Acta Botanica Brasilica, 2023, 37: e2023-0138
doi: https://doi.org/10.1590/1677-941X-ABB-2023-0138

Original article

The genus *Microbryum* (Pottiaceae, Bryophyta) in Argentina

Denise J. Alvarez[1*] and Guillermo M. Suárez[1, 2]

Received: June 02, 2023
Accepted: August 11, 2023

ABSTRACT

The genus *Microbryum* is recorded for the first time in Argentina, with a single species *Microbryum davallianum*. The species differs from others in the genus mainly by stegocarpous capsules, long setae and spore ornamentation. A description, photographs and illustration of the species are provided.

Keywords: Bryophyte, Entre Ríos, *Microbryum davallianum*, Mosses, New record, Spinal.

Introduction

Microbryum Schimp. is a genus of the family Pottiaceae that includes 13 species (Crosby *et al*. 2000; Zander 2007) of annual mosses. It is characterized by small size, costa in cross section rounded to semicircular with a single band of stereids, capsule cleistocarpous or stegocarpous, and peristome (when present) generally rudimentary. The species of the genus inhabit temperate and boreal regions of the world, with preference for dry environments (Chamberlain 1978; Zander 1993; Guerra *et al.* 2006).

As part of a project that evaluates the diversity of bryophytes in Argentina Northeast (Alvarez & Villalba 2021; Alvarez *et al.* 2023a; b) some collected specimens were identified as *Microbryum davallianum* (Sm.) R. H. Zander, a species not recorded for the moss flora of Argentina. Although the species is well known to areas with an old history of bryological expeditions (*e.g.*, Europe, Africa, Asia, North America and Australia), it has only been reported from two collections in South America (Brazil and Chile, Cano & Gallego 2008). The species grows on limestone, sandy, saline or humic soils, often uncovered.

Micrbryum davallianum is here described and illustrated, and some characteristics of its geographical distribution in Argentina are mentioned.

Materials and methods

The specimens were studied morphologically with the conventional techniques proposed by Zander (1993) for Pottiaceae, using stereoscopic magnifying glass Arcano ST30-2L and optical microscope Arcano XSZ107. The identification was made through the keys of Guerra *et al.* (2006) and Da Costa (2016). The material studied with scanning electron microscopy (JEOL 5800 LV operating at 20 KV) was fixed in FAA, critical-point dried, and then mounted on aluminum discs on double-sided tape, to later be coated with gold-palladium.

1 Unidad Ejecutora Lillo, (CONICET-Fundación Miguel Lillo), C. P. 4000, San Miguel de Tucumán, Tucumán, Argentina.
2 Facultad de Ciencias Naturales e Instituto Miguel Lillo, Universidad Nacional de Tucumán, C. P. 4000, San Miguel de Tucumán, Tucumán, Argentina.

* Corresponding author: denise-alvarez15@hotmail.com

Results

Taxonomic treatment

Microbryum davallianum (Sm.) R. H. Zander, Bull. Buffalo Soc. Nat. Sci. 32: 240. 1993. *Pottia davalliana* (Sm.) C.E.O. Jensen, Danmarks Mosser 2: 342. 1923. *Gymnostomum davallianum* Smith, Ann. Bot. (König & Sims) 1: 577. 1805. TYPE: Switzerland. *Davall s.n.* (LINN, holotype).

Plants forming a low turf, gregarious, 1-2 mm high, green-yellow or reddish-brown. Stems erect, 0.7-1.5 mm long, transverse section round, hyalodermis, sclerodermis and central strand absent. Leaves curved to somewhat contorted when dry, erect-patent to patent when moist, ovate to ovate-lanceolate, oblong or elliptic, 0.7-1.2 x 0.3-0.45 mm; apex acute or obtuse; margins entire, revolute at mid leaf to near apex; costa excurrent in a cuspidate point, sometimes percurrent, cells quadrate on ventral surface, papillose on upper half, in cross section usually round, guide cells 2 in 1 layer, dorsal stereid band well developed, hydroid strand present. Upper and medial laminal cells subquadrate to hexagonal, 10-26(36) x 10-18 µm, papillae simple or bifurcate, basal cells rectangular, smooth, 20.8–46.8 x 7.8–22.5 µm. Perichaetial leaves similar in shape and length to stem leaves. Specialized asexual reproduction absent. Paroicous. Solitary axillary antheridia. Setae erect, yellow, 1.2-2.8 mm long. Calyptra cucullate. Operculum low-conic. Capsules exerted, stegocarpous, ovate, erect, brown, reddish-brown or reddish, 0.6-1 mm long, narrow-mouthed when dehisced. Annulus absent. Peristome absent or reduced to a very low membrane, inserted below the mouth. Spores oblate to spherical, 21-30 µm in diameter, yellow to yellow-brown, foveolate surface, with verrucae 0.8-5.6 µm wide (Figs. 1, 2 and 3).

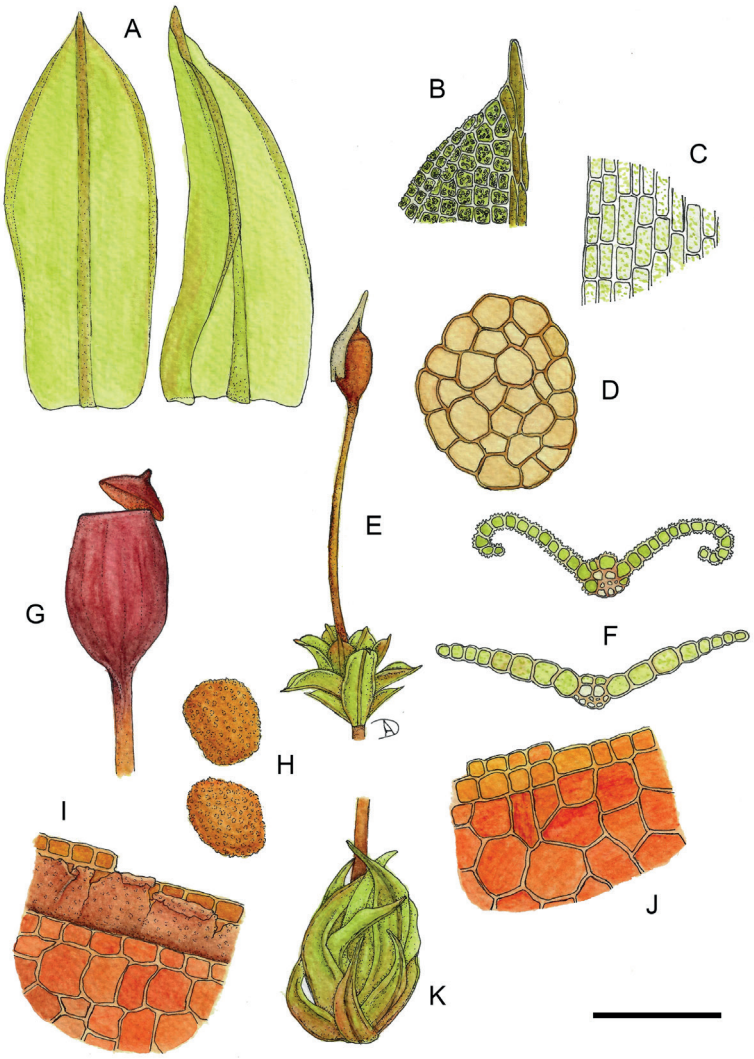

Figure 1. *Microbryum davallianum* (Sm.) R. H. Zander. **A**: leaves; **B**: leaf apical cells; **C**: leaf basal cells; **D**: stem cross section; **E**: plant in wet state with sporophyte; **F**: leaf cross section (apex and base); **G**: capsule; **H**: spores; **I**: inner part of the capsule; **J**: external part of the capsule; **K**: plant in dry state. Scale bars: A = 0.3 mm; B = 120 µm; C, D = 100 µm; E = 1.7 mm; F = 135 µm; G, K = 0.65 mm; H = 45 µm; I, J = 50 µm. Illustration by Denise J. Alvarez, based on *D.J. Alvarez 170* (DTE and LIL).

Distribution and habitat: *Microbryum davallianum* has been registered from China (Zhao *et al.* 2009), Britain, Ireland (Pilkington 2022), North America, Mexico, Europe, Africa, New Zealand (Zander 2007), Brazil (Da Costa 2016) and Chile (Cano & Gallego 2008). In this work it is recorded for the first time from Argentina in the province of Entre Ríos. The species is an annual moss and was found growing in a forest on sunny place and near a temporary watercourse. The soil presented a certain degree of disturbance due to the presence of cattle in the area.

Specimens Examined: ARGENTINA. Entre Ríos: Laurencena, 32°17'04"S, 59°40'15"W, 57 m alt., 12 July 2022, *D.J. Alvarez 170* (DTE and LIL).

Discussion

Microbryum davallianum is characterized by its stegocarpous capsules, long setae (1.2-2.8 mm) and spore ornamentation. It is closely related to *Microbryum starckeanum* (Hedw.) R.H. Zander, but the latter differs in having smooth or tuberculate (sometimes weakly papillose) spores with a diameter of 16-30 µm (Guerra *et al.* 2006; Zander 2007).

Pilkington (2022) mentions that *M. davallianum* is an early colonist of disturbed soils and can be found in a wide variety of habitats, this affirmation is consistent with the environment where our samples were found.

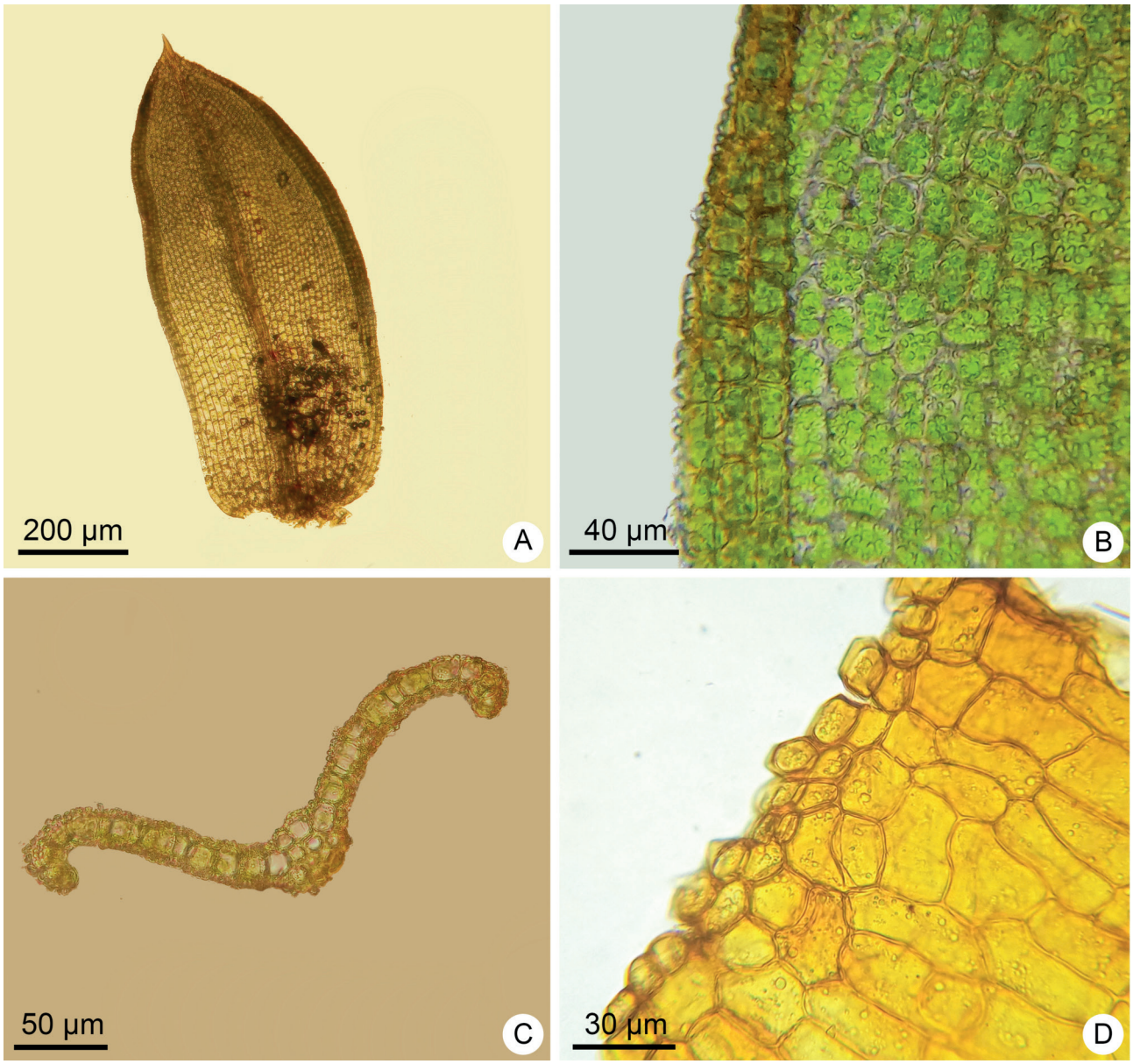

Figure 2. *Microbryum davallianum* (Sm.) R. H. Zander. **A**: leaf (100x); **B**: leaf apical cells (400x); **C**: leaf cross section (400x); **D**: capsule mouth (400x). Photograph by Denise J. Alvarez.

The preference of rural habitats is observed in some species of others genus, such as *Chenia*, *Anaschisma* and *Physcomitrium* (Flores & Suárez 2017; Colotti & Suárez 2022; Alvarez *et al.* 2023a). *Microbryum starckeanum*, *M. curvicollum* (Hedw.) R.H. Zander and *M. rectum* (With.) R.H. Zander, are also found in disturbed habitats (Blockeel *et al.* 2014; Pilkington 2022).

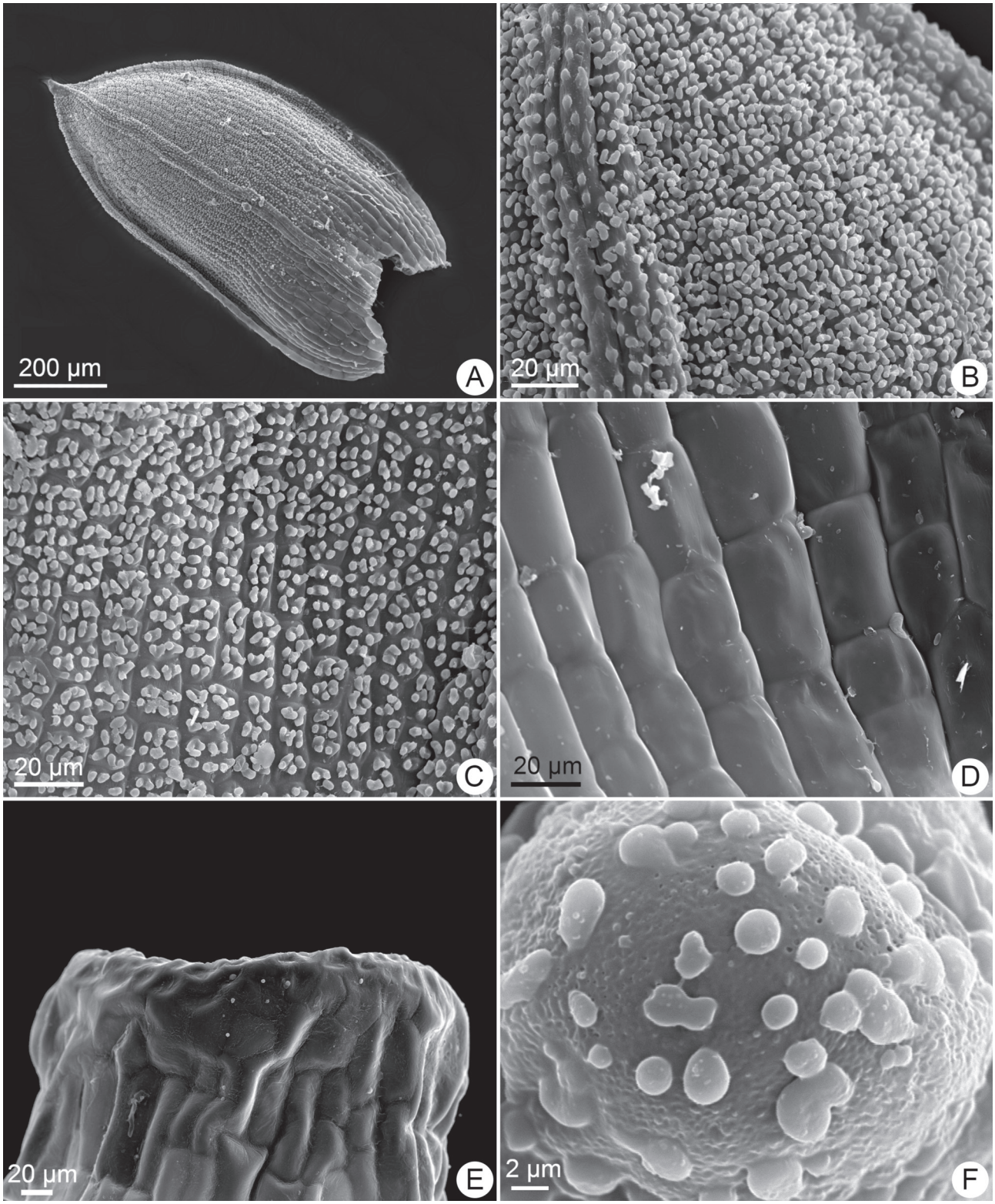

Figure 3. *Microbryum davallianum* (Sm.) R. H. Zander. **A**: dorsal surface of the leaf (100x); **B**: dorsal surface of the leaf apex (750x); **C**: ventral surface of the leaf in the middle portion (750x); **D**: dorsal surface of the leaf base (750x); **E**: mouth of the capsule (330x); **F**: foveolate surface of spore, with verrucae (4000x). Photograph by Denise J. Alvarez.

Acknowledgements

We thank the Microscopy Service of the Northeast National University. This research was supported by the National Scientific and Technological Research Council (CONICET), and the Research Project of the National University of Tucumán PIUNT G744.

References

Alvarez DJ, Villalba AB. 2021. Nuevos registros de flora briofitica para la provincia de Santa Fé (Argentina) en el valle aluvial del río Paraná medio. Journal of Neotropical Biology 18: 60-76. doi: 10.5216/rbn.v18i2.69684

Alvarez DJ, Jimenez MS, Zander RH, Suárez GM. 2023a. Primer registro de *Anaschisma lilliputanum* (Pottiaceae, Bryophyta) para la Argentina. Darwiniana, nueva serie 11: 23-30. doi: 10.14522/darwiniana.2023.111.1089

Alvarez DJ, Villalba AB, Suárez GM. 2023b. Contribución al conocimiento de las briofitas (Bryophyta) en el valle de inundación del río Paraná en su tramo medio (Santa Fe, Argentina). Boletín de la Sociedad Argentina de Botánica 58: 195-213. doi: 10.31055/1851.2372.v58.n2.38909

Blockeel TL, Bosanquet SDS, Hill MO, Preston CD. 2014. Atlas of British & Irish Bryophytes: The distribution and habitat of mosses and liverworts in Britain and Ireland. Newbury, Pisces Publications. vol. II.

Cano MJ, Gallego MT. 2008. The genus *Tortula* (Pottiaceae, Bryophyta) in South America. Botanical Journal of the Linnean Society 156: 173-220. doi: 10.1111/j.1095-8339.2007.00739.x

Chamberlain DF. 1978. *Pottia*. In: Smith AJE (ed.). The Moss Flora of Britain and Ireland. Cambridge, Cambridge University Press. p. 234-342.

Colotti MT, Suárez GM. 2022. Aportes al conocimiento del género *Physcomitrium* (Bryophyta, Funariaceae) en el Noroeste de Argentina. Lilloa 59: 235-245. doi: 10.30550/j.lil/2022.59.2/2022.10.25

Crosby MR, Magill RE, Allen B, He S. 2000. A Checklist of the Mosses. Missouri, Missouri Botanical Garden. vol. VI.

Da Costa DP. 2016. A synopsis of the family Pottiaceae in Brazil. Phytotaxa 251: 1-69. doi: 10.11646/phytotaxa.251.1.1

Flores JR, Suárez GM. 2017. Fruiting material of *Chenia lorentzii* (Bryophyta, Pottiaceae) found in Argentina and an evaluation of the sporophyte taxonomic value in the genus *Chenia*. Boletín de la Sociedad Argentina de Botánica 52: 315-324.

Guerra J, Brugués M, Cano MJ, Cros RM. 2006. Flora Briofítica Ibérica. Pottiaceae, Encalyptaceae, Bartramiaceae. Murcia, Compobell S. L. Vol. III .

Pilkington S. 2022. *Microbryum davallianum* (Sm.) R.H. Zander in Britain and Ireland. Field Bryology 127: 1-7.

Zander RH. 1993. *Microbryum*. In: Zander RH (ed.). Genera of the Pottiaceae: Mosses of harsh enviromments. New York, Bulletin of the Buffalo Society of Natural Sciences. vol. 32, p. 237-240.

Zander RH. 2007. *Microbryum*. In: Flora of North America Editorial Committee (ed.). Flora of North America North of Mexico. New York, Oxford University Press. vol. 27, p. 627-631.

Zhao DP, Bai XL, Wang LH, Zhao N. 2009. *Microbryum* (Pottiaceae) in mainland China. The Bryologist 112: 337-341. doi: 10.1639/0007-2745-112.2.337