

# MNIACEAE

Robert Wyatt<sup>1</sup> & Helen P. Ramsay<sup>2</sup>

**Mniaceae** Schwägr., *Sp. Musc. Frond.* 25 (1830).

Type: *Mnium* Hedw., *nom. cons.*

Dioicous, autoicous or synoicous. Plants robust, perennial, with stoloniferous stems matted with rhizoids and erect simple or forked reproductive shoots. Rhizoids brown, papillose. Leaves on stolons small, crowded. Leaves on reproductive shoots small and remote at the base, larger and forming a comal tuft or rosette at the apex, elliptic to suborbicular; apex rounded to mucronate; costa single, strong, ending in the apex or just below; leaf bordered by linear cells occasionally with weak rounded teeth. Laminal cells rounded-quadrate to hexagonal, mostly thick-walled, non-porose or porose, becoming larger, longer and more rectangular towards the costa and insertion.

Perigonia and perichaetia terminal. Perigonia usually discoid, with large perigonial leaves. Perichaetial leaves forming a comal tuft of narrow and erect leaves; inner ones small and narrow. Setae solitary or polysetous 1–4, clustered, short or long. Capsules exerted, inclined or pendant, rarely erect, oblong-ovoid to cylindrical; neck short; annulus present; operculum convex to obliquely rostrate. Peristome usually well developed; exostome teeth 16, lanceolate-acuminate, trabeculate or not; endostome segments alternating with and similar in length to teeth, rarely reduced; basal membrane high, rarely reduced and low; cilia usually well developed, nodose. Spores papillose, comparatively large.

Koponen (1988) divided the Mniaceae *sens. lat.* into three families, *viz.* Mniaceae *sens. str.*, Plagiomniaceae and Cinclidiaceae. In the classification scheme of Buck & Goffinet (2008) several genera (e.g. *Pohlia*, *Mielichhoferia* and *Schizymenium*), traditionally included in the Bryaceae, but phylogenetically closer to the Mniaceae (Cox & Hedderson, 2003), were transferred into the Mniaceae. However, more recent molecular evidence from nuclear, chloroplast and mitochondrial genomes suggests that a broad Mniaceae clade may have separated early into two diverging lineages, the families Mielichhoferiaceae and Mniaceae. Thus, *Pohlia*, *Mielichhoferia*, *Schizymenium* and other genera have now been recognised as constituting the Mielichhoferiaceae (Shaw, 2009; Goffinet *et al.*, 2012), while 12 other genera, including *Mnium*, *Plagiomnium* and *Orthomnion*, are retained in the Mniaceae. We accept the more recent interpretation for Australian mosses, recognising the two families with *Mielichhoferia* and *Pohlia* in the Mielichhoferiaceae and *Orthomnion* and *Plagiomnium* in the Mniaceae.

There have been extensive cytological studies on the Mniaceae summarised by Fritsch (1991) and Newton (1986) under individual genera. For *Plagiomnium* the recorded chromosome numbers are  $n = 6, 7, 12, 14$  and 21 with karyotype data for many, while for *Orthomnion*  $n = 14$  has been reported by Ono for a single species in Japan (Fritsch, 1991).

This family is well represented in temperate regions of the Northern Hemisphere. Only two genera *Orthomnion* and *Plagiomnium*, with a single species for each, are recorded from Australia where sporophytes are rare in *Plagiomnium* and have not yet been found in *Orthomnion*. Vegetative plants of *Orthomnion* can be distinguished from *Plagiomnium* by the more densely tomentose stolons and bases of erect stems, an entire leaf margin, leaves that are more closely spaced in two rows, a weaker costa, the lack of stereid bands, and the thin-walled and porose laminal cells. The presence of porose cell walls is not usually emphasised

---

<sup>1</sup> Georgia Museum of Natural History, University of Georgia, Athens, GA 30602, U.S.A.

<sup>2</sup> c/- National Herbarium of New South Wales, Mrs Macquaries Road, Sydney, New South Wales 2000, Australia & Department of Biological Sciences, Macquarie University, North Ryde, New South Wales 2109.

in descriptions of *Orthomnion* but is shown clearly in published illustrations [e.g. Koponen (1980a: 43, figs 16–20, 22–24); Koponen (1982a: 79, fig. 3); Eddy (1996: 197, fig. 465)]. Subsection *Orthomniopsis* (Broth.) T.J.Kop., to which the Australian species *O. elimbatum* belongs, is characterised by short setae (less than 10 mm long) and trabeculate peristomes in contrast to the other subsection *Oligodon* T.J.Kop., not present in Australia, which has longer setae and reduced peristomes.

### References

- Beever, J.E., Alison, K.W. & Child, J. (1992), *The Mosses of New Zealand*. Otago University Press, Dunedin.
- Buck, W.R. & Goffinet, B. (2004), Morphology and classification of mosses. In A.J.Shaw & B.Goffinet (eds), *Bryophyte Biology*, 2nd edn, 71–123. Cambridge University Press, Cambridge.
- Cox, C.J. & Hedderson, T.A.J. (1999), Phylogenetic relationships among the ciliate arthrocontous mosses: evidence from chloroplast and nuclear DNA sequences, *Pl. Syst. Bot.* 215: 119–139.
- Cox, C.J. & Hedderson, T.A.J. (2003), Phylogenetic relationships within the moss family Bryaceae based on chloroplast DNA evidence, *J. Bryol.* 25: 31–40.
- Dalton, P.J., Seppelt, R.D. & Buchanan, A.M. (1991), An annotated checklist of Tasmanian mosses. In M.R.Banks, S.J.Smith, A.E.Orchard & G. Kantvilas (eds), *Aspects of Tasmanian Botany: A tribute to Winifred Curtis* 15–32. Royal Society of Tasmania, Hobart.
- Eddy, A. (1996), *A Handbook of Malesian Mosses* 3: 194–197. Natural History Museum, London.
- Fritsch, R. (1991), Index to bryophyte chromosome counts, *Bryophyt. Biblioth.* 40: 1–352.
- Goffinet, B., Buck, W.R. & Shaw, A.J. (2012), *Classification of Bryophytes* [<http://www.eeb.uconn.edu/people/goffinet/Classificationmosses.html>]
- Koponen, T. (1968), Generic revision of the Mniaceae Mitt. (Bryophyta), *Ann. Bot. Fennici* 5: 117–151.
- Koponen, T. (1977), Miscellaneous notes on Mniaceae (Bryophyta) I. New combinations, *Ann. Bot. Fennici* 14: 6.
- Koponen, T. (1980a), A synopsis of Mniaceae (Bryophyta) II. *Orthomnion*, *Ann. Bot. Fennici* 17: 35–55.
- Koponen, T. (1980b), A synopsis of Mniaceae (Bryophyta) III. Carl Müller's undescribed and dubious names, *Ann. Bot. Fennici* 17: 61–64.
- Koponen, T. (1981a), A synopsis of Mniaceae (Bryophyta) VI. Southeast Asian taxa, *Acta Bot. Fennica* 117: 1–34.
- Koponen, T. (1981b), A synopsis of Mniaceae (Bryophyta) VII. List of species and their distribution, *Ann. Bot. Fennici* 18: 113–115.
- Koponen, T. (1982a), The family Mniaceae in Australasia and the Pacific, *J. Hattori Bot. Lab.* 52: 75–86.
- Koponen, T. (1982b), Generic and family concepts in the Mniaceae, *Beih. Nova Hedwigia* 71: 249–259.
- Koponen, T. (1982c), Miscellaneous notes on Mniaceae (Bryophyta) XI. Distribution of *Plagiomnium rostratum*, *Mem. Soc. Fauna Fl. Fennica* 58: 17–20.
- Koponen T. (1983), A synopsis of Mniaceae (Bryophyta) VIII. Taxa in Australia and New Zealand, *Ann. Bot. Fennici* 20: 101–104.
- Koponen T. (1988), The phylogeny and classification of Mniaceae and Rhizogoniaceae (Musci), *J. Hattori Bot. Lab.* 64: 37–46.

- Koponen T. & Norris, D.H. (1983), Bryophyte flora of the Huon Peninsula, Papua New Guinea II. Mniaceae, *Ann. Bot Fennici* 20: 31–40.
- Newton, M.E. (1986), Bryophyte phylogeny in terms of chromosome cytology, *J. Bryol.* 14: 215–230.
- Noguchi, A. (1974), Notes on the genus *Orthomnion* (Musci), *Misc. Bryol. Lichenol.* 6: 57–159.
- Ramsay, H.P. (2011), Australian mosses – new chromosome numbers and a compilation of chromosome data, *Telopea* 13: 577–619.
- Ramsay, H.P. & Cairns, A. (2004), Habitat, distribution and the phylogeographical affinities of mosses in the Wet Tropics bioregion, northeast Queensland, Australia, *Cunninghamia* 8: 371–408.
- Sainsbury, G.O.K. (1955), A handbook of New Zealand mosses, *Bull. Roy. Soc. New Zealand* 5: 1–490.
- Shaw, A.J. (2009), *Bryophyte Flora of North America: Mielichhoferiaceae*. Provisional publication Missouri Botanical Garden. [<http://mobot.org/plantscience/BFNA/bfnamenu.htm>, accessed May 2012]

#### Key to Species

- Leaves of erect stems orbicular; apices rounded-obtuse; border weak, undulate; margin entire; laminal cell walls porose; dioicous; setae short; capsules erect; epiphytic ..... **Orthomnion elimbatum**
- Leaves of erect stems elliptic to ovate; apices rounded, with a short apiculus; border of 3 or 4 rows of narrow elongate cells; margin toothed; laminal cell walls non-porose; synoicous; setae elongate; capsules horizontal to nutant; calcicolous ..... **Plagiomnium novaezelandiae**