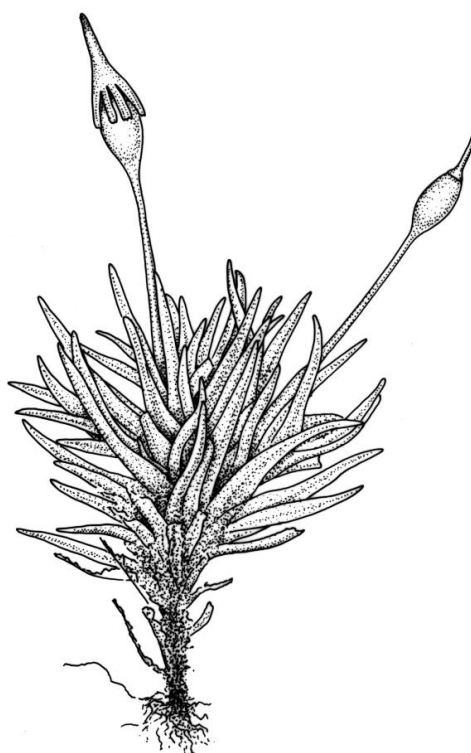




FLORA OF NEW ZEALAND

MOSSES

PTYCHOMITRIACEAE



A.J. FIFE

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Cover image: *Ptychomitrium australe*, habit with capsules, moist. Drawn by Rebecca Wagstaff from J.T. Linzey 3435, CHR 545821.

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Introduction

The Ptychomitriaceae are a small family of rock-inhabiting acrocarps restricted to temperate and tropical regions worldwide. The family is traditionally (by Brotherrus) considered to include three genera, although modern treatments have enlarged the family somewhat with the inclusion of additional genera. However the family is circumscribed, *Ptychomitrium* is the largest genus, although estimates of up to 80 species worldwide in this genus are probably exaggerated. A recent review of the genus for Australia has resulted in a reduction of species accepted there from five to three. One species, *P. australe*, is accepted in the New Zealand Flora; it occurs widely, mostly in drier parts of the country and is also widespread in Australia. In a regional context *P. australe* is distinguished in part by its small, dark green epilithic cushions with ovate-lanceolate leaves and mostly oblate laminal cells, patches of which are bistratose. The leaves of the terminal perichaetia are not differentiated, and the elliptic or ovate capsules are erect on straight setae. There is a highly characteristic lobed and plicate calyptra, which covers about ½ the capsule. Although a second species, *P. acutifolium*, has been reported as a rarity from N.Z., the weight of evidence does not support its occurrence here.

Typification

The following typification is designated in accordance with the International Code of Nomenclature for Plants, Algae and Fungi.

***Grimmia turneri* R.Br.bis, Trans. & Proc. New Zealand Inst. 35: 336 (1903).**

Lectotype (designated here): N.Z., Canterbury, on the north side of Mount Torlesse, Jan. 1900, *R. Brown*, CHR 335676!

Ptychomitriaceae

Plants forming cushions or turves, mostly on rock, not lustrous. **Stems** erect, simple, or branched by forking, in cross-section with a central strand. **Leaves** oblong-lanceolate, ovate-lanceolate, linear-lanceolate, or linear, \pm sheathing or spreading when moist, crisped when dry; **mid** and **upper laminal cells** small, mostly rounded-quadrate, firm-walled, often partially bistratose; **basal cells** more elongate; **alar cells** not differentiated. **Costa** \pm percurrent.

Autoicous or rarely dioicous. **Perichaetial leaves** not differentiated or sheathing. **Setae** erect and straight or cygneous, single or sometimes multiple; **capsules** erect, symmetric, exserted, and smooth; **stomata** present at capsule base, superficial; **annulus** differentiated; **operculum** rostrate. **Peristome** single; **teeth** broadly lanceolate, variously perforate or irregularly split into 2–3 papillose divisions, rarely united in pairs. **Calyptra** mitrate, deeply lobed and usually plicate, covering c. $\frac{1}{2}$ or the entire capsule, lacking hairs but sometimes scabrous at apex. **Spores** spherical.

Taxonomy: The Ptychomitriaceae were treated by Brotherus (1925) to include three genera (*Ptychomitrium*, *Glyphomitrium*, and *Campylostelium*) of which *Ptychomitrium* is the largest. Buck & Goffinet (2000) expanded the family to include the small African genus *Ptychomitriopsis* Dixon. More recently Goffinet et al. (2009) presented an altered view of the family in which they excluded *Glyphomitrium* Brid., but added three other genera (all previously placed in the Grimmiaceae), for a total of six genera. Morphologically, the genera are usually differentiated using features of the perichaetia, the setae, and the calyptrae. However the family is circumscribed, *Ptychomitrium* is by far the largest genus, and is distinguished by having non-differentiated and non-sheathing perichaetial leaves, straight setae, and lobed and plicate calyptrae that do not enclose the entire capsule. *Ptychomitrium* is the only genus that occurs in N.Z.

The family was traditionally placed in the order Isobryales (*sensu* Brotherus 1925) near to the Orthotrichaceae, but Goffinet et al. (2009) placed it near the Grimmiaceae in the order Grimmeriales (subclass Dicranidae). The demonstration by Edwards (1978) that the arrangement of the amphithecial cells (from which the peristome develops) in *Ptychomitrium* is haplolepideous in nature provided support for the latter placement.

***Ptychomitrium* Fürnr., *Flora* 12(2 Ergänzungsblätter): 19 (1829), nom. cons.**

= *Brachysteleum* Rchb., *Consp. Regn. Veg.* [H.G.L.Reichenbach] 34 (1828)

Type taxon: *Ptychomitrium polyphyllum* (Sw.) Bruch. & Schimp.

Plants mostly dark green, forming cushions or turves, mostly on rock. **Stems** erect, often branched, in cross-section with a central strand. **Leaves** oblong- or ovate-lanceolate, spreading when moist, crisped when dry, not sheathing, entire or coarsely toothed, acute, obtuse, or rounded at apex, concave or keeled, usually with bistratose laminal patches, sometimes \pm plicate; **margins** plane or incurved, often bistratose; **mid laminal cells** mostly rounded quadrate, often oblate in N.Z. species, firm-walled, incrassate, smooth or bulging; **basal cells** linear or oblong or \pm quadrate, in N.Z. species rather thin-walled and slightly inflated; **alar cells** not differentiated. **Costa** percurrent, in cross-section with median guide cells and two stereid bands.

Autoicous. **Perichaetial leaves** somewhat enlarged but otherwise not differentiated. **Perigonia** on short branches below the perichaetia in the N.Z. species. **Setae** erect and straight or flexuose, single (as in N.Z. species) or multiple; **capsules** ovoid, ellipsoid, or cylindric; **mouth** transverse; **annulus** usually present (strongly differentiated in N.Z. species); **exothecial cells** firm-walled (as in N.Z. species) or sometimes \pm thin-walled. **Peristome** single; **teeth** variously perforate or irregularly split into 2–3 papillose divisions. **Calyptra** mitrate but sometimes becoming cucullate with maturity, deeply lobed, plicate, covering c. $\frac{1}{2}$ or the entire capsule. **Spores** spherical.

Taxonomy: *Ptychomitrium* is a large genus of nearly cosmopolitan distribution. Sixty-two species were treated by Brotherus (1925, p. 8), while Wijk et al. (1967) accepted 80 species worldwide. Meagher (2017) has recently provided a treatment for Australia in which he accepted three species.

According to the concepts of Meagher (2017, p. 50), *P. australe* differs from the Australian *P. acutifolium* Hook.f. & Wilson [*Bot. Antarct. Voy. III. (Fl. Tasman.) Part II*: 180, 1859] by having leaves that are shouldered when wet, with more bluntly acute apices, and leaf lamina wholly bistratose above the leaf shoulder. By contrast the latter species has leaves that taper uniformly from the base to the apex (lacking a distinct shoulder), with more narrowly acute apices, and bistratose regions of the upper lamina that are confined to the margins and scattered longitudinal rows or patches.

Meagher's characters (particularly with regard to the presence/absence of a shoulder) are difficult to apply to N.Z. material. The bulk of N.Z. material of *P. australe* has upper laminal cells (c. 1 mm below the apex) nearly all bistratose (but sometimes with an "isthmus" of unistratose cells adjacent to the costae, as illustrated in Plate 1, Fig. H). No N.Z. material has been seen that matches Meagher's concept of *P. acutifolium*, although aberrant material of *P. australe* is discussed below.

Meagher referred a single collection, made by G.A.M. Scott on the Queenstown–Arrowtown road in 1966, to *P. acutifolium*. This collection has not been available for study. However, Meagher's suggestion (p. 56) that "most reports of *P. australe* from New Zealand are likely to be *P. acutifolium*" is not supported here and *P. acutifolium* is neither accepted as part of the N.Z. flora nor discussed further here.

Etymology: The generic name derives from Greek roots and refers to the pleated and mitrate calyptra.

***Ptychomitrium australe* (Hampe) A.Jaeger, *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1872–1873: 105 (1874)**

≡ *Brachysteleum australe* Hampe, *Linnaea* 28: 209 (1856)

Holotype: Australia, Victoria, "In alpinis versus Buchan river", *F. Mueller s.n.*, BM000867848. (Cited by Meagher 2017, citing an annotation by Cao Tong). Illustrated by Lewinsky 1980, figs 1–3; image seen online, JSTOR Global Plants, accessed 8 Aug. 2017.

= *Orthotrichum hurunui* R.Br.bis, *Trans. & Proc. New Zealand Inst.* 27: 436 (1895)

Lectotype: N.Z., dry rock, gorge of Hurunui River, South Island, *R. Brown*, March 1893, H. (Designated by Lewinsky 1980, who illustrated the type in detail). Not seen.

= *Grimmia barrii* R.Br.bis, *Trans. & Proc. New Zealand Inst.* 35: 337 (1903)

≡ *Ptychomitrium barrii* (R.Br.bis) Dixon, *Bull. New Zealand Inst.* 3: 155 (1926)

Syntype: N.Z., Otago, near Weston, close to Oamaru, *R. Brown*, Nov. 1897, WELT M019609!

= *Grimmia turneri* R.Br.bis, *Trans. & Proc. New Zealand Inst.* 35: 336 (1903)

Lectotype: N.Z., Canterbury, on the north side of Mount Torlesse, Jan. 1900, *R. Brown*, CHR 335676!

Plants forming cushions or low turves on rock, dark green or yellow-green above, brown or nearly black below. **Stems** c. 5–7 mm, usually branched by forking, in cross-section with a central strand, beset below with smooth brown rhizoids. **Leaves** ovate-lanceolate, entire, acute or rounded and sometimes ± cucullate at apex, concave and U-shaped in section, not plicate, c. 2–3.5 mm, becoming gradually larger towards stem apex; **margins** plane, bistratose; **mid laminal cells** mostly shorter than wide, oblate-elliptic, firm-walled, smooth, c. 6 × 9–12 µm, bistratose in large patches, usually becoming predominantly or wholly bistratose (visible under compound microscope in surface view or in cross-section) in the upper lamina (c. 1 mm from the apex) but occasionally with bistratose areas largely confined to the margins; **basal cells** oblong-rectangular, thinner-walled, and weakly inflated; **alar cells** not differentiated. **Costa** subpercurrent, occupying c. 1/6 the width of the leaf base, often lustrous abaxially when dry, in cross-section bulging on the adaxial surface (inadequately illustrated here), with median guide cells and two stereid bands, the adaxial cell layer approximately the size of adjacent laminal cells.

Autoicous. Perichaetial leaves somewhat enlarged but otherwise not differentiated. **Perigonia** on short branches among upper leaves. **Setae** erect and ± straight, c. 4–5.5 mm, rather thin (c. 0.1 mm diam.), yellow or yellow-brown, smooth; **capsules** ellipsoid or ovoid, erect, 1.0–1.5 mm; **mouth** transverse; **exothecial cells** firm-walled and irregular in outline, mostly elongate; **stomata** few and restricted to extreme capsule base; **annulus** strongly differentiated, vesicular, falling with the operculum or sometimes persistent at mouth; **operculum** long and finely rostrate from a low conic base, ± equal to the urn. **peristome** inserted far below the mouth and obscured at base; **teeth** orange, papillose-baculate above, smooth or nearly so near base, c. 150–180 µm, with a medial gap extending from base nearly to apex or sometimes split apically to form two, ± equal, filiform divisions. **Calyptra** mitrate but sometimes strongly split on one side with maturity, deeply lobed, plicate, covering about 1/2 the capsule. **Spores** c. 12–16 µm, thick-walled, finely papillose.

Illustrations: Plate 1. Lewinsky 1980, figs 1–11 (from Holotype of *Brachysteleum australe* and Lectotype of *Orthotrichum hurunui*); Buck et al. 2002, p. 104; Malcolm & Malcolm 2003, p. 56; Meagher 2017, fig. 2.

Distribution: NI: N Auckland, including offshore islands (PK, HC, LB, GB, Waiheke), S Auckland (Whale I.), Gisborne (Hicks Bay, Waihou Bay), Wellington (Fitzroy Bay, Sinclair Head, near Cape Palliser, Turakirae Heads); SI: Marlborough, Canterbury, Otago (Weston, Kurow); Ch.

Anomalous. Tasmania*, mainland Australia (Qld*, N.S.W*, Vic.*). Recorded from W.A., A.C.T., and Lord Howe I. by Meagher (2017), who also recorded it from “tropical regions” including South Africa, New Caledonia, Vanuatu, and South America. Meagher considered it to be “a largely tropical to warm-temperate species that extends into cold-temperate regions.”

Habitat: Mostly on rock, but sometimes on thin humus or mineral soil over rock, and recorded once from a “clay bank” (Waihopai River). Although the associated rock type is often unrecorded in herbarium specimens, basalt and/or andesite and greywacke are the most frequently recorded. *Ptychomitrium australe* is a common species on basalt garden walls in Auckland City. In the north, *P. australe* frequently occurs in *Metrosideros excelsa*-dominated coastal forest but it also occurs in inland situations. The bulk of North I. collections are from N Auckland and Wellington L.D. On the South I. it is restricted to the eastern, drier regions, extending into the foothills of Canterbury L.D. Commonly associated moss species include *Grimmia pulvinata*, *Syntrichia pagorum*, and *Tortula muralis*. Occurring from near sea level (many localities) to 270 m (Peel Forest, Canterbury L.D.) but a single, aberrant collection (discussed below) is from 1830 m elevation in Marlborough L.D.

Notes: In the great majority of collections, the bistratose fraction of the upper laminae is extensive, and more pronounced near the leaf apices; an “isthmus” of unistratose laminae may be present adjacent to the costa.

Occasional collections (e.g., A.J. Fife 5826 from Ōkaihau & J.T. Linzey s.n., 29 Aug. 1976 from Huia, both North Auckland L.D.; CHR 405618 and CHR 433087) have upper laminal bistratose cells at the margins and only scattered bistratose patches elsewhere. The leaves in these collections are clearly shouldered and the leaf apices are bluntly acute and appear slightly cucullate. They are considered here to fall in the range of continuous variation for *P. australe*.

There appears to be a trend for higher-elevation populations to have a more extensively bistratose upper lamina and for the leaf apices to be more broadly acute than in material from nearer to sea level.

A single collection has been seen from high elevation (1830 m) on Mt Tapuaenuku (Marlborough L.D., J. Child 5922, CHR 430847). It exhibits several morphological differences relative to lowland material: a more robust stature with stems to 13 mm; a larger than usual group of lax basal cells with a tendency to form weak basal plications; short (c. 3 mm) setae, more broadly ovoid capsules; and (fragmentary) peristome teeth that are coarsely papillose at their base. It is referred to *P. australe* with reservation but in my opinion taxonomic separation from the widespread species would be premature. The vegetative leaves are clearly shouldered with apices comparable to lowland *P. australe*, and the entire leaf margins preclude its referral to *P. mittenii*.

The syntype of *Grimmia barrii* R.Br. bis cited above is not exceptional in the context of the range of variation of N.Z. *P. australe*. A second syntype, from Kennedy’s Bush (Canterbury L.D.), designated by Dixon (1926, p. 154), has not been examined; consequently no lectotype is designated here.

Meagher (2017) placed numerous Australian names, including the Victorian *Glypomitrium adamsonii* Mitt., in the synonymy of *P. australe*; these names seem not to have been applied to N.Z. collections.

Recognition: *Ptychomitrium australe* could, if sterile, be confused with *Dicranoweisia antarctica*, a species that also occurs on rock. However, the *Ptychomitrium* has a lustre of the costa which is distinctive and it is generally a smaller plant. Additionally the *Dicranoweisia* differs by having well-developed alar cells, and unistratose upper laminal cells with faint longitudinal striations. When fruiting the two would be unlikely to be confused.

Tridontium tasmanicum is a generally much larger plant growing in aquatic or near aquatic habitats. While some material, particularly if sterile, might be confused with *Ptychomitrium*, the upper laminal cells in *Tridontium* are invariably unistratose. *Ptychomitrium* lacks the intra-marginal border that normally characterises *Tridontium*.

The lustrous costae of *P. australe* could lead to confusion with smaller forms of *Holomitrium perichaetiale*, but the present species is invariably terrestrial while the *Holomitrium* is mostly epiphytic. The present species is autoicous with perigonia on short branches among upper leaves while the *Holomitrium* is pseudautoicous. The distinctive bistratose upper laminal cells of the *Ptychomitrium* also serve to differentiate it. When fruiting (the autoicous *Ptychomitrium* is usually found fruiting), confusion with *Holomitrium* seems very unlikely.

Etymology: The specific epithet *australe* means southern; at the time of the species’ description, no other *Brachysteleum* or *Ptychomitrium* species had been described from Australasia.

References

- Brotherus, V.F. 1925: Musci (Laubmoose). In: Engler, A. (ed.) *Die natürlichen Pflanzenfamilien*. Edition 2. Bd 11. Engelmann, Leipzig. 1–542.
- Brown, R. 1895 ("1894"): Notes on New Zealand mosses: genus *Orthotrichum*. *Transactions and Proceedings of the New Zealand Institute* 27: 422–446.
- Brown, R. 1903 ("1902"): On the Musci of the calcareous districts of New Zealand, with descriptions of new species. *Transactions and Proceedings of the New Zealand Institute* 35: 323–342.
- Buck, W.R.; Goffinet, B. 2000: Morphology and classification of mosses. In: Shaw, A.J.; Goffinet, B. (ed.) *Bryophyte Biology*. Cambridge University Press, Cambridge. 71–123.
- Buck, W.R.; Vitt, D.H.; Malcolm, W.M. 2002: *Key to the genera of Australian Mosses. Flora of Australia Supplementary Series*. Vol. 14. ABRS, Canberra.
- Dixon, H.N. 1926: Studies in the bryology of New Zealand, with special reference to the herbarium of Robert Brown. Part IV. *Bulletin, New Zealand Institute* 3(4): 153–238.
- Edwards, S.R. 1978: Taxonomic implication of cell patterns in haplolepidous moss peristomes. *Bulletin of the British Bryological Society* 31: 13–14.
- Fürnrohr, A.E. 1829: Sam. El. a Bridel-Brideri, a consil. secret. legation. Saxo-gothanae etc. *Bryologia universa. Flora, oder Allgemeine Botanische Zeitung* 12(2 *Ergänzungsblätter*): 1–60.
- Goffinet, B.; Buck, W.R.; Shaw, A.J. 2009: Morphology, anatomy, and classification of the Bryophyta. In: Goffinet, B.; Shaw, A.J. (ed.) *Bryophyte Biology*. Edition 2. Cambridge University Press, Cambridge. 55–138.
- Hampe, E. 1856: Plantae Muellerianae. Musci frondosi Australasia felici lecti. (Continuatio). *Linnaea* 28: 203–215.
- Jaeger, A. 1874: Genera et species muscorum systematice disposita seu adumbratio florum muscorum totius orbis terrarum (continuatio) [Pars IV]. *Bericht über die Thätigkeit der St. Gallischen Naturwissenschaftlichen Gesellschaft 1872–1873*: 61–236. [More commonly available as the "Separatabdruck" of the same title: 1870–1879: 2 vols.]
- Lewinsky, J. 1980: *Orthotrichum hurunui* R. Brown ter. is *Ptychomitrium australe* (Hamp.) Jaeg. *Lindbergia* 6: 19–21.
- Malcolm, B.; Malcolm, N. 2003: *A Colour Atlas of the Genera of New Zealand's Mosses*. Micro-Optics Press, Nelson.
- Meagher, D.A. 2017: The genus *Ptychomitrium* Fürnr. (Bryophyta: Ptychomitriaceae) in Australia. *Telopea* 20: 49–60.
- Reichenbach, H.G.L. 1828: *Conspectus Regni Vegetabilis per gradus naturales evoluti. Tentamen*. Cnobloch, Leipzig.
- Wijk, R. van der; Margadant, W.D.; Florschütz, P.A. 1967: *Index Muscorum*. Vol. 4. International Bureau for Plant Taxonomy and Nomenclature, Utrecht.

Conventions

Abbreviations and Latin terms

| Abbreviations | Meaning |
|-------------------|---|
| A | Auckland Islands |
| A.C.T. | Australian Capital Territory |
| <i>aff.</i> | allied to (<i>affinis</i>) |
| agg. | aggregate |
| Ant | Antipodes Islands |
| a.s.l. | above sea level |
| <i>auct.</i> | of authors (<i>auctorum</i>) |
| B | Bounty Islands |
| C | Campbell Island |
| c. | about (<i>circa</i>) |
| cf. | compare with, possibly the species named (<i>confer</i>) |
| <i>c.fr.</i> | with fruit (<i>cum fructibus</i>) |
| Ch | Chatham Islands |
| <i>comb. nov.</i> | new combination (<i>combinatio nova</i>) |
| D'U | D'Urville Island |
| et al. | and others (<i>et alia</i>) |
| et seq. | and following pages (<i>et sequentia</i>) |
| ex | from |
| fasc. | fascicle |
| <i>fide</i> | according to |
| GB | Great Barrier Island |
| HC | Hen and Chicken Islands |
| Herb. | Herbarium |
| hom. illeg. | illegitimate homonym |
| I. | Island |
| ibid. | in the same place (<i>ibidem</i>) |
| incl. | including |
| <i>in herb.</i> | in herbarium (<i>in herbario</i>) |
| <i>in litt.</i> | in a letter (<i>in litteris</i>) |
| <i>inter alia</i> | among other things (<i>inter alia</i>) |
| Is | Islands |
| K | Kermadec Islands |
| KA | Kapiti Island |
| LB | Little Barrier Island |
| L.D. | Land District or Districts |
| <i>leg.</i> | collected by (<i>legit</i>) |
| loc. cit. | in the same place (<i>loco citato</i>) |
| l:w | length:width ratio |
| M | Macquarie Island |
| Mt | Mount |
| <i>nec</i> | nor |
| NI | North Island |
| no. | number |
| nom. cons. | conserved name (<i>nomen conservandum</i>) |
| nom. dub. | name of doubtful application (<i>nomen dubium</i>) |
| nom. illeg. | name contrary to the rules of nomenclature (<i>nomen illegitimum</i>) |
| nom. inval. | invalid name (<i>nomen invalidum</i>) |
| nom. nud. | name published without a description (<i>nomen nudum</i>) |
| <i>non</i> | not |
| N.P. | National Park |
| N.S.W. | New South Wales |
| N.T. | Northern Territory (Australia) |
| N.Z. | New Zealand |
| op. cit. | in the work cited (<i>opere citato</i>) |
| pers. comm. | personal communication |

| | |
|-------------------|--|
| PK | Poor Knights Islands |
| P.N.G. | Papua New Guinea |
| <i>pro parte</i> | in part |
| Qld | Queensland |
| q.v. | which see (<i>quod vide</i>) |
| RT | Rangitoto Island |
| S.A. | South Australia |
| <i>s.coll.</i> | without collector (<i>sine collectore</i>) |
| <i>s.d.</i> | without date (<i>sine die</i>) |
| sect. | section |
| SEM | scanning electron microscope/microscopy |
| <i>sensu</i> | in the taxonomic sense of |
| SI | South Island |
| <i>sic</i> | as written |
| <i>s.l.</i> | in a broad taxonomic sense (<i>sensu lato</i>) |
| <i>s.loc.</i> | without location (<i>sine locus</i>) |
| Sn | Snares Islands |
| <i>s.n.</i> | without a collection number (<i>sine numero</i>) |
| Sol | Solander Island |
| sp. | species (singular) |
| spp. | species (plural) |
| <i>s.s.</i> | in a narrow taxonomic sense (<i>sensu stricto</i>) |
| St | Stewart Island |
| <i>stat. nov.</i> | new status (<i>status novus</i>) |
| subg. | subgenus |
| subsect. | subsection |
| subsp. | subspecies (singular) |
| subspp. | subspecies (plural) |
| Tas. | Tasmania |
| TK | Three Kings Islands |
| U.S.A. | United States of America |
| var. | variety |
| vars | varieties |
| Vic. | Victoria |
| viz. | that is to say (<i>videlicet</i>) |
| vs | versus |
| W.A. | Western Australia |

Symbols

| Symbol | Meaning |
|--------|--|
| µm | micrometre |
| ♂ | male |
| ♀ | female |
| ± | more or less, somewhat |
| × | times; dimensions connected by × refer to length times width |
| > | greater than |
| < | less than |
| ≥ | greater than or equal to |
| ≤ | less than or equal to |
| = | heterotypic synonym of the preceding name |
| ≡ | homotypic synonym of the preceding name |
| ! | confirmed by the author |
| * | in distribution statements, indicates non-N.Z. localities from which material has been confirmed by the author |

Technical terms conform to Malcolm, B.; Malcolm, N. 2006: *Mosses and other Bryophytes: an Illustrated Glossary*. Edition 2. Micro-Optics Press, Nelson.

Abbreviations for Herbaria follow the standard abbreviations listed in *Index Herbariorum*.

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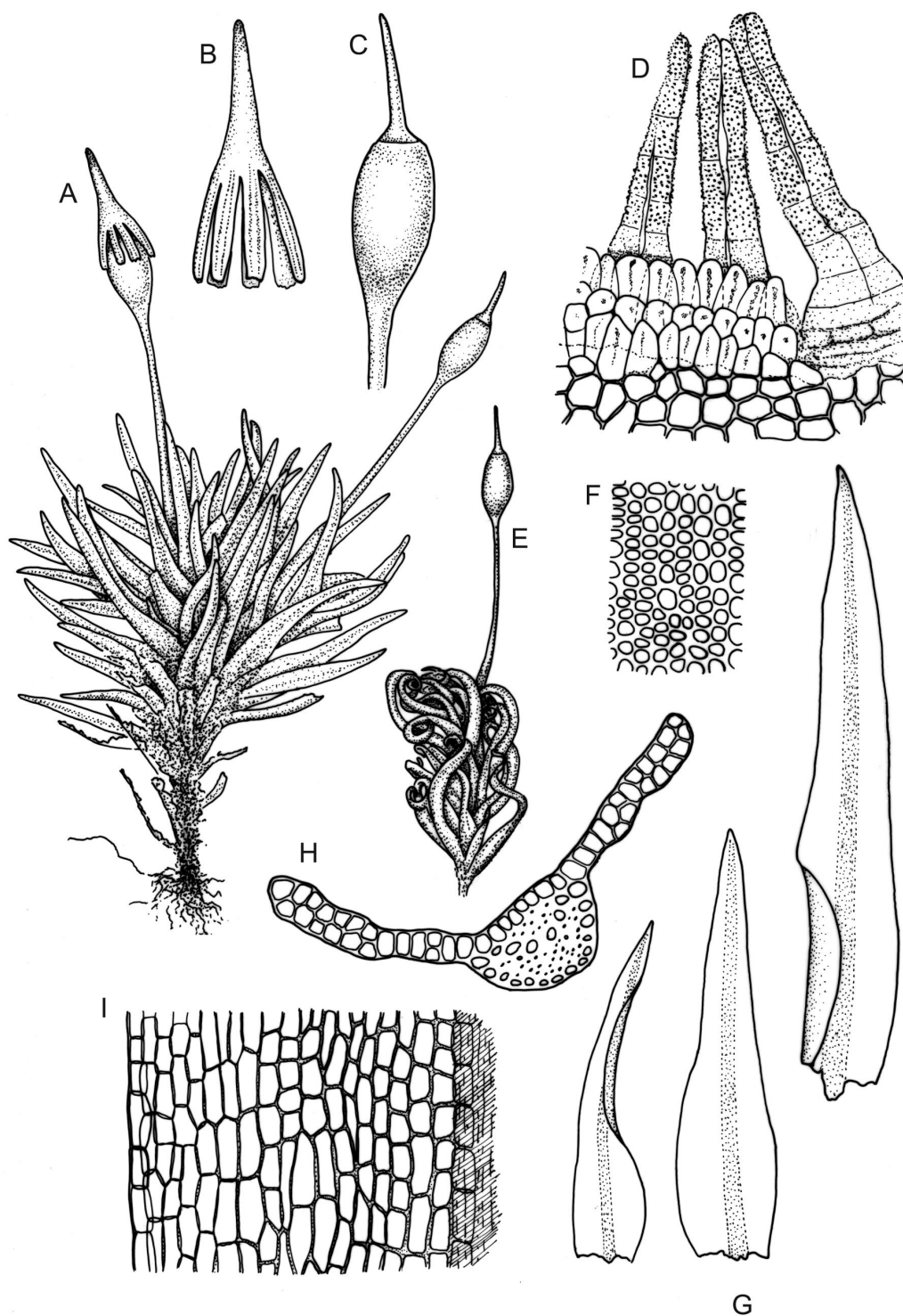
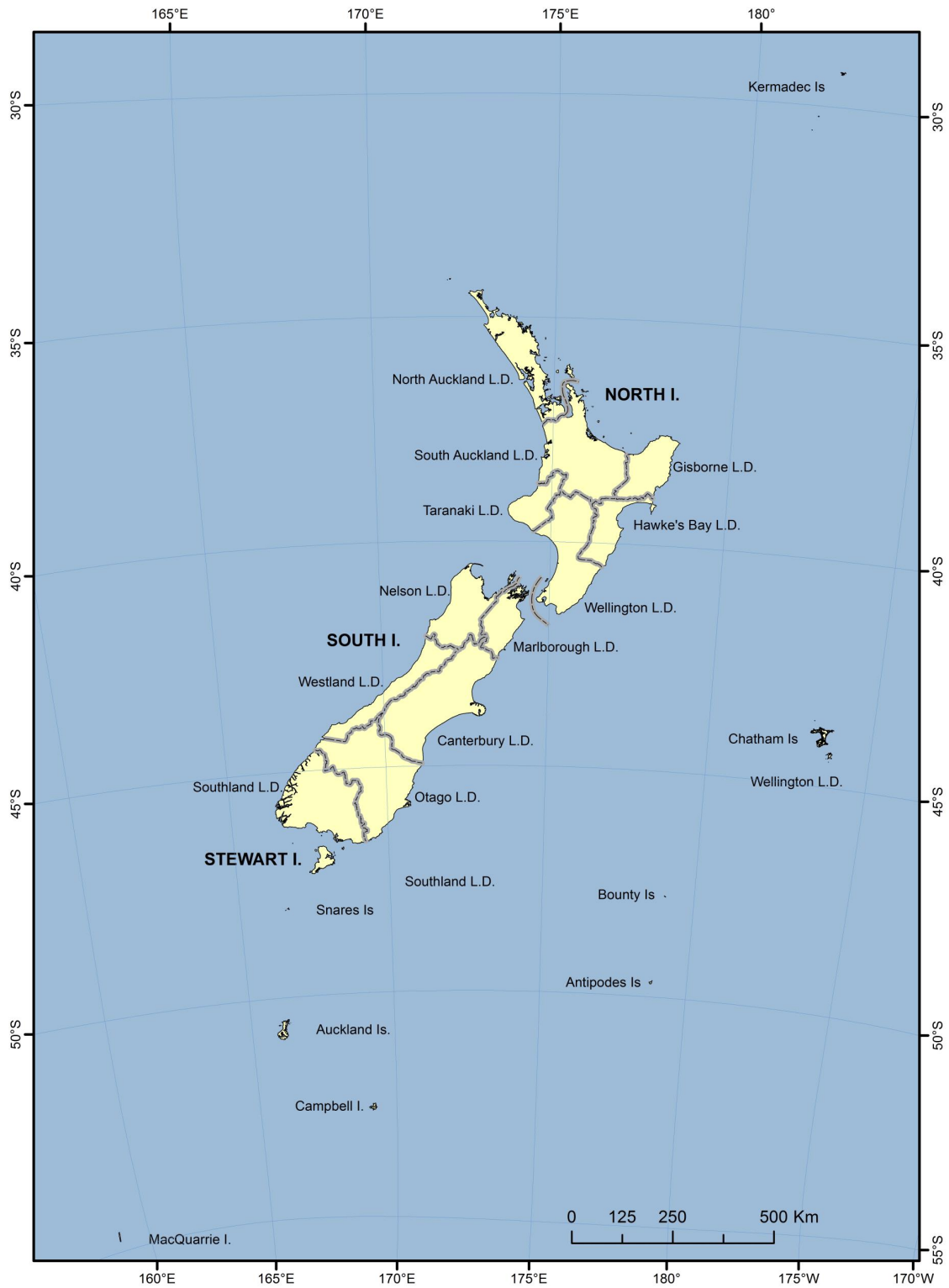
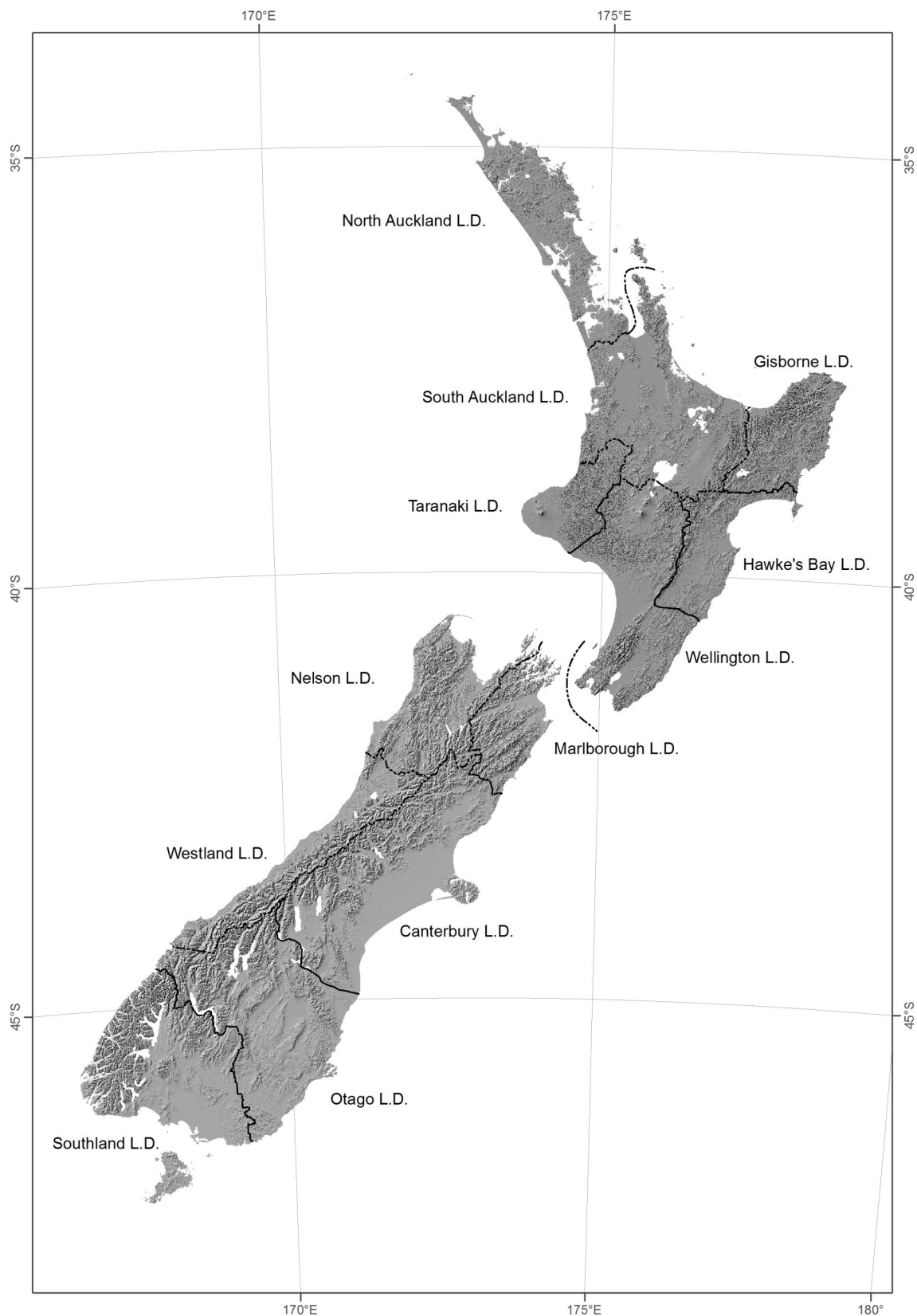


Plate 1: *Ptychomitrium*. A–I: *P. australe*. A, habit with capsules, moist. B, calyptra. C, capsule with operculum. D, peristome detail. E, shoot with capsule, dry. F, mid laminal cells. G, leaves. H, cross-section of laminal cells including costa, c. $\frac{2}{3}$ from base. I, basal laminal cells from costa to margin, c. 200 μm above insertion. Drawn from J.T. Linzey 3435, CHR 545821.



Map 1: Map of New Zealand and offshore islands showing Land District boundaries



Map 2: Map of main islands of New Zealand showing Land District boundaries

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and *italic* for synonyms.

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Flora of New Zealand: PDF publications

The electronic Flora of New Zealand (**eFloraNZ**) project provides dynamic, continually updated, online taxonomic information about the New Zealand flora. Collaborators in the project are Manaaki Whenua – Landcare Research, the Museum of New Zealand Te Papa Tongarewa, and the National Institute of Water and Atmospheric Research (NIWA).

The eFloraNZ presents new systematic research and brings together information from the Manaaki Whenua – Landcare Research network of databases and online resources. New taxonomic treatments are published as fascicles in PDF format and provide the basis for other eFloraNZ products, including the web profiles.

eFloraNZ will have separate sets of PDF publications for algae, lichens, liverworts and hornworts, mosses, ferns and lycophytes, and seed plants.

For each eFloraNZ set the PDF files are made available as dated and numbered fascicles. With the advent of new discoveries and research the fascicles may be revised, with the new fascicle being treated as a separate version under the same number. However, superseded accounts will remain available on the eFlora website.

Moss Set (ISBN 978-0-478-34747-0)

The Moss Set covers indigenous and exotic mosses within the New Zealand Botanical Region.

Authors Allan Fife and Jessica Beever intend to publish *Flora of New Zealand Mosses* as a book. However, they decided to make completed family treatments available through the eFloraNZ project in advance of being published in hardcopy, to enable immediate use.

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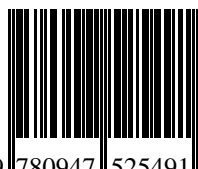
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