

A new species of *Syntrichia* Brid. (Pottiaceae, Bryophyta) from Chile

M. TERESA GALLEGO and MARÍA J. CANO

Universidad de Murcia, Spain

SUMMARY

We describe one distinctive new moss species of *Syntrichia*, *S. muricata* from the Coquimbo Region in northern Chile. It is characterized by the dorsal costa strongly papillose, with prorate cells, a hyaline and smooth hair point, plane leaf margins, and the presence of prominent dorsal-lateral costa cells. Drawings, light microscope and SEM photographs of the main characters are given. The principal characters that separate *S. muricata* from the most similar species are discussed.

KEYWORDS: Chile, *Syntrichia*, Pottiaceae, taxonomy.

INTRODUCTION

Several interesting specimens of mosses were collected from the northern part of the Coquimbo Region (Chile) by the second author in 2001. One of these plants was recently described as a new *Didymodon* Hedw. species, *D. coquimbensis* J.A.Jiménez & M.J.Cano (Jiménez & Cano, 2007). Together with the previous taxon we found a *Syntrichia* Brid. species that differs from congeners known to us in a number of key features. We studied the types of the American taxa of *Tortula* Hedw. and *Syntrichia*, as part of a taxonomic revision of these genera in South America, and compared the specimens with published information (Magill, 1981; Lightowlers, 1986; Kramer, 1988; Zander, 1993; Mishler, 1994, 2007; He, 1998; Li, Crosby & He, 2001; Allen, 2002; Gallego, 2005). We conclude that our samples belong to an undescribed species of *Syntrichia*, which is here described, illustrated and compared with closely related species.

MATERIALS AND METHODS

The specimens cited below are deposited in the herbaria of the Murcia University (MUB), Missouri Botanical Garden (MO) and Concepción University (CONC). The habitat description is based on field observations. Microscopic examination and measurements were undertaken with an Olympus-BH2 light microscope and microphotographs were obtained with a spot insight 3.5 camera mounted on this microscope. The leaf surface was studied using a Jeol JSM-6100 scanning electron microscope (SEM) at an accelerating voltage of 15–20 kV. The material was fixed

in 3% glutaraldehyde with 0.1 M cacodylate buffer at 4°C, washed in cacodylate and saccharose buffer, dehydrated in an increasing acetone gradient (30%–50%–70%–90% and 100%), critical-point dried and sputtered with a gold layer 200–300 Å thick.

DESCRIPTION

Syntrichia muricata M.T.Gallego & M.J.Cano, *sp. nov.* (Figs 1, 2)

Phyllidia exsiccatione spiraliter contorta, ovata vel ovato-lingulata, apice rotundata, obtusa vel emarginata sed nonnumquam dentata, marginibus autem plerumque plana, interdum in dimidia parte inferiore recurvata; unistrata quidem —ita ut margo nullo modo appareat incrassata—, nervo in pilum hyalinum atque laevem excurrenti, dorsaliter valde papilloso, cellulis cooperto scindulosis ('prorate'), ± papilloso, certe, sed saepe sublaevibus, atque lateralibus excrescentiis cellulis papilloso efformatis praedito. Sporophytum ignotum.

Type: CHILE. Coquimbo (IV Region): pr. Hurtado, 30°04'53"S, 70°43'39"W, 890 m a.s.l. 15 Nov. 2001, *M. J. Cano 168a* (holotype: MUB 22198; isotypes: CONC, MO).

Plants 0.2–1.0 cm high, growing in open turfs. *Stems* erect, branched, without hyalodermis, sclerodermis weakly developed, central strand present. *Leaves* spirally twisted around stem when dry, spreading or patent when moist, 0.8–1.5 × 0.5–0.8 mm, ovate or ovate-lingulate, not constricted at mid-leaf, unistratose, red with KOH; apex rounded, obtuse or emarginate, sometimes dentate near apex; margins usually plane, rarely slightly recurved at mid-leaf, papillose-crenulate, unistratose, not bordered; costa

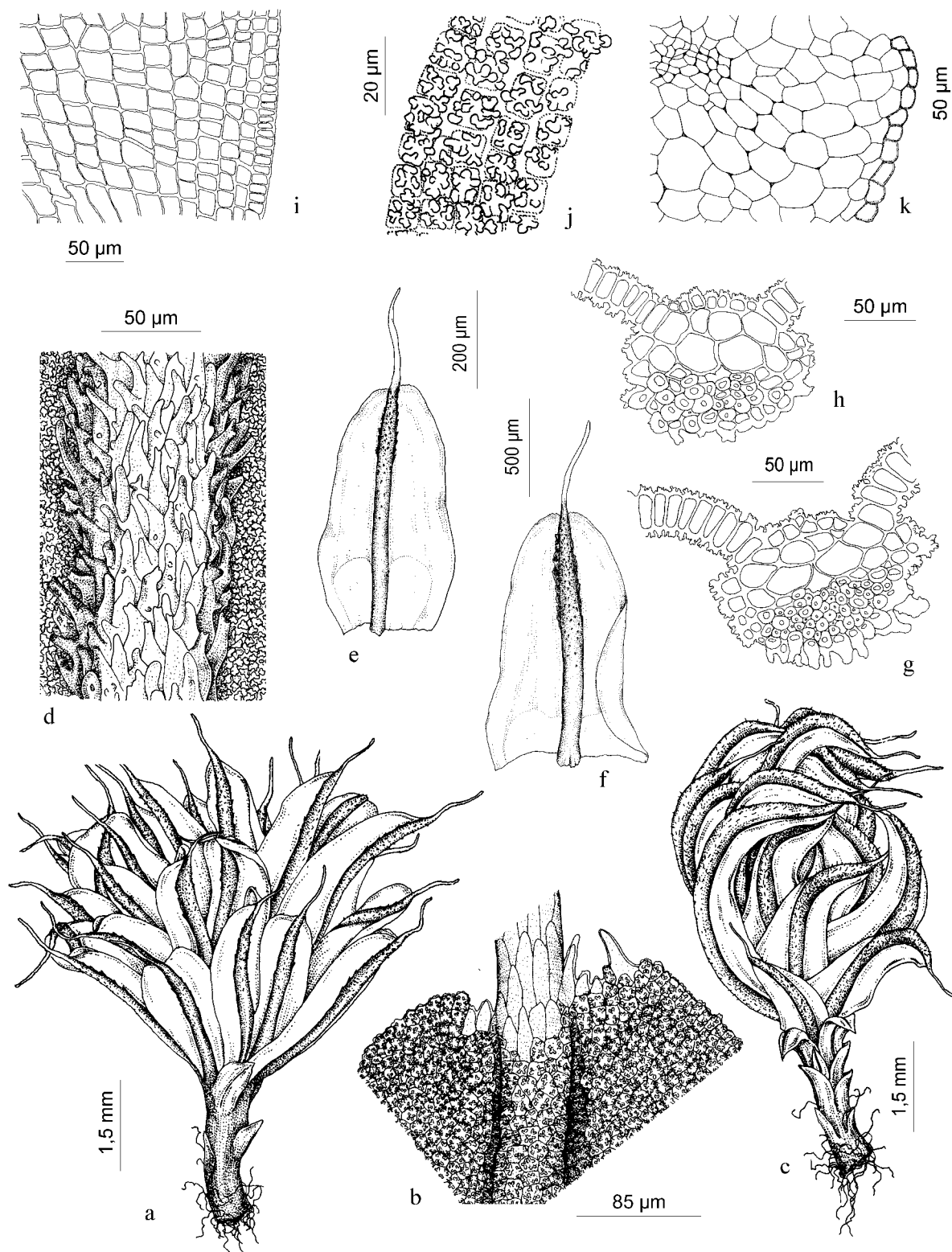


Figure 1. *Syntrichia muricata*: (a) habit, wet; (b) leaf apex; (c) habit, dry; (d) dorsal surface of the costa at mid-leaf; (e, f) leaves, in dorsal view; (g, h) transverse sections of the costa at mid-leaf; (i) basal lamina cells; (j) median lamina cells; (k) transverse section of stem. All from the holotype.

excurrent in a hair point, 0.3–0.8 mm long, hyaline, brown at base, smooth, sometimes weakly spinulose at base, costa 110–125 μm wide, with prominent papillose dorsal-lateral cells, aligned in rows up to 5 cells long, which give a spurred

look, with 1–3 guide cell rows and 3–5 dorsal stereid rows, with hydroids; strongly rough on dorsal side, with prorate cells that are smooth or papillose, papillae 15–65 μm high; upper and median lamina cells quadrate or rectangular

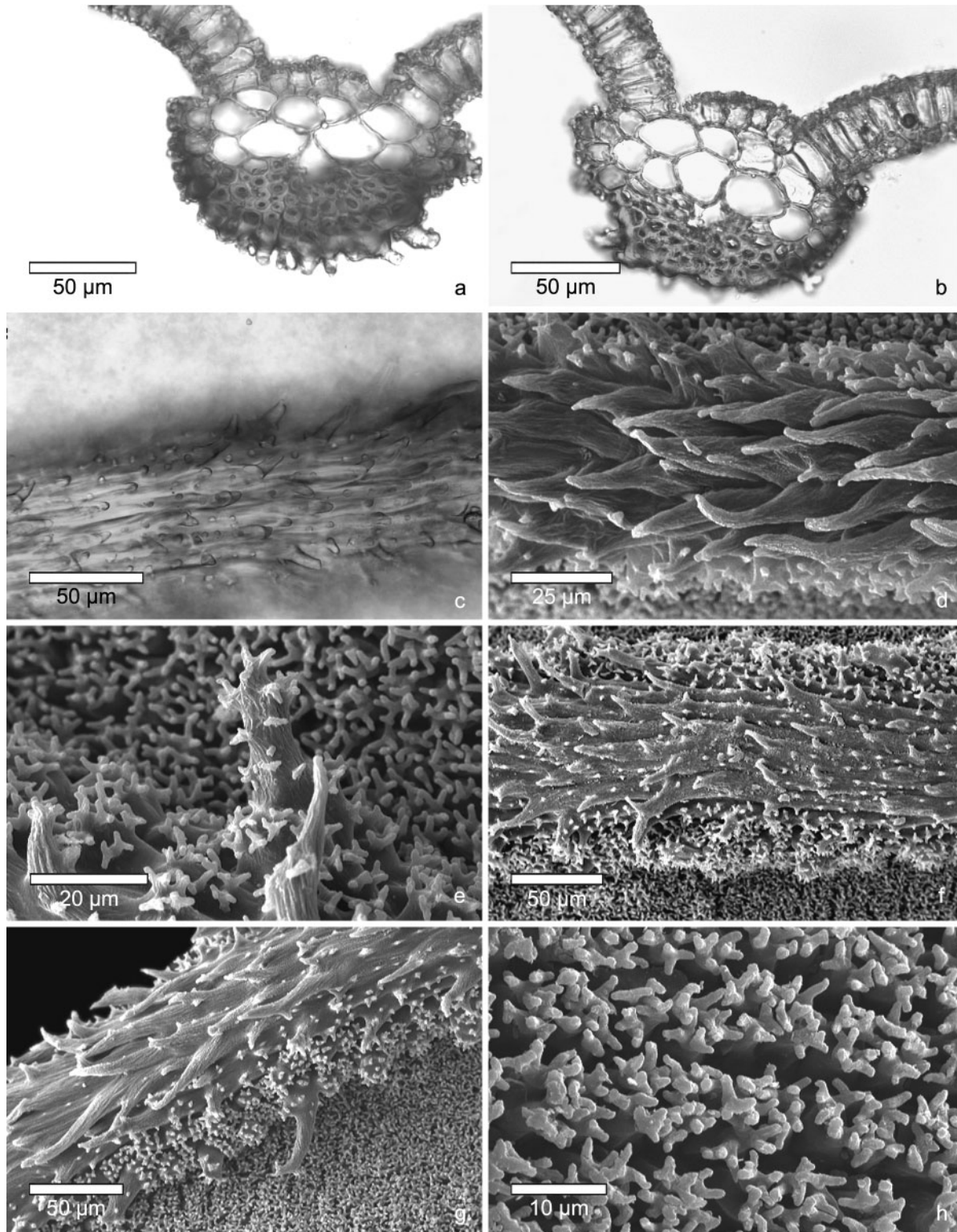


Figure 2. Light (a–c) and scanning electron (d–h) microscope photographs of *Syntrichia muricata*. (a, b) transverse sections of the costa at mid-leaf; (c, d) dorsal surface of the costa; (e) papillosity detail of the dorsal surface of the costa; (f, g) dorsal surface of the costa with papillose lateral cells that are arranged in groups, like short branches; (h) median lamina cells. All from the holotype.

(5.0–)7.5–10.0 × (5.0–)7.5–10.0 μm, thin walled, with 4–6 bifurcate, pedicellate or not, papillae per cell, 2.5–5.0 μm high; juxtacostal basal cells quadrate or rectangular, 20.0–45.0 × 12.5–25.0 μm, hyaline or chlorophyllose, with thin walls, usually collenchymatous, smooth, forming a clearly

differentiated hyaline area up to 18–33% of leaf length; marginal basal cells chlorophyllose, in 4–6 columns, smooth.

Probably dioicous. *Sporophyte* unknown.

Etymology: The species epithet *muricata* refers to the strongly papillose dorsal surface of the costa.

Other specimen studied: CHILE. Coquimbo (IV Region): pr. Hurtado, 30°23'51"S, 70°52'49"W, 750 m, 15 Nov. 2001, *M. J. Cano 187c* (MUB 22197).

DIFFERENTIATION

Syntrichia muricata can be differentiated from the other species in the genus by its prominently papillose dorsal-lateral costa cells, aligned in rows up to 5 cells long, which give a spurred look (Fig. 2f–g). Other distinctive characters are the strongly rough dorsal side of the costa, with prorate cells that at the same time are smooth or papillose, with papillae up to 65 µm high (Fig. 2c–e), usually plane leaf margins, rarely weakly recurved below mid-leaf, small upper and median lamina cells, smooth and hyaline hair point, and obtuse, rounded, or emarginate, sometimes dentate apex.

A strongly rough costa is otherwise found in some *Syntrichia* taxa described from Chile, such as, *Syntrichia scabrella* (Dusén) R.H.Zander, *S. scabrinervis* (Müll.Hal.) R.H.Zander, *S. epilosa* (Broth. ex Dusén) R.H.Zander and *S. epilosa* var. *pilifera* (Thér.) R.H.Zander. All these taxa are easily differentiated from *S. muricata* (Table 1).

Syntrichia scabrinervis resembles the new species in the rough dorsal side of the costa but differs from the latter in the strongly recurved leaf margins up to upper third and weakly mucronate leaf apex.

Syntrichia scabrella can be easily separated by its recurved leaf margins up to upper third, dorsal side of the costa without prorate cells, rough, with simple or bifurcate papillae, and upper and middle laminal cells 12.5–15 µm wide.

Syntrichia epilosa differs from *S. muricata* in the very fragile leaves, with a mucronate apex and recurved margins up to upper third. Furthermore, the papillae that arise from prorate cells in *S. epilosa* are shorter than in *S. muricata* and are distributed mainly in the upper third of the costa (throughout the costa in *S. muricata*). *Syntrichia epilosa* var. *pilifera* resembles *S. muricata* in lamina cell size, its hair-pointed leaves, and in having prorate cells throughout the dorsal surface of the costa, but differs from the latter in having constricted leaves, with bordered and recurved up to upper third margins.

In the genus *Syntrichia*, a strongly rough dorsal surface of the costa and prorate cells occur in some South American species. However, the presence of papillose cells which are arranged in groups along the lateral side of the costa, like short branches (costa spurred), is unique to *S. muricata*.

DISTRIBUTION AND ECOLOGY

The two localities where *Syntrichia muricata* was collected are situated in the northern Coquimbo Region, in an area of Chile with a Mediterranean climate. This species was found without sporophytes and growing practically buried

Table 1. Diagnostic characters of *Syntrichia muricata* compared with the most similar species in Chile

	<i>S. muricata</i>	<i>S. scabrinervis</i>	<i>S. scabrella</i>	<i>S. epilosa</i>	<i>S. pilifera</i>
Leaf cell width (µm)	(5.0)7.5–10.0	7.5–10.0(12.5)	12.5–15.0	5.0–10.0	7.5–10.0(12.5)
Leaf margins	Not bordered, usually plane	Not bordered, recurved up to upper third	Not bordered, recurved up to upper third	Not bordered, recurved up to upper third	Bordered, recurved up to upper third
Leaf apex	With hair-point	Mucronate	Mucronate	Mucronate	With hairpoint
Leaf constriction, mid-leaf	Not constricted	Not constricted	Not constricted	Not constricted	Constricted
Dorsal cells of costa	Prorate, with simple papillae	Prorate, with simple papillae	Not prorate, with bifurcate papillae	Prorate, with simple papillae	Prorate, with simple papillae
Height of papillae arising from prorate cells (µm), and frequency of papillae	15.0–65.0, smooth or papillose	7.5–20.0, usually smooth		7.5–12.5, smooth or papillose	5.0–12.5, smooth or papillose
Costa	Spurred	Not spurred	Not spurred	Not spurred	Not spurred

on talus in dry places, in vegetation composed of Cactaceae, shrubs of Compositae, *Puja* sp. and *Adesmia* sp., between 750 and 890 m a.s.l. Accompanying mosses were *Didymodon coquimbensis*, *Tortula atrovirens* (Sm.) Lindb. and *T. platyphylla* Mitt.

ACKNOWLEDGEMENTS

Financial support was received from the Spanish 'Ministerio de Educación y Ciencia' (Projects PR2001-0293, CGL2006-00599 and CGL2004-00788/BOS, co-financed by FEDER and the 'Ramón y Cajal' Program, co-financed by the European Social Fund) and 'Fundación SENECA' (Project 02979/PI/05). M.J.C. thanks the staff of the Departamento de Botánica, Universidad de Concepción for assistance during her stay in Chile. We also thank Manuel Láinz for the Latin diagnosis and Juan Guerra for uncompromising support.

TAXONOMIC ADDITIONS AND CHANGES: *Syntrichia muricata* M.T.Gallego & M.J.Cano, sp. nov.

REFERENCES

- Allen B. 2002.** Moss flora of Central America, Part 2. Encalyptaceae-Orthotrichaceae. *Monographs in Systematic Botany from the Missouri Botanical Garden* **90**: 1–669.
- Gallego MT. 2005.** A taxonomic study of the genus *Syntrichia* Brid. (Pottiaceae, Musci) in the Mediterranean region and Macaronesia. *Journal of the Hattori Botanical Laboratory* **98**: 47–122.
- He S. 1998.** A checklist of the mosses of Chile. *Journal of the Hattori Botanical Laboratory* **85**: 103–189.
- Jiménez JA, Cano MJ. 2007.** *Didymodon coquimbensis* (Pottiaceae) a new species from Chile. *The Bryologist* **110**: (In press).
- Kramer W. 1988.** Beiträge zur Systematik und Bryogeographie einiger Sippen von *Tortula* Hedw. sect. *Rurales* De Not. (Pottiaceae, Musci) unter besonderer Berücksichtigung der Südhemisphäre. *Journal of the Hattori Botanical Laboratory* **65**: 81–144.
- Li X-J, Crosby MR, He S. 2001.** *Moss flora of China. English version.* Vol. 2. *Fissidentaceae–Ptychomitriaceae*. Beijing/St Louis: Science Press/Missouri Botanical Garden Press.
- Lightowers PJ. 1986.** The moss genus *Tortula* from Antarctic botanical zone. *British Antarctic Survey Bulletin* **72**: 71–76.
- Magill RE. 1981.** *Flora of Southern Africa. Bryophyta.* Part 1. *Mosses.* Fasc. 1. *Sphagnaceae–Grimmiaceae*. Pretoria: Botanical Research Institute, Department of Agriculture and Fisheries.
- Mishler BD. 1994.** *Tortula*. In: Sharp AJ, Crum H, Eckel PM, eds. *The moss flora of Mexico.* Vol. 1. *Memoirs of the New York Botanical Garden* No. 69. New York: New York Botanical Garden, 319–350.
- Mishler BD. 2007.** *Syntrichia*. In: *Bryophyte flora of North America. North of Mexico*, Vol. 27. *Bryophyta.* Part 1. New York, NY: Oxford University Press.
- Zander RH. 1993.** Genera of the Pottiaceae: mosses of harsh environments. *Bulletin of the Buffalo Society of Natural Sciences* **32**: 1–378.

M. T. GALLEGO and M. J. CANO, Departamento de Biología Vegetal, Facultad de Biología, Universidad de Murcia, Campus de Espinardo, 30100-Murcia, Spain. E-mail: mgallego@um.es