

Taxonomic notes and distribution of *Matteria papillosula* and *Microdus euchlorus*, from northern Patagonia (Argentina), with a new combination in *Campylopodium* (Bryopsida)

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Two Chilean moss species endemic to the region, *Matteria papillosula* (Thér.) Goffinet and *Microdus euchlorus* (Mont.) Besch., are reported for the first time from northern Patagonia in Argentina. Both taxa are described and illustrated. *Microdus euchlorus* is transferred to *Campylopodium* (C. Müll.) Besch. as *C. euchlorum* (Mont.) Matteri *comb. nov.*, and *Dicranella flexipes* Card. & Broth. and *D. costata* Broth. are placed in synonymy.

Key words: Argentina, Bryopsida, *Matteria papillosula*, *Microdus euchlorus*, taxonomy

While examining several hundreds of moss collections from Parque Nacional Nahuel Huapi related to our studies on the northern Patagonian moss flora, a number of endemic mosses came to hand. Herein we describe and illustrate two poorly known species, both representing new records for the Argentinian moss flora. Both species have been found in cold-temperate, evergreen *Nothofagus dombeyi* rainforests, with *Saxegothaea conspicua*, *Dasyphyllum diacanthoides* and *Laureliopsis*

philippiana, between 750–800 m. A full facies of this forest develops in the neighboring Valdivian territory (Dimitri 1972). This and other Patagonian material, presently housed in the herbarium of the senior author at BA, or at BCRU (Department of Botany, Comahue University, Bariloche, Argentina) with the junior author, are currently distributed as the *Musci Patagonici Exsiccati* series.

Macrocoma subg. *Trachyphyllum* as defined by Vitt (1980) comprises two species, *M. gracilli-*

ma (Besch.) Vitt and *M. papillosula* (Thér.) Vitt. Recently the subgenus was raised to generic rank as *Matteria* Goffinet (Goffinet & Vitt 1998), a position already proposed by Seki (1974).

Matteria gracillima (Besch.) Goffinet is known from the Chilean province Ultima Esperanza, and also from Aisén, where it has been extensively collected by Seki (1974), and from Osorno. *Matteria papillosula* (Thér.) Goffinet has a more restricted distribution, and it was so far only known from a few collections from Aisén and Llanquihue. It has been probably overlooked due to its small size. Both species are easily separated and a key is provided by Vitt (1980).

Matteria papillosula was recently found in the Argentine provinces of Río Negro and Neuquén within the National Park Nahuel Huapi. The species usually exhibits abundant sporophytes and among them, several capsules show clearly endosporic protonematal and intracapsular development. Capsules from fresh and herbarium collections often contain 2–3 juvenile plants and/or germinating spores (Fig. 1E). This striking feature seems to be characteristic of subg. *Trachyphyllum* since it has also been observed in some specimens of *M. gracillima* (notably in *Newton 12-AAS*, from Ultima Esperanza, Chile), where 3–4 young plants may be found emerging from capsules' mouth. This character provides additional support to Seki's and Goffinet's systematic views.

A complete description of *Matteria papillosula* is lacking, thus, based on recent collections, we provide a description together with illustrations to facilitate identification.

Matteria papillosula (Thér.) Goffinet (Fig. 1)

in Bates *et al.*, *Bryology for the Twenty-first Century*: 154. 1998 ("*papillosa*"). — *Macrocoma papillosula* (Thér.) Vitt, *Bryologist* 83: 433. 1980 ("*papillosa*"). — *Macromitrium papillosulum* Thér. in Herz., *Arch. Esc. Farm. Fac. Cs. Méd. Córdoba* 7: 50. 1938 ("*papillosulm*", for correct spelling cf. Herzog, 1954: 81; the spelling is further authenticated by the labels on type specimens). — Lectotype: Chile. Llanquihue, Petrohué, *C. C. Hosseus* (PC!).

Plants epiphytic, brownish green, main stems creeping, densely subpinnately branched, with clusters of reddish, bright rhizoids; stem apex and

branches erect, these often with short branchlets. Stem transverse section with 2–3 layers of thick-walled epidermal cells, thinner-walled cortical cells, without central strand. Branch leaves densely set, leaves 0.56×0.30 mm at widest point, just below middle, ovate-oblong, bluntly acute to slenderly apiculate, very concave, with slightly reflexed apex when dry, squarrose when wet, apex occasionally whitish; margins flat above, revolute from widest point almost to base, usually one side more than the other, subentire, crenulate above by projecting papillose cells. Costa ending 10–12 cells below apex, in section undifferentiated, formed by 2 rows of thick-walled cells, occasionally upper dorsal costa with long rhizoids; stem leaves similar to branch leaves but laxer and larger, 0.68×0.33 mm, with a rather longer apiculum. Laminal cells uniformly rounded-elliptic and thick-walled, upper leaf cells 12.6×5.6 μm , bulging unipapillose, median and lower cells 7.6×8.8 μm , bulging with lower papillae, flatter towards basal margins, juxtacostal cells 16.3×4.5 μm , smooth, elongate and thicker-walled; at insertion with one transverse row of orange, oblong, thick-walled cells.

Cladautoicous. Perichaetia single (occasionally in pairs) terminal on main stems and subapical branches, with 4–5 short subfloral branchlets; perichaetial bracts 0.80×0.45 mm at widest point, with clusters of paraphyses longer than bracts; perigonia on short subapical branches or branchlets, with few antheridia and few paraphyses. Seta 2.5–5.5 mm long, orange, slightly curved at base. Capsule oblong, 1–1.3 mm long, strongly furrowed; exothecial cells oblong, regularly incrassate in longitudinal rows; stomata superficial, few at base of urn; annulus persistent, of one row of vesicular cells. Exostome teeth 16, fused at base, obtuse, with papillose-spiculose ornamentation, reflexed to the middle when dry, 280–320 μm long \times 60 μm wide at base; endostome a hyaline membrane, irregularly cleft in at least 16, granulate, obtuse segments, 170–190 μm long, with basal or lateral branches linking main processes, not keeled, median line faint. Operculum conic, short-umbonate. Spores few, greenish, polygonal, multicellular, usually germinating, 120–130 μm diam.; juvenile plants frequent. Calyptra cucullate, canalliculate, 1.4–1.8 mm long, irregularly laciniate at base.

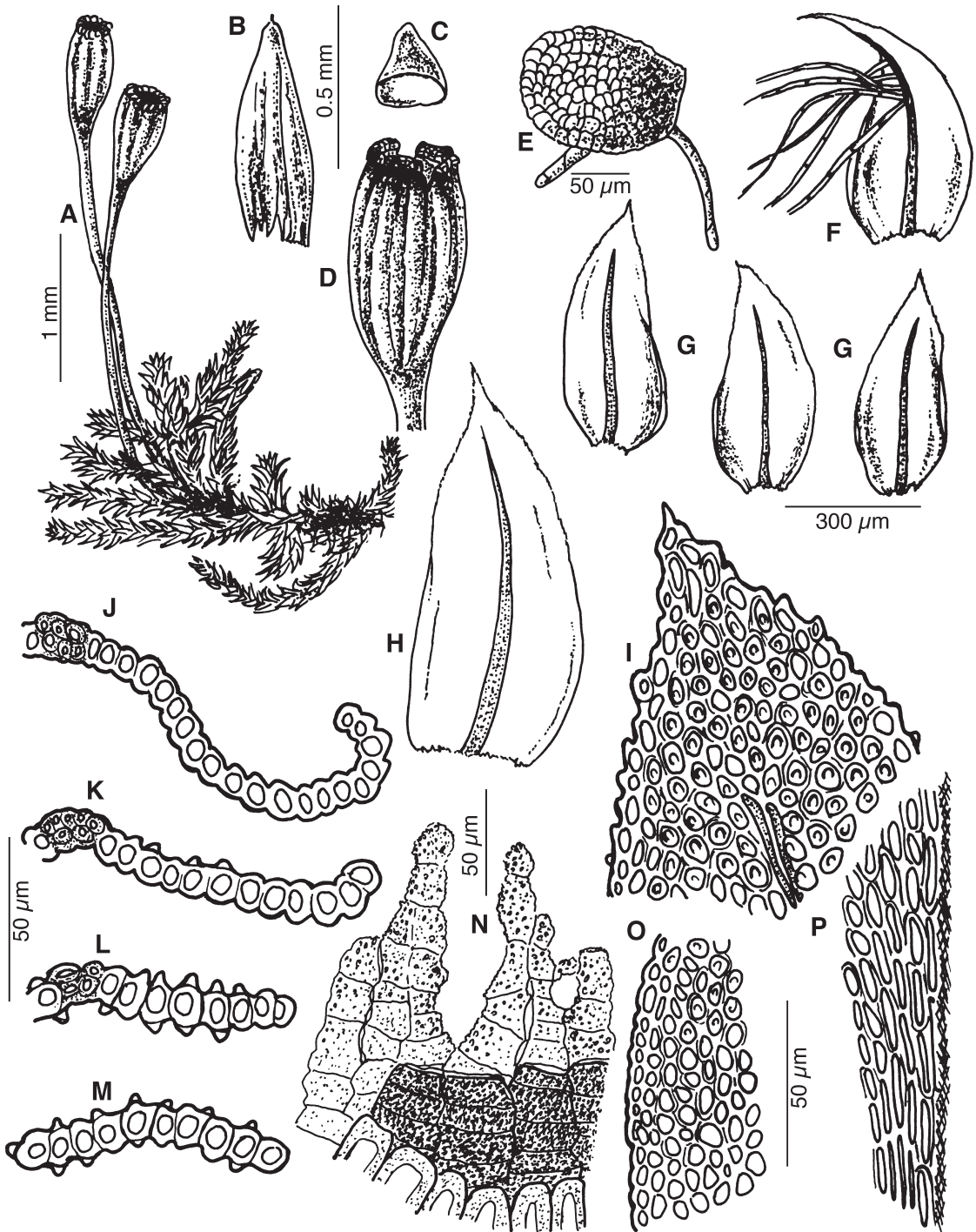


Fig. 1. *Matteria papillosula* (Thér.) Goffinet (drawn from CM 6521, BA). — A: Habit. — B: Calyptra. — C: Operculum. — D: Capsule. — E: Germinating spore. — F: Stem leaf with rhizoids. — G: Median stem leaves. — H: Perichaetial bract. — I: Upper cells of leaf. — J–M: Leaf transverse sections from base to apex. — N: Part of peristome. — O: Median marginal leaf cells. — P: Basal juxtacostal cells.

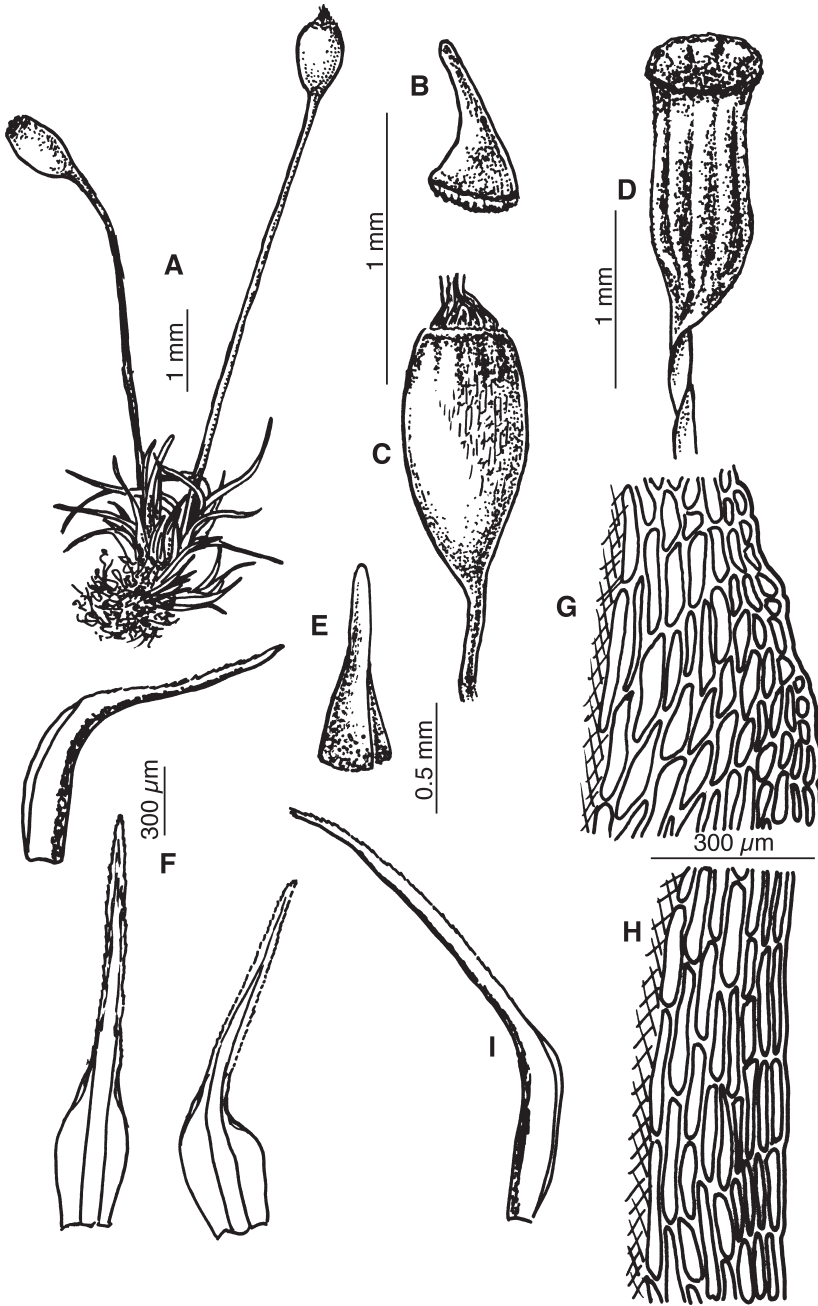


Fig. 2. *Campylopodium euchlorum* (Mont.) Matteri (drawn from CM 6532, BA). — A: Habit. — B: Operculum. — C: Capsule, wet. — D: Capsule, dry. — E: Calyptra. — F: Stem leaves. — G: Cells at leaf shoulder. — H: Basal cells of leaf. — I: Perichaetial bract.

Habitat and distribution. — Growing in small lax cushions on twigs of trees, shrubs or either on bark of young trees, in forests of *Nothofagus dombeii* and *Saxegothaea conspicua*. Associated with *Ulota* spp., *Eucamptodon perichaetialis*, *Hypnum skottsbergii*, etc. Alt. 700–800 m a.s.l. Endemic to Chile and Argentina, between 41° and 47° S

latitude.

Specimens examined. — **Argentina.** Neuquén, Depto. Los Lagos, Pt. Cántaros, bosque costero bordeando el brazo Blest, 41°04'S, 71°49'W, 750 m s.m., *Matteri & Schiavone 6521* (BA). Río Negro, Depto. Bariloche, Camino Pt. Blest a Pt. Alegre, en turbera, 750 m s.m., 41°03'S, 71°48'W, *Calabrese 640* (BA, BCRU). **Chile.** Llanquihue, Petrohué,

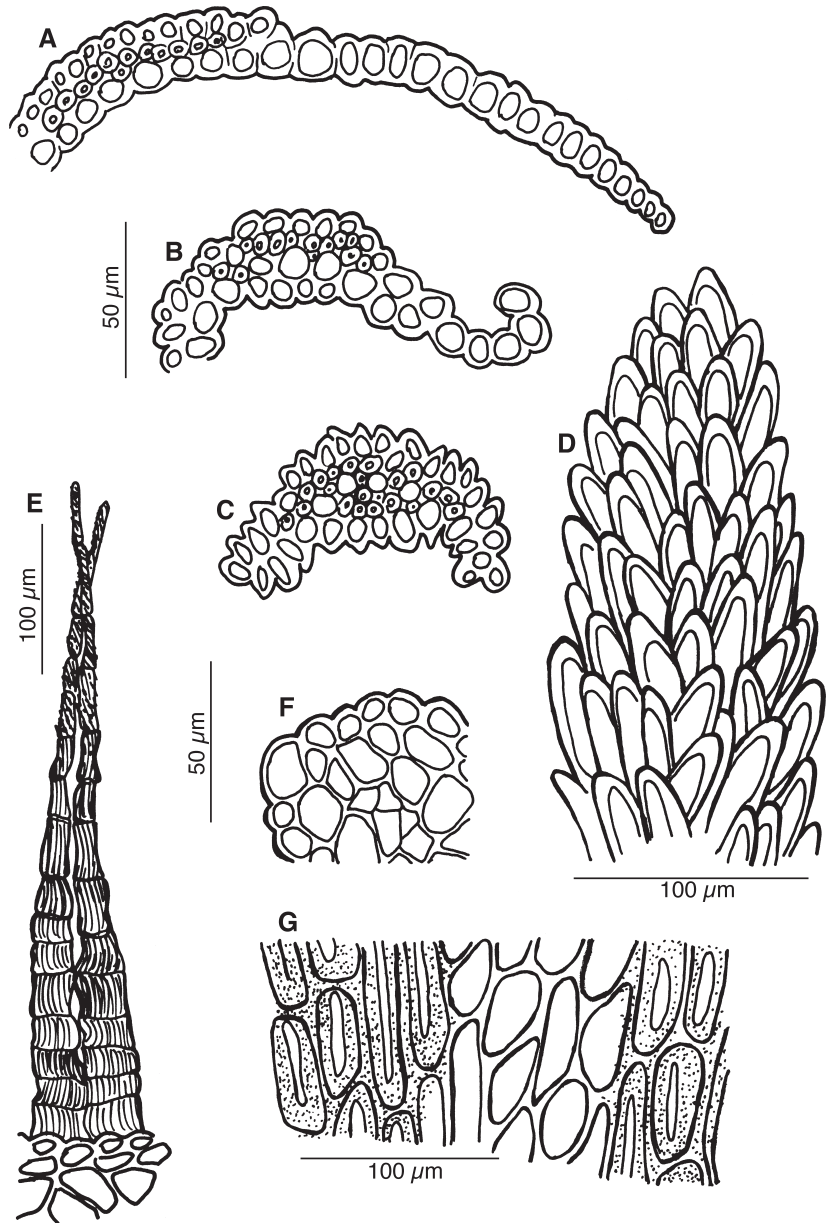


Fig. 3. *Campylopodium euchlorum* (Mont.) Matteri (drawn from CM 6532, BA). — A–C: Leaf transverse sections from base to apex. — D: Upper leaf cells. — E: Peristome tooth. — F: Part of stem transverse section. — G: Exothecial cells.

5.II.1935 *Hosseus* 521 (isotype JE). Aisén, Pt. Puyuhuapi, 1940, *Schwabe* 50/b (JE); Golfo Elefante, Istmo de Ofqui, 1921, *Hicken* s. n. (PC, 2 specimens in JE).

Campylopodium euchlorum (Mont.) Matteri, *comb. nov.* (Figs. 2 and 3)

Dicranum euchlorum Mont., Ann. Sci. Nat. Bot. sér. 3, 4: 112. 1845. — *Aongstroemia euchlora* (Mont.) C. Muell.,

Syn. Musc. 1: 442. 1848. — *Dicranella euchlora* (Mont.) Lor., Bot. Zeit. (Berlin) 24: 186. 1866. — *Microdus euchlorus* (Mont.) Besch. in Par., Ind. Bryol. 803. 1897. — Type: Chile. Provinciae meridionalis, unknown locality, *Gay* s. n. (holotype PC!).

Dicranella flexipes Card. & Broth., K. Svenska Vet. Akad. Handl. 63(10): 11, tab. 1, fig. 9, 1923, *syn. nov.* — Type: Chile. Río Mañuales, près du Río Aysen, *C. Skottsberg* 961 (holotype UPS!).

Dicranella costata Broth. in Skottsbr., Nat. Hist. Juan Fernandez 2: 412. 1924, *syn. nov.* — Type: Chile. Juan Fernán-

dez, Mas a Tierra, Portezuelo de Villagra, ca. 450 m, C. & I. Skottsberg 1 (lectotype, *vide* Robinson 1975, S; isolectotype H!).

Plants very small, less than 2 mm tall, bright green, tomentose at base, stems single or branching at base, in transverse section with one row of slightly thick-walled epidermal cells and larger, thin-walled cortical cells, without central strand. Stem leaves crowded, increasing in size upwards, with widely ovate to obovate, semisheathing base, $0.4\text{--}0.6 \times 0.3$ mm, gradually narrowed in a stout, flexuose, patulous, bistratose lamina, 1.2–1.4 mm long, lanceolate subulate, with obtuse apex, 3 to 4 rows of lamina cells extending to 2/3 of subula; costa strong, 57–65 μm wide at insertion, filling the apex, percurrent, in transverse section with a median row of deuter cells, two stereid bands at apex and one abaxial band towards base; margins revolute at shoulders, strongly serrulate in the lamina by projecting cell ends. Upper cells obscure, elliptic, strongly thick-walled, with stout projecting upper ends, $30\text{--}32 \times 6\text{--}8$ μm ; cells at shoulders oval, sub-quadrate to short rectangular, firm-walled, $34\text{--}44 \times 10\text{--}16$ μm ; basal cells long rectangular, $70\text{--}80 \times 12\text{--}18$ μm , firm-walled, except for 3–4 marginal rows of thin-walled, narrower cells.

Goniautoicous; perichaetia terminal, without paraphyses; perichaetial bracts similar but larger than stem leaves, to 2.7–3.0 mm, with a more abruptly narrowed base. Perigonia inconspicuous, below perichaetia, with 4–5 antheridia and 2 or 3 paraphyses. Seta 5–8 mm long, longer than perichaetial bracts, yellowish, twisted when dry and occasionally nodding, arcuate at apex when wet, single or clustered; capsule ovate, erect or due to the arcuate seta, nutant, 1 mm long, obsolete strumulose, annulus absent, with 8–10 phaneropore stomata at base of urn, strongly furrowed with 4–8 furrows and urceolate when dry, exothelial cells oblong, differentially thickened in longitudinal rows. Peristome teeth narrow, deep orange, 240–300 μm long, distal 1/2 to 2/3 divided into two segments, which are occasionally rejoined at apex, longitudinally striate in lower and central parts, obliquely striate-papillose above. Operculum conic, 0.6–0.7 mm long, obliquely long rostrate. Calyptra cucullate. Spores brown-

ish, somewhat tetrahedral, 18–24 μm diam., with processes of the clavate type under SEM.

This species was described by Montagne (1845) as *Dicranum euchlorum*, but that name has fallen into oblivion. It was recorded several times under *Dicranella* (Seki 1974, Robinson 1975).

All of our Patagonian material of the species is autoicous. However, perigonia are easily overlooked, so that the species was described as dioicous by Cardot and Brotherus (1923) and by Brotherus (1924). Only Montagne (1845) clearly stated the position of perigonia. Still, in the same publication Montagne described a second species, *Dicranum aulacocarpum* Mont. [= *Dicranella aulacocarpa* (Mont.) Mitt.], as similar to *Microdus euchlorus*, but dioicous and with a strongly plicate capsule. Its type material could not be located, but from its description we conclude that it is a potential synonym of *M. euchlorus*, separated only by its dioicous condition.

Despite of the fact that *Microdus* Besch. is an ill-defined genus and treated frequently within *Dicranella* (C. Müll.) Schimp. (Allen 1994, Sharp *et al.* 1994), *M. euchlorus* does not belong in those genera due to its apophysal stomates and arcuate seta. These features indicate its affiliation with *Campylopodium*, as defined by Giese and Frahm (1985). An obvious misprinting in Cardot and Brotherus's (1923: 12) description of *Dicranella flexipes* — a name we treat as a taxonomic synonym of *Campylopodium euchlorum* — gave the length of seta as 10–12 cm, which does not match the illustration (tab. 1: fig. 9a–f) or the type material (UPS).

Campylopodium euchlorum fits perfectly the generic combination of characters presented by Giese and Frahm (1985). It is closely allied to *C. lineare* (Mitt.) Dix., a rare Australasian endemic, and more remotely related to *C. medium* (Duby) Giese & Frahm, a widely distributed species, known also from southern Chile. *Campylopodium euchlorum* is distinguished from both species by: (1) the non-setaceous but flexuose and spreading leaf subulae, (2) setae longer than perichaetial bracts, which do not reach the capsule or exceed

it, and (3) setae, at most arcuate — not cygneous — so that the capsules are not concealed by the perichaetial bracts. It can also be separated from *C. lineare* by the widely ovate to obovate rather than ovate-lanceolate leaf base, and the leaf apex obtuse instead of acute to acuminate. *Campylopodium euchlorum* shares several sporophytic and gametophytic characters with *C. lineare*, such as absence of an annulus, an autoicous sexual condition, and shape and upper serration of leaves.

Habitat and distribution. — Growing in minute, bright green, soft turfs, on wet soil or rotten logs, intermixed and usually hidden below bushy *Bartramia halleriana*, *Lepyrodon tomentosus*, *Chrysoblastella chilensis* and *Notoligotrichum minimum*, in riparian forests dominated by *Nothofagus dombeyi* and *Saxegothaea conspicua*. Alt. 450–1 250 m a.s.l. Endemic on both sides of the Andes, from 39°40' to 46°S latitude and in Juan Fernández Islands.

Additional specimens examined. — **Argentina.** Neuquén, Depto. Los Lagos, próximo a cascada Los Cántaros, 860 m, 41°02'S, 71°49'W, *Calabrese 259a* (BA, BCRU); Pt. Cántaros, 770 m, 41°04'S, 71°49'W, *Matteri-Schiavone CM 6532* (BA). **Chile.** Valdivia, Vn. Choshuenco, 1981 *Schlegel 2* (BA). Aisén, Río Mañuales, près du Río Aysen, 45°24'S, 72°30'W, 1908 *C. Skottsberg 961* (UPS). Juan Fernández, Mas a Tierra, Portezuelo de Villagra, *C. & I. Skottsberg 1* (H).

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