1	3	6.7	0.3	1	0	1	3.7	1.2	0.6
C. nivicola	-9999	-9999	3	7.2	0.3	1	0	1	4.2	1.2	0.5
C. nivicola	0.1	0.1	3	7.7	0.3	1	0	1	3.6	1.3	0.6
C. nivicola	0.15	0.1	3	7.5	0.3	1	0	1	4	1.1	0.5
C. nivicola	-9999	-9999	3	8	0.2	1	0	1	3.5	1.3	0.6
C. nivicola	-9999	-9999	3	7.8	0.4	1	0	1	4	1	0.6
C. nivicola	0.07	0.1	3	6	0.2	1	0	1	3.5	1.1	0.5
C. nivicola	0.1	0.1	3	9.8	0.5	1	0	1	4	1.4	1
C. nivicola	-9999	-9999	3	6.7	0.3	1	0	1	3.5	1.1	0.7
C. nivicola	0.05	0.05	3	6.8	0.4	1	0	1	3.5	1.3	0.6
C. nivicola	-9999	-9999	3	6	2	1	0	1	3.5	0.9	0.6
C. nivicola	0.1	0.1	3	8.5	0.3	1	0	1	4	1.1	0.6
C. nivicola	-9999	-9999	3	6.5	0.4	1	0	1	3.5	1.1	0.6
C. perrieri	0.2	0.1	3	0.9	0.2	2	1	0	2.7	1.1	0
C. perrieri	0.1	0.05	3	0.6	0.2	2	1	0	2.3	0.8	0
C. perrieri	0.15	0.05	3	0.7	0.1	1.5	1	0	2.2	1.3	0
C. perrieri	0.1	0.15	3	0.6	0.2	2	1	0	2.4	1	0
C. perrieri	0.2	0.1	3	0.4	0.2	1.5	1	0	2.5	1	0
C. perrieri	0.1	0.1	3	0.5	0.2	2	1	0	2.5	1	0
C. rodwayi	-9999	-9999	3	3.8	0.4	1	0	1	3	0.9	0.4
C. rodwayi	0.15	0.1	3	6.3	0.2	1	0	1	3.5	2	0.5
C. rodwayi	0.15	0.1	3	4.9	0.3	1	0	1	3.1	0.9	0.5
C. rodwayi	0.4	0.15	3	3.8	0.3	1	0	1	3.1	0.9	0.5
C. rodwayi	0.1	0.1	3	5	0.3	1	0	1	3.2	1	0.3
C. rodwayi	-9999	-9999	3	4	0.2	1	0	1	3.5	0.9	0.5
C. schlechteri	0.3	0.1	3	0.2	0.15	1	1	0	2.3	1	0
C. schlechteri	0.4	0.1	3	0.5	0.1	1	1	0	2.3	0.9	0
C. schlechteri	-9999	-9999	3	0.2	0.15	1	1	0	2.2	1	0
C. schlechteri	-9999	-9999	3	0.5	0.2	2	1	0	3.1	0.9	0
C. schlechteri	0.4	0.1	3	0.5	0.1	1	1	0	2.3	0.7	0
C. schlechteri	-9999	-9999	3	0.4	0.2	1	1	0	2.4	0.9	0
C. schlechteri	0.3	0.05	3	0.5	0.2	1	1	0	2.4	0.9	0
C. schoenoides	0.1	0.1	2	5	0.2	2	1	0	3.5	0.9	0.3
C. schoenoides	-9999	-9999	2	3.5	0.2	2	1	0	3.5	0.9	0.3
C. schoenoides	0.1	0.1	3	4.5	0.2	2	1	0	3	0.8	0.3
C. schoenoides	-9999	-9999	2	3.4	0.2	2	1	0	3.5	1	0.3
C. schoenoides	-9999	-9999	3	4	0.3	2	1	0	3.3	1	0.3
C. schoenoides	-9999	-9999	3	5	0.15	2	1	0	3	0.8	0.2
C. schoenoides	-9999	-9999	2	4.8	0.2	2	1	0	3.2	0.7	0.4
C. schoenoides	-9999	-9999	2	3.2	0.2	2	1	0	3.5	0.9	0.3
C. schoenoides	0.3	0.05	3	3.7	0.2	2	1	0	3.5	0.9	0.4
C. schoenoides	0.1	0.1	2	2.5	0.18	2	1	0	3.2	0.8	0.2
C. ulugurensis	0.1	0.1	3	0.4	0.2	2	1	0	2	1.6	0
C. ulugurensis	0.1	0.1	3	0.2	0.15	2	1	0	2.2	0.7	0
C. ulugurensis	0.3	0.1	3	0.2	0.15	2	1	0	2.2	0.7	0

Appendix 4. Morphological data used in cladistic analysis of *Carpha* and its relatives (including all ingroups and outgroups; Chapter4). Character numbers are the same as those in Table 4.1. Brackets indicate polymorphisms and '?' indicates missing or inapplicable data. State numbers for qualitative characters are the same as those in Table 4.1. The quantitative characters (3, 5, 6, 17 18 22–24 27 29–31 34 38 40 42–47 53 55 59 63 64 71 74–77 80–82 91 92 94) were coded using gap weighting (Thiele 1993) using 24 ordered character states representing by ASCII 48 (0) to ASCII 74 (J), but excluding ASCII 59 (;) and ASCII 63 (?) since these are used by PAUP* as special characters. See Appendix 1 for vouchers.

Species	Characters													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Capeobolus brevicaulis	1	1	3	1	6	0	0	0	?	0	{01}	{012}	0	0
Carpha alpina	1	1	2	2	4	1	0	0	?	0	{01}	{12}	0	0
Carpha angustissima	1	1	5	2	7	0	0	0	?	0	1	2	0	0
Carpha borbonica	1	1	4	2	6	7	0	0	?	0	1	2	0	0
Carpha capitellata	1	1	5	2	5	3	0	0	?	0	1	2	0	0
Carpha cf. *bracteosa*	1	1	7	2	4	4	0	0	?	0	1	2	0	0
Carpha ulugurensis	1	1	6	{02}	<	3	0	0	?	0	1	2	0	0
Carpha curvata	1	1	3	2	7	3	0	0	?	0	1	{02}	0	0
Carpha discolor	1	1	4	2	3	0	0	0	?	0	1	0	0	0
Carpha eminii	1	1	8	2	9	4	0	0	?	0	1	2	0	0
Carpha filifolia	0	1	5	2	1	0	0	0	?	0	1	2	0	0
Carpha glomerata	1	1	C	0	A	:	0	0	?	0	1	2	0	0
Carpha nitens	1	1	5	2	7	>	0	0	?	0	1	2	0	0
Carpha nivicola	1	1	2	2	3	0	0	0	?	0	1	2	0	0
Carpha rodwayi	1	1	1	2	2	1	0	0	?	0	{01}	2	0	1
Carpha schlechteri	1	1	>	0	@	8	0	0	?	0	1	2	0	0
Carpha schoenoides	1	1	3	2	4	0	0	0	?	0	1	2	0	0
Costularia elongata	1	1	<	2	J	9	0	0	?	0	1	2	0	0
Costularia pilisepala	1	1	J	2	=	>	0	0	?	0	1	2	0	0
Costularia urvilleana	1	1	>	2	A	C	0	0	?	0	1	0	0	0
Cyathochaeta avenacea	1	1	A	2	G	4	0	1	0	0	1	2	1	0
Cyathochaeta clandestina	1	1	A	2	C	4	{01}	1	0	0	1	2	{01}	0
Cyathochaeta diandra	1	1	>	2	B	9	{01}	1	0	0	1	2	1	0
Cyathocoma hexandra	1	1	9	2	9	1	0	0	?	0	1	2	0	0
Gahnia aspera	0	1	=	2	F	1	0	1	0	0	1	2	0	0
Gahnia sieberiana	0	1	@	2	G	C	0	1	0	0	1	2	0	0
Gymnoschoenus sphaerocephalus	0	1	>	2	0	0	0	1	1	0	1	2	0	0
Mesomelaena graciliceps	0	1	5	2	0	0	0	1	0	0	1	2	0	0
Mesomelaena tetragona	1	1	9	2	0	4	0	1	0	0	1	2	0	0
Oreobolus distichus	1	1	0	{12}	0	0	0	0	?	0	0	2	0	1
Oreobolus oxycarpus	1	1	0	{12}	2	0	0	0	?	0	0	2	0	1
Oreobolus pumilio	1	1	0	{12}	0	0	0	0	?	0	0	2	0	1
Ptilothrix deusta	0	1	<	2	0	0	0	1	0	0	1	2	0	0
Schoenoides oligocephalus	1	1	0	{12}	1	0	1	0	?	0	0	2	0	1
Schoenus andinus	1	1	4	2	0	0	1	0	?	0	{01}	2	0	0
Schoenus antarcticus	1	1	7	2	2	0	1	0	?	0	1	2	0	0
Schoenus maschalinus	0	1	1	{12}	:	7	0	0	?	0	1	2	0	0
Schoenus paludosus	0	0	4	2	G	3	0	0	?	0	1	2	0	0
Schoenus rhynchosporoides	1	1	4	2	4	0	1	0	?	0	1	2	0	0
Schoenus turbinatus	0	1	4	2	0	0	0	0	?	0	1	{02}	0	0
Tetraria capillaris1	1	1	B	2	3	0	0	1	0	0	1	2	0	0
Tetraria capillaris2	1	1	8	2	3	0	1	1	0	0	1	2	0	0
Trianoptiles capensis	0	0	2	2	5	0	0	0	?	0	1	2	0	0
Trianoptiles solitaria	0	0	2	1	4	0	0	0	?	0	1	2	0	0
Trianoptiles stipitata	0	0	3	2	5	3	0	0	?	0	1	2	0	0
Tricostularia pauciflora	0	1	4	2	2	4	0	0	?	0	1	2	0	0
Tricostularia undulata	1	1	8	{02}	A	0	0	0	?	0	1	2	0	0
Rhynchospora brownii	1	1	8	2	9	6	0	0	?	0	1	2	0	0
Rhynchospora corymbosa	1	1	H	0	8	C	0	0	?	1	1	2	0	0
Scleria levis	1	1	<	0	A	J	0	0	?	1	1	2	0	0
Scleria mackaviensis	1	1	3	0	9	3	0	0	?	1	1	2	0	0

Species	Characters													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Capeobolus brevicaulis	0	2	5	4	0	1	?	7	4	1	0	1	0	?
Carpha alpina	0	2	2	1	0	1	?	2	1	2	0	1	1	3
Carpha angustissima	0	{02}	6	1	0	1	?	7	2	8	0	1	0	?
Carpha borbonica	0	2	6	1	0	1	?	3	2	2	0	0	0	?
Carpha capitellata	0	0	6	4	0	1	?	4	5	5	0	0	2	0
Carpha cf. *bracteosa*	0	{13}	:	3	0	0	1	4	7	2	0	0	0	1
Carpha ulugurensis	0	0	7	5	0	1	?	5	5	8	0	0	3	1
Carpha curvata	0	2	7	2	0	1	?	4	2	3	0	1	1	{13}
Carpha discolor	0	3	4	2	1	1	?	2	1	5	0	0	1	0
Carpha eminii	0	0	=	3	0	1	?	:	4	:	0	1	0	?
Carpha filifolia	0	{13}	7	1	0	1	?	2	3	0	0	0	1	3
Carpha glomerata	0	0	A	I	0	1	?	9	J	F	0	0	J	0
Carpha nitens	0	0	8	5	0	1	?	6	5	8	0	1	0	?
Carpha nivicola	0	2	2	3	0	1	?	2	2	1	0	1	1	3
Carpha rodwayi	0	2	1	2	0	1	?	0	2	1	0	1	1	3
Carpha schlechteri	0	0	<	8	0	1	?	6	6	A	0	0	8	0
Carpha schoenoides	0	2	3	1	0	1	?	3	1	2	0	1	0	3
Costularia elongata	0	2	:	5	0	1	?	5	4	C	0	1	0	?
Costularia pilisepala	0	0	<	:	0	1	?	8	8	H	0	1	0	?
Costularia urvilleana	0	0	9	9	0	1	?	6	7	>	0	0	0	?
Cyathochaeta avenacea	0	2	>	2	0	1	?	6	3	J	0	1	0	?
Cyathochaeta clandestina	0	3	F	4	{01}	1	?	<	3	A	1	0	0	?
Cyathochaeta diandra	0	3	9	1	{01}	1	?	5	1	B	0	1	0	?
Cyathocoma hexandra	0	2	9	4	1	1	?	7	4	8	0	{01}	2	3
Gahnia aspera	0	2	E	8	0	1	?	J	:	7	0	0	0	?
Gahnia sieberiana	0	2	A	<	0	1	?	9	5	>	0	1	0	?
Gymnoschoenus sphaerocephalus	0	2	=	3	0	0	0	0	9	0	0	0	1	2
Mesomelaena graciliceps	0	{23}	4	1	0	0	{01}	1	5	0	1	0	1	3
Mesomelaena tetragona	0	{23}	>	2	0	0	1	6	J	0	1	0	1	3
Oreobolus distichus	1	2	1	1	0	1	?	2	1	0	0	1	0	?
Oreobolus oxycarpus	0	2	1	1	0	1	?	1	1	0	0	1	0	?
Oreobolus pumilio	0	2	0	1	0	1	?	0	1	0	0	1	0	?
Ptilothrix deusta	0	3	:	2	{01}	0	{01}	2	>	0	1	0	1	3
Schoenoides oligocephalus	0	2	1	1	1	1	?	1	6	0	0	1	1	3
Schoenus andinus	0	3	5	2	1	1	?	3	2	1	0	0	1	3
Schoenus antarcticus	0	{23}	<	2	1	1	?	6	3	3	0	1	0	3
Schoenus maschalinus	0	2	1	0	0	1	?	1	1	1	0	1	0	?
Schoenus paludosus	0	2	3	1	0	1	?	3	1	9	0	1	0	?
Schoenus rhynchosporoides	0	2	7	2	1	1	?	4	2	2	0	1	0	?
Schoenus turbinatus	0	{13}	3	0	0	1	?	2	0	0	0	0	1	3
Tetraria capillaris1	0	3	0	0	0	1	?	1	0	0	0	1	0	?
Tetraria capillaris2	0	3	0	0	0	1	?	0	0	0	0	1	0	?
Trianoptiles capensis	0	2	2	2	0	1	?	2	2	4	0	1	0	0
Trianoptiles solitaria	0	2	3	3	0	1	?	2	3	4	0	1	0	?
Trianoptiles stipitata	0	2	3	2	0	1	?	2	2	4	0	1	1	0
Tricostularia pauciflora	0	2	0	1	0	1	?	0	3	0	0	1	0	?
Tricostularia undulata	0	2	A	2	0	1	?	3	1	4	0	1	0	?
Rhynchospora brownii	0	{02}	6	3	0	1	?	5	3	:	0	{01}	0	?
Rhynchospora corymbosa	0	2	J	J	0	1	?	A	@	F	0	1	0	?
Scleria levis	0	2	8	7	0	1	?	5	6	5	0	1	0	?
Scleria mackaviensis	0	0	3	2	0	1	?	5	3	7	0	1	0	?

Species	Characters													
	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Capeobolus brevicaulis	1	?	0	0	0	3	0	1	0	=	2	@	0	3
Carpha alpina	7	3	0	0	0	5	0	1	0	7	0	8	1	4
Carpha angustissima	D	5	0	0	0	2	0	1	0	6	1	7	{01}	2
Carpha borbonica	2	1	1	0	0	2	0	1	0	8	1	9	{01}	2
Carpha capitellata	1	1	2	0	0	3	0	1	0	6	1	7	{01}	2
Carpha cf. *bracteosa*	0	2	1	0	0	3	0	1	0	7	1	7	0	3
Carpha ulugurensis	1	1	4	0	0	2	0	1	0	6	1	7	{01}	2
Carpha curvata	8	4	0	0	0	5	0	1	0	7	0	8	1	4
Carpha discolor	0	1	1	0	0	5	1	1	0	9	?	:	0	5
Carpha eminii	4	3	1	0	0	3	0	1	0	3	1	7	{01}	3
Carpha filifolia	0	2	0	0	0	4	0	1	0	5	1	6	0	4
Carpha glomerata	0	0	J	0	0	3	0	1	0	9	1	7	1	3
Carpha nitens	3	2	2	0	0	3	0	1	0	9	1	9	{01}	2
Carpha nivicola	4	3	0	0	0	9	0	1	0	7	0	8	1	7
Carpha rodwayi	4	3	0	0	0	5	0	1	0	6	0	7	1	5
Carpha schlechteri	0	1	6	0	0	1	0	1	0	8	1	8	{01}	1
Carpha schoenoides	9	4	0	0	0	4	0	1	0	8	0	7	{01}	4
Costularia elongata	J	I	2	0	0	3	0	1	0	9	2	:	0	2
Costularia pilisepala	8	J	@	0	0	2	0	1	0	F	2	E	1	2
Costularia urvilleana	4	4	@	0	0	3	0	1	0	J	2	J	1	2
Cyathochaeta avenacea	I	G	1	0	0	7	0	0	0	3	0	5	0	=
Cyathochaeta clandestina	7	<	1	0	0	J	{01}	0	0	4	0	3	{01}	J
Cyathochaeta diandra	=	@	1	0	0	9	0	0	0	5	0	5	0	8
Cyathocoma hexandra	7	4	1	0	0	4	1	1	{01}	6	0	5	{01}	4
Gahnia aspera	1	0	3	0	0	5	0	0	1	@	1	E	0	2
Gahnia sieberiana	1	0	8	0	0	1	0	0	0	@	1	A	0	1
Gymnoschoenus sphaerocephalus	0	0	2	0	0	2	0	1	0	@	1	B	0	2
Mesomelaena graciliceps	0	0	0	0	0	6	0	1	0	6	0	6	0	6
Mesomelaena tetragona	0	0	3	0	0	6	0	1	0	7	0	9	{01}	5
Oreobolus distichus	5	0	0	0	0	6	0	1	1	0	2	3	0	3
Oreobolus oxycarpus	3	5	0	0	0	1	0	1	1	1	2	5	0	1
Oreobolus pumilio	2	0	0	0	0	2	0	1	1	0	2	3	0	2
Ptilothrix deusta	0	0	0	0	0	9	0	1	0	7	2	6	1	8
Schoenoides oligocephalus	1	1	0	0	0	4	1	1	{01}	5	2	6	{01}	4
Schoenus andinus	4	5	1	0	0	5	1	1	0	:	2	:	1	4
Schoenus antarcticus	=	8	0	0	0	5	0	1	0	9	2	:	1	5
Schoenus maschalinus	3	1	0	0	0	0	0	1	0	5	2	6	{01}	0
Schoenus paludosus	4	0	1	0	0	2	0	1	0	@	2	<	1	1
Schoenus rhynchosporoides	9	7	0	0	0	3	1	1	0	<	2	:	{01}	3
Schoenus turbinatus	0	0	0	0	0	3	0	1	0	A	2	B	1	2
Tetraria capillaris1	2	1	0	0	0	2	0	0	0	3	0	7	0	1
Tetraria capillaris2	2	1	0	0	0	2	0	1	0	6	0	7	1	1
Trianoptiles capensis	6	3	0	1	0	3	0	1	0	5	1	6	0	3
Trianoptiles solitaria	6	<	0	1	0	6	0	1	0	0	?	0	0	6
Trianoptiles stipitata	6	2	0	1	0	3	0	1	0	6	1	7	0	3
Tricostularia pauciflora	0	2	0	0	0	1	0	1	0	6	2	7	{01}	1
Tricostularia undulata	0	2	5	0	0	1	0	1	0	3	2	7	0	1
Rhynchospora brownii	1	4	1	0	0	1	{01}	0	0	B	1	:	{01}	1
Rhynchospora corymbosa	0	2	=	0	0	3	0	1	0	5	{12}	7	0	3
Scleria levis	1	3	2	0	1	1	0	1	0	6	0	7	1	1
Scleria mackaviensis	0	2	0	0	1	2	0	1	0	8	1	3	0	2

Species	Characters													
	43	44	45	46	47	48	49	50	51	52	53	54	55	56
Capeobolus brevicaulis	G	3	@	?	?	0	0	1	0	1	9	1	A	0
Carpha alpina	5	?	?	?	?	0	0	1	0	0	0	1	A	1
Carpha angustissima	5	2	4	?	?	1	1	1	0	0	9	1	A	1
Carpha borbonica	4	2	4	?	?	1	1	1	0	0	2	1	A	1
Carpha capitellata	7	3	8	?	?	1	1	1	0	0	8	1	A	1
Carpha cf. *bracteosa*	8	3	:	?	?	1	1	1	0	0	9	1	A	1
Carpha ulugurensis	4	2	4	?	?	1	1	1	0	0	5	1	A	1
Carpha curvata	6	?	?	?	?	0	0	1	0	0	0	1	A	1
Carpha discolor	6	5	7	?	?	0	0	1	0	0	9	1	A	1
Carpha eminii	3	?	?	?	?	0	0	1	0	0	0	1	A	1
Carpha filifolia	8	4	6	?	?	1	1	1	0	0	9	1	A	1
Carpha glomerata	9	3	>	?	?	1	1	1	0	0	9	1	A	1
Carpha nitens	7	2	6	?	?	1	1	1	0	0	8	1	A	1
Carpha nivicola	=	?	?	?	?	0	0	1	0	0	0	1	A	1
Carpha rodwayi	3	?	?	?	?	0	0	1	0	0	0	1	A	1
Carpha schlechteri	5	2	7	?	?	0	{01}	1	0	1	9	1	A	1
Carpha schoenoides	9	4	5	?	?	0	{01}	1	0	0	9	1	A	1
Costularia elongata	6	2	7	?	?	0	0	1	0	0	9	1	A	1
Costularia pilisepala	4	2	6	?	?	0	0	1	0	1	9	1	A	1
Costularia urvilleana	4	2	4	?	?	0	0	1	0	1	9	1	A	1
Cyathochaeta avenacea	@	A	J	?	?	0	0	1	0	{01}	5	1	<	0
Cyathochaeta clandestina	A	J	B	?	?	0	0	1	0	{01}	9	1	5	0
Cyathochaeta diandra	=	9	>	J	0	0	0	1	0	1	=	1	<	0
Cyathocoma hexandra	:	4	<	?	?	0	0	1	0	0	7	1	A	0
Gahnia aspera	J	?	?	?	?	0	0	1	0	0	0	0	?	?
Gahnia sieberiana	8	1	@	?	?	0	0	1	0	1	9	0	?	?
Gymnoschoenus sphaerocephalus	<	2	9	?	?	0	0	1	0	1	9	1	0	0
Mesomelaena graciliceps	4	6	4	I	3	0	0	1	0	0	=	1	2	0
Mesomelaena tetragona	8	5	I	?	?	0	0	1	0	{01}	6	1	2	0
Oreobolus distichus	2	?	?	?	?	0	0	1	0	0	0	1	A	1
Oreobolus oxycarpus	0	?	?	?	?	0	0	1	0	0	0	1	A	1
Oreobolus pumilio	4	?	?	?	?	0	0	1	0	0	0	1	A	1
Ptilothrix deusta	5	3	4	?	?	1	0	1	0	0	5	1	2	0
Schoenoides oligocephalus	5	4	5	?	?	0	0	1	0	0	5	1	A	1
Schoenus andinus	4	?	?	?	?	1	0	1	0	0	0	1	J	0
Schoenus antarcticus	9	?	?	?	?	1	0	1	0	0	0	1	E	{01}
Schoenus maschalinus	0	0	0	?	?	{01}	0	1	0	0	6	1	A	1
Schoenus paludosus	1	2	3	0	6	0	0	1	0	1	=	1	A	1
Schoenus rhynchosporoides	9	3	9	<	2	0	0	1	0	0	:	1	A	1
Schoenus turbinatus	6	2	7	?	?	0	0	1	0	0	2	1	A	1
Tetraria capillaris1	3	?	?	?	?	0	0	1	0	0	0	1	6	0
Tetraria capillaris2	3	?	?	?	?	0	0	1	0	0	0	0	?	?
Trianoptiles capensis	:	2	3	?	?	1	{01}	1	0	0	9	1	2	0
Trianoptiles solitaria	:	4	:	?	?	1	1	1	0	0	9	1	2	0
Trianoptiles stipitata	@	2	4	?	?	1	0	1	0	0	9	1	2	0
Tricostularia pauciflora	@	2	A	?	?	0	0	1	0	1	9	1	A	1
Tricostularia undulata	5	?	?	?	?	0	0	1	0	0	0	1	A	1
Rhynchospora brownii	=	2	G	2	J	0	0	1	0	0	J	1	@	1
Rhynchospora corymbosa	>	2	1	?	?	0	0	1	0	{01}	6	1	A	1
Scleria levis	A	?	?	?	?	0	0	0	1	1	0	1	2	0
Scleria mackaviensis	7	2	6	8	9	0	0	0	1	1	J	1	2	0

Species	Characters													
	57	58	59	60	61	62	63	64	65	66	67	68	69	70
Capeobolus brevicaulis	0	1	3	0	1	1	?	?	0	0	?	1	0	0
Carpha alpina	0	1	B	0	1	0	H	3	0	0	?	0	0	0
Carpha angustissima	1	1	5	0	1	1	?	?	0	0	?	0	0	0
Carpha borbonica	1	1	3	0	1	1	?	?	0	0	?	0	0	0
Carpha capitellata	1	1	4	0	1	1	?	?	0	0	?	0	0	0
Carpha cf. *bracteosa*	1	1	5	0	1	1	?	?	0	0	?	0	0	0
Carpha ulugurensis	1	1	5	0	1	1	?	?	0	0	?	0	0	0
Carpha curvata	0	1	B	0	1	0	8	5	0	0	?	0	0	0
Carpha discolor	1	1	D	0	1	0	3	C	0	0	?	0	0	0
Carpha eminii	1	1	9	0	1	1	?	?	0	0	?	0	0	0
Carpha filifolia	1	1	8	0	1	1	?	?	0	0	?	0	0	0
Carpha glomerata	{01}	1	5	0	1	1	?	?	0	0	?	0	0	0
Carpha nitens	1	1	4	0	1	1	?	?	0	0	?	0	0	0
Carpha nivicola	0	1	J	0	1	0	J	4	0	0	?	0	0	0
Carpha rodwayi	0	1	E	0	1	0	E	6	0	0	?	0	0	0
Carpha schlechteri	{01}	1	4	0	1	1	?	?	0	0	?	0	0	0
Carpha schoenoides	0	1	@	0	1	0	:	4	0	0	?	0	0	0
Costularia elongata	0	1	8	0	1	1	?	?	0	0	?	0	0	0
Costularia pilisepala	0	1	6	0	1	0	0	2	0	0	?	0	0	0
Costularia urvilleana	0	1	8	0	1	0	1	2	0	0	?	0	0	0
Cyathochaeta avenacea	?	1	D	0	1	0	1	I	0	0	?	0	0	0
Cyathochaeta clandestina	?	0	=	0	1	1	?	?	0	0	?	0	0	0
Cyathochaeta diandra	?	0	9	0	1	1	?	?	0	0	?	0	0	0
Cyathocoma hexandra	?	1	6	0	0	?	?	?	0	0	?	1	0	0
Gahnia aspera	?	?	?	?	?	?	?	?	?	?	?	?	0	?
Gahnia sieberiana	?	?	?	?	?	?	?	?	?	?	?	?	0	?
Gymnoschoenus sphaerocephalus	?	1	4	0	1	1	?	?	0	0	?	0	0	1
Mesomelaena graciliceps	?	1	D	1	0	?	?	?	0	1	0	0	0	0
Mesomelaena tetragona	?	1	C	1	0	?	?	?	0	1	0	0	0	0
Oreobolus distichus	0	1	1	1	0	?	?	?	0	0	0	0	0	1
Oreobolus oxycarpus	0	1	1	1	0	?	?	?	0	0	0	0	0	1
Oreobolus pumilio	0	1	2	1	0	?	?	?	0	0	0	0	0	1
Ptilothrix deusta	0	1	H	0	1	0	4	J	0	0	?	0	0	0
Schoenoides oligocephalus	0	1	3	1	0	?	?	?	0	0	0	0	0	1
Schoenus andinus	?	1	@	0	0	?	?	?	0	0	?	0	0	0
Schoenus antarcticus	?	1	=	0	1	1	?	?	0	0	?	0	0	0
Schoenus maschalinus	0	1	0	0	1	1	?	?	0	0	?	0	0	0
Schoenus paludosus	0	1	1	0	1	1	?	?	0	0	?	0	0	0
Schoenus rhynchosporoides	{01}	{01}	6	0	1	1	?	?	0	0	?	0	0	0
Schoenus turbinatus	0	1	3	0	1	0	0	0	0	0	?	0	0	0
Tetraria capillaris1	?	1	1	0	1	1	?	?	0	0	?	0	0	1
Tetraria capillaris2	?	?	?	?	?	?	?	?	?	?	?	?	0	?
Trianoptiles capensis	?	1	7	1	1	?	?	?	1	0	0	0	0	0
Trianoptiles solitaria	?	1	7	1	1	?	?	?	1	0	0	0	0	0
Trianoptiles stipitata	?	1	<	1	1	?	?	?	1	0	1	0	0	0
Tricostularia pauciflora	1	1	0	1	0	?	?	?	0	0	0	0	0	0
Tricostularia undulata	0	1	0	0	1	1	?	?	0	0	?	0	0	0
Rhynchospora brownii	0	{01}	2	0	1	1	?	?	0	0	?	0	0	0
Rhynchospora corymbosa	0	1	7	0	1	1	?	?	0	0	?	0	0	0
Scleria levis	?	1	1	1	0	?	?	?	0	0	0	0	1	0
Scleria mackaviensis	?	1	0	1	0	?	?	?	0	0	0	0	1	0

Species	Characters													
	71	72	73	74	75	76	77	78	79	80	81	82	83	84
Capeobolus brevicaulis	6	0	1	3	2	=	=	1	1	0	G	0	1	1
Carpha alpina	6	0	0	2	1	<	=	0	1	3	2	0	0	0
Carpha angustissima	6	0	0	1	1	A	=	0	1	0	1	:	0	0
Carpha borbonica	6	0	0	1	1	@	=	0	1	0	0	3	0	0
Carpha capitellata	6	0	0	2	1	>	=	0	1	0	1	9	0	0
Carpha cf. *bracteosa*	6	0	0	2	3	@	=	0	1	1	1	:	0	0
Carpha ulugurensis	6	0	0	1	2	@	=	0	1	0	1	6	0	0
Carpha curvata	6	0	0	4	1	A	=	0	1	2	2	0	0	0
Carpha discolor	6	0	0	4	5	@	=	0	1	?	?	:	0	0
Carpha eminii	6	0	0	3	2	B	=	0	1	1	1	0	0	0
Carpha filifolia	6	0	0	3	2	@	=	0	1	0	1	:	0	0
Carpha glomerata	6	0	0	3	4	=	=	0	1	0	0	:	0	0
Carpha nitens	6	0	0	1	1	@	=	0	1	0	0	9	0	0
Carpha nivicola	6	0	0	3	1	>	=	0	1	5	6	0	0	0
Carpha rodwayi	6	0	0	3	3	C	=	0	1	3	2	0	0	0
Carpha schlechteri	6	0	0	1	6	=	=	0	1	0	0	0	0	0
Carpha schoenoides	2	0	0	2	2	=	=	0	1	3	1	:	0	0
Costularia elongata	6	0	1	2	1	@	=	1	1	1	6	:	1	1
Costularia pilisepala	6	0	1	?	?	?	=	0	1	0	2	0	0	1
Costularia urvilleana	6	0	1	2	<	@	=	0	1	0	1	0	1	1
Cyathochaeta avenacea	0	0	?	?	?	?	0	0	1	8	5	0	4	3
Cyathochaeta clandestina	0	0	0	J	2	:	0	0	1	J	6	0	4	3
Cyathochaeta diandra	0	0	0	3	2	@	0	0	1	6	3	7	4	3
Cyathocoma hexandra	J	0	1	3	8	<	=	1	1	1	A	8	1	1
Gahnia aspera	B	1	0	0	3	@	=	0	1	1	3	0	3	1
Gahnia sieberiana	=	1	0	3	5	@	=	0	1	?	?	0	0	{01}
Gymnoschoenus sphaerocephalus	6	0	0	3	7	J	=	0	1	1	0	0	1	1
Mesomelaena graciliceps	6	0	0	5	J	J	=	0	0	?	?	0	{01}	{01}
Mesomelaena tetragona	6	0	0	2	H	J	=	0	0	?	?	0	2	1
Oreobolus distichus	6	0	0	2	3	@	=	0	0	?	?	0	{01}	1
Oreobolus oxycarpus	6	0	1	0	1	5	=	0	0	?	?	0	2	1
Oreobolus pumilio	6	0	{01}	2	3	@	=	0	0	?	?	0	2	1
Ptilothrix deusta	6	0	0	8	E	@	=	0	1	3	5	5	4	0
Schoenoides oligocephalus	6	0	1	4	3	@	=	1	0	?	?	0	1	1
Schoenus andinus	6	0	0	4	<	E	=	0	1	1	4	0	1	1
Schoenus antarcticus	6	0	0	8	A	@	J	0	1	1	0	0	0	1
Schoenus maschalinus	6	0	1	?	?	?	=	0	0	?	?	7	3	1
Schoenus paludosus	6	0	1	1	2	8	=	0	0	?	?	0	{01}	1
Schoenus rhynchosporoides	6	0	0	2	5	B	=	0	0	?	?	<	3	1
Schoenus turbinatus	6	0	1	1	8	@	=	0	0	?	?	3	1	1
Tetraria capillaris1	6	1	?	?	?	?	=	1	1	1	7	0	1	1
Tetraria capillaris2	6	1	?	?	?	?	=	1	1	1	5	0	1	1
Trianoptiles capensis	6	0	0	1	0	7	=	0	1	1	1	:	{13}	0
Trianoptiles solitaria	6	0	0	?	?	?	=	0	1	1	2	:	{01}	0
Trianoptiles stipitata	6	0	0	0	0	4	=	0	1	1	3	:	{03}	0
Tricostularia pauciflora	6	0	?	?	?	?	=	0	0	?	?	0	1	1
Tricostularia undulata	6	0	1	2	5	@	=	0	0	?	?	0	3	1
Rhynchospora brownii	0	0	1	0	1	=	0	1	1	0	@	J	1	2
Rhynchospora corymbosa	6	0	1	1	1	5	0	1	1	2	J	0	1	2
Scleria levis	6	0	0	1	9	@	=	0	0	?	?	0	3	1
Scleria mackaviensis	6	0	0	1	2	7	=	0	0	?	?	0	3	1

Species	Characters									
	85	86	87	88	89	90	91	92	93	94
Capeobolus brevicaulis	0	0	0	0	1	0	5	=	0	5
Carpha alpina	2	0	0	0	0	1	4	3	0	7
Carpha angustissima	2	0	0	1	0	1	4	2	0	0
Carpha borbonica	2	0	0	1	0	0	2	1	0	0
Carpha capitellata	2	0	0	1	0	0	3	4	0	0
Carpha cf. *bracteosa*	2	0	0	1	0	1	4	3	0	0
Carpha ulugurensis	2	0	0	1	0	0	2	2	0	0
Carpha curvata	2	0	0	1	0	1	5	3	0	6
Carpha discolor	2	0	0	?	?	?	?	?	0	0
Carpha eminii	2	0	0	1	0	1	4	2	0	0
Carpha filifolia	2	0	0	1	0	1	6	2	0	0
Carpha glomerata	2	0	0	1	0	0	4	3	0	0
Carpha nitens	2	0	0	1	0	0	1	1	0	0
Carpha nivicola	2	0	0	0	0	1	6	4	0	9
Carpha rodwayi	2	0	0	0	0	1	5	4	0	7
Carpha schlechteri	2	0	0	1	0	0	3	2	0	0
Carpha schoenoides	2	0	0	1	0	0	5	2	0	4
Costularia elongata	{12}	0	0	0	0	0	2	2	0	7
Costularia pilisepala	{12}	0	0	0	0	0	1	2	0	4
Costularia urvilleana	{12}	0	0	0	0	0	1	1	0	4
Cyathochaeta avenacea	1	0	0	0	0	0	G	5	0	0
Cyathochaeta clandestina	{02}	0	0	0	0	0	J	2	0	0
Cyathochaeta diandra	2	0	0	0	0	0	F	1	0	3
Cyathocoma hexandra	2	0	0	0	1	0	2	5	0	4
Gahnia aspera	1	0	0	0	0	0	8	J	0	0
Gahnia sieberiana	1	0	0	0	0	0	6	<	0	0
Gymnoschoenus sphaerocephalus	2	0	1	0	1	0	5	9	0	0
Mesomelaena graciliceps	0	0	0	0	0	0	6	<	1	J
Mesomelaena tetragona	0	0	0	0	0	0	8	E	1	B
Oreobolus distichus	2	0	0	0	0	0	2	4	0	0
Oreobolus oxycarpus	{12}	1	0	0	0	0	3	2	0	0
Oreobolus pumilio	2	0	0	0	0	0	1	1	0	0
Ptilothrix deusta	2	0	0	0	0	0	8	0	0	0
Schoenoides oligocephalus	2	0	0	0	0	0	1	3	0	0
Schoenus andinus	2	0	0	0	0	0	1	2	0	0
Schoenus antarcticus	2	0	0	0	0	0	3	5	0	0
Schoenus maschalinus	0	0	0	0	0	0	0	0	0	0
Schoenus paludosus	2	0	0	0	0	0	0	1	0	0
Schoenus rhynchosporoides	2	0	0	0	0	0	2	3	0	0
Schoenus turbinatus	2	0	0	0	0	0	1	4	0	0
Tetraria capillaris1	2	0	0	0	1	0	2	7	0	3
Tetraria capillaris2	2	0	0	0	1	0	2	5	0	0
Trianoptiles capensis	{02}	0	0	1	0	0	2	4	0	0
Trianoptiles solitaria	2	0	0	1	0	0	3	3	0	0
Trianoptiles stipitata	2	0	0	1	0	0	2	3	0	<
Tricostularia pauciflora	2	0	0	0	0	0	3	7	0	0
Tricostularia undulata	2	0	0	0	1	0	0	1	0	0
Rhynchospora brownii	2	0	0	0	1	0	2	6	0	0
Rhynchospora corymbosa	2	0	0	0	1	1	3	8	0	0
Scleria levis	0	0	0	0	1	0	3	@	0	0
Scleria mackaviensis	0	0	0	0	1	0	3	8	0	0

Appendix 5. Aligned *trn*L intron and *trn*L-*trn*F intergenic spacer sequences of *Carpha* and its relatives (Chapter 5). ':' indicates gap and missing data. See Table 5.1 for voucher details.

```
[                                    10        20        30        40       ]
[                                    .         .         .         .        ]

Carpha_alpina_JB1880B                ATTTG:AACTGGGGACCCGAGGATTTTCAGTCCTCTGCTCTAACCAAC   [47]
Carpha_alpina_JB1878B                :::::::::::::::::::::::::::::::::::::TTTA:CCAAC   [9]
Carpha_alpina_XZ13                   :::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_curvata_JB1894                ATTTG:AACTGGTGCCCGGAGG:TTTTCAGTCCCTTGCTTTAACCCAC  [46]
Carpha_curvata_JB1896C               :::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_nivicola_JB1868a              ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTGTGCTTTA:CCAAC   [46]
Carpha_nivicola_XZ11                 ATTTGAAACTGGTGACCCGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [47]
Carpha_rodwayi_JB1881B               ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTTTGTTTTC:CCCAC   [46]
Carpha_rodwayi_JB1890                ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTTTGCTTTG:CCAAC   [46]
Carpha_filifolia_JB1700              ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Carpha_bracteosa_JB1725              ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Carpha_nitens_KEW11893               ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Carpha_capitellata_JB1718            ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTTAGCTCTA:CCAAC   [46]
Carpha_glomerata_JB1712              ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTTTGCTCTA:CCAAC   [46]
Carpha_glomerata_JB1711              ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Carpha_glomerata_JB1706              ATTTG:AACTGGTGACCCGAGGATTTTCAGTCCTTTGCTTTA:CCCAC   [46]
Carpha_glomerata_JB1719              ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTT:CCCAC   [46]
Trianoptiles_solitaria_JH1765        ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Trianoptiles_solitaria_JB1756        ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Oreobolus_pumilio_XZ12               ATTTG:AACTGGTGACACGAGGATTTTCAATCGTAGCGTCTC:CATTT   [46]
Oreobolus_distichus_XZ17             ATTTG:AACTGGTGACCCGAGGATTTTCAGTCCTTTGCTTTA:CCAAC   [46]
Schoenoides_oligocephalus            ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Costularia_nervosa_KW9939            ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Gymnoschoenus_sphaerocephalus        ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Schoenus_turbinatus_LM35             ATTTG:AACTGGTGACCCGAGGATTTTCAGTCCTTTGCTCTA:CCAAC   [46]
Schoenus_paludosus_KW9858            ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Costularia_arundinacea_KW9935        ATTTG:AACTGGTGACACGAGGATTTTCCGTCCTCTGCTCTT:CCAAC   [46]
Costularia_pubescens_KW9940          ATTTG:AACTGGTGGCACGAGG:TTTTCAGTCCTCTGCGTTT:CCAAC   [45]
Tricostularia_pauciflora_KW991       ATTTG:AACTGGTGAC:CGAGGATTTTCAGTCCTTTGCTTTA:CCAAC   [45]
Gahnia_clarkei_AR1621                ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Gahnia_sieberiana_KW9913             ATTTG:AACTG:TGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [45]
Ptilothrix_deusta_XZ1                ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Cyathochaeta_diandra_XZ24            ATTTGGAACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [47]
Rhynchospora_brownii_KW9909          ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]
Rhynchospora_corymbosa_KC75          ATTTG:AACTGGTGACACGAGGATTTTCAGTCCTCTGCTCTA:CCAAC   [46]

[                                     50        60        70        80        90     ]
[                                     .         .         .         .         .      ]

Carpha_alpina_JB1880B                T:GGGCTATCCCGACCAGTTC:TTGCGCATCCCCT:GAGTATTT:TAC   [91]
Carpha_alpina_JB1878B                T:GAGCTATCCCGACCAGTTC:TTGCGCATCACCT:GAGTATTT:TAC   [53]
Carpha_alpina_XZ13                   :::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_curvata_JB1894                T:GAGCTATCCCGACCAGTTT:TTGGGCCTCCCCT:GGGTTTTT:ATC   [90]
Carpha_curvata_JB1896C               :::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_nivicola_JB1868a              T:GAGCTATCCCAACCAGTTA:TTGCGCATCACCT:GAGTATTC:TAC   [90]
Carpha_nivicola_XZ11                 T:GAGCTATCCCAACCAGTTA:TTGCGCATCACCT:GAGTATTC:TAC   [91]
Carpha_rodwayi_JB1881B               TTGAGCTATCCCGACCAGGTA:TTGCGCATCACCT:GAGTATTC:TAC   [91]
Carpha_rodwayi_JB1890                T:GAGCTATCCCGGCCAGGTA:TTGCGCATCACCT:GAGTATTC:TAC   [90]
Carpha_filifolia_JB1700              T:GAGCTATCCCGACCAGTTC:TTGCGCATCACCT:GAGTATTC:TAC   [90]
Carpha_bracteosa_JB1725              T:GAGCTATCCCGACCAGTTC:TTGCGCATCACCT:GAGTATTC:TAC   [90]
Carpha_nitens_KEW11893               T:GAGCTATCCCGACCAGTTC:TTGCGCATCACCT:GAGTATTC:TAC   [90]
Carpha_capitellata_JB1718            T:GAGCTATCCCGACCAGTTC:TTGCGCATCACCT:GAGTATTC:TAC   [90]
Carpha_glomerata_JB1712              T:GAGCTATCCCGACCAGTTC:TTGCGCATCCCCT:GAGTATTC:TAC   [90]
Carpha_glomerata_JB1711              T:GAGCTATCCCGACCAGTTC:TTGCGCATCACCT:GAGTATTC:TAC   [90]
Carpha_glomerata_JB1706              T:GAGCTATCCCGACTAGTTC:TTGGGCCTCACCT:GAGTATTC:TAC   [90]
Carpha_glomerata_JB1719              T:GAGCTATCCCGGCTAGTTC:TTGGGCCTCCCCT:GAGTATTC:TAC   [90]
Trianoptiles_solitaria_JH1765        T:GAGCTATCCCGACGAGTTC:TTGCGCATCACCT:GAATATTC:TAC   [90]
Trianoptiles_solitaria_JB1756        T:GAGCTATCCCGACGAGTTC:TTGCGCATCACCT:TAATATTC:TAC   [90]
Oreobolus_pumilio_XZ12               C:GAGCTATCCCGACCATTTC:TTTTTGATCACCT:GAGTAAAA:TAC   [90]
Oreobolus_distichus_XZ17             T:GAGCTATCCCGACCATTTC:TTTTTGATCACCT:GAGTAAAA:TAT   [90]
Schoenoides_oligocephalus            T:GAGCTATCCCGACCATTTC:TTTTTGATCACCT:GAGTAAAA:TAC   [90]
Costularia_nervosa_KW9939            T:GAGCTATCCCGACCATTTC:TTTTTGATCACCT:GAGTAAAA:TAC   [90]
Gymnoschoenus_sphaerocephalus        T:GAGCTATCCCGACCATTTC:TTGTGAATCACCT:GAGTACAA:TAT   [90]
Schoenus_turbinatus_LM35             T:GAGCTATCCCGGCCCTTTCCTTGTGGATCACCT:AAGTAAAA:TA:   [90]
Schoenus_paludosus_KW9858            T:GAGCTATCCCGACCATTTC:TTGCGGATCATCT:TAGTAGAA:TAC   [90]
Costularia_arundinacea_KW9935        T:GAGGTATGCCCGCCGGTTC:TTGGGAATCACC:AGAGTSAGAATAC   [91]
Costularia_pubescens_KW9940          T:GAGGTATTCCGTCCGGTTC:TTGGGGATCCCCTAGAGGAGAAA:A:   [89]
Tricostularia_pauciflora_KW991       T:GTGCTATCCCGACCCTTTT:TTGGGGATCACCT:GAGGAGAA:TA:   [88]
Gahnia_clarkei_AR1621                T:GAGCTATCCCGACCATTTC:TTGTGGATCACCA:GACCAGAAATAC   [91]
Gahnia_sieberiana_KW9913             T:GAGCTATCCCGACCATTTC:TTGTGGATCACCA:GACCAGAAATAC   [90]
Ptilothrix_deusta_XZ1                T:GAGCTATCCCGACCATTTA:TTGTGAATCACCT::::::GAAATAC   [86]
Cyathochaeta_diandra_XZ24            T:GAGCTATCCCGACCATTTC:AGGCGGATCACCT::::::GAAATAT   [87]
Rhynchospora_brownii_KW9909          T:GAGCTATCCCGACCATTTT:TTGTGGATCACCC:GAGTAGAA:TAC   [90]
Rhynchospora_corymbosa_KC75          T:GAGCTATCCCGACCATTTC:TTGCGGATCACCC:GAGTAGAA:TAC   [90]
```

```
[                                    100       110       120       130       140  ]
[                                    .         .         .         .         .    ]

Carpha_alpina_JB1880B              T:CAGG:TCTATA:TCCTTGGGCCTGGATCAATTTAATAA:::::::   [128]
Carpha_alpina_JB1878B              T:CAGG:TCTATA:TCCTTGTGCCTGGTTCAATTAAATAA:::::::   [90]
Carpha_alpina_XZ13                 ::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_curvata_JB1894              C:CAGG:TTTAAA:TCCCTGGCCCCGGTTCCATTAAATAA:::::::   [127]
Carpha_curvata_JB1896C             ::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_nivicola_JB1868a            T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAC:::::::   [127]
Carpha_nivicola_XZ11               T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAC:::::::   [128]
Carpha_rodwayi_JB1881B             T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAA:::::::   [128]
Carpha_rodwayi_JB1890              T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAA:::::::   [127]
Carpha_filifolia_JB1700            T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAA:::::::   [127]
Carpha_bracteosa_JB1725            T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAA:::::::   [127]
Carpha_nitens_KEW11893             T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAA:::::::   [127]
Carpha_capitellata_JB1718          T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAA:::::::   [127]
Carpha_glomerata_JB1712            T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAA:::::::   [127]
Carpha_glomerata_JB1711            T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAA:::::::   [127]
Carpha_glomerata_JB1706            TGCAGG:TCTATA:TCCTTGCACCTGTATCAATTAAATAA:::::::   [128]
Carpha_glomerata_JB1719            T:CAGG:TCTATA:TCCTTGTACCTGTATCAATTAAATAA:::::::   [127]
Trianoptiles_solitaria_JH1765      T:CAGG:TCTATA:TACTTGTACTTGTATCAATTAAATAT:::::::   [127]
Trianoptiles_solitaria_JB1756      T:CAGG:TCTATA:TACTTGTACTTGTATCAATTAAATAT:::::::   [127]
Oreobolus_pumilio_XZ12             T:CAGTATCTATG:TACTTATAGATAAGTCATTTAAATAATAAATTTA   [136]
Oreobolus_distichus_XZ17           T:CAGTATCTATG:TACTTATAGATAAGTCATTTAAATAATAAATTTA   [136]
Schoenoides_oligocephalus          T:CAGTATCTATG:TACTTATAGATAAGTCATTTAAATAATAAATTTA   [136]
Costularia_nervosa_KW9939          T:CAGTATCTATG:TACTTATAGATAAGTCATTTAAATAATAAATTTA   [136]
Gymnoschoenus_sphaerocephalus      T:T:GTATCTATG:TCCTTGTACCTATGTCAAT:AA::::::::::::   [122]
Schoenus_turbinatus_LM35           ::::::::::ATG:TACTTGTATCTATTTCAAT:AA::::::::::::   [114]
Schoenus_paludosus_KW9858          T:CA:TATCTATG:TACTTTTACATATGTCAATTAAGTAA:::::::   [127]
Costularia_arundinacea_KW9935      ::::::::::ATGATACTTGTATCTATTTCAATTAAATAA:::::::   [121]
Costularia_pubescens_KW9940        ::::::::::ATG:TACTTGTATTTATTTCAATTAAATAC:::::::   [118]
Tricostularia_pauciflora_KW991     ::::::::::ATG:TACTTGTATCTATTTCAAT:AA::::::::::::   [112]
Gahnia_clarkei_AR1621              T:C:GTATCTATG:TACGAGTACCTGTGTCAATTAAATAA:::::::   [128]
Gahnia_sieberiana_KW9913           T:C:GTATCTATG:TACGAGTACCTGTGTCAATTAAATAA:::::::   [127]
Ptilothrix_deusta_XZ1              T:C:GTATCTATG:TACGAGTACCTATGTCAATTAAATAA:::::::   [123]
Cyathochaeta_diandra_XZ24          T:C:GTATTTATG:TACGAGTATCTATATCAATTAAATAA:::::::   [124]
Rhynchospora_brownii_KW9909        T:C:GTATCTATG:CCCTTGTACCTACGTCAATTAACTAA:::::::   [127]
Rhynchospora_corymbosa_KC75        T:C:GTATCTATA:CTTTTGTACCTACATCAATTAACT:::::::::   [125]

[                                        150       160       170       180       190]
[                                        .         .         .         .         .  ]

Carpha_alpina_JB1880B              ::::::::::::::::::AGGAACTCAAACCATAAT::::::AAAAAA   [152]
Carpha_alpina_JB1878B              ::::::::::::::::::AGGAACTCCA:CCATAAT::::::AAAAAA   [113]
Carpha_alpina_XZ13                 ::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_curvata_JB1894              ::::::::::::::::::AGGGACCCCAATAATAAG::::::AAAAAA   [151]
Carpha_curvata_JB1896C             ::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_nivicola_JB1868a            ::::::::::::::::::AGGAACTCAAATAATAA:::::::AAAAAA   [150]
Carpha_nivicola_XZ11               ::::::::::::::::::AGGAACTCAAATAATAA:::::::AAAAAA   [151]
Carpha_rodwayi_JB1881B             ::::::::::::::::::AGGAACTCAAATAATAAT::::::AAAAAA   [152]
Carpha_rodwayi_JB1890              ::::::::::::::::::AGGAACTCAAATAATAAT::::::AAAAAA   [151]
Carpha_filifolia_JB1700            ::::::::::::::::::AGGAACTCAAATAATAAT::::::AATAAA   [151]
Carpha_bracteosa_JB1725            ::::::::::::::::::AGGAACTCAAATAATAAT::::::AATAAA   [151]
Carpha_nitens_KEW11893             ::::::::::::::::::AGGAACTCAAATAATAAT::::::AAT:AA   [150]
Carpha_capitellata_JB1718          ::::::::::::::::::AGGAACTCAAATAATAAT::::::AAT:AA   [150]
Carpha_glomerata_JB1712            ::::::::::::::::::AGGAACTCAAATAATAAT::::::AA:AAA   [150]
Carpha_glomerata_JB1711            ::::::::::::::::::AGGAACTCAAATAATAAT::::::AA:AAA   [150]
Carpha_glomerata_JB1706            ::::::::::::::::::AGGAACTCAAATAATAAT::::::AA:AAA   [151]
Carpha_glomerata_JB1719            ::::::::::::::::::AGGAACTCAAATAATAAT::::::AA:AAA   [150]
Trianoptiles_solitaria_JH1765      ::::::::::::::::::TGATACTCCAATAAGAAT::::::::::::   [145]
Trianoptiles_solitaria_JB1756      ::::::::::::::::::TGATACTCCAATAAGAAT::::::::::::   [145]
Oreobolus_pumilio_XZ12             TTATTTAATAATTAA:::AGGAACTCAAATAACAATTTAGTC:::AAA   [178]
Oreobolus_distichus_XZ17           TTATTAAAAAAAAAAAAAAGGAACTCAAATAACAATTTAGTC::AAAA   [182]
Schoenoides_oligocephalus          TTAATTAAAAATTAA:::AGGAACTCAAATAACAATTTAGTC::AAAA   [179]
Costularia_nervosa_KW9939          TTATTTAATAATTAA:::AGGAACTCAAATAACAATTTAGTC:::AAA   [178]
Gymnoschoenus_sphaerocephalus      ::::::::::::::::::GGAACTTAAATAACAATTTATTC:::AAA   [148]
Schoenus_turbinatus_LM35           ::::::::::::::::::AGGAACTCGAATACCAATTTATTC:::AAA   [141]
Schoenus_paludosus_KW9858          ::::::::::::::::::AGGAACTCAAATAACAATTTATTC:::AAA   [154]
Costularia_arundinacea_KW9935      ::::::::::::::::::AGGAACTCGAATACAAATTTATTC:::AAA   [148]
Costularia_pubescens_KW9940        ::::::::::::::::::AAGGAACTCGAATACAAATTTATTC:::AAA   [146]
Tricostularia_pauciflora_KW991     ::::::::::::::::::AGGAACTCGAATACAAATTTATTC:::AAA   [139]
Gahnia_clarkei_AR1621              ::::::::::::::::::AGGAACTCAAATAAAAATT:ATTC:::AAA   [154]
Gahnia_sieberiana_KW9913           ::::::::::::::::::AGGAACTCAAATAAAAATT:ATTC:::AAA   [153]
Ptilothrix_deusta_XZ1              ::::::::::::::::::AGGAACTCAAATAAAAATT:ATTC:::AAA   [149]
Cyathochaeta_diandra_XZ24          ::::::::::::::::::AGGAATTCAAATAAAAATT:ATTC:::AAA   [150]
Rhynchospora_brownii_KW9909        ::::::::::::::::::TTGAACTCAAATAACAATTTATTC:::AAA   [154]
Rhynchospora_corymbosa_KC75        ::::::::::::::::::::::::TCAATTACCAATTTATTC:::AAA   [146]
```

```
[                                    200        210        220        230        240]
[                                    .          .          .          .          .]

Carpha_alpina_JB1880B                AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGGAATGAT   [199]
Carpha_alpina_JB1878B                AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGGAATGAT   [160]
Carpha_alpina_XZ13                   ::::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_curvata_JB1894                AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGGAATGAT   [198]
Carpha_curvata_JB1896C               ::::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_nivicola_JB1868a              AAAA::::::::::::::::::::::::::::::::::::::::::::   [154]
Carpha_nivicola_XZ11                 AAAA::::::::::::::::::::::::::::::::::::::::::::   [155]
Carpha_rodwayi_JB1881B               AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGTAATGAT   [199]
Carpha_rodwayi_JB1890                AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGTAATGAT   [198]
Carpha_filifolia_JB1700              AAAA::::::::::::::::::::::::::::::::::::::::::::   [155]
Carpha_bracteosa_JB1725              AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGTAATGAT   [198]
Carpha_nitens_KEW11893               AAAATTGA:A:::::::::::::::::::::::::::::::::::::   [159]
Carpha_capitellata_JB1718            AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGTAATGAT   [197]
Carpha_glomerata_JB1712              AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGTAATGAT   [197]
Carpha_glomerata_JB1711              AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGTAATGAT   [197]
Carpha_glomerata_JB1706              AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGTAATGAT   [198]
Carpha_glomerata_JB1719              AAAATTGA:ATAGTCAATGTTAGGATAATGAAATGGATTGGTAATGAT   [197]
Trianoptiles_solitaria_JH1765        ::::::::::::::::::::::::::::::::::ATTGG::::::::   [150]
Trianoptiles_solitaria_JB1756        ::::::::::::::::::::::::::::::::::ATTGG::::::::   [150]
Oreobolus_pumilio_XZ12               AAAATGGA:ATAGTAGATGTTAGGATAATGATATGGATTAGTAATTAT   [225]
Oreobolus_distichus_XZ17             AAAATGGACATAGTAGATGTTAGGATAATGATATGGATTGGTAATGAT   [230]
Schoenoides_oligocephalus            AAAA:GGA:ATAGTAGATGTTAGGATAATGATATGGATTGGTAATGAT   [225]
Costularia_nervosa_KW9939            AAAATGGA:ATAGTAGATGTTAGGATAATGATATGGATTGGTAATGAT   [225]
Gymnoschoenus_sphaerocephalus        AAAATTGA:ATAGTCAATGTTAGGATAATGATATGGATTGGTAATGAT   [195]
Schoenus_turbinatus_LM35             AAAATAGA:ATAGTCAATGTTAGGATAATGATATGGGTTGGTAATGAT   [188]
Schoenus_paludosus_KW9858            AAAATGAA:ATAGTCAATGTTAGGATAATGATATGGATTGGTAATGAT   [201]
Costularia_arundinacea_KW9935        AAAATTGA:ATAGTCAATGTTAGGATAATGATATGGGTTGGTAATGAT   [195]
Costularia_pubescens_KW9940          AAAATTGA:ATAGTCAATGTTAGGATAATGATATGGGTTGGTAATGAT   [193]
Tricostularia_pauciflora_KW991       AAAATTGA:ATAGTCAATGTTAAGATAATGATATGGGTTGGTAATGAT   [186]
Gahnia_clarkei_AR1621                AAAATGGA:ATAGTCAATGTTAGGATAATGATATGAATTGGTAATGAT   [201]
Gahnia_sieberiana_KW9913             AAAATGGA:ATAGTCAATGTTAGGATAATGATATGAATTGGTAATGAT   [200]
Ptilothrix_deusta_XZ1                AAAATGGA:ATAGTCAATGTCAGGATAATGAGATGAATTGGTAATGAT   [196]
Cyathochaeta_diandra_XZ24            AAAATAAA:ATAGTCAATGT:::::::ATGGTATGAATTGGTAATGAT   [190]
Rhynchospora_brownii_KW9909          AAAATGGA:ATAGTCAATGTTAAGATAATGATATG:ATTGGTAATTAT   [200]
Rhynchospora_corymbosa_KC75          AAAATTGA:ATAGTCAATGTTAAGATAATGATATG:ATTGGTAATCAT   [192]

[                                         250        260        270        280       ]
[                                         .          .          .          .         ]

Carpha_alpina_JB1880B                TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [226]
Carpha_alpina_JB1878B                TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [187]
Carpha_alpina_XZ13                   ::::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_curvata_JB1894                TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [225]
Carpha_curvata_JB1896C               ::::::::::::::::::::::::::::::::::::::::::::::::   [0]
Carpha_nivicola_JB1868a              ::::::::::::::::::::::::::::::::::::::::::::::::   [154]
Carpha_nivicola_XZ11                 ::::::::::::::::::::::::::::::::::::::::::::::::   [155]
Carpha_rodwayi_JB1881B               TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [226]
Carpha_rodwayi_JB1890                TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [225]
Carpha_filifolia_JB1700              ::::::::::::::::::::::::::::::::::::::::::::::::   [155]
Carpha_bracteosa_JB1725              TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [225]
Carpha_nitens_KEW11893               ::::::::::::::::::::::::::::::::::::::::::::::::   [159]
Carpha_capitellata_JB1718            TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [224]
Carpha_glomerata_JB1712              TTCATTTT::::::::::::::TCATTATAAAGAT::::::TTCTTG   [224]
Carpha_glomerata_JB1711              TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [224]
Carpha_glomerata_JB1706              TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [225]
Carpha_glomerata_JB1719              TTCATTTT::::::::::::::TCATTATAGAGAT::::::TTCTTG   [224]
Trianoptiles_solitaria_JH1765        ::::::::::::::::::::::::::::::::::::::::::::::::   [150]
Trianoptiles_solitaria_JB1756        ::::::::::::::::::::::::::::::::::::::::::::::::   [150]
Oreobolus_pumilio_XZ12               TTCATTATAGAGATAATGATTCCTCATTATAGAGATAATGATTCCTTA   [273]
Oreobolus_distichus_XZ17             TTCATTATAGAGATAATGATTCCTCATTATAGAGATAATGATTCCTTA   [278]
Schoenoides_oligocephalus            TTCATTATAGAGATAATGATTCCTCATTATAGAGATAATGATTCCTTA   [273]
Costularia_nervosa_KW9939            TTCATTATAGAGATAATGATTCCTCATTATAGAGATAATGATTCCTTA   [273]
Gymnoschoenus_sphaerocephalus        TTCTTT::::::::::::::::::::::ATAGAGAT::::::TACTTG   [215]
Schoenus_turbinatus_LM35             TTCATT::::::::::::::::::::::ATAGAGATAATGATTCTTTG   [214]
Schoenus_paludosus_KW9858            TTCATT::::::::::::::::::::::ATAGAGAA::::::TCCTTG   [221]
Costularia_arundinacea_KW9935        TTCATC::::::::::::::::::::::ATAGAGAT::::::TCCTTG   [215]
Costularia_pubescens_KW9940          TTCATC::::::::::::::::::::::ATAGAGAT::::::TCCTTG   [213]
Tricostularia_pauciflora_KW991       TTCATC::::::::::::::::::::::ATAGAGAT::::::TCCTTG   [206]
Gahnia_clarkei_AR1621                TTCATT::::::::::::::::::::::ATAGAGAT::::::TCCTTG   [221]
Gahnia_sieberiana_KW9913             TTCATT::::::::::::::::::::::ATAGAGAT::::::TCCTTG   [220]
Ptilothrix_deusta_XZ1                TTCATT::::::::::::::::::::::ATAGATAT::::::TCCTTG   [216]
Cyathochaeta_diandra_XZ24            TTCATT::::::::::::::::::::::AAAGAAAA::::::::::::   [204]
Rhynchospora_brownii_KW9909          TTCGTT::::::::::::::::::::::ATAGAGAT::::::TCCTTG   [220]
Rhynchospora_corymbosa_KC75          TTCGTT::::::::::::::::::::::ATAGAAAT::::::TCCTTG   [212]
```

```
[                                290       300       310       320       330    ]
[                                .         .         .         .         .      ]

Carpha_alpina_JB1880B            GTTA:TATGTATAA:::::::::::::TAACCATAAAAAAAAAAAAAT   [260]
Carpha_alpina_JB1878B            GTTA:TATGTATAA:::::::::::::TAACCATAAAAAAAAAAAAAT   [221]
Carpha_alpina_XZ13               :::::::::::::::::::::::::::ACC::AATAAAAAAAAA:T    [16]
Carpha_curvata_JB1894            GTTA:TATGTATAA:::::::::::::TAACCCTAAAAAAAAAAAAAT   [259]
Carpha_curvata_JB1896C           ::::::::::::::::::::::::::::::TAAAAAAAAAAAAAT     [15]
Carpha_nivicola_JB1868a          ::::::::::::::::::::::::::::::::A:::::::::::T     [156]
Carpha_nivicola_XZ11             ::::::::::::::::::::::::::::::::::::::::::::T     [156]
Carpha_rodwayi_JB1881B           GTTA:TATGTATAA:::::::::::::TAACCATAAAAAAAAAAAA:T   [259]
Carpha_rodwayi_JB1890            GTTA:TATGTATAA:::::::::::::TAACCATAAAAAAAAAAAA:T   [258]
Carpha_filifolia_JB1700          ::::::::::::::::::::::::::::::::A:::::::::::T     [157]
Carpha_bracteosa_JB1725          GTTA:TATGTATAA:::::::::::::TAACCATAAAAAAAAA:::T    [255]
Carpha_nitens_KEW11893           ::::::::::::::::::::::::::::::::::::::::::::      [159]
Carpha_capitellata_JB1718        GTTA:TATGTATAA:::::::::::::TAACCATAAAAAAAAA:::T    [255]
Carpha_glomerata_JB1712          GATA:TATGTATAA:::::::::::::TAACCATAAAAAAAACAA::T   [256]
Carpha_glomerata_JB1711          GTTA:TATGTATAA:::::::::::::TAACCATAAAAAAAAAA::T    [256]
Carpha_glomerata_JB1706          GTTA:TATGTATAA:::::::::::::TAACCATAAAAAAAAAA::T    [257]
Carpha_glomerata_JB1719          GTTA:TATGTATAA:::::::::::::TAACCATAAAAAAAAAA::T    [256]
Trianoptiles_solitaria_JH1765    ::::::::::::::::::::::::::::::C::::::::::AAA::T   [155]
Trianoptiles_solitaria_JB1756    ::::::::::::::::::::::::::::::C::::::::::AAA::T   [155]
Oreobolus_pumilio_XZ12           TATA:TATGGATTCTTATATGGATTTTTTTGCATAA::::::::::T    [309]
Oreobolus_distichus_XZ17         CATA:TATGGATTCTTATATGGATTTTTTTGCATAA::::::::::T    [314]
Schoenoides_oligocephalus        CATA:TATGGATTCTTATATGGATTTTTTTGCATAA::::::::::T    [309]
Costularia_nervosa_KW9939        CATA:TATGGATTCTTATATGGATTTTTTTGCATAA::::::::::T    [309]
Gymnoschoenus_sphaerocephalus    CTTA:TATGTCTTATATGTA:::TTATTTTGCATAA::::AAAAATTA   [255]
Schoenus_turbinatus_LM35         CTTACTATGTA:::::::::::TTTTTTTGCATAATCAAAGAAA:TA    [249]
Schoenus_paludosus_KW9858        TTTA:TTTGTA::::::::::::TTATTTTTCATAAT:ACAGCAA:TA   [254]
Costularia_arundinacea_KW9935    CTTACTATGTA:::::::::::::TTTTTTTCATAAT:AAAGAAA::T   [247]
Costularia_pubescens_KW9940      CTTACTATGTA:::::::::::::TTTTTTTCATAAT:AAAGAAA::T   [245]
Tricostularia_pauciflora_KW991   CTTACTATGTA:::::::::::::TTATTTTGCATAAT:AAAGAAA::T   [239]
Gahnia_clarkei_AR1621            CTTA:TATGTATTATTTCTT:TA:ATATTAACATATT:AAAGAAA:TA   [264]
Gahnia_sieberiana_KW9913         CTTA:TATGTATTATTTCTT:TA:ATATTAACATATT:AAAGAAA:TA   [263]
Ptilothrix_deusta_XZ1            CTTA:TTTTTATTATTTTGCGTA:ATATAATTATATT:AAAGAAA::T   [259]
Cyathochaeta_diandra_XZ24        ::::::::::::::::::::::::::::::TATGTT:AAAGAAA::T   [218]
Rhynchospora_brownii_KW9909      CTTA:TATTTTATATATTGTTATGCAATTTTATTATT:GTTATGCA:A   [265]
Rhynchospora_corymbosa_KC75      CTTC:TATTT::::::::::::::::::TTTTAATA:::GA:AAGCA:A  [237]

[                                340       350       360       370       380    ]
[                                .         .         .         .         .      ]

Carpha_alpina_JB1880B            ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [276]
Carpha_alpina_JB1878B            ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [237]
Carpha_alpina_XZ13               ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [32]
Carpha_curvata_JB1894            ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [275]
Carpha_curvata_JB1896C           ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [31]
Carpha_nivicola_JB1868a          ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [172]
Carpha_nivicola_XZ11             ACAAATATTTTT::::::::::::::::::::::::::::::::::TTAG [172]
Carpha_rodwayi_JB1881B           ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [275]
Carpha_rodwayi_JB1890            ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [274]
Carpha_filifolia_JB1700          ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [173]
Carpha_bracteosa_JB1725          ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [271]
Carpha_nitens_KEW11893           ::::::::::::::::::::::::::::::::::::::::::::::    [159]
Carpha_capitellata_JB1718        ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [271]
Carpha_glomerata_JB1712          TCAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [272]
Carpha_glomerata_JB1711          ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [272]
Carpha_glomerata_JB1706          ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [273]
Carpha_glomerata_JB1719          ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [272]
Trianoptiles_solitaria_JH1765    ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [171]
Trianoptiles_solitaria_JB1756    ACAAATATTTTT::::::::::::::::::::::::::::::::TTAG   [171]
Oreobolus_pumilio_XZ12           :CAAAATTTTTT::::::::::::::::::::::::::::::::TT::   [322]
Oreobolus_distichus_XZ17         CCAAAA:TTTTT::::::::::::::::::::::::::::::::::G    [326]
Schoenoides_oligocephalus        CCAAAA:TTTTT::::::::::::::::::::::::::::::::::G    [321]
Costularia_nervosa_KW9939        CCAAAA:TTTTT::::::::::::::::::::::::::::::::::G    [321]
Gymnoschoenus_sphaerocephalus    TACAAATTTTTT::::::::::::::::::::::::::::::::TCAG   [271]
Schoenus_turbinatus_LM35         AAAATATTTTTT::::::::::::::::::::::::TTTTAGATCTAT   [273]
Schoenus_paludosus_KW9858        AAAATATTCTTT::::::::::::::::::::::::::::::::TCAT   [270]
Costularia_arundinacea_KW9935    ACAAATATTTTT:::::::::TTTTTAGATCTGTTTTTTAGATCTAT    [285]
Costularia_pubescens_KW9940      ACAAATATTTTT::::::::::TTTTAGATCTGTTTTTTAGATCTAT    [282]
Tricostularia_pauciflora_KW991   ACAAATATTTTTCAAATATTTTTTTTTAGATCTATTTTTTAGATCTAT   [287]
Gahnia_clarkei_AR1621            ATACAGATTTTT::::::::::::::::::::::::::::::::ACAA  [280]
Gahnia_sieberiana_KW9913         ATACAGATTTTT::::::::::::::::::::::::::::::::ACAA  [279]
Ptilothrix_deusta_XZ1            GCAAATATTTTC::::::::::::::::::::::::::::::::ACAA  [275]
Cyathochaeta_diandra_XZ24        AGAAATATTTTT::::::::::::::::::::::::::::::::ACAA  [234]
Rhynchospora_brownii_KW9909      AAAAATAATATC:::::::::::::::::::::::::TTTTTTTTCAG  [288]
Rhynchospora_corymbosa_KC75      AAAAATATTATT:::::::::::::::::::::::::TTCATTTTCAG  [260]
```

```
[                                    390       400       410       420       430]
[                                    .         .         .         .         .  ]

Carpha_alpina_JB1880B                ATATATTTGTCAA::ATGAAAAAA:TTTTA:::::::::::::TGAG   [307]
Carpha_alpina_JB1878B                ATATATTTGTCAA::ATGAAAAAA:TTTTA:::::::::::::TGAG   [268]
Carpha_alpina_XZ13                   ATATATTTGTCAA::ATGAAAAAA:TTTTA:::::::::::::TGAG   [63]
Carpha_curvata_JB1894                ATCTATTTGTCAA::ATGAAAAAA:TTTTA:::::::::::::TGAG   [306]
Carpha_curvata_JB1896C               ATCTATTTGTCAA::ATGAAAAAA:TTTTA:::::::::::::TGAG   [62]
Carpha_nivicola_JB1868a              ATCTATTTGTCAA::ATGAAAAAA:TTTTA:::::::::::::TGAG   [203]
Carpha_nivicola_XZ11                 ATCTATTTGTCAA::ATGAAAAAA:TTTTA:::::::::::::TGAG   [203]
Carpha_rodwayi_JB1881B               ATCTATTTGTCAA::ATGAAAAAA:TTTTA:::::::::::::TGAG   [306]
Carpha_rodwayi_JB1890                ATCTATTTGTCAA::ATGAAAAAA:TTTTA:::::::::::::TGAG   [305]
Carpha_filifolia_JB1700              ATCTATTTGTCAA::ATTAAAAAA:TTTAA:::::::::::::::::   [200]
Carpha_bracteosa_JB1725              ATCTATTTGTCAA::ATGAAAAAA:TTGAA:::::::::::::::::   [298]
Carpha_nitens_KEW11893               ::::::::::::::::::::::::::::::::::::::::::::::   [159]
Carpha_capitellata_JB1718            ATCTATTTGTCAA::ATGAAAAAA:TTGAA:::::::::::::::::   [298]
Carpha_glomerata_JB1712              ATCTATTTGTCAA::ATGAAAAAA:TTTAA:::::::::::::::::   [299]
Carpha_glomerata_JB1711              ATCTATTTGTCAA::ATGAAAAAA:TTTAA:::::::::::::::::   [299]
Carpha_glomerata_JB1706              ATCTATTTGTCAA::ATGAAAAAA:TTTAA:::::::::::::::::   [300]
Carpha_glomerata_JB1719              ATCTATTTGTCAA::ATGAAAAAA:TTTAA:::::::::::::::::   [299]
Trianoptiles_solitaria_JH1765        ATCTATTTGTCAA::ATGAAAAAA:TTGAA:::::::::::::TAAG   [202]
Trianoptiles_solitaria_JB1756        ATCTATTTGTCAA::ATGAAAAAA:TTGAA:::::::::::::TAAG   [202]
Oreobolus_pumilio_XZ12               :TCTTTTTGTGAA::ACGATAAAA:TTGAA::::::::::TGAATGAG   [356]
Oreobolus_distichus_XZ17             ATCTTTTTGTGAA::ACGAGAAAA:TTGAA::::::::::TGAATGAG   [361]
Schoenoides_oligocephalus            ATCTTTTTGTGAA::ACGATAAAA:TTGAA::::::::::TGAATGAG   [356]
Costularia_nervosa_KW9939            ATCTTTTTGTGAA::ACGATAAAA:TTGAA::::::::::TGAATGAG   [356]
Gymnoschoenus_sphaerocephalus        ATTTATTTGTGAA::ATGAAATAC:TTTAA::::::::::TGAATGAT   [306]
Schoenus_turbinatus_LM35             TTTTTATTATAAAAAAAATAATAG:TTGAA::::::::::TGAATAAG   [310]
Schoenus_paludosus_KW9858            GTCTATTTGTAAA::ATGAAAAAG:TTGAA::::::::::TGAATGAG   [305]
Costularia_arundinacea_KW9935        TTAAAATTATGAA::ATGAAATAA:TAGTT::::::::::GAATGAG   [319]
Costularia_pubescens_KW9940          TTAAAATTATGAA::ATGAAATAA:TAGTT::::::::::GAATGAG   [316]
Tricostularia_pauciflora_KW991       TTATGATTATGAA::ATGAAATAA:TAGTT:::::::AAATTAATAAG   [325]
Gahnia_clarkei_AR1621                ATGTATTTGTGAA::ACAAATAGAATTGAA::::::::::TAAATGAG   [316]
Gahnia_sieberiana_KW9913             ATGTATTTGTGAA::ACAAATAGAATTGAA::::::::::TAAATGAG   [315]
Ptilothrix_deusta_XZ1                ATTTATTTGTGAA::ACAAAGTAG:TTGAA::::::::::TAAA::::   [306]
Cyathochaeta_diandra_XZ24            ATCAATTTGTGAA::ACAAAATAG:TTGAA::::::::::TAAATAAA   [269]
Rhynchospora_brownii_KW9909          ATCTATTTTCGAA::ATGAAAAGG:TTGAATGAATCAGAAAAGATGAG   [333]
Rhynchospora_corymbosa_KC75          ATCTATTTTTGAA::ATGAAATAG:TTGAATGAATCAGAAAGAATTAG   [305]

[                                        440       450       460       470       480]
[                                        .         .         .         .         .]

Carpha_alpina_JB1880B                :::::::AAAGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [327]
Carpha_alpina_JB1878B                :::::::AAAGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [288]
Carpha_alpina_XZ13                   :::::::AAAGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [83]
Carpha_curvata_JB1894                :::::::AAAGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [326]
Carpha_curvata_JB1896C               :::::::AAAGGTAAGGTAGTGAAT::TTTTTT:T::::::::::::   [87]
Carpha_nivicola_JB1868a              :::::::AAAGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [223]
Carpha_nivicola_XZ11                 :::::::AAAGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [223]
Carpha_rodwayi_JB1881B               :::::::AAAGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [326]
Carpha_rodwayi_JB1890                :::::::AAAGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [325]
Carpha_filifolia_JB1700              :::::::::AGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [218]
Carpha_bracteosa_JB1725              :::::::::AGG:::::TAGTGAAT::TTTTTT::::::::::::::   [315]
Carpha_nitens_KEW11893               :::::::::AGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [177]
Carpha_capitellata_JB1718            :::::::::AGG:::::TAGTGAAT::TTTTTT:T::::::::::::   [316]
Carpha_glomerata_JB1712              :::::::::AGG:::::TAGTTAAT::TTTTTT:T::::::::::::   [317]
Carpha_glomerata_JB1711              :::::::::AGG:::::TAGTTAAT::TTTTTT:T::::::::::::   [317]
Carpha_glomerata_JB1706              :::::::::AGG:::::TAGTTAAT::TTTTTT:TTT::::::::::   [320]
Carpha_glomerata_JB1719              :::::::::AGG:::::TAGTTAAT::TTTTTT:TTT::::::::::   [319]
Trianoptiles_solitaria_JH1765        :::::::AAAGT:::::TAGTGAAT::TTTTTT:T::::::::::::   [222]
Trianoptiles_solitaria_JB1756        :::::::AAAGT:::::TAGTGAAT::TTTTTT:T::::::::::::   [222]
Oreobolus_pumilio_XZ12               :::::::AAAGA:::::ATGTGAAT::TTTTTT:TTTTTTTTTT:::   [385]
Oreobolus_distichus_XZ17             :::::::AAAGA:::::ATGTGAAT::TTTTTT:TT::::::::::   [382]
Schoenoides_oligocephalus            :::::::AAAGA:::::ATGTGAAT::TTTTTTCTTT::::::::::   [379]
Costularia_nervosa_KW9939            :::::::AAAGA:::::ATGTGAAT::TTTTTT:TTT::::::::::   [378]
Gymnoschoenus_sphaerocephalus        :::::::AAAGA:::::TAGTGAAT:::TTTTT::::::::::::::   [324]
Schoenus_turbinatus_LM35             :::::::AAAGA:AAGATAATGAAT:CTTTTTT:TTTTT::::::::   [339]
Schoenus_paludosus_KW9858            :::::::AAAGA:::::TAGTGAAT:::TTTTT::::::::::::::   [323]
Costularia_arundinacea_KW9935        :::::::AAAGA:AAGATAATGAAT:CTTTTTT:TTTTTTTTTT:::   [354]
Costularia_pubescens_KW9940          :::::::AAAGA:AAGATAATGAAT:CTTTTTTTTTTTTTTTTTTT:   [354]
Tricostularia_pauciflora_KW991       :::::::AAAGA:::::CAGTGAAT:CTTTTTT:TTTTTTTT:::::G   [354]
Gahnia_clarkei_AR1621                :::::::AAAGA:::::TAGTGAAT::TTTTTT::::::::::::::   [335]
Gahnia_sieberiana_KW9913             :::::::AAAGA:::::TAGTGAAT::TTTTTT::::::::::::::   [334]
Ptilothrix_deusta_XZ1                :::::::AAAGT::::ATAGTGAAT:CTTTTTT::::::::::::::   [327]
Cyathochaeta_diandra_XZ24            :::::::AAAGA:::::TAGTTCAT::TTTTTT:T::::::::::::   [289]
Rhynchospora_brownii_KW9909          :::::::AAAGT::::ATAGCTAATTCGTTTTT::::::::::::::   [355]
Rhynchospora_corymbosa_KC75          AGAGCAGAAAGA:::::TAGTGAATTCTTTTTT:TT::::::::::::   [335]
```

```
[                                    490        500        510        520       ]
[                                    .          .          .          .         ]

Carpha_alpina_JB1880B                GAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [346]
Carpha_alpina_JB1878B                GAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [307]
Carpha_alpina_XZ13                   GAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [102]
Carpha_curvata_JB1894                GAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [345]
Carpha_curvata_JB1896C               GAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [106]
Carpha_nivicola_JB1868a              GAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [242]
Carpha_nivicola_XZ11                 GAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [242]
Carpha_rodwayi_JB1881B               GAATTATTT:AGAAATTCAATAAAATAAGAAATATTTAGAAATT:CCA  [372]
Carpha_rodwayi_JB1890                GAATTATTT:AGAAATTCAATAAAATAAGAAATATTTAGAAATT:CCA  [371]
Carpha_filifolia_JB1700              CACTTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [237]
Carpha_bracteosa_JB1725              CAATTATTTTAGAAA:::::::::::::::::::::::::TT:TAA   [335]
Carpha_nitens_KEW11893               CAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [196]
Carpha_capitellata_JB1718            CAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [335]
Carpha_glomerata_JB1712              CAATTATTT:AAAAA:::::::::::::::::::::::::TTCCAA   [337]
Carpha_glomerata_JB1711              CAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [336]
Carpha_glomerata_JB1706              CAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [339]
Carpha_glomerata_JB1719              CAATTATTT:AGAAA:::::::::::::::::::::::::TT:CAA   [338]
Trianoptiles_solitaria_JH1765        GAATTATTT:CTAAA:::::::::::::::::::::::::TT:CAA   [241]
Trianoptiles_solitaria_JB1756        GAATTATTT:CTAAA:::::::::::::::::::::::::TT:CAA   [241]
Oreobolus_pumilio_XZ12               :AATTTTTG:ATAA:::::::::::::::::::::::::::::AA   [399]
Oreobolus_distichus_XZ17             GAATTTTTG:ATAA:::::::::::::::::::::::::::::AA   [397]
Schoenoides_oligocephalus            GAATTTTTG:ATAA:::::::::::::::::::::::::::::AA   [394]
Costularia_nervosa_KW9939            GAATTTTTG:ATAA:::::::::::::::::::::::::::::AA   [393]
Gymnoschoenus_sphaerocephalus        ::ATTATTG:ATAAT:::::::::::::::::::::::::AAT:GAA  [342]
Schoenus_turbinatus_LM35             GAATGATTG:ATAAA:::::::::::::::::::::::::AAT:AAA  [359]
Schoenus_paludosus_KW9858            :::::ATTG:ATCAA:::::::::::::::::::::::::AAT:CAA  [338]
Costularia_arundinacea_KW9935        GAATGATTG:ATAAA:::::::::::::::::::::::::AAT:AAA  [374]
Costularia_pubescens_KW9940          GAATGATTG:ATAAA:::::::::::::::::::::::::AAT:AAA  [374]
Tricostularia_pauciflora_KW991       GAATGATTG:ATAAA:::::::::::::::::::::::::AAT:AAA  [374]
Gahnia_clarkei_AR1621                ::ATTATTG:ATAAA:::::::::::::::::::::::::AAT:AAA  [353]
Gahnia_sieberiana_KW9913             ::ATTATTG:ATAAA:::::::::::::::::::::::::AAT:AAA  [352]
Ptilothrix_deusta_XZ1                ::ATTTTTT:TTT:::::::::::::::::::::::::::AT:CAA   [342]
Cyathochaeta_diandra_XZ24            :AATTATTC:ATAAA:::::::::::::::::::::::::AAT:CAA  [308]
Rhynchospora_brownii_KW9909          CCATTTTTG:ATAAA:::::::::::::::::::::::::AAT:ACA  [375]
Rhynchospora_corymbosa_KC75          :AATA::::AAAAA:::::::::::::::::::::::::AAT:CAA   [350]

[                                    530        540        550        560        570    ]
[                                    .          .          .          .          .      ]

Carpha_alpina_JB1880B                TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [370]
Carpha_alpina_JB1878B                TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [331]
Carpha_alpina_XZ13                   TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [126]
Carpha_curvata_JB1894                TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [369]
Carpha_curvata_JB1896C               TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [130]
Carpha_nivicola_JB1868a              TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [266]
Carpha_nivicola_XZ11                 TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [266]
Carpha_rodwayi_JB1881B               TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [396]
Carpha_rodwayi_JB1890                TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [395]
Carpha_filifolia_JB1700              TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [261]
Carpha_bracteosa_JB1725              TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [359]
Carpha_nitens_KEW11893               TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [220]
Carpha_capitellata_JB1718            TAAAAT:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [359]
Carpha_glomerata_JB1712              TAAAATT::::AAGAAATATTTA:::::::::::::::::GGAAAT   [362]
Carpha_glomerata_JB1711              TAAAATT::::AAGAAATATTTA:::::::::::::::::GGAAAT   [361]
Carpha_glomerata_JB1706              TAAAATT::::AAGAAATATTTA:::::::::::::::::GGAAAT   [364]
Carpha_glomerata_JB1719              TAAAATT::::AAGAAATATTTA:::::::::::::::::GGAAAT   [363]
Trianoptiles_solitaria_JH1765        TAAAAG:::::AAAAAATATTTA:::::::::::::::::GAAAAT   [265]
Trianoptiles_solitaria_JB1756        TAAAAG:::::AAAAAACATTTA:::::::::::::::::GAAAAT   [265]
Oreobolus_pumilio_XZ12               TAAAAG:::::AAGAAATACTTA:::::::::::::::::T:GGAATT  [424]
Oreobolus_distichus_XZ17             TAAAAG:::::AAGAAATACTTA:::::::::::::::::T:GGGATT  [422]
Schoenoides_oligocephalus            TAAAAG:::::AAGAAATACTTA:::::::::::::::::T:GGGATT  [419]
Costularia_nervosa_KW9939            TAAAAG:::::AAGAAATACTTA:::::::::::::::::T:GGGATT  [418]
Gymnoschoenus_sphaerocephalus        TAAAAG:::::AAGAAATACTTA:::::::::::::::ACTTAGGAAAT  [371]
Schoenus_turbinatus_LM35             TCAAAA:::::AAGAAATACTTAGGCAAAGAAGAAATACTTAGGAAAT  [402]
Schoenus_paludosus_KW9858            TAAAAG:::::AAGAAATATTT:::::::::::::::::GAAAAT    [361]
Costularia_arundinacea_KW9935        TCAAAG:::::AAGAAATACTTAGGCAAAGAAGAAGTACTTAGGAAAT  [417]
Costularia_pubescens_KW9940          TCAAAG:::::AAGAAATACTTAGGCAAAGAAGAAGTACTTAGGAAAT  [417]
Tricostularia_pauciflora_KW991       TCAAAG:::::AAGAAATACTTAGGCAAAGAAGAAGTACTTAGGAAAT  [417]
Gahnia_clarkei_AR1621                TAAAAGAAAAGAAGAAATATTTA:::::::::::::::::GGAAAT   [382]
Gahnia_sieberiana_KW9913             TAAAAGAAAAGAAGAAATATTTA:::::::::::::::::GGAAAT   [381]
Ptilothrix_deusta_XZ1                TAAAAG:::::AAGAAATATTTA:::::::::::::::::GGAAAT   [366]
Cyathochaeta_diandra_XZ24            TAAAAGAAAAGAAGAAATATTTA:::::::::::::::::GGAAAT   [337]
Rhynchospora_brownii_KW9909          AAAAAG:::::AAGAAATATTAA:::::AGAAGAAATATTTAGGAAAT  [413]
Rhynchospora_corymbosa_KC75          AAAAAG:::::AACAATAACAAT::::::::::::ATAGTTAGGAAAG  [381]
```

```
[                                    580        590        600        610        620  ]
[                                    .          .          .          .          .    ]

Carpha_alpina_JB1880B                CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [404]
Carpha_alpina_JB1878B                CCAATGGGCTT:TGGGC:TTTTTAG:::::::::::::TGGGGATAGA   [364]
Carpha_alpina_XZ13                   CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [160]
Carpha_curvata_JB1894                CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [403]
Carpha_curvata_JB1896C               CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [164]
Carpha_nivicola_JB1868a              CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [300]
Carpha_nivicola_XZ11                 CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [300]
Carpha_rodwayi_JB1881B               CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [430]
Carpha_rodwayi_JB1890                CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [429]
Carpha_filifolia_JB1700              CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [295]
Carpha_bracteosa_JB1725              CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [393]
Carpha_nitens_KEW11893               CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [254]
Carpha_capitellata_JB1718            CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [393]
Carpha_glomerata_JB1712              CCAATGGGCTTTTGGGC::TTTTAT:::::::::::::TGGGGATAGA   [395]
Carpha_glomerata_JB1711              CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [395]
Carpha_glomerata_JB1706              CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [398]
Carpha_glomerata_JB1719              CCAATGGGCTTTTGGGC:TTTTTAT:::::::::::::TGGGGATAGA   [397]
Trianoptiles_solitaria_JH1765        AAAATGGGCTTTT:::::::::TAC:::::::::::::TGGGGATAGA   [291]
Trianoptiles_solitaria_JB1756        AAAATGGGCTTTT:::::::::TAC:::::::::::::TGGGGATAGA   [291]
Oreobolus_pumilio_XZ12               CAAATGGGCTTTT:::::::::TAT:::::::::::::TGGGGATAGA   [450]
Oreobolus_distichus_XZ17             CAAATGGGCTTTT:::::::::TAT:::::::::::::TGGGGATAGA   [448]
Schoenoides_oligocephalus            CAAATGGGCTTTT:::::::::TAT:::::::::::::TGGGGATAGA   [445]
Costularia_nervosa_KW9939            CAAATGGGCTTTT:::::::::TAT:::::::::::::TGGGGATAGA   [444]
Gymnoschoenus_sphaerocephalus        CAAATGGGCTTTT:::::::::TCT:::::::::::::TGGGGATAGA   [397]
Schoenus_turbinatus_LM35             CAAATGGGCTTTT:::::::::TTT:::::::::::::TGGGGATAGA   [428]
Schoenus_paludosus_KW9858            CAAATGGGCTTTT:::::::::TAT:::::::::::::TGGGGATAGA   [387]
Costularia_arundinacea_KW9935        CAAATGGGCTTTT:::::::::TAT:::::::::::::TGGGGATAGA   [443]
Costularia_pubescens_KW9940          AAAATGGGCTTTT::::::::::AT:::::::::::::TGGGGATAGA   [442]
Tricostularia_pauciflora_KW991       CAAATGGGCTTTT::::TATTTTAT:::::::::::::TGGGGATAGA   [448]
Gahnia_clarkei_AR1621                CAAATGGGCTTTT::::TATTTTATTGGGGATAGAGGGTGGGGATAGA   [426]
Gahnia_sieberiana_KW9913             CAAATGGGCTTTT::::TATTTTATTGGGGATAGAGGGTGGGGATAGA   [425]
Ptilothrix_deusta_XZ1                CAAATGGGCTTTT::::::::::::TGGGGATAGAGG:TGGGGATAGA   [401]
Cyathochaeta_diandra_XZ24            CAAACGGGCTTTT::::TATTTTAT:::::::::::::TGGGGATAGA   [368]
Rhynchospora_brownii_KW9909          CAAATGGGCTTTT:::::::::TAT:::::::::::::TGGGGATAGA   [439]
Rhynchospora_corymbosa_KC75          CAAATGGGCTTTT:::::::::TAT:::::::::::::TGGGGATAGA   [407]

[                                         630        640        650        660        670]
[                                         .          .          .          .          .  ]

Carpha_alpina_JB1880B                GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [451]
Carpha_alpina_JB1878B                GGGACTTGAACCCTCAGTGATTTTAAAAATCGACGGATTTTCCTCTTA   [412]
Carpha_alpina_XZ13                   GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [207]
Carpha_curvata_JB1894                GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [450]
Carpha_curvata_JB1896C               GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [211]
Carpha_nivicola_JB1868a              GGGACTTGAACCCTCA:TGATTTGAAAAATCGACGGATTTTCCTCTTA   [347]
Carpha_nivicola_XZ11                 GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [347]
Carpha_rodwayi_JB1881B               GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [477]
Carpha_rodwayi_JB1890                GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [476]
Carpha_filifolia_JB1700              GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [342]
Carpha_bracteosa_JB1725              GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [440]
Carpha_nitens_KEW11893               GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [301]
Carpha_capitellata_JB1718            GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [440]
Carpha_glomerata_JB1712              GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [442]
Carpha_glomerata_JB1711              GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [442]
Carpha_glomerata_JB1706              GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [445]
Carpha_glomerata_JB1719              GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCTTA   [444]
Trianoptiles_solitaria_JH1765        GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCATA   [338]
Trianoptiles_solitaria_JB1756        GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCCTCATA   [338]
Oreobolus_pumilio_XZ12               GGGACTTGAACCCTCA:TGATTTCAAGAATCGACGGATTTTCCTCTTA   [497]
Oreobolus_distichus_XZ17             GGGACTTGAACCCTCA:TGATTTCAAGAATCGACGGATTTTCCTCTTA   [495]
Schoenoides_oligocephalus            GGGACTTGAACCCTCA:TGATTTCAAGAATCGACGGATTTTCCTCTTA   [492]
Costularia_nervosa_KW9939            GGGACTTGAACCCTCA:TGATTTCAAGAATCGACGGATTTTCCTCTTA   [491]
Gymnoschoenus_sphaerocephalus        GGGACTTGAACCCTCA:TGATTCAAAAAATCGACGGATTTTCCTCTTA   [444]
Schoenus_turbinatus_LM35             GGGACTTGAACCCTCA:TGATTTCAAAAATCGACGGATTTTCCTCTTA   [475]
Schoenus_paludosus_KW9858            GGGACTTGAACCCTCA:TGATTTTAAAAATCGACGGATTTTCATTTTA   [434]
Costularia_arundinacea_KW9935        GGGACTTGAACCCTCA:TGATTTCAAAAATCGACGGATTTTCCTCTTA   [490]
Costularia_pubescens_KW9940          GGGACTTGAACCCTCA:TGATTTCAAAAATCGACGGATTTTCCTCTTA   [489]
Tricostularia_pauciflora_KW991       GGGACTTGAACCCTCA:TGATTTCAAAAATCGACGGATTTTCCTCTTA   [495]
Gahnia_clarkei_AR1621                GGGATTTGAACCCTCA:TGATTTAAAAAATCGACGGATTTTCATCTTA   [473]
Gahnia_sieberiana_KW9913             GGGATTTGAACCCTCA:TGATTTAAAAAATCGACGGATTTTCATCTTA   [472]
Ptilothrix_deusta_XZ1                GGGATTTGAACCCTCA:TGATTTAAAAAATCGACGGATTTTCATCTTA   [448]
Cyathochaeta_diandra_XZ24            GGGATTTGAACCCTCA:TGATTTCAAAAATCGACGGATTTTCATTTTA   [415]
Rhynchospora_brownii_KW9909          GGGACTTGAACCCTCA:TGATTTAAAAAAATCGACGGATTTTCCTCTTA   [486]
Rhynchospora_corymbosa_KC75          GGGACTTGAACCCTCA:TGATTTCAAAAATCGACGGATTTTCCTCTTA   [454]
```

```
[                                680       690       700       710       720]
[                                .         .         .         .         .]

Carpha_alpina_JB1880B            CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [498]
Carpha_alpina_JB1878B            CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [459]
Carpha_alpina_XZ13               CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [254]
Carpha_curvata_JB1894            CTTTCAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [497]
Carpha_curvata_JB1896C           CTTTCAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [258]
Carpha_nivicola_JB1868a          CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [394]
Carpha_nivicola_XZ11             CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [394]
Carpha_rodwayi_JB1881B           CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [524]
Carpha_rodwayi_JB1890            CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [523]
Carpha_filifolia_JB1700          CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [389]
Carpha_bracteosa_JB1725          CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [487]
Carpha_nitens_KEW11893           CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [348]
Carpha_capitellata_JB1718        CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [487]
Carpha_glomerata_JB1712          CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [489]
Carpha_glomerata_JB1711          CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [489]
Carpha_glomerata_JB1706          CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [492]
Carpha_glomerata_JB1719          CTTTAAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [491]
Trianoptiles_solitaria_JH1765    CTTTCAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [385]
Trianoptiles_solitaria_JB1756    CTTTCAA:TTTCCTTGTTGTCGATATCGACATGTAGAATGGACTCTCT   [385]
Oreobolus_pumilio_XZ12           CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [544]
Oreobolus_distichus_XZ17         CTATAAA:TTTCATTGTTGTCAATATTGACATGTAGAATGGACTCTCT   [542]
Schoenoides_oligocephalus        CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [539]
Costularia_nervosa_KW9939        CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [538]
Gymnoschoenus_sphaerocephalus    CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [491]
Schoenus_turbinatus_LM35         CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGGATGGACTCTCT   [522]
Schoenus_paludosus_KW9858        CTATAAA:TTTCATTGTTGTCGATATTGACATGTAAAATGGACTCTAT   [481]
Costularia_arundinacea_KW9935    CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [537]
Costularia_pubescens_KW9940      CTATAAA:TTTCATTGTTGTCAATATTGACATGTAGAATGGACTCTCT   [536]
Tricostularia_pauciflora_KW991   CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [542]
Gahnia_clarkei_AR1621            CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [520]
Gahnia_sieberiana_KW9913         CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [519]
Ptilothrix_deusta_XZ1            CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [495]
Cyathochaeta_diandra_XZ24        CTATAAAATTTCATTCTTGTCGATATTGACATGTAGAATGGACTCTCT   [463]
Rhynchospora_brownii_KW9909      CTATAAA:TTTCATTGTTGTCGATATTGACATGTAGAATGGACTCTCT   [533]
Rhynchospora_corymbosa_KC75      CTAGAAA:TTTCATTGTTGTCAATTTTGACATGTAGAATGGACTCTCT   [501]

[                                730       740       750       760       ]
[                                .         .         .         .         ]

Carpha_alpina_JB1880B            CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [524]
Carpha_alpina_JB1878B            CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [485]
Carpha_alpina_XZ13               CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [280]
Carpha_curvata_JB1894            CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [523]
Carpha_curvata_JB1896C           CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [284]
Carpha_nivicola_JB1868a          CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [420]
Carpha_nivicola_XZ11             CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [420]
Carpha_rodwayi_JB1881B           CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [550]
Carpha_rodwayi_JB1890            CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [549]
Carpha_filifolia_JB1700          CTTTATTCTCGTTTGATT::::::::::AAAAAAAC::::::::::    [415]
Carpha_bracteosa_JB1725          CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [513]
Carpha_nitens_KEW11893           CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [374]
Carpha_capitellata_JB1718        CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [513]
Carpha_glomerata_JB1712          CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [515]
Carpha_glomerata_JB1711          CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [515]
Carpha_glomerata_JB1706          CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [518]
Carpha_glomerata_JB1719          CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [517]
Trianoptiles_solitaria_JH1765    CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [411]
Trianoptiles_solitaria_JB1756    CTTTATTCTCGTTTGATT::::::::::AATCAAAC::::::::::    [411]
Oreobolus_pumilio_XZ12           CTTTATTCTCGTTTGATT::::::::::AATCA::::::TTTTTTCA   [575]
Oreobolus_distichus_XZ17         CTTTATTCTCGTTTGATT::::::::::AATCA::::::TTTTTTCA   [573]
Schoenoides_oligocephalus        CTTTATTCTCGTTTGATT::::::::::AATCA::::::TTTTTTCA   [570]
Costularia_nervosa_KW9939        CTTTATTCTCGTTTGATT::::::::::AATCA::::::TTTTTTCA   [569]
Gymnoschoenus_sphaerocephalus    CTTTATTCTCGTTTGATT::::::::::AATCA::::::::::::::   [514]
Schoenus_turbinatus_LM35         CTTTATTCTCGTTTGATT::::::::::AATTT::::::TTTTTTCA   [553]
Schoenus_paludosus_KW9858        CTTTATTCTCGTTTGATT:::::::AATCAATCA::::::TTTTTTCA   [516]
Costularia_arundinacea_KW9935    CTTTATTCTCGTTTGATTTTTGATT::::AATCT::TTTTTTTTTTT   [578]
Costularia_pubescens_KW9940      CTTTATTCTCGTTTGATT::::::::::AATCT:::::TTTTTTTCA   [568]
Tricostularia_pauciflora_KW991   CTTTATTCTCGTTTGATT::::::::::AATCC::::::TTTTTTCA   [573]
Gahnia_clarkei_AR1621            CTTTATTCTCGTTTGATT::::::::::AATCA::::::::::::::   [543]
Gahnia_sieberiana_KW9913         CTTTATTCTCGTTTGATT::::::::::AATCA::::::::::::::   [542]
Ptilothrix_deusta_XZ1            CTTTATTCTCGTTTGATT::::::::::AATCA::::::TTTTTTTA   [526]
Cyathochaeta_diandra_XZ24        CTTTATTCTCGTTTGATT::::::::::AATCA::::::TT:::::A   [489]
Rhynchospora_brownii_KW9909      CTTTATTCTCGTTTGATT:::::::TATCA:TCA::::::ATTTTTCA   [567]
Rhynchospora_corymbosa_KC75      CTTTATTCTCGTTTGATT:::::::TCTCA:TCA::::::TTTTTTCA   [535]
```

```
[                                770       780       790       800       810    ]
[                                .         .         .         .         .      ]

Carpha_alpina_JB1880B            ::::::::::::::::::::::::::::::::::::GATTA::::::   [529]
Carpha_alpina_JB1878B            ::::::::::::::::::::::::::::::::::::GATTA::::::   [490]
Carpha_alpina_XZ13               ::::::::::::::::::::::::::::::::::::GATTA::::::   [285]
Carpha_curvata_JB1894            ::::::::::::::::::::::::::::::::::::GATTA::::::   [528]
Carpha_curvata_JB1896C           ::::::::::::::::::::::::::::::::::::GATTA::::::   [289]
Carpha_nivicola_JB1868a          ::::::::::::::::::::::::::::::::::::GATTA::::::   [425]
Carpha_nivicola_XZ11             ::::::::::::::::::::::::::::::::::::GATTA::::::   [425]
Carpha_rodwayi_JB1881B           ::::::::::::::::::::::::::::::::::::GATTA::::::   [555]
Carpha_rodwayi_JB1890            ::::::::::::::::::::::::::::::::::::GATTA::::::   [554]
Carpha_filifolia_JB1700          ::::::::::::::::::::::::::::::::::::GATTA::::::   [420]
Carpha_bracteosa_JB1725          ::::::::::::::::::::::::::::::::::::GATTA::::::   [518]
Carpha_nitens_KEW11893           ::::::::::::::::::::::::::::::::::::GATTA::::::   [379]
Carpha_capitellata_JB1718        ::::::::::::::::::::::::::::::::::::GATTA::::::   [518]
Carpha_glomerata_JB1712          ::::::::::::::::::::::::::::::::::::GATTA::::::   [520]
Carpha_glomerata_JB1711          ::::::::::::::::::::::::::::::::::::GATTA::::::   [520]
Carpha_glomerata_JB1706          ::::::::::::::::::::::::::::::::::::GATTA::::::   [523]
Carpha_glomerata_JB1719          ::::::::::::::::::::::::::::::::::::GATTA::::::   [522]
Trianoptiles_solitaria_JH1765    ::::::::::::::::::::::::::::::::::::GATTA::::::   [416]
Trianoptiles_solitaria_JB1756    ::::::::::::::::::::::::::::::::::::GATTA::::::   [416]
Oreobolus_pumilio_XZ12           AAAGATCTAGC:::::AAATTCTATAATGAATGATTTGATTAC:::::   [613]
Oreobolus_distichus_XZ17         AAAGATCTAGC:::::AAATTCTATAATGAATGATTTTATTAC:::::   [611]
Schoenoides_oligocephalus        AAAGATCTAGC:::::AAATTCTATAATGAATGATTTGATTAC:::::   [608]
Costularia_nervosa_KW9939        AAAGATCTAGC:::::AAATTCTATAATGAATGATTTGATTAC:::::   [607]
Gymnoschoenus_sphaerocephalus    ::::::::::::::::::::::::::::::::::::::::::::::::   [514]
Schoenus_turbinatus_LM35         AAAGATCTAGC:::::AAACTCTATAATGAATGATTTGATTAC:::::   [591]
Schoenus_paludosus_KW9858        AAAGATCTAGC:::::AAACCCTATAATGAATCATTTGATTAT:::::   [554]
Costularia_arundinacea_KW9935    AA:GATCTAGC:::::AAACTCTATAATGAATGATTTGATTAC:::::   [615]
Costularia_pubescens_KW9940      AAAGATCTAGC:::::AAACTCTATAATGAATGATTTGATTAC:::::   [606]
Tricostularia_pauciflora_KW991   AAAGATCTAGC:::::AAACTCTATAATGAATGATTTGATTAC:::::   [611]
Gahnia_clarkei_AR1621            ::::::::::::::::::::::::::::::::::::::::::::::::   [543]
Gahnia_sieberiana_KW9913         ::::::::::::::::::::::::::::::::::::::::::::::::   [542]
Ptilothrix_deusta_XZ1            AAAGATCTAGC:::::AAACTCTATAATGAATGATTTGATTACTTAAT   [569]
Cyathochaeta_diandra_XZ24        TATT::::::::::::AAATTAC:TTATC::T::::::::::::::T   [507]
Rhynchospora_brownii_KW9909      AATGAAAAAATATAAAAAACTCTATAATGAATAATTTGATTAC:::::   [610]
Rhynchospora_corymbosa_KC75      AATGAAAAAATCTAACAAACTCTATAATGAATAATTTGATTAC:::::   [578]

[                                   820       830       840       850       860  ]
[                                   .         .         .         .         .    ]

Carpha_alpina_JB1880B            ::::::::::::::::::::::::::::::::::::::::::::::::   [529]
Carpha_alpina_JB1878B            ::::::::::::::::::::::::::::::::::::::::::::::::   [490]
Carpha_alpina_XZ13               ::::::::::::::::::::::::::::::::::::::::::::::::   [285]
Carpha_curvata_JB1894            ::::::::::::::::::::::::::::::::::::::::::::::::   [528]
Carpha_curvata_JB1896C           ::::::::::::::::::::::::::::::::::::::::::::::::   [289]
Carpha_nivicola_JB1868a          ::::::::::::::::::::::::::::::::::::::::::::::::   [425]
Carpha_nivicola_XZ11             ::::::::::::::::::::::::::::::::::::::::::::::::   [425]
Carpha_rodwayi_JB1881B           ::::::::::::::::::::::::::::::::::::::::::::::::   [555]
Carpha_rodwayi_JB1890            ::::::::::::::::::::::::::::::::::::::::::::::::   [554]
Carpha_filifolia_JB1700          ::::::::::::::::::::::::::::::::::::::::::::::::   [420]
Carpha_bracteosa_JB1725          ::::::::::::::::::::::::::::::::::::::::::::::::   [518]
Carpha_nitens_KEW11893           ::::::::::::::::::::::::::::::::::::::::::::::::   [379]
Carpha_capitellata_JB1718        ::::::::::::::::::::::::::::::::::::::::::::::::   [518]
Carpha_glomerata_JB1712          ::::::::::::::::::::::::::::::::::::::::::::::::   [520]
Carpha_glomerata_JB1711          ::::::::::::::::::::::::::::::::::::::::::::::::   [520]
Carpha_glomerata_JB1706          ::::::::::::::::::::::::::::::::::::::::::::::::   [523]
Carpha_glomerata_JB1719          ::::::::::::::::::::::::::::::::::::::::::::::::   [522]
Trianoptiles_solitaria_JH1765    ::::::::::::::::::::::::::::::::::::::::::::::::   [416]
Trianoptiles_solitaria_JB1756    ::::::::::::::::::::::::::::::::::::::::::::::::   [416]
Oreobolus_pumilio_XZ12           :::::::TCAATATTGAAGTCTTTTCTCATTGAACTTCTAT::TTGAA   [652]
Oreobolus_distichus_XZ17         :::::::TCAATATTGAAGTCTTTTCTCATTGAACTTCTAT::TTGAA   [650]
Schoenoides_oligocephalus        :::::::TCAATATTGAAGTCTTTTCTCATTGAACTTCTAT::TTGAA   [647]
Costularia_nervosa_KW9939        :::::::TCAATATTGAAGTCTTTTCTCATTGAACTTCTAT::TTGAA   [646]
Gymnoschoenus_sphaerocephalus    ::::::::::::::::::::::::::::::::::::::::::::::::   [514]
Schoenus_turbinatus_LM35         :::::::TCAATATTGAGTTCTTTTCTCATGGAACTTCTAT::TTGAA   [630]
Schoenus_paludosus_KW9858        :::::::TAAATATTGAATTCTTTTCTCATTGAACTCCTAT::TTGAA   [593]
Costularia_arundinacea_KW9935    :::::::TCAATATTGAGTTCTTTTCTCATTGAACTTCTAT::TTGAA   [654]
Costularia_pubescens_KW9940      :::::::TCAATATTGAGTTCTTTTCTCATTGAACTTCTAT::TTGAA   [645]
Tricostularia_pauciflora_KW991   :::::::TCAATATTAAGTTCTTTTCTCATTGAACTTCTAT::TTGAA   [650]
Gahnia_clarkei_AR1621            ::::::::::::::::::::::::::::::::::::::::::::::::   [543]
Gahnia_sieberiana_KW9913         ::::::::::::::::::::::::::::::::::::::::::::::::   [542]
Ptilothrix_deusta_XZ1            ATTCAATTTAATATTAAATTCTTATCTCATTAAACTTCTATAATTGAA   [617]
Cyathochaeta_diandra_XZ24        ATTGAATTTCGAATTTCTATATTGAATCAA::::::::::::TTCAA   [542]
Rhynchospora_brownii_KW9909      :::::::TAAAAATGAAGTTCTTTTCTTATTGAACTTCTAT::TCGAA   [649]
Rhynchospora_corymbosa_KC75      :::::::TCAAAATAGAGTTTTTTTCTTCTATTC::::::::::AAA   [608]
```

```
[                                870       880       890       900       910]
[                                .         .         .         .         .  ]

Carpha_alpina_JB1880B            ::::::::::::::::::::::::::::::::::::::::::::::::::   [529]
Carpha_alpina_JB1878B            ::::::::::::::::::::::::::::::::::::::::::::::::::   [490]
Carpha_alpina_XZ13               ::::::::::::::::::::::::::::::::::::::::::::::::::   [285]
Carpha_curvata_JB1894            ::::::::::::::::::::::::::::::::::::::::::::::::::   [528]
Carpha_curvata_JB1896C           ::::::::::::::::::::::::::::::::::::::::::::::::::   [289]
Carpha_nivicola_JB1868a          ::::::::::::::::::::::::::::::::::::::::::::::::::   [425]
Carpha_nivicola_XZ11             ::::::::::::::::::::::::::::::::::::::::::::::::::   [425]
Carpha_rodwayi_JB1881B           ::::::::::::::::::::::::::::::::::::::::::::::::::   [555]
Carpha_rodwayi_JB1890            ::::::::::::::::::::::::::::::::::::::::::::::::::   [554]
Carpha_filifolia_JB1700          ::::::::::::::::::::::::::::::::::::::::::::::::::   [420]
Carpha_bracteosa_JB1725          ::::::::::::::::::::::::::::::::::::::::::::::::::   [518]
Carpha_nitens_KEW11893           ::::::::::::::::::::::::::::::::::::::::::::::::::   [379]
Carpha_capitellata_JB1718        ::::::::::::::::::::::::::::::::::::::::::::::::::   [518]
Carpha_glomerata_JB1712          ::::::::::::::::::::::::::::::::::::::::::::::::::   [520]
Carpha_glomerata_JB1711          ::::::::::::::::::::::::::::::::::::::::::::::::::   [520]
Carpha_glomerata_JB1706          ::::::::::::::::::::::::::::::::::::::::::::::::::   [523]
Carpha_glomerata_JB1719          ::::::::::::::::::::::::::::::::::::::::::::::::::   [522]
Trianoptiles_solitaria_JH1765    ::::::::::::::::::::::::::::::::::::::::::::::::::   [416]
Trianoptiles_solitaria_JB1756    ::::::::::::::::::::::::::::::::::::::::::::::::::   [416]
Oreobolus_pumilio_XZ12           TTAATTCACAATAAATAA:::::::TTCAGAA:TTTTTTGA:ATTCAT     [691]
Oreobolus_distichus_XZ17         TTTATTCACAATAAATAA:::::::TTCAGAA:TTTTTTGA:ATTCAT     [689]
Schoenoides_oligocephalus        TTAATTCACAATAAATAA:::::::TTCAGAA:TTTTTTAA:ATTCAT     [686]
Costularia_nervosa_KW9939        TTAATTCACAATAAATAA:::::::TTCAGAA:TTTTTTGA:ATTCAT     [685]
Gymnoschoenus_sphaerocephalus    ::::::::::::::::::::::::::::::::::::::::::::::::::   [514]
Schoenus_turbinatus_LM35         TCGATTCACCATAAAAAA:::::::TTCATAA:TTTTTGAA:ATTCAT     [669]
Schoenus_paludosus_KW9858        TCAATTCACCATAAAGAA:::::::TTTATAAATTTTTTAATATTTAT     [634]
Costularia_arundinacea_KW9935    TCGATTCATCATAAAGAATAAAGAATTCAGAA:TTTTTTGA:ATTCAT     [700]
Costularia_pubescens_KW9940      TCGATTCATCATAAAGAA:::::::TTCAGAA:TTTTTTGA:ATTCAT     [684]
Tricostularia_pauciflora_KW991   TCGATTCACCATAAAGAA:::::::TTCAGAA:TTTTTTCA:ATTCAT     [689]
Gahnia_clarkei_AR1621            ::::::::::::::::::::::::::::::::::::::::::::::::::   [543]
Gahnia_sieberiana_KW9913         ::::::::::::::::::::::::::::::::::::::::::::::::::   [542]
Ptilothrix_deusta_XZ1            TCAATTCACCATAAAGAA:::::::TTCAAAA:ATTTTTGA:ATTCAT     [656]
Cyathochaeta_diandra_XZ24        TA:::CTATACTAAAGAA::::::::T:ATG::::::::GA:::TAAT     [567]
Rhynchospora_brownii_KW9909      TCAATTCTCCATAAATAA:::::::TTCAGAA:TTTTTCAA::TTCAT     [687]
Rhynchospora_corymbosa_KC75      AAAACTCTCCATAAATAA:::::::TTCATAA:TTTTTCAA::TTTAT     [646]

[                                      920       930       940       950       960]
[                                      .         .         .         .         .]

Carpha_alpina_JB1880B            ::::::::::::::::::::::::::::::::::::::::::::::::::   [529]
Carpha_alpina_JB1878B            ::::::::::::::::::::::::::::::::::::::::::::::::::   [490]
Carpha_alpina_XZ13               ::::::::::::::::::::::::::::::::::::::::::::::::::   [285]
Carpha_curvata_JB1894            ::::::::::::::::::::::::::::::::::::::::::::::::::   [528]
Carpha_curvata_JB1896C           ::::::::::::::::::::::::::::::::::::::::::::::::::   [289]
Carpha_nivicola_JB1868a          ::::::::::::::::::::::::::::::::::::::::::::::::::   [425]
Carpha_nivicola_XZ11             ::::::::::::::::::::::::::::::::::::::::::::::::::   [425]
Carpha_rodwayi_JB1881B           ::::::::::::::::::::::::::::::::::::::::::::::::::   [555]
Carpha_rodwayi_JB1890            ::::::::::::::::::::::::::::::::::::::::::::::::::   [554]
Carpha_filifolia_JB1700          ::::::::::::::::::::::::::::::::::::::::::::::::::   [420]
Carpha_bracteosa_JB1725          ::::::::::::::::::::::::::::::::::::::::::::::::::   [518]
Carpha_nitens_KEW11893           ::::::::::::::::::::::::::::::::::::::::::::::::::   [379]
Carpha_capitellata_JB1718        ::::::::::::::::::::::::::::::::::::::::::::::::::   [518]
Carpha_glomerata_JB1712          ::::::::::::::::::::::::::::::::::::::::::::::::::   [520]
Carpha_glomerata_JB1711          ::::::::::::::::::::::::::::::::::::::::::::::::::   [520]
Carpha_glomerata_JB1706          ::::::::::::::::::::::::::::::::::::::::::::::::::   [523]
Carpha_glomerata_JB1719          ::::::::::::::::::::::::::::::::::::::::::::::::::   [522]
Trianoptiles_solitaria_JH1765    ::::::::::::::::::::::::::::::::::::::::::::::::::   [416]
Trianoptiles_solitaria_JB1756    ::::::::::::::::::::::::::::::::::::::::::::::::::   [416]
Oreobolus_pumilio_XZ12           AAA:TATTTCCTT:CCAAATTTGCTATTTCATA:::ATAATTCACAA:     [733]
Oreobolus_distichus_XZ17         AAA:TATTTTCTT:CCAAATTTGCTATTTCATA:::AAAATTCACAA:     [731]
Schoenoides_oligocephalus        AAA:TATTTCCTT:CCAAATTTGCTATTTCATA:::AAAATTCACAA:     [728]
Costularia_nervosa_KW9939        AAA:TATTTCCTT:CCAAATTTGCTATTTCATA:::ATCATTCACAA:     [727]
Gymnoschoenus_sphaerocephalus    ::::::::::::::::::::::::::::::::::::::::::::::::::   [514]
Schoenus_turbinatus_LM35         AAAATAAATACTT:CCGAATTTGCTATCTCACA:::ATCATT::::A:     [708]
Schoenus_paludosus_KW9858        AAA:TATTT:CTTTCCGAATTTGCTATTTAATA:::ATCATTCAAAA:     [676]
Costularia_arundinacea_KW9935    AAA:TA::::CTT:CCGAATTTGCTATCTCATA:::ATCATTCCCAT:     [738]
Costularia_pubescens_KW9940      AAA:TA::::CTT:CCGAATTTGCTATCTCATA:::ATCATTCCCAT:     [722]
Tricostularia_pauciflora_KW991   AAA:TA::::CTT:CCGAATTTGCTATCT:ATA:::ATCATTCCCATA     [727]
Gahnia_clarkei_AR1621            ::::::::::::::::::::::::::::::::::::::::::::::::::   [543]
Gahnia_sieberiana_KW9913         ::::::::::::::::::::::::::::::::::::::::::::::::::   [542]
Ptilothrix_deusta_XZ1            AAA:TATTTCCTTTCCGAATTTGTTATTTGATATTTTATAATCATTCC     [703]
Cyathochaeta_diandra_XZ24        ATTA:ATTT:::::::GAT::C:GTGATT:::::::ATCATTT:::::     [592]
Rhynchospora_brownii_KW9909      AAAA:ATTT:::::CAGAATTTGCTATTTCATA:::ATCATTCACAA:     [725]
Rhynchospora_corymbosa_KC75      CAAA:ATTT:::::CCCAATTTGATATTTCCGA:::ATTATTGGTAA:     [684]
```

```
[                                    970       980       990       1000     ]
[                                    .         .         .         .        ]

Carpha_alpina_JB1880B                ::::::::::::::::::::::::::::::::::::::::::::::::   [529]
Carpha_alpina_JB1878B                ::::::::::::::::::::::::::::::::::::::::::::::::   [490]
Carpha_alpina_XZ13                   ::::::::::::::::::::::::::::::::::::::::::::::::   [285]
Carpha_curvata_JB1894                ::::::::::::::::::::::::::::::::::::::::::::::::   [528]
Carpha_curvata_JB1896C               ::::::::::::::::::::::::::::::::::::::::::::::::   [289]
Carpha_nivicola_JB1868a              ::::::::::::::::::::::::::::::::::::::::::::::::   [425]
Carpha_nivicola_XZ11                 ::::::::::::::::::::::::::::::::::::::::::::::::   [425]
Carpha_rodwayi_JB1881B               ::::::::::::::::::::::::::::::::::::::::::::::::   [555]
Carpha_rodwayi_JB1890                ::::::::::::::::::::::::::::::::::::::::::::::::   [554]
Carpha_filifolia_JB1700              ::::::::::::::::::::::::::::::::::::::::::::::::   [420]
Carpha_bracteosa_JB1725              ::::::::::::::::::::::::::::::::::::::::::::::::   [518]
Carpha_nitens_KEW11893               ::::::::::::::::::::::::::::::::::::::::::::::::   [379]
Carpha_capitellata_JB1718            ::::::::::::::::::::::::::::::::::::::::::::::::   [518]
Carpha_glomerata_JB1712              ::::::::::::::::::::::::::::::::::::::::::::::::   [520]
Carpha_glomerata_JB1711              ::::::::::::::::::::::::::::::::::::::::::::::::   [520]
Carpha_glomerata_JB1706              ::::::::::::::::::::::::::::::::::::::::::::::::   [523]
Carpha_glomerata_JB1719              ::::::::::::::::::::::::::::::::::::::::::::::::   [522]
Trianoptiles_solitaria_JH1765        ::::::::::::::::::::::::::::::::::::::::::::::::   [416]
Trianoptiles_solitaria_JB1756        ::::::::::::::::::::::::::::::::::::::::::::::::   [416]
Oreobolus_pumilio_XZ12               :::TTT::::GTTATGATATAACA::::::::::::::::::::::::   [750]
Oreobolus_distichus_XZ17             :::TTT::::GTTATGATATAACA::::::::::::::::::::::::   [748]
Schoenoides_oligocephalus            :::TTT::::GTTATGATATAACA::::::::::::::::::::::::   [745]
Costularia_nervosa_KW9939            :::TTT::::GTTATGATATAACA::::::::::::::::::::::::   [744]
Gymnoschoenus_sphaerocephalus        ::::::::::::::::::::::::::::::::::::::::::::::::   [514]
Schoenus_turbinatus_LM35             :::TTTAT::GTTAATAAATAATAAAAA:::::::::::::::::TT   [733]
Schoenus_paludosus_KW9858            :::TTTCTTTGTTAACATAGAACAATATA:::::::::::::::ATT   [705]
Costularia_arundinacea_KW9935        :::TTTTTTTATTAGCATAAAAAAGAAAA:::::::::::::::TT   [766]
Costularia_pubescens_KW9940          :::TTTTTTTATTAGCATAAAAAAGAAAA:::::::::::::::TT   [750]
Tricostularia_pauciflora_KW991       TTCTTTTTT::::ACCATAAAAAAGAAAA:::::::::::::::TT   [754]
Gahnia_clarkei_AR1621                ::::::::::::::::::::::::::::::::::::::::::::::::   [543]
Gahnia_sieberiana_KW9913             ::::::::::::::::::::::::::::::::::::::::::::::::   [542]
Ptilothrix_deusta_XZ1                AAATTTCTTTATTAATATGAATAATAAATATTATTATTATTTTGAATT   [751]
Cyathochaeta_diandra_XZ24            ::::::::::::::::ATCA:::::::::::::::::::::::::TT   [598]
Rhynchospora_brownii_KW9909          :::TTTCTTTATTAACATGAAAAATGTTA:::::::::::::::::TT   [753]
Rhynchospora_corymbosa_KC75          :::TTTTGTCAGTACCATGAAAAATATTA:::::::::::::::::TT   [712]

[                                    1010      1020      1030      1040      1050   ]
[                                    .         .         .         .         .      ]

Carpha_alpina_JB1880B                ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [540]
Carpha_alpina_JB1878B                ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [501]
Carpha_alpina_XZ13                   ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [296]
Carpha_curvata_JB1894                ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [539]
Carpha_curvata_JB1896C               ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [300]
Carpha_nivicola_JB1868a              ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [436]
Carpha_nivicola_XZ11                 ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [436]
Carpha_rodwayi_JB1881B               ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [566]
Carpha_rodwayi_JB1890                ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [565]
Carpha_filifolia_JB1700              ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [431]
Carpha_bracteosa_JB1725              ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [529]
Carpha_nitens_KEW11893               ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [390]
Carpha_capitellata_JB1718            ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [529]
Carpha_glomerata_JB1712              ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [531]
Carpha_glomerata_JB1711              ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [531]
Carpha_glomerata_JB1706              ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [534]
Carpha_glomerata_JB1719              ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [533]
Trianoptiles_solitaria_JH1765        ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [427]
Trianoptiles_solitaria_JB1756        ::::::::::::::::::::::::::::::::::ATCAGT:ATATA   [427]
Oreobolus_pumilio_XZ12               TGATTGTGATTATCATG::::::AATTATTTGATTAATAAGT:ATATA   [791]
Oreobolus_distichus_XZ17             TGATTGTGATTATCATG::::::AATTATTTGATTAATCAGT:ATATA   [789]
Schoenoides_oligocephalus            TCATTGTGATTATCATG::::::AATTATTTGATTAATAAGT:ATATA   [786]
Costularia_nervosa_KW9939            TGATTGTGATTATCATG::::::AATTATTTGATTAATCAGT:ATATA   [785]
Gymnoschoenus_sphaerocephalus        ::::::::::::::::::::::::::::::::::::::GT:ATATA   [521]
Schoenus_turbinatus_LM35             TA:TCGTGATTATGATT::::::CATAATTTGATTAATCAGT:ATATA   [773]
Schoenus_paludosus_KW9858            TGATCGTGATTATGATT::::::CATCATTTGATTAATCAGT:ATATA   [746]
Costularia_arundinacea_KW9935        TGATCGTGATTATGATT::::::CATCATTTGATTAATCAGT:ATATA   [807]
Costularia_pubescens_KW9940          TGATCGTGATTATGATT::::::CATCATTTGATTAATCAGT:ATATA   [791]
Tricostularia_pauciflora_KW991       TGATCGTGATTATGATT::::::CATCATTTGATTAATCAGT:ATATA   [795]
Gahnia_clarkei_AR1621                ::::::::::::::::::::::::::::::::::::::GT:ATATA   [550]
Gahnia_sieberiana_KW9913             ::::::::::::::::::::::::::::::::::::::GT:ATATA   [549]
Ptilothrix_deusta_XZ1                TGATCGTGATTATCATTTTCATTTATCATTTAATTAATCAGT:ATATA   [798]
Cyathochaeta_diandra_XZ24            T::::::GATTAA:::::::::::TATCATTTGATTAATCAGT:ATATA   [629]
Rhynchospora_brownii_KW9909          TGATCATGATTATGATC::::::::AATCAAAATGAATCAGTAATATA   [793]
Rhynchospora_corymbosa_KC75          TGATTTACCAT::GAAA::::::::AATATTATTTGATC:GTGATTAA   [749]
```

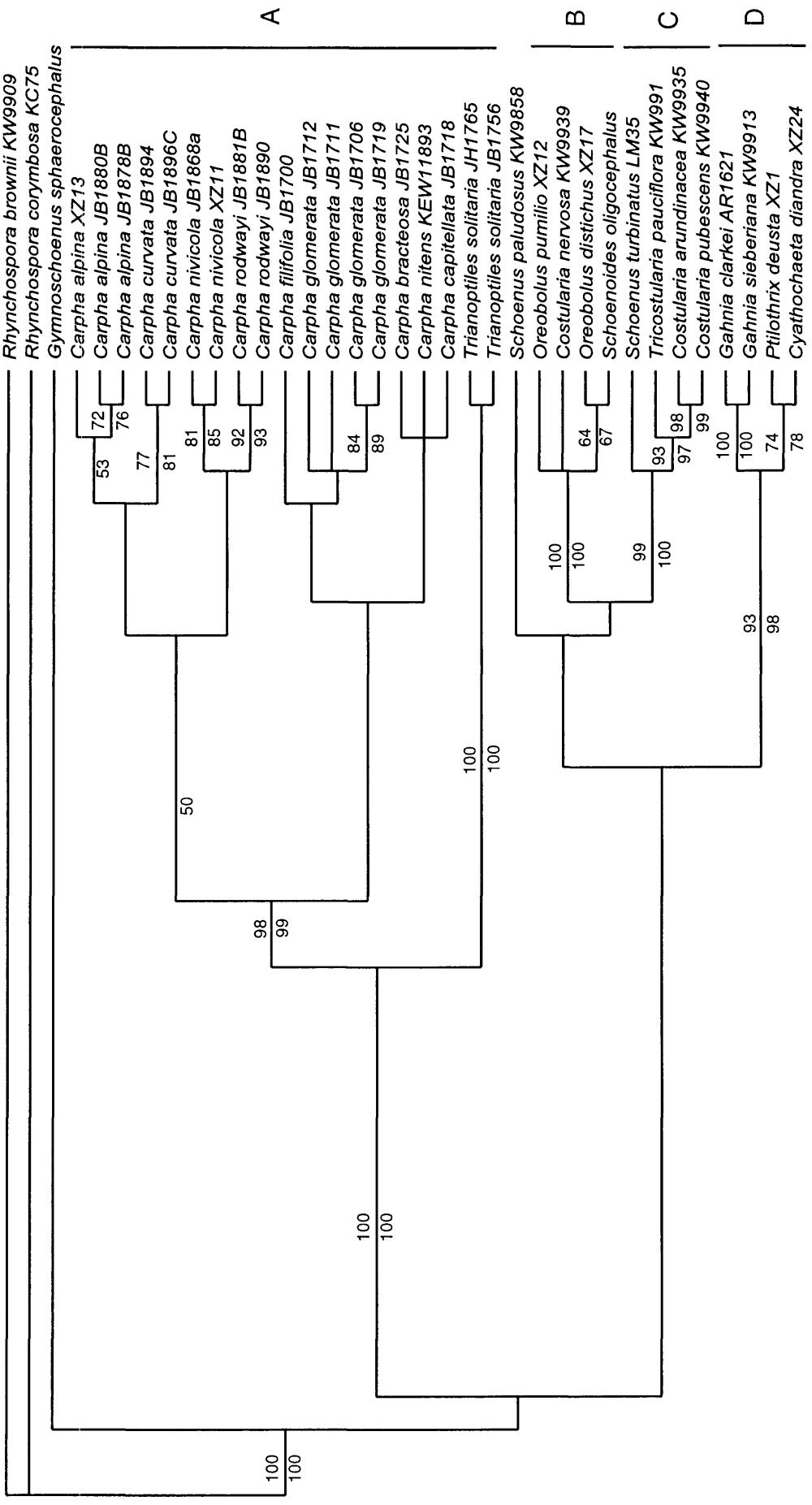
```
[                                  1060      1070      1080      1090      1100 ]
[                                  .         .         .         .         .    ]

Carpha_alpina_JB1880B              TACG::::::::::::::::::::::::::::::::::::::::::::   [544]
Carpha_alpina_JB1878B              TACG::::::::::::::::::::::::::::::::::::::::::::   [505]
Carpha_alpina_XZ13                 TACG::::::::::::::::::::::::::::::::::::::::::::   [300]
Carpha_curvata_JB1894              TACG::::::::::::::::::::::::::::::::::::::::::::   [543]
Carpha_curvata_JB1896C             TACG::::::::::::::::::::::::::::::::::::::::::::   [304]
Carpha_nivicola_JB1868a            TACG::::::::::::::::::::::::::::::::::::::::::::   [440]
Carpha_nivicola_XZ11               TACG::::::::::::::::::::::::::::::::::::::::::::   [440]
Carpha_rodwayi_JB1881B             TACG::::::::::::::::::::::::::::::::::::::::::::   [570]
Carpha_rodwayi_JB1890              TACG::::::::::::::::::::::::::::::::::::::::::::   [569]
Carpha_filifolia_JB1700            TACG::::::::::::::::::::::::::::::::::::::::::::   [435]
Carpha_bracteosa_JB1725            TACG::::::::::::::::::::::::::::::::::::::::::::   [533]
Carpha_nitens_KEW11893             TACG::::::::::::::::::::::::::::::::::::::::::::   [394]
Carpha_capitellata_JB1718          TACG::::::::::::::::::::::::::::::::::::::::::::   [533]
Carpha_glomerata_JB1712            TACG::::::::::::::::::::::::::::::::::::::::::::   [535]
Carpha_glomerata_JB1711            TACG::::::::::::::::::::::::::::::::::::::::::::   [535]
Carpha_glomerata_JB1706            TACG::::::::::::::::::::::::::::::::::::::::::::   [538]
Carpha_glomerata_JB1719            TACG::::::::::::::::::::::::::::::::::::::::::::   [537]
Trianoptiles_solitaria_JH1765      TACG::::::::::::::::::::::::::::::::::::::::::::   [431]
Trianoptiles_solitaria_JB1756      TACG::::::::::::::::::::::::::::::::::::::::::::   [431]
Oreobolus_pumilio_XZ12             TACG::::::::::::::::::::::::::::::::::::::::::::   [795]
Oreobolus_distichus_XZ17           TACG::::::::::::::::::::::::::::::::::::::::::::   [793]
Schoenoides_oligocephalus          TACG::::::::::::::::::::::::::::::::::::::::::::   [790]
Costularia_nervosa_KW9939          TACG::::::::::::::::::::::::::::::::::::::::::::   [789]
Gymnoschoenus_sphaerocephalus      TACG::::::::::::::::::::::::::::::::::::::::::::   [525]
Schoenus_turbinatus_LM35           GACG::::::::::::::::::::::::::::::::::::::::::::   [777]
Schoenus_paludosus_KW9858          TA::::::::::::::::::::::::::::::::::::::::::::::   [748]
Costularia_arundinacea_KW9935      TACG::::::::::::::::::::::::::::::::::::::::::::   [811]
Costularia_pubescens_KW9940        TACG::::::::::::::::::::::::::::::::::::::::::::   [795]
Tricostularia_pauciflora_KW991     TACG::::::::::::::::::::::::::::::::::::::::::::   [799]
Gahnia_clarkei_AR1621              TACG::::::::::::::::::::::::::::::::::::::::::::   [554]
Gahnia_sieberiana_KW9913           TACG::::::::::::::::::::::::::::::::::::::::::::   [553]
Ptilothrix_deusta_XZ1              TACG::::::::::::::::::::::::::::::::::::::::::::   [802]
Cyathochaeta_diandra_XZ24          TACG::::::::::::::::::::::::::::::::::::::::::::   [633]
Rhynchospora_brownii_KW9909        T:::::::::::::::::::::::::::::::::::::::::::::::   [794]
Rhynchospora_corymbosa_KC75        TGCGTGATTAATGATTAATCAAATTATTAATGATTAATCAAATTATTA   [797]

[                                       1110      1120      1130      1140      1150]
[                                       .         .         .         .         .  ]

Carpha_alpina_JB1880B              ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [560]
Carpha_alpina_JB1878B              ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [521]
Carpha_alpina_XZ13                 ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [316]
Carpha_curvata_JB1894              ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [559]
Carpha_curvata_JB1896C             ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [320]
Carpha_nivicola_JB1868a            ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [456]
Carpha_nivicola_XZ11               ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [456]
Carpha_rodwayi_JB1881B             ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [586]
Carpha_rodwayi_JB1890              ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [585]
Carpha_filifolia_JB1700            ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [451]
Carpha_bracteosa_JB1725            ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [549]
Carpha_nitens_KEW11893             ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [410]
Carpha_capitellata_JB1718          ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [549]
Carpha_glomerata_JB1712            ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [551]
Carpha_glomerata_JB1711            ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [551]
Carpha_glomerata_JB1706            ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [554]
Carpha_glomerata_JB1719            ::::::::::TATGTCTT::::::::::::::::::::::TGGTATTT   [553]
Trianoptiles_solitaria_JH1765      ::::::::::TATGTCTTTCGTATTTTAGATTTTGGTATTTGGTATTT   [469]
Trianoptiles_solitaria_JB1756      ::::::::::TATGTCTTTCGTATTTTAGATTTTGGTATTTGGTATTT   [469]
Oreobolus_pumilio_XZ12             ::::::::::TATGTCTT::::::::::::::::::::::::::::T   [804]
Oreobolus_distichus_XZ17           ::::::::::TATGTCTT::::::::::::::::::::::::::::T   [802]
Schoenoides_oligocephalus          ::::::::::TATGTCTT::::::::::::::::::::::::::::T   [799]
Costularia_nervosa_KW9939          ::::::::::TATGTCTT::::::::::::::::::::::::::::T   [798]
Gymnoschoenus_sphaerocephalus      ::::::::::TGTGTCTT::::::::::::::::::::::::::::T   [534]
Schoenus_turbinatus_LM35           ::::::::::TATGTATG::::::::::::::::::::::::::::T   [786]
Schoenus_paludosus_KW9858          ::::::::::TACGTATG::::::::::::::::::::::::::TTTTT   [761]
Costularia_arundinacea_KW9935      ::::::::::TA::::::::::::::::::::::::::::::::::   [813]
Costularia_pubescens_KW9940        ::::::::::TA::::::::::::::::::::::::::::::::::   [797]
Tricostularia_pauciflora_KW991     ::::::::::TATGTATT::::::::::::::::::::::::::::T   [808]
Gahnia_clarkei_AR1621              ::::::::::TATGCCTT::::::::::::::::::::::::::::T   [563]
Gahnia_sieberiana_KW9913           ::::::::::TATGCCTT::::::::::::::::::::::::::::T   [562]
Ptilothrix_deusta_XZ1              ::::::::::TATGCCTT::::::::::::::::::::::::::::T   [811]
Cyathochaeta_diandra_XZ24          ::::::::::TATGCTCT::::::::::::::::::::::::::::T   [642]
Rhynchospora_brownii_KW9909        :::::::::ATATGTCTT::::::::::::::::::::::::::::T   [804]
Rhynchospora_corymbosa_KC75        ATCAGTAATATATGTCTT::::::::::::::::::::::::::::T   [816]
```

```
[                                    1160       1170       1180       1190       1200]
[                                    .          .          .          .          .]

Carpha_alpina_JB1880B                GGTATATAGGGTCG:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [601]
Carpha_alpina_JB1878B                GGTATATAGGGTCG:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [562]
Carpha_alpina_XZ13                   GGTATATAGGGTCAGTCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [358]
Carpha_curvata_JB1894                GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [600]
Carpha_curvata_JB1896C               GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [361]
Carpha_nivicola_JB1868a              GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [497]
Carpha_nivicola_XZ11                 GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [497]
Carpha_rodwayi_JB1881B               GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [627]
Carpha_rodwayi_JB1890                GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [626]
Carpha_filifolia_JB1700              GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [492]
Carpha_bracteosa_JB1725              GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [590]
Carpha_nitens_KEW11893               GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [451]
Carpha_capitellata_JB1718            GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [590]
Carpha_glomerata_JB1712              GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [592]
Carpha_glomerata_JB1711              GGTATATAGGGTCA:TCCTTTTCTCTGATTTCGATA:GAAAAAT::::   [593]
Carpha_glomerata_JB1706              GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [595]
Carpha_glomerata_JB1719              GGTATATAGGGTCA:TCCTTT:CTCTGATTTCGATA:GAAAAAT::::   [594]
Trianoptiles_solitaria_JH1765        GGTATATAGGGTCA:TCTTTT:CTCTGATTTTGATA:GAAAAAT::::   [510]
Trianoptiles_solitaria_JB1756        GGTATATAGGGTCA:TCTTTT:CTCTGATTTTGATA:GAAAAAT::::   [510]
Oreobolus_pumilio_XZ12               GGTATATAGGGCTA:TCCTTT:ATCTTATTTCGATA:AAGATATTGCA   [849]
Oreobolus_distichus_XZ17             GGTATATAGGGTTA:TCCTTT:ATCTTATTTCGATA:AAAATATTGCA   [847]
Schoenoides_oligocephalus            GGTATATAGGGCTA:TTCTTT:ATCTTATTTCGATA:AAGATATTGCA   [844]
Costularia_nervosa_KW9939            GGTATATAGGGCTA:TCCTTT:ATCTTATTTCGATA:AAGATATTGCA   [843]
Gymnoschoenus_sphaerocephalus        GGTATATGCGGCCA:TCCTTT:CTCTTATTTCGATA:GAGAGATTCCA   [579]
Schoenus_turbinatus_LM35             GATATACATGGCTA:TCCTTT:CTCTTATTCCGATA:GAGAAATTCCA   [831]
Schoenus_paludosus_KW9858            GGTATATATGGTTA:TCCTTT:CTTTTATTTCGATA:GAGAAATTCCA   [806]
Costularia_arundinacea_KW9935        ::TATATATGGCTA:TCCTTC:CTCTTATTTCGATA:GAGAAATTCCA   [856]
Costularia_pubescens_KW9940          ::TATATATGGCTA:TCCTTC:CTCTTATTTCGATA:GAGAAATTCCA   [840]
Tricostularia_pauciflora_KW991       GATACATATGGTTA:TCCTTT:CTCTTATTTCGATA:GAGAAATTCTA   [853]
Gahnia_clarkei_AR1621                GGTATATATGTCTA:TCCTTT:CTCTTATTTTGATA:GAGAAATTCCA   [608]
Gahnia_sieberiana_KW9913             GGTATATATGTCTA:TCCTTT:CTCTTATTTTGATA:GAGAAATTCCA   [607]
Ptilothrix_deusta_XZ1                GGTATATACGCATG:TCTTTT:CTCTTATTTTGATA:GAGAAATTCCA   [856]
Cyathochaeta_diandra_XZ24            GGTATATACGTCTA:TCTTTT:CTCTTATTTCGATA:GATAGATTCCA   [687]
Rhynchospora_brownii_KW9909          GGTATATACGGCTA:TCCTTT:CTCTTATTTCGATAAGAAACATCC::   [848]
Rhynchospora_corymbosa_KC75          GGTATATAAAACTA:TCCTTT:ATCTTATTTTGATAA:ATACATTC::   [859]

[                                         1210       1220       1230       1240      ]
[                                         .          .          .          .         ]

Carpha_alpina_JB1880B                CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [647]
Carpha_alpina_JB1878B                CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [608]
Carpha_alpina_XZ13                   CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [404]
Carpha_curvata_JB1894                ACTACCAATGCAACG:TAATCAACTCTATT:AGTTAGAATAGCTTCCA   [646]
Carpha_curvata_JB1896C               ACTACCAATGCAACG:TAATCAACTCTATT:AGTTAGAATAGCTTCCA   [407]
Carpha_nivicola_JB1868a              CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [543]
Carpha_nivicola_XZ11                 CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [543]
Carpha_rodwayi_JB1881B               CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [673]
Carpha_rodwayi_JB1890                CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [672]
Carpha_filifolia_JB1700              CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [538]
Carpha_bracteosa_JB1725              CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [636]
Carpha_nitens_KEW11893               CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [497]
Carpha_capitellata_JB1718            CCTACCAATGCAACGGTAATCAACTCTATT:CGTTAGAATAGCTTCCA   [637]
Carpha_glomerata_JB1712              CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [638]
Carpha_glomerata_JB1711              CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [639]
Carpha_glomerata_JB1706              CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [641]
Carpha_glomerata_JB1719              CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [640]
Trianoptiles_solitaria_JH1765        CCTATCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [556]
Trianoptiles_solitaria_JB1756        CCTATCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [556]
Oreobolus_pumilio_XZ12               CTTACCAATGGAACG:TAATCAATTCTATTACGTTAGAATAGCTTCCA   [896]
Oreobolus_distichus_XZ17             CTTACCTATGGAACG:TAATCCATTATATTACGTTAGAATAGCTTCCA   [894]
Schoenoides_oligocephalus            CTTACCAATGGAACG:TAATCAATTCTATTACGTTAGAATAGCTTCCA   [891]
Costularia_nervosa_KW9939            CTTACCAATGGAACG:TAATCAATTCTATTACGTTAGAATAGCTTCCA   [890]
Gymnoschoenus_sphaerocephalus        CCTACCAATCTAACG:TAATCAACTCTGTT:CGTTAGAATAGCTTCCA   [625]
Schoenus_turbinatus_LM35             CCTACCAATGCAACGGTAATAAACTCTATT:CGTTAGAATAGCTTCCA   [878]
Schoenus_paludosus_KW9858            CCTACCAATGCAACG:TAATAAACTCTATT:CGTTAGAATAGCTTCCA   [852]
Costularia_arundinacea_KW9935        CCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [902]
Costularia_pubescens_KW9940          TCTACCAATGCAACG:TAATCAACTCTATT:CGTTAGAATAGCTTCCA   [886]
Tricostularia_pauciflora_KW991       CCTACCAATGCAACG:TAATCACCTCTATT:CGTTAGAATAGCTTCCA   [899]
Gahnia_clarkei_AR1621                CCTACCAATGCAACG:CAATCAACTCTATT:CGTTAGAATAGCTTCCA   [654]
Gahnia_sieberiana_KW9913             CCTACCAATGCAACG:CAATCAACTCTATT:CGTTAGAATAGCTTCCA   [653]
Ptilothrix_deusta_XZ1                CCTACCAATGTAACG:TAATCAACCCTATT:CGTTAGAATAGCTTCCA   [902]
Cyathochaeta_diandra_XZ24            ::::::AATGCAACG:TAATCAACTGTATT:CGTTAGAATAGCTTCCA   [727]
Rhynchospora_brownii_KW9909          ::TACCAATGCAAC::AAATCAATTCTATT:CGTTAGAATAGCTTCCA   [891]
Rhynchospora_corymbosa_KC75          ::TACCAATACAAC::AAATCAACCATATT:CGTTAGAATAGCTTCCA   [902]
```

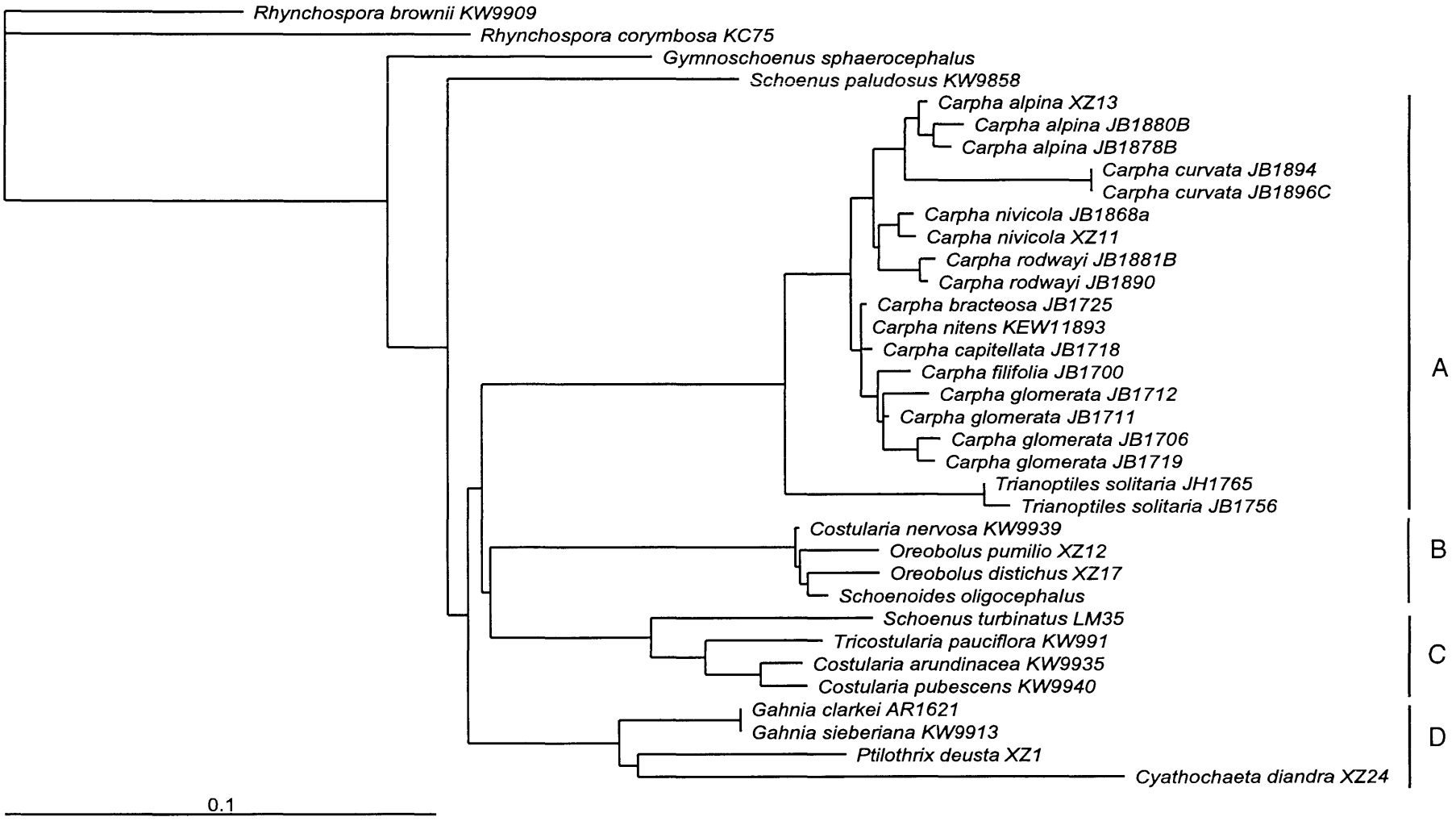
```
[                                1250      1260      1270      1280      1290   ]
[                                .         .         .         .         .      ]

Carpha_alpina_JB1880B            TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [682]
Carpha_alpina_JB1878B            TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [643]
Carpha_alpina_XZ13               TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [439]
Carpha_curvata_JB1894            TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [681]
Carpha_curvata_JB1896C           TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [442]
Carpha_nivicola_JB1868a          TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTACTATCTTTTTTAT   [591]
Carpha_nivicola_XZ11             TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:TATCTTTTTTAT   [590]
Carpha_rodwayi_JB1881B           TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [708]
Carpha_rodwayi_JB1890            TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [707]
Carpha_filifolia_JB1700          TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [573]
Carpha_bracteosa_JB1725          TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [671]
Carpha_nitens_KEW11893           TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [532]
Carpha_capitellata_JB1718        TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [672]
Carpha_glomerata_JB1712          TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [673]
Carpha_glomerata_JB1711          TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [674]
Carpha_glomerata_JB1706          TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [676]
Carpha_glomerata_JB1719          TCGAGTCTCTGCACCTATCTTTTTTATTCTACTTA:::::::::::::   [675]
Trianoptiles_solitaria_JH1765    TCGAGTCTCTGCACCTATCTTTTTGATTCTACTTA:::::::::::::   [591]
Trianoptiles_solitaria_JB1756    TCGAGTCTCTGCACCTATCTTTTTGATTCTACTTA:::::::::::::   [591]
Oreobolus_pumilio_XZ12           TCGAGTCTCTGCACCTATCCTTTTTATTCTAGTTA:::::::TTTTAT   [937]
Oreobolus_distichus_XZ17         TCGAGTCTCTGCACCTATCCTTTTTATTCTAGTTA:::::::::::::   [929]
Schoenoides_oligocephalus        TCGAGTCTCTGCACCTATCCTTTTTATTCTAGTTA:::::::TTTTAT   [932]
Costularia_nervosa_KW9939        TCGAGTCTCTGCACCTATCCTTTTTATTCTAGTTA:::::::TTTTCT   [931]
Gymnoschoenus_sphaerocephalus    TTGAGTCTCTGCACCTATCCTTTTAATTCTTTTTA:::::::::::::   [660]
Schoenus_turbinatus_LM35         TTGAGTCTCTGCACCTATCTTTTTGATTCTAGTTA:::::::::::::   [913]
Schoenus_paludosus_KW9858        TCGAGTCTCTGCACCTATCCTTTTTATTCTAGTTA:::::::::::::   [887]
Costularia_arundinacea_KW9935    TCGAGTCTCTGCACCTATCCTTTTGATTCTGGTTA:::::::::::::   [937]
Costularia_pubescens_KW9940      TCGAGTCTCTGCACCTATCCTTTTGATTCTGGTTA:::::::::::::   [921]
Tricostularia_pauciflora_KW991   TCGAGTCTCTGCACCTATCCTTTTCATTCTAGTTA:::::::::::::   [934]
Gahnia_clarkei_AR1621            TCGAGTCTCTGCACCTATCCTTTTGATTCGAGTTA:::::::::::::   [689]
Gahnia_sieberiana_KW9913         TCGAGTCTCTGCACCTATCCTTTTGATTCGAGTTA:::::::::::::   [688]
Ptilothrix_deusta_XZ1            TCGAGTCTCTGCACCTATCCTTTTTATTCTAGTTA:::::::::::::   [937]
Cyathochaeta_diandra_XZ24        TTGAGTCTCTGCACCTATCCTTTTTATTCTAGTTA:::::::::::::   [762]
Rhynchospora_brownii_KW9909      TTGAGTCTCTGCACCTATCCTTTTTCTTTTTTATTTTT::CAAA:AAAA   [936]
Rhynchospora_corymbosa_KC75      TCGAGTCTCTGCACCTATCCTTTTGATTTT:::::::::CAAA:CAAA   [940]

[                                   1300      1310      1320      1330      1340 ]
[                                   .         .         .         .         .    ]

Carpha_alpina_JB1880B            ::::::::::::::::ATAGATATTAAGTACCAAAAGA:::::::CCA   [707]
Carpha_alpina_JB1878B            ::::::::::::::::ATAGATATTAAGTACCAAAAGA:::::::CCA   [668]
Carpha_alpina_XZ13               ::::::::::::::::ATAGATATTAAGTACCAAAAGA:::::::CCA   [464]
Carpha_curvata_JB1894            ::::::::::::::::ATAGATATTATATACCAAAAGA:::::::CCA   [706]
Carpha_curvata_JB1896C           ::::::::::::::::ATAGATATTATATACCAAAAGA:::::::CCA   [467]
Carpha_nivicola_JB1868a          TCTACTTAATAGATATATAGATATTAAGTACCAAAAGA:::::::CCA   [632]
Carpha_nivicola_XZ11             TCTACTTA::::::::ATAGATATTAAGTACCAAAAGA:::::::CCA   [623]
Carpha_rodwayi_JB1881B           ::::::::::::::::ATAGATATTATATATCAAAAGA:::::::CCA   [733]
Carpha_rodwayi_JB1890            ::::::::::::::::ATAGATATTATATATCAAAAGA:::::::CCA   [732]
Carpha_filifolia_JB1700          ::::::::::::::::ATATATATTATATACCAAAAGATTATATACCA   [605]
Carpha_bracteosa_JB1725          ::::::::::::::::ATATATATTAAGTACCAAAAGATTATATACCA   [703]
Carpha_nitens_KEW11893           ::::::::::::::::ATATATATTAAGTACCAAAAGATTATATACCA   [564]
Carpha_capitellata_JB1718        ::::::::::::::::ATATATATTAAGTACCAAAAGATTATATACCA   [704]
Carpha_glomerata_JB1712          ::::::::::::::::ATATATATTATATACCAAAAGATTATATACCA   [705]
Carpha_glomerata_JB1711          ::::::::::::::::ATATATATTATATACCAAAAGATTATATACCA   [706]
Carpha_glomerata_JB1706          ::::::::::::::::ATATATATTATATACCAAAAGATTCTATATCA   [708]
Carpha_glomerata_JB1719          ::::::::::::::::ATATATATTATATACCAAAAGATTCTATATCA   [707]
Trianoptiles_solitaria_JH1765    ::::::::::::::::AAATATAGATA::::::::::TTATATACTA   [612]
Trianoptiles_solitaria_JB1756    ::::::::::::::::AAATATAGATA::::::::::TTATATACTA   [612]
Oreobolus_pumilio_XZ12           TCTAGTT:::::::::ATAATAGAATAAGAAAAAGAA:TTAATAAGT:   [974]
Oreobolus_distichus_XZ17         ::::::::::::::::TAATAGAATAAGAAAAAGAA:TTAATAACT:   [958]
Schoenoides_oligocephalus        TCTAGTT:::::::::ATAATAGAATAAGAAAAAGAA:TTAATAACT:   [969]
Costularia_nervosa_KW9939        TCTAGTT:::::::::ATAATAGAATAAGAAAAAGAA:TTAATAACT:   [968]
Gymnoschoenus_sphaerocephalus    ::::::::::::::::ATTCTA::::::::::::::GTTATACA:::   [674]
Schoenus_turbinatus_LM35         ::::::::::::::::TAAT::::::::::::::::::::::::::   [917]
Schoenus_paludosus_KW9858        ::::::::::::::::TATATAACTA::::::::::::::::::::   [897]
Costularia_arundinacea_KW9935    ::::::::::::::::TAAT::::::::::::::::::::::::::   [941]
Costularia_pubescens_KW9940      ::::::::::::::::TAAT::::::::::::::::::::::::::   [925]
Tricostularia_pauciflora_KW991   ::::::::::::::::TAAT::::::::::::::::::::::::::   [938]
Gahnia_clarkei_AR1621            ::::::::::::::::TATA::::::::::::::::::::::::::   [693]
Gahnia_sieberiana_KW9913         ::::::::::::::::TATA::::::::::::::::::::::::::   [692]
Ptilothrix_deusta_XZ1            ::::::::::::::::TATA::::::::AAAA::::::::::::::   [945]
Cyathochaeta_diandra_XZ24        ::::::::::::::::TATATA:::::GAAAATATA::::::::::   [777]
Rhynchospora_brownii_KW9909      TTGGA::::::::::ATTTTCATATATTTCATTTTTTTTCAATCAATA   [973]
Rhynchospora_corymbosa_KC75      TTGGA::::::::::ATTTGAA::::::::::::::TTTATTCCATA   [963]
```

```
[                                    1350       1360       1370       1380       1390]
[                                    .          .          .          .          .  ]

Carpha_alpina_JB1880B              :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [749]
Carpha_alpina_JB1878B              :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [710]
Carpha_alpina_XZ13                 :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [506]
Carpha_curvata_JB1894              :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [748]
Carpha_curvata_JB1896C             :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [509]
Carpha_nivicola_JB1868a            :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [674]
Carpha_nivicola_XZ11               :AAAGTAGAATTAGTTTTCTCAAAAGAAA:::::GATTTGGCTCAGGA   [665]
Carpha_rodwayi_JB1881B             :AAAGTAGAATTAGTTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA  [775]
Carpha_rodwayi_JB1890              :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [774]
Carpha_filifolia_JB1700            :AAAGTATAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [647]
Carpha_bracteosa_JB1725            :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [745]
Carpha_nitens_KEW11893             :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [606]
Carpha_capitellata_JB1718          :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [746]
Carpha_glomerata_JB1712            TAAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [748]
Carpha_glomerata_JB1711            TAAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [749]
Carpha_glomerata_JB1706            :AAAGTAGAATTAGTTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA  [750]
Carpha_glomerata_JB1719            :AAAGTAGAATTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [749]
Trianoptiles_solitaria_JH1765      :AATGTAGTATTAATTTTCTCAAAATAAA:TAAAGATTTGGCTCAGGA   [658]
Trianoptiles_solitaria_JB1756      :AATATAGTATTAATTTTCTCAAAATAAA:TAAAGATTTGGCTCAGGA   [658]
Oreobolus_pumilio_XZ12             :AGAATAGATTTAGTTTTTTCAAAATAAA:::::GATTTGGCTCAGGA   [1016]
Oreobolus_distichus_XZ17           :AGAATAGAATTAGTTTTTTCAAAATAAA:::::GATTTGGCTCAGGA   [1000]
Schoenoides_oligocephalus          :AGAATAGAATTAGTTTTTTCAAAATAAA:::::GATTTGGCTCAGGA   [1011]
Costularia_nervosa_KW9939          :AGAATAGAATTAGTTTTTTCAAAATAAA:::::GATTTGGCTCAGGA   [1010]
Gymnoschoenus_sphaerocephalus      :TAACTAGAATTAGTTTTTTCAAAATAAAATAAAGATTTGGCTCAGGA   [721]
Schoenus_turbinatus_LM35           :CAACTAGAATCGGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [959]
Schoenus_paludosus_KW9858          :GAATTTAGTTTAGTTTTCTAAAAAAAAA:::::GATTTGGCTCAGGA   [939]
Costularia_arundinacea_KW9935      :CAACTAGAATCGGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [983]
Costularia_pubescens_KW9940        :CAACTAGAATCGGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [967]
Tricostularia_pauciflora_KW991     :TAACTAGAATTGGTTTTATAAAAAAAAAA:::GATTTGGCTCAGGA   [981]
Gahnia_clarkei_AR1621              :AAACTCGAATTAGTTTTTATCAAAATAAA:::::GATTTGGCTCAGGA  [735]
Gahnia_sieberiana_KW9913           :AAACTCGAATTAGTTTTATCAAAATAAA:::::GATTTGGCTCAGGA   [734]
Ptilothrix_deusta_XZ1              :AAACTAGATTTAGTTTTCTCAAAATAAA:::::GATTTGGCTCAGGA   [987]
Cyathochaeta_diandra_XZ24          :AAACTAGAATAAGTTTTCTTAAAATCAA:::::GATTTGGCTCAGGA   [819]
Rhynchospora_brownii_KW9909        TATATTCGTATTCGTTTTCTAAAAATAAA:::::GATTTGGCTCAGAA   [1016]
Rhynchospora_corymbosa_KC75        TATATTTGTATTTGTTCTCTCAAAATACA:::::GATTTGGCTCAGAA   [1006]

[                                         1400       1410       1420       1430       1440]
[                                         .          .          .          .          .]

Carpha_alpina_JB1880B              TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [795]
Carpha_alpina_JB1878B              TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [756]
Carpha_alpina_XZ13                 TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [552]
Carpha_curvata_JB1894              TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [794]
Carpha_curvata_JB1896C             TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [555]
Carpha_nivicola_JB1868a            TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGATTTTGGAAGTTAA:CA  [720]
Carpha_nivicola_XZ11               TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGATTTTGGAAGTTAA:CA  [711]
Carpha_rodwayi_JB1881B             TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [821]
Carpha_rodwayi_JB1890              TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [820]
Carpha_filifolia_JB1700            TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [693]
Carpha_bracteosa_JB1725            TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [791]
Carpha_nitens_KEW11893             TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [652]
Carpha_capitellata_JB1718          TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [792]
Carpha_glomerata_JB1712            TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [794]
Carpha_glomerata_JB1711            TTGCCCAGTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [795]
Carpha_glomerata_JB1706            TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [796]
Carpha_glomerata_JB1719            TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [795]
Trianoptiles_solitaria_JH1765      TTGCCCATTTTTT:CATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [704]
Trianoptiles_solitaria_JB1756      TTGCCCAATTTTT:CATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [704]
Oreobolus_pumilio_XZ12             TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGATTTTGGAAGTTAA:CA  [1062]
Oreobolus_distichus_XZ17           TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGATTTTGGAAGTTAA:CA  [1046]
Schoenoides_oligocephalus          TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGATTTTGGAAGTTAA:CA  [1057]
Costularia_nervosa_KW9939          TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGATTTTGGAAGTTAA:CA  [1056]
Gymnoschoenus_sphaerocephalus      TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [767]
Schoenus_turbinatus_LM35           TTGCCC:TTTTTTAATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA   [1005]
Schoenus_paludosus_KW9858          TTGCCCCTTTTTTAATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA   [986]
Costularia_arundinacea_KW9935      TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [1029]
Costularia_pubescens_KW9940        TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [1013]
Tricostularia_pauciflora_KW991     TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [1027]
Gahnia_clarkei_AR1621              TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [781]
Gahnia_sieberiana_KW9913           TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [780]
Ptilothrix_deusta_XZ1              TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAATCA  [1034]
Cyathochaeta_diandra_XZ24          TTACCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [865]
Rhynchospora_brownii_KW9909        TTGCCCATTTTTT:AATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [1062]
Rhynchospora_corymbosa_KC75        TTGCCCATTTTTT:CATTCCAGGGTTTCTCTGAATTTGGAAGTTAA:CA  [1052]
```

```
[                                        1450       1460       1470       1480      ]
[                                        .          .          .          .         ]

Carpha_alpina_JB1880B                CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [842]
Carpha_alpina_JB1878B                CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [803]
Carpha_alpina_XZ13                   CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [599]
Carpha_curvata_JB1894                CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [841]
Carpha_curvata_JB1896C               CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [602]
Carpha_nivicola_JB1868a              CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [767]
Carpha_nivicola_XZ11                 CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [758]
Carpha_rodwayi_JB1881B               CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [868]
Carpha_rodwayi_JB1890                CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [867]
Carpha_filifolia_JB1700              CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [740]
Carpha_bracteosa_JB1725              CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [838]
Carpha_nitens_KEW11893               CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [699]
Carpha_capitellata_JB1718            CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [839]
Carpha_glomerata_JB1712              CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATGAAGTCCGTAGC:G   [841]
Carpha_glomerata_JB1711              CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [842]
Carpha_glomerata_JB1706              CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [843]
Carpha_glomerata_JB1719              CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [842]
Trianoptiles_solitaria_JH1765        CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [751]
Trianoptiles_solitaria_JB1756        CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [751]
Oreobolus_pumilio_XZ12               CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1109]
Oreobolus_distichus_XZ17             CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1093]
Schoenoides_oligocephalus            CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1104]
Costularia_nervosa_KW9939            CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1103]
Gymnoschoenus_sphaerocephalus        CTTAGCAAGTTTCCAAACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [814]
Schoenus_turbinatus_LM35             CTTGGTAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1052]
Schoenus_paludosus_KW9858            CTTAGCAAGTTTCCACACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1033]
Costularia_arundinacea_KW9935        CTTAGTAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1076]
Costularia_pubescens_KW9940          CTTAGTAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1060]
Tricostularia_pauciflora_KW991       CTTAGTAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1074]
Gahnia_clarkei_AR1621                CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [828]
Gahnia_sieberiana_KW9913             CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [827]
Ptilothrix_deusta_XZ1                CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGC:G   [1081]
Cyathochaeta_diandra_XZ24            CTTAGCAAGTTTCCATACCAAGGCTCAATCCAATCAAGTCCGTAGCAG   [913]
Rhynchospora_brownii_KW9909          CTTAGCAAGTTTCCATACTAAGGCTCAATCTAATCAAGTCCGTAGC:G   [1109]
Rhynchospora_corymbosa_KC75          CTTAGCAAGTTTCCATACCAAGGCTCAATTCAATTAAGTCCGTAGC:G   [1099]

[                                         1490       1500]
[                                         .          .  ]

Carpha_alpina_JB1880B                TCTACC:GATTTCG   [855]
Carpha_alpina_JB1878B                TCTACC:GATTTCG   [816]
Carpha_alpina_XZ13                   TCTACC:GATTTCG   [612]
Carpha_curvata_JB1894                TCTACC:GATTTCG   [854]
Carpha_curvata_JB1896C               TCTACC:GATTTCG   [615]
Carpha_nivicola_JB1868a              TCTACC:GATTTCG   [780]
Carpha_nivicola_XZ11                 TCTACCGGATTTCG   [772]
Carpha_rodwayi_JB1881B               TCTACC:GATTTCG   [881]
Carpha_rodwayi_JB1890                TCTACC:GATTTCG   [880]
Carpha_filifolia_JB1700              TCTACCGGATTTCG   [754]
Carpha_bracteosa_JB1725              TCTACC:GATTTCG   [851]
Carpha_nitens_KEW11893               TCTACC:GATTTCG   [712]
Carpha_capitellata_JB1718            TCTACCGGATTTCG   [853]
Carpha_glomerata_JB1712              TCTACC:GATTTCG   [854]
Carpha_glomerata_JB1711              TCTACC:GATTTCG   [855]
Carpha_glomerata_JB1706              TCTACC:GATTTCG   [856]
Carpha_glomerata_JB1719              TCTACC:GATTTCG   [855]
Trianoptiles_solitaria_JH1765        TCTACC:GATTTCG   [764]
Trianoptiles_solitaria_JB1756        TCTACC:GATTTCG   [764]
Oreobolus_pumilio_XZ12               TCTACC:GATTTCG   [1122]
Oreobolus_distichus_XZ17             TCTACC:GATTTCG   [1106]
Schoenoides_oligocephalus            TCTACC:GATTTCG   [1117]
Costularia_nervosa_KW9939            TCTACC:GATTTCG   [1116]
Gymnoschoenus_sphaerocephalus        TCTACC:GATTTCG   [827]
Schoenus_turbinatus_LM35             TCTACC:GATTTCG   [1065]
Schoenus_paludosus_KW9858            TCTACC:GATTTCG   [1046]
Costularia_arundinacea_KW9935        TCTACC:GATTTCG   [1089]
Costularia_pubescens_KW9940          TCTACC:GATTTCG   [1073]
Tricostularia_pauciflora_KW991       TCTACC:GATTTCG   [1087]
Gahnia_clarkei_AR1621                TCTACC:GATTTCG   [841]
Gahnia_sieberiana_KW9913             TCTACC:GATTTCG   [840]
Ptilothrix_deusta_XZ1                TCTACCTGATTTCG   [1095]
Cyathochaeta_diandra_XZ24            TCTACC:GATTTCG   [926]
Rhynchospora_brownii_KW9909          TCTACC:GATTTCG   [1122]
Rhynchospora_corymbosa_KC75          TCTACC:GATTTCG   [1112]
```



Appendix 6. Strict consensus of eight equally most parsimonious trees of all samples listed in Table 5.1 with bootstrap values (> 50%) above each branch and jackknife values (> 50%) below each branch. Analysis methods are the same as that described in section 5.2.3a.



Appendix 7. Maximum likelihood reconstruction of all samples listed in Table 5.1 under GTR + P_{inv} + Γ model. Model selection and analysis method are the same as that described in section 5.2.3c.