

***Syzygiella riclefii* sp. nov. (Marchantiophyta,
Jungermanniaceae) from the Andes of Mérida.**

**Registros para la Bryoflora
de Los Andes Venezolanos, II**

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RÉSUMÉ – *Syzygiella riclefii* est décrit comme espèce nouvelle des Andes de Mérida, Venezuela. Elle se distingue clairement des autres espèces de *Syzygiella* par ses feuilles très fragiles avec une marge révolutée. Des portions de feuilles et les périanthes peuvent se transformer en propagules par fragmentation.

RESUMEN – *Syzygiella riclefii* es descrita como una especie nueva de los Andes de Mérida, Venezuela. Se distingue claramente de otras especies de *Syzygiella*, por sus hojas muy frágiles con márgenes revolutos. Detalles de la lamina de las hojas y los periantos puedan modificarse en los propágulos por fragmentación.

SUMMARY – *Syzygiella riclefii* is described as a new species from the Andes of Mérida, Venezuela. It is clearly distinguished from all other species of *Syzygiella* by its very fragile leaves with revolute margin. Parts of the leaf lamina and the perianth can be transformed into propagules by fragmentation.

Andes / Hepatics / Jungermanniaceae / new species / *Syzygiella* / Venezuela

INTRODUCTION

During a collection trip to Venezuela in 1997, we visited the Sierra Nevada National Park in the Andes of Mérida. In the subpáramo belt near the Aguada cable car station, we found an interesting *Syzygiella* species, growing on half shady siliciferous rocks. Even in the field, peculiar characters can clearly be identified. Firstly, all leaves close to the stem apex have a wavelike revolute margin. Secondly, most of the leaves are broken or partly eroded. Following subsequent light microscopic and SEM investigation, the leaf lamina appears to be very

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fragile and tends to break of easily, producing one to many celled fragments, which serve for vegetative propagation.

The genus *Syzygiella* was monographed by Inoue (1966). Inoue (*l.c.*) established three subgenera: *Protosyzygiella*, *Pseudoplagiochila* and *Syzygiella*. The subgenus *Syzygiella* was further divided into three sections, *Anomalae*, *Bidentes* and *Integerrimae*. This subdivision is still accepted today. Since his monograph was published he described two new species, *Syzygiella liberata* Inoue and *Syzygiella grollei* Inoue from Colombia (Inoue, 1974). He also synonymised *Syzygiella variabilis* Sande Lac. with *Syzygiella variegata* (Lindenb.) Spruce (Inoue, 1968), while the African species were revised by Vána (1985). In addition, *Syzygiella inouei* was described from Bolivia by Grolle (1968) and finally *Syzygiella kerguelensis* by So & Grolle (2003), who recognized 24 species in the genus, of which 16 occur in the Neotropis, the center of diversity for this genus (Gradstein *et al.*, 2001). Three species are known from the south temperate belt (West Patagonia, Kerguelen and Tristan da Cunha), with a further 3 from Africa and 5 from tropical Asia and Australasia-Oceania. However, there are still unclarified groups and the genus needs a thorough revision. Even the classic placement of *Syzygiella* in Jungermanniaceae/Lophoziaceae has been controversial. Buch (1938) and Schuster (2002) favored a transfer to Plagiochilaceae, based mostly on the opposite, connate leaf insertion. In my opinion this leaf arrangement is a secondary, derived character. Since similar tendencies appear in several families (e.g. Arnelliaceae, Jungermanniaceae, Lepidoziaceae, Geocalycaceae, Plagiochilaceae), it appears to be an example of parallel evolution within leafy liverworts. The perianth shape in most of the *Syzygiella* species is so typically jungermannoid, that I can not imagine other assignment than to Jungermanniaceae *s.l.* A similar opinion was already published by Kitagawa (1965), who placed *Syzygiella* in Lophoziaceae. More recently, based on chloroplast gene *rbcL* sequences, Groth & Heinrichs (2005) established that *Syzygiella* belongs to a clade together with *Lophozia*, *Tritomaria* and *Scapania*, sister to a clade of *Jungermannia*, *Calypogeia* and *Tylimanthus*, and is not related to Plagiochilaceae.

DESCRIPTION

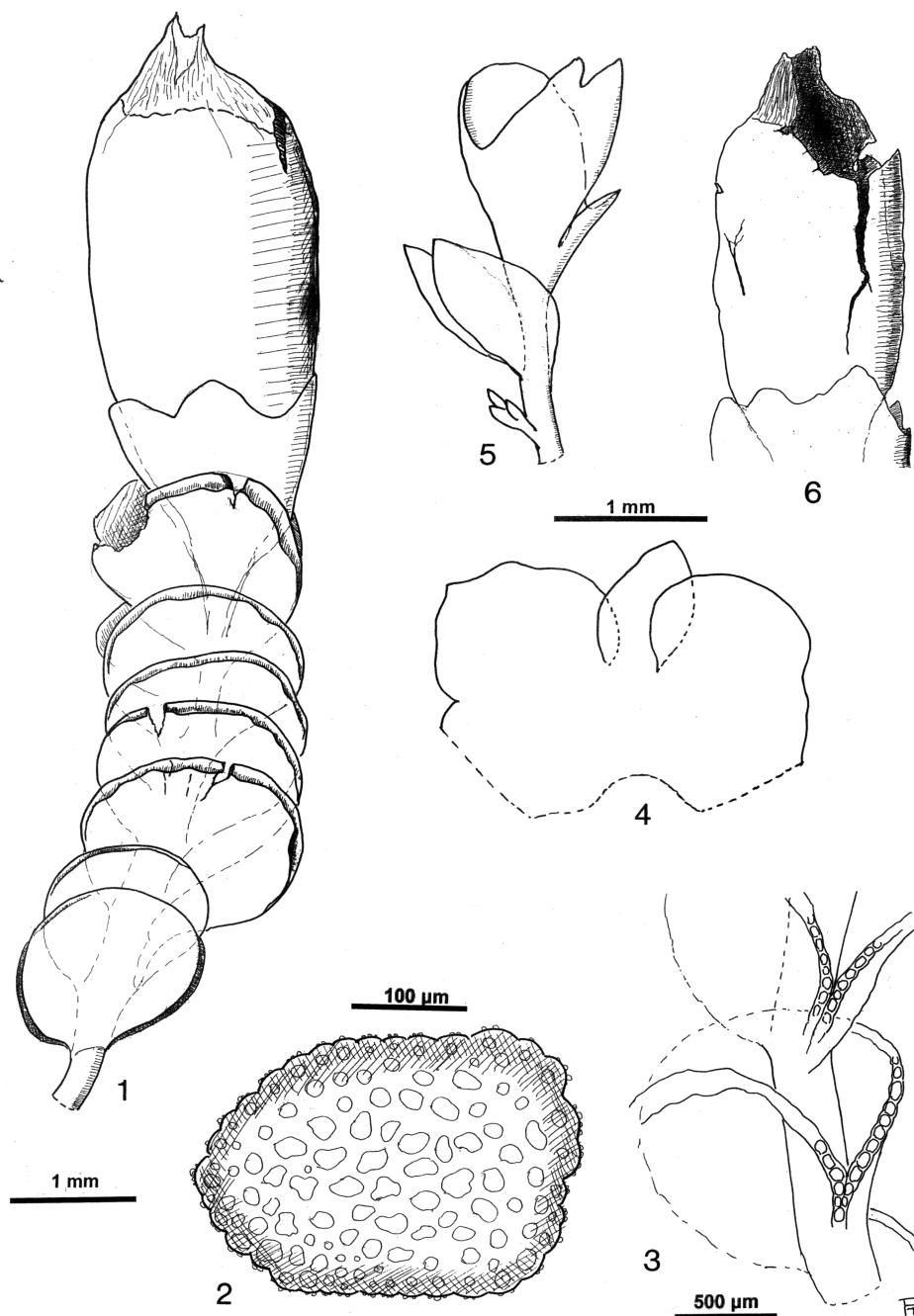
Syzygiella riclefii Pócs, sp. nov. (Figs 1-20)

Subgenus *Syzygiella* Inoue Section *Integerrimae* Inoue

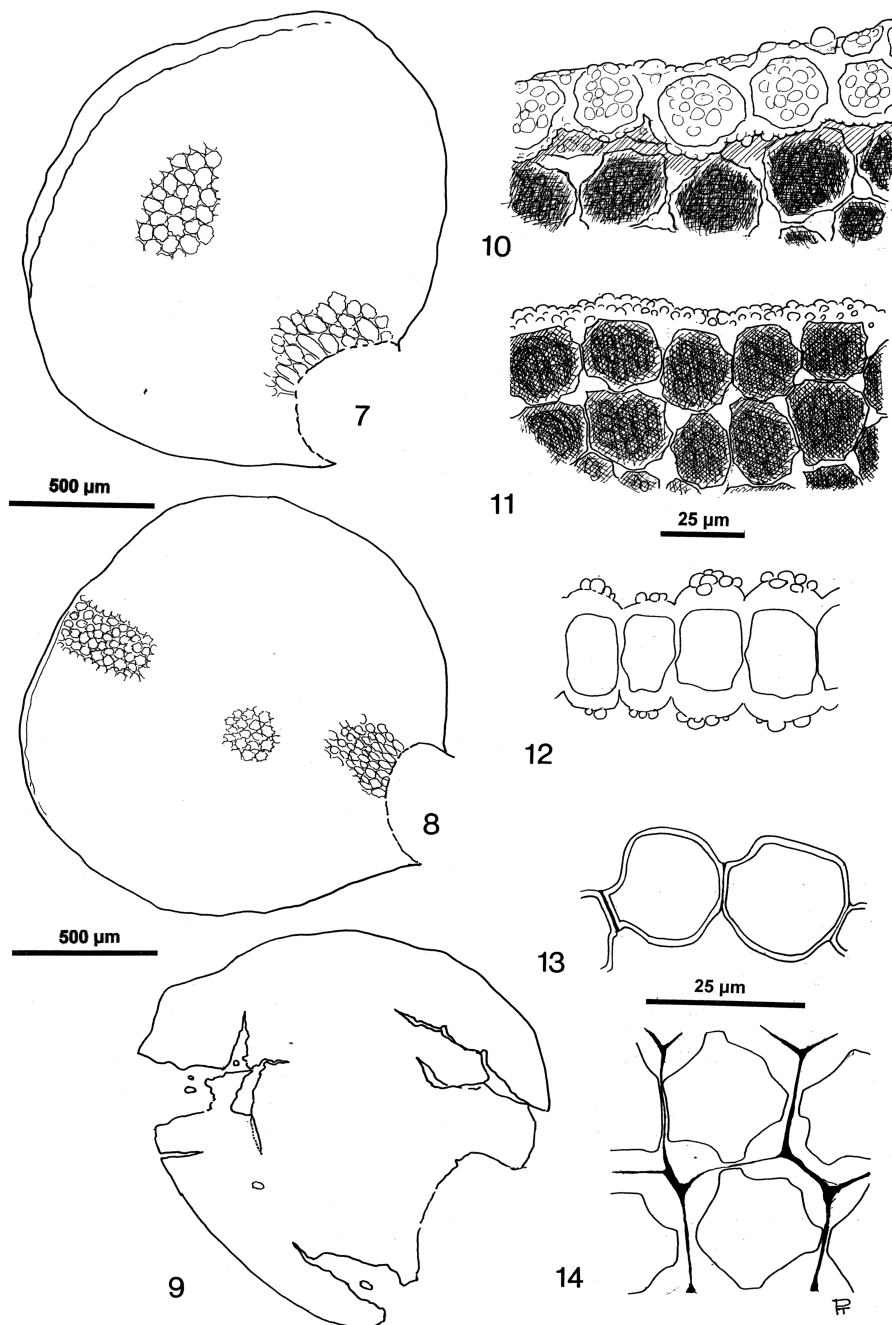
Diagnosis – *Species similis* *Syzygiellae campanulatae*, *sed bene differt foliis fragilissimis propagulae formantibus marginibus revolutis*.

Species nova in honorem Doctoris Riclef Grolle, beati investigatoris illustrissimis generis Syzygiellae et Hepaticarum toti Orbis Terrarum dedicata.

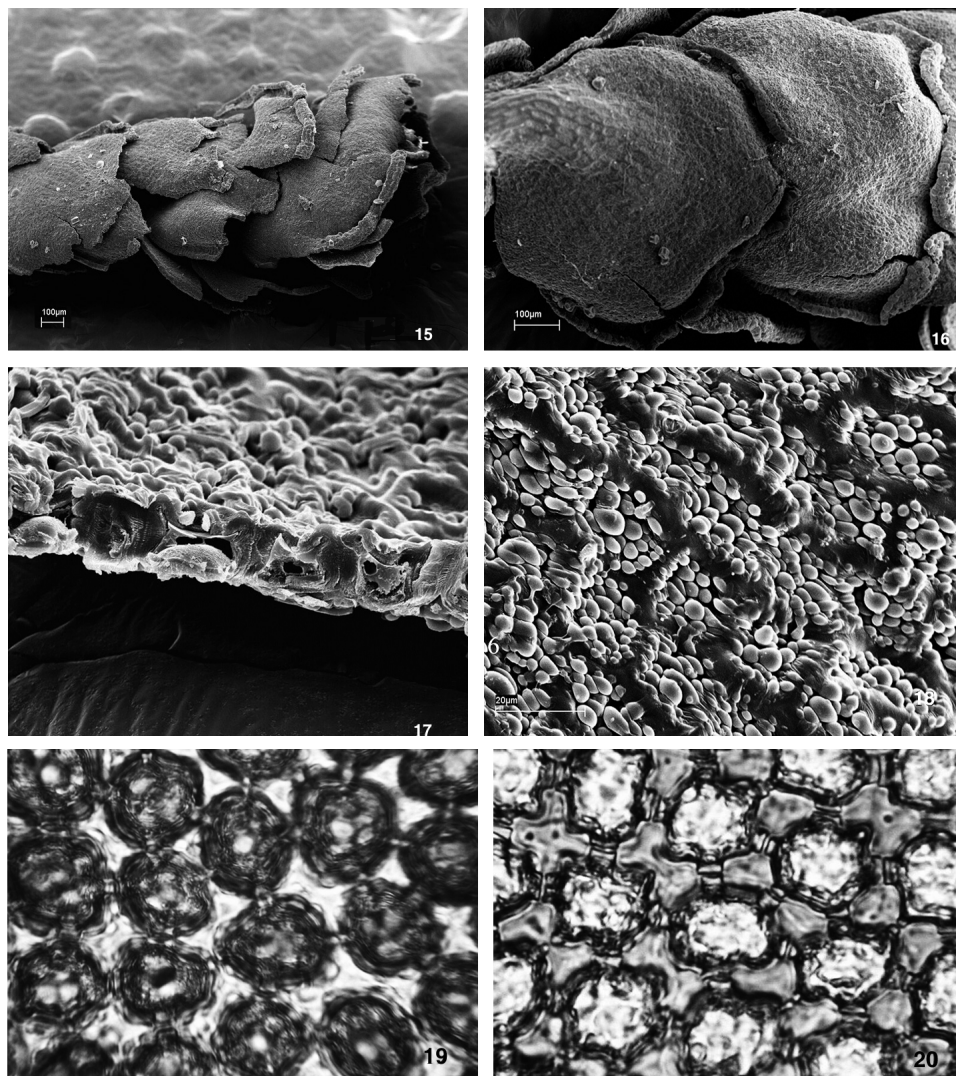
Holotypus – Venezuela, Municipio Libertador, Parque Nacional de Sierra Nevada, Estación la Aguada. 8°34'N, 71°05'W. Páramo abierto (borde inferior), sobre rocas silicosas, 3330m. Dominant vascular plants: *Espeletia schulzii*, *Ruilopezia atropurpurea*, *Chaetolepis lindeniana*, *Vaccinium meridionale*, *Ugni myricoides*, *Disterigma empetrifolium*, *Hypericum laricifolium*. Accompanying liverworts: *Anastrophyllum auritum*, *A. piligerum*, *Cephaloziella fragillima*, *Cryptochila grandiflora* and *Jamesoniella purpurascens*. **Coll.:** T. & S. Pócs, Y. León, R. Rico, C. Tirado 9702/BQA (Holotypus: EGR, Isotypi: G, MERC). No other specimens seen.



Figs 1-6. *Syzygiella riclefii* Pócs. 1: General habit, side view. 2: Stem, transversal section. 3: Connate ventral leaf bases. Ventral-side view. 4: Fused bracts and bracteole, flattened. 5: Fused bracts, bracteole, the subfloral leaf pair and a branch initial, in situ. 6: Propagule forming, fragmenting perianth. All pictures drawn from the type.



Figs 7-14. *Syzygiella riclefii* Pócs. **7:** Leaf near the apex. **8:** Leaf from a lower part of stem. **9:** Fragmented leaf forming propagulae. **10:** Involute leaf margin. **11:** Flat leaf margin. **12:** Transversal section of an entire leaf. **13:** Transversal section of a propagule from a fragmented leaf. **14:** Cells splitting along the primary cell walls during leaf fragmentation. All pictures drawn from the type.



Figs 15-20. *Syzygiella riclefii* Pócs. **15**: General habit of the apical shoot part, side view. **16**: Detail of the apical shoot part. **17**: Transversal section of leaf. **18**: Cuticular pattern of abaxial leaf surface. All SEM images made from the type. **19**: Leaf areolation. Microphoto made from the type. **20**: *Syzygiella campanulata* Herzog. Leaf areolation. Microphoto made from the type.

Description – **Shoots** 1-2 cm long and 0.6-1.5 mm wide, ascendent, forming dark purple mats on half shady, siliciferous rocks. **Stem** single or with scarce intercalary, parallel directed side branches. Stem slightly flattened, elliptic in section, $250 \times 350 \mu\text{m}$ in diameter, cells with strongly incrassated walls and narrow lumen. Cortex 1-2 cells thick, not sharply delimited, differs from the $7-8 \times 10$ cells

thick, hyaline medulla only by its dark purple pigmentation and somewhat smaller cell diameter (15-20 μm , in medulla 20-25 μm). Stem cuticle slightly papulose. **Leaves** succubous, obliquely (about 45°) inserted, dorsally shortly, ventrally somewhat longer decurrent and connate (on dorsal side by 0-2, on ventral by 2-5 cells), suborbicular, lower leaves entire, 0.6-0.8 mm in size, with smooth or slightly revolute margin, upper leaves larger, 0.9-1.6 mm in size, with strongly revolute margin, very fragile and often disintegrating, depauperate. **Leaf cells**, especially near margin, arranged in perpendicular rows, isodiametric, with 20-30 μm diameter, basal cells somewhat elongated. Oil bodies of *Jungermannia* type, ellipsoid and very finely granulate, greyish, 3-10 per cell. Cell walls hyaline and incrassated, with triangular or nodulose thickenings, leaving star shaped lumen for dark purple pigmented protoplasmatic cell content. Parts of leaves crack along lines of primary walls between cells, as a result, secondary walls remain on concerned cells. Broken off parts of leaf lamina one to many celled; if one celled, similar to star shaped "endogenous gemmae" observed in *Bazzania kokawana* Kitagawa & Kodama (Kitagawa, 1974; Kitagawa & Kodama, 1975). Cuticle slightly to densely papillose, with 10-30 bacciform papillae above the lumen of each cell. **Gynoeceium** terminal. Two uni- or obtusely bilobed bracts and a similar, just smaller bracteole form full or halfway split, funnel-shaped perichaetium. **Perianth** 2.5-3 mm long, cylindric pyriform, smooth or very slightly plicate, exerted, at base narrowing into cuneate stalk. Uppermost part of perianth constricted into conical, hyaline apex, formed by narrow, elongate cells. Perianth mouth with irregular teeth. Perianth wall dark brown to purple, composed of cells similar to those of leaf lamina, but radial walls also pigmented. Sometimes the fragile perianth fragmented into irregular shaped propagules. **Androeceia** not seen.

DISCUSSION

The closest known relative of the new species is *Syzygiella campanulata* Herzog, a species described from Costa Rica (Herzog, 1938), which is known also from the Andes of Mérida (León *et al.*, 1998). However, *Syzygiella campanulata* differs from *S. riclefii* by its larger stature, its much less fragile, entire leaves without revolute margin, its perianth which is strongly plicate at least in its upper half and contracted into a truncate apex, and its leaf pigmentation. While in *Syzygiella riclefii* the cell content is dark pigmented and the cell walls hyaline, in *S. campanulata* the cell walls are pigmented and the cell contents translucent.

Syzygiella riclefii seems to be one of the well isolated endemics of the northern, Venezuelan and Colombian Andes, similar to *Adelanthus aureomarginatus* R.M. Schust., *Amphilejeunea patellifera* (Spruce) R.M. Schust., *Anastrophyllum austroamericanum* Váňa, *Aureolejeunea paramicola* (Herz.) R.M. Schust., *A. fulva* R.M. Schust., *Bazzania canelensis* (Steph.) Fulf., *Cephalozia venezuelana* R.M. Schust., *Cephaloziella grisea* R.M. Schust., *Chaetocolea palmata* R.M. Schust., *Cheilolejeunea nana* R.M. Schust., *Ch. invaginata* R.M. Schust., *Diplasiolejeunea papilionacea* R.M. Schust., *D. involuta* Winkler ssp. *andicola* Pócs, *Diplophyllum andicolum* R.M. Schust., *Frullania holostipula* R.M. Schust., *F. lobato-hastata* Steph., *Gymnomitrium setaceum* Grolle & Váňa, *Jungermannia ovato-trigona* (Steph.) Grolle, *Leptoscyphus physocalyx* R.M. Schust., *Lophozia verruculosa* R.M. Schust., *Marsupella xenophylla* R.M. Schust., *Microlejeunea*

colombiana R.M. Schust., *Omphalanthus platycoleus* Herz., *Oryzolejeunea venezuelana* (R.M. Schust.) R.M. Schust., *Plagiochila caducidentata* R.M. Schust., *P. bifaria* (Sw.) Lindenb. var. *rosea* (R.M. Schust.) Heinrichs, *Platycolea renifolius* R.M. Schust., *Radula sonsonensis* Steph., *Stephaniella rostrata* Schmitt, *Telaranea microstipulata* R.M. Schust., *T. rectangularis* R.M. Schust., and *Temnoma chaetophylla* R.M. Schust. (Schuster, 1978a, 1978b, 1985, 1987, 1995; Schmitt & Winkler, 1968; León *et al.*, 1998; Gradstein, 1999; Váña, 1976, 1982; Heinrichs *et al.*, 2004).

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