Acta Acad. Paed. Agriensis, Sectio Biologiae **XXIV** *(2003) 109–128*

Notes on Gymnomitriaceae (subf. Gymnomitrioideae) in Latin America

Váňa, J.
Department of Botany, Charles University
Benátská 2, CZ-128 01 Praha 2, Czech Republic

Abstract. An overview of the species of the family Gymnomitriaceae in Latin America is given. Keys to Latin American species of the genera *Gymnomitrion* (6 species) and *Marsupella* (9 species) is presented. Three new combinations (*Marsupella lacerata, M. moralesae and M. truncato-apiculata*) are made, two new taxa (*Gymnomitrion pacificum* and *Marsupella paroica*) are newly reported from the area and many additional data to the distribution and synonymies of different taxa are published. The problems connected with the concept of the genera *Gymnomitrion* and *Marsupella* are discussed.

The knowledge of the subfamily Gymnomitrioideae in Latin America is very poor. Nearly all species occurring in this area are very rare, and they are restricted mostly only to higher elevations (especially in the páramo region) or the subantarctic area. Nevertheless, the number of taxa in the subfamily in the area is significant (20 species at present, with 2 additional taxa in South Georgia).

In recent times two very important studies have contributed with many additional data to the knowledge of the subfamily in the study area (Schuster 1996, 2002). However, there are still many unanswered problems based on:

- the delimitation of the genera in the family, especially in the complex *Gymnomitrion* Corda – *Marsupella* Dumort., including newly separated genera (especially *Apomarsupella* R. M. Schust.) or subgenera in *Marsupella*,
- inadequate knowledge of distribution of nearly all taxa based on the limited number of collections and the relatively even more limited number of determined species (taxa of the present subfamily are not in the area of interest of most bryologists, and most of the species are difficult to determine),
- lack of good material (with gametangia, sporophytes) of some taxa,

- omission of some important and taxonomically problematical taxa by Schuster (1996, 2002) because of "poor knowledge"
- and, finally, lack of modern biosystematic or molecular study based on the taxa of the family Gymnomitriaceae.

The main problem seems to be the delimitation of the genera and subgenera in the complex *Gymnomitrion* – *Apomarsupella* – *Marsupella*. Although Váňa (1999) revised the subgeneric concept in *Marsupella*, his study is neither accepted nor mentioned in the study of Schuster (2002); moreover, Schuster described an additional subgenus (*Marsupella* subg. *Amphimarsupella* R. M. Schust.), further complicating the situation.

There are two "basic" concepts for delimitation of the genera *Gymnomitrion* and *Marsupella*. The "classical" concept used as the "crucial criterion separating *Gymnomitrion* from *Marsupella*" (cf. Schuster 2002: 565) concerns the structure of the female inflorescence, especially the presence or absence of a perianth and especially a perigynium. This concept was used by Müller (1906–1916), as it was in many other studies up to the end of the first half of the 20th century. *Gymnomitrion* was characterised by the lack of perianth and perigynium (although at least a reduced perigynium can be present), whereas in *Marsupella* a relatively well developed perigynium and perianth (at least in reduced form) must be present. Knapp (1930) established that the "classical" or "usual" distinctions drawn between *Marsupella* and *Gymnomitrion* failed to exist, and Müller (1951–1958), separating both mentioned genera, gives preference to the "gymnomitrioid" or "marsupelloid" characters of the habit over the "classical" differential characters in the structure of the gynaeceum. Thus, *Gymnomitrion* species form densely caespitose patches, and individual plants are mostly julaceous or filiform, of whitish, yellowish to greyish colour very rarely tinged with red or purple, with closely imbricate, densely appressed leaves, decolorate leaf tips and margins etc. In contrast, *Marsupella* species do not grow in such dense patches, they are not julaceous, are mostly greenish, often fuscous to purplish, and the leaves are mostly remotely arranged, not appressed and without decolorate margins and tips. The last concept is accepted in nearly all recent studies and treatments of the mentioned genera; it was accepted also in both mentioned treatments of Schuster (1996, 2002).

However, some problems connected with each concept and with the combining of both concepts complicate the situation:

1. The density of leaves and the decoloration of margins or leaf lobe tips are connected with the ecological characters of the locality. When plants of some *Gymnomitrion* species are growing in wet and shady places they have more remote leaves than usual, approaching many *Marsupella* species in habit. In contrast, some *Marsupella* species from extreme habitats such

as exposed rocks at very high altitudes etc. may have a julaceous habit and be decolorate, at least the tips of the lobes, as in *Gymnomitrion.*

2. The gynoecium structure is sometimes not correlated with the habit characters. There are some "primitive" species of "true" *Gymnomitrion* without perianth and perigynium with a somewhat "marsupelloid" habit (cf., f.e., fig. 424: 13, 14 of G. *asperulatum* R. M. Schust. in Schuster 2002: 568, where the leaves are not densely appressed and closely imbricate). Similarly, some species of *Marsupella* have the "gymnomitrioid" habit with julaceous or stoloniform shoots or with closely imbricate, appressed leaves, resembling *Gymnomitrion* (f.e. *M. adusta* (Nees) Spruce, *M. condensata* (Ångstr. ex C. Hartm.) Lindb. ex Kaal. or *M. stoloniformis* N. Kitag.).

3. The reduction of the perigynium is a continuous process in the evolution of species and it is very difficult to draw the line establishing whether it is present or not. This reduction can be relatively well demonstrated in the *Marsupella* subg. *Homocraspis* (Lindb. ex Schiffn.) Grolle culminating in *M. adusta*, where an exceptionally low perigynium is found, or more often it is completely missing. Not only *M. adusta*, but also some other species treated here have the perigynium completely absent. 3.6.

4. The exact form of the female bracts (more deeply lobed than the leaves, but still bilobed to separate in some lanceolate filaments), connected with the reduction in the perigynium, can be detected only when the plants are fertile. When unfertilised gynoecia are present, the female bracts can be similar to the leaves and mostly not yet separated into filaments. Moreover, in both genera (*Gymnomitrion* and *Marsupella*) in the present concept there are species with the innermost bracts basically bilobed with deeply lobed margins, or with bracts separated into irregular lanceolate filaments.

5. The segregation of plants with a "marsupelloid" habit and a "gymnomitrioid" gynaeceum structure (without any trace of a perigynium) in the genus *Apomarsupella* (described on the basis of the presence of *Anomoclada*-type branches) solved these problems only partially, and not for all the problematic species (*Anomoclada*-type branches were found also in *M. yakushimensis* S. Hatt., a typical *Marsupella* species with a perianth closely related to *M. emarginata* (Ehrh.) Dumort., the type of the genus). The reason is that not all taxa with a "marsupelloid" habit and a "gymnomitriod" gynaeceum have the *Anomoclada*-type branches. Schuster (2002) recently placed the rest of the *Marsupella* species with a "gymnomitrioid" gynaeceum in the subgenera *Micromarsupella* R. M. Schust. and *Amphimarsupella.*

6. In *Gymnomitrion* subg. *Nardiocalyx* (Jörg.) S. W. Arnell (*G. apiculatum* (Schiffn.) Müll. Frib.) both a low but distinct perianth and a ring-like perigynium occur. This species has a typical "gymnomitrioid" habit. Schuster (2002: 567) wrote that this species "does not fit well into *Gymnomitrion*".

Based on these points, it will be almost impossible to decide in which of the genera *Gymnomitrion* or *Marsupella* some species treated here should be placed—for example, *M. lacerata* (Steph.) Váňa, *M. moralesae* (Váňa) Váňa and *M. truncato-apiculata* () Váňa. I think that studies based on morphological characters alone, even when fertile and well-developed material is used, cannot answer the question of the generic placement of these (and other) species. Biosystematic studies based on molecular methods may provide more information, but so far such information is not available.

The present study presents some taxonomic and nomenclatural additions to the knowledge of the taxa occurring in the region and some additional data to their distribution. The taxa with no additional information available (*Acrolophozia fuegiana* R. M. Schust., *A. sulcata* Hässel, *Gymnomitrion concinnatum* (Lightf.) Corda, *Herzogobryum molle* Grolle, *H. teres* (Carrington et Pearson) Grolle, *H. vermiculare* (Schiffn.) Grolle, *Marsupella microphylla* R. M. Schust., *M. minutula* Hässel) are not treated in the following treatment.

Apomarsupella africana (Steph. ex Bonner) R. M. Schust., J. Hattori Bot. Lab. 80: 91, 1966

For the synonymy see Váňa (1985: 91).

Fig.: Arnell 1956, fig. 11, p. 543, fig. 12, p. 544.

Specimens examined (Latin America only): **Mexico**, Hildago, above Chapulhuacan, 3000 ft, 7.12.1944 A. J. Sharp, det. J. Váňa (TENN); Estado de Mexico, Gap at Nevado de Toluca trough which foot trail passes, 4350 m, 15.06.1973 A. J. & E. B. Sharp, E. C. Clebsch & K. R. Thornburgh 1518, 1525, det. J. Váňa (TENN); Estado de Mexico, Nevado de Toluca, NE side, outer wall of crater, 13000 ft, 19.12.1976 D. G. Horton 7882 (ALTA); Estado de Mexico, Mpio. De Toluca, crater of Nevado de Toluca volcano, 4800 m, 11.08.1995 J. Váňa (PRC); Estado de Mexico, Mt. Popocatepetl, 4000 m, 1.04.1973 G. Schwab SN 28, det. J. Váňa (JE); Puebla, Ixtaccihuatl above Huejotzingo, 13700 ft, 21.10.1945 A. J. Sharp 4274, det. J. Váňa (TENN); Veracruz, rod from Perote to Cofre, 4000 m, 30.09.1979 A. J. Sharp, G. Juárez, M. Baez & B. Boom 7175c, det. J. Váňa (TENN). **Guatemala**, Dept. San Marcos, between San Sebastián and summit of Volcán Tajumulco, 3800–4600 m, 13.02.1940 J. A. Steyermark 35542, det. J. Váňa (F). **Venezuela**, Estado Merida, Sierra Nevada de Merida, Pico Espejo, 3700–3900 m, 03.1969 B. & F. Oberwinkler & J. Poelt HV 69-125, HV 69-141, det. J. Váňa (JE). **Chile**, Gay (holotype of *Marsupella chilensis* Steph.; G-10880).

Distr.: Mexico, Guatemala, Venezuela, Chile; also in Uganda, Kenya, Tanzania, Rwanda and Zaire.

Notes: New for Guatemala; for Mexico mentioned in Váňa (1985) without citing of localities. The report of *Apomarsupella revoluta* (Nees) R. M. Schust. from Venezuela (Schuster 1974, Gradstein et Váňa 1987, Long et Grolle 1990, Schuster 2002; not mentioned already in Schuster 1996) is based on the specimens collected by B. & F. Oberwinkler and J. Poelt which belong to this species. I have seen no specimen of *A. revoluta* from Latin America.

Key to Latin American species of *Gymnomitrion*.

1. Leaf margin denticulate or crenulate. Small, wiry, filiform plants sometimes tinged with red, with slender stem under 10 cells in diam. and shallowly bilobed, ovate leaves with decolorate margins. ..... **2.**

— Leaf margin entire. Larger, julaceous plants mostly whitish to silver-greyish, with stem more than 10 cells in diam. and at least to 0.2 their length bilobed leaves. ..... **3.**

2. Marginal 1–2 (–3) rows of cells decolorate, mostly isodiametric, similar to other leaf cells (not differentiated), at least slightly obliquely elongated. [páramos of tropical America] ..... *G. atrofilum*

— Marginal 1 (–2) rows of cells decolorate, differentiated, diagonally elongate, other leaf cells ± isodiametric. [only Mexico] ..... *G. pacificum*

5. Green to yellowish-brown plants with very closely imbricate or appressed leaves; cuticle strongly asperulate.♀ bracts never spinose or denticulate. [southernmost South America] ..... *G. concinnatum*

3. Leaves sheath the stem, with setaceus lobes; lobe cells thick-walled. ..... *G. setaceum*

— Leaves do not sheath the stem, without setaceous lobes; lobe cells thick- or thin-walled. ..... **4.**

4. Leaves bilobed to 0.4–0.5 their length; marginal cells tangentially elongated. Terminal branching and small underleaves, sometimes connate with base of one leaf, present. ..... *G. laceratum*

— Leaves bilobed to 0.2–0.3 (–0.4) their length; marginal cells not elongated or elongated at right angles to leaf margin or obliquely (never tangentially). Terminal branching and underleaves lacking. ..... **5.**

5. Green to yellowish-brown plants with very closely imbricate or appressed leaves; cuticle strongly asperulate.♀ bracts never spinose or denticulate. [southernmost South America] ..... *G. concinnatum*

— Whitish to greyish plants with ± distichous, suberect, loosely imbricate

leaves; cuticle nearly smooth.♀ bracts armed with spinous teeth or denticulations. [páramos of tropical America] ..... *G. asperulatum*

Gymnomitrion asperulatum R. M. Schust., J. Hattori Bot. Lab. 80: 106, fig. 19–20, 1996

Typus: Venezuela, Estado Merida, Sierra Nevada de Merida, above Merida, Loma Redonda station of the Teleferico, 4160 m, 02.1976 R. M. Schuster & L. Ruiz-Terán 76–1449 (herb. Schuster – holotype non vidi, PRC – isotype!)

Fig.: Schuster 1996, fig. 19, p. 109 and fig. 20, p. 111; the same fig. in Schuster 2002, fig. 423, p. 564 and fig. 424, p. 568.

Specimens examined: Costa Rica, Prov. de San José, Cerro de la Muerte, Páramo Buena Vista, 3100 m, 9.11.1999 I. Holz 99–620, det. J. Váňa (PRC). **Venezuela**, Estado Merida, Sierra Nevada de Merida, above Merida, Loma Redonda station of the Teleferico, 4160 m, 02.1976 R. M. Schuster & L. Ruiz-Terán 76-1432b as *G. laceratum* (MER); same locality, 4100 m, 19.01.1990 R. Lübenau-Nestle V 260 (herb. Lübenau-Nestle, PRC); Estado Merida, Distr. Rangel, Sierra de Santo Domingo, Páramo de Mucubají above Laguna Grande, 3500 m, 07–08.1972 D. Griffin III, M. Lopéz F. & L. Ruiz-Terán 1109 (FLAS); between Valéra and Aguila pass, 3900 m, 15.01.1990 A. Schäfer-Verwimp & I. Verwimp 12146, det. J. Váňa (herb. Schäfer-Verwimp, PRC).

Distr.: Costa Rica, Venezuela.

New for Costa Rica; until now known only on the basis of type specimen.

Gymnomitrion atrofilum Váňa, J. Hattori Bot. Lab. 41: 411, fig. 1, 1976

Typus: Colombia, Dept. Meta, Páramo de Sumapaz, Cerro Nevado del Sumapaz, 4015 m, 13.01.1973 A. M. Cleef 7757a (U – holotype!, PRC – isotype!)

Fig.: Váňa 1976, fig. 1, p. 412; Schuster 1996, fig. 11: 8–15, p. 67, the same fig. in Schuster 2002, fig. 419: 8–15, p. 552.

Specimens examined: Colombia, Cundinamarca, Páramo de Chirgaza, around lagunita along trail to St. Juanito, 3400 m, 23.09.1982 S. R. Gradstein & E. Santana 4266, det. S. R. Gradstein (U). **Ecuador**, Prov. Chimborazo, Morona Santiago, Cerros Yuibug – Pailacajas, 4400 m, 31.07.1997 P. Sklenař, det. J. Váňa (PRC); Prov. Tungurahua, Cerro Hermoso, 4300 m, 6.09.1997 P. Sklenař, det. J. Váňa (PRC).

Distr.: Colombia, Ecuador.

New for Ecuador; until now known only on the basis of type specimen.

Gymnomitrion laceratum (Steph.) Horik., Acta Phytotax. Geobot. 13: 212, 1943

For the synonymy see Váňa (1985: 89)

Fig.: Schuster 1949, fig. 1–4, p. 104, fig. 5–11, p. 106; Arnell 1956, fig. 6, p. 532, fig. 7, p. 533; Arnell 1963, fig. 220, p. 309; Kitagawa 1963, fig. 20, p. 113; Schuster 1974, fig. 325, p. 124, fig. 326, p. 128.

Specimens examined (Latin America only): **Mexico**, Estado de Mexico, Nevado de Toluca volcan, E side of the volcano, 13600 ft., 19.12.1976 D.G. Horton 78491 (TNS); Oaxaca, Gap in Sierra Juárez, 27.12.1969 A. J. Sharp 9817a, 9817e, 9850, 9850a p.p. (F, TENN); Oaxaca, Sierra Juárez, above Valle Nacional along road from Tuxtepec to Oaxaca, 5.09.1974 D. Richards, A. J. & E. B. Sharp 2771, 2774a, 2774b, 2777, det. A. J. Sharp (TENN); Oaxaca, above Llano de las Flores on the road between Ixtlán de Juárez and Tuxtepec, 9000 ft., 6.07.1996 A. J. Sharp, C. Delgadillo M., W. Chester & M. Folson 2712a, det. J. Váňa (TENN). **Peru**, Prov. La Libertad, Cerro la Gordas between Los Alisos and Quiruvilca, 3600 m, 16.05.1976 E. Hegewald 5972, 5976, det. J. Váňa (JE); Prov. Ancash, Prov. Recuay, between Tunnel Cahuish and Chavin (Quebrada Pucayado), 4050 m, 18.10.1973 P. & E. Hegewald 7716, 7717, 7722, 7733 (F, JE); Prov. Junin, Huayrapallana, 4900 m, 28.05.1960 G. Kunkel, det. S. Arnell (S). **Bolivia**, Dept. La Paz, Prov. Sur Yurgas, Taquesi East, E side of Taquesi pass along Inca Trail between Abra and Estancia Taquesi, 4480 m, 5–6.06.1983 M. Lewis 83-2154, 83-2172A, det. J. Váňa (F); Dept. Cochabamba, Prov. Chapare, along old Chapare road 7 km S of Incachasa, 3400 m, 8–13.11.1989 S. R. Gradstein 7393, det. J. Váňa (U).

Distr.: Mexico, Peru, Bolivia; U.S.A.: Tennessee; Uganda, Kenya, Tanzania, Zaire, Rwanda, Natal, Cape, Réunion; Russia: Altai Mts., Nepal, Japan.

New for Bolivia.

Gymnomitrion pacificum Grolle, Trans. Brit. Bryol. Soc. 5/1: 92, 2 f–k, 1966

Fig.: Grolle 1966a, fig. 2 f–k, p. 90.

Specimens examined (Latin America only): **Mexico**, Oaxaca, Gap in Sierra Juárez above Tuxtepec, 27.12.1969 A. J. Sharp 9850a p.p., det. J. Váňa (TENN); same locality, 10000 ft, 26.12.1970 A. J. Sharp 3860 as *G. laceratum*, 3861b, det. J. Váňa (F, TENN); Oaxaca, north of Oaxaca on Highway 175 at Sierra Juárez Gap, 9500–10000 ft., 24.12.1972 A. J. Sharp & al. 4180 as *G. laceratum*, 4231, det. J. Váňa (TENN).

Distr.: Mexico; S Alaska, Canada: British Columbia; Japan, Russia: Czukotka.

New for Mexico and the whole Latin America.

Gymnomitrion setaceum Grolle et Váňa in Váňa, J. Hattori Bot. Lab. 41: 411, 1976

Typus: Venezuela: Estado Merida, Sierra de Santo Domingo, Páramo de Muchuchies, near Laguna Negra, 3500 m, 03.1969 B. & F. Oberwinkler & J. Poelt HV 69-122 (JE – holotype!, PRC – isotype!)

Fig.: Váňa 1967, fig. 2, p. 413; Schuster 1996, fig. 23, p.123, the same fig. in Schuster 2002, fig. 428, p. 575.

Specimens examined: Costa Rica, Prov. de San José, Cerro de la Muerte, Páramo Buena Vista south of Cartago, 3200–3270 m, 3–5.09.1973 D. Griffin III & D. Eakin 598, det. J. Váňa (FLAS); Prov. de San José, Cerro de la Muerte, Páramo Buena Vista, 3100 m, 9. & 14.11.1999 I. Holz CR 99-0614, CR 99-0636, det. J. Váňa (PRC); Prov. San José, Cerro de la Muerte, 3400 m, 26.12.1999 I. Holz & A. Schäfer-Verwimp CR 99-1199, det. J. Váňa (PRC). **Venezuela**, Estado Merida, Sierra de Santo Domingo, Páramo de Muchuchies, near Laguna Negra, 3550 m, 18.04.1969 H. Hertel, B. & F. Oberwinkler, det. R. Grolle & J. Váňa (JE, Herb. Hertel 10482); Estado Merida, Sierra de Santo Domingo, Páramo de Mucuchies, near Laguna Negra, 3500 m, 1969 F. Oberwinkler & J. Poelt HV 69-121 p.p., det. J. Váňa (JE); Estado Trujillo, 3400 m, Las Paridor Lake, Páramo de Guiigay, 1975 M. López F. & L. Ruiz-Terán 10833, det. R. Grolle (JE). **Colombia**, S side of Sierra Nevada de Santa Marta, Chogurugue above San Sebastian, 3200 m, 26.01.1967 S. Winkler C 201 as *Herzogobryum paramophilum* n. sp. p.p., det. R. Grolle & J. Váňa (JE); Boyacá, Páramos NW de Belen, Q. Minas, 3855 m, 2.03.1972 A. M. Cleef 2112a, det. J. Váňa (U), Boyacá, Sierra Nevada del Cocuy, Quebrada Bocatoma, 4260 m, 5.10.1972 A. M. Cleef & P. Florschütz 5858, det. S. R. Gradstein (U); Cundinamarca, Páramo de Palacio, Lagunas de Buitrago, 3665 m, 29.09.1972 A. M. Cleef 6685b, det. J. Váňa (U); Cundinamarca, Páramo de Palacio, Carretera hacia la Q. Chuza, 4 km SE from Mina de cal. Cabeceras Q. Chuscal, 3700 m, 9.09.1972 A. M. Cleef 5445, det. S. R. Gradstein (U); Cundinamarca, Páramo de Palacio, 4 km SE from Mina de Cal hacia Chusa, 3665 m, 29.11.1972 A. M. Cleef & L. Uribe 6685, det. S. R. Gradstein (U); Cundinamarca, Páramo de Chirgaza, around lagunita along trail to St. Juanito, 3400 m, 23.09.1982 S. R. Gradstein & E. Santana 4244, det. S. R. Gradstein (U); Meta, Páramo de Sumapaz, Cerro Nevado del Sumapaz, 4300 m, 11.01.1973 S. R. Gradstein 7632a (U).

Distr.: Costa Rica, Venezuela, Colombia.

Notes: Schuster (1996: 124) doubted the placement of this species in the sect. *Dianthelia* (R. M. Schust.) R. M. Schust., where it was placed

by Váňa (1976). He suggested an affinity to the Nepalese *G. crenatilobum* Grolle, but this seems to be only a presumption, and not based on the study of specimens of the last species. This opinion seems not to be well founded, as it is probably based only on similar leaf cell structure. I agree with Schuster (1996, p. 124) that *G. setaceum* "is very different from 'normal' species of the genus, in that the leaves do not sheath the stem", but, examining the material of *G. crenatilobum*, it is clear that *G. crenatilobum* belongs to the "normal" species of the genus (leaves do not sheath the stem). Future studies can answer the question of whether *G. setaceum* should be placed in its own section; the infrageneric taxonomy of *Gymnomitrion* has not been yet fully clarified.

Key to Latin American species of *Marsupella*

1. Plants paroecious. ..... **2.**
— Plants dioecious. ..... **5.**

2. Perianth present. Leaves only rarely small and scale-like. ..... **3.**
— Perianth lacking. Leaves small and scale-like, about 0.2 their length bilobed, appressed to stem. [South Georgia only] ..... *M. minutula*

3. Plants with remote, scale-like leaves, their width scarcely or not exceeding that of the stem. ..... *M. microphylla*
— Plants with imbricate leaves, at least in the upper parts of the shoots, their width twice or more exceeding that of the stem. ..... **4.**

4. Plants minute (0.2–0.6 mm), brownish; leafy shoots arising from the system of stoloniform creeping axes with leaves slightly wider than the width of the stem, erect shoots abruptly larger-leaved distally. [Fuegia only] ..... *M. sprucei*
— Plants larger (mostly more than 1 cm), green; stoloniform creeping axes lacking, shoots with large leaves throughout. [Mexico] .... *M. paroica*

5. Leaves strongly concave (flattening a leaf without tearing impossible), suborbicular, sinus lunate, descending to 0.1–0.2 the length; lobes subacute to apiculate. ..... *M. truncato-apiculata*
— Leaves + canaliculate, only concave at base, sinus semilunate to acute, descending to 0.2–0.4 the length. ..... **6.**

6. Leaves nearly orbicular; sinus flaring to semilunate; lobes much broader than long. ..... **7.**
— Leaves ovate to egg-shaped, rarely nearly orbicular; sinus subacute to acute, lobes mostly longer than wide. ..... **8.**

7. Perianth absent; leaves mostly bilobed to 0.1–0.2 their length. ..... *M. moralesae*
— Perianth present; leaves bilobed to 0.2–0.3 their length. ..... *M. emarginata*

8. Plants deep red to brownish, only lobe tips often decolorate; leafy shoots often arising from the system of stoloniform creeping axes. Leaves bilobed mostly to 0.2–0.3 their length; cells thin-walled with large to nodular trigones; lobes ending in 1–2 cells. Innermost♀ bracts bifid, crispate, with dentate to laciniate margin and lateral teeth, never multifid and free. ..... *M. miniata*
— Plants subhyaline to greyish-green, system of stolons and flagella not common. Leaves bilobed mostly to 0.3–0.4 their length; cells thick-walled; lobes ending in 3–4 (–5) cells. Innermost♀ bracts deeply multifid, free, lacerate to laciniate. ..... *M. lacerata*

Marsupella emarginata (Ehrh.) Dumort., Recueil Observ. Jungerm., p. 24, 1835

= ***Sarcoscyphus mexicanus*** Lindenb. et Gottsche in Gottsche, Lindenb. et Nees, Syn. Hepat., p. 618, 1846 ≡ ***Marsupella mexicana*** (Lindenb. et Gottsche) Steph., Spec. Hepat. 2: 25, 1901; syn. fide Gradstein et Váňa, Mem. New York Bot. Garden 45: 414, 1987

Typus: Mexico, Sempoaltepec, 06.1842 F. Liebmann, Pl. mex. 10.223 (Pl. mex. Liebm. 186) (C – lectotype!, W-Lindenb. Hep. 249 – isolectotype!, G-10885 – isolectotype!)

= ***Marsupella andina*** J. B. Jack et Steph., Hedwigia 31: 23, 1892; syn. fide Gradstein et Váňa, Mem. New York Bot. Garden 45: 414, 1987

Typus: Colombia, Nova Granada, Prov. Antiognio, Páramo de Sonsón, 10000 ft, 1872 G. Wallis (G-10879 – holotype!)

For the additional synonymy and figs. see manuals of European or North American hepatics.

Specimens examined (Latin America only): **Mexico**, 1913 Arsén 7419 (G-10887); Iztaccíhuatl, 4000 m, 27.08.1973 A. M. Cleef & C. Delgadillo M, 10268, det. J. Váňa (U); Edo Durango, along highway 40 about 9 mi. W of La Cuidad, 8600 ft, 30.12.1973 F. D. Bowers, C. Delgadillo M. & P. Sommers jr. 5082c, det. J. Váňa (F). **Colombia**, Dept. Cundinamarca, Mnpio. Guasca, Páramo de Guasca, along the road Guasca – Guachete, Cll. Pena Negra, valley of Chuscal, 3200 m, 6.09.1984 E. Linares, J. Aguirre C., S. R. Gradstein & B. O. van Zanten, det. S. R. Gradstein (U).

Distr.: Mexico, Colombia; Uganda, Tanzania, Rwanda, Zaire, Malesia, Sumatra, Philippines, widely distributed in the holarctic region.

Notes: Determination of three specimens cited in Gradstein et Váňa (1987) under *M. emarginata* is corrected in this paper (see *M. miniata* and *M. paroica*). The species is rare in the area.

Marsupella lacerata (Steph.) Váňa, comb. nova

Basionym: ***Sphenolobus laceratus*** Steph., Spec. Hepat. 2: 165, 1902 ≡ ***Gymnomitrion andinum*** R. M. Schust., Rev. Bryol. Lichénol. 34: 279, 1966 hom. illeg.

Typus (cf. Schuster, Rev. Bryol. Lichénol. 34: 279, 1966): **Colombia**, Andes Novogranatensis (Bogota), Lindig (G-11034 – lectotype!, FH – isolectotype!); same locality, Lindig sine no. (G-16002!, S!), Lindig 200 (G-16004!), Lindig 251 as *Jungermannia adulterina* f. etiolata (G-17212!), Lindig 253 (G-16003!) – syntypes.

= ***Anastrophyllum bolivianum*** Steph., Bibl. Bot. 87: 186, fig. 100, 1916

Typus: Bolivia, Yanakaka Montes, 4000 m, T. Herzog 3832 (G-17213 – holotype!)

= ***Marsupella cuspidata*** Steph., Bibl. Bot. 87: 181, fig. 93 a–b, 1916

Typus (cf. Váňa, Bryobrothera 5: 228, 1999): **Bolivia**, Hochtal Viloco, 4600 m, 10.1911 T. Herzog 3164/a (G-14539 – lectotype!, L – isolectotype!)

= ***Acolea andina*** Herzog, Bibl. Bot. 88: 27, fig. 14, 1921 ≡ ***Gymnomitrion andinum*** (Herzog) Herzog, Hedwigia 74: 81, 1934

Typus: Bolivia, an Felsen um Pinasgebiet gegen Cerro Incachacca, 4600 m, 08.1911 T. Herzog (JE – holotype!); same locality T. Herzog 2617, Stephani as *Anastrophyllum laxifolium* (JE – isotype or syntype!)

= ***Marsupella trollii*** Herzog, Hedwigia 74: 82, 1934

Typus: Bolivia, Mapiri, C. Troll no. 40 (JE – holotype!)

= ***Marsupella capensis*** S.W. Arnell, Bot. Notiser 110: 403, fig. 3, 1957

Typus: South Africa, Cape, Ceres Div., Hex River Mts., shale band from Witels Kloof up Buffelsshoek Peak, SW aspect, 4000 ft., 8.10.1956 E. Esterhuysen 26375 (BOL – holotype!, UPS – isotype!), same locality, E. Esterhuysen 26376, 26377 (syntypes non vidi).

= ? ***Marsupella subhyalina*** R. M. Schust., J. Hattori Bot. Lab. 80: 142, fig.27, 1996

Typus: Ecuador, hyperpáramo, N. of Pifo – Papallacta Rd., near microwave transmitter station at crest of Andes, 4200–4300 m, R. M. Schuster 93-218a (**F** – holotype non vidi)

Fig.: Stephani 1916, fig. 93 a–b, p. 181, fig. 100, p. 186; Herzog 1921, fig. 14, p. 28; Arnell 1957, fig. 3, p. 403, the same fig. in Arnell 1963, fig. 219, p. 308; Schuster 1996, fig. 27, p. 141; the same fig. in Schuster 2002, fig. 420, p. 554.

Specimens examined: Mexico, Estado de Mexico, Nevado de Toluca volcan, E side of the volcano, 13600 ft., 19.12.1976 D.H. Vitt 17879 as *G. laceratum* (TNS). **Costa Rica**, Prov. De San José, Cerro de la Muerte, 3450 m, 26.12.1999 A. Schäfer-Verwimp & I. Holz SV/H-0143, det. J. Váňa (PRC, Herb. Schäfer-Verwimp). **Venezuela**, Estado Merida, Sierra Nevada de Merida, E of Merida, 3700–3900 m, 1969 F. Oberwinkler & J. Poelt HV 69-119, det. R. Grolle (JE), Estado Merida, Sierra de St. Domingo, Páramo de Mucuchies, 1 km NW Passo El Aguila, 4250 m, 1969 H. Hertel & J. Poelt, det. R. Grolle (JE, Herb. Hertel 10541); Estado Merida, Páramo de Pinango (part of gran páramo de Mucuchíes), 4100 m, 18.07.1984 D. Griffin III & M. Lopéz F. PV-485 p.p., det. J. Váňa (FLAS); Estado Merida, Distr. Rangel, Páramo de Piedras Blancas, 4000–4220 m, 14.08.1975 D. Griffin III, M. López F. & L. Ruiz-Terán 1463, 1511, det. J. Váňa (FLAS). **Colombia**, S side of Sierra Nevada de Santa Marta, Chorugue above San Sebastian, 3200 m, 26.01.1967 S. Winkler C 201 as *Herzogobryum paramophilum* n. sp. p.p., det. J. Váňa (JE); S side of Sierra Nevada de Santa Marta, above Mamacanaca, 24.01.1967 S. Winkler C 402, det. J. Váňa (U); Caldas, W slope of Volcán Ruiz, Las Nereidas, 4300 m, 14.09.1984 E. Linares, J. Aguirre C., S. R. Gradstein & B. O. van Zanten 1433, 1434, det. J. Váňa (U); Boyacá, Páramo de Pisva, carretera Socha-La Punta, Filo Batanera, 2 km SW de la Laguna Batanera, Norros de S. Gabriel, 3750 m, 18.06.1972 A. M.Cleef 4692, det. J. Váňa (F, U); Meta, Páramo de Sumapaz, Hoya El Nevado, Laguna La Guitarra, 3425 m, 22.01.1972 A. M. Cleef 841, det. J. Váňa (U). **Ecuador**, sine loco spec., R. Espinosa 30, det. T. Herzog (JE); Prov. Chimborazo, Mt. Chimborazo, 4200 m, 4.07.1999 Z. Soldán, det. J. Váňa (PRC); Prov. Chimborazo, Mt. Chimborazo, near Hermanos Carrel, 4400, 6.07.1999 Z. Palice, det. J. Váňa (PRC); same locality, 4800–4830 m, 6.07.1999 Z. Soldán, det. J. Váňa (PRC). **Peru**, Dept. Cuzco, Prov. Paucartambo, Abra Acjanaco, near Paucartambo, upper part of Ceja de Selva, 3400–3500 m, 17.09.1984 H. Inoue 34011, det. J. Váňa (TNS); Dept. Puno, Prov. Melgar, between Santa Rosa and Sicuani, pass La Raya, 4300 m, 5.05.1973 P. & E. Hegewald 5507, 5522, det. J. Váňa (JE). **Bolivia**, Hochtal Viloco, 4600 m, 10.1911 T. Herzog 3162b, det. J. Váňa (JE); Quimzaoruz, Viloco, Miness valley, 4500–4600 m, 10.1911 T. Herzog 3166a (JE); Cerro Kaphir (Meseta), 4400 m, C. Troll 74, det. T. Herzog (JE, S); Dept. La Paz, Prov. Larecaja, along road between Sorata and Mina Mina Progresiva on mountain NE of Laripata and 5 km of Sarata, 3750 m, 5.12.1982 M. Lewis 82-122, 82-130, 82-132B, det. J. Váňa (F); Dept. La Paz, Prov. Murillo, uppermost headwaters of Río Livinosa, 33 km N of La Ceja de El Alto La Paz, 4880 m, 14.12.1982 M. Lewis 82-359, det. J. Váňa (F); Dept. La Paz, Prov. Loayza, ridge of Cerro Tres Cruces where it meets Cerro Quisma

Willkhi just S, 12 km of Caxata, 4900 m, 25.07.1983 M. Lewis 83-3010, det. J. Váňa (F); Dept. La Paz, Prov. Inquisivi, slopes between Río Chichipata (Río Huma Palca) and Hacienda Jucumarini, ca 2 km NW of Quime, 3260 m, 20.11.1986 M. Lewis 86-2197, det. J. Váňa (F); Dept. Cochabamba, Abra de San Benito, 3900 m, 01.1908 T. Herzog 6037, det. F. Stephani as *Marsupella* sp. (FI); Dept. Cochabamba, Prov. Chapaer, along old Chapare road 7 km S of Incachasa, 3400 m, 8–13.11.1989 S. R. Gradstein 7405, det. J. Váňa (U); Dept. Cochabamba, Prov. Ayopaya, Cordillera de Tunari on lower slopes of Cerro Khena Khena around N and W side of Laguna Cuyuntani, 22 km NW of Quillacollo, 4500 m, 9–10.10.1983 M. Lewis 83-4420A, det. J. Váňa (F); Dept. Cochabamba, Prov. Carrasco, Zona La Siberia along Cochabamba – Santa Cruz Highway ca 2 km NW of Cerro Bravo and 27 km NW of Comarapa, 2960–3010 m, 29.11.1983 M. Lewis 83-5117, det. J. Váňa (F).

Distr.: Bolivia, Peru, Ecuador, Colombia, Venezuela, Costa Rica, Mexico; South Africa.

Notes: This is a very critical and problematic taxon. It usually, but not always, has a typical "marsupelloid" habit and always has a typical "gymnomitrioid" gynaeceum, with no trace of a perigynium and with lanceolate lobes representing the inner female bracts. It is also "gymnomitrioid" in the colour of plants and the decolorate lobes. Schuster (2002) placed this species under *Gymnomitrion* on the basis of gynaeceum structure (cf. Schuster 1966, p. 277–278: "...", or Schuster 2002, p. 567: "*Sphenolobus laceratus* Steph. = *Gymnomitrion andinum* Schust. of Colombia, dealt with in Schuster (1966) ... has innermost♀ bracts reduced and "resolved into lanceolate filaments" and "deeply multifid", as shown in Schuster (1974) for *G. laceratum.*") and also under *Marsupella* on the basis of habit (cf. *M. subhyalina* R. M. Schust. in Schuster 1996, 2002). Herzog (1934) did the same for *Gymnomitrion andinum* and *Marsupella trollii* in Bolivia. African populations were accepted as undoubted *Marsupella* because of the habit characters (*M. capensis* S. W. Arnell).

In the author's present opinion this very variable species may belong to *Marsupella* subg. *Homocraspis* (Lindb. ex Schiffn.) Grolle sect. *Homocraspis* rather than to *Gymnomitrion* (as accepted by Schuster 1966 or Váňa 1999 on the basis of gynaeceum structure, decolorate lobes and greyish plants). Molecular studies will clarify if this opinion is correct or not. Typical "gymnomitrioid" plants with densely arranged leaves, of a greyish to silvery colour without any trace of purple, and decolorate parts of the leaf, occur mostly in Bolivia, where the species is relatively common. Typical "marsupelloid" plants were described f.e. as *Anastrophyllum bolivianum, Marsupella capensis* etc.

New for Mexico, Venezuela and Peru. For Costa Rica reported under

the name *Marsupella trollii* (Morales 1991), but the specimens were not checked.

Marsupella miniata (Lindenb. et Gottsche) Grolle, J. Jap. Bot. 47: 144, 1966

Basionym: *Gymnomitrion miniatum* Lindenb. et Gott. in Gottsche, Lindenb. et Nees, Syn. Hepat., p. 617, 1846

Typus: Mexico, Mt. Orizaba, 10000 ft, 09.1841 F. Liebmann, Pl. mex. 10.026 (Pl. mex. Liebm. 358a) (C – lectotype!, G-14834 – isolectotype!, S – isolectotype!, W-Lindenb. Hep. 71 – isolectotype!)

= *Marsupella lorentziana* Steph., Spec. Hepat. 2: 19, 1901

Typus: Argentina, E. G. Lorentz (ex Herb. C. Müller Hal.) (G-10884 – holotype!, FH – isotype!, NY – herb. Mitten – isotype!)

= ? *Marsupella andicola* R. M. Schust., Austral Hepaticae 2: 555, 2002 (nomen nudum)

Typus: Venezuela, Sierra de Santo Domingo, Páramo de Mucubají, above Laguna Grande, 3600 m, R. M. Schuster 76-817a (herb. Schuster – holotype non vidi)

Fig.: Grolle 1966b, fig. 1, p. 15; Schuster 2002, fig. 420A, p. 556.

Specimens examined: Mexico, Estado de Mexico, Road to Nevado de Toluca, 4000 m, 15.06.1973 A. J. & E. B. Sharp, E. C. Clebsch & K. R. Thornburgh 1504b, 1509, det. J. Váňa (TENN); Estado de Mexico, Gap at Nevado de Toluca trough which fot trail passes, 4350 m, 15.06.1973 A. J. & E. B. Sharp, E. C. Clebsch & K. R. Thornburgh 1533, 1541, 1542b, 1545a, 1548c, det. J. Váňa (TENN); Estado de Mexico, Mpio. Toluca, NW slopes of Nevado de Toluca volcano, 3650 m, 11.08.1995 J. Váňa (PRC); Estade de Mexico, Mt. Popocatepetl, 4000 m, 1.04.1973 G. Schwab SN 26, SN 29, SN 31, det. J. Váňa (JE); same locality, 27.08.1973 A. M. Cleef & C. Delgadillo M. 10243, det. J. Váňa prius as *M. emarginata*, cf. Gradstein et Váňa 1987 (F, U); Puebla, Ixtaccihuatl above Huejotzingo, 13800 ft, 21.10.1945 A. J. Sharp 4288, det. J. Váňa (TENN); Veracruz, road from Perote to Cofre, 3900 m, 30.09.1979 A. J. Sharp, G. Juárez, M. Baez & B. Boom 7177c, det. J. Váňa (TENN). **Costa Rica**, Prov. Cartago, Parque Nacional Chirripó, NE Chirripó, 3775 m, 28.03. 1983 A. Chaverri, A. M. Cleef & R. Madrigal 1153, det. J. Váňa (U); Prov. Cartago, Volcán Irazú, 3300 m, 16.08.1993 C. Aedo, det. J. Váňa (Herb. Munoz 5124); Prov. de San José, Cordillera de Talamanca, Cerro de la Muerte, 3450 m, 26.12.1999 A. Schäfer-Verwimp & I. Holz SV/IH-0144, det. J. Váňa (Herb. Schäfer-Verwimp); Prov. de Limón, Parque Nacional Chirripó, Valle Crestones, 3430 m, 03.1983 A. Chaverri, A. M. Cleef & R. Madrigal 1036, 1045, det. J. Váňa (U, USJ); **Venezuela**, Estado Merida, Sierra de Santo Domingo, Páramo de Mucuchies, near Laguna

Negra, 3500 m, 1969 F. Oberwinkler & J. Poelt HV 69-121 p.p., det. J. Váňa (JE); Estado Merida, Sierra Nevada de Merida, Pico Espejo, 3500–3700 m, 1969 F. Oberwinkler & J. Poelt HV 69-140, det. J. Váňa (JE); Estado Merida, Páramo de Pinanango, part of Gran páramo de Mucuchíes, 4300 m, 17.06.1984 D. Grifin III & D. Diaz M PV-22, det. J. Váňa (FLAS); Estado Merida, between Valera – Aguila pass, 3900 m, 15.01.1990 A. Schäfer-Verwimp & I. Verwimp 12144 p.p., det. J. Váňa (Herb. Schäfer-Verwimp); Estado Merida, Pico d'Aguila, 3800–3900 m, 15.01.1990 R. Lübenau-Nestle V 119, det. J. Váňa (Herb. Lübenau-Nestle). **Colombia**, S side of Sierra Nevada de Santa Marta, Mamacanaca valley, 31.01.1967 S. Winkler, det. J. Váňa (U); Prov. de Magdalena, Sierra Nevada de Santa Marta, transecto del Rio Buritaca, Filo La Cumbre, 3500–3900 m, 15–19.08.1977 O. Rangel & A. M. Cleef 890, 1021, 1045, 1057 p.p., det. J. Váňa (U); Arauca, Sierra Nevada del Cocuy, Cabeceras de la Quebrada El Playón, Patio Bolos, Hoya S. Luís, 4350 m, 9.03.1973 A. M. Cleef 9002a, det. J. Váňa (U); Cundinamarca: Sabana de Bogotá, 2700 m, 05.1951 R.E.Schultes 12253, det. J. Váňa (FLAS); Cundinamarca, Páramo de Palacio, Lagunas de Buitrago, 3665 m, 29.09.1972 A. M. Cleef 6685b, det. J. Váňa (U); Cundinamarca, Guasca, 3150 m, 7.08.1980 S. R. Gradstein & J. Aguirre C. 3673, det. J. Váňa prius as *M. emarginata*, cf. Gradstein et Váňa 1987 (U); Cundinamarca, Páramo de Chirgaza, along trail to St. Juanito, 3400 m, 23.09.1982 S. R. Gradstein & E. Santana 4239, 4258, det. J. Váňa (U). **Ecuador**, Prov. Cotopaxi, SW of Paque Nacional Cotopaxi, 3600 m, 17.12.1983 W. R. Buck 10107, det. J. Váňa (NY).

Distr.: Mexico, Costa Rica, Venezuela, Colombia, Ecuador, Argentina.

Notes: Another "difficult" species, omitted in all Gymnomitriaceae treatments of Schuster. Based on the gyneaceum structure (correctly described previously by Stephani 1901), this species belongs to *Marsupella* subg. *Homocraspis* (Lindb. ex Schiffn.) Grolle sect. *Homocraspis*. Because the type specimen is very atypical (consisting of very small, reduced plants), the species has been known until now only on the basis of the type and normal plants were placed in herbaria under different names. Typically developed plants are 1–3 cm high, fuscous to reddish in colour, with a stoloniform system of axes and abruptly larger-leaved shoots distally. This form is more common in the páramos region. Probably *M. andicola* R. M. Schust. also belongs here and represents the "typical phase" of this species; at the time of writing, the description (cited as Schuster 2002 without specification) was not available, like the type specimen.

New for Costa Rica, Venezuela, Colombia, Ecuador, and northern Argentina.

Marsupella moralesae (Váňa) Váňa, comb. nova

Basionym: *Gymnomitrion moralesae* Váňa, J. Hattori Bot. Lab. 48: 230, fig. 4, 1980

Typus: Costa Rica, Alajuela, Parque Nacional Volcán Poás, 2400–2700 m, 30–31.07.1977 D. Griffin III et A. Araya P. 88 (FLAS – holotype!, PRC – isotype!)

Fig.: Váňa 1980, fig. 4, p. 231 and fig. 5, p. 232.

Distr.: Costa Rica.

Notes: Known only from the type specimen. Based on the gynaeceum structure, the species belongs to *Marsupella* subg. *Homocraspis* (Lindb. ex Schiffn.) Grolle sect. *Homocraspis*. This species has the habit of a dense-leaved *Marsupella emarginata* or a *Gymnomitrion* species. It is somewhat similar to *M. emarginata* in the form of the leaves, but the gynaeceum structure is completely different (perianth and perigynium absent etc.).

Marsupella paroica R. M. Schust., Bryologist 60: 145, 1957

Typus: U.S.A., North Carolina, Swain Co., Soco Falls, NE of Cherokee, 1.06.1952 R. M. Schuster 24203 (Herb. Schuster – holotype non vidi, H – isotype!)

Fig.: Schuster 1974, fig. 303: 10–11, p. 14, 317, p. 88, 318, p. 92.

Specimens examined (Latin America only): **Mexico**, Oaxaca, along road north of Llano de las Flores, N of Oaxaca, 2000–2500 m, 25.12.1965 A. J. Sharp & Z. Iwatsuki 5394, det. J. Váňa prius as *M. emarginata*, cf. Gradstein et Váňa 1987 (TENN).

Distr.: Mexico, U.S.A.

New for Mexico and the whole Latin America; until now regarded as endemic of eastern North America.

Marsupella truncato-apiculata (Herzog) Váňa, comb. nova

Basionym: *Gymnomitrion truncato-apiculatum* Herzog, Hedwigia 74: 81, fig. 2 a–b, 1934

Typus: Colombia, Paramo El Boquerón bei Bogota, 3500 m, 1929 K. Troll 2169 (JE – holotype!)

= *Marsupella involuta* Váňa, J. Hattori Bot. Lab. 41: 414, fig. 3, 1976

Typus: Colombia, Arauca, Sierra Nevada del Cocuy, Cabeceras de la Quebrada El Playon, Patio Bolos, Hoya S. José, ca 1 km SW from Alto de Patio Bolos, 4250 m, 7.03.1973 A. M. Cleef 8906a (PRC – holotype!, U – isotype!)

Fig.: Herzog 1934, fig. 2 a–b, p. 81; Váňa 1976, fig. 3, p. 415; Schuster 1966, fig. 11: 1–7, p. 67, the same fig. in Schuster 2002, fig. 419: 1–7, p. 552.

Specimens examined: Mexico, Estado de Mexico, Municipio Toluca, NW slopes of Nevado de Toluca volcan, 3650 m, 11.08.1995 J. Váňa (PRC). **Costa Rica**, Prov. de San José, Cerro de la Muerte, 3350–3450 m, 26.12.1999 A. Schäfer-Verwimp & I. Holz SV/H 0136, 0189, det. J. Váňa (PRC, Herb. Schäfer-Verwimp); Prov. de San José, Páramo Buena Vista, interamerican highway 90 km S of Cartago, 3200–3270 m, 3–5.09.1973 D. Griffin III & D. Eakin 590, det. J. Váňa (FLAS). **Venezuela**, Estado Merida, Sierra de Santo Domingo, Páramo de Mucubají, near Laguna Grande, 3600 m, 28.07.1984 D. & N. Griffin III PV-691, det. J. Váňa (FLAS); Estado Merida, between Valera – Aguila pass, 3900 m, 15.01.1990 A. Schäfer-Verwimp & I. Verwimp 12144 p.p., det. J. Váňa (Herb. Schäfer-Verwimp); Estado Merida, Pico del Espejo, 4675 m, 19.01.1990 R. Lübenau-Nestle, det. J. Váňa (Herb. Lübenau-Nestle). **Colombia**, S side of Sierra Nevada de Santa Marta, Mamacanaca, 4300 m, 29.01.1967 S. Winkler C 262 (U); Prov. de Magdalena, Sierra Nevada de Santa Marta, transecto del Rio Buritaca, Filo La Cumbre, 3500–3900 m, 15–19.08.1977 O. Rangel & A. M. Cleef 1057 p.p., det. J. Váňa (U); Boyacá, Páramo de Pisva, carretera Socha-La Punta, Alto de Granados, 3615 m, 12.06.1972 A. M. Cleef 4451a, det. J. Váňa (U); Boyacá, Páramos NW of Belén, cabeceras Quebrada Minas, Hoya Cll. Larga, 3835 m, 2.03.1973 A. M. Cleef 2128a, det. J. Váňa (U); Boyacá, Sierra Nevada del Cocuy, Boquerón de Cusirí, 4320 m, 5.03.1975 A. M. Cleef 8790, det. S. R. Gradstein (U); Boyacá, Páramo de Chisacá, along road Usmé – Nazareth, along Rio Santa Rosa, 3400 m, 4.09.1984 J. Aguirre C., S. R. Gradstein, B. O. van Zanten & E. Linares 4682a, det. J. Váňa (U); Cundinamarca, Páramo de Chirgaza, along trail to St. Juanito, 3400 m, 23.09.1982 S. R. Gradstein & E. Santana 4260, det. S. R. Gradstein (U); Meta, Páramo de Sumapaz, Cerro Nevado del Sumapaz, W. Rastrojo, 4015 m, 13.01.1973 A. M. Cleef 7758a, det. J. Váňa (U). **Ecuador**, Prov. Chimborazo, volcán Chimborazo, 4200 m, 4.07.1999 Z. Soldán, det. J. Váňa (PRC). **Bolivia**, Dept. Cochabamba, Prov. Arani, Cordillera de Tiraque, around shores of Laguna Cajitilla Khoda, 13 km S of Ne of Tiraque, 3950 m, 23.06.1985 M. Lewis 85-010, det. J. Váňa (F).

Distr.: Mexico, Costa Rica, Venezuela, Colombia, Ecuador, Bolivia.

Notes: The description of *Marsupella involuta* Váňa (accepted in Schuster 1996 and 2002 as a member of the genus Marsupella) was based on the commonly used "habit" concept of the genus. It was described on the basis of plants from wet habitats, in contrast to the type plants of *Gymnomitrion truncato-apiculatum* growing probably in dry and very exposed habitats. The species certainly has no perianth or perigynium (although Schuster 1996, 2002 doubts this) and should be placed, according to gynaeceum structure, in *Marsupella* subg. *Homocraspis* (Lindb. ex Schiffn.) Grolle

sect. *Homocraspis* (in the Schuster's concept subg. *Amphimarsupella* R. M. Schust.), with *M. lacerata* (= ? *M. subhyalina*) and *M. miniata* (= ? *M. andicola*).

New for Mexico, Venezuela and Ecuador. For Bolivia reported by Váňa (1999) without citing of localities.

Marsupella sprucei (Limpr.) H. Bernet, Catal Hép. Sud-Ouest Suisse, p. 33, 1888

For the synonymy and figs. see manuals of European or North American hepatics; also Schuster 2002, fig. 415, p. 541.

Specimens examined (Latin America only): **South Georgia**, W side of Olsen valley, opposite Ruby Peak, Stromnes Bay, 100 ft, 17.03.1961 S. Greene 2975d, det. G. Hässel de Menéndez (AAS). **Chile**, Prov. Llanquihe, Dept. Osorno, Antillanaca, 1160 m, 1965/6 B. Ruthsatz 52/7, det. J. Váňa (GOET).

Distr.: South Georgia, Argentina (Schuster 1968), Chile; New Zealand; widely distributed in the holarctic region.

Reported for Chile in Váňa (1999); the exact locality is cited here.

Nanomarsupella xenophylla (R. M. Schust.) R. M. Schust., J. Hattori Bot. Lab. 80: 132, 1966

Basionym: ***Marsupella xenophylla*** R. M. Schust., Phytologia 39: 248, 1978.

Typus: Venezuela, Estado Merida, Sierra Nevada de Mérida, 4160 m, R. M. Schuster & L. Ruiz-Terán 76-1449 (Herb. Schuster – holotype non vidi, PRC – isotype!)

Fig.: Schuster 1996, fig. 24, p. 131; the same fig. in Schuster 2002, fig. 429, p. 579.

Specimens examined: Venezuela, Estado Merida, Páramo de Pinango (part of gran páramo de Mucuchíes), 4100 m, 18.07.1984 D. Griffin III & M. Lopéz F. PV-485 p.p., det. J. Váňa (FLAS). **Ecuador**, Prov. Napo, NE side of volcán Antisana, 4300 m, 17.08.1997 P. Slenař, det. J. Váňa (PRC); Prov. Chimborazo, volcán Chimborazo, 4200 m, 4.07.1999 Z. Soldán, det. J. Váňa (PRC).

New for Ecuador; until now known only from the type specimen.

Acknowledgements

Thanks are due to drs. R. Grolle, I. Holz, R. Lübenau-Nestle, J. Munoz, A. Schäfer-Verwimp, R. M. Schuster, P. Sklenař, Z. Soldán and the curators of herbaria AAS, ALTA, BOL, C, F, FH, FI, FLAS, G, GOET, H, JE, L,

MER, NY, S, TENN, TNS, U, UPS, USJ, W for the loan of many specimens. Special thanks to N. Hodgetts for the linguistic correction of the text and many valuable suggestions. This study was partially sponsored by the grant agency of the Charles University (project no. 272/1999/B).

References

ARNELL, S. (1956): Hepaticae collected by O. Hedberg et al. on the East African mountains. Ark. Bot., ser. 2, 3/16: 517–562.

ARNELL, S. (1957): Notes on South African Hepaticae V. Bot. Notiser 110: 399–405.

ARNELL, S. (1963): Hepaticae of South Africa. 411 p., P. A. Norstedt & Söner, Stockholm.

GRADSTEIN, S. R. & VÁŇA, J. (1987): On the occurrence of Laurasian liverworts in the Tropics. Mem. New York Bot. Garden 45: 388–425.

GROLLE, R. (1966a): *Gymnomitrion crenulatum* und Verwandte. Trans. Brit. Bryol. Soc. 5 (1): 86–94.

GROLLE, R. (1966b): Miscellanea hepaticologica 51–60. J. Jap. Bot. 41: 141–147.

HERZOG, T. (1921): Die ryophyten meiner zweiten Reise durch Bolivia. Nachtrag. Bibl. Bot. 88: 1–31.

HERZOG, T. (1934): Die Bryophyten der Andenreisen von C. Troll (Bolivia, Columbia, Panama). Hedwigia 74: 79–114.

KITAGAWA, N. (1963): A revision of the family Marsupellaceae of Japan. J. Hattori Bot. Lab. 26: 76–118.

KNAPP, E. (1930): Untersuchungen über die Hüllorgane um Atrchegonien und Sporogonien der akogynen Jungermanniaceen. Bot. Abhandl. 16: 1–168.

LONG, D. G. ET GROLLE, R. (1990): Hepaticae of Bhutan II. J. Hattori Bot. Lab. 68: 381–440.

MORALES, M. I. (1991): Las hepaticas comunicadas para Costa Rica. Trop. Bryol. 4: 25–57.

MÜLLER, K. (1906–1916): Die Lebermoose Dautschlands, Oesterreichs u. d. Schweiz. In: Rabenhorst's Kryptogamen-Flora, 2. ed., 6 (1): 1–870, 6/2: 1–947, Leipzig.

MÜLLER, K. (1942): Beiträge zur Systematik der Lebermoose. III. Hedwigia 81: 95–126.

MÜLLER, K. (1951–1958): Die Lebermoose Europas. In: Rabenhorst's Kryptogamen-Flora, 3. ed., 6: 1–1365, Leipzig.

Schuster, R. M. (1949): Notes on Nearctic Hepaticae. I. *Dianthelia steerei* gen. et sp. n., a critical endemic of the Appalachians. The Bryologist 52: 101–120.

Schuster, R. M. (1966): Studies in Lophoziaceae. 1. The genera *Anastrophyllum* and *Sphenolobus* and their segregates. 2. *Cephalobus* gen. nov., *Acrolophozia* gen. n. and *Protomarsupella* gen. n. Rev. Bryol. Lichénol. 34: 240–287.

Schuster, R. M. (1968): Studies on Hepaticae XXIX–XLIV. A miscellany of new taxa and new range extensions. Nova Hedwigia 15: 437–531.

Schuster, R. M. (1974): The Hepaticae and Anthocerotae of North America ast of the hundredth meridian. Vol. III. 880 p., Columbia University Press, New York & London.

Schuster, R. M. (1996): Studies on Antipodal Hepaticae. XII. Gymnomitriaceae. J. Hattori Bot. Lab. 80: 1–147.

Schuster, R. M. (2002): Austral Hepaticae. Part II. Nova Hedwigia, Beih. 119: 1–606.

Stephani, F. (1901): Species Hepaticarum. Vol. 2. 215 p., Geneve.

Stephani, F. (1916): Hepaticae. In: Herzog T., Die bryophyten meiner zweiten Reise durch Bolivia. Bibl. Bot. 87: 173–270.

Váňa, J. (1976): Drei neue Gymnomitriaceen aus Südamerika. J. Hattori Bot. Lab. 41: 411–417.

Váňa, J. (1980): Some new South and Central American hepatics. J. Hattori Bot. Lab. 48: 225–234.

Váňa, J. (1985): Notes on some African Hepatic genera 6–9. Folia Geobot. Phytotax. 20: 81–99.

Váňa, J. (1999): Notes on the genus *Marsupella* s. lat. (Gymnomitriaceae, Hepaticae) 1–10. Bryobrothera 5: 221–229.