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Rare liverwort species of Romania from the exsiccatae of K. Loitlesberger

SORIN ȘTEFĂNUȚ
Institute of Biology Bucharest of Romanian Academy, 296 Splaiul Independenței, 060031 Bucharest, P.O. Box 56-53, Romania.
E-mails: sorin.stefanut@ibiol.ro or sorinstefanut@gmail.com

Abstract

Within the framework of the Synthesys Programme, some European liverwort species held by the Herbarium of the Natural History Museum in Vienna (W) were checked, in particular for their occurrence in Romania. Examination of these liverwort specimens has led to the identification of rare species for Romania, some of which are only present in the Vienna collection. This includes the exsiccatae collections compiled by the bryologist Karl Loitlesberger for Romania, during his field trip in 1897 and held by W. In these exsiccatae, several rare species of liverworts have been identified and confirmed, such as *Frullania parvistipula*, the holotype of the taxon *Marsupella lapponica*, the male of *Bucegia romanica* (=*Marchantia romanica*), and *Scapania crassiretis* for Romania. This paper presents for the first time the oldest known drawings of *Frullania parvistipula* and *Bucegia romanica*.

Keywords: liverworts, *Frullania parvistipula, Bucegia romanica*, Romania

Introduction

In the summer of 1897, the Austrian bryologist Karl Loitlesberger (1857–1943) made a bryological trip to the Southern Carpathians in Romania, especially in the Bucegi Massif, Iezer-Păpușa Mountains and Făgăraș Mountains (Fig. 1). The collected bryophytes were determined and an exsiccatae collection was prepared, which was sent to several herbaria around the world, such as Budapest (BP), Vienna (W) and Bucharest (BUC). The liverworts were published in 1898 (Loitlesberger 1898) and mosses in 1900 (Loitlesberger 1900). Unfortunately, the bryophyte collection of the Bucharest Herbarium (BUC) was destroyed during the bombings in World War II, on April 4, 1944. In the framework of the Synthesys Programme, the author had the opportunity to check the specimens from the K. Loitlesberger collections in Budapest (BP) and Vienna (W). From examination of these exsiccatae, it can be concluded that the Vienna Herbarium (W) contains the most complete series.

At present, 992 bryophyte species are listed for Romania and from these, 229 species are liverworts. The last checklist and red list of bryophytes of Romania were published by Ștefănuț & Goia (2012). Distribution data, records and maps for the liverworts of Romania are available (free on web) in *The Hornwort and Liverwort Atlas of Romania* (Ștefănuț 2008). The conservation status of bryophytes was assessed in accordance with the IUCN guidelines (IUCN Standards and Petitions Committee 2019).

Access to the Budapest and Vienna herbaria was possible through the facilities provided by the SYNTHESYS programme (Synthesys 2019), funded by the European Commission. The aims of SYNTHESYS are to produce an accessible European resource for research users in the natural sciences and to provide funded researcher visits to access 390,000,000 specimens, including 4,049,800 type specimens. At the Institute of Biology Bucharest, research on bryophytes is carried out within the project: *Taxonomy and sozology of flora and fauna species of Romania.*

Among the specimens held by the W herbarium, the following rare liverwort species of Romania were identified. The species names were updated according to Söderström *et al.* (2016).

1. ***Marsupella boeckii*** (Austin 1872: 9) Lindberg ex Kaalaas (Kaalaas 1893: 409), Romania, Făgăraș Mountains, Negoiu Mountain, 2200 m a.s.l., *leg.* K. Loitlesberger, 16.08.1897, *det.* K. Loitlesberger, as *Marsupella lapponica* Limpricht ex Loitlesberger (1898: 192), *Hep. Alp. Transsylv. Exsiccata no. 169* (W *1898-8207*), *rev.* S. Ștefănuț, 23.10.2014. The presence of this species in Romania has been reconfirmed after more than 100 years (Ellis *et al.* 2012).

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In 2010, the specimen of *Marsupella lapponica* from *Hep. Alp. Transsylv. Exsiccata no. 169*, BP *5567/H* had been recognised as the holotype (Váňa *et al.* 2010: 32). Examining the specimens from the W Herbarium and the paper of Loitlesberger (1898) revealed that Loitlesberger designated the specimens of the Vienna Herbarium (W) as the holotype of this taxon (Loitlesberger 1898: 192). As a result, the following amendment is proposed: the specimens of *Marsupella lapponica* from *Hep. Alp. Transsylv. Exsiccata no. 169* (W *1898-8207*) is the holotype (Figs. 2–3), and the one from BP *5567/H*, published by Váňa *et al.* (2010) is here designated as the isotype.

FIGURE 1. The field trip area of Karl Loitlesberger in Romania, 1897 (in green).

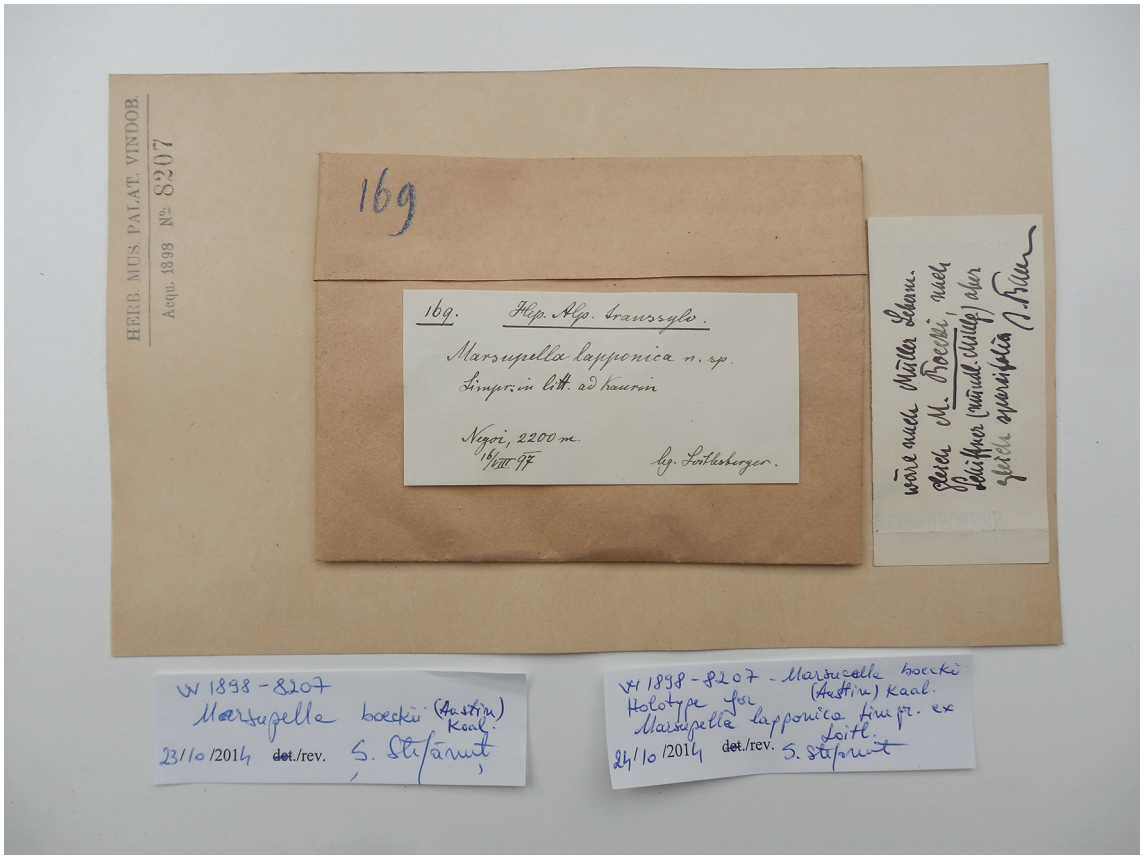

FIGURE 2. The herbarium envelope of *Marsupella lapponica*, *Hep. Alp. Transsylv. Exsiccata no. 169* (holotype W *1898-8207*).

FIGURE 3. The holotype of *Marsupella lapponica*, *Hep. Alp. Transsylv. Exsiccata no. 169* (W *1898-8207*).

Revised type designation

Marsupella lapponica Limpricht ex Loitlesberger

"Type:—ROMANIA. Făgăraș Mountains: Negoiu Mountain, 2200 m a.s.l., 16 August 1897, *Hep. Alp. Transsylv. Exsiccata no. 169, W 1898-8207* (holotype W!, isotype BP!)."

2. ***Frullania parvistipula*** Stephani (1910: 397), Romania, Nămăești, 700 m a.s.l., *leg.* K. Loitlesberger, 31.07.1897, *det.* K. Loitlesberger as *Frullania dilatata* (Linné 1753: 1133) Dumortier (1835: 13) var. *subtilissima* (Nees 1838a: 219) Debat (1874: 231), *Hep. Alp. Transsylv. Exsiccata no. 95* (W *1898-8141*) (Loitlesberger 1898: 196), *rev.* S. Ștefănuț, 28.10.2014.

This is the oldest sample of *Frullania parvistipula* in Europe and the second record of this species for Romania (Figs. 4–5). *Frullania parvistipula* was described as a new species by F. Stephani in 1910 from Tosa, Japan (Stephani 1909–1912: 397). The first European sample of *F. parvistipula* were collected by V. Schiffner on 23.07.1899 on the Schlern Mountain, in the Dolomites, South Tirol, Italy, 1440–1500 m a.s.l., on dolomite (Rüegsegger 1986). The first specimens published under the name *F. parvistipula* from Romania were collected on 7 July 1998 and 10 July 2003 on the Great Gorges of the Dâmbovița River, near Rucăr, Piatra Craiului National Park, 800 m a.s.l., on rocks, *BUCA B943, B944* (Ștefănuț 2004). This site is 10 km distance from Nămăești where Loitlesberger originally collected specimens of *F. parvistipula*.

The original drawings of Loitlesberger (Figs. 6–7) were also found attached to the herbarium specimens of *Frullania dilatata* var. *subtilissima* and proved to be the oldest known drawings of *F. parvistipula.* The drawings are of high quality and faithfully represent the determining characters of *F. parvistipula*, such as the leaf lobes, cells of lobes and stylus.

Since the species was determined incorrectly and a new taxon name was not proposed, a change of taxon name was not required.

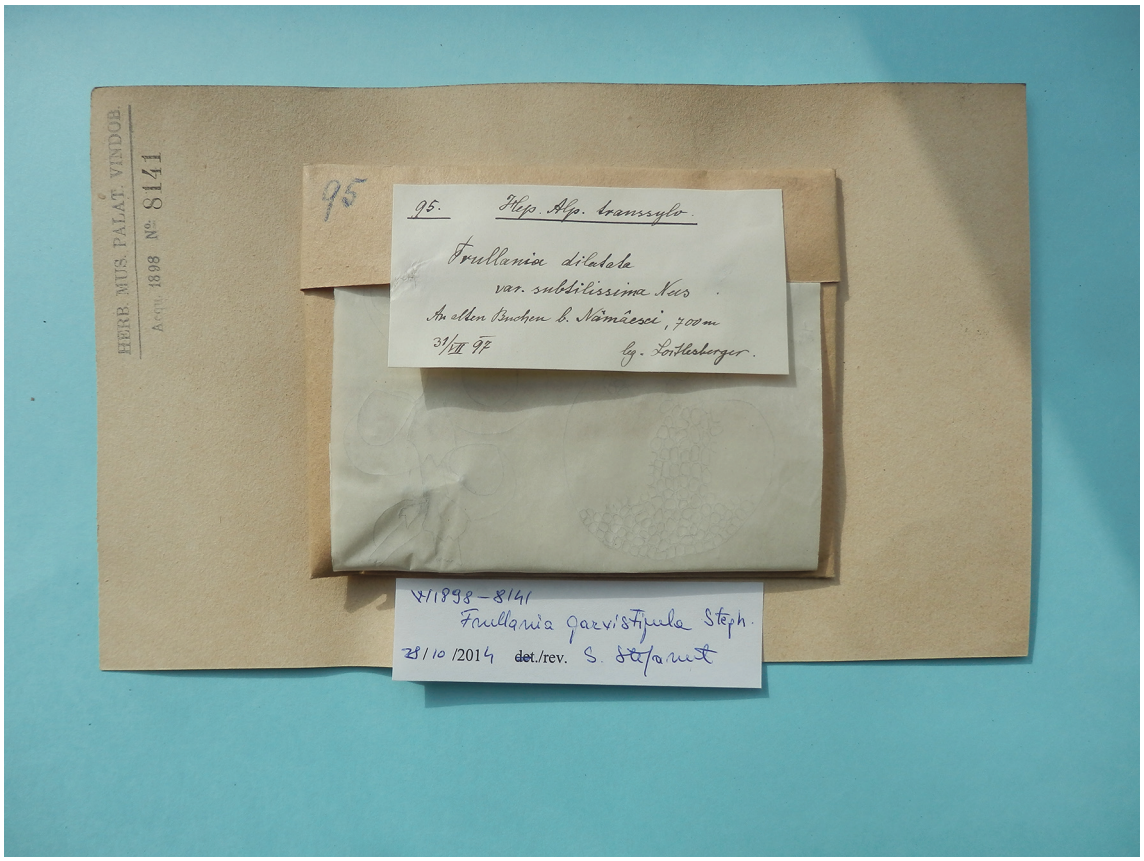

FIGURE 4. The herbarium envelope of *Frullania parvistipula*, *Hep. Alp. Transsylv. Exsiccata no. 95* (W *1898-8141*).

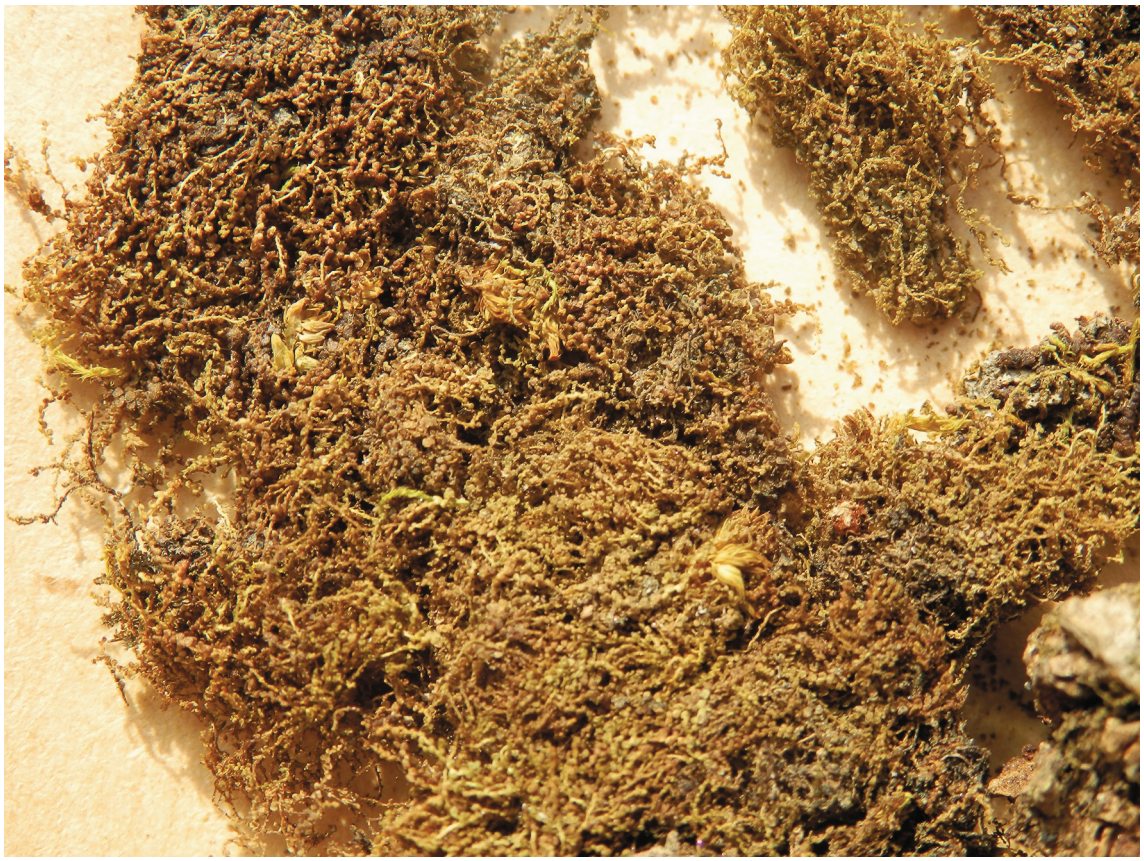

FIGURE 5. *Frullania parvistipula*, *Hep. Alp. Transsylv. Exsiccata no. 95* (W *1898-8141*).

FIGURE 6. The first known drawings of *Frullania parvistipula*, *Hep. Alp. Transsylv. Exsiccata no. 95* (W *1898-8141*). Photo of the original (Drawing by K. Loitlesberger).

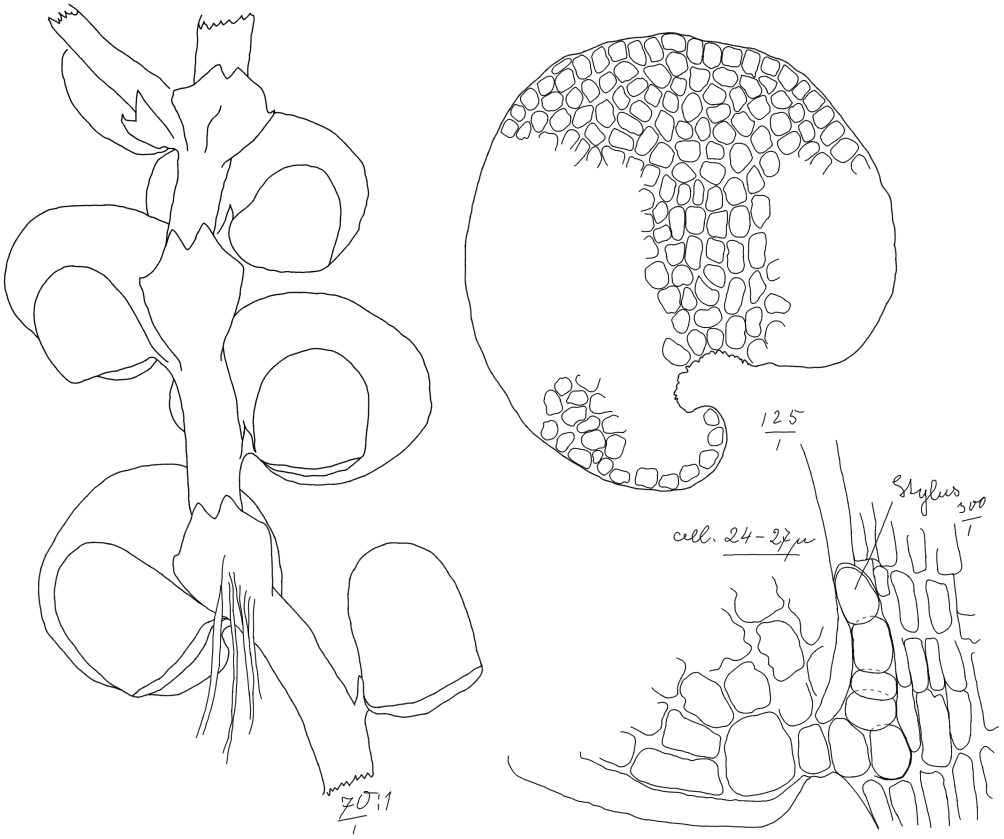

FIGURE 7. The first known drawings of *Frullania parvistipula*, *Hep. Alp. Transsylv. Exsiccata no. 95* (W *1898-8141*). Drawing reproduced after the original.

3. ***Gymnomitrion commutatum*** (Limpricht 1880: 314) Schiffner (1915: 304), Romania, Făgăraș Mountains, Negoiu Mountain, 2200 m a.s.l., *leg.* K. Loitlesberger, 16.08.1897, *det.* K. Loitlesberger as *Marsupella funckii* (Weber & Mohr 1807: 422) Dumortier (1835: 24), *Hep. Alp. Transsylv. Exsiccata no. 182* (W *1898-8206*), *rev.* S. Ștefănuț, 23.10.2014.

Gymnomitrion commutatum was reported for the first time for Romania in 2004, collected from the Făgăraș Mountains, on the edge of Urlea Lake and published as *Marsupella commutata* (Limpricht 1880: 314) Bernet (1888: 29) (see Blockeel *et al.* 2004). Since 2004, *G. commutatum* has been reported for the Bucegi Massif, Babele Mountain (Ștefănuț 2007), Făgăraș Mountains, Ciortea Mountain (Ellis *et al.* 2012) Podragu Lake (Ștefănuț 2014) and Parâng Mountains, below Cârja Peak, 2350 m a.s.l., *leg*. S. Ștefănuț, 27 June 2012, *det*. S. Ștefănuț (BUCA *B4386*). The specimens of *G. commutatum* from *Hep. Alp. Transsylv. Exsiccata no. 182* (W *1898-8206*) are the oldest known specimens of this species collected from Romania. The conservation status of *Gymnomitrion commutatum* should be changed from CR B2ab(ii,iii,iv) (Ștefănuț & Goia 2012) to VU B2ab(ii,iii,iv).

[Abbreviations according IUCN Standards and Petitions Committee (2019):

CR—critically endangered, B2—area of occupancy < 10 km^2, a—Severely fragmented or number of locations = 1, b—Continuing decline in any of: (ii) area of occupancy, (iii) area, extent and/or quality of habitat, (iv) number of locations or subpopulations, VU—vulnerable, B2—area of occupancy < 2,000 km^2, a—Severely fragmented or number of locations ≤ 10, b—Continuing decline in any of: (ii) area of occupancy, (iii) area, extent and/or quality of habitat, (iv) number of locations or subpopulations.]

4. ***Scapania crassiretis*** Bryhn (1892: 7), Romania, Făgăraș Mountains, Negoiu Mountain, 2200 m a.s.l., *leg.* K. Loitlesberger, 16.08.1897, *Hep. Alp. Transsylv. Exsiccata no. 167* (W *1898-8258*) (Loitlesberger 1898: 193), conf. S. Ștefănuț, 22.10.2014.

The occurrence of *Scapania crassiretis* in Romania was considered doubtful (Dihoru 2004). The specimens of *S. crassiretis* from *Hep. Alp. Transsylv. Exsiccata no. 167* (W *1898-8258*) are a single report of this species from Romania. Although for more than 15 years this species has been searched for, on the Negoiu Mountain, and though it has not been found in the last 120 years, this herbarium data does confirm its past presence in Romania.

5. ***Bucegia romanica*** Radian (1903: 4), male specimens, Romania, Bucegi Mountains, Bătrâna Peak—Omu Mountain, 2200 m a.s.l., *leg.* K. Loitlesberger, 21.07.1897, *det.* K. Loitlesberger as *Preissia quadrata* (Scopoli 1772: 355) Nees (1838b: 135), *Hep. Alp. Transsylv. Exsiccata no. 75* (W *1898-8246*) (Loitlesberger 1898: 196), *rev.* S.Ș. Radian (Radian 1903), *conf*. S. Ștefănuț, 22.10.2014.

After the bombing of Bucharest, a large fire destroyed the BUC Herbarium, which at that time had over 1,000,000 specimens, including the bryophyte collection of Simeon Ștefan Radian and Loitlesberger's exsiccatae. The holotype of *Bucegia romanica,* the female specimen, collected by S.Ș. Radian, was reduced to ashes, and also the male specimen, *leg*. K. Loitlesberger 1897, *rev.* S.Ș. Radian (Radian 1903). As a result, the sample from *Hep. Alp. Transsylv. Exsiccata no. 75* (W *1898-8246*) (Loitlesberger 1898: 196), *rev.* S.Ș. Radian (Radian 1903), *conf*. S. Ștefănuț, 22.10.2014, becomes the reference specimen for male plants of *Bucegia romanica* (Fig. 8).

The Harvard University Herbaria (Farlow Herbarium (FH), in the V. Schiffner collection), host the original female specimens of *B. romanica* sent by S.Ș. Radian to V. Schiffner for checking (FH *290660*) (Figs. 9–10). The collection also contains a letter by Radian to Schiffner, as well as the original drawings made by Radian for the description of this species (Figs. 11–12). These are the oldest known drawings of *Bucegia romanica.* Although the label of the *B. romanica* herbarium sample is written by Schiffner, it contains all the necessary identification data to confirm that this sample is an isotype of the original specimen. The label and the letter even have the initial mistake made by Radian regarding elevation, 1000–1100 m a.s.l. (Radian 1903: 4), corrected later by himself to 1500–1800 m a.s.l. (Radian 1920: 81). The sample was checked by R. Grolle in 1972 and lectotypified FH *290660* (lectotype FH!) (Grolle 1976: 183).

In a phylogenetic study of Marchantiaceae by Long *el al.* (2016), the status of *Bucegia romanica* has been altered and subsumed within the genus *Marchantia* as *Marchantia romanica* (Radian) D.G. Long, Crandall-Stotler, L.L. Forrest & Villarreal (Long *et al.* 2016: 78).

The images were published with the agreement of the curators of the Herbarium of the Natural History Museum in Vienna (W) and the Harvard University Herbaria—Farlow Herbarium (FH).

FIGURE 8. Male plants of *Bucegia romanica*, *Hep. Alp. Transsylv. Exsiccata no. 75* (W *1898-8246*).

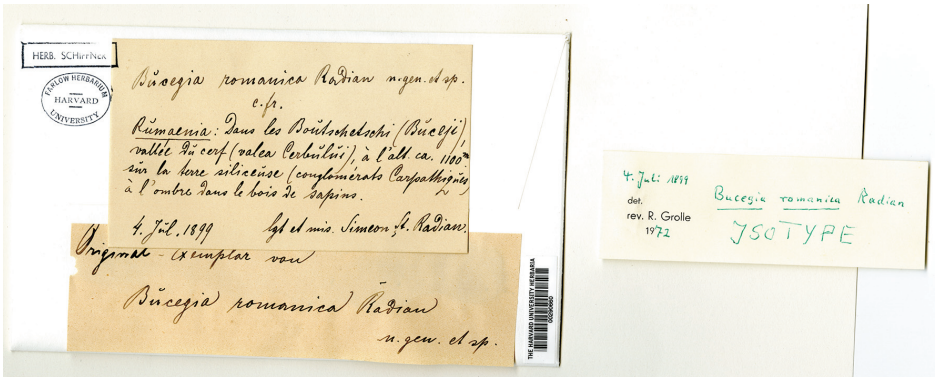

FIGURE 9. Lectotype of *Bucegia romanica* (FH *290660*).

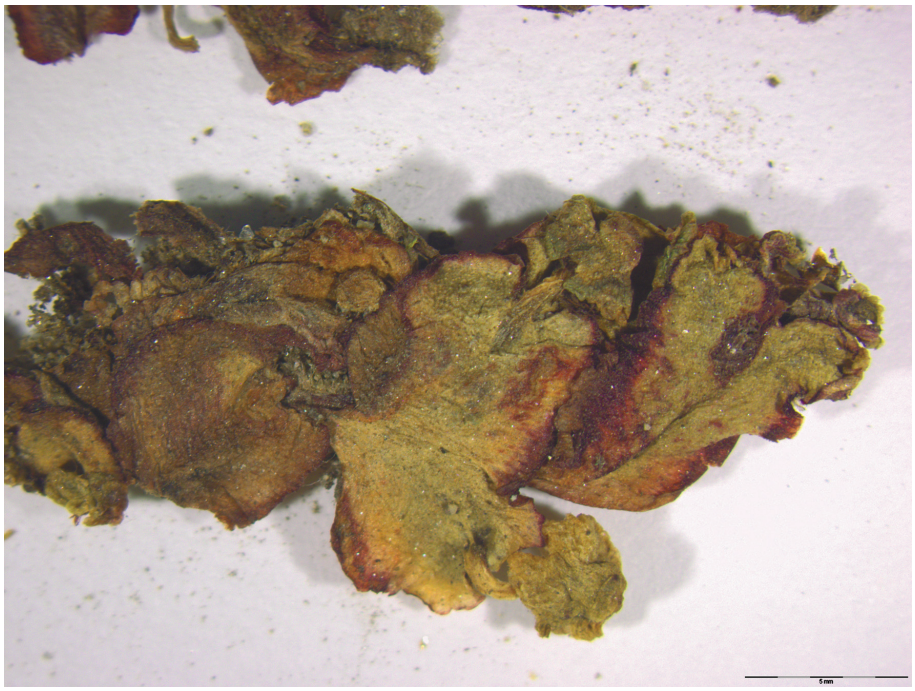

FIGURE 10. Lectotype of *Bucegia romanica*—female plants (FH *290660*).

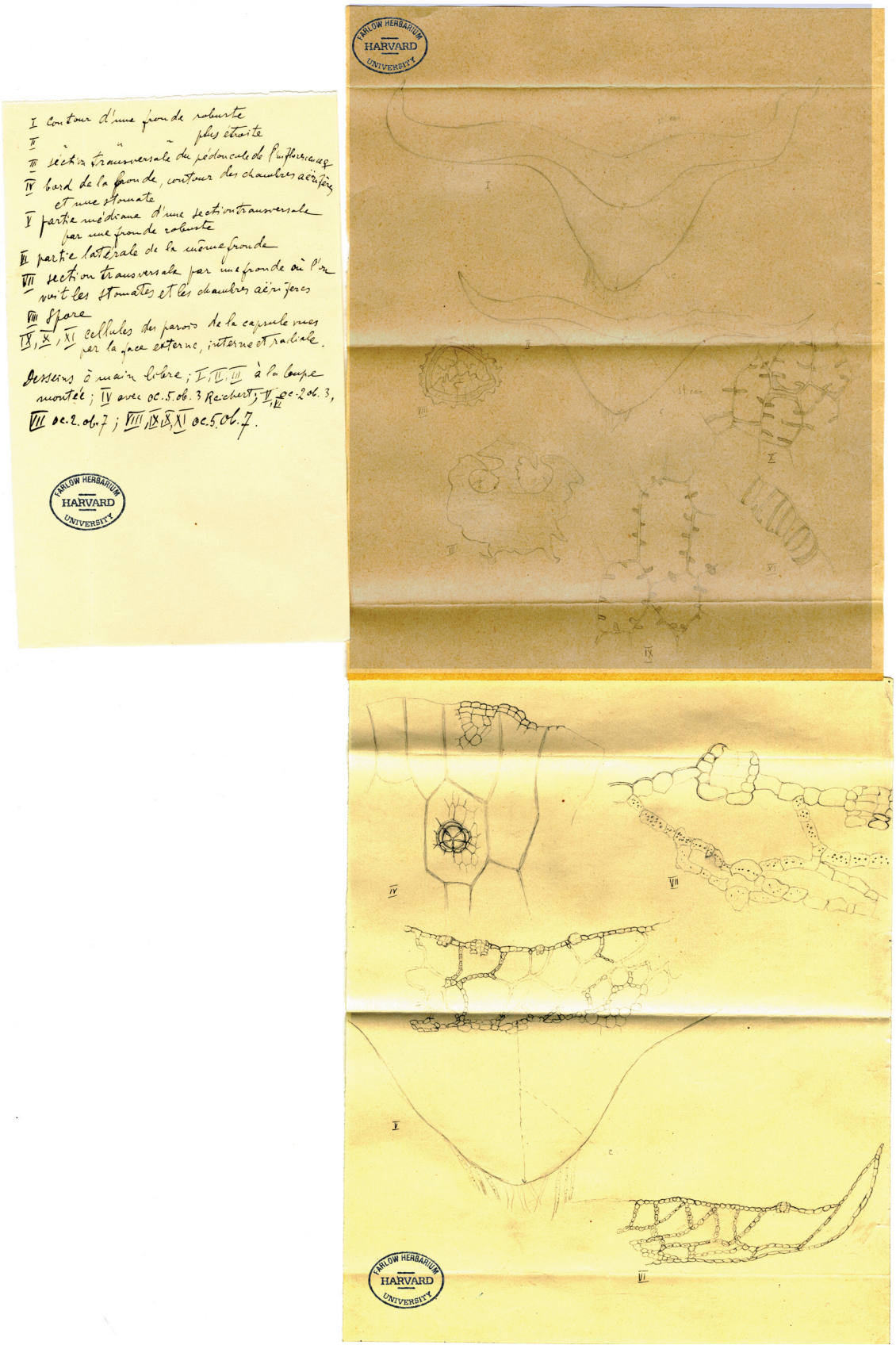

FIGURE 11. The first known drawings of *Bucegia romanica* (FH *290660*): I,II,V–VII—Transverse section of thallus, III—Transverse section of archegoniophore stalk, IV—Thallus margin, dorsal view, VIII—Spore, IX–XI—Capsule cells. Photo of the original (Drawing by S.Ș. Radian, 1903).

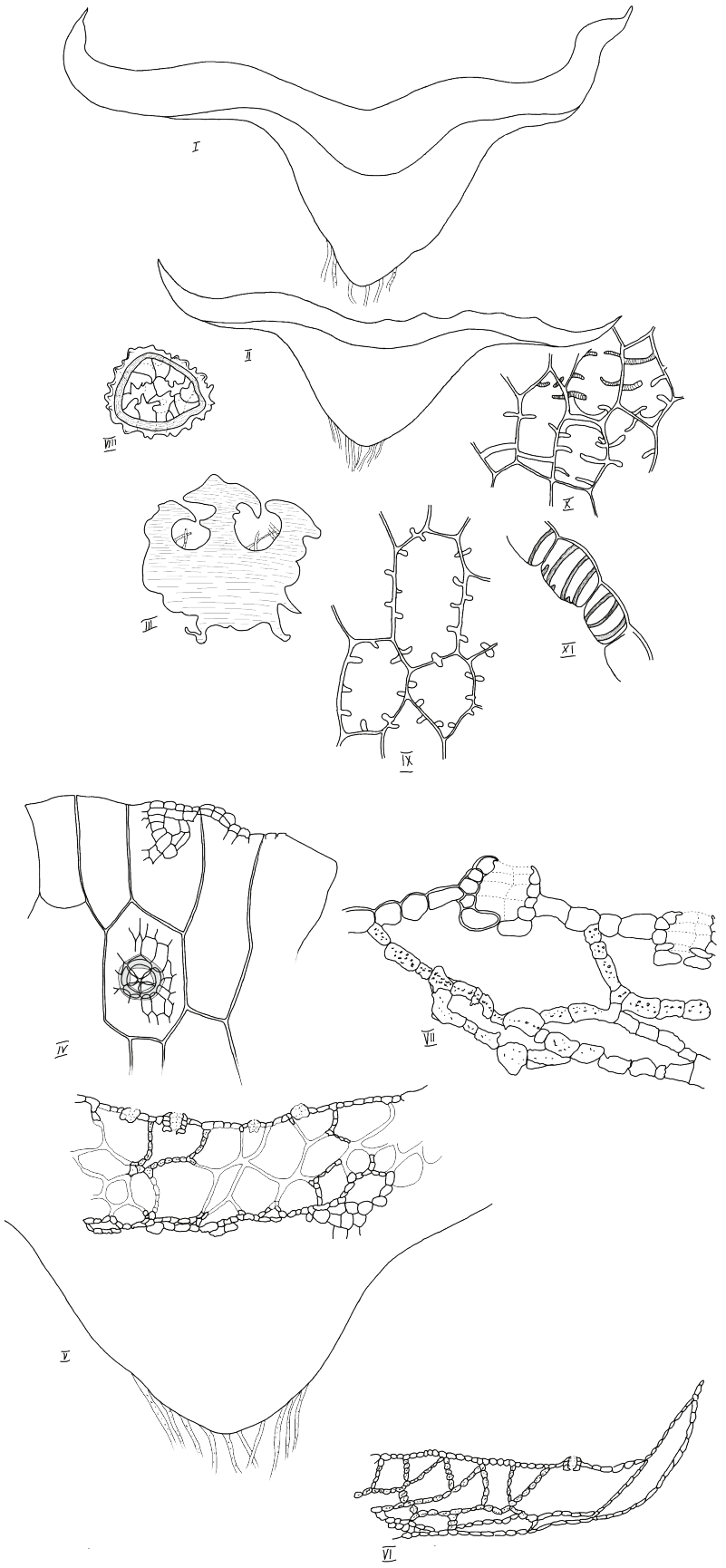

FIGURE 12. The first known drawings of *Bucegia romanica* (FH *290660*): I,II,V–VII—Transverse section of thallus, III—Transverse section of archegoniophore stalk, IV—Thallus margin, dorsal view, VIII—Spore, IX–XI—Capsule cells. Drawing reproduced after the original.

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