

GONIOMITRIUM

Allan J. Fife¹ & Rodney D. Seppelt²

Goniomitrium Hook. & Wilson, *London J. Bot.* 5: 142 (1846); from the Greek *gonia* (an angle or corner) and the Latin *mitra* (a turban or head-dress), in reference to the angled calyptra.

Type: not designated.

Rehmanniella Müll.Hal., *Bot. Centralbl.* 7: 347 (1881). T: *R. africana* Müll.Hal. [= *G. acuminatum* subsp. *africanum* (Müll.Hal.) Fife]

Paroicous, synoicous or autoicous. Plants small, brownish green to bright green, forming dense clusters. Stems reddish brown or pale, unbranched, rarely forked, to c. 2 mm tall, in cross-section with a central strand, a medulla of parenchyma and weakly differentiated firmer-walled cortical layers. Stems beset below with reddish brown or cerise rhizoids that rarely bear ovoid tubers. Leaves appressed when dry, erect-spreading to spreading when moist, concave to somewhat keeled, ovate to obovate-spathulate, acute to acuminate-aristate; costa weakly to well developed, rarely absent, usually percurrent to excurrent; margins plane and entire. Upper laminal cells variable, often hexagonal to oblong, frequently some oblate; lower laminal cells more oblong or quadrate and often laxer, sometimes their walls undulate and weakly thickened at the corners; a row of yellowish brown cells frequently present across the leaf base; marginal cells not differentiated.

Male bud-like branch very short, beside the perichaetium. Calyptra broadly mitrate, with a short stout rostrum, with 8 radial pleats, 8-lobed at base, completely covering the immature capsule and often persisting after dehiscence. Setae yellow, 0.2–1.0 mm long, smooth, straight, not twisted. Capsules erect, symmetrical, ellipsoidal to globose (before dehiscence), globose to somewhat pyriform (after dehiscence), c. 1 mm long, operculate, gymnostomous, yellowish brown, strongly and irregularly wrinkled when dry, with a weakly differentiated neck to 1/5 the length of the capsule; mouth transverse, equal to or slightly less than the diameter of capsule; exothecial cells irregularly polygonal, c. 30–50 µm wide, with thin non-cuneate walls, c. 6 suboral rows oblate and firmer-walled; operculum plano-convex, not rostrate, falling with a portion of the columella attached, composed of irregularly arranged thin-walled cells; annulus weakly differentiated, composed of a single row of small firm-walled isodiametric to oblong cells, persistent; stomata numerous, weakly immersed. Spores ellipsoidal, yellowish brown to golden, minutely verrucate, the surface appearing reticulate; in polar view oval, occasionally almost isodiametric; in lateral view convex on the distal side, plane to slightly concave on the proximal side, with a long narrow aperture area or laesura, 60–110 µm in greater diam.

One species and its two subspecies occur in Australia. These were recognised as distinct species by Scott & Stone (1976), Catcheside (1980) and Stone (1981) but, based on there being considerable overlap in morphological features, *G. enerve* is considered to be a subspecies of *G. acuminatum*.

Goniomitrium is a genus of five species, although there are reasonable grounds for considering it to be monotypic. *Goniomitrium speluncae* P. de la Varde was described from sterile material, and its affinities must remain in doubt. Of the four remaining taxa, *G. seroi* Casas de Puig from Spain is similar to *G. acuminatum* but the spores are smaller (37–50 µm). *Goniomitrium africanum* (Müll.Hal.) Broth., differs from Australian *G. acuminatum* in having shorter upper laminal cells with undulate walls in the upper part of the lamina, stouter and

¹ Landcare Research, P.O. Box 40, Lincoln 7640, New Zealand.

² Australian Antarctic Division, Channel Highway, Kingston, Tasmania 7050, Australia.

more excurrent costae, conspicuously redder rhizoids and spores 50–75 µm. Fife (1985) reduced *G. africanum* to a subspecies of *G. acuminatum*, although Magill (1987) retained it as a distinct species.

References

- Catcheside, D.G. (1980), *Mosses of South Australia* 218–239.
- Fife, A.J. (1982), Taxonomic and nomenclatural observations on the Funariaceae. I. *Physcomitrium*, *Physcomitrella*, and *Goniomitrium* in New Zealand, *Lindbergia* 8: 96–104.
- Fife, A.J. (1985), A generic revision of the Funariaceae (Bryophyta: Musci). Part I, *J. Hattori Bot. Lab.* 58: 149–196.
- Fife, A.J. & Seppelt, R.D. (2001), A revision of the family Funariaceae (Musci) in Australia, *Hikobia* 13: 473–490.
- Magill, R.E. (1987), *Flora of Southern Africa. Bryophyta*. Part 1 Mosses. Fascicle 2. Gigaspermaceae–Bartramiaceae.
- Scott, G.A.M. & Stone, I.G. (1976), *The Mosses of Southern Australia*. Academic Press, London.
- Stone, I.G. (1981), Spore morphology and some other features of *Goniomitrium* Hook. & Wils. (Funariaceae), *J. Bryol.* 11: 491–500.

Upper leaves obovate, acuminate from a narrow base; costa weak or occasionally absent below, usually percurrent to excurrent, strongest in the mid- and upper leaf..... **a. *G. acuminatum* subsp. *acuminatum***

Upper leaves ovate or very broad, often wider than long, obovate to spatulate; apex broadly obtuse, often apiculate; costa generally absent, or short and vestigial, bistratose ‘costa’ a few cells wide and long in mid- and upper leaf **b. *G. acuminatum* subsp. *enerve***

a. *Goniomitrium acuminatum* Hook. & Wilson, *London J. Bot.* 5: 143, pl. 3b (1846) subsp. *acuminatum*

T: Swan R., W.A., *J.Drummond 6b*; BM.

Illustrations: D.G.Catcheside, *Mosses of South Australia* 236, fig. 133; 237, fig. 134 (1980), as *G. acuminatum*.

Plants small, brownish green to bright green, forming dense clusters on soil. Stems reddish brown or pale, unbranched or rarely forked, to c. 2 mm tall. Upper leaves obovate, acuminate from a narrow base, to 2.5 mm long, often wider than long; apiculus often ending in a long pointed hyaline cell; costa weak or sometimes absent below, occasionally discontinuous (rarely almost or completely absent), usually percurrent to excurrent, strongest in the mid- and upper leaf; margins plane and entire. Upper laminal cells quite variable, hexagonal to oblong, 20–35 µm long, mostly 3–5 times longer than wide, longer in the tapered subula; proximal laminal cells more oblong or quadrate, somewhat laxer; marginal cells not differentiated.

Perichaetial leaves usually 2.2–2.5 mm long (including the long tapered acuminate apex), contracting when dry. Spores (60–) 70–80 (–85) µm in greater diam.

Occurs in W.A., S.A., N.S.W., A.C.T. and Vic. Also in New Zealand.

N.S.W.: Blackett, *R.J.Coveny 13200*; Ryde Wharf, 1915, 1916, *W.W.Watts* (NSW).

b. *Goniomitrium acuminatum* subsp. *enerve* (Hook. & Wilson) Fife & Seppelt, *Hikobia* 13: 487 (2001)

Goniomitrium enerve Hook. & Wilson, *London J. Bot.* 5: 142 (1846); *Physcomitrium enerve* (Hook. & Wilson) Müll.Hal., *Syn. Musc. Frond.* 2: 545 (1851). T: Swan R., W.A., *J.Drummond 6a*; holo: BM.

Illustrations: D.G.Catcheside, *Mosses of South Australia* 235, fig. 132 (1980), as *G. enerve*; D.Meagher & B.Fuhrer, *A Field Guide to the Mosses and Allied Plants of Southern Australia* 101 (2003), as *G. acuminatum* var. *enerve*.

Plants small, brownish green to bright green, forming dense clusters on soil. Stems reddish brown or pale, unbranched or rarely forked, to c. 2 mm tall. Upper leaves concave, ovate or very broad and often wider than long, obovate to spatulate; apex broadly obtuse, often apiculate, to 2.5 mm long; costa generally absent, a few leaves with a vestigial 'costa' consisting of a bistratose strip 1 or 2 cells wide and 2 or 3 cells long, occasionally discontinuous, in the position of a true costa in the mid- and upper part of the leaf; margins plane and entire. Upper laminal cells quite variable, hexagonal to oblong, 15–25 µm wide, equidimensional to elongate; those in lower portion of lamina more oblong or quadrate, somewhat laxer; marginal cells not differentiated.

Perichaetial leaves very concave with an obtuse, apiculate or occasionally acuminate apex, to 2 mm long, usually much shorter than in the type subspecies, ecostate or sometimes with a vestigial 'costa'. Spores (70–) 80–90 (–110) µm in greater diam.

Occurs in W.A., N.T., S.A., Qld, N.S.W. and Vic.; endemic.

N.T: Kunoth Well, Hamilton Downs Stn, *D.Nelson* 2307. N.S.W.: 80 km SW of Cobar, *D.J.Eldridge* BSCS 93; Mundi Mundi, W of Broken Hill, *D.J.Eldridge* BSCS 523. Vic.: Mt Wycheproof, *W.W.Watts* 652.