Early Land Plants Today: Taxonomy, systematics and nomenclature of Gymnomitriaceae

JIŘÍ VÁŇA1, LARS SÖDERSTRÖM2, ANDERS HAGBORG3, MATT VON KONRAT3 & JOHN J. ENGEL3

1Charles University, Department of Botany, Czech Republic; email: vana@natur.cuni.cz
2Department of Biology, Norwegian University of Science and Technology, Trondheim, Norway; lars.soderstrom@bio.ntnu.no
3Department of Botany, The Field Museum, 1400 South Lake Shore Drive, Chicago, IL 60605–2496; mvonkonrat@fieldmuseum.org, hagborg@pobox.com
Abstract

There remains a critical need to synthesize the vast amount of nomenclatural, taxonomical and global distributional data for liverworts. This is fundamental in taxonomists’ efforts towards developing a working list of all known plant species under the auspices of the Convention on Biological Diversity (CBD) as well as having far reaching implications and applications, including providing a valuable tool for taxonomists and systematists. We here provide the first synthesis of the taxonomy, systematics, and nomenclature of the family Gymnomitriaceae. The family is here conservatively treated to include ten genera representing 73 accepted species. We propose 149 new synonyms, 102 of them for validly published names. Significantly, we briefly discuss recent developments based on molecular studies and we predict future investigations will dramatically redefine the family. Detailed taxonomy and nomenclature is treated for almost 800 names associated with the family. Noteworthy remarks on various aspects of the distribution, ecology, conservation, and biology of members of the family are also included.

Key words: synonymies, check-list, Acrolophozia, Apomarsupella, Gymnomitrion, Herzogobryum, Marsupella, Nanomarsupella, Nothogymnomitrion, Paramomitrion, Poeltia, Prasanthus

Introduction

Recently there has been a major international effort to synthesize the vast amount of nomenclatural, taxonomical and global distributional data for Marchantiophyta (Söderström et al. 2008, von Konrat et al. 2008, 2009). An introduction to the project, including overall project objectives, detailed description of standards used and applied, and discussion on the critical need for synthesizing data is outlined in Söderström et al. (2008) and von Konrat et al. (2010). We here provide the first synthesis of the taxonomy, systematics, and nomenclature of the family Gymnomitriaceae H.Klinggr. This has been a collaborative effort between Jiři Váňa, who is a leading authority with many publications on the family (e.g., Váňa 1976b, c, 1999, 2003, Váňa...
& Piippo 1989), and coordinators of the Early Land Plants Today project. The family is here circumscribed to include ten genera. This includes: four monotypic genera of *Poeltia* Grolle, *Nothogymnomitrion* R.M.Schust., *Nanomarsupella* (R.M.Schust.) R.M.Schust., and *Paramomitrion* R.M.Schust.; *Prasanthus* Lindb. with 2 species (Fig. 1); *Acrolophozia* R.M.Schust. with 3 species; *Apomarsupella* R.M.Schust. and *Herzogobryum* Grolle each with 5 species; and the two larger and more widespread genera, *Gymnomitrion* Corda (Fig. 2) and *Marsupella* Dumort. (Fig. 3), each with 27 species.

A brief synopsis of the historical and contemporary taxonomy and systematics of the family is provided. This is followed by brief, but noteworthy remarks on various aspects of the distribution, ecology, conservation, and biology of members of the family. The central part of the paper is in the detailed taxonomy and nomenclature of the close to 800 names associated with Gymnomitriaceae. It includes accepted names, synonyms, authorities, original citations, type data, references to relevant parts of the latest International Code for Botanical Nomenclature (McNeill et al. 2006), a 3-level coding system to indicate the level of knowledge about a taxon, as well as auxiliary data and annotations. There has been no prior publication that attempts to unify this vast amount of taxonomic and nomenclatural data in such detail for the family.
Taxonomic history

Historically Gymnomitriaceae included only two widespread genera, Gymnomitrion and Marsupella. However, for many decades in the 20th century the name Marsupellaceae had almost been equally applied to the same genera since Buch (1936) first proposed the family (Schuster 1974). The family was expanded to include Prasanthus with only one species at the time (Kitagawa 1963b) and later to include a second species, P. jamalicus, described more than 100 years later (Potemkin 1992c). It is evident that there is a very complex and contentious interrelationship between Gymnomitrion and Marsupella, which has been treated and discussed extensively in works by Müller (1942, 1956), Knapp (1930), Kitagawa (1963b), Schuster (1974, 1996b, 2002b), and Váňa (2003). Over the past several decades the family has been expanded to include several additional genera, i.e., Herzogobryum (Grolle 1966j), Acrolophozia (Schuster 1966c), Poeltia (Grolle 1966j), Lophonardia (Schuster 1978), Apomarsupella (Schuster 1996b), and Nothogymnomitrion (Schuster 1996b). Eremonotus Lindb. et Kaal. ex Pearson (Schuster 1969b as Anomomarsupella) and Paramomitrion have also been placed in Gymnomitriaceae (Schuster 1984, 1996b). Schuster (1984) assigned both Eremonotus and Paramonitrion to their own subfamily Eremonotoideae R.M. Schust., which was invalidly described at the time, but later validated in Schuster (1996b). Similarly, Schuster (1996a) placed the monotypic Lophonardia into its own subfamily, Lophonardiaceae. In that same paper Schuster also promoted the monotypic subgenus Marsupella subg. Nanomarsupella to genus level.

Stephaniella J.B. Jack (1894: 11) and Stephaniellidium S.Winkler ex Grolle (1983: 38) were also included, albeit tentatively, in Gymnomitriaceae (e.g., Schuster 1969a, 1974). The definite placement of both genera to Gymnomitriaceae was proposed by Schuster (1984). However, Schuster (2002b) later removed these two genera from Gymnomitriaceae and placed them in the Stephaniellaceae (Schuster 1984: 67) Schuster (2002: 584). It is apparent that the recognition of Poeltia in the family also is problematic. Schuster (1996b) reduced the genus to a subgenus of Marsupella, but Váňa (1999) demonstrated that it is quite distinct from Marsupella and may not even belong to the Gymnomitriaceae based on the study of additional specimens with mature sporophytes. Nevertheless until further evidence comes to hand Poeltia is retained here in Gymnomitriaceae. The only species in the genus Lophonardia has since been recognized as a synonym of Lophozia laxifolia (Montagne 1845: 346) Grolle (1964: 173; Gradstein et al. 2001, Engel & Gradstein 2003)—a concept we follow here. Yet, Crandall-Stotler et al. (2009) recently retained the genus in Gymnomitriaceae.

Váňa (2003) provided an excellent discourse outlining the inherent difficulty of circumscription and delimitation of the genera and subgenera in the complex Gymnomitrion – Marsupella – Apomarsupella. In that paper, Váňa provided a detailed analysis and critique of the historical morphological concepts used to distinguish Gymnomitrion and Marsupella. In brief, up until the end of the first half of the 20th century, the structure of the female inflorescense was used as a “crucial criterion separating Gymnomitrion and Marsupella” (Schuster 2002b: 565). However Müller (1956) separated both genera giving preference to “gymnomitrionid” or “marsupelloid” characters of the habit. Váňa (2003) also identified several problems that contributed to a lack of knowledge in this complex, including a) inadequate knowledge of the distribution of nearly all taxa, b) lack of fertile material in some taxa, c) omission of several important and taxonomically problematical taxa in previous studies, e.g., Schuster (1996b, 2002b), and d) lack of modern biosystematic and molecular studies.

The infrageneric classification of both Gymnomitrion and Marsupella remains to be fully clarified, yet the works of Kitagawa (1963b), Schuster (1974, 1996b) and Váňa (1999) provide the foundation of the current infrageneric classification for both genera. Arnell (1956) described Gymnomitrion subg. Nardiocalyx. Váňa (2003) highlighted this subgenus as one of several problems that complicate the morphological boundaries used to delimit both Gymnomitrion and Marsupella, and Schuster (2002b) also stated that this species “does not fit well into Gymnomitrion”. Kitagawa (1963b) described the subgenera, subg. Archigymnomitrion and

1. Authorities for taxa treated in this paper can be found in the taxonomic section.

The infrageneric classification of *Marsupella* has had many modifications over the decades. This has in part been due to the establishment of purportedly allied genera, and the contractions and expansions of generic, subgeneric and even sectional concepts. The most recent and extensive treatise discussing generic and subgeneric boundaries of Gymnomitriaceae was by Schuster (2002b) who remained uncommitted and proposed two alternative and competing classification schemes. On the one hand *Apomarsupella*, *Nanomarsupella* and *Poeltia* were retained as three autonomous genera, but in a competing scheme they were recognized as three subgenera within *Marsupella*. Kitagawa (1963b) described two subgenera, subg. *Neomarsupella* and subg. *Stolonicaulon* and later Schuster (1996b, 2002b) described subg. *Nanocaulon*, *Micromarsupella*, and *Amphimarsupella*. Schuster (1974) also described *Marsupella* subg. *Marsupella* sect. *Boeckiae* and sect. *Funciae*. Váňa (1999) recommended a significant rearrangement in the infrageneric classification of *Marsupella*, reducing *Stolonicaulon* to a section within subg. *Marsupella*, *Neomarsupella* and *Micromarsupella* to sections within subg. *Homocraspis*, and reduced subg. *Nanocaulon* to a synonym of *Marsupella* sect. *Boeckiae*.

**Contemporary Taxonomy and Systematics**

**Overview:**— The increased application of molecular data over recent years to create phylogenetic reconstructions has generated novel insights into the evolutionary history of liverworts and subsequent classification (Crandall-Stotler et al. 2009). Unfortunately, to date only a few such studies have incorporated exemplars of Gymnomitriaceae s.l. into their analyses. Yet molecular data may provide us with the very tools we need in order to unravel both inter-generic and infra-generic relationships within the group. Although Schuster (1996b, p.3) stated that a consensus “has begun to appear” as to the limits of Gymnomitriaceae, later, Schuster (2002b) declared that inclusion of the genera *Stephaniella*, *Eremonotus*, *Paramomitrion*, and *Lophonardia* made the perimeters of the family almost indefinable. Indeed, evidence from recent molecular studies is supporting that supposition. De Roo et al. (2007) provided evidence based on DNA sequences of the chloroplast *rps4* gene and the *trnG* intron showing that *Stephaniella* was nested within a strongly supported Arnelliaceae. Crandall-Stotler et al. (2009) in the latest classification of Marchantiophyta subsequently placed *Stephaniella* and *Stephanieiliidium* in Arnelliaceae. Similarly, Hentschel et al. (2007) proposed to include the monospecific holarctic *Eremonotus* in the Jungermanniaceae based on the phylogenetic reconstructions of cpDNA variation. Hentschel et al. (2007) appropriately noted that the genus represented an excellent example of the problematic interpretations of morphological similarities in taxa with a minute size. Interestingly, although Crandall-Stotler et al. (2009) placed *Eremonotus* in the Jungermanniaceae, they did not include *Paramomitrion*, which is presumably closely allied (Schuster 2002b).

Other investigations that have included exemplars of Gymnomitriaceae include Davis (2004), Yatsentyuk et al. (2004), Forrest et al. (2006), and He-Nygrén (2007). Most of these studies resolve Gymnomitriaceae typically as a monophyletic group, but in most studies only *Marsupella* and *Gymnomitrion* have been sampled (Crandall-Stotler et al. 2009). Davis (2004) and Forrest et al. (2006) also analyzed *Herzogobryum teres* which they indicated was aligned with the Cephaloziellaceae–Scapaniaceae lineage. Unpublished molecular data (J. Shaw et al., pers. comm.) indicates that *Herzogobryum* may be polyphyletic and not part of Gymnomitriaceae in the traditional sense. However, we follow the Crandall-Stotler et al. (2009) classification here and maintain *Herzogobryum* as an element of the Gymnomitriaceae until the type species *Herzogobryum vermiculare* has been included in future studies.

The study by Vilnet et al. (2007) remains the only investigation to date that includes significant exemplars of Gymnomitriaceae with eleven species of *Marsupella*, four species of *Gymnomitrion* as well as *Prasanthus*.
suecicus. Their phylogenetic reconstruction inferred from ITS1-2 nrDNA and trnL-F cpDNA possibly has important implications. This underscores the critical need for a complete revision of Gymnomitriaceae with exemplars representing as many species as possible in order to unravel generic and infrageneric relationships. Vilnet et al. (2007) stated their study supported previous investigations indicating that Gymnomitriaceae is a monophyletic group. However only three of the ten genera traditionally assigned to the family were included in their investigation.

Significantly, the authors include the type species of all three genera in their analyses, which despite the plethora of molecular studies is not always done, yet critical before translating a phylogeny into a classification scheme. As the only detailed molecular study to date it warrants further discussion here. Based on their analyses of 17 taxa, Vilnet et al. (2007) indicate that Gymnomitrion and Marsupella are polyphyletic. Specifically they suggest that species of Gymnomitrion subg. Nardiocalyx (with G. apiculatum) belong to Marsupella while species of Marsupella subg. Homocraspis (Marsupella alpina, M. brevissima and M. commutata included in the study) are members of Gymnomitrion, which they state is also supported by morphological studies by Müller (1909c), and confirm that perianth and perigynium development or reduction is an important character for classification within Gymnomitriaceae. Finally, Vilnet et al. (2007) present evidence that Marsupella aquatica, supported by a high bootstrap value should indeed be considered a distinct species, which is adhered to in our current treatise of the family.

Critical need for re-evaluation of the family—. In the following treatment we retain a conservative circumscription of the family to include the ten genera Poeltia, Nothogymnomitrion, Nanomarsupella, Paramomitrion, Prasanthus, Acrolophozia, Apomarsupella, Herzogobryum, Gymnomitrion and Marsupella. However, all indications strongly suggest that the family will be dramatically redefined with future investigations. Indeed, after such studies, the family may only be represented by possibly four genera. For instance, published and unpublished molecular data (J. Shaw, pers. comm.) already provide strong evidence that Nanomarsupella and Herzogobryum are untenable in Gymnomitriaceae. And the retaining of Paramomitrion in Gymnomitriaceae remains in doubt, considering it is apparently closely allied to Eremonotus, which has been discussed above to be placed in the Jungermanniaceae. Finer resolution and refinement of the family will only be achieved with multi gene analyses as well as a full reappraisal of the morphology. The inclusion of the type species of each genus as well as critical exemplars will also be fundamental in order to unravel the family boundaries.

Monographs and Revisions

The treatment of Gymnomitriaceae by Schuster (1974) for North America and the broader treatments by Schuster (1996b, 2002b) that included southern hemisphere and “critical” taxa worldwide remain the most influential studies in the detail of the descriptions, illustrations, morphological assessment and keys. Other significant regional studies on Gymnomitriaceae that have broad implications include: Kitagawa (1963b) for East Asia; Müller (1956) for Europe; Váňa (1976c) for New Guinea; Váňa (1976b) for several Andean species; Váňa and Pippo (1989) for the Huon Peninsula, Papua New Guinea; Váňa (1993) for Zaire and Rwanda; Váňa (2003) for Latin America; Váňa and Watling (2004) for Uganda; Blockeel et al. (2005) for Hunan Province, China; and Engel and Glenny (2008) for New Zealand. The treatment by Váňa (2003) for Latin America was particularly extensive and included keys to 14 species, three new combinations, two new records, and many additional data relating to distribution and synonymy as well as a noteworthy analysis of the generic boundaries of Gymnomitrion and Marsupella. Váňa (1999) summarized the present state of knowledge at that time for the Jungermanniaceae stating that there remained no worldwide monograph for Gymnomitrion and Marsupella. Despite the extensive treatments by Schuster this remains true for the group today. Grolle’s (1966j) and Schuster’s (1996b) treatments of Herzogobryum remain the only studies of that scale to date for the genus.
Morphology

For descriptions of the family and at least selected genera see Schuster (1974, 1996b, 2002b), Váňa (1993), Váňa and Piippo (1989), Váňa and Watling (2004), Engel and Glenny (2008), and Crandall-Stotler et al. (2009). The following provides a very brief synthesis from the aforementioned papers of the morphology: Plants often form dense mats or cushions and are rarely intermixed between other bryophytes. Shoots typically small, e.g., reaching 5-80 mm high and only 0.1–3.5 mm wide, usually erect or ascending, and rarely prostrate. Leaves transverse to weakly succulent, interlocking dorsally, with insertions extending across the stem midline, 2-lobed (rarely undivided), with the apices and margins often hyaline; leaf surface either smooth or papillose. Oil-bodies mostly 2–3 per cell, spherical to ovoid, colorless, granular to papillose. Underleaves absent or vestigial and very small; rhizoids scattered; branches lateral, of the Plagiochila-type, rarely Frullania-type. Plants mostly dioicous or paroicous. Androecia and gynoecia on leading axes; androecia scarcely differentiated from vegetative regions. Sporophytes uncommon; enclosed by either a true or a shoot calyptra and a perianth or stem perigynium–perianth complex (or incipient hollow marsupium in Prasanthus). Perianths short, nonemergent, or lacking (replaced by large bracts in Gymnomitrion). Capsules spheroidal, with the wall 2-stratose, with the inner wall cells quadrate, with nodular thickenings; elaters 2–(rarely 3–4)-spiral. Asexual reproduction absent.

Chemistry and cytology

It is well established that the chemical constituents of liverworts show important biological activities, and that the major substances, particularly the sesqui- and diterpenes, are valuable chemical markers in chemosystematic studies (e.g., Asakawa 1990, 1995, 2007, Mues 2000). Interestingly, Gymnomitrine, a sesquiterpene ketone, was only known as a synthetic product but was found in nature for the first time in Gymnomitrion obtusum (Warmers & König 1999). Asakawa (2004) provided a brief synopsis of more than a dozen chemical studies of Gymnomitriaceae stating that many interesting chemical compounds have been isolated from members of the group and identified the application of chemical markers to chemosystematics, e.g., the identification least two chemotypes of M. aquatica in Europe. As early as 1972, Connolly et al. (1972) discovered Gymnomitrol, a novel tricyclic sesquiterpenoid isolated from Gymnomitrion obtusum, and recently Scher et al. (2004) showed that the compound has moderate antifungal activity. In particular, the chemical composition of the liverwort M. emarginata has been studied by several groups with a number of interesting compounds being reported (Adio & König 2007). Asakawa (2007) reported that the crude ether extract from M. emarginata showed cytotoxicity against P-388 in vitro [leukemia cells]. Recently, nine new amorphane sesquiterpenoids were identified for Marsupella aquatica from Austrian specimens (Adio et al. 2007) and a new sesquiterpenoid was isolated from M. emarginata (Adio & König 2007).

The following chromosome numbers have been reported for the family: Gymnomitrion concinnatum n = 8+m (Kuta et al. 1984), Herzogobryum teres n = 8+ m (Ochyra et al. 1982), Marsupella emarginata n = 9 (8+m?; Inoue H. 1989), M. yakushimensis n = 9 (8+m; Tatuno 1938, 1941a, 1941b).

Distribution

Fig. 4 provides an overview of the distribution of the family throughout the world. The diversity of Gymnomitriaceae, with the exception of some isolated elements, is concentrated in the Northern Hemisphere. Söderström et al. (2002, 2007) provided detailed distribution for the species of the family across Europe and Macaronesia.

Marsupella, with the most species of the family, is largely confined to the Northern Hemisphere with a wide distribution in the holarctic and isolated extensions into high elevated areas of the Neotropics as well as central Africa, South Africa, and austral regions (Váňa 1985, 2003, Schuster 1996b, Engel & Glenny 2008).
Interestingly, the genus has two bipolar species, *Marsupella sprucei* and *M. sparsifolia* (Engel & Glenny 2008). The other large genus, *Gymnomitrion*, is also predominately Northern Hemisphere in distribution. Elsewhere, there are only a few taxa that occur in southern South America, Australasia, Central and South Africa. Engel and Glenny (2008) state that the first credible report of the genus in the Southern Hemisphere was by Váná in 1976 who reported *G. concinnatum* from southern South America. However, in fact, *G. laceratum* and *G. bolivianum* were actually earlier described from South Africa and the Andes respectively. *Prasanthus* with two species is restricted to the Northern Hemisphere. *Prasanthus suecicus* is distributed in Greenland, the European Alps, Scandanavia and the Arctic regions, and *P. jamalicus* Potemkin was described from the Yamal Peninsula, West Siberian Arctic (Potemkin 1992c).

**FIGURE 4.** Number of Gymnomitriaceae species in broadly defined regions of the world. The number range from 0 to 24 species

*Acrolophozia*, with three species, is subantarctic in range with *A. fuegiana* known from South Georgia, the Falkland Islands, and Tierra del Fuego. *A. sulcata* being apparently endemic to South Georgia, and *A. pectinata* known from the New Zealand botanical region (Engel & Glenny 2008). Similarly, the five species of *Herzogobryum* are all alpine and have a distribution of cool to cold south temperate-subantarctic in range, and some with a circum-subantarctic distribution (Schuster 2002b). New Zealand is considered a center of diversity with all species occurring except *Herzogobryum molle* (Engel & Glenny 2008). The monotypic *Nothogymnomitrion* has a mainly subantarctic distribution and is a common subalpine-alpine plant (Grolle 1966), Schuster 1992, Engel & Glenny 2008). Its distribution includes Tasmania (type locality), New Zealand and southern South America, including Tierra del Fuego, Tristan da Cunha, and South Georgia.

*Apomarsupella* with five species includes three species that are known from China, Eastern Asia and the Indian the Subcontinent, *A. revoluta* has a disjunct holarctic distribution, extending to Borneo and New Guinea, and *A. africana* in Africa and Latin America. Váná noted that previous reports of *A. revoluta* from Venezuela (e.g., Schuster 1974, Long & Grolle 1990, and Schuster 2002b) are erroneous. These were based on specimens collected by B. & F. Oberwinkler and J. Poelt, which are in fact *A. africana*. There are three monotypic genera all with apparently very restricted distribution. *Nanomarsupella* and *Paramomitrion* are only known from the northern Andes. Schuster (2002b) described *Nanomarsupella* as a ”strange plant” stating it could be placed as a subgenus within *Marsupella* or *Gymnomitrion*, and is only known from the type specimen. Similarly, *Paramomitrion* is only known from the type collection and Schuster (1996b) admittedly could not convincingly place it in any family although he was certain a distinct genus was at hand. The third monotypic genus, *Poeltia*, Schuster (1996b) mistakenly stated that it was only known from the type collection from the Himalayas. In fact, *Poeltia* has been reported multiple times from Nepal, including by Noguchi et al. (1966), Mizutani (1979d), Mizutani et al. (1995), and Miehe (1990), as well as from Bhutan (coll. G. & S. Miehe, det.Váná, unpublished data).

Even in the last decade, there remain many new and significant records being reported reflecting that many regions remain under-collected as well as being under-reported because of their often small size. For
example, within the last ten years Zhu et al. (1998) reported Marsupella pseudofunckii, M. yakushimensis as new to Zhejiang Province; Furuki (2000) reported Marsupella emarginata as a new record for Shikoku, Southern Japan; Furuki et al. (2001) reported Marsupella pseudofunckii as new to the Izu Islands; Lönnell et al. (2002) reported Marsupella arctica found in Padjelanta, northern Sweden, as new to the European mainland; Czernyadjeva et al (2005) reported Marsupella condensata as a new record for Kamchatka Peninsula, Russia, and Bakalin (2003) reported a further 7 species of Marsupella and Gymnomitrion; Váňa et al. (2005a) reported Marsupella emarginata (Ehrh.) Dumort. as a new record for Hunan and for mainland China; and Blockeel et al. (2005) reported Gymnomitrion alpinum as new for Yukon, Canada, which represented a major range extension for the taxon. Váňa (2003) reported significant new distributional records for Latin America. In all, Váňa (2003) disclosed ten new records for Latin America, including Gymnomitrion asperulatum for Costa Rica, which was prior to that time only known from the type specimen from Venezuela, Gymnomitrion atrofilum for Equador, which was likewise previously only known from the type specimen from Colombia, and Gymnomitrion pacificum, which was reported new for Mexico and the whole of Latin America.

Ecology

The majority of species are associated with growth in extremely exposed environments in subalpine or alpine environments from Taymyr Peninsula, the most northern part of mainland Asia, to 4200 m in the Andes. Schuster (2002b) postulated that the lack of asexual reproduction is an adaptation to such environments. Schuster (1996b) suggested that members of the Gymnomitriaceae possibly tolerate higher desiccation and higher levels of ultraviolet illumination than most other hepatics. Other taxa that grow below the tree line can grow in running water, around cascades or on rocks in streams, e.g., Marsupella sphacelata (Schuster 2002b). In a review paper of bryophyte physiological ecology Proctor (2008) noted that the glaucous-looking taxon Gymnomitrion obtusum bears conspicuous epicuticular wax as an adaptation to reconcile the potentially conflicting requirements of water conduction and storage, and free gas exchange for photosynthesis. Bates (2008), in a discussion paper on mineral nutrition and substratum ecology, identifies Gymnomitrion and Marsupella as containing many obligate epiliths, but bryophytes inhabiting rocks have received less attention than epiphytes. Interestingly, Odland & Munkefjord (2008) included Marsupella in their investigation of using plants as indicators of snow layer duration in southern Norwegian mountains. Likewise, Marsupella was used in an investigation of aquatic bryophytes as indicators of acidification and eutrophication (Stetzka & Baumann 2002). Whether bryophytes have mycorrhizas or not is still a debatable issue, but many liverworts and hornworts have fungal associations (Read et al. 2000). Wang & Qiu (2006) in a literature survey of over 600 papers of fungal associations with plants listed seven species of Gymnomitriaceae that had been examined for mycorrhizal occurrence, but only Marsupella emarginata had a fungal association.

Conservation

Söderström (2006) provided a recent overview of conservation biology of bryophytes, and specifically discussed threats to bryophytes, and provided an evaluation process to determine how threatened a species is, along with suggested actions to conserve bryophytes and bryophyte diversity. Bryophytes start to appear on Red Lists in various parts of the world. However, no Gymnomitriaceae species is currently on the World List of Threatened Bryophytes (IUCN SSC Bryophyte Specialist Group).

Although not on the global Red List, many species of Gymnomitriaceae are represented in national Red Lists. In New Zealand four taxa were reported as part of New Zealand’s threatened species list. Gymnomitrion strictum var. inaequalis was reported as Data Deficient and Herzogobryum vermiculare, H. atricapillum, and H. filiforme were all reported as Nationally Critical (Glenny & Fife 2005). Several The European Red List
Phytotaxa (ECCB 1995) list 6 species using the ‘old’ IUCN criteria (IUCN 1978), 
*Marsupella adusta* (Regionally threatened), 
*M. andreaeoides* (Rare), 
*M. arctica* (Rare), 
*M. profunda* (Vulnerable), 
*M. spiniloba* (Taxonomic problem) and 
*M. stableri* (Taxonomic problem). Gymnomitriaceae species are also on several national Red Lists in Europe (Table 1).

**TABLE 1.** Gymnomitriaceae species on Red Lists in various countries of Europe. The two main criteria used are the ‘old’ IUCN categories (IUCN 1978) where Ex=Extinct, Ev= Vanished, E=Endangered, V=Vulnerable, R=Rare, I=Indeterminate, and the ‘new’ IUCN Criteria (IUCN 1994) where EX=Extinct, RE=Regionally Extinct, CR=Critically Endangered, EN=Endangered, VU=Vulnerable and DD=Data deficient

<table>
<thead>
<tr>
<th>Country</th>
<th>Criteria</th>
<th>Taxa included</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>new</td>
<td><em>Marsupella spiniloba</em> (DD)</td>
<td>Kålås et al. 2006</td>
</tr>
<tr>
<td>Sweden</td>
<td>new</td>
<td><em>Apometzgeria pubescens</em> (DD), <em>Marsupella andreaeoides</em> (DD)</td>
<td>Gärdenfors 2005</td>
</tr>
<tr>
<td>Britain</td>
<td>new</td>
<td><em>Gymnomitrion apiculatum</em> (VU), <em>Marsupella arctica</em> (VU), <em>M. profunda</em> (VU), <em>M. sparsifolia</em> (VU)</td>
<td>Church et al. 2001</td>
</tr>
<tr>
<td>Belgium</td>
<td>own criteria</td>
<td><em>Marsupella sphacelata</em> (rare), <em>M. sprucei</em> (rare)</td>
<td>De Zuttere &amp; Schumacker 1984</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>new</td>
<td><em>Marsupella funckii</em> (VU)</td>
<td>Werner 2003</td>
</tr>
<tr>
<td>Austria</td>
<td>old</td>
<td><em>Marsupella adusta</em> (I), <em>M. alpina</em> (I), <em>M. ramosa</em> (I), <em>Prasanthus suecicus</em> (I)</td>
<td>Saukel &amp; Köckinger 1999</td>
</tr>
<tr>
<td>Hungary</td>
<td>old</td>
<td><em>Marsupella emarginata</em> (R)</td>
<td>Rajczy 1990</td>
</tr>
<tr>
<td>Portugal</td>
<td>new</td>
<td><em>Marsupella adusta</em> (EN), <em>M. profunda</em> (R), <em>M. sprucei</em> (R)</td>
<td>Sérjio et al. 2007</td>
</tr>
</tbody>
</table>

******continued******
Marsupella profunda has a special status. It occurs only in Britain, Portugal, Madeira and the Azores (Fig. 5) and is listed as a priority species on EU’s Habitat Directive (Porley et al., in press). In Britain it is fully protected and grows as a pioneer species on China Clay waste. However, since the China Clay extraction has ceased very little new habitat spots are opened up and the habitat is disappearing. Therefore, an action plan to secure its long term survival is needed where artificial disturbance is a part of the conservation action.

Encouragingly, Marsupella sprucei, which was previously thought to be extinct in the National Park Harz (Saxony-Anhalt, Germany) was reported by Mueller (2008).

**FIGURE 5.** World distribution of Marsupella profunda.

---

**TABLE 1 (continued)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Criteria</th>
<th>Taxa included</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>new</td>
<td>Marsupella alpina (EN), M. brevissima (VU), M. sparsifolia (DD)</td>
<td>Sérgio et al. 2007</td>
</tr>
<tr>
<td>Italy</td>
<td>old</td>
<td>Apometzgeria pubescens (E), Marsupella adusta (Ev), M. alpina (Ev), M. boeckii (V), M. brevissima (E), M. commutata (Ev), M. condensata (E), M. sparsifolia (Ev), M. sphacelata (R)</td>
<td>Aleffi &amp; Schumacker 1995</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>new</td>
<td>Gymnomintrion apiculatum (DD), G. corallioides (VU), Marsupella adusta (VU), M. alpina (VU), M. brevissima (VU), M. funckii (VU), M. sparsifolia (DD)</td>
<td>Natcheva et al. 2006</td>
</tr>
<tr>
<td>Serbia and Montenegro</td>
<td>new</td>
<td>Marsupella funckii (VU)</td>
<td>Saboljievic et al. 2004</td>
</tr>
<tr>
<td>Madeira</td>
<td>old</td>
<td>Marsupella adusta (Ex), M. profunda (E)</td>
<td>Sérgio et al. 1992</td>
</tr>
</tbody>
</table>
Methodology

The detailed methodology undertaken for the current paper including the international standards adopted, the data components, sources and quality control, higher classification adopted, and description of the projects internal standard operating practices is provided in von Konrat et al. (2009, 2010) as well as at http://www.early-land-plants-today.org. A large number of taxa, mostly infrataxa, are in need of typification. We have not made any attempts to do that for this compilation except when it potentially could have nomenclatural consequences (Váňa et al. 2010).

Each accepted taxon is qualified using a four level ranking system that indicates our level of confidence about a taxons value. The coding convention is outlined in detail by von Konrat et al. (2010). Briefly, (?) = problem with the taxon name (one case in the current list); (*) = serious doubts about the value of the taxon (none of the current taxa); (**) = probably a good taxon; (***) = accepted, a good taxon as currently understood. This qualifier follows immediately after the name. Synonyms preceeded by * are invalid or illegitimate and the Article in the ICBN (McNeill et al. 2006) as well as a short verbal reason follows. Invalid names do technically not have synonyms according to the ICBN but we still want to associate them with the accepted names. Thus we preceed the synonym statement with a * for those names to mark that this use do not conform to the ICBN.

Gymnomitriaceae H.Klinggr.

Gymnomitriaceae H.Klinggr., Höh. Crypt. Preuss.: 16, 1858 (see Klinggräff 1858). Type: Gymnomitrion Corda


Marsupellaceae Jørg., Bergens Mus. Skr. n.s. 16: 60, 1934 (see Jørgensen 1934). Type: Marsupella Dumort.

Marsupellaceae H.Buch, Suomen Maksasammalet: 89, 1936 (see Buch 1936). Type: Marsupella Dumort.

Acrolophozia R.M.Schust.


Acrolophozia fuegiana R.M.Schust. (***)

Distribution:—Southern South America, Subantarctic Islands.


Acrolophozia pectinata R.M.Schust. (***)

Distribution:—New Zealand.


Acrolophozia sulcata Hässel (***)

Distribution:—Subantarctic Islands.

Apomarsupella R.M.Schust.


Apomarsupella africana (Steph. ex Bonner) R.M.Schust. (***)

Distribution:—West-Central Tropical Africa, East Tropical Africa, Mexico, Central America, Northern South America, Southern South America. Erroneously reported from Eastern Asia.


Apomarsupella crystallocaulon (Grolle) Váňa (***)

Distribution:—Indian Subcontinent.


Apomarsupella crystallocaulon (Grolle) Váňa, Bryobrothera 5: 227, 1999 (see Váňa 1999).

Apomarsupella revoluta (Nees) R.M.Schust. (***)

Distribution:—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Siberia, China, Mongolia, Eastern Asia, Indian Subcontinent, Malesia, Papuasia, Subarctic America, Western Canada, Eastern Canada. Erroneously reported from Russian Far East, Northern South America.


Marsupella revoluta (Nees) Trevis., Rendiconti Ist. Lomb. Sci. Lett. 7: 783, 1874 (see Trevisan 1874).


Cesius revolutus (Nees) Lindb., Kungl. Svenska Vetenskapsakad. Handl. 23 (5): 65, 1889 (see Lindberg & Arnell 1889), "Cesia".

Gymnomitrium revolutum (Nees) H.Philib., Rev. Bryol. 17: 34, 1890 (see Philibert 1890), "Gymnomitrium".


Gymnomitrion atratum (Mitt.) Parihar, Census Indian hepatics: 11, 1962 (see Parihar 1962), nom. inval. (Art. 33.4; basionym not cited), "atrata".


Apomarsupella revoluta subsp. novoguineanensis R.M.Schust. (**)

Distribution:—Malesia, Papuaasia.


Apomarsupella revoluta subsp. revoluta (**)

Distribution:—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Siberia, China, Mongolia, Eastern Asia, Indian Subcontinent, Malesia, Subarctic America, Western Canada, Eastern Canada.


Apomarsupella rubida (Mitt.) R.M.Schust. (***)

Distribution:—Eastern Asia, Indian Subcontinent. Erroneously reported from China.


Apomarsupella verrucosa (W.E.Nicholson) Váňa (***)

Distribution:—China, Indian Subcontinent.


**Gymnomitrion Corda**

*Cesium* Gray, Nat. Arr. Brit. Pl. 1: 705, 1821 (see Gray 1821), nom. rej. Type: *Cesium concinnatus* (Lightf.) Gray (=*Gymnomitrion concinnatum* (Lightf.) Corda). Note: Kuntze (1891) intended to change the spelling of the genus *Cesium* to *Cesius* to make it feminine. Grolle (1983) treated the latter as a validly (but illegitimate) genus, and not a spelling variant. We can not see that this is justified as Kuntze himself say that he is changing the spelling and thus treat it as an orthographic variant here.

*Cesium* subgen. *Eucesiua Lindb.*, Finland 1885 (290) 13 Dec.: 2, 1885 (see Lindberg 1885), nom. inval. (Art. 32.1.d; no description), "Cesia subgen. Eucesiua". Cited taxon: *Cesium concinnatus* (Lightf.) Gray (=*Gymnomitrion concinnatum* (Lightf.) Corda)

**Gymnomitrion Corda**, Naturalientausch 12: 651, 1829 (see Corda 1829), nom. conserv. Type: *Gymnomitrion concinnatum* (Lightf.) Corda


*Acolea Dumort.*, Sist. Jungerm. Europ.: 76, 1831 (see Dumortier 1831), nom. illeg. (Art. 52.1, type of Gymnomitrion included). Type: *Acolea concinnata* (Lightf.) Dumort. (=*Gymnomitrion concinnatum* (Lightf.) Corda) [lectotype according to Art. 7.5]


*Cesium* subgen. *Homocraspis Lindb., Finland 1885 (290) 13 Dec.: 2, 1885 (see Lindberg 1885), nom. inval. (Art. 32.1.d; no description), "Cesia".


**Dianthelia R.M.Schust.,** Bryologist 52: 103, 1949 (see Schuster 1949). Type: *Dianthelia steerei* R.M.Schust. (=*Gymnomitrion laceratum* (Steph.) Horik.)


*Marsupella sect. Alpiniae Grolle, Feddes Repert. 87: 260, 1976 (see Grolle 1976b). Type: Marsupella alpina (Gottsche ex Husn.) Bernet (=*Gymnomitrion alpinum* (Gottsche ex Husn.) Schiffn.)


**Gymnomitrium adustum** Nees (***)

**Distribution:**—Northern Europe, Central Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Macaronesia, ?Siberia (reports from southern Siberia not verified), Russian Far East, Eastern Asia. Erroneously reported from Western Canada, Eastern Canada.


Cesius adustus (Nees) Carruth., J. Bot. 3: 300, 1865 (see Carruthers 1865).

*Nardia sparisiolfa* β adusta (Nees) Lindb. ex Carrington, Brit. Hep. 1: 20, 1874 (see Carrington 1874), nom. inval. (Art. 34.1.c; sub Nardia adusta (Nees) Lindb.).

*Cesius* adustus (Nees) Carrington, Brit. Hep. 1: 20, 1874 (see Carrington 1874), nom. superfluous.


Marsupella adusta (Nees) Spruce, Rev. Bryol. 8: 98, 1881 (see Spruce 1881b).


Cesius adustus var. adusta, Bergens Mus. Skr. n.s. 16: 68, 1934 (see Jørgensen 1934).

*Jungermannia concinna var. minor* Nees, Naturgesch. Eur. Leberm. 1: 120, 1833 (see Nees 1833), nom. inval. (Art. 34.1.c; sub Gymnomitrium adustum Nees). Cited material: EUROPE. *Syn. in Nees 1833.

*Jungermannia brunnea* Spreng. ex Nees, Naturgesch. Eur. Leberm. 1: 120, 1833 (see Nees 1833), nom. inval. (Art. 34.1.c; sub Gymnomitrium adustum Nees). Cited material: "in Herb. Flotow". *Syn. in Nees 1833.


Gymnomitrium adustum var. olivaceum (Spruce) Macvicar, Ann. Scott. Nat. Hist. 13: 47, 1904 (see Macvicar 1904), "olivaced".

---

**Gymnomitrium alpinum** (Gottsche ex Husn.) Schiffn. (***)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Siberia, Russian Far East, China, Eastern Asia, Indian Subcontinent, Subarctic America, Western Canada, Northwestern USA.


*Nardia alpina* Gottsche ex Carrington, Brit. Hep. 1: 27, 1874 (see Carrington 1874), nom. inval. (Art. 32.1.d; no description).


Sarcocystos alpinus f. alpinus, Hepat. Eur., Leberm. 62-64: 618, 1877 (see Gottsche & Rabenhorst 1877), "Sarcocystos".


Sarcocystos alpinus var. alpina, Rev. Bryol. 12: 47, 1885 (see Bernet 1885), "Sarcocystos".

Cesius alpinus (Gottsche ex Husn.) Lindb., Finland 1886 (80) 7 Apr.: 2, 1886 (see Lindberg 1886), "Cesia alpina".

Marsupella alpina (Gottsche ex Husn.) Bernet, Cat. Hép. Suisse: 29, 1888 (see Bernet 1888).

Marsupella alpina var. alpina, Moss Exch. Club Cat. Brit. Hepat.: 6, 1897 (see Waddell 1897).

Gymnomitrium alpinum (Gottsche ex Husn.) Schiffn., Österr. Bot. Z. 53: 280, 1903 (see Schiffner 1903), "Gymnomitrium".

---

TAXONOMY, SYSTEMATICS & NOMENCLATURE OF GYMNOMITRIACEAE

Phytotaxa 11 © 2010 Magnolia Press • 17


**Cesia alpina** var. alpina, Bergens Mus. Skr. n.s. 16: 72, 1934 (see Jørgensen 1934).


**Cesia alpina** f. alpinus, Bergens Mus. Skr. n.s. 16: 72, 1934 (see Jørgensen 1934).


**Gymnomitrium alpinum** f. laxior (Gottsche et Rabenh.) Schiffn., Lotos 58: 179, 1910 (see Schiffner 1910a), "Gymnomitrium".

**Cesia alpinus** f. laxior (Gottsche et Rabenh.) Kaal. ex Jorg., Bergens Mus. Skr. n.s. 16: 72, 1934 (see Jørgensen 1934).


**Marsupella alpina** var. b laxior (Carrington et Pearson) Waddell, Moss Exch. Club Cat. Brit. Hepat.: 6, 1897 (see Waddell 1897).


**Marsupella alpina** f* heterophylla (Bernet) Bernet, Cat. Hép. Suisse: 30, 1888 (see Bernet 1888).

**Marsupella alpina** var. heterophylla (Bernet) Bannel, Musc. France 2: 146, 1904 (see Bannel 1904).


**Cesia alpina** var. heterophylla (Bernet) Jorg., Bergens Mus. Skr. n.s. 16: 72, 1934 (see Jørgensen 1934), "Cesia alpina var. heterophylla".


**Gymnomitrium alpinum** var. payotii (Bernet) Zodda, Nuovo Giorn. Bot. Ital. n.s. (suppl.) 41: 122, 1934 (see Zodda 1934), "Gymnomitrium alpinum f. payotii".


*Sarcocysthos pectinatus* Limpr. ex Payot, Rev. Bryol. 15: 18, 1888 (see Payot 1888), nom. inval. (Art. 34.1.c; sub Sarcocysthos sphaelatus), "Sarcocysthos". Cited material: s. loc. cit. (cf. Marsupella alpina var. payotii Bernet). * Syn. nov.

**Cesia alpina** f. pygmaea Kaal. ex Jorg., Bergens Mus. Skr. n.s. 16: 72, 1934 (see Jørgensen 1934), "Cesia alpina f. pygmaea". Type: s. loc. cit. (typification needed). Syn. nov.

**Cesia alpina** f. gracilis Kaal. ex Jorg., Bergens Mus. Skr. n.s. 16: 72, 1934 (see Jørgensen 1934), "Cesia alpina f. pygmaea". Type: s. loc. cit. (typification needed). Syn. nov.

**Gymnomitrium asperulatum** R.M.Schust. ex Vána (***)

**Gymnomitrium atrofilum** Vána (***)


**Gymnomitrium atrofilum** Vána (***)

**Gymnomitrion bolivianum** (Steph.) Váňa (***)

Distribution:—Southern Africa, Mexico, Central America, Northern South America, Western South America.


**Gymnomitrion bolivianum** (Steph.) Váňa, J. Hattori Bot. Lab. 80: 225, 2010 (see Váňa et al. 2010).


**Gymnomitrion andinum** (Herzog) Herzog, Hedwigia 74: 81, 1935 (see Herzog 1935).


**Gymnomitrion brevissimum** (Dumort.) Warnst. (***)

Distribution:—Northern Europe, Midddle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Siberia, Russian Far East, Caucasus, China, Indian Subcontinent, Subarctic America, Western Canada, Eastern Canada, Northwestern USA.


*Jungernania concinntata* var. **b minor** Schlech. ex Dumort., Syll. Jungerm. Europ.: 76, 1831 (see Dumortier 1831), nom. inval. (Art. 32.1.c, 34.1.c; no description, sub *Acolea brevissima*).


*Cesia minor* (Schlech. ex Lindb.) Schlech. ex Kuntze, Revis. Gen. Pl. 2: 834, 1891 (see Kuntze 1891), "Cesiusa".


*Nardia brevissima* (Dumort.) Lindb., Musci Scand.: 9, 1879 (see Lindberg 1879).

*Cesia brevissima* (Dumort.) Pearson, Hepat. Brit. Isl. 1: 399, 1901 (see Pearson 1901), "Cesia brevissima".

**Gymnomitrion brevissimum** (Dumort.) Warnst., Hedwigia 53: 196, 1913 (see Warnstorf 1913).


*Marsupella crassifolia* (Carrington) Spruce, Rev. Bryol. 8: 98, 1881 (see Spruce 1881b).

**Cesia crassifolia** (Carrington) Lindb., *Meddel. Soc. Fauna Fl. Fenn.* 14 "1888": 68, 1887 (see Lindberg 1887a), "Cesia crassifolia".


*Cesia varians* var. *crassifolia* (Carrington) Jörg., *Bergens Mus. Skr. n.s.* 16: 70, 1934 (see Jörgensen 1934), "Cesia varians var. crassifolia".


**Nardia cochlearis** Lindb., *Musci Scand.*: 9, 1879 (see Lindberg 1879). Type: NORWAY: s. loc. (typification needed).

Syn. with *Marsupella varians* (Lindb.) Müll. Frib. in Müller 1956.


*Cesia cochlearis* (Lindb.) Lindb., *Finland 1885 (290) 13 Dec.: 2, 1885 (see Lindberg 1885), *nom. inval.* (Art. 32.1.d; no description), "Cesia".

*Cesia cochlearis* (Lindb.) Lindb. ex Kaal., *Nyt Mag. Naturvidensk.* 33: 431, 1893 (see Kaalaas 1893), "Cesia".


*Cesia varians* var. *cochlearis* (Lindb.) Jörg., *Bergens Mus. Skr. n.s.* 16: 71, 1934 (see Jörgensen 1934), "Cesia".

**Nardia varians** Lindb., *Musci Scand.*: 9, 1879 (see Lindberg 1879). Type: NORWAY: s. loc. (typification needed).

Syn. in Grolle 1965b.

*Cesia varians* (Lindb.) Lindb., *Finland 1885 (290) 13 Dec.: 2, 1885 (see Lindberg 1885), *nom. inval.* (Art. 32.1.d; no description), "Cesia".

*Gymnomitrium varians* (Lindb.) Schiffn., *Hepat.* (Engl.-Prantl): 77, 1893 (see Schiffner 1893), "Gymnomitrium".

*Gymnomitrium varians* (Lindb.) Lindb. ex Kaal., *Nyt Mag. Naturvidensk.* 33: 429, 1893 (see Kaalaas 1893), "Cesia".


*Gymnomitrium varians* var. *variants* (Lindb.) Losos: 58: 214, 1910 (see Schiffner 1910b).

*Cesia varians* var. *variants*, *Bergens Mus. Skr. n.s.* 16: 70, 1934 (see Jörgensen 1934).


*Gymnomitrium confertum* (Limpr.) Limpr., *Flora* 64: 73, 1881 (see Limpricht 1881a).


---

**Gymnomitrium commutatum** (Limpr.) Schiffn. (***)

**Distribution**: Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Siberia, Russian Far East, China, Eastern Asia, Indian Subcontinent, Malesia, Subarctic America, Western Canada, Northwestern USA.


*Gymnomitrium commutatum* (Limpr.) Schiffn., *Magyar Bot. Lapok* 13 "1914": 304, 1915 (see Schiffner 1915), "Gymnomitrium".
**Gymnomitrium concinnatum** (Lightf.) Corda (***Fig. 2.**

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Siberia, Russian Far East, Caucasus, Western Asia, China, Eastern Asia, Subarctic America, Western Canada, Eastern Canada, Northwestern USA, Northeastern USA, Southwestern USA, Southern South America. Erroneously reported from Indian Subcontinent, Australia, New Zealand.


*Schisma concinnatum* Dumort., *Commentat. Bot. (Dumortier):* 114, 1822 (see Dumortier 1822), *nom. inval.* (Art. 32.1.d; no description), "(concinnata"

**Gymnomitrium concinnatum** (Lightf.) Corda, *Naturalientausch* 12: 651, 1829 (see Corda 1829).


**Gymnomitrium concinnatum** f. *procumbens* (Nees) Limpr., *Krypt.-Fl. Schlesien* "1876": 246, 1877 (see Limpricht 1877).


*Cesius concinnatus* var. *concinnatus*, Bergens Mus. Skr. n.s. 16: 63, 1934 (see Jørgensen 1934).


**Gymnomitrium concinnatum** f. *procumbens* (Nees) Limpr., *Krypt.-Fl. Schlesien* "1876": 246, 1877 (see Limpricht 1877).


*Cesius concinnatus* var. *Rufus* (Limpr.) Jürg., Bergens Mus. Skr. n.s. 16: 63, 1934 (see Jørgensen 1934), "Cesia concinnata var. Rufa"


*Acolea concinnata* var. *intermedia* (Limpr.) Bernet, Cat. Hép. Suisse: 24, 1888 (see Bernet 1888).

*Cesius concinnatus* var. *intermedius* (Limpr.) Jürg., Bergens Mus. Skr. n.s. 16: 63, 1934 (see Jørgensen 1934), "Cesia concinnata var. intermedius"


Cesius concinnatus var. Cesius concinnatus (Steph.) Horik., Gymnomitrion brevilobum (Steph.) Horik., Acta Phytotax. Geobot. 13: 212, 1943 (see Horikawa 1943), "Gymnomitrion".

Gymnomitrion concinnatum f. laxum Meyl., Beitr. Kryptogamenfl. Schweiz 6(4): 125, 2024 (see Meylan 2024), "laxa".

Type: SWITZERLAND: TORNELAND (typification needed). Syn. nov.


Gymnomitrion brevilobum (Steph.) Horik., Acta Phytotax. Geobot. 13: 212, 1943 (see Horikawa 1943), "Gymnomitrion brevilobum".

Gymnomitrion concinnatum var. argentaeus Jörg., Bergens Mus. Skr. n.s. 16: 64, 1934 (see Jørgensen 1934), "Cesia concinnata var. argentae". Type: NORWAY: Nordland: Ørfjell, 1894 (typification needed). Syn. nov.

*Gymnomitrion concinnatum var. argentaeum (Jög.) Müll.Frib., Leberm. Eur.: 798, 1956 (see Müller 1956), nom. inval. (Art. 33.4; no basionym cited).


*Gymnomitrion concinnatum var. bryhnii (Kaal. ex Jög.) Müll.Frib., Leberm. Eur.: 798, 1956 (see Müller 1956), nom. inval. (Art. 33.4; no basionym cited).


*Gymnomitrion concinnatum var. rufescens (Kaal. ex Jörg.) Müll.Frib., Leberm. Eur.: 798, 1956 (see Müller 1956), nom. inval. (Art. 33.4; no basionym cited).


Gymnomitrion concinnatum var. ambiguus (Kaal. ex Jörg.) S.W.Arnell, Ill. Moss Fl. Fennosc. Hep.: 228, 1956 (see Arnell 1956a).

Gymnomitrion coralloides Nees (***)

Distribution:—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Siberia, Russian Far East, Caucasus, Mongolia, Eastern Asia, Subarctic America, Western Canada, Eastern Canada, Northwestern USA, Northeastern USA. Erroneously reported from China, Antarctic Continent.

Gymnomitrion coralloides Nees, Naturgesch. Eur. Leberm. 1: 118, 1833 (see Nees 1833), "Gymnomitrion". Type: POLAND/CZECH REPUBLIC: Riesenengebirge: Mädelsteine, leg. Nees (type location is a rock on the border between Poland and Czech Republic) (STR, lectotype by Grolle 1976b).

Acolea coralloides (Nees) Dumort., Recueil Observ. Jungerm.: 23, 1835 (see Dumortier 1835), "coralloides".

Cesia coralloides (Nees) Carruth., J. Bot. 3: 300, 1865 (see Carruthers 1865), "Cesia coralloides".

Cesia coralloides var. coralloides, Herb. Mus. Fenn., ed. 2, Musci: 1, 1894 (see Bomansson & Brotherus 1894).


*Jungermannia concinnata var. β clavuligera Nees ex Huebener, Ann. Pharmacie (Heidelberg) 7: 75, 1833 (see Hübener 1833), nom. inval. (Art. 32.1.d; no description). Cited material: s.loc.cit. Note: apparently based on the same specimen(s) as in Nees 1833. *Syn. nov.

*Cesia coralloides var. β intermedius Lindb., Helsingfors Dagblad 1877 (47) 14 Feb.: 2, 1877 (see Lindberg 1877a), nom. inval. (Art. 32.1.d; no description), "Cesia coralloides var. β intermedius". Cited material: FINLAND: Savonia borealis: Kuopio, leg. Lackström (H-SOL). *Syn. nov.

*Acolea coralloides var. intermedia Bom. et Broth., Herb. Mus. Fenn., ed. 2, Musci: 3, 1894 (see Bomansson & Brotherus 1894), nom. inval. (Art. 32.1.c; no description (presumed basionym also without description)).


**Gymnomitrium crenatilobum** Grolle (***)

**Distribution:**—Indian Subcontinent.


---

**Gymnomitrium crenulatum** Gottsche ex Carrington (***)

**Distribution:**—Northern Europe, Southwestern Europe. Erroneously reported from Eastern Europe, Siberia, China, Eastern Asia, Subarctic America, Western Canada, Subantarctic Islands.


*Cesius crenulatus* (Gottsche ex Carrington) Carruth., *J. Bot.* 3: 300, 1865 (see Carruthers 1865).


---

**Gymnomitrium incompletum** (Gottsche) R.M.Schust. ex Váňa (**)

**Distribution:**—Malesia, Papuasia, Australia, New Zealand.


**Gymnomitrion laceratum** (Steph.) Horik. (***)

**Distribution:**—West-Central Tropical Africa, East Tropical Africa, Southern Africa, Western Indian Ocean, Siberia, China, Eastern Asia, Indian Subcontinent, Southeastern USA, Mexico, Northern South America, Western South America. ERRONEOUSLY reported from Malesia.


*Gymnomitrion laceratum* (Steph.) Horik., Acta Phytotax. Geobot. 13: 212, 1943 (see Horikawa 1943), "Gymnomitrium".


**Gymnomitrion minutulum** (Hässel) Váňa (***)

**Distribution:**—Subantarctic Islands.


**Gymnomitrion moralesae** Váňa (***)

**Distribution:**—Mexico, Central America.


**Gymnomitrion mucronulatum** (N.Kitag.) N.Kitag. (***)

**Distribution:**—Eastern Asia, Indian Subcontinent.


**Gymnomitrion mucrophorum** R.M.Schust. (***)

**Distribution:**—Subarctic America.

Gymnomitrion nigrum (Grolle et Váňa) Váňa (***)

**Distribution:**—Papuasia.


Gymnomitrion noguchianum S.Hatt. (***)

**Distribution:**—Eastern Asia.


Gymnomitrion obtusilobum N.Kitag. (***)

**Distribution:**—Indian Subcontinent.


Gymnomitrion obtusum Lindb. (***)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Caucasus, Indian Subcontinent, Subarctic America, Western Canada, Northwestern USA, Southwestern USA. Erroneously reported from Siberia, Australia, Southern South America.


Gymnomitrion pacificum Grolle (***)

**Distribution:**—Russian Far East, Eastern Asia, Subarctic America, Western Canada, Mexico.

**Gymnomitrion setaceum Grolle et Váňa (***)**

**Distribution:**—Central America, Northern South America, Western South America.


**Gymnomitrion sinense Müll.Frib. (***)**

**Distribution:**—China, Indian Subcontinent.


**Gymnomitrion strictum (Berggr.) R.M.Schust. (**)**

**Distribution:**—New Zealand.


**Gymnomitrion strictum var. inaequale R.M.Schust. (**)**

**Distribution:**—New Zealand.


**Gymnomitrion strictum var. strictum (**)**

**Distribution:**—New Zealand.


**Gymnomitrion subintegrum (S.W.Arnell) Váňa (***)**


**Gymnomitrion truncato-apiculatum** Herzog (***)

**Distribution:**—Mexico, Central America, Northern South America, Western South America.


**Herzogobryum** Grolle


**Herzogobryum atrocapillum** (Hook.f. et Taylor) Grolle (***)

**Distribution:**—Australia?, New Zealand, Subantarctic Islands, Antarctic Continent.


**Herzogobryum filiforme** R.M.Schust. (***)

**Distribution:**—New Zealand.

**Herzogobryum molle** Grolle (***)

**Distribution:**—Southern South America, Subantarctic Islands.

**Herzogobryum teres** (Carrington et Pearson) Grolle (***)

**Distribution:**—Australia, New Zealand, Southern South America, Subantarctic Islands, Antarctic Continent.


Distribution:—New Zealand, Southern South America, Subantarctic Islands.

**Herzogobryum vermiculare** (Schiffn.) Grolle (***)


**Sarcocyphos Corda,** Naturalientausch 12: 652, 1829 (see Corda 1829). Type: Sarcocyphos ehrhardttii Corda nom. illeg. (=Marsupella emarginata subsp. emarginata (Ehrh.) )

*Marsupia Dumort.,* Syll. Jungerm. Europ.: 77, 1831 (see Dumortier 1831), nom. illeg. (Art. 52.1; Marsupella included). Type: Marsupella emarginata (Ehrh.) Dumort. (=Marsupella emarginata (Ehrh.) Dumort.)

**Nardia subgen. Hyalacme Lindb.,** Helsingfors Dagblad 1878 (38) 9 Feb.: 2, 1878 (see Lindberg 1878c), "Hyalocme". Type: Nardia condensata (Ångstr. ex C.Hartm.) Lindb. (=Marsupella condensata (Ångstr. ex C.Hartm.) Lindb. ex Kaal.)


**Nardiocalyx Lindb. ex Jørg.,** Bergens Mus. Skr. n.s. 16: 74, 1934 (see Jørgensen 1934). Type: Nardiocalyx apiculata (Schiffn.) Jørg. (=Marsupella apiculata Schiffn.)


Marsupella alata S.Hatt. et N.Kitag. ex N.Kitag. (***)

Distribution:—Russian Far East, Eastern Asia.

Marsupella andreaeoides (Lindb.) Müll.Frib. (***)

Distribution:—Northern Europe.

Marsupella apiculata Schiffn. (***)

Distribution:—Northern Europe, Middle Europe, Southeastern Europe, Eastern Europe, Siberia, Russian Far East, Caucasus, China, Eastern Asia, Subarctic America, Western Canada, Eastern Canada.

Marsupella aquatica (Lindenb.) Schiffn. (***) Fig. 3.

Distribution:—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Macaronesia, Siberia, Russian Far East, Caucasus, Subarctic America, Western Canada, Eastern Canada, Northwestern USA, Northeastern USA.


*Jungermannia emarginata var. β aquatica Sw. ex Hook., Brit. Jungerm.: 27, 1812 (see Hooker 1812), nom. inval. (Art. 34.1.a; not accepted by author). Cited material: s. loc. cit. * Syn. nov.
Marsupella emarginata

Marsupella aquatica

Nardia emarginata

Sarcocyphos emarginatus


Jungermannia emarginata

Sarcocyphos ehrhardtii β aquaticus (Lindenb.) Nees, Naturgesch. Eur. Leberm. 1: 125, 1833 (see Nees 1833), "Sarcocyphus ehrharti β aquatica".

Sarcocyphos ehrhardtii var. aquaticus (Lindenb.) Bernet, Mitt. Naturwiss. Vereins Steiermark 30: 286, 1894 (see Bernet 1894), "Sarcocyphus".

Marsupella aquatica var. aquaticus (Lindenb.) Austin, Hepat. Bor.-Amer. Exsicc.: 3, 1873 (see Austin 1873), "Sarcocyphus".

Nardia emarginata

Marsupella emarginata

Sarcocyphos ehrhardtii

Jungermannia emarginata

Jungermannia rivularis

Jungermannia patens

Limpricht 1877), cit. *needed). Note: The earlier description), "Sarcoscyphus". Cited material: s.loc.cit. *Syn. nov.


*Marsupella arctica* (Berggr.) Bryhn et Kaal. (***)

**Distribution:**—Northern Europe, Siberia, Russian Far East, China, Subarctic America, Eastern Canada.


*Marsupella boeckii* (Austin) Lindb. ex Kaal. (***)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Siberia, Russian Far East, Eastern Asia, Indian Subcontinent, Subarctic America, Western Canada, Eastern Canada, Northeastern USA. Erroneously reported from East Tropical Africa, Antarctic Continent.


*Nardia boeckii* (Austin) Lindb., Musci Scand. 9: 1879 (see Lindberg 1879).


*Marsupella boeckii var. latifolia* (Lindb. ex Norrl.) Kaal., Bergens Mus. Skr. n.s. 16: 87, 1934 (see Jørgensen 1934).

*Cephalozia divaricata var. latifolia* (Lindb. ex Norrl.) Lindb., Leberm. Eur.: 789, 1956 (see Müller 1956), nom. inval. (Art. 34.1.c; sub Marsupella boeckii).

Marsupella bolanderi (Austin) Underw. (***)

Distribution:—Northwestern USA, Southwestern USA.


Marsupella bolanderi (Austin) Underw., Zoological J. 1 "1890": 365, 1891 (see Underwood 1891).
**Marsupella condensata** (Ângstr. ex C.Hartm.) Lindb. ex Kaal. (***)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Siberia, Russian Far East, Caucasus, China, Subarctic America, Western Canada, Eastern Canada, Northwestern USA.


**Cesius condensatus** (Ângstr. ex C.Hartm.) Lindb., *Musci Scand.*: 9, 1879 (see Lindberg 1879), "Cesia condensata".


**Marsupella condensata** f. condensata, *Bergens Mus. Skr.* n.s. 16: 89, 1934 (see Jørgensen 1934).


**Sarcocyphos aemulus** Lindb., *Finland 1885 (290) 13 Dec.*: 2, 1885 (see Lindberg 1885), nom. inval. (Art. 32.1.d; no description). Cited material: s. loc. cit. *Syn. in Müller 1909b.

**Marsupella disticha** Steph. (***)

**Distribution:**—Eastern Asia.


**Marsupella emarginata** (Ehrh.) Dumort. (***)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, North Africa, Macaronesia, West-Central Tropical Africa, East Tropical Africa, Siberia, Russian Far East, Caucasus, Western Asia, China, Eastern Asia, Indian Subcontinent, Malesia, Subarctic America, Western Canada, Eastern Canada, Northwestern USA, North-Central USA, Northeastern USA, Southwestern USA, Southeastern USA, Mexico, Central America, Western South America.


**Marsupella emarginata subsp. emarginata** (**)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, North Africa, Macaronesia, West-Central Tropical Africa, East Tropical Africa, Siberia, Russian Far East, Caucasus, Western Asia, China, Eastern Asia, Indian Subcontinent, Malesia, Subarctic America, Western Canada, Eastern Canada, Northwestern USA, North-Central USA, Northeastern USA, Southwestern USA, Southeastern USA, Mexico, Central America, Western South America. Erroneously reported from Eastern Asia.


**Marsupia emarginata** var. emarginata, *Syll. Jungerm. Europ.*: 78, 1831 (see Dumortier 1831).


**Marsupella emarginata** subsp. emarginata (**)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, North Africa, Macaronesia, West-Central Tropical Africa, East Tropical Africa, Siberia, Russian Far East, Caucasus, Western Asia, China, Eastern Asia, Indian Subcontinent, Malesia, Subarctic America, Western Canada, Eastern Canada, Northwestern USA, North-Central USA, Northeastern USA, Southwestern USA, Southeastern USA, Mexico, Central America, Western South America. Erroneously reported from Eastern Asia.


**Marsupia emarginata** var. emarginata, *Syll. Jungerm. Europ.*: 78, 1831 (see Dumortier 1831).
Jungermannia emarginata


Nardia emarginata f. emarginata, Brit. Hep. 1: 14, 1874 (see Carrington 1874).

Sarcocyphos emarginatus f. emarginatus, Rev. Bryol. 2: 84, 1875 (see Lamy 1875), "Sarcocyphus". Marsupella emarginata var. emarginata, Fl. Tirol 5 "1904"; 24, 1902 (see Dalla Torre & Sarnthein 1902).


Jungermannia macrorhiza


*Jungermannia emarginata var. a fusca


*Jungermannia emarginata var. b viridis


Jungermannia pulvinata


Marsupella pulvinata (Raddi) Trevis., Rendiconti Ist. Lomb. Sci. Lett. 7: 784, 1874 (see Trevisan 1874).


*Jungermannia emarginata d minima

Schleich., Cat. Pl. Helv., ed. 4: 44, 1821 (see Schleicher 1821), nom. inval. (Art. 32.1.d; no description). Cited material: SWITZERLAND. * SYN. NOV.

*Jungermannia emarginata c nigra

Schleich., Cat. Pl. Helv., ed. 4: 44, 1821 (see Schleicher 1821), nom. inval. (Art. 32.1.d; no description). Cited material: SWITZERLAND. * SYN. NOV.

Jungermannia emarginata β julacea


Sarcocyphus ehrhartii γ julaceus (Nees) Nees, Naturgesch. Eur. Leberm. 1: 125, 1833 (see Nees 1833), "Sarcocyphus ehrharti γ julaceus".

*Sarcocyphus ehrhartii * julaceus (Nees) Ångstr., Disp. Musc. Scand.: 24, 1842 (see Ångström 1842), nom. inval. (Art. 32.1.d; no description), "Sarcocyphus Ehrharti * julaceus".


*Sarcocyphus ehrhartii Corda, Naturalienwiss. 12: 652, 1829 (see Corda 1829), nom. illeg. (Art. 52.1.; the earlier Jungermannia emarginata Ehrh. 1784 included). Type: s. loc. cit. (typification needed). Syn. in Hübener 1834.

Sarcocyphus ehrhartii f. ehrhartii, Naturgesch. Eur. Leberm. 2: 417, 1836 (see Nees 1836), "Sarcocyphus ehrharti".


Sarcocyphus densifolius


Marsupella densifolia (Nees) Dumort., Recueil Observ. Jungerm.: 24, 1835 (see Dumortier 1835).

Marsupella densifolia (Nees) Trevis., Rendiconti Ist. Lomb. Sci. Lett. 7: 784, 1874 (see Trevisan 1874).


Marsupella emarginata f. densifolia (Nees) Jorg., Bergens Mus. Skr. n.s. 16: 77, 1934 (see Jørgensen 1934).

Sarcocyphus muelleri var. muelleri, Comment. Soc. Crittog. Ital. 1: 86, 1861 (see De Notaris 1861), "Sarcocyphus müleri".

*Jungermannia fusca


Jungermannia ustulata


Sarcocyphos ehrhardtii f. humilis Nees, Naturgesch. Eur. Leberm. 2: 417, 1836 (see Nees 1836), "Sarcocyphus ehrhartii". Type: s. loc. cit. (typification needed). *Syn. nov.

Sarcocyphos ehrhardtii f ericetorum Gottsche, Lindenb. et Nees, Syn. Hepat. 1: 7, 1844 (see Gottsche et al. 1844), "Sarcoscyphus ehrhartii f ericetorum". Type: s. loc. cit. (typification needed). *Syn. nov.

Nardia emarginata var ericetorum (Gottsche, Lindenb. et Nees) C.Massal., Annuario Reale Ist. Bot. Roma 2 "1885": 93, 1886 (see Massalongo 1886).


Marsupella emarginata f. ligurica (Gottsche) Jorg., Bergens Mus. Skr. n.s. 16: 77, 1934 (see Jorgensen 1934).


*Nardia robusta (De Not.) Lindb. ex Carrington, Brit. Hep. 1: 14, 1874 (see Carrington 1874), *nom. inval. (Art. 34.1.c; sub Nardia emarginata a major Carrington).

Sarcocyphus robustus (De Not.) Limpr., Krypt.-Fl. Schlesien "1876": 431, 1877 (see Limpricht 1877), "Sarcocyphus".


Marsupella emarginata var. robusta (De Not.) Bom. et Broth., Herb. Mus. Fenn., ed. 2, Musci: 1, 1894 (see Bomansson & Brotherus 1894).

Marsupella robusta (De Not.) A.Evans, Rhodora 10: 186, 1908 (see Evans 1908).


Sarcocyphos fuscus Nees ex P.Kumm.

Sarcocyphos emarginatus Marsupella andina

Sarcocyphos ehrhardtii α Marsupella emarginata

Nardia emarginata δ Nardia muelleri var. c

Nardia emarginata δ Sarcocyphos ehrhardtii

Sarcocyphos ehrhardtii α Nardia emarginata

De Notaris Waddell 1897), Riesengebirge, leg.

Type: FRANCE: herb.

De Notaris Waddell 1897), Haute-Savoie: Aiguilles-Rouges, 1884, leg.

Payot & Bernet 1888. Type: ITALY: Emilio-Romagna: Buzzo (typification needed).

Cited material: UK. *

Sarcoscyphus ehrhardti (J.B.Jack) Dalla Torre et Sarnth., Fl. Tirol 5 "1904": 24, 1902 (see Dalla Torre & Sarnthein 1902).

* Marsupella emarginata var. c minor Carrington ex Waddell, Moss Exch. Club Cat. Brit. Hepat.: 6, 1897 (see Waddell 1897), nom. illeg. (Art. 52.1; the earlier Sarcoscyphus erhartii var. γ julacea (Nees) Gottsche, Lindenberg et
Lophozia canariensis


Marsupella pearsonii var. pearsonii, Lotos 58: 253, 1910 (see Schiffner 1910d).

Marsupella emarginata var. pearsonii (Macvicar) Jorg., Bergens Mus. Skr. n.s. 16: 78, 1934 (see Jørgensen 1934).


Marsupella emarginata subsp. tubulosa (Steph.) N. Kitag. (* *)

Distribution:—Siberia, Russian Far East, China, Eastern Asia.


*Marsupella emarginata* subsp. *tubulosa* var. *apertifolia* (Steph.) N. Kitag. (**)

**Distribution:**—Eastern Asia.


*Marsupella emarginata* subsp. *tubulosa* var. *patens* N. Kitag. (**)

**Distribution:**—China, Eastern Asia.


*Marsupella funckii* (F. Weber et D. Mohr) Dumort. (***)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Macaronesia, Siberia, Russian Far East, Caucasus, Western Asia, Southeastern USA. Erroneously reported from Eastern Asia.


*Jungermannia funckii*, *Hepaticol. Germ.*: 134, 1834 (see Hübener 1834).


*Sarcocyphus funckii* var. *funckii*, *Führer Leberm.*: 26, 1875 (see Kummer 1875), "Sarcocyphus".


Marupsella funckii var. byssacea (Mougeot et Nestl.) Dalla Torre et Samth., *Fl. Tirol* 5 "1904": 25, 1902 (see Dalla Torre & Sarmthein 1902).


Marupsella muelleri (Nees) Dumort., Recueil Observ. Jungerm.: 24, 1835 (see Dumortier 1835), "mulleri".


Nardia funckii *β* minor (Nees) C.Massal., *Annuario Reale Ist. Bot. Roma* 2 "1885": 94, 1886 (see Massalongo 1886).

*Jungermannia funckii* *γ* gracilescens Huebener, *Hepaticol. Germ.*: 134, 1834 (see Hübener 1834). Type: "vorzüglich in Gebirgsgegenden" - location missing (typification needed). Syn. nov.

Sarcocyphos funckii (Huebener) P.Kumm., *Führer Leberm.*: 26, 1875 (see Kummer 1875), "Sarcocyphus".


*Sarcocyphos funckii* var. decipiens (C.Massal. et Carestia) Spruce, *Rev. Bryol.* 8: 95, 1881 (see Spruce 1881b), nom. invalid. (Art. 34.1.c; sub Marupsella decipiens), "Sarcocyphus".


TAXONOMY, SYSTEMATICS & NOMENCLATURE OF GYMNOMITRIACEAE  Phytotaxa 11 © 2010 Magnolia Press • 39


Marsupella microphylla R.M.Schust. (***) Distribution:—Northern South America, ?Brazil (reports from SE Brazil questioned).

Marsupella minutissima N.Kitag. (***) Distribution:—China, Eastern Asia.
Marsupella neesii Sande Lac. ex Schiffn., *Consp. Hepat. Arch. Ind.*: 70, 1898 (see Schiffner 1898a).


**Marsupella paroica** R.M.Schust. (***)

**Distribution:**—Eastern Canada, North-Central USA, Southeastern USA, Mexico.


**Marsupella profunda** Lindb. (***)

**Distribution:**—Northern Europe, Southwestern Europe, Macaronesia (Fig. 5).


**Marsupella pseudofunckii** S.Hatt. (***)

**Distribution:**—Russian Far East, China, Eastern Asia.


**Marsupella shimizuana** S.Hatt. (?)

**Distribution:**—Eastern Asia.


**Marsupella sparsifolia** (Lindb.) Dumort. (***)

**Distribution:**—Russian Far East, China, Eastern Asia.


Type: NORWAY: Buskerud: Kongsberg, 1865, leg. Cleve (H-SOL, holotype).


**Marsupella sparsifolia subsp. childii R.M.Schust.** (?) Fig. 6.

**Distribution:**—Australia, New Zealand.

**Note:**—The taxon is recognized by Engel & Glenny (2008) although the name is not validated there. We are not validating it until we have localized a possible type specimen.


**Marsupella sparsifolia subsp. sparsifolia (?)**

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Macaronesia, Southern Africa, Caucasus, Subarctic America, Western Canada, Eastern Canada, Northwestern USA, Northeastern USA, Southwestern USA, Subantarctic Islands. Erroneously reported from East Tropical Africa, North-Central USA.


Marsupella sparsifolia subsp. sparsifolia, *J. Hattori Bot. Lab.* 80: 61, 1996 (see Schuster 1996a), no validly publishes subspecies exist. Note: the autonym is technically not existing as subsp. *childii* is not valid.


**Marsupella sphacelata** (Giesecke ex Lindenb.) Dumort. (***)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Macaronesia, Siberia, Russian Far East, Caucasus, China, Eastern Asia, Subarctic America, Western Canada, Eastern Canada, Northwestern USA, North-Central USA, Northeastern USA, Southwestern USA, Southeastern USA.


Marsupia sphacelata (Giesecke ex Lindenb.) Dumort., *Syll. Jungerm. Europ.*: 78, 1831 (see Dumortier 1831).

Sarcocyphos sphacelatus (Giesecke ex Lindenb.) Nees, *Naturgesch. Eur. Leberm.* 1: 129, 1833 (see Nees 1833), "Sarcoscyphus".

*Marsupella sphacelata* (Giesecke ex Lindenb.) Dumort., *Recueil Observ. Jungerm.*: 24, 1835 (see Dumortier 1835).


Sarcocyphos ehrhardtii δ saccatus *Nees*, *Naturgesch. Eur. Leberm.* 1: 125, 1833 (see Nees 1833), "Sarcoscyphus ehrharti δ saccata". Type: GERMANY (typification needed). Syn. nov.
Sarcocyphus ehrhardtii

Sarcocyphus sphacelatus

Marsupella joergensenii

Marsupella erythrorhiza

β

Nardia sphacelata

Marsupella jackii

Marsupella sphacelata

α

Marsupella sullivantii

*Sarcocyphus sullivantii

Marsupella johgsenii

Marsupella emarginata

Jungermannia emarginata

44   •  Phytotaxa 11  © 2010 Magnolia Press  VĂĂA ET AL.


*Marsupella sphacelata var. β eusphacelata Schiffn., Lotos 58: 255, 1910 (see Schiffner 1910d), nom. illeg. (Art. 24.3, 63.1; type of species included). Type: s. loc. cit. "Sarcoscyphus sphacelatus in Limpricht; Schiffner Exsicc. n.49; K. Müller, etc.", Syn. nov.


*Marsupella joergensenii f. gracilis Bryhn ex Jorg., Bergens Mus. Skr. n.s. 16: 81, 1934 (see Jørgensen 1934), nom. inval. (Art. 32.1.d; no description). Cited material: NORWAY: Aust-Agder: Meienfjell, 1897, leg. Bryhn. Note: it is possible that this is an orthographic error for var. gracilior Kaal. ex Jørg. (from the same locality) but Jørgensen (1934) ascribe this taxon to Bryhn in his list of specimens. *Syn. nov.


Marsupella spiniloba R.M. Schust. et Damsh. (***)

Distribution:—Northern Europe, Eastern Europe, Subarctic America.


TAXONOMY, SYSTEMATICS & NOMENCLATURE OF GYMNOMITRIACAEA

Phytotaxa 11 © 2010 Magnolia Press • 45
**Marsupella sprucei** (Limpr.) Bernet (***)

**Distribution:**—Northern Europe, Middle Europe, Southwestern Europe, Southeastern Europe, Eastern Europe, Macaronesia, Siberia, Russian Far East, China, New Zealand, Subarctic America, Western Canada, Eastern Canada, Northwestern USA, Northeastern USA, Southwestern USA, Southern South America, Subantarctic Islands.


---

**Marsupella stableri** *Spruce* (***)

**Distribution:**—Northern Europe, Western Canada.
Note:—syn. (nov.) with \textit{M. boeckii} in Schuster (1974) but recognized by Grolle & Long (2000). When describing the species, Spruce also used the name “\textit{Nardia (Marsupella) stableri}” but it is clear from his discussion that he intended to recognize it as a species of \textit{Marsupella} and thus the name \textit{Nardia stableri} Spruce does not exist.


\textbf{Marsupella stoloniformis N.Kitag. (***)}

\textbf{Distribution:—Eastern Asia, Indian Subcontinent, Malesia, Papuasia.}


\textbf{Marsupella stoloniformis subsp. stoloniformis (**)}

\textbf{Distribution:—Indian Subcontinent, Malesia.}


\textbf{Marsupella stoloniformis subsp. vermiformis R.M.Schust. (**)}

\textbf{Distribution:— Eastern Asia, Malesia, Papuasia.}


\textbf{Marsupella yakushimensis (Horik.) S.Hatt. (***)}

\textbf{Distribution:—China, Eastern Asia, Indo-China.}


\textbf{Nanomarsupella R.M.Schust.}


\textbf{Nanomarsupella xenophylla (R.M.Schust.) R.M.Schust. (***)}

\textbf{Distribution:—Northern South America, Western South America.}


**Nothogymnomitrion** R.M. Schust.


**Nothogymnomitrion erosum** (Carrington et Pearson) R.M. Schust. (***)

**Distribution**:—Australia, New Zealand, Southern South America, Subantarctic Islands.


**Paramomitrion** R.M. Schust.


**Paramomitrion paradoxum** R.M. Schust. (***)

**Distribution**:—Northern South America.


**Poeltia** Grolle

*Poeltia* Grolle, Khumbu Himal: 280, 1966 (see Grolle 1966d). Type: *Poeltia campylata* Grolle


**Poeltia campylata** Grolle (***)

**Distribution**:—Indian Subcontinent.


**Prasanthus** Lindb.

*Cesius sect. c. Prasanthus* Lindb., Musci Scand.: 9, 1879 (see Lindberg 1879), nom. inval. (Art. 32.1.d; no description), "Cesia". Cited taxon: *Cesius suecicus* (Gottsche) Lindb. (=*Prasanthus suecicus* (Gottsche) Lindb.)

*Cesius subgen. C Prasanthus* Lindb., Finland 1885 (290) 13 Dec.: 2, 1885 (see Lindberg 1885), nom. inval. (Art.
32.1.d; no description), "Cesia". Cited taxon: Cesius

**Prasanthus Lindb.**, Kungl. Svenska Vetenskapsakad. Handl. 23 (5): 62, 1889 (see Lindberg & Arnell 1889). Type: **Prasanthus suecicus** (Gottsche) Lindb.


**Prasanthus suecicus** (Gottsche) Lindb. (***) Fig. 1.

**Distribution**:—Northern Europe, Middle Europe, Southwestern Europe, Eastern Europe, Siberia, Russian Far East, Subarctic America, Eastern Canada. Erroneously reported from Southeastern Europe.


**Cesius suecicus** (Gottsche) Lindb., Musci Scand.: 10, 1879 (see Lindberg 1879), "Cesia suecica".


### Excluded taxa


**Acolea caledonica** Steph., Nova Caledonia, Bot. 1: 19, 1914 (see Stephani 1914) = Acromastigum caledonicum (Steph.) Grolle (Lepidoziaceae).


Gymnomitrium argillaceum (Nees) Gottsche, Syn. Hepat. 1: 5, 1844 (see Gottsche et al. 1844), "Gymnomitrium". = Neesioscyphus argillaceus (Nees) Grolle (Balantiopsaceae).


Gymnomitrium caledonicum (Steph.) Horik., Acta Phytotax. Geobot. 13: 212, 1943 (see Horikawa 1943), "Gymnomitrium caledonicum". = Acromastigium caledonicum (Steph.) Grolle (Lepidoziaceae).

Gymnomitrium carneum (Nees) Gottsche, Syn. Hepat. 1: 5, 1844 (see Gottsche et al. 1844), "Gymnomitrium". = Neesioscyphus carneus (Nees) Grolle (Balantiopsaceae).

Gymnomitrium erythrorhizum Bisch., Fl. Azor.: 12, 1844 (see Bischoff 1844) = Fossombronia angulosa (Dicks.) Raddi (Fossombroniaceae). Syn. in Stephani 1900.


Gymnomitrium hookeri (Lyell ex Sm.) Corda, Naturalientausch 12: 651, 1829 (see Corda 1829) = Haplomitrium hookeri (Lyell ex Sm.) Nees (Haplomitriaceae).


*Gymnomitrium juniperinum (Sw.) Corda, Naturalientausch 12: 651, 1829 (see Corda 1829), nom. illeg. (Art. 52.1; type of earlier name included) = Herbertus juniperoides (Sw.) Grolle (Herbertaceae). Syn. in .

Gymnomitrium lutescens (Lehm. et Lindenb.) Gottsche, Syn. Hepat. 1: 4, 1844 (see Gottsche et al. 1844), "Gymnomitrium". = Notoscyphus lutescens (Lehm. et Lindenb.) Mitt. (Geocalycaceae).


Gymnomitrium physocaulum (Taylor) ex Gottsche, Lindenb. et Nees, Syn. Hepat. 4: 615, 1846 (see Gottsche et al. 1846) = Metahydrogiella tubulata (Hook.f. et Taylor) R.M.Schust. et J.J.Engel (Cephaloziaceae). Syn. in


**Marsupella polyanthos** (L.) Dunmort., *Comment. Bot.* (Dumortier): 114, 1822 (see Dumortier 1822) = *Chiloscyphus polyanthos* (L.) Corda (Lophocoleaceae).


**Sarcocyphus auritus** (Art. 32.1.d; no description), "Sarcocyphus" = Nardia geoscyphus (De Not.) Lindb. (Solenostomataceae). Syn. in Váňa 1976a.

**Sarcocyphus auritus** (Lehm.) Nees, *Syn. Hepat.* 1: 9, 1844 (see Gottsche et al. 1844), "Sarcocyphus". = Anastrophyllum auritum (Lehm.) Steph. (Anastrophyllaceae).


**Sarcocyphus kerguelenius** Schiffn., *Leberm.* 4: 114, 1822 (see Schiffner 1822), "Sarcocyphus". = Sphenolobus minutus (Schreb. ex Crantz) Berggr. (Anastrophyllaceae). Syn. in Müller 1909b.


Synopsis

Gymnomitriaceae H.Klinggr.

Acrolophozia R.M.Schust.
   A. fuegiana R.M.Schust. (***)
   A. pectinata R.M.Schust. (***)
   A. sulcata Hässel (***)

Apomarsupella R.M.Schust.
   A. africana (Steph. ex Bonner) R.M.Schust. (***)
   A. crystallocaulon (Grolle) Váňa (***)
   A. revoluta (Nees) R.M.Schust. (***)
      – subsp. novoguineanensis R.M.Schust. (**
      – subsp. revoluta (**
   A. rubida (Mitt.) R.M.Schust. (***)
   A. verrucosa (W.E.Nicholson) Váňa (***)

Gymnomitrion Corda
   G. adustum Nees (***)
   G. alpinum (Gottsche ex Husn.) Schiffn. (***)
   G. asperulatum R.M.Schust. ex Váňa (***)
   G. atriformum Váňa (***)
   G. bolivianum (Steph.) Váňa (***)
   G. brevissimum (Dumort.) Warnst. (***)
   G. commutatum (Limpr.) Schiffn. (***)
   G. concinnatum (Lightf.) Corda (***)
   G. corallloides Nees (***)
   G. crenatilobum Grolle (***)
   G. crenulatum Gottsche ex Carrington (***)
   G. incompletum (Gottsche) R.M.Schust. ex Váňa (**
   G. laceratum (Steph.) Horik. (***)
   G. minutulum (Hässel) Váňa (***)
   G. moralesae Váňa (***)
   G. mucronulatum (N.Kitag.) N.Kitag. (***)
   G. mucrophorum R.M.Schust. (***)
   G. nigrum (Grolle et Váňa) Váňa (***)
   G. noguchianum S.Hatt. (***)
   G. obtusilobum N.Kitag. (***)
   G. obtusum Lindb. (***)
   G. pacificum Grolle (***)
   G. setaceum Grolle et Váňa (***)
   G. sinense Müll.Frib. (***)
   G. strictum (Berggr.) R.M.Schust. (***)
      – var. inaequale R.M.Schust. (**
      – var. strictum (**
   G. subintegrum (S.W.Arnell) Váňa (***)
   G. truncato-apiculatum Herzog (***)

Herzogobryum Grolle
   H. atrocapillum (Hook.f. et Taylor) Grolle (***)
   H. filiforme R.M.Schust. (***)
   H. molle Grolle (***)
   H. teres (Carrington et Pearson) Grolle (***)
H. vermiculare (Schiffn.) Grolle (***)

Marsupella Dumort.

M. alata S.Hatt. et N.Kitag. ex N.Kitag. (***)
M. andreaoides (Lindb.) Müll.Frib. (***)
M. apiculata Schiffn. (***)
M. aquatica (Lindenb.) Schiffn. (***)
M. arctica (Berggr.) Bryhn et Kaal. (***)
M. boeckii (Austin) Lindb. ex Kaal. (***)
M. bolanderi (Austin) Underw. (***)
M. condensata (Ångstr. ex C.Hartm.) Lindb. ex Kaal. (***)
M. disticha Steph. (***)
M. emarginata (Ehrh.) Dumort. (***)
  – subsp. emarginata (**)
  – subsp. tubulosa (Steph.) N.Kitag. (**)
  – subsp. tubulosa var. apertifolia (Steph.) N.Kitag. (**)
  – subsp. tubulosa var. patens N.Kitag. (**)
  – subsp. tubulosa var. tubulosa (Steph.) N.Kitag. (**)
M. funckii (F.Weber et D.Mohr) Dumort. (***)
M. microphylla R.M.Schust. (***)
M. miniata (Lindenb. et Gottsche) Grolle (***)
M. minutissima N.Kitag. (**)
M. neesii Sande Lac. ex Schiffn. (***)
M. paroica R.M.Schust. (***)
M. profunda Lindb. (***)
M. pseudofunckii S.Hatt. (***)
M. shimizuana S.Hatt. (?)
M. sparsifolia (Lindb.) Dumort. (***)
  – subsp. childii R.M.Schust. (?)
  – subsp. sparsifolia (?)
M. sphacelata (Giesecke ex Lindenb.) Dumort. (***)
M. spiniloba R.M.Schust. et Damsh. (***)
M. sprucei (Limpr.) Bernet (***)
M. stableri Spruce (***)
M. stoloniformis N.Kitag. (***)
  – subsp. stoloniformis (***)
  – subsp. vermiciformis R.M.Schust. (***)
M. yakushimensis (Horik.) S.Hatt. (***)

Nanomarsupella R.M.Schust.
N. xenophylla (R.M.Schust.) R.M.Schust. (***)

Nothogymnomitrion R.M.Schust.
N. erosum (Carrington et Pearson) R.M.Schust. (***)

Paramomitrion R.M.Schust.
P. paradoxum R.M.Schust. (***)

Poeltia Grolle
P. campylata Grolle (***)

Prasanthus Lindb.
P. jamaicus Potemkin (**)
P. suecicus (Gottsche) Lindb. (***)

TAXONOMY, SYSTEMATICS & NOMENCLATURE OF GYMNOMITRIACEAE Phytotaxa 11 © 2010 Magnolia Press • 53
Summary of all names


*Acolea adusta* (Nees) Trevis. = *Gymnomitrion adustum* Nees

*Acolea africana* Steph. = *Apomarsupella africana* (Steph. ex Bonner) R.M.Schust.

*Acolea alpina* (Gottsch ex Husn.) C.Massal. = *Gymnomitrion alpinum* (Gottsch ex Husn.) Schiffn.

*Acolea andina* Herzog = *Gymnomitrion bolivianum* (Steph.) Váňa


*Acolea argillacea* (Nees) Trevis. = *Neesioscyphus argillaceus* (Nees) Grolle

*Acolea atrata* (Mitt.) Witt. = *Apomarsupella revoluta* (Nees) R.M.Schust.

*Acolea atrocapilla* (Hook.f. et Taylor) Steph. = *Herzogobryum atrocapillum* (Hook.f. et Taylor) Grolle


*Acolea brevifolobata* Step. = *Gymnomitrion concinnatum* (Lightf.) Corda

*Acolea brevissima* Dumort. = *Gymnomitrion brevissimum* (Dumort.) Warnst.

*Acolea caledonica* Steph. = *Acromastigum caledonicum* (Steph.) Grolle

*Acolea carnea* (Steph. ex Bonner) R.M.Schust.

*Acolea carnea* (Steph.) Inoue = *Gymnomitrion corallioides* (Steph.) Bernet

*Acolea carnea* (Steph. ex Bonner) R.M.Schust. = *Fossombronia angulosa* (Dicks.) Raddi

*Acolea cocklearis* (Lindb.) Steph. = *Gymnomitrion brevissimum* (Dumort.) Warnst.

*Acolea concinnata* (Lightf.) Dumort. = *Gymnomitrion concinnatum* (Lightf.) Corda

*Acolea concinnata* (Lightf.) Dumort. var. *intermedia* (Limpr.) Bernet = *Gymnomitrion concinnatum* (Lightf.) Corda

*Acolea concinnata* (Lightf.) Dumort. *β procumbens* (Nees) C.Massal. = *Gymnomitrion concinnatum* (Lightf.) Corda

*Acolea concinnata* (Lightf.) Dumort. *f. procumbens* (Nees) Bernet = *Gymnomitrion concinnatum* (Lightf.) Corda

*Acolea concinnata* (Lightf.) Dumort. *f. rufa* (Limpr.) Bernet = *Gymnomitrion concinnatum* (Lightf.) Corda

*Acolea concinnata* (Lightf.) Dumort. *f. viridis* (Limpr.) Bernet = *Gymnomitrion concinnatum* (Lightf.) Corda

*Acolea conferta* (Limpr.) C.Massal. et Carestia = *Gymnomitrion brevissimum* (Dumort.) Warnst.

*Acolea corallioides* (Nees) Dumort. = *Gymnomitrion corallioides* (Nees)

*Acolea corallioides* (Nees) Dumort. *α brevis* Bernet = *Gymnomitrion corallioides* (Nees)

*Acolea corallioides* (Nees) Dumort. *β elongata* Bernet = *Gymnomitrion corallioides* (Nees)

*Acolea crassifolia* (Carrington) Step. = *Gymnomitrion brevissimum* (Dumort.) Warnst.

*Acolea crassifolia* (Carrington) C.Massal. et Carestia = *Gymnomitrion brevissimum* (Dumort.) Warnst.

*Acolea crenulata* (Gottsch ex Carrington) Step. = *Gymnomitrion crenulatum* Gottsch ex Carrington

*Acolea cuspidata* (Berggr.) Step. = *Gymnomitrion incompletum* (Gottsch) R.M.Schust. ex Váňa


*Acolea eurythrorhiza* (Bisch.) Trevis. = *Fossombronia angulosa* (Dicks.) Raddi

*Acolea fauriana* Step. = *Gymnomitrion corallioides* Nees

*Acolea formosae* Step. = *Cyldirocolea recurvifolia* (Steph.) Inoue

*Acolea lacerata* Step. = *Gymnomitrion laceratum* (Steph.) Horik.


*Acolea magellanica* C.Massal. et Steph. = *Herzogobryum teres* (Carrington et Pearson) Grolle

*Acolea miniata* (Lindenb. et Gottsche) Trevis. = *Marsupella miniata* (Lindenb. et Gottsche) Grolle

*Acolea obtusa* (Lindb.) C.Massal. et Carestia = *Gymnomitrion obtusum* Lindb.


*Acolea scariosa* (Lehm.) Trevis. = *Gongylanthus scariosus* (Lehm.) Step.


*Acolea suecica* (Gottsche) C.Massal. et Carestia = *Prasanthus suecicus* (Gottsche) Lindb.

*Acolea varians* (Lindb.) Step. = *Gymnomitrion brevissimum* (Dumort.) Warnst.

*Acrolophozia suffulgens* R.M.Schust.

*Acrolophozia sulphurea* Hässel

*Anaclostophyllum bolivianum* Steph. = *Gymnomitrion bolivianum* (Steph.) Váňa

*Anaclostophyllum merrillanum* Steph. = *Apomarsupella revoluta* (Nees) R.M.Schust.

*Anaclostophyllum revolutens* Herzog = *Apomarsupella revoluta* (Nees) R.M.Schust.

*Apomarsupella africana* (Steph. ex Bonner) R.M.Schust.

*Apomarsupella crystallocaulon* (Grolle) Váňa
Apomarsupella revoluta (Nees) R.M.Schust.
Apomarsupella revoluta (Nees) R.M.Schust. subsp. novoguineanensis R.M.Schust.
Apomarsupella rubida (Mitt.) R.M.Schust.
Apomarsupella verrucosa (W.E.Nicholson) Väña
*Cephalozia divaricata (Sm.) Dumort. var. latifolia (Lindb. ex Norrl.) Lindb. nom. inval. = Marsupella boeckii (Austin) Lindb. ex Kaal.
*Cephalozia nevicensis (Carrington) C.Massal. = Marsupella boeckii (Austin) Lindb. ex Kaal.
Cesius acinacifolius (Hook.f. et Taylor) K.Feldberg, Väña, Hentschel et Heinrichs
Cesius adustus (Nees) Carruth. = Gymnomitrion adustum Nees
Cesius adustus (Nees) Carruth. var. andreaeoides (Lindb.) Jörg. = Marsupella andreaeoides (Lindb.) Müll.Frib.
Cesius alpinus (Gottsche ex Husn.) Lindb. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Cesius alpinus (Gottsche ex Husn.) Lindb. f. gracilis Kaal. ex Jörg. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Cesius alpinus (Gottsche ex Husn.) Lindb. var. heterophyllus (Bernet) Jörg. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Cesius alpinus (Gottsche ex Husn.) Lindb. f. laxior (Gottsche et Rabenh.) Kaal. ex Jörg. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Cesius alpinus (Gottsche ex Husn.) Lindb. f. pygmaeus Kaal. ex Jörg. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Cesius andreaeoides Lindb. = Marsupella andreaeoides (Lindb.) Müll.Frib.
Cesius apiculatus (Schiffn.) Bryhn = Marsupella apiculata Schiffn.
Cesius argillaceus (Nees) Kuntze = Neesioscyphus argillaceus (Nees) Grolle
Cesius atrocapillus (Lindb.) Lindb. = Neocystis atrocapillus (Lindb.) Schiffn.
Cesius brevissimus (Dem.) Pearson = Gymnomitrion brevissimum (Dem.) Warnst.
Cesius carneus (Nees) Kuntze = Neesioscyphus carneus (Nees) Grolle
*Cesius cochlearis (Lindb.) Lindb. nom. inval. = Gymnomitrion brevissimum (Dem.) Warnst.
Cesius cochlearis (Lindb.) Lindb. ex Kaal. = Gymnomitrion brevissimum (Dem.) Warnst.
Cesius concinnatus (Lightf.) Gray = Gymnomitrion concinnatum (Lightf.) Corda
Cesius concinnatus (Lightf.) Gray var. ambiguis Kaal. ex Jörg. = Gymnomitrion concinnatum (Lightf.) Corda
Cesius concinnatus (Lightf.) Gray var. argenteus Jörg. = Gymnomitrion concinnatum (Lightf.) Corda
Cesius concinnatus (Lightf.) Gray var. bryhnii Kaal. ex Jörg. = Gymnomitrion concinnatum (Lightf.) Corda
Cesius concinnatus (Lightf.) Gray var. intermedius (Limpr.) Jörg. = Gymnomitrion concinnatum (Lightf.) Corda
Cesius concinnatus (Lightf.) Gray var. rufus (Limpr.) Jörg. = Gymnomitrion concinnatum (Lightf.) Corda
Cesius condensatus (Ångstr. ex C.Hartm.) Lindb. = Marsupella condensata (Ångstr. ex C.Hartm.) Lindb. ex Kaal.
Cesius confertus (Limpr.) Pearson = Gymnomitrion brevissimum (Dem.) Warnst.
Cesius corallioides (Nees) Carruth. = Gymnomitrion corallioides Nees
*Cesius corallioides (Nees) Carruth. var. β intermedius Lindb. nom. inval. = Gymnomitrion corallioides Nees
Cesius crassifolius (Carrington) Lindb. = Gymnomitrion brevissimum (Dem.) Warnst.
Cesius crenulatus (Gottsche ex Carrington) Carruth. = Gymnomitrion crenulatum Gottsch ex Carrington
Cesius crenulatus (Gottsche ex Carrington) Carruth. f. rufescens Bryhn = Gymnomitrion crenulatum Gottsch ex Carrington
Cesius cuspidatus Berggr. = Gymnomitrion incompletum (Gottsche) R.M.Schust. ex Väña
Cesius erosus Carrington et Pearson = Nothogymnomitrion erosum (Carrington et Pearson) R.M.Schust.
Cesius erythrorhizus (Bisch.) Kuntze = Fossombronia angulosa (Dicks.) Raddi
Cesius lutescens (Lehm. et Lindemb.) Kuntze = Notoscyphus lutescens (Lehm. et Lindemb.) Mitt.
Cesius miniatus (Lindemb. et Gottsch) Kuntze = Marsupella miniata (Lindemb. et Gottsch) Grolle
Cesius minor (Schleich. ex Lindb.) Schleich. ex Kuntze = Gymnomitrion brevissimum (Dem.) Warnst.
Cesius obtusus (Lindb.) Lindb. = Gymnomitrion obtusum Lindb.
*Cesius obtusus (Lindb.) Lindb. f. alboviridis Kaal. ex Jörg. = Gymnomitrion obtusum Lindb.
*Cesius obtusus (Lindb.) Lindb. f. argenteus Kaal. ex Jörg. nom. inval. = Gymnomitrion obtusum Lindb.
*Cesius obtusus (Lindb.) Lindb. var. intermedius Jörg. nom. inval. = Gymnomitrion obtusum Lindb.
Cesius ochrophyllus (Hook.f. et Taylor) Kuntze = Accrobolbus ochrophyllus (Hook.f. et Taylor) R.M.Schust.
Cesius physocaulus (Taylor) Kuntze = Metahygrobiella tubulata (Hook.f. et Taylor) R.M.Schust. et J.J.Engel
Cesius revolutus (Nees) Lindb. = Apomarsupella revoluta (Nees) R.M.Schust.
Cesius revolutus (Nees) Lindb. var. gracilis Bryhn ex Kaal. = Apomarsupella revoluta (Nees) R.M.Schust.
Cesius scariosus (Lehm.) Kuntze = Gongylanthus scariosus (Lehm.) Steph.
Cesius suecicus (Gottsche) Lindb. = Prasanthus suecicus (Gottsche) Lindb.
Cesius varians (Lindb.) Lindb. ex Kaal. = Gymnomitron brevissimum (Dumort.) Warnst.
*Cesius varians (Lindb.) Lindb. nom. inval. = Gymnomitron brevissimum (Dumort.) Warnst.
Cesius varians (Lindb.) Lindb. var. coehlearis (Lindb.) Jörg. = Gymnomitron brevissimum (Dumort.) Warnst.
Cesius varians (Lindb.) Lindb. var. crassifolius (Carrington) Jörg. = Gymnomitron brevissimum (Dumort.) Warnst.
Chondrophyllo cucculatum Herzog = Herzogobryum verniculare (Schiffn.) Grolle
Dianthelia steeri R.M.Schust. = Gymnomitron laceratum (Steph.) Horik.
Gymnomitron adustum Nees
Gymnomitron adustum Nees var. olivaceum (Spruce) Macvicar = Gymnomitron adustum Nees
Gymnomitron africanum (Steph.) Horik. = Apomarsupella africana (Steph. ex Bonner) R.M.Schust.
Gymnomitron alpinum (Gottsche ex Husn.) Schiffn.
Gymnomitron alpinum (Gottsche ex Husn.) Schiffn. f. heterophyllum (Bernet) Müll.Frib. = Gymnomitron alpinum (Gottsche ex Husn.) Schiffn.
Gymnomitron alpinum (Gottsche ex Husn.) Schiffn. f. laxior (Gottsche et Rabenh.) Schiffn. = Gymnomitron alpinum (Gottsche ex Husn.) Schiffn.
Gymnomitron alpinum (Gottsche ex Husn.) Schiffn. var. payotii (Bernet) Zodda = Gymnomitron alpinum (Gottsche ex Husn.) Schiffn.
*Gymnomitron altissimum R.M.Schust. nom. inval. = Gymnomitron incompletum (Gottsche) R.M.Schust. ex Váňa
Gymnomitron argillaceum (Nees) Gottsche = Neesioscyphus argillaceus (Nees) Grolle
Gymnomitron argillaceum (Nees) Gottsche a major (Nees) Gottsche = Neesioscyphus argillaceus (Nees) Grolle
Gymnomitron argillaceum (Nees) Gottsche β minor (Nees) Gottsche = Neesioscyphus argillaceus (Nees) Grolle
Gymnomitron asperulatum (R.M.Schust.) R.M.Schust. ex Váňa
*Gymnomitron asperulatum R.M.Schust. nom. inval. = Gymnomitron asperulatum (R.M.Schust.) R.M.Schust. ex Váňa
*Gymnomitron atratum (Mitt.) Parihar nom. inval. = Apomarsupella revoluta (Nees) R.M.Schust.
Gymnomitron atrocapillum Hook.f. et Taylor = Herzogobryum atrocapillum (Hook.f. et Taylor) Grolle
Gymnomitron atrocapillum Váňa
Gymnomitron belangerianum (Lehm. et Lindenb.) Gottsche = Notothecium lutescens (Lehm. et Lindenb.) Mitt.
Gymnomitron bolivianum (Steph.) Váňa
Gymnomitron brevifolium (Steph.) Horik. = Gymnomitron concinnatum (Lightf.) Corda
Gymnomitron brevissimum (Dumort.) Warnst.
Gymnomitron caledonicum (Steph.) Horik. = Acromastigum caledonicum (Steph.) Grolle
Gymnomitron carneum (Nees) Gottsche = Neesioscyphus carneus (Nees) Grolle
Gymnomitron cochleare (Lindb.) Müll.Frib. = Gymnomitron brevissimum (Dumort.) Warnst.
Gymnomitron commutatum (Limpr.) Schiffn.
Gymnomitron concinnatum (Lightf.) Corda
Gymnomitron concinnatum (Lightf.) Corda var. ambiguum (Kaal. ex Jörg.) S.W.Arnell = Gymnomitron concinnatum (Lightf.) Corda
*Gymnomitron concinnatum (Lightf.) Corda var. argenteum (Jörg.) Müll.Frib. nom. inval. = Gymnomitron concinnatum (Lightf.) Corda
*Gymnomitron concinnatum (Lightf.) Corda var. bryhnii (Kaal. ex Jörg.) Müll.Frib. nom. inval. = Gymnomitron concinnatum (Lightf.) Corda
Gymnomitron concinnatum (Lightf.) Corda b crenulatum (Gottsche ex Carrington) Limpr. = Gymnomitron crenulatum (Lightf.) Corda
Gymnomitron concinnatum (Lightf.) Corda f. elongatum Schiffn. = Gymnomitron concinnatum (Lightf.) Corda
Gymnomitron concinnatum (Lightf.) Corda var. intermedium Limpr. = Gymnomitron concinnatum (Lightf.) Corda
Gymnomitron concinnatum (Lightf.) Corda f. laxum Meyl. = Gymnomitron concinnatum (Lightf.) Corda
Gymnomitron concinnatum (Lightf.) Corda var. mucronulatum N.Kitag. = Gymnomitron mucronulatum (N.Kitag.)
N. Kitag.

Gymnomitrion concinnatum (Lightf.) Corda var. obtusum (Lindb.) Limpr. = Gymnomitrion obtusum Lindb.
Gymnomitrion concinnatum (Lightf.) Corda f. procumbens (Nees) Limpr. = Gymnomitrion concinnatum (Lightf.) Corda
Gymnomitrion concinnatum (Lightf.) Corda f. procumbens Nees = Gymnomitrion concinnatum (Lightf.) Corda
Gymnomitrion concinnatum (Lightf.) Corda var. reflexum Müll. Fr. = Gymnomitrion concinnatum (Lightf.) Corda

*Gymnomitrion concinnatum (Lightf.) Corda var. rufescens (Kaal. ex Jørg.) Müll. Frib. nom. inval. = Gymnomitrion concinnatum (Lightf.) Corda

Gymnomitrion concinnatum (Lightf.) Corda f. rufum Limpr. = Gymnomitrion concinnatum (Lightf.) Corda
Gymnomitrion concinnatum (Lightf.) Corda f. viride Limpr. = Gymnomitrion concinnatum (Lightf.) Corda
Gymnomitrion concinnatum Ångstr. ex C. Hartm. = Marsupella condensata (Ångstr. ex C. Hartm.) Lindb. ex Kaal.

Gymnomitrion confertum (Limpr.) Limpr. = Gymnomitrion brevissimum (Dumort.) Warnst.
Gymnomitrion corallioides Nees

*Gymnomitrion corallioides Nees var. asperulum S. Hatt. nom. inval. = Gymnomitrion corallioides Nees
Gymnomitrion corallioides Nees var. faurianum (Steph.) S. Hatt. = Gymnomitrion corallioides Nees
Gymnomitrion crassifolium Carrington = Gymnomitrion brevissimum (Dumort.) Warnst.
Gymnomitrion crenatilobum Grolle
Gymnomitrion crenulatum Gottsch. ex Carrington

Gymnomitrion crenulatum Gottsch. ex Carrington f. rufescens (Bryhn) Müll. Fr. = Gymnomitrion crenulatum Gottsch. ex Carrington
Gymnomitrion cuspidatum (Berggr.) R. M. Schust. = Gymnomitrion incompletum (Gottsch.) R. M. Schust. ex Váňa
Gymnomitrion denticulatum (Berggr.) Müll. Fr. = Nothogymnomitrion erosum (Carrington et Pearson) R. M. Schust.
Gymnomitrion elgonense S. W. Arnell = Gymnomitrion laceratum (Steph.) Horik.
Gymnomitrion elgonense S. W. Arnell var. squarrosum S. W. Arnell = Gymnomitrion laceratum (Steph.) Horik.
Gymnomitrion erosum (Carrington et Pearson) Bastow = Nothogymnomitrion erosum (Carrington et Pearson) R. M. Schust.

Gymnomitrion erythrorhizum Bisch. = Fossombronia angulosa (Dicks.) Raddi
Gymnomitrion faurianum (Steph.) Horik. = Gymnomitrion corallioides Nees
Gymnomitrion formosae (Steph.) Horik. = Cylindrocolea recurvifolia (Steph.) Inoue
Gymnomitrion hookeri (Lyell ex Sm.) Corda = Haplomitrium hookeri (Lyell ex Sm.) Nees
Gymnomitrion incompletum (Gottsch.) R. M. Schust. ex Váňa

*Gymnomitrion incompletum (Gottsch.) R. M. Schust. nom. inval. = Gymnomitrion incompletum (Gottsch.) R. M. Schust. ex Váňa

Gymnomitrion integerrimum N. Kitag. = Cryptocoleopsis imbricata Amakawa

*Gymnomitrion juniperum (Sw.) Corda nom. illeg. = Herbertus juniperoides (Sw.) Grolle
Gymnomitrion laceratum (Steph.) Horik.
Gymnomitrion laceratum (Steph.) Horik. var. borneense N. Kitag. = Gymnomitrion incompletum (Gottsch.) R. M. Schust. ex Váňa

*Gymnomitrion laceratum (Steph.) Horik. var. squarrosum S. W. Arnell nom. inval. = Gymnomitrion laceratum (Steph.) Horik.

Gymnomitrion lutescens (Lehm. et Lindemb.) Gottsche = Notoscyphus lutescens (Lehm. et Lindemb.) Mitt.
Gymnomitrion marionense S. W. Arnell = Herzogobryum atrocapillum (Hook. f. et Taylor) Grolle
Gymnomitrion miniatum Lindemb. et Gottsche = Marsupella miniata (Lindemb. et Gottsche) Grolle
Gymnomitrion minutulum (Hässel) Váňa
Gymnomitrion moralesae Váňa
Gymnomitrion mucronulatum (N. Kitag.) N. Kitag.
Gymnomitrion mucrophorum R. M. Schust.

*Gymnomitrion nigrum Wade et McVean nom. inval. = Gymnomitrion nigrum (Grole et Váňa) Váňa
Gymnomitrion nigrum (Grole et Váňa) Váňa
Gymnomitrion nigrum (Grole et Váňa) Váňa
Gymnomitrion nigrum (Grole et Váňa) Váňa
Gymnomitrion obtusilobum N. Kitag.
Gymnomitrion obtusum Lindb.

Gymnomitrion orbiculatum Colenso = Solenostoma orbiculatum (Colenso) R. M. Schust.
Gymnomitrion pacificum Grolle
Gymnomitrion physocaulum (Taylor) Taylor ex Gottsche, Lindemb. et Nees = Metahygrobiella tubulata (Hook. f. et Taylor) R. M. Schust. et J. J. Engel

TAXONOMY, SYSTEMATICS & NOMENCLATURE OF GYMNOMITRIACEAE

Phytotaxa 11 © 2010 Magnolia Press • 57
Gymnomitrion scariosum (Lehm.) Nees = Gongylanthus scariosus (Lehm.) Steph.
Gymnomitrion setaceum Grolle et Váňa
Gymnomitrion sinense Müll.Frib.
Gymnomitrion strictum (Berggr.) R.M.Schust.
Gymnomitrion strictum (Berggr.) R.M.Schust. var. inaequale R.M.Schust.
Gymnomitrion subintegrum (S.W.Arnell) Váňa
Gymnomitrion suecicum Gottsche = Prasanthus suecicus (Gottsche) Lindb.
Gymnomitrion truncato-apiculatum Herzog
Gymnomitrion uncrenulatum C.Gao et G.C.Zhang = Gymnomitrion commutatum (Limpr.) Schiffn.
Gymnomitrion varians (Lindb.) Schiffn. = Gymnomitrion brevissimum (Dumort.) Warnst.
Gymnomitrion varians (Lindb.) Schiffn. var. majus Schiffn. = Gymnomitrion brevissimum (Dumort.) Warnst.
Gymnomitrion vermiculare Schiffn. = Herzogobryum vermiculare (Schiffn.) Grolle
Herzogobryum aterrimum (Steph.) Grolle = Cephalomitrion aterrimum (Steph.) R.M.Schust.
Herzogobryum atrocapillum (Hook.f. et Taylor) Grolle
Herzogobryum cucullatum (Herzog) Grolle = Herzogobryum vermiculare (Schiffn.) Grolle
Herzogobryum erosum (Carrington et Pearson) Grolle = Nothogymnomitrion erosum (Carrington et Pearson)
R.M.Schust.
Herzogobryum filiforme R.M.Schust.
Herzogobryum filicum Grolle
Herzogobryum molle Grolle
Herzogobryum teres (Carrington et Pearson) Grolle
Herzogobryum vermiculare (Schiffn.) Grolle
Hygrobiella japonica Steph. = Marsupella spachelata (Giesecke ex Lindenb.) Dumort.
Hygrobiella nevicensis (Carrington) Spruce = Marsupella boeckii (Austin) Lindb. ex Kaal.
Jamesoniella inflexo-limbata Herzog = Herzogobryum teres (Carrington et Pearson) Grolle
Jamesoniella teres (Carrington et Pearson) Steph. = Herzogobryum teres (Carrington et Pearson) Grolle
*Jungermannia aquatica "Schrad." ex Carringt. nom. inval. = Marsupella aquatica (Lindenb.) Schiffn.
*Jungermannia atrata Mitt. nom. illeg. = Apomarsupella revoluta (Nees) R.M.Schust.
Jungermannia atrocapilla (Hook.f. et Taylor) Hook.f. et Taylor = Herzogobryum atrocapillum (Hook.f. et Taylor) Grolle
*Jungermannia brunnea Spreng. ex Nees nom. inval. = Gymnomitrion adustum Nees
Jungermannia concinnata Lightf. = Gymnomitrion concinnatum (Lightf.) Corda
*Jungermannia concinnata Lightf. β clavuligera Nees nom. inval. = Gymnomitrion corallioidees Nees
*Jungermannia concinnata Lightf. var. β clavuligera Nees ex Huebener nom. inval. = Gymnomitrion corallioidees Nees
*Jungermannia concinnata Lightf. b minor Schleich. nom. inval. = Gymnomitrion brevissimum (Dumort.) Warnst.
*Jungermannia concinnata Lightf. var. minor Nees nom. inval. = Gymnomitrion adustum Nees
*Jungermannia concinnata Lightf. var. b minor Schleich. ex Dumort. nom. inval. = Gymnomitrion brevissimum (Dumort.) Warnst.
Jungermannia divaricata Sm. var. latifolia Lindb. ex Norrl. = Marsupella boeckii (Austin) Lindb. ex Kaal.
Jungermannia emarginata Ehrh. = Marsupella emarginata (Ehrh.) Dumort.
Jungermannia emarginata Ehrh. var. ε angusta Nees ex Huebener = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Jungermannia emarginata Ehrh. β aquatica Lindemb. = Marsupella aquatica (Lindenb.) Schiffn.
*Jungermannia emarginata Ehrh. var. β aquatica Sw. ex Hook. nom. inval. = Marsupella aquatica (Lindenb.) Schiffn.
Jungermannia emarginata Ehrh. var. b crispa Grognot = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
*Jungermannia emarginata Ehrh. var. α fusca Moug. et Nestl. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Jungermannia emarginata Ehrh. var. β grandis Nees ex Huebener = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Jungermannia emarginata Ehrh. var. γ julacea (Nees) Lindemb. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
*Jungermannia emarginata Ehrh. d minima Schleich. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp.
emarginata

*Jungermannia emarginata Ehrh. c nigra Schleich. ex Lindenb. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
*Jungermannia emarginata Ehrh. c nigra Schleich. ex Lindenb. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Jungermannia emarginata Ehrh. var. α patens Nees = Marsupella aquatic (Lindenb.) Schiffn.
*Jungermannia emarginata Ehrh. var. γ rivularis Sw. ex Huebener nom. illeg. = Marsupella aquatic (Lindenb.) Schiffn.
*Jungermannia emarginata Ehrh. var. γ rivularis Sw. ex Steud. nom. inval. = Marsupella aquatic (Lindenb.) Schiffn.
Jungermannia emarginata Ehrh. var. saccata (Nees) Moug., Nestl. et Schimp. = Marsupella sphaelata (Giesecke ex Lindenb.) Dumort.
*Jungermannia emarginata Ehrh. var. δ turgida Huebener = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
*Jungermannia emarginata Ehrh. var. β viridis Moug. et Nestl. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata


Lophonardia caespitosa
Lophozia canariensis Bryhn = Hypophoza laxifolia (Mont.) Vána et J.J.Engel
Lophozia ubayensis Steph. = Gymnomitrion corallioides Nees
Marsupella aemula (Nees) Spruce = Gymnomitrion adustum Nees
Marsupella aemula (Limpr.) Lindb. ex Kaal. = Marsupella condensata (Ångstr. ex C.Hartm.) Lindb. ex Kaal.
*Marsupella aemula Lindb. nom. inval. = Marsupella condensata (Ångstr. ex C.Hartm.) Lindb. ex Kaal.
Marsupella aequiloba (Nees) Spruce = Gymnomitrion adustum Nees
Marsupella alpina (Gottsche ex Husn.) Bernet = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
*Marsupella alpina (Gottsche) Gottsch ex Trevis. nom. inval. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Marsupella alpina (Gottsche ex Husn.) Bernet α fusca Bernet = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Marsupella alpina (Gottsche ex Husn.) Bernet β* heterophylla (Bernet) Bernet = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Marsupella alpina (Gottsche ex Husn.) Bernet var. heterophylla (Bernet) Boulay = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Marsupella alpina (Gottsche ex Husn.) Bernet var. laxior (Carrington et Pearson) Waddell = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Marsupella alpina (Gottsche ex Husn.) Bernet γ payotii Bernet = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Marsupella alpina (Gottsche ex Husn.) Bernet β procumbens Bernet = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
*Marsupella andicola R.M.Schust. nom. inval. = Marsupella miniata (Lindenb. et Gottsche) Grolle
Marsupella andina J.B.Jack et Steph. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella andreaeoides (Lindlb.) Müll.Frib.
Marsupella aequiloba Steph. = Marsupella emarginata (Ehrh.) Dumort. subsp. tubulosa var. apertifolia (Steph.) N.Kitag.
Marsupella aquatica Schiffl.
Marsupella apiculata Schiffn. = Marsupella apiculata Schiffn.
Marsupella aquatica (Lindem.) Schiffn.
Marsupella austro-americana Váňa ex Gradst. et Hekking nom. inval. = Marsupella miniata (Lindem. et Gottsch.) Grolle
Marsupella brevissima (Dumort.) Grolle = Gymnomitrium brevissimum (Dumort.) Warnst.
Marsupella cambrica Pearson ex Schiffn. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella campylata (Grolle) R.M.Schust. = Poeltia campylata Grolle
Marsupella capensis S.W.Arnell = Gymnomitrium bolivianum (Steph.) Váňa
Marsupella capillaris (Limpr.) Bernet = Marsupella boeckii (Austin) Lindb. ex Kaal.
Marsupella chilensis Steph. ex Bonner = Apomarsupella africana (Steph. ex Bonner) R.M.Schust.
Marsupella cochlearis (Lindb.) Spruce = Gymnomitrium brevissimum (Dumort.) Warnst.
Marsupella commutata (Limpr.) Bernet = Gymnomitrium commutatum (Limpr.) Schiffn.
Marsupella concinnata (Lightf.) Spruce = Gymnomitrium concinnatum (Lightf.) Corda
Marsupella condensata (Ángstr. ex C.Hartm.) Lindb. ex Kaal.
Marsupella conferta (Limpr.) Spruce = Gymnomitrium brevissimum (Dumort.) Warnst.
Marsupella crassifolia (Carrington) Spruce = Gymnomitrium brevissimum (Dumort.) Warnst.
Marsupella crenulata C.Massal. et Steph. nom. illeg. = Anastrophyllum auritum (Lehm.) Steph.
Marsupella crenulata (Gottsche ex Carrington) Spruce = Gymnomitrium crenulatum Gottsch ex Carrington
Marsupella crystallocaulon Grolle = Apomarsupella crystallocaulon (Grolle) Váňa
Marsupella cuspidata Steph. = Gymnomitrium bolivianum (Steph.) Váňa
Marsupella delavayi Steph. = Apomarsupella revoluta (Nees) R.M.Schust.
Marsupella densifolia (Nees) Trevis. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella densifolia (Nees) Dumort. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. *Marsupella emarginata Dumort. nom. inval. = Marsupella emarginata (Ehrh.) Dumort.
Marsupella emarginata (Ehrh.) Dumort. subsp. aquatica (Lindenb.) Meyl. = Marsupella aquatica (Lindenb.) Schiffn.
Marsupella emarginata (Ehrh.) Dumort. var. β aquatica (Lindenb.) Dumort. = Marsupella aquatica (Lindenb.) Schiffn.
Marsupella emarginata (Ehrh.) Dumort. subsp. aquatica (Lindenb.) Bernet = Marsupella aquatica (Lindenb.) Schiffn.
Marsupella emarginata (Ehrh.) Dumort. var. arctica (Berggr.) Frye et L.Clark = Marsupella arctica (Berggr.) Bryhn et Kaal.
Marsupella emarginata (Ehrh.) Dumort. var. attenuata Kaal. ex Jorg. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Spruce var. densifolia (Nees) Müll.Frib. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. ericetorum (Gottsche, Lindenb. et Nees) Zodda = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. f. filamentosa (J.B.Jack) Dalla Torre et Sarth. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. f. gracilescens Kaal. ex Jorg. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. γ gracilis Bernet = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. δ humilis Bernet = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. γ julacea (Nees) Dumort. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. latiloba R.M.Schust. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. ligurica (Gottsche) Schiffn. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. f. ligurica (Gottsche) Jorg. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. f. minor Kaal. ex Jorg. nom. illeg. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. minor C.Massal. ex Schiffn. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. e minor Carrington ex Waddell nom. illeg. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. f. mutabilis Jorg. = Marsupella aquatica (Lindenb.) Schiffn.
Marsupella emarginata (Ehrh.) Dumort. f. nigra C.E.O.Jensen = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. obtusiloba Schiffn. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. pearsonii (Macvicar) Jorg. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. f. pearsonii (Macvicar) S.W.Arnell = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. α* procera Gottsche ex Bernet = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. robusta (De Not.) Bom. et Broth. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella emarginata (Ehrh.) Dumort. var. saccata (Nees) Pearson = Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
Marsupella emarginata (Ehrh.) Dumort. subsp. tubulosa (Steph.) N.Kitag.
Marsupella emarginata (Ehrh.) Dumort. subsp. tubulosa var. apertifolia (Steph.) N.Kitag.
Marsupella emarginata (Ehrh.) Dumort. subsp. tubulosa var. patens N.Kitag.
Marsupella emarginata (Ehrh.) Dumort. subsp. tubulosa var. tubulosa (Steph.) N.Kitag.
Marsupella emarginata (Ehrh.) Dumort. f. umbraticola Kaal. ex Jorg. = Marsupella emarginata (Ehrh.) Dumort. subsp.
emarginata

*Marsupella emarginata* (Ehrh.) Dumort. f. umbrosa Schiffn. nom. inval. = *Marsupella emarginata* (Ehrh.) Dumort. subsp. emarginata

*Marsupella erythrorhiza* (Limpri.) Schiffn. = *Marsupella sphacelata* (Giesecke ex Lindenb.) Dumort.


*Marsupella erythrorhiza* (Limpri.) Schiffn. var. brevicaulis (Schiffn.) Schiffn. = *Marsupella sphacelata* (Giesecke ex Lindenb.) Dumort.


*Marsupella fengchengensis* (Schiffn.) Dumort. f.


*Marsupella filiformis* (Lindb.) Lindb. var. c = *Marsupella filiformis* (Lindb.) Lindb. ex Kaal.

*Marsupella fosteri* Step. ex Bonner = *Marsupella emarginata* (Ehrh.) Dumort. subsp. emarginata


*Marsupella gracilis* (C.Massal. et Carestia) Pearson = *Marsupella sprucei* (Limpri.) Bernet

*Marsupella groenlandica* C.E.O.Jensen = *Marsupella arctica* (Berggr.) Bryhn et Kaal.

*Marsupella gypsophylla* Dumort. nom. inval. = *Sphenolobus minutus* (Schreb. ex Crantz) Berggr.

*Marsupella hedbergii* S.W.Arnell = *Apomarsupella africana* (Steph. ex Bonner) R.M.Schust.


*Marsupella integrifolia* N.Kitag. = *Gymnomitrion subintegrum* (S.W.Arnell) Váňa

*Marsupella integrifolia* Steph. ex Bonner = *Gymnomitrion robustum* var. nivalis (N.Kitag.) Steph.


*Marsupella involuta* Váňa = *Gymnomitrion truncata-apatulata* Herzog

*Marsupella jackii* (Limpri.) Loeske = *Marsupella sphacelata* (Giesecke ex Lindenb.) Dumort.

*Marsupella japonica* Steph. ex Bonner = *Marsupella sphacelata* (Giesecke ex Lindenb.) Dumort.

*Marsupella japonica* Steph. ex Bonner = *Marsupella emarginata* (Ehrh.) Dumort. subsp. tubulosa (Steph.) N.Kitag.

*Marsupella joergensennii* Schiffn. = *Marsupella sphacelata* (Giesecke ex Lindenb.) Dumort.


*Marsupella joergensennii* Schiffn. f. gracilis Bryhn ex Jörg. nom. inval. = *Marsupella sphacelata* (Giesecke ex Lindenb.) Dumort.

*Marsupella joergensennii* Schiffn. f. nivalis Jörg. = *Marsupella sphacelata* (Giesecke ex Lindenb.) Dumort.


*Marsupella lacerata* (Steph.) Váňa = *Gymnomitrion bolivianum* (Steph.) Váňa


Marsupella lorentziana Steph. = Marsupella miniata (Lindenb. et Gottsche) Grolle
Marsupella media (Gottsche) Schiffn. = Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
Marsupella mexicana (Lindenb. et Gottsche) Steph. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella microphylla R.M.Schust.
Marsupella mitkawana Steph. ex Bonner = Marsupella emarginata (Ehrh.) Dumort. subsp. tubulosa (Steph.) N.Kitag.
Marsupella miyati (Lindenb. et Gottsche) Grolle
Marsupella minutissima N.Kitag.
Marsupella minutula Hässel = Gymnomitrion minutulum (Hässel) Váňa
Marsupella moralesae (Váňa) Váňa = Gymnomitrion Moralesae Váňa
Marsupella neesii (Nees ex Sande Lac.) Sande Lac. ex Schiffl. = Marsupella neglecta (Limp.) Lindb. = Marsupella sprucei (Limp.) Bernet
Marsupella nevicensis (Carrington) Pearson = Marsupella boeckii (Austin) Lindb. ex Kaal.
Marsupella nevicensis (Carrington) Pearson f. irrigua (Limp.) Müll.Frib. = Marsupella boeckii (Austin) Lindb. ex Kaal.
Marsupella nigra Grolle et Váňa = Gymnomitrion nigrum (Grolle et Váňa) Váňa
Marsupella nitida N.Kitag. = Apomarsupella rubida (Mitt.) R.M.Schust.
Marsupella obcordata (Berggr.) Steph. = Scapania obcordata (Berggr.) S.W.Arnell
Marsupella olivacea Spruce = Gymnomitrion adustum Nees
Marsupella paroica R.M.Schust.
Marsupella parvifolia Steph. = Gymnomitrion commutatum (Limp.) Schiffn.
Marsupella pearsonii Macvicar = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella pearsonii Macvicar var. revoluta Schiffn. = Marsupella aquatica (Lindenb.) Schiffn.
Marsupella polyanthos (L.) Dumort. = Chiloscyphus polyanthos (L.) Corda
Marsupella profunda Lindb.
Marsupella pseudofunckii S.Hatt.
Marsupella pulvinata (Raddi) Trevis. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella pusilla Steph. = Anastrophyllum auritum (Lehm.) Steph.
*Marsupella repens Lindb. ex Müll.Frib. nom. inval. = Marsupella sprucei (Limp.) Bernet
Marsupella revoluta (Nees) Trevis. = Apomarsupella revoluta (Nees) R.M.Schust.
Marsupella rikuchuna Steph. ex Bonner = Gymnocolea inflata (Huds.) Dumort.
Marsupella robusta (De Not.) A.Evans = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella robusta (De Not.) A.Evans f. pearsonii (Macvicar) Schljakov = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Marsupella rubida (Mitt.) Grolle = Apomarsupella rubida (Mitt.) R.M.Schust.
*Marsupella shimizuana S.Hatt. nom. inval.
Marsupella silvrettae (Gottsche et Rabenh.) Gottsche ex Dumort. = Nardia geoscyphus (De Not.) Lindb.
Marsupella sparsifolia (Lindb.) Dumort.
*Marsupella sparsifolia (Lindb.) Dumort. var. africana S.W.Arnell nom. inval. = Marsupella sparsifolia (Lindb.) Dumort.
*Marsupella sparsifolia (Lindb.) Dumort. subsp. childii R.M.Schust. nom. inval.
Marsupella sparsifolia (Lindb.) Dumort. var. norica (Limp.) Müll.Frib. = Marsupella sparsifolia (Lindb.) Dumort. subsp. sparsifolia
Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
Marsupella sphacelata (Giesecke ex Lindenb.) Dumort. var. arduennensis Boulay = Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
Marsupella sphacelata (Giesecke ex Lindenb.) Dumort. f. bifida R.M.Schust. = Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
Marsupella sphacelata (Giesecke ex Lindenb.) Dumort. f. densiretis Kaal. ex S.W.Arnell nom. inval. = Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
Marsupella sphacelata (Giesecke ex Lindenb.) Dumort. var. erythrorhiza (Limp.) Loitl. = Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
*Marsupella sphacelata (Giesecke ex Lindenb.) Dumort. var. β euphalacata Schiffn. nom. illeg. = Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
*Marsupella sphacelata (Giesecke ex Lindenb.) Dumort. f. inaequalis H.Buch nom. inval. = Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
*Marsupella sphacelata (Giesecke ex Lindenb.) Dumort. var. inundata Müll.Frib. nom. inval. = Marsupella sphacelata (Giesecke ex Lindenb.) Dumort.
*Marsupella varia* var. *sprucei* (Carrington) Jorg. ex S.W. Arnell *Gymnomitrion brevissimum* (Dumont.) Warnst.
*Marsupella varia* var. *crassifolia* (Carrington) Jorg. ex S.W. Arnell *Gymnomitrion brevissimum* (Dumont.) Warnst.
*Marsupella vulcanica* Schiffn. *Marsupella neesii* (Nees ex Sande Lac.) Sande Lac. ex Schiffn.
*Marsupella yakushimensis* (Horik.) S. Hatt.
*Marsupia emarginata* (Ehrh.) Dumort. *Marsupiala emarginata* (Ehrh.) Dumort.
*Marsupia emarginata* (Ehrh.) Dumort. var. *β aquatica* (Lindenb.) Dumort. *Marsupella aquatica* (Lindenb.) Schiffn.
*Marsupia emarginata* (Ehrh.) Dumort. var. *γ julacea* (Nees) Dumort. *Marsupella emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Marsupia sphacelata* (Giesecke ex Lindenb.) Dumort. *Marsupella sphacelata* (Giesecke ex Lindenb.) Dumort.
*Nanomarsupella xenophylla* (Ehrh.) Dumort. *Marsupella xenophylla* (Ehrh.) Dumort.
*Nardia adusta* (Nees) Carrington *Marsupia adusta* Bean
*Nardia aemula* (Limpr.) C. Massal. et Carestia *Marsupella condensata* (Ångstr. ex C. Hartm.) Lindb. ex Kaal.
*Nardia alpina* (Gottsche ex Husn.) Trevis. *Gymnomitrion alpinum* (Gottsche ex Husn.) Schiffn.
*Nardia alpina* (Gottsche) Gottsche ex Carrington *nom. inval. = Gymnomitrion alpinum* (Gottsche ex Husn.) Schiffn.
*Nardia alpina* (Gottsche ex Husn.) Trevis. var. *laxior* Carrington et Pearson *Gymnomitrion alpinum* (Gottsche ex Husn.) Schiffn.
*Nardia brevissima* (Dumont.) Lindb. *Gymnomitrion brevissimum* (Dumont.) Warnst.
*Nardia capillaris* (Limpr.) C. Massal. et Carestia *Marsupella boeckii* (Austin) Lindb. ex Kaal.
*Nardia commutata* (Limpr.) C. Massal. et Carestia *Gymnomitrion commutatum* (Limpr.) Schiffn.
*Nardia densifolia* (Nees) Trevis. *Marsupella emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Nardia emarginata* (Ehrh.) *Marsupella emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Nardia emarginata* (Ehrh.) Gray *Marsupella emarginata* (Ehrh.) Dumort. *nom. illeg. = Marsupella *emarginata* (Ehrh.) Dumort.
*Nardia emarginata* (Ehrh.) Gray *acutiuscula* Carrington *Marsupella emarginata* (Ehrh.) Dumort. *nom. illeg. = Marsupella *emarginata* (Ehrh.) Dumort.
*Nardia emarginata* (Ehrh.) Gray *β aquatica* (Lindenb.) Carrington *Marsupella aquatica* (Lindenb.) Schiffn.
*Nardia emarginata* (Ehrh.) Gray *β elongata* C. Massal. et Carestia *Marsupella aquatica* (Lindenb.) Schiffn.
*Nardia emarginata* (Ehrh.) Gray *ε ericetorum* (Gottsche, Lindenb. et Nees) C. Massal. *Marsupella emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Nardia emarginata* (Ehrh.) Gray *xx intermedia* C. Massal. et Carestia *Marsupella emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Nardia emarginata* (Ehrh.) Gray *x ligurica* (Gottsche) C. Massal. et Carestia *Marsupella emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Nardia emarginata* (Ehrh.) Gray *α major* Carrington *Marsupella aquatica* (Lindenb.) Schiffn.
*Nardia emarginata* (Ehrh.) Gray *β minor* (C. Massal. et Carestia) C. Massal. *nom. illeg. = Marsupella *emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Nardia emarginata* (Ehrh.) Gray *γ minor* Carrington *nom. illeg. = Marsupella *emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Nardia emarginata* (Ehrh.) Gray *f. * *minor* C. Massal. et Carestia *nom. illeg. = Marsupella *emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Nardia emarginata* (Ehrh.) Gray *f. ** obtusa* Carrington *Marsupella emarginata* (Ehrh.) Dumort. subsp. *emarginata*
*Nardia emarginata* (Ehrh.) Gray *δ picea* Carrington *Marsupella emarginata* (Ehrh.) Dumort. subsp. emarginata
*Nardia emarginata* (Ehrh.) Gray *f. propagulifera* Corb. *Marsupella emarginata* (Ehrh.) Dumort. subsp. emarginata
*Nardia funckii* (F. Weber et D. Mohr) Carrington ex Lindb. *β* *diffusa* Carrington *Marsupella funckii* (F. Weber et
Nardia gracilis C.Massal. et Carestia = Marsupella sprucei (Limpr.) Bernet
Nardia intricata Lindb. = Marsupella boeckii (Austin) Lindb. ex Kaal.
*Nardia latifolia Lindb. nom. inval. = Marsupella boeckii (Austin) Lindb. ex Kaal.
Nardia mexicana (Lindeb. et Gottsche) Trevis. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Nardia muelleri (Nees) C. Massal. var. ligurica C. Massal. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
*Nardia muelleri (Nees) C. Massal. var. b ligurica-viride Carrington nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Nardia interrupta (Nees) (Carrington) Dumort. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Nardia nevicensis (Carrington) C. Massal. et Carestia = Marsupella boeckii (Austin) Lindb. ex Kaal.
*Nardia pectinata Carrington ex Müll.Frib. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Nardia picea (Carrington) Carrington = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Nardia pulvinata (Raddi) Trevis. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Nardia robusta (De Not.) Trevis. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
*Nardia robusta (De Not.) Lindb. ex Carrington nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata
Nardia sparsifolia (Lindb.) Lindb. = Marsupella sparsifolia (Lindb.) Dumort.
*Nardia sparsifolia (Lindb.) Lindb. β adusta (Nees) Lindb. ex Carrington nom. inval. = Gymnomitrion adustum Nees
Nardia sparsifolia (Lindb.) Lindb. var. β minor Schleich. ex Lindb. = Gymnomitrion brevissimum (Dumort.) Warnst.
Nardia spahelatata (Giesecke ex Lindeb.) Carrington = Marsupella spahelatata (Giesecke ex Lindeb.) Dumort.
Nardia spahelatata (Giesecke ex Lindeb.) Carrington β media (Gottsche) C. Massal. = Marsupella spahelatata (Giesecke ex Lindeb.) Dumort.
Nardia sprucei (Limpr.) C. Massal. et Carestia = Marsupella sprucei (Limpr.) Bernet
*Nardia stableri (Spruce) Spruce nom. inval. = Marsupella stableri Spruce
Nardia sustellata (De Not.) Trevis. = Marsupella spahelatata (Giesecke ex Lindeb.) Dumort.
Nardia ustulata (Spruce) Lindb. = Marsupella sprucei (Limpr.) Bernet
Nardia varians Lindb. = Gymnomitrion brevissimum (Dumort.) Warnst.
Nardiocalyx apiculata (Schiffn.) Jorg. = Marsupella apiculata Schiffn.
Nothogymnomitrion erosum (Carrington et Pearson) R.M. Schust.
Notoscyphus suecicus (Gottsche) Steph. = Prasanthus suecicus (Gottsche) Lindb.
Paramomitrion paradoxum R.M. Schust.
Poeltia campylata Grolle
Poeltia stolonformis (N. Kitag.) R.M. Schust. = Marsupella stoloniformis N. Kitag.
Prasanthus jamalicas Potemkin
Prasanthus paroicus (Schiffn.) Kamim. = Notoscyphus lutescens (Lehm. et Lindeb.) Mitt. Prasanthus suecicus (Gottsche) Lindb.
Sarcocyclops adustus (Nees) Spruce = Gymnomitrion adustum Nees
Sarcocyclops aemulus Limpr. = Marsupella condensata (Ångstr. ex C. Hartm.) Lindb. ex Kaal.
Sarcocyclops alpinus Gottsche ex Husn. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
*Sarcocyclops alpinus Gottsche nom. inval. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
*Sarcocyclops alpinus Lindb. nom. inval. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Sarcocyclops alpinus Gottsche ex Husn. var. heterophyllus Bernt = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Sarcocyclops alpinus Gottsche ex Husn. f. laxior Gottsche et Rabenh. = Gymnomitrion alpinum (Gottsche ex Husn.) Schiffn.
Schiffn.
*Sarcocyclops anomalous J.B. Jack ex Gottsche et Rabenh. nom. inval. = Nardia geoscyphus (De Not.) Lindb.
Sarcocyclops aquaticus (Lindemb.) Breid. = Marsupella aquatica (Lindemb.) Schiffn.
Sarcocyclops auritus (Lehm.) Nees = Anastrophylum auritum (Lehm.) Steph.
Sarcocyclops boeckii Austin = Marsupella boeckii (Austin) Lindb. ex Kaal.
Sarcocyclops bolanderi Austin = Marsupella bolanderi (Austin) Underw.
Sarcocyclops capillaris Limpr. = Marsupella boeckii (Austin) Lindb. ex Kaal.
Sarcocyclops capillaris Limpr. var. β irrigus Limpr. = Marsupella boeckii (Austin) Lindb. ex Kaal.
<table>
<thead>
<tr>
<th>Sarcocyphos commutatus</th>
<th>Gymnomitrium commutatum (Limpr.) Schiffn.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarcocyphos confertus</td>
<td>Gymnomitrium brevisimum (Dumort.) Warnst.</td>
</tr>
<tr>
<td>Sarcocyphos decolorans (Limpr.) Husn. nom. inval. = Isopaches decolorans (Limpr.) H. Buck</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos densifolius Nees = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos densifolius Nees β dichotomus Nees = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos densifolius Nees γ fascicularis Nees = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda nom. illeg. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda f. acutus Carrington nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda β aquaticus (Lindenb.) Nees = Marsupella aquatica (Lindenb.) Schiffn.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda ε ericetorum Gottsche, Lindenb. et Nees = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda c erythrorhizus Limpr. = Marsupella sphaelata (Gieseecke ex Lindenb.) Dumort.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda f. filamentosus J.B. Jack = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda f. α fusco-purpureus Nees ex Limpr. nom. inval. = Marsupella aquatica (Lindenb.) Schiffn.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda f. humilis Nees = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda γ julaceus (Nees) Nees = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda * julaceus (Nees) Ångstr. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda var. micranthus De Not. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda α minor Gottsche et Rabenh. nom. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda ε montanus J.B. Jack nam. inval. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda f. obtusus Carrington nom. inval. = Marsupella sphaelata (Gieseecke ex Lindenb.) Dumort.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda var. δ piceus (Carrington) Gottsche et Rabenh. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda var. procerus Gottsche ex Limpr. nom. inval. = Marsupella aquatica (Lindenb.) Schiffn.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda f. purpureo-brunneus Nees ex Limpr. nom. inval. = Marsupella aquatica (Lindenb.) Schiffn.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda var. β rivularis Sw. ex De Not. nom. inval. = Marsupella aquatica (Lindenb.) Schiffn.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda var. robustus De Not. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda δ saccatus Nees = Marsupella sphaelata (Gieseecke ex Lindenb.) Dumort.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos ehrhardtii Corda f. tenius Rabenh. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos emarginatus (Ehrh.) Spruce = Marsupella emarginata (Ehrh.) Dumort.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos emarginatus (Ehrh.) Spruce var. aquaticus (Lindenb.) Austin = Marsupella aquatica (Lindenb.) Schiffn.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos emarginatus (Ehrh.) Spruce var. arcticus Berggr. = Marsupella arctica (Berggr.) Bryhn et Kaaal.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos emarginatus (Ehrh.) Spruce var. densifolius (Nees) Breidl. = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos emarginatus (Ehrh.) Spruce var. gracilis Payot nom. inval. = Marsupella aquatica (Lindenb.) Schiffn.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos emarginatus (Ehrh.) Spruce var. major (Carrington) Husn. = Marsupella aquatica (Lindenb.) Schiffn.</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos emarginatus (Ehrh.) Spruce f. minor Lamy = Marsupella emarginata (Ehrh.) Dumort. subsp. emarginata</td>
<td></td>
</tr>
<tr>
<td>Sarcocyphos filiformis (Lindb.) Warnst. = Marsupella boeckii (Austin) Lindb. ex Kaaal.</td>
<td></td>
</tr>
</tbody>
</table>
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion incompletum (Gottsche) R.M.Schust. et VÁňa
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
*Sarcocyphos funckii (F.Weber et D.Mohr) Nees var. \(\beta\) obtusifolius = Gymnomitrion brevissimum (Dumont.) Warnst.
Acknowledgements

The ELPT project is generously supported in part by the Global Biological Information Facility (GBIF) Seed Money Award No.2007-41 and supported in part by funding from the Biodiversity Synthesis Center of the Encyclopedia of Life. Funding from the National Science Foundation (DBI 0749762 and EF-0531730) have also partially supported aspects of the ELPT project, especially those relating to database activities. We would also like to thank the New York Botanical Gardens, The Natural History Museum, and the Farlow Herbarium for very kindly providing scanned copies of critical exsiccatae. We graciously thank Ana Séneca for help with compiling some aspects of the data as well as Gea Zijlstra, Pekka Isoviiita, Marshall Crosby, Ray Stotler and Fred Barrie for comments and suggestions regarding nomenclature. Michel Lüth kindly provided us with excellent pictures of some species. We graciously thank Maarten Christenhusz (Chief Editor) and Zhi-Qiang Zhang (Founding Editor) for their support and for their guidance throughout the editorial process as well as the and Phytotaxa editorial/production team and Magnolia Press.

References


University, Series B, Division 2 (Botany) 4: 73–187.


71.


