

**Austral Hepaticae 42. The Austral species of *Mnioloma*
(Calypogeiaceae), together with a new species,
Mnioloma novaezelandiae n. sp.**

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Abstract — *Mnioloma novaezelandiae* Engel, a new member of the Calypogeiaceae, is described and illustrated from New Zealand. The species belongs to subg. *Caracoma* (Bischl.) Schust. and is compared to *Mnioloma fuscum*.

Hepaticae / Calypogeiaceae / *Mnioloma novaezelandiae* / new taxa / New Zealand

Mnioloma Herz. was circumscribed by Schuster (1995) to include two of the three subgenera that were assigned to *Calypogeia* by Bischler (1963); the third subgenus, subg. *Calypogeia*, was retained in that genus. *Mnioloma* is a pantropical genus of ca 13 species, 11 of which are restricted to the Neotropics and mostly occur in northern South America, Central America and the West Indies. The genus is absent from southern South America. *Mnioloma* was first reported for New Zealand by Renner (2003), who used the name *Mnioloma fuscum* (Lehm.) Schust., a species that is broadly distributed in the paleotropics (the type is based on an Ecklon collection from Table Mt., South Africa). New Zealand plants differ from *M. fuscum* in a number of respects, and in my opinion warrant recognition as a distinct species, as discussed below.

This paper is dedicated to the memory of H el ene Bischler. H el ene published many papers on the Calypogeiaceae; these have been instrumental in developing a taxonomy and classification of that family, and are crucial to our understanding of the group. It is befitting, therefore, that the subject matter of this paper should involve an unusual species of the genus *Mnioloma*.

***Mnioloma novaezelandiae* Engel, sp. nov.**

Mniolomate fusco similis sed foliis non ad lineam mediam dorsaliter insertis, vittam efoliosam latitudine e cellulis duabus caulinis composita delimitantibus, apice marginibusque saepe inaequaliter repandis, cellulis mediis foliaribus parietes tenues formantibus, trigonis nullis vel minutis, amphigastriis in 4-6 seriebus cellularum caulinarum insertis, marginibus eorum integris, laevibus, non crenulatis, ad apicem aequaliter vel inaeque bilobis vel retusis differt.

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Holotype: New Zealand, South Is., Southland Land District, Fiordland Natl. Park, Charles Sound, south side of Gold Arm, 340 m, 8 April 2002, *Renner CMS J156 T/10* (F); isotype: (CHR).

Plants rather flexuous, procumbent, distinctly brownish, the stems more deeply so, the shoots medium in size, to 1.6 mm wide. **Branching** frequent, irregular, uniformly ventral intercalary, at times 2 per underleaf axil, uniformly leafy in some populations, one population with branches leafy as well as stoloniform, geotropic and whip-like. **Stems** conspicuously striolate in surface view, in cross section with cortex in 10-16 rows, in an ill-defined layer of slightly thickened, markedly brown pigmented cells; medullary cells with walls thin, pigmented or not. **Rhizoids** hyaline or pale brown, at immediate base of underleaves, few per underleaf base or sporadic, the rhizoid surface finely but distinctly roughened, the apices at times dendritic. **Leaves** virtually flat, widely spreading, contiguous to weakly imbricate, the insertion not extending to stem midline dorsally, delimiting a leaf-free strip of 2 cells wide, the stem widely exposed in dorsal view; leaves ovate-oblong to rounded-quadrate, on mature shoots 480-600 μm wide \times 600-730 μm long; apices broadly rounded to truncate, often unevenly repand, sporadically retuse; margins often unevenly repand, especially the dorsal, otherwise entire, the free tangential wall of marginal cells straight or somewhat bulging, the margin not crenulate and not with marginal cells widest at the radial walls and with the intervening free wall arched toward the cell lumen; leaves with apex and margins with 1(2) rows of marginal cells mostly subisodiametric, smaller than intramarginal cells and forming an incipient border, the marginal cells with free wall straight to bulging to, at times, angularly projecting (particularly toward the distal end of the free wall), lending the margin locally minutely denticulate, the marginal cells sporadically somewhat radially elongated (to 2.2:1), especially toward the leaf bases, but these cells on the whole narrower than intramarginal cells and contributing to the aspect of a border of differentiated cells. Cells of median sector of leaf thin-walled, trigones absent or minute, the cells 25-36 μm wide \times 34-49 μm long; surface conspicuously papillose, the surface becoming striate toward basal cells. **Oil-bodies** occupying conspicuous portion of volume of lumen, smokey grey, 6-11(13) per cell in median portion of leaf, narrowly elliptic to fusiform, less often broad elliptic, some globose, finely botryoidal, 10.6-16.3 \times 4.8-6.2 μm , broad elliptic ones 8.2 \times 5.8 μm , the globose ones 5.8-6.2 μm in diam. **Underleaves** inserted on 4-5 rows of stem cells, 1.7-2.6X stem width, distant, slightly convex (ventral view), oblate to reniform, the apices equally or unequally bilobed to retuse, the lobe apex often rounded, each with a slime papillae, the 2 papillae often closely juxtaposed, the cells ringing the sinus not much differentiated from those below or if elongated, then not much narrower; the sinus often notch-like; margins entire, the free tangential wall of marginal cells straight or somewhat bulging, locally and sporadically imperceptibly crenulate via marginal cells widest at the radial walls and with the intervening free wall arched toward the cell lumen. **Asexual reproduction lacking.**

Diocious. Androecia unknown. **Gynoecia** on very short ventral-intercalary branches, budlike when unfertilized. **Marsupium** fleshy, cylindrical, brownish, similar in pigmentation to stem, rhizoidous, the summit with a few, vestigial bractlets.

Sporophyte unknown.

Taxonomy: *Mnioloma novaezealandiae*, like *M. fuscum*, belongs to subg. *Caracoma* (Bischn.) Schust. (*Fragm. Flor. Geobot.* 40: 833. 1995, *Calypogeia* subg. *Caracoma* Bischn., *Candollea* 18: 26. 1963 [1962]). The two species are clearly

allied, but differ in a number of notable respects; they may be differentiated as follows:

1. Leaves not inserted to stem midline dorsally, delimiting a leaf-free strip of 2 cells wide; leaf apex and margins (especially the dorsal) often unevenly repand, the dorsal base entire; median leaf cells thin-walled, with trigones absent or minute; rhizoid surface finely but distinctly roughened; underleaves inserted on 4-6 rows of stem cells; underleaf margins entire, not crenulated, the free tangential wall of marginal cells straight or somewhat bulging, the free radial walls not dilated or projecting; underleaf apex equally or unequally bilobed to retuse, the cells ringing the sinus not much differentiated from those below or if elongated, then not much narrower *M. novaezelandiae*
1. Leaves inserted to stem midline dorsally; leaf apex and margins not repand, the dorsal base often with a 1-2-celled tooth; median leaf cells faintly to perceptibly thick-walled, with trigones distinct, at times weakly bulging; rhizoid surface smooth; underleaves inserted on 8-13 rows of stem cells; underleaf margins regularly sinuate-crenulate via marginal cells widest at radial walls and with the intervening free wall arched toward cell lumen, the free radial walls somewhat dilated and projecting; underleaf apex minutely notched, the cells ringing the sinus often differentiated from those below, longer and narrower *M. fuscum*

A number of characters will differentiate *M. novaezelandiae* from *M. fuscum*. In *M. novaezelandiae* the leaf insertion lines do not extend to the stem midline dorsally, and delimit a leaf-free "gutter" of 2 cells wide (Fig. 2: 1), whereas in *M. fuscum* the leaves are inserted to the stem midline dorsally (Fig. 2: 4). Several underleaf characters may be used to distinguish the two species. The underleaves of *M. novaezelandiae* are inserted on 4-6 rows of stem cells (Fig. 2: 2) vs. 8-13 rows in *M. fuscum* (Fig. 2: 8). Underleaf apices in *M. novaezelandiae* are equally or unequally bilobed to retuse (Fig. 1: 1, 2, 11, 12), and the cells that ring the sinus are not much differentiated from those below or, if elongated, then not much narrower (Fig. 1: 11, 12). On the other hand the underleaf apex in *M. fuscum* is minutely notched, and the cells that ring the sinus are often longer and narrower than those below and are clearly differentiated from them (Fig. 2: 8, 9). Also, the underleaf margins in *M. novaezelandiae* are smooth and uninterrupted, with the free tangential wall of the marginal cells straight or somewhat bulging and the free radial walls are not dilated or projecting (Fig. 1: 11, 12) vs. underleaf margins regularly sinuate-crenulate due to marginal cells being widest at the radial walls, with the intervening free wall arched toward the cell lumen in *M. fuscum* (Fig. 2: 8). Moreover, the free radial walls of the underleaf margins in *M. fuscum* are somewhat dilated and projecting (Fig. 2: 8), often lending a crenulated aspect. The leaf apex and margins of *M. novaezelandiae* are often unevenly repand (Fig. 1: 1-6) and the dorsal base is uniformly entire. In *M. fuscum*, on the other hand, the leaf apex and margins are smooth and evenly curved or arched (Fig. 2: 5), and the dorsal base often has a 1-few-celled tooth (Fig. 2: 4, 6). For further comments on *M. fuscum* (*s. str.*) see: Bischler (1970), Kitagawa (1988) and Schuster (1995, 2000).

Distribution and Ecology: Known only from a few sites, one in the southwestern sector of South Island (type) and on Mt. Moehau in the Coromandel Peninsula of South Auckland. On Mt. Moehau plants occurred on soil admixed with *Psiloclada clandestina* and *Bazzania taylorii* deep in a protected pocket of a vertical bank at ca. 800-840 m in a area of rocky outcrops and shrub-heath

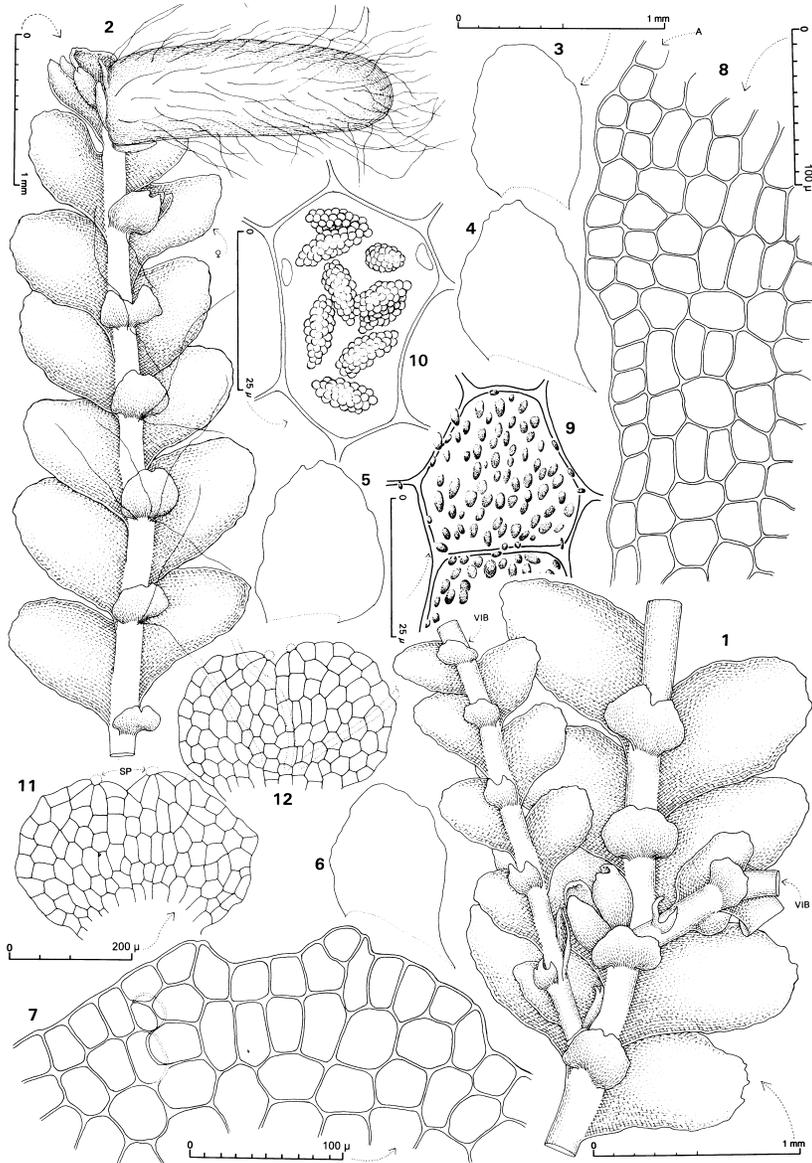


Fig. 1. *Mnioloma novaeselandiae* Engel. **1.** Portion of main shoot with 2 ventral-intercalary branches (= vib) and a young gynoeceium (= ♀), ventral view. **2.** Portion of main shoot with marsupium and a young female inflorescence (= ♀), ventral view. **3-6.** Leaves (all drawn to same scale). **7.** Portion of leaf apex showing marginal row of smaller cells. **8.** Portion of apex (= A) and dorsal lateral margin of leaf showing marginal row of smaller cells. **9.** Median leaf cells showing surface papillae. **10.** Median leaf cells with oil-bodies and a few chloroplasts. **11, 12.** Underleaves; rhizoids shown with stipple at right; note small slime papillae (= sp). (Figs 1-9, 11, 12, from type; 10, from *Glennie* 8876, New Zealand, Westland, Mt. Te Kinga).

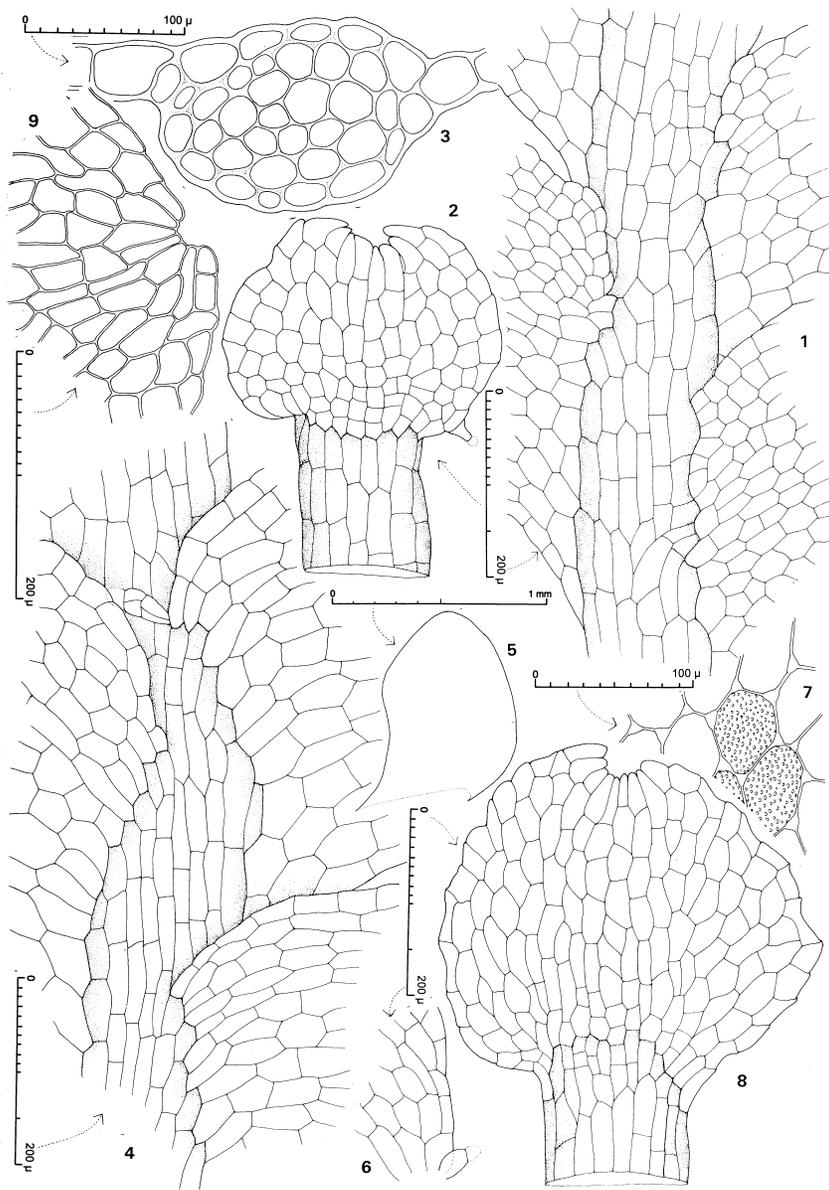


Fig. 2. *Mnioloma novaezelandiae* Engel (1-3) and *M. fuscum* (Lehm.) Schust. (4-9). **1.** Portion of leading shoot showing leaf bases (dorsal view); note that the insertion lines delimit a leaf-free strip of 2 stem cells wide. **2.** Portion of stem with underleaf; note ventral merophyte width of 6 cells. **3.** Stem, cross section. **4.** Portion of leading shoot showing leaf bases (dorsal view); note that the insertion lines extend to the stem midline; note also the tooth at base of leaf at upper right. **5.** Leaf. **6.** Dorsal base of leaf with 1-celled tooth capped by a slime papillae. **7.** Median leaf cells, the papillose surface shown in part. **8.** Portion of stem with underleaf; note ventral merophyte width of 13 cells. **9.** Underleaf apex showing the minute notch and the differentiated cells ringing the sinus. (Figs 1-3, from type of *M. novaezelandiae*; 4-9, from type of *M. fuscum*).

communities including *Dracophyllum recurvum*, *Lepidothamnus laxifolius*, *Coprosma foetidissima*, *Oreobolus pectinatus* and *Corokia buddleioides*. The type occurred at 340 m on a soil bank in a forest dominated by *Nothofagus menziesii*, *N. solandri* var. *cliffortioides* growing with *Zoopsis argentea*, *Bazzania adnexa* and *Tylimanthus tenellus* (see Renner, 2003).

Specimen seen: NEW ZEALAND. NORTH ISLAND. SOUTH AUCKLAND PROV.: Coromandel Forest Park, Mt. Moehau, exposed rocky ridge below summit area of "Little Moehau" and adjacent to a protected valley system with a western aspect, *Engel & von Konrat 23701* (F).

***Mnioloma fuscum* (Lehm.) Schust.**

Jungermannia fusca Lehm., *Linnaea* 4: 360. 1829. *Calypogeia fusca* (Lehm.) Steph., *Spec. Hep.* 3: 398. 1908. *Metacalypogeia fusca* (Lehm.) Kitag., *Beih. Nova Hedwigia* 90: 168. 1988. *Mnioloma fuscum* (Lehm.) Schust., *Fragm. Flor. Geobot.* 40: 848. 1995. **Type:** South Africa, Cape Prov., Table Mt., *Ecklon s. n.* (G!), 2 coll., one labeled "Original von Lehmann sub Meissner's Herbar.").

The following diagnosis is based on the type of *Jungermannia fusca*.

Plants light brown; branching of ventral-intercalary type. **Stem** in surface view with cortical cells moderately elongate (to 4.4:1), the surface conspicuously striolate. **Rhizoid** surface smooth. **Leaves** inserted to stem midline dorsally, a leaf-free strip of stem cells not delimited; leaf apex and margins smooth and not repand, the dorsal base often with a small tooth comprised of a single cell, a uniseriate row of 2 cells, or several biseriate tires, in all cases the tooth is capped by a slime papilla, the dorsal margin not decurrent, the ventral moderately so; leaves with apex and margins with 1(2) rows of marginal cells mostly subsodiametric, slightly smaller than intramarginal cells and forming a very weakly defined border, the marginal cells with free wall slightly to moderately bulging, but never angularly projecting, the marginal cells for the most part remaining subsodiametric to the leaf bases, and only sporadically somewhat elongated in a direction parallel with the margin (esp. near the ventral base). Cells of median sector of leaf perceptibly firm-walled, with trigones distinct, concave-sided, 24-32(38) μm wide \times (42)48-60 μm long; surface markedly papillose throughout, the surface of basal cells with some markings rounded in profile to at most short elliptic, i.e., the surface not becoming striate. **Underleaf** inserted on 8-13 rows of stem cells, the apices minutely notched, the notch at times inconspicuous, the cells ringing the sinus often differentiated from those below, longer and narrower (esp. at the distal end of the cell); margins often regularly sinuate-crenulate by marginal cells widest at radial walls and with the intervening free wall arched toward the cell lumen, the free radial walls somewhat dilated and projecting.

Distribution: The range of this species includes Tristan da Cunha and Inaccessible Is. (Arnell, 1958), Africa (South Africa and north to Ethiopia; cf. Arnell, 1963; Bischler, 1970), Madagascar, Réunion, Seychelles, St. Helena, the Azores, Borneo, Java, Sumatra, Sri Lanka, Thailand, New Guinea, New Caledonia, Solomon Isls., Samoa, Guadacanal and Hawaii.

Specimens seen: INACCESSIBLE IS.: Above "Waterfall," E part, 200 m, *Christophersen & Mejlund 2606* (O); near highest peak, 500 m, *Christophersen & Mejlund 2531* (O). SOUTH AFRICA: Cape, Betty's Bay, Porter Nature Reserve in kloof behind Botanic Garden, *Magill 6321* (F).

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LITERATURE CITED

- ARNELL S., 1958 — Hepatics from Tristan da Cunha. *Results of the Norwegian Scientific Expedition to Tristan da Cunha 1937-1938*, 3 (42): 1-76, f. 1-30.
- ARNELL S., 1963 — *Hepaticae of South Africa*. Stockholm, Norstedt & Söner, 411 p., 290 Figs.
- BISCHLER H., 1963 (1962) — The genus *Calypogeia* Raddi in Central and South America. I-III. *Candollea* 18: 19-51, 52-93, 95-128, Figs 1-41.
- BISCHLER H., 1970 — Les espèces du genre *Calypogeia* sur le continent africain et les îles africaines. *Revue bryologique & lichénologique* 37: 63-134, Figs 1-17.
- KITAGAWA N., 1988 — Studies on the Hepaticae of Thailand V. The family Calypogeiaceae. *Beihefte zur Nova Hedwigia* 90: 163-170.
- RENNER M.A.M., 2003 — *Mnioloma fuscum* (Marchantiopsida: Calypogeiaceae), an unexpected addition to the indigenous flora of New Zealand. *Journal of bryology* 25: 287-291.
- SCHUSTER R. M., 1995 — Phylogenetic and taxonomic studies on Jungermanniidae, III. Calypogeiaceae. *Fragmenta floristica et geobotanica* 40: 825-888.
- SCHUSTER R. M., 2000 — Austral Hepaticae. Part I. *Nova Hedwigia, Beiheft* 118: 1-524, Figs 1-211.