

## A synopsis of liverworts occurring in the Tatra Mountains (Western Carpathians, Poland and Slovakia): checklist, distribution and new data

Přehled játrovek Tater (Západní Karpaty, Polsko a Slovensko): seznam, rozšíření a nové údaje

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This paper presents the current state of knowledge on the liverwort flora of the entire massif of the Tatra Mts, the highest mountain range in the Carpathians. All data on the liverwort flora of the massif, published during 1814–2014, and personal material collected by P. Górski during 2002–2014 were compiled. The distribution of species is presented separately for five areas: Belianske Tatry Mts (located entirely in Slovakia), High Tatra Mts (Slovak part), High Tatra Mts (Polish part), Západné Tatry Mts (Slovakia) and Tatry Zachodnie Mts (Poland). For each species, its range in altitude in particular areas is presented and the total number of localities given. Moreover, the highest (maximum) and lowest (minimum) localities are listed for every species. The data collected consists of more than 18,500 records (3600 of which are original). In the entire area of the Tatra Mts there are 194 species of liverwort, with 131 in the Belianske Tatry Mts, 178 in the High Tatra Mts and 179 in the Western Tatra Mts (Západné Tatry and the Tatry Zachodnie Mts). Nearly the same number of species is recorded on each side of the Poland-Slovak border. There is a total of 185 species in the Slovak Tatra Mts and 184 in the Polish Tatra Mts. The liverwort flora in the Tatra Mts has been studied unequally. Most data came from the Slovak High Tatra Mts and the least from the Slovak Západné Tatry Mts. This paper presents, for the first time, nine species previously not recorded in Slovak Západné Tatry Mts, four previously not recorded in Belianske Tatry Mts, three previously not recorded in Slovak High Tatra Mts, two previously not recorded in Polish Tatry Zachodnie Mts and two previously not recorded in Polish High Tatra Mts. The first locality of *Odontoschisma* (= *Cladopodiella*) *francisci* is documented in Polish Tatra Mts. Moreover, new localities for liverworts considered extinct in Slovakia (i.e. *Cephaloziella varians* and *Geocalyx graveolens*) are recorded. The new data for the years 2002–2014 allowed an analysis of the frequency of some liverworts in the Polish and Slovak Red Lists. The rarest and most common liverworts in the Tatra Mts are highlighted. The liverwort flora on the highest peak of the Tatra Mts (and the entire Carpathians), Mt Gerlachovský štít (2655 m above sea level) and its ridge was catalogued. The results of the search for the rarest Tatra liverworts at their historical localities are also presented. This article presents original localities for many species, including the rarest Tatra liverworts such as *Nardia breidleri*, *Marsupella apiculata*, *M. sparsifolia*, *Eremonotus myriocarpus*, *Frullania fragilifolia*, *Odontoschisma* (= *Cladopodiella*) *francisci*, *Orthocaulis* (= *Barbilophozia*) *binsteadii*, *Fuscocephalozia* (= *Cephalozia*) *catenulata*, *Scapania crassiretis* and *S. gymnostomophila*. The list of Tatra liverworts presented also includes 22 species erroneously reported from this area. The species excluded from the Tatra liverwort flora upon revision of the available data include *Barbilophozia hyperborea* (R. M. Schust.) Potemkin, *Lophozia groenlandica* (Nees) Macoun (*L. schusterana* Schljakov) and *Scapania glaucocephala* (Taylor) Austin var. *scapanioides* (C. Massal.) Potemkin.

**Key words:** bryology, checklist, liverworts, Poland, Slovakia, Tatra Mts, Western Carpathians

## Introduction

Initial studies on the liverwort flora of the Tatra Mts were conducted early in the 19th century. The first list of liverworts was included in the “Flora carpathorum principalium ...” (Wahlenberg 1814), in which 30 species of liverworts are documented, which make up 16% of the contemporary liverwort flora. The species described in that work are mostly very common plants on the massif. Among the important bryological publications on the Tatra Mts is “On the distribution of liverworts in the Tatra Mountains” (in Polish), by Szyszyłowicz (1885). It presents, according to the author, 134 species of liverworts (i.e. theoretically nearly 70% of the current Tatra Mts flora). However, taking into account later changes in taxonomy and revisions of the identifications of some species, the Szyszyłowicz flora makes up only nearly 50% of the current hepaticoflora. Szyszyłowicz (1885) presents ~700 localities found by him or cited in the literature, including the works of G. Wahlenberg, J. Krupa, K. G. Limpricht and F. Hazslinszky. It is worth mentioning that I. Szyszyłowicz found many rare Tatra Mts liverworts that occur at few localities even today, including *Frullania fragilifolia*, *Porella arboris-vitae*, *Anastrophyllum michauxii* and *Scapania apiculata*. Moreover, this author unintentionally found a very rare liverwort *Arnellia fennica* (Gottsche) Lindb., which he erroneously identified as *Jungermannia crenulata* Sm. Fortunately, the herbarium collection of I. Szyszyłowicz at Charles University in Prague (PRC) was revised after nearly 90 years by J. Váňa, who documented, for the first time, *A. fennica* occurring in the Carpathians (Váňa 1975a). Another important monograph is “Floristic investigations on the liverwort flora of the Tatra Mountains” (in Polish), by Szweykowski (1960a). This author cites 160 species (82% of the Tatra Mts liverwort flora) he collected during studies at 1540 localities. Nevertheless, the monographic series of 63 articles in “The distribution of liverworts in Czech and Slovak Republic” (in Czech), published in 1968–1995 by J. Duda and J. Váňa, is considered to be the largest database on liverworts occurring in the Tatra Mts. The authors record material collected at almost 6200 localities, both by themselves and recorded in the literature. In addition, all available herbarium data on the Slovak Tatra Mts from the 19th and 20th centuries has been revised and published, which excludes (or confirms) the occurrence of a number of species. It should be mentioned that the revision of herbarium data for the Polish part of the Tatra Mts has not yet been completed.

There is a detailed history of the studies on liverworts in the Tatra Mts in the works of Szweykowski (1957, 1996) and Szweykowski & Klama (2010). The highest numbers of liverworts new to the Tatra Mts were recorded by K. G. Limpricht (32 new liverworts), G. Wahlenberg (30), F. Hazslinszky (20), I. Szyszyłowicz (20), J. Krupa (15), V. Schiffner together with I. Györfy (15), F. Lilienfeldówna (11) and A. Rehman (11) (Szweykowski 1957). These studies were published in the 19th and early 20th centuries. From that time on, a lower number of new liverworts were recorded. Fewer than 10 species new to the Tatra Mts were added by V. Krajina, A. Boros, I. Szepesfalvy, L. Hausbrandt, J. Szweykowski, J. Duda, J. Šmarda, J. Vilhelm, J. Váňa and P. Górski. Current literature on the occurrence of liverworts in the Tatra Mts comprises more than 300 publications (see References) and 14,700 records.

The aim of this work was to compile a comprehensive, revised list of liverworts for the entire Tatra Mts, with their overall horizontal and vertical distributions (with minimum

and maximum altitudes) and present new localities for selected species, documented during 2002–2014.

### Characteristics of the study area

The Tatra Mts are the highest mountain ridge in the Carpathians (Fig. 1). They are a part of the Central Western Carpathians. The Tatra Mts ridge is 80 km long (56.5 km in a straight line) and the maximum width is 18.5 km (15 km on average). The Tatra Mts are a border ridge separating Poland and Slovakia. The area covers 785 km<sup>2</sup>, including 610 km<sup>2</sup> (77.7%) in Slovakia and 175 km<sup>2</sup> (22.3%) in Poland (Radwańska-Paryska & Paryski 2004). The massif is divided into the Belianske Tatry Mts, the Western Tatra Mts (= Západné Tatry Mts, Tatry Zachodnie Mts) and the High Tatra Mts.

The Belianske Tatry Mts are located entirely in Slovakia. They cover an area of 67.5 km<sup>2</sup> and their ridge is ~13 km long. They consist entirely of sedimentary rocks, mostly limestone, marl and dolomite. The highest peak is Havran, 2152 m above sea level (a.s.l.). The High Tatra Mts cover an area of 335 km<sup>2</sup>. They are the highest mountain range with Mt Gerlachovský štít (Gerlach, 2655 m a.s.l.) the highest peak in the Carpathians. In this part of the massif, in Slovakia, the other highest peaks of the Tatra Mts are Mt Lomnický štít (Łomnica, 2634 m a.s.l.), Mt Ladový štít (Łodowy Szczyt, 2627 m a.s.l.) and Mt Pyšný štít (Durny Szczyt, 2623 m a.s.l.). On the Polish side, in the borderline ridge, the highest peak of Poland is Mt Rysy (2499 m a.s.l.). The major part of the High Tatra Mts, 253 km<sup>2</sup>, is located in Slovakia (Nyka 2000). The length of the ridge is 16.5 km (Radwańska-Paryska & Paryski 2004). The High Tatra Mts are built mostly of a crystalline core of granitoid with little sedimentary rock.

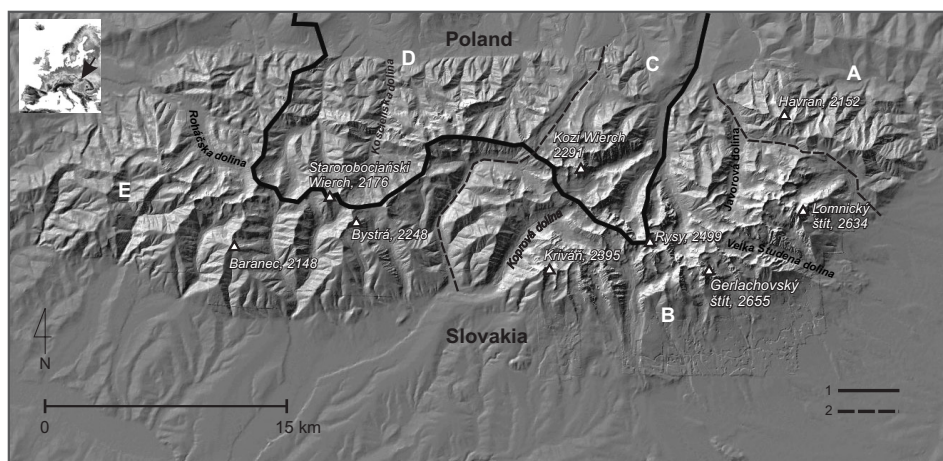


Fig. 1. – Location of study areas: A – Belianske Tatry Mts, B – High Tatra Mts (Slovak part), C – High Tatra Mts (Polish part), D – Tatry Zachodnie Mts (= Western Tatra Mts, Polish part), E – Západné Tatry Mts (= Western Tatra Mts, Slovak part); 1 – state border, 2 – borders of the various parts of the Tatra Mts.

The Western Tatra Mts (~382.5 km<sup>2</sup>) occupy almost half of the entire area of the Tatra Mts and most of them, 292 km<sup>2</sup>, are located in Slovakia (Nyka 2000). The length of the main ridge is ~42 km. The highest peaks are Mt Bystrá (Bystra, 2248 m a.s.l.), Mt Jakubíná (Raczkowa Czuba, 2193 m a.s.l.), and Mt Baranec (Baraniec, 2148 m a.s.l.), all located in Slovakia. On the Polish side, Mt Starorobociański Wierch (2176 m a.s.l.) is the highest peak. Metamorphic (mostly gneissic rock and crystalline slates) and sedimentary rock predominate and the contribution of magma rock (granite) is low.

The average annual temperature in the vertical profile of the Tatra Mts ranges from +6°C to –4°C, ~0.5°C per every 100 m. Spatial layout of the vegetation is associated with changes in temperature (for 2 degrees). The upper limit of the lower montane belt corresponds to an isotherm of +4°C, the upper limit of the upper mountain belt to +2°C, that of dwarf mountain pines to 0°C, and the alpine belt to –2°C (Hess 1996). Average annual rainfalls are as follows: Zakopane (844 m a.s.l.), 1138 mm; Mt Kasprowy Wierch (1987 m a.s.l.), 1876 mm; Tatranská Lomnica (840 m a.s.l.), 833 mm; and Mt Lomnický štít (2634 m a.s.l.), 1561 mm (Konček 1974).

## Material and methods

In this study, all published data on the occurrence of liverworts in the Tatra Mts, starting from Wahlenberg (1814) until 2014, were considered. Both floristic and phytosociological works were examined. In the case of the latter, the records were treated with caution because many are unreliable as they could not be verified due to the lack of collections. In the case of doubt or especially rare species, available herbarium data were verified. Unfortunately, for many records from the Polish side of the Tatra Mts published in the second half of 19th and first half of the 20th centuries, no herbarium material exist. This is the case for the studies of J. Krupa, W. Szafer, B. Pawłowski, S. Kulczyński and M. Sokółowski. However, the material collected by I. Szyszylowicz, the author of the first monograph on the Tatra Mts liverworts, is secure in the herbarium of the W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków. In the same herbarium, there is also the collection of F. Lilienfeldówna. The material of the majority of the phytosociological (including monographs) studies carried out on the Polish side of the Tatra Mts and published after 1945 is also unavailable. The material gathered on the Slovak side (also those from the 19th century) was mostly retained, revised and published (Duda & Váňa 1968–1995).

If altitude is not provided in the original publication, it is given only for sites of known altitude (i.e. lakes, passes, peaks, etc). Szyszylowicz (1885), when mentioning historical localities recorded by J. Krupa, K. G. Limpricht and F. Hazslinszky, provides information on altitude even though it is not given in original publications of these authors. Some of his decisions are doubtful and have been criticised. This is especially important when determining the minimum and maximum altitudes of some of the liverworts in the Tatra Mts.

For some lowland-mountain liverworts, it was difficult to establish their lower limit in the Tatra Mts. This was mainly due to an inaccurate description of the locality and unclear determination of the fault line on which the Tatra Mts occur. The accepted convention is that the lower borderline of the Tatra Mts is at 750–800 m a.s.l. on the southern side and 800–900 m a.s.l. on the northern side.

The occurrence of liverworts in the Tatra Mts is presented with regard to physiographic and political division of the massif. Five areas are distinguished: the Belianske Tatry Mts (located entirely in Slovakia), the High Tatra Mts (Slovak part), the High Tatra Mts (Polish part), the Západné Tatry Mts (Slovak part) and the Tatry Zachodnie Mts (Polish part). The characteristics of each species comprise the number of localities and range in altitude (minimum and maximum) in each of the five Tatra Mts areas, detailed description of the lowest and the highest localities, a list of publications confirming the occurrence of the plant and new localities found by P. Górski during 2002–2014. In some cases, additional remarks and unpublished localities of other authors are cited.

Altogether, 18,513 floristic and phytosociological records, including 3600 original records of P. Górski, were used in compiling the list of the liverworts occurring in the Tatra Mts. All original data were used when compiling the number of localities for particular species, whereas only some of the data are shown in the lists of new localities. The localities selected for citing in this manuscript were chosen using several criteria. Stands of all species are given if (i) they are new to the Tatra Mts region, (ii) they are located at the maximum or minimum altitude on the massif. The localities of species that are rare, or very rare in the Tatra Mountains, or are included in the Red Lists of Polish and Slovak liverworts (Kubinská et al. 2001a, b, Klama 2006) are also given, even if the plants are common in the given area. With regard to the frequency of common liverworts, those found at localities situated on high peaks or hard-to-reach ridges and valleys were chosen. In these places, bryological studies have previously not been carried out. In addition, the localities of species regarded as alpine are published if they were found at lower locations or in the case of the Tatra forest belt liverworts if usually recorded at higher locations. In many cases, localities were selected subjectively by the first author. For some species, the number of original localities in the Tatra Mts are given in 'Note' (i) if the authors had a large pool of data (more than 50 localities) or (ii) to emphasize a considerable increase in the number of new localities compared to historical data.

The nomenclature of liverworts is in accordance with the most recently published information and not based on checklists. Thus, full author citations are included for each taxon.

## Results

### *General characteristics of the liverwort flora*

Altogether, 194 species of liverworts are recorded in the Tatra Mts: 178 in the High Tatra Mts, 179 in the Western Tatra Mts and 131 in the Belianske Tatry Mts. Fourteen species occur exclusively in the High Tatra Mts (Table 1). Another seven species are recorded only in the Western Tatra Mts. There are no species exclusive to the Belianske Tatry Mts, which is due to the presence there of sedimentary rock that mainly occurs in the Western Tatra Mts and mylonite with basophilous flora as in the High Tatra Mts. The species richness on both sides of the border is almost identical (185 species in Slovakia and 184 in Poland), despite differences in species composition (Table 1).

Table 1. – Liverworts recorded in the Tatra Mts. 1 – total number of species recorded in a given area, 2 – species that occur exclusively in that particular part of the Tatra Mts.

Tatra Mountains					
1	194				
	Belianske Tatra Mts	High Tatra Mts (Slovak and Polish parts)	Western Tatra Mts (Slovak and Polish parts)		
1	131	178	179		
2	–	<i>Anastrophyllum assimile</i> , <i>Apomarsupella revoluta</i> , <i>Biantheridion undulifolium</i> , <i>Cephaloziella grimsulana</i> , <i>C. massalongi</i> , <i>C. varians</i> , <i>Gymnomitrium alpinum</i> , <i>G. apiculatum</i> , <i>G. obtusum</i> , <i>Jungermannia borealis</i> , <i>Marsupella condensata</i> , <i>M. sparsifolia</i> , <i>Nardia breidlerii</i> , <i>Odontoschisma francisci</i>	<i>Anastrophyllum donnianum</i> , <i>Arnellia fennica</i> , <i>Mannia triandra</i> , <i>Nardia compressa</i> , <i>Porella arboris-vitae</i> , <i>Riccia sorocarpa</i> , <i>Scapania aspera</i>		
	Belianske Tatra Mts	High Tatra Mts (Slovak part)	High Tatra Mts (Polish part)	Západné Tatry Mts (Slovak)	Tatry Zachodnie (Polish)
1	131	167	155	158	168
2	–	<i>Apomarsupella revoluta</i> , <i>Cephaloziella grimsulana</i> , <i>Gymnomitrium obtusum</i>	<i>Anastrophyllum assimile</i> , <i>Biantheridion undulifolium</i>	<i>Mannia triandra</i> , <i>Nardia compressa</i> , <i>Riccia sorocarpa</i>	<i>Arnellia fennica</i> , <i>Porella arboris-vitae</i>
	Slovak Tatra Mts (incl. Belianske, Západné Tatry Mts and High Tatra Mts)			Polish Tatra Mts (incl. High Tatra and Tatry Zachodnie Mts)	
1	185			184	
2	<i>Apomarsupella revoluta</i> , <i>Cephaloziella elegans</i> , <i>Cephaloziella grimsulana</i> , <i>Cephaloziella hampeana</i> , <i>Fuscocephaloziopsis connivens</i> , <i>Gymnomitrium obtusum</i> , <i>Lophocolea minor</i> , <i>Mannia triandra</i> , <i>Nardia compressa</i> , <i>Riccia sorocarpa</i>			<i>Anastrophyllum assimile</i> , <i>Aneura maxima</i> , <i>Arnellia fennica</i> , <i>Bazzania flaccida</i> , <i>Biantheridion undulifolium</i> , <i>Conocephalum conicum s.str.</i> , <i>Haplomitrium hookeri</i> , <i>Porella arboris-vitae</i> , <i>Scapania paludicola</i>	

The rarest liverworts in the Tatra Mts, recorded at only 1–5 localities, include: *Anastrophyllum assimile*, *A. donnianum*, *Apomarsupella revoluta*, *Arnellia fennica*, *Biantheridion* (= *Jamesoniella*) *undulifolium*, *Cephaloziella massalongi*, *C. varians*, *Fuscocephaloziopsis* (= *Cephalozia*) *loitlesbergeri*, *Gymnomitrium obtusum*, *Jungermannia borealis*, *Kurzia trichoclados*, *Lophozia savicziae*, *Mannia triandra*, *Metzgeria violacea*, *Nardia compressa*, *Odontoschisma* (= *Cladopodiella*) *fluitans*, *O.* (= *C.*) *francisci*, *Porella arboris-vitae*, *Scapania carinthiaca*, *S. paludicola*, *S. praetervisata*, *Solenostoma subellipticum*, and *Tritomaria scitula*. The most frequently recorded species is *Pseudolophozia* (= *Lophozia*) *sudetica* (more than 1000 localities). The following species are considered common (300–600 localities): *Anthelia juratzkana*, *Barbilophozia lycopodioides*, *Bazzania tricrenata*, *Blepharostoma trichophyllum*, *Cephalozia bicuspidata*, *Diplophyllum taxifolium*, *Fuscocephaloziopsis* (= *Pleurocladula*) *albescens*, *Gymno-*

*mitrion concinatum*, *Nardia scalaris*, *Ptilidium ciliare*, *Scapania undulata*, *Solenostoma* (= *Jungermannia*) *sphaerocarpum* and *Trilophozia* (= *Tritomaria*) *quinquedentata*.

Considering the Carpathians as a whole, the Tatra Mts has the largest flora of species with arctic (or subarctic)-alpine centers of distribution, which includes: *Cephaloziella grimsulana* (one locality), *C. varians* (four), *Scapania carinthiaca* (three), *Arnellia fennica* (five), *Gymnomitrium apiculatum* (six), *Orthocaulis binsteadii* (12), *Nardia breidlerii* (11), *Odontoschisma elongatum* (20) and *Tetralophozia setiformis* (48). The Tatra Mts are the main area of occurrence of arctic-alpine liverworts with only single localities on other ridges in the Carpathians. An example is *Marsupella condensata* for which there are 83 localities, but only one in the Southern Carpathians and one in the Făgăraș Mts (Ștefănuț 2010). A similar case is *Marsupella boeckii*, which is recorded at 117 localities in the Tatra Mts but in other parts of the Carpathians only in the Făgăraș Mts and Babia Góra Mts in Poland (Ștefănuț in Ellis et al. 2012, Klama 2013). Other species in this group include *Jungermannia borealis* (two localities in the Tatra Mts, one in the Făgăraș Mts), *Marsupella sparsifolia* (seven in the Tatra Mts and one in the Babia Góra Mts), *Eremonotus myriocarpus* (15 in the Tatra Mts and one in Babia Góra Mts), *Scapania gymnostomophila* (35 in the Tatra Mts and one on the Bucegi Massif, Southern Carpathians) and *Jungermannia polaris* (31 in the Tatra Mts and few in Karpaty Rumuńskie) (Váňa 1973a, Vajda 1975, Ștefănuț 2008, Klama 2013).

New data recorded in this study allowed previous opinions on the rarity of some liverworts in the Tatra Mts to be revised. For example, *Marsupella condensata* and *M. boeckii* can no longer be considered rare. The former was previously recorded at only five localities but is now recorded at 83 localities, whereas the latter was recorded at 104 new localities and occurs at 117 localities altogether. Both species are included on the Polish and Slovak Red Lists of endangered species (Kubinská et al. 2001a, b, Klama 2006). In Slovakia, they are considered critically endangered. Both species grow in the Tatra Mts in a very narrow range (for *M. boeckii* it is slightly broader) of variability of snow-bed localities and are associated with blocks of rock in the higher parts of alpine valleys. It is worth noting that despite these plants being associated with snow-bed communities, they are also found in alpine kettles on the southern side of the main mountain ridge. Of the other species of the genus *Marsupella* sensu lato (including *Gymnomitrium*) only *M. sparsifolia* is very rare. The rest, including also those on the Polish and Slovak Red Lists (i.e. *Gymnomitrium alpinum*, *G. brevissimum*, *G. commutatum* and *Marsupella emarginata*) are not endangered in the Tatra Mts and the latter three actually occur there frequently. A more rare plant is *Gymnomitrium adustum*. After reporting it as a new species for the Tatra Mts (Górski & Váňa 2011), other localities were recorded and are presented in this study. Moreover, the following species could not be regarded as endangered (Kubinská et al. 2001a, b): *Moerckia blyttii*, *Gymnomitrium corallioides*, *Harpanthus flotvianus*, *Schistochilopsis* (= *Lophozia*) *opacifolia*, *Jungermannia pumila*, *Saccobasis* (= *Tritomaria*) *polita*, *Scapania parvifolia* and *S. subalpina*. The increase in floristic data changed the view of the rarity of plants like *Schljakovia* (= *Barbilophozia*) *kunzeana* and *Tetralophozia setiformis*. In the 1950s, they were considered very rare (Szweykowski 1956a, b, 1957); however, new data and material published after 2000 (Górski 2007a, 2011, Cykowska 2011) indicate they occur at many localities (see List of species).

Revision of available herbarium material allowed the removal of the following species from the list of liverworts in the Tatra Mts: *Barbilophozia hyperborea*, *Lophozia groen-*

*landica* and *Scapania glaucocephala* var. *scapanioides*. The first two are not recorded outside arctic areas (not even in Scandinavia). Specimens of *B. hyperborea* in the herbarium of Adam Mickiewicz at Poznań (POZW) originated mostly from the Western Tatra Mts (eight vouchers collected between 1280–1600 m a.s.l.; one collected from the High Tatra Mts, 1970 m a.s.l.). This herbarium material is a form of *Orthocaulis floerkei*. The collection of *Lophozia groenlandica* from the Tatra Mts belongs to *Pseudolophozia* (= *Lophozia*) *sudetica*. The herbarium material of *Scapania glaucocephala* var. *scapanioides* from the Polish Tatra Zachodnie Mts kept in Warsaw (WA) is *Scapania* cf. *curta* (specimens are worn).

#### *Maximum altitudes of liverworts in the Tatra Mountains*

The greatest species richness of liverworts in the Tatra Mts is in the subalpine and alpine belts (Szweykowski 1996). In these areas, most species occur at their maximum altitude. As much as 75% of the liverworts in Tatra Mts occur at localities above 1800 m a.s.l. In the subnival belt (2300 m a.s.l. and above) there are 54 species (28% of the liverwort flora), in the alpine belt (1800–2299 m a.s.l.) 91 (47%), in the subalpine belt (1550–1799 m a.s.l.) 26 (13%), whereas in lower and upper montane belts there are 23 species (12%). There is a lack of knowledge on the highest parts of the Tatra Mts, especially on the characteristics of the flora of the subnival belt. Most of the data originate from single summits of particular peaks, whereas there is little information based on the exploration of whole parts of the main Tatra Mts ridge. It should be noted that heights above 2300 m a.s.l. make up only 1.5% of all records of the occurrence of liverworts in the Tatra Mts (for comparison, 30% of records originate from the alpine belt). Despite the fact that the highest parts of the Tatra Mts are not favourable for liverwort vegetation, due to high winds and dryness (Szweykowski 1996), more than one-fourth of all liverworts are recorded in these areas.

Thus, the highest localities for liverworts in the Tatra Mts are recorded in the peak area of Mt Lomnický štít (High Tatra, Slovakia, 2634 m a.s.l.). This data is in Szyszyłowicz (1885) and Šmarda (1961). The highest altitudes for nine species of liverworts are recorded there. Cykowska (2008) has catalogued a fragment of the main Tatra Mts ridge near Morskie Oko lake, including the highest Polish peak, Mt Rysy (2499 m a.s.l.). In 2013, P. Górski catalogued the liverwort flora of the highest peak in the Tatra Mts – Mt Gerlachovský štít and parts of the ridge in the direction of Mt Malý Gerlach. On Mt Gerlachovský štít (2655 m a.s.l.), seven species were recorded: *Barbilophozia hatcheri*, *Cephaloziella divaricata*, *Gymnomitrium concinatum*, *G. corallioides*, *Pseudolophozia* (= *Lophozia*) *sudetica*, *Tritomaria exsectiformis* and *Trilophozia* (= *Tritomaria*) *quinquedentata*. *Barbilophozia hatcheri*, which produces gemmae profusely, was particularly abundant. The remaining species occurred in one area of turf. On the ridge, between the main peak and Mt Malý Gerlach, at 2560–2590 m a.s.l., *Barbilophozia lycopodioides*, *Gymnocolea inflata*, *Gymnomitrium brevissimum*, *Lophozia wenzelii*, *Marsupella boeckii*, *M. condensata* and *M. sprucei* were also recorded. It should be noted that there are few studies for this area due to its inaccessibility. The list of liverworts potentially growing there could be longer. In the history of the studies on the Tatra Mts liverworts, the highest numbers of maximum altitudes are provided by P. Górski (38), J. Szweykowski (27), J. Šmarda (27), J. Vaňha (20), I. Szyszyłowicz (15), J. Duda (13) and B. Cykowska (13).



*Rediscoveries of Tatra Mountains liverworts at historical localities*

Rediscovering species at their historical localities is crucial for evaluating changes in the flora of a given area. The main difficulty in searching for liverworts in the Tatra Mts is the imprecise topographical localization provided in original sources. The altitude of many historical localities are not provided and the accuracy of the location of some of them is that they occur in a particular valley. The precision of former descriptions of localities was also limited due to the poor topographic nomenclature used at the beginning of 19th century compared to the current situation (Radwańska-Paryska & Paryski 2004). During 2002–2013, P. Górski attempted to rediscover very rare liverworts in the Tatra Mts at their historical localities.

The oldest confirmed record is a locality for *Tetralophozia setiformis* in the Dolina Kežmarskej Bielej vody valley, near Čierne pleso lake (High Tatra Mts, Slovakia), originally cited by Wahlenberg (1814). It was recorded at the same place in 2007 (Górski 2011). *Tetralophozia setiformis* still grows at other historical localities, for example, Mt Veľká Svišťovka (Boros et al. 1960, Šmarda 1961; recorded in 2006, Górski 2007a), the Dolina Gašienicowa and Pańszczyca valleys (High Tatra Mts, Poland, Szweykowski 1956b, Wojterski 1957; recorded again in 2005, Górski 2007a) and the Veľká Studená dolina valley (High Tatra Mts, Slovakia; Duda & Váňa 1982a; recorded again in 2007, Górski 2011).

The rarest peat-bog species still grow in the Tatra Mts. In 2011, *Fuscocephalozia* (= *Cephalozia*) *loitlesbergeri* was recorded in a peat-bog near Toporowy Staw Wyżni lake (Polish Tatry Zachodnie Mts). This species was originally recorded there in 1912 (Lilienfeldówna 1914b) and it is one of its two localities in the Tatra Mts. Another very rare peat-bog liverwort, *Odontoschisma* (= *Cladopodiella*) *fluitans*, cited in the aforementioned work, still grows at the same place. A peculiarity of the Tatra Mts flora, *Odontoschisma* (= *Cladopodiella*) *francisci*, is recorded at only two localities. In 2012, it was rediscovered in a peat-bog near Trojrohé pleso lake (High Tatra Mts, Slovakia), where it was originally recorded by J. Szweykowski in 1957 (Szweykowski 1960a).

A very rare snow-bed species, *Nardia breidleri*, still occurs in the Dolina Kežmarskej Bielej vody valley, near Zelené pleso lake. It was first recorded by I. Györffy in 1909 (Schiffner 1910, 1911, Györffy 1924, Duda & Váňa 1971a). Later, this plant was recorded at that site by A. Degen (in 1912), A. Boros (in 1933 and 1938, 1940), J. Šmarda (in 1949), M. Rivola (in 1961), J. Váňa (in 1967) and P. Górski (in 2009 and 2011). Currently, this locality is highly endangered due to the synanthropic character of the pond's surroundings and extreme pressure from tourists. The population of this liverwort is small. Another historical locality for *N. breidleri* is in the Dolina za Mnichem valley (Polish High Tatra Mts). It was recorded there in 1958 (Szweykowski 1960a) and rediscovered there in 2007 and 2012.

A snow-bed species, *Moerckia blyttii*, was rediscovered at several historical localities. The oldest in the Mlynická dolina valley (High Tatra Mts, Slovakia), where this plant was recorded by V. Krajina in 1932 (Krajina 1933). The species was recorded again in 2008 at exactly the same place as recorded by V. Krajina. In the Temnosmrečinská dolina valley (High Tatra Mts, Slovakia), *M. blyttii* was recorded by Hadač (1956) at many localities. It was recorded many times in 2008–2012. The highest frequency of localities for this plant recorded in the Tatra Mts is in the aforementioned valley. Most historical localities still

exist both in the Polish High Tatra Mts (i.e. the Dolina Gašienicowa, Dolina za Mnichem and Dolina Pięciu Stawów Polskich valleys; Krupa 1888, Szweykowski 1960a, Balcerkiewicz 1984) and Slovak High Tatra Mts (i.e. the Veľká Studená dolina, Roháčska dolina and aforementioned Temnosmrečinská dolina and Mlynická dolina valleys; Krupa 1888, Krajina 1933, Duda 1958, Hadač 1956). Thus, Šoltés & Ciriaková (2010) paper is incorrect in stating that of the historical localities only the Temnosmrečinská dolina valley locality remains.

In 2011, *Arnellia fennica* was rediscovered in a gully in the Kalackie Koryto. There are five localities recorded for this liverwort in the Tatra Mts, all in the Polish Tatry Zachodnie Mts. This liverwort was earlier recorded there by J. Szweykowski and H. Klama in 1985 (Szweykowski et al. 1993). *Scapania crassiretis* is a rare species in the Tatra Mts, but in 2006 many localities were recorded on the northern slopes of Mt Veľká Svišťovka, where it was first recorded in 1958 (Boros et al. 1960). Another liverwort, *Anthelia julacea*, was recorded in 1958 in the Dolina Pięciu Stawów Polskich valley (Szweykowski 1960a). In 2012, it was abundant at the same locality. This species still occurs near Žiarske pleso lake (Slovak Západné Tatry Mts), where it was collected in 1966 by J. Duda and J. Váňa (Duda & Váňa 1975a). In 2006, it was recorded again at the same site. In 2003, *Marsupella condensata* was recorded in the Dolina Pańszczycy valley (High Tatra Mts, Poland), where it was previously recorded in 1955 (Szweykowski 1960a).

The search for rare species of liverworts in the Tatra Mts failed in several cases. *Anastrophyllum assimile*, one of the rarest species, previously recorded at two localities in Polish High Tatra Mts by Krupa (1882), was not found. The occurrence of this plant in the Tatra Mts is questioned due to the lack of herbarium material (Szweykowski 2006, Szweykowski & Klama 2010). Nevertheless, this species is included in the main list of the current study. We believe that an outstanding specialist like J. Krupa could not misidentify a plant with such distinct morphological features. *Apomarsupella revoluta* is another species that was not rediscovered. Five localities were recorded for this liverwort in the Slovak High Tatra Mts during 1903–1921 (Schiffner 1915, Szepesfalvy 1930b, Duda & Váňa 1980a). The presence of this plant in the Tatra Mts is not questioned because of preserved herbarium material (Duda & Váňa 1980a). However, it is interesting that nobody has collected it in the Tatra Mts for 100 years. In 2012, *Biantheridium* (= *Jamesoniella*) *undulifolium* was not found at the sole locality cited by Krupa (1882). The description of the original site, “Dolina Pięciu Stawów Polskich valley”, is very imprecise for such a broad, high mountain valley. In addition, *Anastrophyllum donnianum* was not found at the locality in the Polish Tatry Zachodnie Mts where it was recorded in 1958 (Szweykowski 1960a). Despite three searches, this plant was not rediscovered. The locality is not precisely defined; hence, it is possible that it is still present there. According to the author, *A. donnianum* grew “in masses”, which is supported by the collections that were used to prepare the herbarium publication, Hepaticotheca Polonica (Szweykowski 1958c).

#### *State of the knowledge on the liverworts that occur in the Tatra Mountains*

It is difficult to judge the state of knowledge on the liverworts in the Tatra Mts. It differs depending on the issue. The list of species occurring in the Tatra Mts is considered to be complete. Despite the fact that the most recent new species, *Nardia compressa*, was discovered in 2008 (Górski 2010), it is unlikely that another new species will be recorded in

the Tatra Mts. “Novelties” may occur in the Tatra Mts areas on both sides of the border or in different physiogeographical parts of the massif. This aspect of bryological research in the Tatra Mts is very well studied as there have been numerous floristic studies of a wide spectrum of habitats in different parts of the range. It is very important to rediscover some extremely rare species that were recorded at 1–2 localities and for which there is no herbarium material, such as *Anastrophyllum assimile* and *Biantheridion undulifolium* (*Jame-soniella undulifolia*). Both these species were recorded in the late 19th century (Krupa 1882, 1888). The liverwort flora of major habitats associated with the geological differentiation of the Tatra Mts is well known. There are many publications that list species associated with magma, sedimentary and metamorphic rocks (including mylonite rock) (Boros et al. 1960, Šmarda 1960a, b, 1976a, Szweykowski 1960a, 1996, Šmarda et al. 1962). The extent of our knowledge on the distribution of particular species on the Tatra Mts massif is definitely insufficient in terms of both their horizontal and vertical distributions. In the past, studies that involved a comprehensive analysis of liverwort distributions were not undertaken even for small regions in the Tatra Mts (e.g. valleys). The list of new localities presented here is an important contribution to that knowledge. We still know very little about the flora of the highest mountain regions. The maximum altitudes at which vascular plants occur are well known (Pawłowski 1931, Paclová 2004), but such information is not available for bryophytes, with the exception of the borderline ridge near Morskie Oko lake in the High Tatra Mts, studied by Cykowska (2008).

Based on previously published data and that presented in this study, it can be stated that the Tatra Mts are unevenly investigated (Table 2). The Slovak High Tatra Mts are the most extensively explored. As much as 45% of the floristic data originating from the Tatra Mts came from that region. In the Slovak High Tatra Mts, floristic explorations were initiated by the publication of Wahlenberg (1814) and all Hungarian and German botanists from the turn of the 19th and 20th centuries. The Slovak Západné Tatry Mts are especially poorly studied compared to the High Tatra Mts. Only 11% of the data originate from there.

Table 2. – The number of liverworts records for the Tatra Mts: 1 – absolute number (floristic and phytosociological data), 2 – number expressed as percentage of the overall data pool

Tatra Mountains					
1	18,513				
	Belianske Tatra Mts	High Tatra Mts (Slovak and Polish parts)		Western Tatra Mts (Slovak and Polish parts)	
1	2432	11,203		4878	
2	13	61		26	
	Belianske Tatra Mts	High Tatra Mts (Slovak part)	High Tatra Mts (Slovak part)	Západné Tatry (Slovak)	Tatry Zachodnie (Polish)
1	2432	8276	2927	2072	2806
2	13	45	16	11	15
	Slovak Tatra Mts (incl. Belianske, Západné Tatry Mts and High Tatra Mts)			Polish Tatra Mts (incl. High Tatra and Tatry Zachodnie Mts)	
1	12,780			5733	
2	69			31	

Not much more came from the Belianske Tatry Mts (13%). Comparing both regions in the Polish Tatra Mts, it is clear they are both extensively explored, but have yielded little data (15% and 16% of the entire data set). This may partially be the result of the difference in the area of the Polish and Slovak Tatra Mts. Despite the fact that 69% and 31% of hepatological data originated from the Slovak and Polish Tatra Mts, respectively, the total number of species of liverworts recorded in both countries is almost equal.

An implication of the unequal state of the knowledge on the liverworts in the Tatra Mts is the number of new species recorded in different regions as presented in this study. The highest number (nine) was recorded in Slovak Západné Tatry Mts. They comprise *Calypogeia sphagnicola* (with two localities), *Conocephalum salebrosum* (one), *Frullania fragilifolia* (one), *Jungermannia polaris* (one), *Liochlaena lanceolata* (one), *Marsupella boeckii* (three), *Scapania calcicola* (three), *S. praetervisa* (one) and *Schistochilopsis* (= *Lophozia*) *opacifolia* (five). New species for the Belianske Tatry Mts comprise *Conocephalum salebrosum* (11), *Geocalyx graveolens* (three), *Scapania nemorea* (one) and *Scapania praetervisa* (one). In the Slovak High Tatra Mts, *Conocephalum salebrosum* (one), *Orthocaulis* (= *Barbilophozia*) *binsteadii* (one) and *Pedinophyllum interruptum* (two) were recorded for the first time. In the Polish part of the Tatra Mts, *Marsupella boeckii* (one) and *Scapania aspera* (three) were recorded in the Tatry Zachodnie Mts and *Calypogeia suecica* (two) in the High Tatra Mts. A new species recorded in the Polish Tatra Mts, *Odontoschisma* (= *Cladopodiella*) *francisci* was found at one locality in the Dolina Pięciu Stawów Polskich valley.

This study also records the localities of five species of liverworts considered to be extinct in Slovakia (i.e. *Cephaloziella varians* and *Geocalyx graveolens*). During the examination of material in personal herbaria for this study, data for new species in the Tatra Mts was published separately. This is the case for *Orthocaulis* (= *Barbilophozia*) *binsteadii* and *Nardia compressa* in Slovakia (Górski 2010, Górski in Ellis et al. 2012), *Cephaloziella massalongi*, *Jungermannia borealis* and *J. exsertifolia* subsp. *cordifolia* in Poland (Górski & Váňa 2013, Górski & Váňa in Ellis et al. 2013a, Váňa & Górski in Ellis et al. 2013b) and *Gymnomitrium adustum* in both these countries (Górski & Váňa 2011).

### List of species occurring in the Tatra Mts

Explanations: \* new to this part of the Tatra Mts; PL – Poland, SL – Slovakia; wa – lacking information on the altitude of the locality (localities); ld – lack of data; ~ uncertain information; herbarium material from the locality should be examined (currently unavailable or missing); ? dubious data; (new loc.) – new locality with minimum and maximum altitudes. For each species, altitudinal range and number of localities is given in parentheses for each mountain range: BT – Belianske Tatry Mts, HT-SL – High Tatra Mts (Slovak part), HT-PL – High Tatra Mts (Polish part), ZT-SL – Západné Tatry Mts, Slovakia, TZ-PL – Tatry Zachodnie Mts, Poland. Max. and min. refer to altitudinal maxima and minima, respectively.

#### *Anastrepta orcadensis* (Hook.) Schiffn.

**Distribution:** BT 900–1950 (9); HT-SL 800–2290 (95); HT-PL 1507–2430 (29); ZT-SL 750–2178 (27); TZ-PL 1040–2101 (39).

**Max.** High Tatra Mts, PL, Mt Niznie Rysy, alt. 2430 m, 49°11'00"N, 20°05'17"E, leg. B. Cykowska (Cykowska 2008).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horničková (Peciar 1981).

**Literature:** Limpricht (1877a, b), Krupa (1882), Hazslinszky (1885), Szyszyłowicz (1885), Schiffner (1911), Lilienfeldówna (1914a), Szafer et al. (1927), Krajina (1933), Šmarda (1937b, 1938, 1944, 1961), Suza (1937b), Boros (1951), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1957, 1958a, c, 1960a, 1964, 2006),

Šmarda et al. (1962), Váňa & Duda (1965), Vajda (1971), Duda & Váňa (1981a), Peciar (1981), Balcerkiewicz (1984), Unar et al. (1984–1985), Šoltés (1990), Blackburn et al. (1997), Szweykowski & Buczkowska (2000), Wojterska et al. (2004), Cykowska (2006b, 2008, 2011), Šibík et al. (2006), Górski (2007a), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, SL: Svišňová (Bielovodská) dolina valley, upper part, 49°10.866'N, 20°08.230'E, alt. 1975 m, leg. P. Górski, 26.09.2011 (POZNB 975); N slope of Mt Predný Holý vrch (Liptovské kopy), *Polytrichum-Sphagnum* hummock, 49°11.399'N, 19°57.834'E, alt. 1890 m, leg. P. Górski, 30.08.2014 (POZNB 1871); Západné Tatry Mts, SL, Mt Predný Salatín, alt. 1825 m, leg. P. Górski, 24.07.2006 (POZNB 890); Tatry Zachodnie Mts, PL, Dolina Chochołowska valley, Mt Ropa, alt. 1150 m, leg. P. Górski, 27.09.2003 (POZNB 1772).

### *Anastrophyllum assimile* (Mitt.) Steph.

**Distribution:** BT –; HT-SL –; HT-PL 2150–2190 (2); ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, PL, Mt Koszyska, ca 2190 m (Krupa 1882), –.

**Min.** High Tatra Mts, PL, below Przełęcz Zawrat pass, ca 2150 m (Krupa 1882), –.

**Literature:** Krupa (1882), Szweykowski (1957, 1958a, 2006).

**Note:** Species known only from two localities in the Polish Tatra Mts (see above). In Polish herbaria there is no material for this species from the Tatra Mts. Missing specimens of *A. assimile* collected by J. Krupa were already noted in 1920 by W. Kulesza, who revised the liverwort herbarium in Kraków (Kulesza 1920). On the other hand, he states that “Krupa was an expert when it comes to liverworts and an honest collector, so in my opinion, one can completely rely on his identification of this characteristic species” (Kulesza l.c., p. 103). According to Szweykowski (2006) and Szweykowski & Klama (2010), the occurrence of *A. assimile* in the Tatra Mts is dubious. The search for this species in the Tatra Mts (including historical localities) by J. Váňa and P. Górski failed. In our opinion, it is possible that this plant occurs in the Tatra Mts.

### *Anastrophyllum donnianum* (Hook.) Steph.

**Distribution:** BT –; HT-SL –; HT-PL –; ZT-SL 1835 (2); TZ-PL 1700 (1).

**Max.** Západné Tatry Mts, SL, near the southwestern margin of Vyšné Jamnícke pleso lake, in the upper part of the Jamnícka dolina valley, alt. 1835 m, leg. P. Górski, 25.08.2008, conf. J. Váňa (POZNB 825, Górski 2009b).

**Min.** Tatry Zachodnie Mts, PL, on western slopes of Mt Jarzabczy Wierch, humus between granite rocks, alt. 1700 m, leg. J. Szweykowski, 12.09.1958 (Szweykowski 1960a).

**Literature:** Krupa (1888), Szweykowski (1957, 1958a, c, 1960a, 1962, 1996, 2006), Duda & Váňa (1982c), Górski (2009b), Szweykowski & Klama (2010).

*Anastrophyllum hellerianum* (Nees ex Lindenb.) R. M. Schust. ⇒ see under *Crossocalyx hellerianus* (Nees ex Lindenb.) Meyl.

### *Anastrophyllum michauxii* (F. Weber) H. Buch

**Distribution:** BT 900–1500 (14); HT-SL 985–1575 (10); HT-PL 1100–1384 (7); ZT-SL 1200–1300 (4); TZ-PL 1035–1170 (5).

**Max.** High Tatra Mts, SL, Mt Grúnik, alt. 1575 m, leg. J. Šmarda, 8.1947 (Šmarda 1961, Duda & Váňa 1984a).

**Min.** Belianske Tatry Mts, Monkova dolina valley, alt. 900 m, leg. J. Šmarda sub *Barbilophozia floerkei*, 21.08.1951, rev. J. Duda (Duda & Váňa 1984a).

**Literature:** Rehman (1864), Limpricht (1877a, b), Krupa (1882, 1888), Hazslinszky (1885), Szyszyłowicz (1885), Suza (1937b), Šmarda (1938, 1958, 1961, 1976b), Szweykowski (1957, 1958a, 1960a, 2006), Duda (1962a), Duda & Váňa (1971a, 1984a), Blackburn et al. (1997), Szweykowski & Buczkowska (2000), Szweykowski & Klama (2010).

**Note:** Szweykowski (2006) states that in the Polish Tatra Mts, *A. michauxii* occurs at more than 30 localities. The locality given by Krupa (1882), cited by Szyszyłowicz (1885), has an incorrect and inflated altitude of 1625 m a.s.l. The original record of Krupa (l.c.) is not precise “in Dolina Stawów Gąsienicowych valley”. I. Szyszyłowicz nevertheless cited it as “near Gąsienicowe Stawy lakes”. This species includes also a locality published for *Scapania compacta* (Hazslinszky 1885, rev. J. Duda, Duda & Váňa 1971a, 1984a).

**New localities:** Belianske Tatry Mts: Dolina pod Košiare valley, spruce forest, decaying log, 49°14.666'N, 20°15.295'E, alt. 1115 m, leg. P. Górski, 27.06.2012 (POZNB 1218); Havrania dolina valley, lower part of Novy žľab gully, 49°15.951'N, 20°11.154'E, alt. 1225 m, leg. P. Górski, 26.06.2012 (POZNB 1253); Rígfarská dolina

valley, decaying log near Rígfanský potok stream, 49°15.238'N, 20°13.691'E, alt. 1070 m, leg. P. Górski, 1.09.2014 (POZNB 1785); High Tatra Mts, PL, Dolina Rybiego Potoku valley, Las pod Czubą forest, above Droga Oswalda Balzera road, on log in *Plagiothecio-Piceetum*, alt. 1125–1150 m, leg. P. Górski, 15.09.2004 (POZNB 341, 385); High Tatra Mts, SL, Bielowodská dolina valley, mouth of the valley, in spruce forest on a granite rock, alt. 985 m, leg. P. Górski, 22.08.2007 (POZNB 386).

*Anastrophyllum minutum* (Schreb.) R. M. Schust. ⇒ see under *Sphenolobus minutus* (Schreb.) Berggr.

*Anastrophyllum saxicola* (Schrud.) R. M. Schust. ⇒ see under *Sphenolobus saxicola* (Schrud.) Steph.

### *Aneura maxima* (Schiffn.) Steph.

**Distribution:** BT –; HT-SL –; HT-PL 1000 (1); ZT-SL –; TZ-PL 950 (1).

**Max.** High Tatra Mts, PL, Dolina Białki valley, alt. 1000 m (Buczowska & Bączkiewicz 2006, Buczowska unpublished).

**Min.** Tatry Zachodnie Mts, PL, Las Capowski forest, alt. 950 m (Buczowska & Bączkiewicz 2006, Buczowska unpublished).

**Literature:** Buczowska & Bączkiewicz (2006), Szweykowski & Klama (2010).

### *Aneura pinguis* (L.) Dumort.

**Distribution:** BT 1200–1950 (12); HT-SL 850–1800 (16); HT-PL 1380–1650 (3); ZT-SL 860–2000 (5); TZ-PL 945–1750 (20).

**Max.** Západné Tatry Mts, SL, Bystrá dolina valley, Bystré plesa lakes, alt. 2000 m (Šmarda 1937b, Duda 1955a).

**Min.** High Tatra Mts, SL, Dlhý les Kežmarský forest, alt. 850 m, leg. R. Šoltés, 27.04.1983 (Šoltés 1990).

**Literature:** Wahlenberg (1814), Limpricht (1877a), Krupa (1878), Hazslinszky (1860, 1865), Szyszyłowicz (1885), Schiffner (1908b), Lilienfeldówna (1910), Szafer et al. (1927), Šmarda (1937b, 1958, 1961), Duda (1955a, 1958), Szweykowski (1957, 1958a, 1960a, 1968, 2006), Pawłowski et al. (1960), Hadač et al. (1969a), Balcerkiewicz & Pawlak (1978b), Kubinská & Pišút (1982), Peciar (1982), Balcerkiewicz (1984), Unar et al. (1984–1985), Šoltés (1989, 1990), Mirek & Piękoś-Mirkowa (1990), Blackburn et al. (1997), Bączkiewicz & Buczowska (2005), Šoltés et al. (2006), Górski (2007b), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, SL: Kolová dolina valley, above Kolové pleso lake, 49°13.106'N, 20°11.663'E, alt. 1645 m, leg. P. Górski, 28.08.2010 (POZNB 1650); Kobyliá dolina valley, peat-bog near Kobyliá pleso lake, alt. 1760 m, leg. P. Górski, 29.07.2009 (POZNB 1649); Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, 49°16.838'N, 19°46.293'E, alt. 860 m, calcareous outcrops in lower part of the valley, leg. P. Górski, 30.09.2013 (POZNB 1737).

### *Anthelia julacea* (L.) Dumort.

**Distribution:** BT –; HT-SL 1565–2174 (18); HT-PL 1560–2190 (13); ZT-SL 1835–1855 (2); TZ-PL –.

**Max.** High Tatra Mts, PL, Mt Koszysta, alt. ca 2190 m (Krupa 1882), ~.

**Min.** (new loc.) High Tatra Mts, PL, Dolina Roztoki valley, Wielka Siklawa waterfall, alt. 1560 m, leg. P. Górski, 22.09.2005 (POZNB 434).

**Literature:** Wahlenberg (1814), Hazslinszky (1860), Rehman (1864), Limpricht (1877a), Krupa (1878, 1882), Szyszyłowicz (1885), Lilienfeldówna (1910), Szweykowski (1956e, 1957, 1958a, 1960a, 1966, 2006), Rejment-Grochowska (1971), Duda & Váňa (1975a), Szweykowski & Klama (2010).

**Note:** Two localities cited by Krajina (1933) in the Mlynická valley (High Tatra Mts, SL) and the data of Hazslinszky (1860, 1865) refer to *Anthelia juratzkana* (rev. J. Váňa, Duda & Váňa 1975a). The report by Lilienfeldówna (1910) from the Dolina Gąsienicowa valley (High Tatra Mts, PL) belong also to *A. juratzkana* (rev. P. Górski, KRAM 044653). The locality on the Czerwone Wierchy ridge (Tatry Zachodnie Mts, PL, Fritze & Ilse 1870) is doubtful and it was not included in this study.

**New localities:** High Tatra Mts, PL: Dolina Gąsienicowa valley, backwater SW from Zielony Staw Gąsienicowy lake, on a big rock dripping with water, 49°13.908'N, 19°59.794'E, alt. 1635 m, leg. P. Górski, 30.06.2010 (POZNB 155); Dolina Gąsienicowa valley, below Grzędy ridge, backwater near Kotlinowy Stawek lake, SW from Zielony Staw Gąsienicowy lake, 49°13.831'N, 19°59.695'E, alt. 1690 m, leg. P. Górski, 30.06.2010 (POZNB 159); Dolina Pięciu Stawów Polskich valley, in a stream entering the southern part of Przedni Staw Polski lake, alt. 1655 m, leg. P. Górski, 26.07.2005 (POZNB 446); High Tatra Mts, SL: Żabia Bielowodská dolina valley, near N shore of Vyšné Žabie Bielowodské pleso lake, slow-flowing stream, alt. 1695 m, leg. P. Górski, 29.06.2010 (POZNB 198); Żabia Bielowodská dolina valley, rock wall with water dripping from above, SE shore

of Vyšné Žabie Bielovodské pleso lake, alt. 1730 m, leg. P. Górski, 21.09.2009 (POZNB 348); Čierna Javorová dolina valley, Čierne mlaki (upper glacial cirque in the valley), on rocks dripping with water, 49°12.567'N, 20°11.322'E, alt. 1910 m, leg. P. Górski, 26.08.2010 (POZNB 223); Kolová dolina valley, near N shore of Kolové pleso lake, 49°13.258'N, 20°11.553'E, alt. 1565 m, leg. P. Górski, 28.08.2010 (POZNB 254, 282); Kolová dolina valley, SEE and above Kolové pleso lake, below rock walls Hrebeň Kolových veží, 49°13.106'N, 20°11.663'E, alt. 1645 m, leg. P. Górski, 28.08.2010 (POZNB 257); Malá Studená dolina valley, on the sub-glacially eroded step of the upper part of the valley (Kotlina Piatich Spišských Plies), rock wall with dripping water near waterfall, 49°11.321'N, 20°12.045'E, alt. 1930 m, leg. P. Górski, 06.11.2010 (POZNB 265); Dolina Bielych Plies valley, stream backwater, alt. 1750 m, leg. P. Górski, 26.09.2007 (POZNB 387); Tichá dolina valley, Zadna Tichá dolina valley, below Hladké sedlo pass, upper reaches of Tichý potok, backwater of this stream, alt. 1805 m, leg. P. Górski, 29.07.2009 (POZNB 342); Západné Tatry Mts, SL: Žiarska dolina valley, backwater of a stream entering Žiarske pleso lake, alt. 1835 m, leg. P. Górski, 20.07.2006 (POZNB 438; a locality of this plant near Žiarske pleso lake was earlier cited by Duda & Váňa 1975a; leg. J. Duda, J. Váňa, 13.09.1966, alt. 1855 m).

### *Anthelia juratzkana* (Limpr.) Trevis.

**Distribution:** BT 1570–2100 (28); HT-SL 1360–2633 (393); HT-PL 1550–2315 (109); ZT-SL 1600–2120 (55); TZ-PL 1465–2120 (24).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2633 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** High Tatra Mts, SL, Furkotská dolina valley, Slepé pleso lake, alt. 1360 m, leg. J. Školek, 11.10.2005, *Sphagno tenelli-Rhynchosporetum albae*, table 27, relevés 5, 6 (Školek 2009), ~.

**Literature:** Hazslinszky (1860), Limpricht (1877a, b), Krupa (1878, 1882), Lilienfeldówna (1910), Schiffner (1910, 1911, 1915), Györfy (1924), Pawłowski & Stecki (1927), Szafer et al. (1927), Vilhelm (1927), Pawłowski et al. (1928), Klika (1929), Braun-Blanquet (1930), Krajina (1933), Šmarda (1937b, 1938, 1940, 1944, 1961, 1976a, b), Suza (1937a, b, 1949, 1951), Boros (1940, 1942, 1959), Duda (1955a, 1958, 1962a, 1965), Hadač (1956), Szweykowski (1956e, 1957, 1958a, 1960a, 1966, 1996, 2006), Boros et al. (1960), Váňa & Duda (1965), Rejment-Grochowska (1971), Peciar (1973), Duda & Váňa (1975a), Balcerkiewicz (1984), Unar et al. (1984–1985), Šoltés (1989, 1990, 2004), Dúbravcová (1991), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Górski (2007b, 2008, 2009a), Školek (2009), Szweykowski & Klama (2010), Górski & Váňa (2011).

**Note:** A total of 258 unpublished localities recorded by P. Górski were included in this study.

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

**Distribution:** BT –; HT-SL 1800–2000 (5); HT-PL –; ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, SL, Furkotská dolina valley, Wahlenbergova plesa lakes, alt. 2000 m, leg. J. Szurák, 8.1905, teste J. Váňa (Duda & Váňa 1980a).

**Min.** High Tatra Mts, SL, Malá Studená dolina valley, alt. 1800–2000 m, leg. J. Podpera, 20.07.1921, teste J. Váňa (Duda & Váňa 1980a).

**Literature:** Schiffner (1915), Györfy (1924), Szepesfalvy (1930b), Szweykowski (1957), Váňa (1969), Duda & Váňa (1978b, 1980a), Šoltés (1992).

**Note:** The specimen from the locality recorded by Duda (1962a) belongs to *Gymnomitrium* (= *Marsupella*) *commutatium* (rev. J. Váňa, Duda & Váňa 1978b, 1980a). The data cited by Krajina (1933) are probably based on a misidentification. *Apomarsupella revoluta* was not collected in the Tatra Mts after 1921.

*Apometzgeria pubescens* (Schrank) Kuwah. ⇒ see under *Metzgeria pubescens* (Schrank) Raddi

### *Arnellia fennica* (Gottsche) Lindb.

**Distribution:** BT –; HT-SL –; HT-PL –; ZT-SL –; TZ-PL 1040–1360 (5).

**Max.** Tatry Zachodnie Mts, PL, Kalackie Koryto (Suchy Žleb) gully, alt. 1360 m, leg. J. Szweykowski & H. Klama, 22–23.08.1985 (Szweykowski et al. 1993).

**Min.** Tatry Zachodnie Mts, PL, Dolina Strážyska valley, leg. I. Szyszyłowicz sub *Jungermannia gracillima*, alt. 1040 m (published in Szyszyłowicz 1885, p. 74), rev. et det. J. Váňa (Váňa 1975a).

**Literature:** Váňa (1975a), Szweykowski et al. (1993), Szweykowski (1996, 2006), Szweykowski & Klama (2010).

**Note:** In 2011, P. Górski confirmed the occurrence of *Arnellia fennica* in the locality given by Szweykowski et al. (1993). Localization: Tatry Zachodnie Mts, PL, Kalackie Koryto (Suchy Žleb) gully, middle part, on a limestone rock with northern exposure, 49°15.357'N, 19°57.610'E, alt. 1335 m, leg. P. Górski, 24.11.2011 (POZNB 777).

### *Asterella lindenbergiana* (Corda ex Nees) Arnell

**Distribution:** BT 1520–2020 (9); HT-SL 1700–2000 (2); HT-PL 1850 (1); ZT-SL 1610–1900 (5); TZ-PL wa (1).  
**Max.** Belianske Tatry Mts, Mt Zadné Jatki, alt. ca 2020 m (Boros 1959, Boros et al. 1960).  
**Min.** Belianske Tatry Mts, Mt Kozí chrbát, alt. 1520 m, leg. V. Peciar, 27.09.1958 (Peciar 1959).  
**Literature:** Schiffner (1908b), Lilienfeldówna (1910), Szepesfalvy (1926), Müller (1956), Szweykowski (1957, 1958a, 1960a, 2006), Keilová & Keil (1958), Šmarda (1958, 1961, 1976a), Boros (1959), Peciar (1959), Boros et al. (1960), Rejment-Grochowska (1966, 1971), Duda & Váňa (1974a), Szweykowski & Klama (2010).

### *Athalamia hyalina* (Sommerf.) S. Hatt.

**Distribution:** BT 1100–2024 (17); HT-SL –; HT-PL –; ZT-SL 1512–2000 (3); TZ-PL 2050 (1).  
**Max.** Tatry Zachodnie Mts, PL, precise location not given, alt. 2050 m, leg. J. Szweykowski (Szweykowski 2006).  
**Min.** Belianske Tatry Mts, between Mt Havran and Mt Ždiarska Vidla, alt. 1100–1200 m, leg. J. Šmarda sub *Sauteria alpina*, 23.07.1955, rev. J. Váňa (Duda & Váňa 1973b).  
**Literature:** Boros (1940), Szweykowski (1957, 1958a, 2006), Keilová & Keil (1958), Šmarda (1960a, 1961, 1976a), Duda (1962a), Rejment-Grochowska (1966), Duda & Váňa (1973b), Szweykowski & Klama (2010).  
**Note:** Some of the localities cited by Šmarda (1940; rev. J. Váňa, see Duda & Váňa 1973b) for *Peltolepis quadrata* and Boros et al. (1960) and Šmarda (1961; rev. J. Váňa, see Duda & Váňa 1974a) for *Mannia pilosa*, are for this species.

*Barbilophozia atlantica* (Kaal.) Müll. Frib.) ⇒ see under *Orthocaulis atlanticus* (Kaal.) H. Buch

*Barbilophozia attenuata* (Mart.) Loeske ⇒ see under *Orthocaulis attenuatus* (Mart.) A. Evans

### *Barbilophozia barbata* (Schmidel ex Schreb.) Loeske

**Distribution:** BT 1000–2148 (35); HT-SL 750–1908 (25); HT-PL 985–1880 (12); ZT-SL 750–1610 (23); TZ-PL 950–1760 (25).

**Max.** Belianske Tatry Mts, Mt Ždiarska Vidla, alt. 2148 m, leg. J. Szweykowski, 8.07.1957 (Szweykowski 1960a).

**Min.** Západné Tatry Mts, SL, Pribylina, alt. 750 m, leg. J. Horníčková, 1968, det. J. Duda (Duda & Váňa 1985a); High Tatra Mts, SL, Svit, Mt Baba, alt. 750 m (Peciar 1978).

**Literature:** Hazslinszky (1860), Rehman (1864), Krupa (1882), Szyszylowicz (1885), Schiffner (1911), Szafer et al. (1927), Šmarda (1938, 1940, 1958, 1961), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a, 1960a, 1967), Ježek & Vondráček (1962), Šmarda et al. (1962), Mickiewicz (1965), Peciar (1973, 1978, 1981, 1982, 1988), Wojterski et al. (1978), Šomšák (1979), Kubinská & Pišút (1982), Kubíček et al. (1983), Balcerkiewicz (1984), Duda & Váňa (1985a), Szweykowski & Buczkowska (2000), Wojterska et al. (2004), Cykowska (2006b, 2011), Šoltés et al. (2006), Klama (2008), Szweykowski & Klama (2010).

**New localities:** Západné Tatry Mts, SL, S slope on Mt Osobitá, open calcareous outcrops above Sedlo pod Osobitou pass, 49°15.606'N, 19°43.273'E, alt. 1610 m, leg. P. Górski, 1.10.2013 (POZNB 1684); Tatry Zachodnie Mts, PL: Dolina Lejowa valley, trail slope, mouth of the valley, 49°16.310'N, 19°50.668'E, alt. 950 m, leg. P. Górski, 20.11.2011 (POZNB 799); Dolina Lejowa valley, above Polana Hutý Lejowý glade, trail slope, 49°15.481'N, 19°51.185'E, alt. 1050 m, leg. P. Górski, 20.11.2011 (POZNB 859); near route from Dolina Kościeliska valley to Iwaniacka Przełęcz pass, *Polysticho-Piceetum*, alt. 1275 m, leg. P. Górski, 2.07.2004 (POZNB 1309); High Tatra Mts, SL, Dolina Zadné Međodoly valley, on rock boulder near route, 49°14.329'N, 20°09.924'E, alt. 1170 m, leg. P. Górski, 22.10.2010 (POZNB 1565); Belianske Tatry Mts, Dolina pod Košiare valley, slightly above the junction of the stream from Jahňacia dolina valley with the Tokársky potok stream, calcareous rocks, 49°14.894'N, 20°15.548'E, alt. 1030 m, leg. P. Górski, 27.06.2012 (POZNB 1278).

*Barbilophozia binsteadii* (Kaal.) Loeske ⇒ see under *Orthocaulis binsteadii* (Kaal.) H. Buch

*Barbilophozia floerkei* (F. Weber et D. Mohr) Loeske ⇒ see under *Orthocaulis floerkei* (F. Weber et D. Mohr) H. Buch

### *Barbilophozia hatcheri* (A. Evans) Loeske

**Distribution:** BT 1050–2148 (32); HT-SL 800–2655 (147); HT-PL 1400–2499 (45); ZT-SL 800–2200 (46); TZ-PL 1440–2030 (17).

**Max.** (new loc.) High Tatra Mts, SL, Mt Gerlachovský štít, alt. 2655 m, leg. P. Górski, 7.08.2013 (POZNB 1637-1640).

**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Duda, 15.09.1966 (Duda & Váňa 1984b); High Tatra Mts, SL, Tatranské Matliare, the valley of Biela voda stream, alt. 800 m, leg. L. Vajda, 12.07.1974 (Duda & Váňa 1984b).



**Literature:** Lilienfeldówna (1914a, b), Schiffner (1915), Krajina (1933), Šmarda (1937b, 1938, 1940, 1960a, 1961), Boros (1944), Duda (1955a, 1958), Hadač (1956), Szweykowski (1957, 1958a, 1960a), Boros et al. (1960), Ježek & Vondráček (1962), Šmarda et al. (1962), Váňa & Duda (1965), Šmarda et al. (1971), Vajda (1971), Szweykowski & Kožlicka (1980), Peciar (1981, 1982), Balcerkiewicz (1984), Duda & Váňa (1984b), Unar et al. (1984–1985), Šoltés (1990), Kosiński (1999, 2001), Bączkiewicz et al. (2003), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Górski (2007b), Školek (2009), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, SL: below Mt Gerlachovská veža (ridge Malý Gerlach-Gerlachovský štít), 49°09.790'N, 20°08.057'E, alt. 2590 m, leg. P. Górski, 7.08.2013 (POZNB 1634); Mt Kriváň, alt. 2496 m, leg. P. Górski, 29.09.2013 (POZNB 1692, 1694); S slope on Mt Kriváň, below the summit, 49°09.724'N, 20°00.034'E, 49°09.742'N, 20°00.016'E, alt. 2465 m, alt. 2480 m, leg. P. Górski, 29.09.2013 (POZNB 1703, 1708).

*Barbilophozia kunzeana* (Huebener) Müll. Friib. ⇒ see under *Schljakovia kunzeana* (Huebener) Konst. et Vilnet

### *Barbilophozia lycopodioides* (Wallr.) Loeske

**Distribution:** BT 900–2148 (64); HT-SL 800–2590 (180); HT-PL 1158–2360 (44); ZT-SL 750–2200 (70); TZ-PL 950–2000 (30).

**Max.** (new loc.) High Tatra Mts, SL, below Mt Gerlachovská veža (ridge Malý Gerlach-Gerlachovský štít), 49°09.790'N, 20°08.057'E, alt. 2590 m, leg. P. Górski, 7.08.2013 (POZNB 1634).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horníčková (Peciar 1981).

**Literature:** Hazslinszky (1860, 1865), Rehman (1864), Limpricht (1877a), Krupa (1882, 1888), Szyszyłowicz (1885), Schiffner (1908b, 1910, 1911), Lilienfeldówna (1914a), Kulesza (1920), Szafer et al. (1927), Pawłowski et al. (1928), Krajina (1933), Šmarda (1937b, 1938, 1940, 1958, 1961, 1976a), Suza (1937b), Šmarda et al. (1954), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1956e, 1957, 1958a, 1960a, 1996), Wojterski (1957), Boros et al. (1960), Pawłowski et al. (1960), Ježek & Vondráček (1962), Šmarda et al. (1962, 1971), Váňa & Duda (1965), Hadač et al. (1969a, b), Šoltésová (1974), Šoltés (1976), Horvat et al. (1980), Szweykowski & Kožlicka (1980), Peciar (1981, 1982, 1988), Dúbravcová (1982), Kubiček et al. (1983), Balcerkiewicz (1984), Unar et al. (1984–1985), Duda & Váňa (1985b), Šoltés (1989, 1990), Vidličková (1989), Górski (2002b, 2007b, 2009a), Bączkiewicz et al. (2003), Wojterska et al. (2004), Cykowska (2006b, 2011), Šibík et al. (2006), Šoltés & Školek (2010), Szweykowski & Klama (2010).

**New locality:** High Tatra Mts, SL, Mt Slavkovský štít, rock crevices on northern slope, 49°09.966'N, 20°11.029'E, alt. 2450 m, leg. P. Górski, 24.09.2010 (POZNB 634).

*Barbilophozia quadriloba* (Lindb.) Loeske ⇒ see under *Schljakovianthus quadrilobus* (Lindb.) Konst. et Vilnet

### *Bazzania flaccida* (Dumort.) Grolle

**Distribution:** BT –; HT-SL –; HT-PL 1300–2145 (14); ZT-SL –; TZ-PL 1550–1830 (5).

**Max.** High Tatra Mts, PL, Mt Wołoszyn, rock crevices in sub-peak area, alt. 2145 m, leg. J. Szweykowski, 21.09.1955 (Szweykowski 1960a).

**Min.** High Tatra Mts, PL, Dolina Rostoki valley, above Hala w Roztoce, granite rock in spruce forest, alt. 1300 m, leg. J. Szweykowski, 19.09.1955 (Szweykowski 1960a).

**Literature:** Szweykowski (1957, 1958a, 1960a, 2006), Šmarda (1961), Balcerkiewicz (1984), Duda & Váňa (1992b), Balcerkiewicz et al. (2001), Szweykowski & Klama (2010).

**Note:** The localities cited by Szyszyłowicz (1885), Duda (1958), Šmarda (1961) and Váňa & Duda (1965) are for *Bazzania tricrenata* (rev. W. Kulesza, R. Grolle, J. Duda; see Kulesza 1920, Duda & Váňa 1989c). According to J. Duda all data from the Slovak Tatra Mts published for *B. denudata* (Boros et al. 1960, Szweykowski 1960a, Boros & Vajda 1967) are for *B. tricrenata*.

### *Bazzania tricrenata* (Wahlenb.) Lindb.

**Distribution:** BT 900–1900 (32); HT-SL 900–2200 (214); HT-PL 975–2375 (50); ZT-SL 1000–2100 (51); TZ-PL 965–2050 (29).

**Max.** High Tatra Mts, PL, Mt Cubryna, 49°11'16"N, 20°03'13"E, alt. 2375 m, leg. B. Cykowska (Cykowska 2008).

**Min.** Belianske Tatry Mts, Monkova dolina valley, alt. 900 m (Šmarda 1961); High Tatra, SL, Studenovské vodopády waterfalls, alt. 900 m, leg. J. Šmarda (Duda & Váňa 1989c).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865), Rehman (1864), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Schiffner (1909b, 1910, 1911, 1915), Lilienfeldówna (1910), Szafer et al. (1927), Vilhelm (1927), Krajina (1933), Šmarda (1937b, 1938, 1940, 1944, 1960b, 1961, 1976a), Boros (1940, 1942), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1956e, 1957, 1958a, 1960a, 2006), Boros et al. (1960), Ježek & Vondráček (1962), Šmarda et al. (1962), Váňa & Duda (1965), Boros & Vajda (1967), Hadač et al. (1969a), Rejment-Grochowska (1971), Grolle (1972), Peciar (1978, 1981, 1982, 1988), Wojterski et al. (1978), Dúbravcová (1982), Kubinská & Pišút (1982), Balcerkiewicz (1984), Šoltés (1984, 1989, 1990), Duda & Váňa (1989c), Blackburn et al. (1997), Wojterska et al. (2004), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Górski (2007a, 2009a, b), Klama (2008), Szweykowski & Klama (2010).

### *Bazzania trilobata* (L.) Gray

**Distribution:** BT 1020–1225 (6); HT-SL 780–1760 (24); HT-PL 985–1900 (13); ZT-SL 795–855 (5); TZ-PL 965–1226 (6).

**Max.** High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, alt. 1900 m, leg. S. Balcerkiewicz, 12.09.1978, *Trifido-Distichetum salicetosum herbaceae*, table 9, relevé 9 (Balcerkiewicz 1984), ~ (maybe a misprint: *tricenata-trilobata*?).

**Min.** High Tatra Mts, SL, Tatranská Lomnica, alt. 780 m (Šomšák 1979).

**Literature:** Wahlenberg (1814), Hazslinszky (1860), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Györfly (1924), Šmarda (1938, 1961, 1976a), Hadač (1956), Szweykowski (1957, 1958a, 1960a, 1962), Duda (1958), Jurko (1961), Šmarda et al. (1962), Wojterski et al. (1978), Šomšák (1979), Horvat et al. (1980), Duda & Váňa (1990b), Šoltés (1990), Szweykowski & Buczkowska (2000), Wojterska et al. (2004), Klama (2008), Szweykowski & Klama (2010).

**New localities:** Tatra Zachodnie Mts, PL: between Chłabówka and Cyrhla, minerotrophic spring in forest, near Droga Oswalda Balzera road, 49°17.087'N, 20°00.719'E, alt. 990 m, leg. P. Górski, 16.11.2012 (POZNB 1375); Cyrhla, leg., det. I. Rejment-Grochowska, 10.07.1958, conf. P. Górski (WA); Dolina Chochołowska valley, Mt Ropa, spruce forest, alt. 1150, leg. P. Górski, 27.09.2003 (POZNB 898); Toporowy Staw Wyżni lake, spruce forest around lake, alt. 1100 m, P. Górski, 28.09.2011 (observation); High Tatra Mts, SL, Bielovodská dolina valley, spruce forest near route, above the site where Žabí potok stream joins the Biela voda stream, 49°12.834'N, 20°06.182'E, alt. 1160 m, leg. P. Górski, 9.08.2012 (POZNB 1229); Belianske Tatry Mts: Havrania dolina valley, lower part of Novy žľab gully, 49°15.951'N, 20°11.154'E, alt. 1225 m, leg. P. Górski, 26.06.2012 (POZNB 1258); Ríglfanská dolina valley, decaying log near Ríglfanský potok stream, 49°15.457'N, 20°13.746'E, 49°15.338'N, 20°13.679'E, alt. 1020 m, 1065 m, leg. P. Górski, 1.09.2014 POZNB (1829, 1808).

### *Biantheridion undulifolium* (Nees) Konst. et Vilnet [= *Jamesoniella undulifolia* (Nees) Müll. Frib.]

**Distribution:** BT –; HT-SL –; HT-PL wa (1); ZT-SL –; TZ-PL –.

**Literature:** Krupa (1882), Szweykowski (1957, 1958a, 1971), Pilous & Duda (1960), Duda & Váňa (1969a), Szweykowski & Klama (2010).

**Note:** This species is known from only one locality in the Tatra Mts: High Tatra Mts, PL, peat-bogs in Dolina Pięciu Stawów Polskich valley (Krupa 1882, –). Herbarium material has disappeared. In 2012, P. Górski could not find this plant in peat-bogs in the Dolina Pięciu Stawów Polskich valley. *B. undulifolium* is considered to be extinct both in Poland and Slovakia (Kubinská et al. 2001a, b, Klama 2006).

### *Blasia pusilla* L.

**Distribution:** BT 1000–1300 (1); HT-SL 900–1000 (4); HT-PL –; ZT-SL –; TZ-PL 1100 (2).

**Max.** Belianske Tatry Mts, Rigliany, alt. 1000–1300 m, leg. A. Boros (Duda & Váňa 1984b).

**Min.** High Tatra Mts, SL, Vyšné Hágy, alt. 900 m, leg. J. Szweykowski, 17.07.1958 (Boros et al. 1960, Duda & Váňa 1984b); High Tatra Mts, SL, Tatranská Lomnica, alt. 900 m, leg. A. Boros, 17.09.1940 (Duda & Váňa 1984b).

**Literature:** Rehman (1864), Hazslinszky (1865), Krupa (1882), Szweykowski (1957, 1958a, 1960a, 1968, 1996, 2006), Boros et al. (1960), Rejment-Grochowska (1966), Duda & Váňa (1984b), Szweykowski & Klama (2010).

**Note:** Szweykowski (2006) gives maximum of this species in the Tatra Mts as 1350 m a.s.l. without precise locality. There is no material deposited from this locality in the herbarium of Adam Mickiewicz University in Poznań (POZW).

### *Blepharostoma trichophyllum* (L.) Dumort.

**Distribution:** BT 883–2148 (77); HT-SL 850–2400 (116); HT-PL 915–2438 (58); ZT-SL 860–2000 (16); TZ-PL 860–2050 (82).

**Max.** High Tatra Mts, PL, Mt Mięguszowiecki Szczyt Wielki, 49°11'13"N, 20°03'34"E, alt. 2438 m, leg. B. Cykowska (Cykowska 2008).

**Min.** High Tatra Mts, SL, Tatranské Matliare, alt. 850 m, *Lepidozio-Tetraphidietum pellucidi*, table 10 (rel. 2 and 5), leg. R. Šoltés, 3.07.1980 (Šoltés 1989).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865), Rehman (1864), Fritze & Ilse (1870), Limpricht (1877a), Krupa (1878, 1882), Szyszyłowicz (1885), Schiffner (1908b, 1910, 1911), Lilienfeldówna (1914a), Kulesza (1920), Pawłowski & Stecki (1927), Szafer et al. (1927), Vilhelm (1927), Krajina (1933), Šmarda (1937b, 1938, 1956, 1958, 1961, 1976b), Duda (1955a, b), Hadač (1956), Szweykowski (1957, 1958a, b, 1960a, 1966, 1996, 2006), Szweykowski & Šmarda (1958), Boros et al. (1960), Ježek & Vondráček (1962), Mickiewicz (1965), Váňa & Duda (1965), Lisowski (1966), Hadač et al. (1969a), Váňa (1969), Šoltésová (1974), Šoltés (1976, 1990), Peciar (1978, 1982, 1988), Šomšák (1979), Balcerkiewicz (1984), Unar et al. (1984–1985), Vidličková (1989), Piękoś-Mirkowa & Łobaszewska (1990), Blackburn et al. (1997), Kosiński (1999), Szweykowski & Buczkowska (2000), Balcerkiewicz et al. (2001), Wojterska et al. (2004), Cykowska (2006b, 2008, 2011), Górski (2007b), Klama (2008), Szweykowski & Klama (2010), Vončina et al. (2011).

**Note:** This species is here considered in a broad sense (incl. also *B. trichophyllum* subsp. *brevirete* (Bryhn et Kaal.) R. M. Schust.). The reason is that the majority of the former authors did not recognize subspecies or examine all available herbarium material. *B. trichophyllum* subsp. *trichophyllum* grows at low altitudes (also on wood) whereas *B. trichophyllum* subsp. *brevirete* is known only from alpine (and subalpine p.p.) areas, where it grows on humus on rocks.

**New localities:** High Tatra Mts, SL, Veľká Zmrzlá dolina valley, Barania kotlina basin, 49°12.161'N, 20°12.269'E, alt. 2085 m, leg. P. Górski, 27.09.2011 (POZNB 541); Západné Tatry Mts, SL: Lataná dolina valley, below Zábrať pass, alt. 1420 m, leg. P. Górski, 18.07.2006 (POZNB 360); Juráňova dolina valley, Tiesňavy, decaying log in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1661, 1670).

### *Bucegia romanica* Radian

**Distribution:** BT 1200–2148 (61); HT-SL 1600–2545 (147); HT-PL 2020–2307 (8); ZT-SL 1510–2100 (22); TZ-PL 1400–2100 (19).

**Max.** High Tatra Mts, SL, Batizovský žľab gully under Mt Gerlachovský štít, alt. 2545 m, leg. L. Pačlová (Pačlová 1966).

**Min.** Belianske Tatry Mts, Tristarská dolina valley, alt. 1200 m, leg. J. Šmarda, 23.07.1955 (Duda & Váňa 1990c).

**Literature:** Schiffner (1908a, b, 1909b, 1910, 1911), Lilienfeldówna (1910), Müller (1912–1916), Györfy & Péterfi (1915), Kulesza (1920), Györfy (1926, 1939, 1958), Szepesfalvy (1926), Pawłowski & Stecki (1927), Šmarda (1936, 1938, 1940, 1960a, b, 1961, 1976a), Suza (1937b), Boros (1940, 1942, 1959), Doignon (1956), Duda (1958, 1962a), Györfy (1958), Szweykowski & Šmarda (1958), Vězda (1958), Boros et al. (1960), Inoue (1960), Váňa & Duda (1965), Pačlová (1966), Rejment-Grochowska (1966, 1971), Boros & Komlodi (1975), Kubinská & Pišút (1982), Balcerkiewicz (1984), Unar et al. (1984–1985), Duda & Váňa (1990c), Šoltés (1990), Kosiński (1999), Szweykowski & Klama (2010).

**Note:** *Bucegia romanica* was described in 1903 (Radian 1903). Some of the previously published localities for *Preiszia quadrata* in the Tatra Mts refer to *B. romanica*. Herbarium material of *P. quadrata* collected by Szyszyłowicz (1885) was revised by W. Kulesza (Kulesza 1920). The localities for *P. quadrata* in the subnival belt in the Polish Tatra Mts also refer to *B. romanica* (Cykowska 2008, rev. A. Stebel, see Górski et al. 2011).

**New localities:** Tatry Zachodnie Mts, PL: Kobylarzowy Żleb gully (under Mt Małolączniak), upper part of the gully, 49°14.632'N, 19°54.649'E, alt. 1700 m, leg. P. Górski, 22.11.2011 (POZNB 838); Kobylarzowy Żleb gully (under Mt Małolączniak), lower part of the gully, 49°14.602'N, 19°54.428'E, alt. 1540 m, leg. P. Górski, 22.11.2011 (POZNB 862); High Tatra Mts, SL: Rovienky valley, Zadné Rovienky, rock walls descending from Mt Svišťový štít, 49°11.221'N, 20°08.495'E, alt. 1790 m, leg. P. Górski, 25.09.2011 (POZNB 709); Mt Veľká Svišťovka, N slope, in a gully descending from the summit, alt. 1725 m, leg. P. Górski, 30.09.2006 (POZNB 827); Kačacia dolina valley, Kačači žľab gully, 49°10.319'N, 20°07.080'E, alt. 1795 m, leg. P. Górski, 28.09.2013 (POZNB 1716, KRAM); High Tatra Mts, PL, below Mięguszowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.044'N, 20°04.101'E, alt. 2200 m, leg. P. Górski, 2.09.2014 (POZNB 1900).

### *Calypogeia azurea* Stotler et Crotz

**Distribution:** BT 920–1600 (22); HT-SL 900–1850 (60); HT-PL 955–2025 (37); ZT-SL 800–1950 (22); TZ-PL 980–1580 (31).

**Max.** High Tatra Mts, PL, precise location not given, alt. 2025 m, leg. K. Buczkowska (Szweykowski 2006).

**Min.** Západné Tatry Mts, SL: Jalovecká dolina valley, alt. 800 m, leg. J. Duda, 15.09.1966 (Duda & Váňa 1986b); Dolinky, above Žiar village, alt. 800 m, leg. I. Pišút, 1975 (Kubinská & Pišút 1982).

**Literature:** Wahlenberg (1814), Hazslinszky (1860), Rehman (1864), Limpricht (1877a), Krupa (1878), Szyszylowicz (1885), Schiffner (1911), Szafer et al. (1927), Krajina (1933), Šmarda (1937b, 1961), Duda (1955a, 1962a), Szweykowski (1957, 1958a, 1960a, 2006), Ježek & Vondráček (1962), Šmarda et al. (1962), Váňa & Duda (1965), Hadač et al. (1969a), Šoltés (1976, 1989, 1990), Wojterski et al. (1978), Kubinská & Pišút (1982), Duda & Váňa (1986b), Vidličková (1989), Viceníková et al. (1995), Blackburn et al. (1997), Buczkowska et al. (2004), Wojterska et al. (2004), Cykowska (2006b, 2011), Górski (2007b, 2009a), Klama (2008), Stachurska-Swakoń (2008), Szweykowski & Klama (2010), Buczkowska & Dabert (2011), Buczkowska et al. (2012).

**Note:** All localities for *Calypogeia muelleriana* published by Peciar (1982; rev. J. Duda, see Duda & Váňa 1987b) refer to *C. azurea*.

**New localities:** High Tatra Mts, SL: Nefcerka valley, sub-glacially eroded step of the valley, below Vyšný Nefcerský vodopád waterfall, unmarked path in dwarf mountain pine, 49°10.440'N, 19°59.482'E, alt. 1555 m, leg. P. Górski, 2.08.2012 (POZNB 1305); Kôprovnicva valley, spruce forest, near unmarked path, 49°11.023'N, 19°56.022'E, alt. 1315 m, leg. P. Górski, 29.08.2014 (POZNB 1852); SW slope on Mt Predný Holý vrch (Liptovské kopy), near stream, 49°11.309'N, 19°57.740'E, alt. 1820 m, leg. P. Górski, 30.08.2014 (POZNB 1866); Tatry Zachodnie Mts, PL, between Chłabówka and Cyrhla, minerotrophic spring in forest, near Oswald Balzer road, 49°17.065'N, 20°00.753'E, alt. 995 m, leg. P. Górski, 16.11.2012 (POZNB 1379).

### *Calypogeia integristipula* Steph.

**Distribution:** BT 900–1600 (53); HT-SL 800–2320 (175); HT-PL 1015–1810 (11); ZT-SL 750–2000 (54); TZ-PL 885–1770 (9).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2320 m, leg. E. Hadač, 12.08.1957, det. M. Vondráček sub *C. neesiana*, rev. J. Duda (Duda & Váňa 1987c).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horníčková, det. V. Peciar sub *C. neesiana*, rev. J. Duda (Duda & Váňa 1987c).

**Literature:** Šmarda (1958, 1961), Szweykowski (1958a, 1960a), Duda (1962a, 1965), Ježek & Vondráček (1962), Šmarda et al. (1962), Váňa & Duda (1965), Šmarda et al. (1971), Šoltésová (1974), Šoltés (1976, 1990), Wojterski et al. (1978), Šomšák (1979), Kubinská & Pišút (1982), Peciar (1982, 1988), Duda & Váňa (1987c), Vidličková (1989), Viceníková et al. (1995), Buczkowska (2004), Buczkowska et al. (2004), Cykowska (2006b, 2011), Klama (2008), Szweykowski & Klama (2010), Buczkowska & Dabert (2011), Buczkowska et al. (2012).

**Note:** The data given for *Calypogeia neesiana* and *C. azurea* var. *neesiana* in Slovakia in the following publications: Szyszylowicz (1885), Schiffner (1909b, 1910, 1911), Szepesfalvy (1930b), Šmarda (1937b, 1938, 1940), Duda (1955a, 1958), Hadač et al. (1969a) [see Duda & Váňa 1987c; all rev. J. Duda] refer to *C. integristipula* as does the locality for *C. muelleriana* published by Boros & Vajda (1962; rev. J. Duda, see Duda & Váňa 1987b).

**New localities:** Západné Tatry Mts, SL, Jalovecká dolina, trail slope, near route, alt. 855 m, leg. P. Górski, 16.07.2008 (POZNB 904); Tatry Zachodnie Mts, PL, Dolina Chochołowska valley, Mt Ropa, *Plagiothecio-Piceetum sphagnetosum*, alt. 1170 m, leg. P. Górski, 27.09.2003 (POZNB 1520); Belianske Tatry Mts: Havrania dolina valley, lower part of Novy žlab gully, 49°15.951'N, 20°11.154'E, alt. 1225 m, leg. P. Górski, 26.06.2012 (POZNB 1231); above SE part of Stará poľana glade, a gully descending from Mt Nižny Havran, 49°15.429'N, 20°11.858'E, alt. 1440 m, leg. P. Górski, 24.06.2012 (POZNB 1271); Ríglfánská dolina valley, decaying log near Ríglfánský potok stream, 49°15.447'N, 20°13.734'E, 49°15.431'N, 20°13.738'E, alt. 1025 m, 1040 m, leg. P. Górski, 1.09.2014 (POZNB 1810, 1817); High Tatra Mts, SL, Kôprovnicva valley, spruce forest, near unmarked path, 49°11.023'N, 19°56.022'E, alt. 1315 m, leg. P. Górski, 29.08.2014 (POZNB 1850).

### *Calypogeia muelleriana* (Schiffn.) Müll. Frib.

**Distribution:** BT 1100–1600 (5); HT-SL 1000–2100 (13); HT-PL 1810 (7); ZT-SL 900–1400 (4); TZ-PL 1226–1830 (2).

**Max.** High Tatra Mts, SL, Bystré sedlo pass, alt. 2100 m, leg. J. Šmarda (Šmarda 1961).

**Min.** Západné Tatry Mts, SL: Trnovská dolina valley, under Mt Baranec, alt. 900 m, leg. J. Duda sub *C. azurea* (Duda 1955a), rev. J. Duda (Duda & Váňa 1987b); Biela skala, alt. 900 m (Peciar 1981).

**Literature:** Szweykowski (1960a), Šmarda (1961), Peciar (1973, 1981), Duda & Váňa (1987b), Šoltés (1990), Buczkowska et al. (2004), Wojterska et al. (2004), Cykowska (2006b, 2011), Górski (2009a), Szweykowski & Klama (2010).

**Note:** The data cited by Duda (1955a) and Peciar (1982) for *Calypogeia azurea* (rev. J. Duda, see Duda & Váňa 1987b) refer to *C. muelleriana*. The locality recorded by Boros & Vajda (1962) belongs to *C. integrispula* (rev. J. Duda, see Duda & Váňa 1987b).

### *Calypogeia neesiana* (C. Massal. et Carestia) Müll. Frib.

**Distribution:** BT 800–1635 (6); HT-SL 900–2000 (40); HT-PL 1240–1850 (21); ZT-SL 750–2000 (16); TZ-PL 990–1690 (13).

**Max.** Západné Tatry Mts, SL, Nová plesa lakes, alt. 2000 m (Šmarda 1937b); High Tatra Mts, SL, Zbojnické pleso lake, alt. 2000 m (Šmarda 1940).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horničková (Peciar 1981).

**Literature:** Szyszyłowicz (1885), Schiffner (1909b, 1910, 1911), Kulesza (1920), Szafer et al. (1927), Šmarda (1937b, 1938, 1940, 1961, 1976a), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a, 1960a, 2006), Boros et al. (1960), Šmarda et al. (1962), Hadač et al. (1969a), Peciar (1981, 1982, 1988), Unar et al. (1984–1985), Duda & Váňa (1988c), Szweykowski & Buczkowska (2000), Buczkowska (2004), Wojterska et al. (2004), Cykowska (2006b, 2011), Górski (2009a), Šoltés & Školek (2010), Szweykowski & Klama (2010), Buczkowska & Dabert (2011), Buczkowska et al. (2012).

**Note:** One locality of this plant given by Krajina (1933) was omitted (see Váňa & Duda 1965).

**New localities:** Belianske Tatry Mts, Dolina Podspádska valley, near Podspádski potok stream, decaying log, 49°16.402'N, 20°11.786'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1361); Západné Tatry Mts, SL, upper, S part of Látaná dolina valley, below Sedlo Zábraf pass, *Polytrichum-Sphagnum* hummock, alt. 1650 m, leg. P. Górski, 18.07.2006 (POZNB 899, 903); Tatry Zachodnie Mts, PL: between Chlabówka and Cyrhla, minerotrophic spring in forest, near Oswald Balzer road, 49°17.087'N, 20°00.719'E, alt. 990 m, leg. P. Górski, 16.11.2012 (POZNB 1369); Dolina Chochołowska valley, Mt Ropa, *Plagiothecio-Piceetum sphagnetosum*, alt. 1170 m, leg. P. Górski, 27.09.2003 (POZNB 1521); High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, below Mt Kotelnica, 49°12.277'N, 20°01.171'E, alt. 1850 m, *Polytrichum-Sphagnum* hummock, leg. P. Górski, 23.08.2012 (POZNB 1751); High Tatra, SL, Kôprovnicva valley, spruce forest, near unmarked path, 49°11.023'N, 19°56.022'E, alt. 1315 m, leg. P. Górski, 29.08.2014 (POZNB 1851).

### *Calypogeia sphagnicola* (Arnell et J. Perss.) Warnst. et Loeske

**Distribution:** BT –; HT-SL 1000–1448 (3); HT-PL 1274–1860 (10); ZT-SL 1650–1795 (2\*); TZ-PL 1100–1830 (15).

**Max.** (new loc.) High Tatra Mts, PL, Dolina Waksmundzka valley, slope of Mt Koszysta, *Polytrichum-Sphagnum* hummock, alt. 1860 m, leg. P. Górski, 22.08.2005 (POZNB 428).

**Min.** High Tatra Mts, SL, in the vicinity of Tatranská Polianka, alt. 1000 m, leg. A. Boros, L. Vajda, 30.08.1964 (Duda & Váňa 1986c).

**Literature:** Lilienfeldówna (1914a, b), Krajina (1933), Szweykowski (1957, 1958a, 1960a, 2006), Rejment-Grochowska (1971), Duda & Váňa (1986c), Szweykowski & Buczkowska (2000), Buczkowska (2004), Buczkowska et al. (2004), Cykowska (2006b, 2011), Szweykowski & Klama (2010), Buczkowska & Dabert (2011), Buczkowska et al. (2012).

**New localities:** \* Západné Tatry Mts, SL: upper, S part of Látaná dolina valley, below Sedlo Zábraf pass, *Polytrichum-Sphagnum* hummock, alt. 1650 m, leg. P. Górski, 18.07.2006 (POZNB 899); Račková dolina valley, Račkov Zadok, above Vyšné Račkove pleso lake, *Polytrichum-Sphagnum* hummock, 49°11.898'N, 19°48.206'E, alt. 1795 m, leg. P. Górski, 6.08.2012 (POZNB 1166, 1499); High Tatra Mts, SL, peat-bog near NW shore of Jamské pleso lake, alt. 1448 m, leg. P. Górski, 29.09.2013 (POZNB 1727).

### *Calypogeia suecica* (Arnell et J. Perss.) Müll. Frib.

**Distribution:** BT 930–1400 (46); HT-SL 800–1750 (19); HT-PL 1175–1205 (2\*); ZT-SL 800–1600 (19); TZ-PL 925–1600 (19).

**Max.** High Tatra Mts, SL, Mt Ostrva, alt. 1750 m (Šmarda 1961).

**Min.** High Tatra Mts, SL, Tatranské Matliare, alt. 800 m (Šmarda 1961); Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Duda, 15.09.1966 (Duda & Váňa 1987b).

**Literature:** Schiffner (1911), Krajina (1933), Šmarda (1938, 1940, 1944, 1958, 1961, 1976b), Duda (1955a, 1962a), Szweykowski (1956e, 1957, 1960a, 1996, 2006), Šmarda et al. (1962), Peciar (1985, 1988), Duda & Váňa

(1987b), Chudzińska et al. (2001), Buczkowska (2004), Buczkowska et al. (2004), Górski (2007b), Szweykowski & Klama (2010), Buczkowska & Dabert (2011), Buczkowska et al. (2012).

**New localities:** \* High Tatra Mts, PL: Dolina Roztoki valley, Wodogrzmoty Mickiewicza waterfall, 49°14.012'N, 20°05.321'E, alt. 1175 m, leg. P. Górski, 26.08.2012 (POZNB 1480); Dolina Roztoki valley, Las Roztoka forest, above Wodogrzmoty Mickiewicza waterfall, near road to Morskie Oko lake, 49°13.771'N, 20°05.705'E, alt. 1205 m, leg. P. Górski, 26.08.2012 (POZNB 1484); High Tatra Mts, SL: Kôprovnicva valley, lower part, decaying log near unmarked path, 49°10.771'N, 19°55.646'E, alt. 1180 m, leg. P. Górski, 29.08.2014 (POZNB 1856); Kôprovnicva valley, decaying log at mouth of the valley, 49°10.594'N, 19°55.370'E, alt. 1095 m, leg. P. Górski, 29.08.2014 (POZNB 1860); Taty Zachodnie Mts, PL: Żleb Zabijak gully (upper part of the Dolina Lejowa valley), 49°14.971'N, 19°50.899'E, decaying log, alt. 1250 m, leg. P. Górski, 20.11.2011 (POZNB 1044); Dolina Pyszniańska valley, near Pyszniański potok stream, decaying log, alt. 1200 m, leg. H. Klama, P. Górski, B. Cykowska, 1.07.2004 (POZNB 905); Dolina Tomanowa valley, near route, alt. 1600 m, leg. P. Górski, 15.08.1998 (POZNB 770/1998); between Chłabówka and Cyrhla, minerotrophic spring in forest, near Droga Oswalda Balzera road, 49°17.065'N, 20°00.753'E, alt. 995 m, leg. P. Górski, 16.11.2012 (POZNB 1383); Dolina Wielkie Koryciska valley, undergrowth of *Polysticho-Piceetum*, alt. 955 m, leg. P. Górski, 18.09.2005 (POZNB 902); above Kuźnice, Zgorzelec forest, near route to Dolina Gaśienicowa valley, decaying log, 49°15.835'N, 19°59.616'E, alt. 1275 m, leg. P. Górski, 16.11.2012 (POZNB 1390); Dolina za Bramką valley (in the part available for sightseeing), 49°16.452'N, 19°54.956'E, alt. 995 m, decaying log, leg. P. Górski, 21.11.2011 (POZNB 1744); Západné Tatry Mts, SL: Zadná Látaná dolina valley, decaying log near route, alt. 1410 m, leg. P. Górski, 18.07.2006 (POZNB 900); Mt Parzączak (at Slovak side), decaying log, 49°15.535'N, 19°47.348'E, alt. 1450 m, leg. P. Górski, 30.09.2013 (POZNB 1732); High Tatra Mts, SL: Bielovodská dolina valley, Poľana pod Vysokou glade, alt. 1300 m, leg. P. Górski, 25.09.2011 (POZNB 901); Dolina Bielych plies valley, rowan wood in upper montane belt, decaying log, 49°13.093'N, 20°14.562'E, alt. 1445 m, leg. P. Górski, 20.11.2012 (POZNB 1443); Belianske Tatry Mts: Tristarský žľab gully, decaying log in spruce forest, 49°15.357'N, 20°12.709'E, alt. 1275 m, leg. P. Górski, 25.06.2012 (POZNB 1179); N slope on Mt Malý vrch, 49°15.999'N, 20°10.982'E, alt. 1205 m, leg. P. Górski, 26.06.2012 (POZNB 1197); Mt Čierny vrch, decaying log, 49°15.993'N, 20°11.333'E, alt. 1305 m, leg. P. Górski, 26.06.2012 (POZNB 1227); valley of the Čierny potok stream, 49°16.033'N, 20°11.702'E, alt. 1050 m, leg. P. Górski, 24.06.2012 (POZNB 1181); valley of Čierny potok stream, below rocks on Biela stena (near unmarked route to Stará poľana glade), decaying log, 49°16.126'N, 20°11.733'E, alt. 1000 m, leg. P. Górski, 24.06.2012 (POZNB 1262); Podspádska dolina valley, W part, near Podspádski potok stream, decaying log, 49°16.440'N, 20°11.708'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1349); Podspádska dolina valley, middle part, in a valley of small stream flowing south from Podspádski potok stream, decaying log, 49°16.284'N, 20°12.048'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1358); Zlatý žľab gully, near stream, decaying log, 49°15.607'N, 20°12.640'E, alt. 1150 m, leg. P. Górski, 25.06.2012 (POZNB 1246, 1252); Žltý žľab gully, upper part of the gully, decaying log near stream, 49°15.595'N, 20°12.633'E, 49°15.595'N, 20°12.633'E, alt. 1145 m, 1155 m, leg. P. Górski, 19.11.2012 (POZNB 1402, 1420); Dolina Hučava valley, upper part, decaying log near stream, 49°13.213'N, 20°18.394'E, alt. 945 m, leg. P. Górski, 19.11.2012 (POZNB 1434); Rígfánská dolina valley, decaying log at mouth of the valley, 49°15.631'N, 20°13.958'E, alt. 975 m, leg. P. Górski, 1.09.2014 (POZNB 1826); Rígfánská dolina valley, decaying log near Rígfánský potok stream, 49°15.238'N, 20°13.691'E, 49°15.167'N, 20°13.621'E, 49°15.171'N, 20°13.674'E, 49°15.071'N, 20°13.674'E, alt. 1070 m, 1095 m, 1100 m, 1135 m, leg. P. Górski, 1.09.2014 (POZNB 1776, 1783, 1787, 1822, 1823, 1923).

### *Cephalozia ambigua* C. Massal.

**Distribution:** BT 1756–2000 (2); HT-SL 1490–2330 (53); HT-PL 1570–2195 (17); ZT-SL 1800–2000 (6); TZ-PL –.

**Max.** High Tatra Mts, SL, Mlynická dolina valley, Červené sedlo pass, alt. 2330 m, leg. V. Krajina, 2.08.1932, *Silenetum acaulis*, table 47, relevé 10 (Krajina 1933).

**Min.** High Tatra Mts, SL, Čierna Javorová dolina valley, near Čierné Javorové pleso lake, alt. 1490 m, leg. J. Růžička, 12.08.1957, det. J. Duda (Duda 1962a, Duda & Váňa 1987b).

**Literature:** Schiffler (1915), Vilhelm (1927), Krajina (1933), Šmarda (1938, 1940, 1961), Duda (1955a, 1962a), Szweykowski (1957, 1960a, 2006), Boros et al. (1960), Váňa & Duda (1965), Šoltés (1982), Balcerkiewicz (1984), Duda & Váňa (1987b), Šoltés (1989), Šoltés et al. (2006), Szweykowski & Klama (2010).

**Note:** The locality of this species published by Peciar (1982) belongs to *Fuscocephalozia* (= *Pleurocladula*) *albescens* (rev. J. Váňa, Duda & Váňa 1987b). Some localities of *Cephalozia ambigua* published in studies of Šmarda (1938, 1961) belong to *C. bicuspidata* and one to *Gymnocolea inflata* (for details see Duda & Váňa 1987b). Vilhelm (1927) published one locality in the Belianske Tatry Mts at 955–965 m a.s.l. However, that record seems to be unreliable and was omitted.

**New localities:** High Tatra Mts, SL: Žabia Bielovodská dolina valley, blocks of rock above S shore of Vyšné Žabie Bielovodské pleso lake, alt. 1705 m, 1730 m, leg., det. P. Górski, 15.08.2009, 19.09.2009, conf. J. Váňa (POZNB 85, 1512); Piargová dolinka valley, glacial cirque below Mt Cubrina, snow-bed in rock boulders, alt. 1860 m, leg., det. P. Górski, 28.07.2009, conf. J. Váňa (POZNB 1515); Hlinská dolina valley, upper part of the valley, glacial cirque below Výšné Kôprovské sedlo pass, snow-bed near route, alt. 1775 m, leg., det. P. Górski, 21.08.2006, conf. J. Váňa (POZNB 147); Zlomisková dolina valley, Kotlina Lodového plesa basin, near SE shore of Lodové pleso lake, 49°09.771'N, 20°06.453'E, alt. 1930 m, leg., det. P. Górski, 6.08.2010, conf. J. Váňa (POZNB 1513); Furkotská dolina valley, Rázcestie pod Soliskom, on soil near stream, alt. 1720 m, leg., det. P. Górski, 8.08.2008, conf. J. Váňa (POZNB 1568); High Tatra Mts, PL: Dolina za Mnichem valley, snow-bed near Staw Staszica lake, alt. 1790 m, leg., det. P. Górski, 13.09.2004, conf. J. Váňa (POZNB 290); Dolina Rybiego Potoku valley, rocky walls above Czarny Staw pod Rysami lake, near route to Mt Rysy, alt. 1730 m, leg., det. P. Górski, 18.08.2004, conf. J. Váňa (POZNB 1567).

### *Cephalozia bicuspidata* (L.) Dumort.

**Distribution:** BT 945–2000 (26); HT-SL 810–2375 (206); HT-PL 920–2195 (106); ZT-SL 800–2050 (31); TZ-PL 854–2060 (79).

**Max.** High Tatra Mts, SL, Mlynická dolina valley, below Mt Malý Satan, alt. 2375 m, leg. V. Krajina, 14.08.1932, *Geetum montani*, table 22, releve 8 (Krajina 1933).

**Min.** Západné Tatry Mts, SL, Mihulčia dolina valley (N to Mt Osobita), alt. 800 m, leg. V. Peciar (Peciar 1985).

**Literature:** Hazslinszky (1860, 1965), Rehman (1864), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Schiffner (1909b, 1910, 1911, 1915), Lilienfeldówna (1914a, b), Kulesza (1920), Krajina (1933), Šmarda (1938, 1940, 1958, 1961, 1976b), Duda (1955a, b, 1983), Szweykowski (1957, 1958a, 1960a, 2006), Wojterski (1957), Váňa & Duda (1965), Hadač et al. (1969a), Peciar (1978, 1982, 1985, 1988), Wojterski et al. (1978), Šomšák (1979), Balcerkiewicz (1984), Unar et al. (1984–1985), Duda & Váňa (1987b), Šoltés (1989, 1990), Vidličková (1989), Blackburn et al. (1997), Balcerkiewicz et al. (2001), Górski (2002a, 2004, 2007b, 2009a), Stebel & Górski (2004), Wojterska et al. (2004), Cykowska (2006b, 2008, 2011), Šibík et al. (2006), Klama (2008), Szweykowski & Klama (2010), Vončina et al. (2011).

**Note:** To this species belong some localities attributed to *Cephalozia ambigua* by Šmarda (1938, 1961; rev. J. Váňa, for detail see Duda & Váňa 1987b). Altogether, 235 localities of *C. bicuspidata* recorded by P. Górski were included in this study.

*Cephalozia catenulata* (Huebener) Lindb. ⇒ see under *Fuscocephaloziopsis catenulata* (Huebener) Váňa et L. Söderstr.

*Cephalozia connivens* (Dicks.) Lindb. ⇒ see under *Fuscocephaloziopsis connivens* (Dicks.) Váňa et L. Söderstr.

*Cephalozia leucantha* Spruce ⇒ see under *Fuscocephaloziopsis leucantha* (Spruce) Váňa et L. Söderstr.

*Cephalozia loitlesbergeri* Schiffn. ⇒ see under *Fuscocephaloziopsis loitlesbergeri* (Schiffn.) Váňa et L. Söderstr.

*Cephalozia lunulifolia* (Dumort.) Dumort. ⇒ see under *Fuscocephaloziopsis lunulifolia* (Dumort.) Váňa et L. Söderstr.

*Cephalozia pleniceps* (Austin) Lindb. ⇒ see under *Fuscocephaloziopsis pleniceps* (Austin) Váňa et L. Söderstr.

### *Cephaloziella divaricata* (Sm.) Schiffn.

**Distribution:** BT 1250–1600 (5); HT-SL 1100–2655 (10); HT-PL 1735–2307 (11); ZT-SL 800 (3); TZ-PL 1300–1620 (4).

**Max.** (new loc.) High Tatra Mts, SL, Mt Gerlachovský štít, alt. 2655 m, leg. P. Górski, 7.08.2013 (POZNB 1641).

**Min.** Západné Tatry Mts, SL: Ráčkova dolina valley, alt. 800 m, leg. J. Duda, 19.10.1952 (Duda 1955a, Duda & Váňa 1975a); Jalovecká dolina valley, alt. 800 m, leg. J. Váňa, 15.09.1966 (Duda & Váňa 1975a).

**Literature:** Krupa (1882), Duda (1955a), Szweykowski (1957, 1960a), Šmarda (1958), Duda & Váňa (1975a), Cykowska (2008, 2011), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, PL: on ridge between Wrota Chałubińskiego pass and Mt Szpiglasowy Wierch, close to Wrota Chałubińskiego pass, rock crevices with northern exposure, 49°11.576'N, 20°02.619'E, alt. 2075 m, leg., det. P. Górski, 28.08.2012, conf. J. Váňa (POZNB 1517); Miękusowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.018'N, 20°03.920'E, alt. 2307 m, leg. P. Górski, 2.09.2014 (POZNB 1887, 1893); Dolina Gašenicowa valley, glacial cirque under Mylna Przełęcz pass and Mt Kościelec, 49°13.365'N, 20°00.755'E, alt. 1975 m, leg. P. Górski, 30.08.2011, det. J. Váňa (POZNB 587); High Tatra Mts, SL: Kolová dolina valley, bottom plateau of upper kettle, 49°13.095'N, 20°12.017'E, alt. 1820 m, leg. P. Górski, 1.09.2011, det. J. Váňa (POZNB 586); Veľká Zmrzlá dolina valley, rock rubble above a sub-glacially eroded step (to Dolina Kežmarskej Bielej

vody), 49°12.265'N, 20°12.539'E, alt. 1920 m, leg. P. Górski, 27.09.2011, det. J. Váňa (POZNB 591); Važecká dolina valley, lower kettle, below a sub-glacially eroded step of upper kettle with lake, on a stone near water, 49°09.228'N, 20°00.480'E, alt. 1900 m, 11.08.2010, leg., det. P. Górski, conf. J. Váňa (POZNB 592); Važecká dolina valley, rock boulders north of the N shore of Krivánske Zelené pleso lake, 49°09.715'N, 20°00.409'E, alt. 2020 m, leg. P. Górski, 11.08.2010, det. J. Váňa (POZNB 593); *Cephaloziella* cf. *divaricata*: High Tatra Mts, SL: Nefcerka valley, in a kettle below Przełęcz Špára pass, rock rubble, kettle bottom, *Pohlietum commutatae*, 49°10.016'N, 20°00.478'E, alt. 1915 m, leg. P. Górski, 2.08.2011, det. J. Váňa (POZNB 590); Temnosmrečinská dolina valley, Piargová dolinka valley, in northern part of the kettle, 49°11.259'N, 02°02.718'E, alt. 1855 m, leg. P. Górski, 5.08.2011, det. J. Váňa (POZNB 597).

### *Cephaloziella elegans* (Heeg) Schiffn.

**Distribution:** BT 1365 (1); HT-SL –; HT-PL –; ZT-SL 1000 (1); TZ-PL –.

**Max.** Belianske Tatry Mts, Milý potok stream, alt. 1365 m (Vilhelm 1927).

**Min.** Západné Tatry Mts, SL, Tichá dolina valley, alt. 1000 m, leg. J. Duda sub *C. divaricata*, 26.08.1954, rev. J. Duda (Duda 1955a, Duda & Váňa 1974a).

**Literature:** Vilhelm (1927), Szweykowski (1957), Duda & Váňa (1974a).

**Note:** Species found only in two localities in the Tatra Mts (see above).

### *Cephaloziella grimsulana* (J. B. Jack ex Gotsche et Rabenh.) Sde.-Lac.

**Distribution:** BT –; HT-SL 1600 (1); HT-PL –; ZT-SL –; TZ-PL –.

**Min./Max.** High Tatra Mts, SL, Veľká Studená dolina valley, alt. 1600 m, leg. L. Vajda, 14.07.1961 (Boros & Vajda 1962, Duda & Váňa 1974a).

**Literature:** Boros & Vajda (1962), Duda & Váňa (1974a), Šoltés (1992).

### *Cephaloziella hampeana* (Nees) Schiffn.

**Distribution:** BT 1490–2100 (4); HT-SL 1d–1755 (2); HT-PL –; ZT-SL 800 (1); TZ-PL –.

**Max.** Belianske Tatry Mts, sub-peak area of Mt Ždiarska Vidla, alt. 2100 m, leg. J. Szweykowski, 19.07.1956 (Szweykowski 1960a).

**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Duda, 15.09.1966 (Duda & Váňa 1974b).

**Literature:** Szweykowski (1960a), Duda & Váňa (1974b).

**New locality:** High Tatra Mts, SL, Svišťová (Bielovodská) dolina valley, below Vyšna Svišťová roveň, on peat near stream bank, 49°11.246'N, 20°07.812'E, alt. 1755 m, leg. P. Górski, 26.09.2011, det. J. Váňa (POZNB 699).

### *Cephaloziella massalongi* (Spruce) Müll. Frib.

**Distribution:** BT –; HT-SL 1600–1800 (2); HT-PL 1700–1960 (2); ZT-SL –; TZ-PL –.

**Max.** (new loc.) High Tatra Mts, PL, Dolina Rybiego Potoku valley, Mt Turnia Zwornikowa, climbing route Filar Vogla, alt. 1960 m, leg. S. Szlagowski, 20.03.2012, det. P. Górski, conf. J. Váňa (POZNB 1592, KRAM).

**Min.** High Tatra Mts, SL, Zlomisková dolina valley, alt. 1600–1800 m, leg. A. Boros, 14.08.1963, det. L. Vajda (Duda & Váňa 1974a).

**Literature:** Vajda (1971), Duda & Váňa (1974a), Górski & Váňa in Ellis et al. (2013a).

### *Cephaloziella rubella* (Nees) Warnst.

**Distribution:** BT 1200–1400 (2); HT-SL 1500–1884 (4); HT-PL 1660–2259 (5); ZT-SL 900 (1); TZ-PL 1100–1770 (5).

**Max.** High Tatra Mts, PL, Mt Žabi Szczyt Wyżni, alt. 2259 m, leg. B. Cykowska (Cykowska 2008).

**Min.** Západné Tatry Mts, SL, Trnovská dolina valley, under Mt Baranec, alt. 900 m, leg. J. Duda sub *C. starkei*, 12.07.1953, rev. J. Duda (Duda & Váňa 1974b).

**Literature:** Szweykowski (1957, 1958a, 1960a), Duda & Váňa (1974b), Peciar (1982), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Szweykowski & Klama (2010).

### *Cephaloziella spinigera* (Lindb.) Warnst.

**Distribution:** BT –; HT-SL 1350 (1); HT-PL 2090 (1); ZT-SL wa (1); TZ-PL 1120–2030 (12).

**Max.** High Tatra Mts, PL, Dolina Waksmundzka valley, slope between Wołoszyn and Koszysta, 49°13'46"N, 20°03'01"E, alt. 2090 m, leg. B. Cykowska (Cykowska 2011).



**Min.** Tatry Zachodnie Mts, PL, Toporowy Staw Wyżni lake, alt. ca 1120 m, leg. F. Lilienfeldówna, 10.08.1912 (Lilienfeldówna 1914b).

**Literature:** Lilienfeldówna (1914b), Szweykowski (1957, 1958a), Duda & Váňa (1974a), Szweykowski & Klama (2010), Cykowska (2011).

### *Cephaloziella varians* (Gottsche) Steph.

**Distribution:** BT –; HT-SL 1675–2060 (3); HT-PL 1675 (1); ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, SL, Furkotská dolina valley, Nižné Wahlenbergovo pleso lake, alt. 2060 m, leg. J. Šmarda, 3.07.1937, det. J. Duda (Duda & Váňa 1974a).

**Min.** High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, NW shore of the Wielki Staw Polski lake, 49°12'38"N, 20°02'16"E, alt. 1675 m, leg. H. Klama, 4.08.1991 (Klama in Ellis et al. 2011).

**Literature:** Duda & Váňa (1974a), Šoltés (1992), Szweykowski & Klama (2010), Klama in Ellis et al. (2011).

**Note:** *Cephaloziella varians* is considered to be extinct in Slovakia (Kubinská et al. 2001a, b). Despite two expeditions (2005 and 2011), P. Górski did not find this plant near Nižné Wahlenbergovo pleso lake, the locality described by J. Duda (Duda & Váňa 1974a). However, this species does occur in the Slovak Tatra Mts at two new localities (compare below).

**New localities:** High Tatra Mts, SL: Mlynická dolina valley, rock walls descending from Mt Štrbský štít, rock wall with dripping water, 49°10.035'N, 20°02.489'E, alt. 1990 m, leg. P. Górski, 31.07.2012, det. J. Váňa (POZNB 1518); Žabia Bielovodská dolina valley, blocks of rock near NW shore of Nižné Žabie Bielovodské pleso lake, leg. P. Górski, 14.08.2009, det. J. Váňa (POZNB 33/2009). *Cephaloziella* cf. *variens/grimsulana*: High Tatra Mts, SL: Mt Slavkovský štít, rock crevices on northern slope, 49°09.966'N, 20°11.029'E, alt. 2450 m, leg. P. Górski, 24.09.2010, det. J. Váňa (POZNB 596); Zlomisková dolina valley, on the sub-glacially eroded step in the Rumanova dolinka valley, in a slowly flowing stream, 49°09.766'N, 20°06.086'E, alt. 1955 m, leg., det. P. Górski, 4.08.2010, rev. J. Váňa (POZNB 595).

*Chiloscyphus coadunatus* (Sw.) J. J. Engel et R. M. Schust. ⇒ see under *Lophocolea bidentata* (L.) Dumort.

*Chiloscyphus minor* (Nees) J. J. Engel et R. M. Schust. ⇒ see under *Lophocolea minor* Nees

### *Chiloscyphus pallescens* (Ehrh. ex Hoffm.) Dumort.

**Distribution:** BT 1100–1200 (3); HT-SL 810–1820 (25); HT-PL 940–1760 (23); ZT-SL 900–1720 (10); TZ-PL 960–1750 (55).

**Max.** High Tatra Mts, SL, Mlynická dolina valley, near Pleso nad Skokom lake, alt. 1820 m, leg. J. Szweykowski, 16.07.1958 (Szweykowski 1960a).

**Min.** High Tatra Mts, SL, Kežmarské Žľaby, alt. 810 m (Šomšák 1979).

**Literature:** Hazslinszky (1865), Limpricht (1877a), Györfy (1924), Szepesfalvy (1930c), Šmarda (1938, 1960c, 1961), Duda (1955a), Szweykowski (1957, 1958a, 1960a), Boros et al. (1960), Váňa & Duda (1965), Balcerkiewicz & Pawlak (1978a), Šomšák (1979), Peciar (1981, 1982), Viceníková et al. (1995), Blackburn et al. (1997), Šoltés (2006), Klama (2008), Klama et al. (2008), Szweykowski & Klama (2010), Cykowska & Smieja (2011).

**New locality:** Západné Tatry Mts, SL, Gáborova dolina valley, Gaborov potok stream, on stone in stream, 49°11.595'N, 19°49.846'E, alt. 1720 m, leg. P. Górski, 26.08.2011 (POZNB 569).

### *Chiloscyphus polyanthos* (L.) Corda

**Distribution:** BT 1095–1708 (7); HT-SL 910–2200 (33); HT-PL 910–1580 (23); ZT-SL 750–1400 (7); TZ-PL 830–1650 (46).

**Max.** High Tatra Mts, SL, Polský hrebeň pass, leg. 1900–2200 m (Vilhelm 1927).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horničková (Peciar 1978, 1981).

**Literature:** Hazslinszky (1860, 1865), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Schiffner (1909b), Kulesza (1920), Vilhelm (1927), Szepesfalvy (1930c), Krajina (1933), Šmarda (1937b, 1938, 1940, 1976b), Duda (1955a, 1962a), Szweykowski (1957, 1958a, c, 1960a), Pawłowski et al. (1960), Ježek & Vondráček (1962), Váňa & Duda (1965), Hadač et al. (1969a), Šoltés (1976, 1990), Balcerkiewicz et al. (1978a), Peciar (1978, 1981, 1982), Blackburn et al. (1997), Klama et al. (2008), Stachurska-Swakoń (2008), Górski (2009a), Školek (2009), Szweykowski & Klama (2010).

*Chiloscyphus profundus* (Nees) J. J. Engel et R. M. Schust. ⇒ see under *Lophocolea heterophylla* (Schrad.) Dumort.

*Cladopodiella fluitans* (Nees) H. Buch ⇒ see under *Odontoschisma fluitans* (Nees) L. Söderstr. et Váňa

*Cladopodiella francisci* (Hook.) Jörg. ⇒ see under *Odontoschisma francisci* (Hook.) L. Söderstr. et Váňa

### *Cololejeunea calcarea* (Lib.) Schiffn.

**Distribution:** BT 1030–1400 (23); HT-SL 1035–1700 (5); HT-PL 1025–1035 (2); ZT-SL 860–2000 (7); TZ-PL 910–1760 (30).

**Max.** Západné Tatry Mts, SL, Mt Plačlivý Roháč, alt. 2000 m, leg. J. Váňa, 12.09.1966 (Duda & Váňa 1975b).

**Min.** (new loc.) Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, calcareous outcrops in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1660).

**Literature:** Hazslinszky (1865, 1885), Límpricht (1877a), Krupa (1878, 1888), Szyszłowicz (1885), Boros (1940, 1942), Duda (1955a, 1962a), Szweykowski (1957, 1958a, c, 1960a, 1996, 2006), Šmarda (1958, 1960a, 1961, 1976a), Šmarda et al. (1962), Szweykowski & Kožlicka (1974), Duda & Váňa (1975b), Klama (2008), Szweykowski & Klama (2010).

**New localities:** Tatry Zachodnie Mts, PL: Dolina ku Dziurze valley, near Jaskinia Dziura cave, 49°16.318'N, 19°56.549'E, alt. 1005 m, leg. P. Górski, 21.11.2011 (POZNB 738); Dolina Stražyska valley, limestone rocks near the mouth of the valley, 49°16.255'N, 19°55.937'E, alt. 990 m, leg. P. Górski, 21.11.2011 (POZNB 953); Dolina za Bramką valley, tall vertical rock faces near the mouth of the valley, 49°16.593'N, 19°55.174'E, alt. 915 m, leg. P. Górski, 21.11.2011 (POZNB 957); Dolina za Bramką valley, tall vertical rock faces, 49°16.566'N, 19°55.090'E, alt. 930 m, leg. P. Górski, 21.11.2011 (POZNB 966); Dolina za Bramką valley (at the end of the part available for sightseeing), limestone faces with *Caricetum firmae*, 49°16.337'N, 19°55.022'E, alt. 970 m, leg. P. Górski, 21.11.2011 (POZNB 968); Staników Żleb gully, lower part of the gully, shaded calcareous rocks in spruce forest, 49°16.168'N, 19°52.805'E, alt. 1075 m, leg. P. Górski, 22.11.2011 (POZNB 970); Dolina Kościeliska valley, limestone rocks near the mouth of the valley, alt. 910 m, leg. P. Górski, 21.09.2005 (POZNB 948); Dolina Kościeliska valley, Wąwóz Kraków gully, alt. 1060 m, leg. P. Górski, 21.09.2005 (POZNB 390); Dolina Kościeliska valley, first part of Wąwóz Kraków gully, alt. 1010 m, leg. H. Klama, P. Górski, 1.07.2004 (POZNB 949); Dolina Chochołowska valley, Wyżnia Chochołowska Brama, limestone rocks near former Schronisko Blaszyńskich hut, *Carici-Festucetum tatrae*, alt. 1040 m, leg. P. Górski, 8.08.2004 (POZNB 818); Dolina Chochołowska valley, Niżnia Chochołowska Brama, calcareous rocks with *Carici-Festucetum tatrae*, alt. 1010 m, leg. P. Górski, 8.08.2004 (POZNB 830); Dolina Wielkie Koryciska valley, limestone rocks near the mouth of the valley, alt. 925 m, leg. P. Górski, 18.09.2005 (POZNB 389); Kobylarzowy Żleb pod Małolączniakiem gully, in upper part, rock faces with northern exposure, *Caricetum firmae*, on humus and on naked rock, 49°14.632'N, 19°54.649'E, alt. 1700 m, leg. P. Górski, 22.11.2011 (POZNB 842) and 49°14.668'N, 19°54.757'E, alt. 1760 m, leg. P. Górski, 22.11.2011 (POZNB 857); SW part in Polana Kalatówki glade, shaded calcareous rocks in spruce forest, at the mouth of Kalackie Koryto gully, 49°15.419'N, 19°57.754'E, alt. 1265 m, leg. P. Górski, 24.11.2011 (POZNB 954); Západné Tatry Mts, SL: Juráňova dolina valley, Válovec, exposed calcareous outcrops, 49°15.310'N, 19°46.930'E, alt. 1325 m, leg. P. Górski, 30.09.2013 (POZNB 1678); S slope on Mt Osobitá, exposed calcareous outcrops above Sedlo pod Osobitou pass, 49°15.561'N, 19°43.313'E, alt. 1555 m, leg. P. Górski, 1.10.2013 (POZNB 1680); High Tatra Mts, SL: Javorová dolina valley, calcareous boulder near route, spruce forest, alt. 1260 m, leg. P. Górski, 18.08.2006 (POZNB 811); Bielovodská dolina valley, calcareous boulder near route, above Bielovodská poľana glade, 49°13.559'N, 20°06.127'E, alt. 1065 m, leg. P. Górski, 9.08.2012 (POZNB 1321); Dolina Zadne Medodoly valley, Bránka, 49°14.303'N, 20°11.122'E, alt. 1205 m, leg. P. Górski, 22.10.2010 (POZNB 925); Belianske Tatry Mts: N slope of Mt Malý vrch, calcareous rocks in spruce forest, 49°15.999'N, 20°10.982'E, alt. 1205 m, leg. P. Górski, 26.06.2012 (POZNB 1194); valley of the Čierny potok stream, below rocks on Biela stena (near unmarked route to Stará poľana glade), calcareous rocks, 49°16.077'N, 20°11.780'E, alt. 1060 m, leg. P. Górski, 24.06.2012 (POZNB 1202); Dolina pod Košiare valley, calcareous rocks in lower part of Veľký Košiar, 49°14.439'N, 20°14.948'E, alt. 1380 m, leg. P. Górski, 27.06.2012 (POZNB 1216); Dolina pod Košiare valley, slightly above the site where the stream from the Jahňacia dolina valley meets Tokársky potok stream, calcareous rocks, 49°14.894'N, 20°15.548'E, alt. 1030 m, leg. P. Górski, 27.06.2012 (POZNB 1275); Havrania dolina valley, lower part of Novy žľab gully, 49°15.951'N, 20°11.154'E, alt. 1225 m, leg. P. Górski, 26.06.2012 (POZNB 1255); lower part of Tristarský žľab gully, shaded calcareous rocks in spruce forest, 49°15.444'N, 20°12.747'E, alt. 1210 m, leg. P. Górski, 25.06.2012 (POZNB 1268); E part of Tristarský žľab gully, near Žľabina, 49°15.269'N, 20°12.712'E, alt. 1355 m, leg. P. Górski, 25.06.2013 (POZNB 1279); Žltý žľab gully, upper part of the gully, calcareous rocks, 49°15.595'N, 20°12.633'E, alt. 1155 m, leg. P. Górski, 19.11.2012 (POZNB 1401).

*Conocephalum conicum* (L.) Dumort. (sensu stricto)

**Distribution:** BT –; HT-SL –; HT-PL 865–1075 (9); ZT-SL –; TZ-PL 935–1050 (13).

**Max.** High Tatra Mts, PL, Mt Przednia Kopa Sołtysia and Dolina Filipka valley, alt. 1075 m, leg. J. Szweykowski, K. Buczkowska, 1988 (Szweykowski et al. 2005).

**Min.** High Tatra Mts, PL, Dolina Sucheju Wody valley, on sandy river alluvial soil, alt. 865 m, leg. A. Flakus, 28.08.2002 (Cykowska & Smieja 2011).

**Note:** It is highly possible that this species occurs also in the Slovak Tatra Mts.

**Literature:** Odrzykoski (1995, *C. conicum* species L.), Szweykowski et al. (2005), Szweykowski (2006), Klama (2008), Szweykowski & Klama (2010), Cykowska & Smieja (2011).

**New locality:** Tatry Zachodnie Mts, PL, between Chłabówka and Cyrhla, minerotrophic spring in forest, near Droga Oswalda Balzera road, 49°17.087'N, 20°00.719'E, alt. 990 m, leg., det. P. Górski, 16.11.2012, conf. K. Buczkowska (POZNB 1475).

*Conocephalum conicum* (L.) Dumort. (sensu lato)

**Note:** Data referring to *C. conicum* s. str. and *C. salebrosum*, published before Szweykowski et al. (2005), were included.

**Literature:** Rehman (1864), Krupa (1882), Hazslinszky (1885), Szyszyłowicz (1885), Schiffler (1908b, 1909b, 1910, 1911), Lilienfeldówna (1914a), Szepesfalvy (1926), Šmarda (1938, 1958), Duda (1955a, 1965), Szweykowski (1957, 1958a, 1960a, 1968), Pawłowski et al. (1960), Ježek & Vondráček (1962), Šmarda et al. (1962), Hadač et al. (1969a), Duda & Váňa (1973b), Peciar (1973, 1978), Balcerkiewicz (1978, 1984), Balcerkiewicz et al. (1978a, b), Šoltés (1989, 1990), Blackburn et al. (1997), Kosiński (1999), Balcerkiewicz et al. (2001).

*Conocephalum salebrosum* Szweykowski, Buczkowska et Odrzykoski

**Distribution:** BT 925–1460 (11\*); HT-SL 1065–1445 (3\*); HT-PL 890–1550 (36); ZT-SL 860–1760 (3\*); TZ-PL 910–1700 (101).

**Max.** (new loc.) \* Západné Tatry Mts, SL, N slope of Mt Sivý Vrch, alt. 1760 m, leg. P. Górski, 19.07.2008 (POZNB 909).

**Min.** High Tatra Mts, PL, Potok Głęboki stream, alt. 890 m, leg. J. Szweykowski, E. Chudzińska, 1993 (Szweykowski et al. 2005).

**Literature:** Odrzykoski (1995, *C. conicum* species S), Szweykowski et al. (2005), Szweykowski (2006), Klama (2008), Szweykowski & Klama (2010).

**Note:** Szweykowski (2006) provides maximum as 1850 m a.s.l. (no location regarding that part of the Tatra Mts).

**New localities:** \* Belianske Tatry Mts: Dolina Hučava valley, lower part of the valley, calcareous rocks near stream, 49°13.190'N, 20°18.479'E, alt. 925 m, leg., det. P. Górski, 19.11.2012, conf. K. Buczkowska (POZNB 1474); Dolina pod Košiare valley, calcareous rocks in lower part of the valley, spruce forest, 49°14.746'N, 20°15.312'E, alt. 1090 m, leg., det. P. Górski, 27.06.2012, conf. K. Buczkowska (POZNB 1466); Dolina pod Košiare valley, slightly above the place where the stream from the Jahňacia dolina valley joins the Tokársky potok stream, calcareous rocks, 49°14.894'N, 20°15.548'E, alt. 1030 m, leg. P. Górski, 27.06.2012, det. K. Buczkowska (POZNB 1468); Havrania dolina valley, Havrania rovien, rocks on the sub-glacially eroded step in the upper kettle of the valley, 44°15.379'N, 20°11.301'E, 44°15.617'N, 20°11.359'E, alt. 1460 m, 1380 m, leg., det. P. Górski, 26.06.2012, conf. K. Buczkowska (POZNB 1462, 1467); lower part of Tristarský žľab gully, shaded calcareous rocks in spruce forest, 49°15.444'N, 20°12.747'E, alt. 1210 m, leg., det. P. Górski, 25.06.2012, conf. K. Buczkowska (POZNB 1460); Ríglfánská dolina valley, decaying log at mouth of the valley, 49°15.631'N, 20°13.958'E, alt. 975 m, leg. P. Górski, 1.09.2014 (POZNB 1827); Žltý žľab gully, upper part of the gully, decaying log near stream, 49°15.595'N, 20°12.633'E, alt. 1145 m, leg. P. Górski, 19.11.2012, det. K. Buczkowska (POZNB 1477); N slope on Mt Malý vrch, shady calcareous rocks in spruce forest, 49°15.999'N, 20°10.982'E, alt. 1205 m, leg. P. Górski, 26.06.2012, det. K. Buczkowska (POZNB 1465); valley of the Čierny potok stream, near Čierny potok stream, 49°16.033'N, 20°11.702'E, alt. 1050 m, leg. P. Górski, 24.06.2012, det. K. Buczkowska (POZNB 1461); Dolina Podspádska valley, middle part, in a little valley of a small stream south of Podspádski potok stream, decaying log, 49°16.284'N, 20°12.048'E, alt. 980 m, leg. P. Górski, 18.11.2012, det. K. Buczkowska (POZNB 1473); \* High Tatra Mts, SL: Javorová dolina valley, below Javorová polana glade, calcareous boulder near route in spruce forest, alt. 1275 m, leg. P. Górski, 18.08.2006, conf. K. Buczkowska (POZNB 907); Kolová dolina valley, near unmarked route to Kolové pleso lake, shaded calcareous rocks in spruce forest, 49°13.796'N, 20°11.080'E, alt. 1445 m, leg. P. Górski, 1.09.2011, conf. K. Buczkowska (POZNB

910); Bielovodská dolina valley, calcareous boulder near route, above Bielovodská poľana glade, 49°13.559'N, 20°06.127'E, alt. 1065 m, leg. P. Górski, 9.08.2012 (POZNB 1322); \* Západné Tatry Mts, SL: Juráňova dolina valley, Tiesňavy, calcareous outcrops in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1662); Teplý žľab gully, above Pučatina polana glade, on stone near Javorinka stream, 49°15.543'N, 19°42.446'E, alt. 1095 m, leg. P. Górski, 1.10.2013 (POZNB 1725); Tatry Zachodnie Mts, PL: Dolina Chochołowska valley, above shelter, slope near route to Mt Grześ, alt. 1245 m, leg., det. P. Górski, 26.09.2006, conf. K. Buczkowska (POZNB 915); between Chłabówka and Cyrhla, close to Chłabówka, calcareous rocks in spruce forest, near Droga Oswalda Balzera road, 49°16.998'N, 20°00.639'E, alt. 965 m, leg., det. P. Górski, 16.11.2012, conf. K. Buczkowska (POZNB 1476); Kobylarzowy Żleb pod Małołączniakiem gully, upper part of the gully, alpine grassland with *Carex firma*, on humus, 49°14.632'N, 19°54.649'E, alt. 1700 m, leg. P. Górski, 22.11.2011, det. K. Buczkowska (POZNB 1472); Staników Żleb gully, mouth of the gully, shady calcareous rocks in spruce forest, 49°16.168'N, 19°52.805'E, alt. 1075 m, leg., det. P. Górski, 22.11.2011, conf. K. Buczkowska (POZNB 1463); SW part of Polana Kalatówki glade, shaded calcareous rocks in spruce forest, 49°15.419'N, 19°57.754'E, alt. 1265 m, leg., det. P. Górski, 24.11.2011, conf. K. Buczkowska (POZNB 1471); Żleb Zabijak gully (upper part of the Dolina Lejowa valley), 49°15.103'N, 19°50.978'E, alt. 1180 m, leg. P. Górski, 20.11.2011, det. K. Buczkowska (POZNB 1469).

*Crossocalyx hellerianus* (Nees ex Lindenb.) Meyl. [= *Anastrophyllum hellerianum* (Nees ex Lindenb.) R. M. Schust.]

**Distribution:** BT 925–1450 (7); HT-SL 800–1000 (1); HT-PL 955–1450 (2); ZT-SL –; TZ-PL 1170–1250 (2).  
**Max.** High Tatra Mts, PL, Dolina Gašenicowa valley, Las Gašenicowy forest, alt. 1450 m, leg. J. Szwejkowski, 16.09.1955 (Szwejkowski 1960a); Belianske Tatry Mts, Mt Faixová, E slope, on decaying wood, alt. 1450 m, leg. J. Szwejkowski, 21.07.1956 (Szwejkowski 1960a).

**Min.** High Tatra Mts, SL, Tatranská Lomnica, alt. 800 m, leg. A. Boros, det. L. Vajda (Duda & Váňa 1984a).

**Literature:** Limpricht (1877a, b), Szwejkowski (1956c, 1957, 1958a, 1960a, 1971, 1996, 2006), Šmarda (1976a), Duda & Váňa (1984a), Klama (2008), Szwejkowski & Klama (2010).

**Note:** Two reports of *Lophozia ascendens* and *L. longidens* from the Belianske Tatry Mts published by Šmarda (1961) oraz Šmarda et al. (1962) are based on an erroneous identification and belong to this species (rev. J. Váňa, J. Hubáčková, Duda & Váňa 1989c, 1992b). Szwejkowski (2006), referring to unpublished data, claims that there are 14 localities for *Crossocalyx hellerianus* in the Polish Tatra Mts.

**New localities:** Belianske Tatry Mts: Dolina Hučava valley, upper part, on decaying log (probably *Abies alba*), 49°13.220'N, 20°18.367'E, leg., det. P. Górski, 19.11.2012, conf. J. Váňa (POZNB 1452); Ríglfánská dolina valley, decaying log near Ríglfánský potok stream, 49°15.341'N, 20°13.700'E, alt. 1060 m, leg. P. Górski, 1.09.2014 (POZNB 1797).

*Diplophyllum albicans* (L.) Dumort.

**Distribution:** BT 800–1060 (9); HT-SL 900–2390 (80); HT-PL 975–2330 (20); ZT-SL 800–2050 (33); TZ-PL 1700–1770 (2).

**Max.** (new loc.) High Tatra Mts, SL, above Sedielko pass, 49°11.583'N, 20°10.900'E, alt. 2390 m, leg. P. Górski, 14.08.2013 (POZNB 1647).

**Min.** Belianske Tatry Mts, Tatranská Kotlina, in the valley of Hučava stream, alt. 800 m, leg. J. Podpěra, 21.07.1922 (Duda & Váňa 1980a); Západné Tatry Mts, SL: Račkova dolina valley, alt. 800 m, leg. J. Šmarda, 7.1936 (Šmarda 1937b, Duda & Váňa 1980a); Jalovecká dolina valley, alt. 800 m, leg. J. Duda, 15.09.1966 (Duda & Váňa 1980a).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1885), Limpricht (1877a), Szyszyłowicz (1885), Lilienfeldówna (1910, 1914b), Schiffner (1910, 1911, 1915), Vilhelm (1927), Krajina (1933), Šmarda (1937b, 1938, 1940, 1961), Duda (1955a, 1958, 1962a, 1965), Szwejkowski (1957, 1958a, 1960a, 1962), Ježek & Vondráček (1962), Šmarda et al. (1962), Šoltés (1976, 1989, 1990), Duda & Váňa (1980a), Kubinská & Pišút (1982), Peciar (1982, 1988), Blackburn et al. (1997), Cykowska (2006a, b, 2008, 2011), Šoltés et al. (2006), Klama (2008), Szwejkowski & Klama (2010).

*Diplophyllum obtusifolium* (Hook.) Dumort.

**Distribution:** BT wa (1); HT-SL 1000–1600 (13); HT-PL 1384–1500 (2); ZT-SL 820–1600 (4); TZ-PL 980–1230 (9).

**Max.** High Tatra Mts, SL, Malá Studená dolina valley, alt. 1600 m (Šmarda 1940); Západné Tatry Mts, SL, Tomanovské pleso lake, alt. 1600 m, leg. J. Šmarda sub *D. taxifolium*, 3.07.1959, rev. J. Duda (Duda & Váňa 1980c).

**Min.** (new loc.) Západné Tatry Mts, SL, Jalovecká dolina valley, at the valley mouth, slope near the route, *Plagiothecio-Piceetum*, alt. 820 m, leg. P. Górski, 15.07.2008 (POZNB 411).

**Literature:** Limpricht (1877a, b), Hazslinszky (1885), Szyszyłowicz (1885), Šmarda (1938, 1940), Duda (1955a), Szweykowski (1957, 1958a, 1960a, 1971, 1996), Duda & Váňa (1980c), Balcerkiewicz (1984), Górski (2009a), Szweykowski & Klama (2010).

**Note:** The data cited by Balcerkiewicz (1984, table 9, relevé 9, alt. 1900 m a.s.l.) is considered to be unreliable and not included in this list.

**New localities:** Tatry Zachodnie Mts, PL: Dolina Chochołowska valley, above shelter, slope near route Mt Grześ, alt. 1190 m, 1200 m, leg. P. Górski, 26.09.2006 (POZNB 913, 914); Dolina Starorobociańska valley, spruce forest, near route to Siwa Przełęcz pass, alt. 1170 m, 1215 m, 1230 m, leg. P. Górski, 29.09.2006 (POZNB 916, 917, 918); Dolina Jarzabcza valley, Szlak Jana Pawła II route, trail slope, alt. 1140 m, 1180 m, leg. P. Górski, 27.09.2006 (POZNB 919, 920).

### *Diplophyllum taxifolium* (Wahlenb.) Dumort.

**Distribution:** BT 1600–1900 (2); HT-SL 1000–2633 (205); HT-PL 1384–2430 (74); ZT-SL 1000–2250 (49); TZ-PL 1445–1890 (12).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2633 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885), conf. P. Górski (KRAM 198394).

**Min.** Západné Tatry Mts, SL: Spálená dolina valley, alt. 1000 m, leg. J. Šmarda, 8.1935 (Šmarda 1937b, Duda & Váňa 1981a); the valley of Trnovečanka stream, alt. 1000 m, leg. J. Šmarda, 7.1936 (Šmarda 1937b, Duda 1955a, Duda & Váňa 1981a); High Tatra Mts, SL, Tatranská Lomnica, alt. 1000 m, leg. J. Šmarda, 22.07.1938 (Šmarda 1940, Duda & Váňa 1981a).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865), Limpricht (1877a), Krupa (1878, 1882), Szyszyłowicz (1885), Schiffner (1909b, 1910, 1911, 1915), Müller (1912–1916), Lilienfeldówna (1914a), Krajina (1933), Šmarda (1937b, 1938, 1940, 1944, 1961, 1976a), Duda (1955a, 1962a), Boros et al. (1960), Szweykowski (1957, 1958a, 1960a, 1971, 1996), Váňa & Duda (1965), Peciar (1978, 1981, 1982), Wojterski et al. (1978), Duda & Váňa (1981a), Balcerkiewicz (1984), Šoltés (1984, 1989, 1990, 2004), Blackburn et al. (1997), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Górski (2007a), Szweykowski & Klama (2010).

**Note:** To this species belongs the locality for *Scapania umbrosa* cited by Vilhelm (1927, rev. J. Duda, Duda & Váňa 1970a). This list includes 51 unpublished localities recorded by P. Górski.

### *Eremonotus myriocarpus* (Carrington) Pearson

**Distribution:** BT –; HT-SL 1650–1795 (8); HT-PL 1393–2305 (5); ZT-SL 1600 (1); TZ-PL 1685 (1).

**Max.** (new loc.) High Tatra Mts, PL, below Mięszowicka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.037'N, 20°03.955'E, alt. 2305 m, leg. P. Górski, 2.09.2014 (POZNB 1908).

**Min.** (new loc.) High Tatra Mts, PL, Dolina Rybiego Potoku valley, near Morské Oko lake, alt. 1393 m, leg. F. Lilienfeldówna, T. Wilczyński, 29.08.1912, det. P. Górski (WA; a specimen of *E. myriocarpus* was discovered among voucher specimens named *Gymnomitrium adustum* and stored in WA).

**Literature:** Szweykowski & Šmarda (1958), Boros (1959), Boros et al. (1960), Pilous & Duda (1960), Šmarda (1960a, 1961, 1976a), Szweykowski (1960a, 1996, 2006), Váňa (1969), Urmi (1978), Duda & Váňa (1982c), Peciar (1982), Szweykowski & Klama (2010), Váňa & Górski in Ellis et al. (2013b).

**Note:** Most of the reports of *Eremonotus myriocarpus* published for the High Tatra Mts are for the northern slopes of Mt Veľká Svišťovka (SL). The specimen from the Vyšné Kôprovské sedlo pass (Šmarda 1960a, 1961, Urmi 1978) belongs to *Gymnomitrium* (= *Marsupella*) *brevissimum* (rev. J. Váňa, Duda & Váňa 1982c). The locality of *E. myriocarpus* recorded by Váňa & Górski and cited in Ellis et al. (2013b) was published together with information on the occurrence of *Jungermannia borealis* in Poland (High Tatra, PL, Dolina Rybiego Potoku valley, above Czarny Staw pod Rysami lake, Szeroki Zagon, rocky dripping water, in rock crevices, near route to Mt Rysy, 49°11'02"N, 20°04'46"E, alt. 1730 m, leg., det. P. Górski, 18.08.2004, conf. J. Váňa, POZNB 1540).

**New localities:** High Tatra Mts, SL, Kačacia dolina valley, Kačací žľab gully, 49°10.319'N, 20°07.080'E, alt. 1795 m, leg. P. Górski, 28.09.2013 (POZNB 1719, 1728; KRAM); Dolina Kežmarskej Bielej vody valley, SW part of Dolina Zeleného plesa lake, above and SW from Zelené pleso lake, near entrance to Veľka Zmrzla dolina valley, 49°12'325"N, 20°12'965"E, alt. 1665 m, rock walls and rock fissures, leg. P. Górski, 20.11.2012 (POZNB 1334); Kôprovica valley, upper part, rocks below Mt Krížne, 49°11.382'N, 19°57.518'E, alt. 1760 m, leg.

P. Górski, 29.08.2014 (POZNB 1848); High Tatra Mts, PL: below Mięguszwowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.044'N, 20°04.101'E, alt. 2200 m, leg. P. Górski, 2.09.2014 (POZNB 1896, 1897); below Mt Kazalnica, rocks near route to Mięguszwowiecka Przełęcz pod Chłopkiem pass, 49°11.228'N, 20°03.988'E, alt. 1870 m, leg. P. Górski, 2.09.2014 (POZNB 1906).

### *Frullania dilatata* (L.) Dumort.

**Distribution:** BT 750–1450 (23); HT-SL 850–980 (6); HT-PL 1025–1298 (4); ZT-SL 800–1325 (7); TZ-PL 940–1215 (26).

**Max.** Belianske Tatry Mts, Stežky, alt. 1450 m, leg. J. Szweykowski, 24.07.1956 (Szweykowski 1960a).

**Min.** Belianske Tatry Mts, valley of the Sumivý potok stream, alt. 750 m, leg. A. Boros, 16.07.1960 (Duda & Váňa 1977a).

**Literature:** Wahlenberg (1814), Hazslinszky (1860), Rehman (1864), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Suza (1937b), Duda (1955a), Szweykowski (1957, 1958a, 1960a, 1996, 2006), Šmarda (1961, 1976a), Ježek & Vondráček (1962), Šmarda et al. (1962), Mickiewicz (1965), Peciar (1965, 1982), Duda & Váňa (1977a), Szweykowski & Kožlicka (1977), Šoltés (1989, 1990), Klama (2008), Szweykowski & Klama (2010).

**New localities:** Tatry Zachodnie Mts, PL: Dolina Kościeliska valley, at the mouth of the valley, alt. 905 m, leg. P. Górski, 21.09.2005 (POZNB 920, 921); Dolina Kościeliska valley, Cudakowa Polana glade, alt. 930 m, leg. P. Górski (POZNB 922); Dolina Wielkie Koryciska valley, alt. 915 m, leg. P. Górski, 18.09.2005 (POZNB 923); Západné Tatry Mts, SL: Jalovecká dolina valley, on bark of *Acer pseudoplatanus*, near route to Mt Babky, alt. 1120 m, leg. P. Górski, 19.07.2008 (POZNB 924); Juráňova dolina valley, Válovec, exposed calcareous outcrops, 49°15.306'N, 19°46.867'E, alt. 1325 m, leg. P. Górski, 30.09.2013 (POZNB 1691).

### *Frullania fragilifolia* (Taylor) Gotsche et al.

**Distribution:** BT 880 (2); HT-SL –; HT-PL 893–993 (1); ZT-SL 890 (1\*); TZ-PL 950–1710 (9).

**Max.** (new loc.) Tatry Zachodnie Mts, PL, W slope of Mt Jarząbczy Wierch, alt. 1710 m, leg., det. J. Szweykowski, 2.09.1959, conf. P. Górski (POZW 6052).

**Min.** Belianske Tatry Mts, Dolina Hučáva valley, on a fir tree near the spring of Sumivý prameň, alt. 880 m, leg. J. Szweykowski, 13.07.1957 (Szweykowski 1960a).

**Literature:** Krupa (1878), Hazslinszky (1885), Szyszyłowicz (1885), Szweykowski (1957, 1958a, c, 1960a, 1996, 2006), Šmarda (1961), Duda & Váňa (1977a), Szweykowski & Kožlicka (1977), Szweykowski & Klama (2010), Górski (2013).

**Note:** *Frullania fragilifolia* is considered to be extinct in Poland (Klama 2006) and vulnerable in Slovakia (Kubinská et al. 2001a, b). Despite intensive searching, in 2012 P. Górski did not find the plant at selected historical localities in the Polish and Slovak Tatra Mts (for details see Górski 2013). Unpublished herbarium material deposited in POZW was also included in the list.

**New locality:** \* Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, on bark of *Acer pseudoplatanus*, 49°16.566'N, 19°46.396'E, alt. 890 m, leg. P. Górski, 30.09.2013 (POZNB 1674).

### *Frullania jackii* Gottsche

**Distribution:** BT 1200–1300 (2); HT-SL 1600–1610 (3); HT-PL –; ZT-SL 1300 (2); TZ-PL 891–1685 (2).

**Max.** Tatry Zachodnie Mts, PL, W slope of Mt Jarząbczy Wierch, alt. 1685 m, leg. J. Szweykowski, 18.08.1956 (Szweykowski 1960a).

**Min.** Tatry Zachodnie Mts, PL, Dolina ku Dziurze valley, alt. 891–1026 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885), ~.

**Literature:** Szyszyłowicz (1885), Boros (1951), Duda (1955a, b), Szweykowski (1957, 1958a, 1960a, 2006), Šmarda (1960a, b, 1961, 1976a), Duda & Váňa (1976b), Szweykowski & Kožlicka (1977), Šoltés (1992), Szweykowski & Klama (2010).

**Note:** Szweykowski (2006) gives information on the occurrence of *Frullania jackii* in the Polish Tatra Mts at an altitude of 2050 m a.s.l. (without providing the location of the locality). Simultaneously, he questioned the identification of this liverwort recorded by Szyszyłowicz at this locality (1885, see above). There is no herbarium material for this locality.

*Frullania tamarisci* (L.) Dumort.

**Distribution:** BT 800–2140 (47); HT-SL 1300–2050 (11); HT-PL 750–2110 (7); ZT-SL 850–1610 (11); TZ-PL 965–2050 (46).

**Max.** Belianske Tatry Mts, N slope of Mt Ždiarska Vidla, alt. 2140 m, leg. J. Szweykowski, 8.07.1957 (Szweykowski 1960a).

**Min.** High Tatra Mts, PL, Dolina Filipka valley, Potok Filipczański stream, on the bark of *Alnus incana*, alt. 750 m, leg. J. Szweykowski, 22.08.1988 (Zubel & Stebel 2008).

**Literature:** Wahlenberg (1814), Hazslinsky (1860, 1865, 1885), Rehman (1864), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Schiffner (1911), Krajina (1933), Duda (1955a, 1958, 1962a, 1965), Szweykowski (1957, 1958a, b, 1960a, 2006), Šmarda (1958, 1960b, 1961), Ježek & Vondráček (1962), Šmarda et al. (1962, 1971), Mickiewicz (1965), Váňa & Duda (1965), Hadač et al. (1969a), Duda & Váňa (1976b), Szweykowski & Kožlička (1977), Cykowska (2008), Klama (2008), Zubel & Stebel (2008), Szweykowski & Klama (2010).

**New localities:** Belianske Tatry Mts, Rígfanská dolina valley, calcareous boulder in spruce forest, alt. 1040 m, leg. P. Górski, 19.08.2006 (POZNB 824); Tatry Zachodnie Mts, PL, Dolina Lejowa valley, limestone rocks near valley mouth, alt. 965 m, leg. P. Górski, 20.11.2011 (POZNB 774); Západné Tatry Mts, SL: Juráňova dolina valley, Tiesňavy, 49°16.566'N, 19°46.396'E, calcareous outcrops and on bark of *Acer pseudoplatanus*, alt. 890 m, leg. P. Górski, 30.09.2013 (POZNB 1671, 1672); S slope on Mt Osobitá, exposed calcareous outcrops above Sedlo pod Osobitou pass, 49°15.606'N, 19°43.273'E, alt. 1610 m, leg. P. Górski, 1.10.2013 (POZNB 1685); High Tatra Mts, SL, Kôprovnicová valley, upper part, rocks below Mt Krížne, 49°11.128'N, 19°57.466'E, alt. 1735 m, leg. P. Górski, 29.08.2014 (POZNB 1840).

*Fuscocephaloziopsis albescens* (Hook.) Váňa et L. Söderstr. [= *Pleurocladula albescens* (Hook.) Grolle]

**Distribution:** BT 1700–2150 (5); HT-SL 1500–2380 (263); HT-PL 1550–2259 (139); ZT-SL 1720–2025 (24); TZ-PL 1700–2005 (7).

**Max.** High Tatra Mts, SL, Mlynická dolina valley, Mt Malý Satan, alt. 2380 m, leg. V. Krajina, 31.07.1932, *Silenetum acaulis noricae*, table 47, relevé 11 (Krajina 1933).

**Min.** High Tatra Mts, SL, above Tatranské Matliare, alt. 1500 m, leg. L. Vajda, 26.08.1964 (Duda & Váňa 1975b).

**Literature:** Hazslinsky (1860, 1865, 1885), Rehman (1864), Limpricht (1877a, b), Krupa (1882), Szyszyłowicz (1885), Schiffner (1909b, 1911, 1915), Lilienfeldówna (1910), Kulesza (1920), Klika (1929), Braun-Blanquet (1930), Krajina (1933), Šmarda (1938, 1940, 1944, 1961, 1976a, b), Boros (1942), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1956e, 1957, 1958a, c, 1960a, 1966, 2006), Györfy (1957), Boros et al. (1960), Váňa & Duda (1965), Krzakowa (1969, 1972), Rejment-Grochowska (1971), Duda & Váňa (1975b), Krzakowa & Szweykowski (1981), Balcerkiewicz (1984), Šoltés (1989, 1990, 2004), Dúbravcová (1991), Kosiński (1999), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Górski (2007b, 2009a), Szweykowski & Klama (2010), Górski & Váňa (2011).

**Note:** Altogether, 199 unpublished localities, recorded by P. Górski in the Tatra Mts were included in the list.

**New localities:** Západné Tatry Mts, SL: Hlboká (Jalovecká) dolina valley, Vreče, alt. 1740 m, leg. P. Górski, 19.07.2008 (POZNB 22); Jamnícka dolina valley, glacial cirque below Žiarske sedlo pass, alt. 1800 m, leg. P. Górski, 20.07.2006 (POZNB 11/2006); Kamenistá dolina valley, glacial cirque below Mt Blyš, below Pyšné sedlo pass, alt. 1875 m, leg. P. Górski, 29.08.2008 (POZNB 38/2008); High Tatra Mts, SL: Batizovská dolina valley, N slope on Mt Kostolík, *Polytrichetum norvegici*, 49°09.697'N, 20°07.447'E, alt. 2240 m, leg. P. Górski, 2.08.2010 (POZNB 184); Spádová dolinka valley, SW part of the glacial cirque, blocks of rock below Mt Malé Rysy, alt. 2020 m, leg. P. Górski, 25.08.2009 (POZNB 65/2009).

*Fuscocephaloziopsis catenulata* (Huebener) Váňa et L. Söderstr. [= *Cephalozia catenulata* (Huebener) Lindb.]

**Distribution:** BT 980–1300 (9); HT-SL 900–1000 (3); HT-PL 975–985 (3); ZT-SL 860–1100 (3); TZ-PL 995–1170 (2).

**Max.** Belianske Tatry Mts, Mt Muráň, alt. 1300 m, leg. A. Boros, 17.08.1963, det. L. Vajda (Duda & Váňa 1986c).

**Min.** (new loc.) Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, decaying log in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1661).

**Literature:** Limpricht (1877a), Krupa (1882), Hazslinsky (1885), Szyszyłowicz (1885), Schiffner (1911), Vilhelm (1927), Szweykowski (1957, 1958a, 1960a), Duda & Váňa (1986c), Klama (2008), Szweykowski & Klama (2010).

**Note:** All localities for *Fuscocephaloziopsis catenulata* cited by Szyszylowicz (1885) and recorded in the herbarium of Polish Academy of Sciences in Kraków (KRAM) refer to *Cephalozia bicuspidata* or *Fuscocephaloziopsis* (= *Cephalozia*) *leucantha* (rev. P. Górski; see also comments in Kulesza 1920). The presence of this species at the locality cited by Vilhelm (1927, High Tatra Mts, SL, Mt Zámky, alt. 1870 m a.s.l.) is doubtful, hence it was not included in the list.

**New localities:** Belianske Tatry Mts: Žltý žľab gully, upper part of the gully, decaying log near stream, 49°15.607'N, 20°12.640'E, 49°15.595'N, 20°12.633'E, alt. 1150 m, 1145 m, leg. P. Górski, 25.06.2012, 19.11.2012 (POZNB 1244, 1413); Podspádská dolina valley, middle part, in the valley of a small stream running south from Podspádski potok stream, decaying log, 49°16.284'N, 20°12.048'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1353, 1355, 1362); valley of the Čierny potok stream, near Čierny potok stream, 49°16.033'N, 20°11.702'E, alt. 1050 m, leg. P. Górski, 24.06.2012 (POZNB 1187); Rígfarská dolina valley, decaying log at mouth of the valley, 49°15.631'N, 20°13.958'E, alt. 975 m, leg. P. Górski, 1.09.2014 (POZNB 1824); Rígfarská dolina valley, decaying log near Rígfarský potok stream, 49°15.447'N, 20°13.734'E, 49°15.167'N, 20°13.621'E, alt. 1025 m, 1095 m, leg. P. Górski, 1.09.2014 (POZNB 1809, 1794); Tatry Zachodnie Mts, PL, Dolina za Bramką valley (at the end accessible to sightseers), 49°16.452'N, 19°54.956'E, alt. 995 m, decaying log, leg. P. Górski, 21.11.2011 (POZNB 1738).

*Fuscocephaloziopsis connivens* (Dicks.) Váňa et L. Söderstr. [= *Cephalozia connivens* (Dicks.) Lindb.]

**Distribution:** BT –; HT-SL 1350 (1); HT-PL –; ZT-SL 1642 (1); TZ-PL –.

**Max.** Západné Tatry Mts, SL, near Druhé Roháčke pleso lake, ca 1642 m, leg. Komárková, det. J. Váňa (Duda & Váňa 1988a).

**Min.** High Tatra Mts, SL, Štrbské pleso lake, alt. 1350 m, leg. J. Šmarda (Šmarda 1938, 1976a), conf. J. Váňa (Duda & Váňa 1988a).

**Literature:** Hazslinszky (1859, 1860, 1865, 1885), Limpricht (1877a), Krupa (1878), Kulesza (1920), Krajina (1933), Šmarda (1938, 1961, 1976a), Szweykowski (1957, 1958a, 2006), Šmarda et al. (1962), Hadač et al. (1969a), Balcerkiewicz (1984), Duda & Váňa (1988a), Szweykowski & Buczkowska (2000), Cykowska (2006b), Szweykowski & Klama (2010).

**Note:** The above summary is based on a revision of herbarium material. *Fuscocephaloziopsis connivens* is recorded in the Tatra Mts at 25 localities. The revision of herbarium material indicated frequent misidentifications. The localities published by Hazslinszky (1859, 1885) and Limpricht (1877a), and partially the collections of Šmarda (1938, 1961) and Hazslinszky (1865) are for *Fuscocephaloziopsis* (= *Cephalozia*) *lunulifolia* and *Cephalozia bicuspidata* (rev. J. Váňa, see Duda & Váňa 1988a). All the plants recorded by Szyszylowicz (1885) and deposited in KRAM are misidentified and belong to *Fuscocephaloziopsis lunulifolia* or *F. pleniceps* (rev. P. Górski). The locality described by Cykowska (2011) in the Polish High Tatra Mts (at 1700 m a.s.l.) is for *Fuscocephaloziopsis* (= *Cephalozia*) *pleniceps* (rev. P. Górski, KRAM 195773). In POZW there is only one specimen of *F. connivens* from the Tatry Zachodnie Mts (alt. 1850 m, leg. J. Szweykowski, POZW 3513) and it is *F. pleniceps* (rev. P. Górski). Only two cases of the presence of *F. connivens* in the Slovak Tatra Mts are certain (see above, maximum and minimum of the species, rev. J. Váňa). The highest altitude was reported by Balcerkiewicz (1984) in the Dolina Pięciu Stawów Polskich valley (High Tatra Mts, PL), at 1825 m a.s.l. (herbarium material unavailable).

*Fuscocephaloziopsis leucantha* (Spruce) Váňa et L. Söderstr. [= *Cephalozia leucantha* Spruce]

**Distribution:** BT 900–1500 (18); HT-SL 1000–1750 (11); HT-PL 930–1660 (4); ZT-SL 800–1700 (13); TZ-PL 1170–1300 (6).

**Max.** High Tatra Mts, SL, Veľké Hincovo pleso lake, alt. 1750 m, leg. J. Jedlička, 22.09.1950, det. J. Váňa (Duda & Váňa 1986c).

**Min.** Západné Tatry Mts, SL, Mihulčia dolina valley (N to Mt Osobita), alt. 800 m, leg. V. Peciar, 10.11.1977, det. J. Váňa (Peciar 1985, Duda & Váňa 1986c).

**Literature:** Schiffner (1911), Šmarda (1938, 1961), Szweykowski (1957, 1958a, 1960a), Duda (1959, 1962a), Peciar (1985), Duda & Váňa (1986c), Klama (2008), Szweykowski & Klama (2010).

**New localities:** Belianske Tatry Mts: Podspádská dolina valley, W part, near Podspádski potok stream, decaying log, 49°16.440'N, 20°11.708'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1347); Zlatý žľab gully, near stream, decaying log, 49°15.607'N, 20°12.640'E, alt. 1150 m, leg. P. Górski, 25.06.2012 (POZNB 1245); Žltý



žlab gully, upper part of the gully, decaying log near stream, 49°15.595'N, 20°12.633'E, alt. 1145 m, leg. P. Górski, 19.11.2012 (POZNB 1419); valley of the Čierny potok stream, near Čierny potok stream, 49°16.033'N, 20°11.702'E, alt. 1051 m, leg. P. Górski, 24.06.2012 (POZNB 1186); Rígľanská dolina valley, decaying log near Rígľanský potok stream, 49°15.447'N, 20°13.734'E, 49°15.431'N, 20°13.738'E, 49°15.341'N, 20°13.700'E, 49°15.238'N, 20°13.691'E, 49°15.167'N, 20°13.621'E, 49°15.171'N, 20°13.674'E, alt. 1025 m, 1040 m, 1060 m, 1070 m, 1095 m, 1100 m, leg. P. Górski, 1.09.2014 (POZNB 1809, 1819, 1802, 1774, 1796, 1821); Tatry Zachodnie Mts, PL: Dolina Kościeliska valley, Wąwóz Kraków gully, decaying log, alt. 1040 m, leg. P. Górski, 21.09.2005 (POZNB 1055); Dolina Pyszniańska valley, near Pyszniański potok stream, decaying log, alt. 1200 m, leg. H. Klama, P. Górski, B. Cykowska, 1.07.2004 (POZNB 388); Żleb Zabijak gully (upper part of the Dolina Lejowa valley), 49°14.971'N, 19°50.899'E, decaying log, alt. 1250 m, leg. P. Górski, 20.11.2011 (POZNB 1044); High Tatra Mts, SL: Kôprová dolina valley, near route, above Rázcestie pod Hlinskou, decaying stump in spruce forest *Plagiothecio-Piceetum athyrietosum*, alt. 1440 m, leg. M. Zmrhalová, P. Górski, 28.06.2010 (POZNB 156); Javorová dolina valley, decaying log near route, alt. 1260 m, leg. P. Górski, 18.08.2006 (POZNB 1528); Bielovodská dolina valley, above Poľana pod Vysokou glade, decaying log, *Plagiothecio-Piceetum*, 49°11.098'N, 20°07.001'E, alt. 1380 m, leg. P. Górski, 28.09.2013 (POZNB 1658).

*Fuscocephaloziopsis loitlesbergeri* (Schiffn.) Váňa et L. Söderstr. [= *Cephalozia loitlesbergeri* Schiffn.]

**Distribution:** BT –; HT-SL 1610 (1); HT-PL –; ZT-SL –; TZ-PL 1120 (1).

**Max.** High Tatra Mts, SL, Trojrohé pleso lake, alt. 1610 m, leg. J. Váňa, 5.09.1967 (Duda & Váňa 1985b).

**Min.** Tatry Zachodnie Mts, PL, Toporowy Staw Wyżni lake, alt. ca 1120 m, leg. F. Lilienfeldówna, 10.08.1912 (Lilienfeldówna 1914b, see 'Note' below).

**Literature:** Lilienfeldówna (1914b), Szweykowski (1957, 1958a), Duda & Váňa (1985b), Szweykowski & Klama (2010), Górski (2014), Górski & Pawlikowski in Ellis et al. (2014).

**Note:** Species recorded in the Tatra Mts at only two localities (see above). In 2011 P. Górski confirmed the occurrence of *Fuscocephaloziopsis loitlesbergeri* (after almost 100 years) at the locality reported by Lilienfeldówna (1914b): Tatry Zachodnie Mts, PL, NW part of Toporowy Staw Wyżni lake, in a *Polytrichum strictum* clump, 49°16.756'N, 20°01.758'E, alt. 1100 m, leg., det. P. Górski, 28.09.2011, conf. J. Váňa (POZNB 507).

*Fuscocephaloziopsis lunulifolia* (Dumort.) Váňa et L. Söderstr. [= *Cephalozia lunulifolia* (Dumort.) Dumort.]

**Distribution:** BT 900–2024 (32); HT-SL 870–2059 (89); HT-PL 935–1700 (16); ZT-SL 1000–1900 (26); TZ-PL 854–1500 (8).

**Max.** High Tatra Mts, SL, Sedlo pod Svišŕovkou pass, alt. 2059 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** Tatry Zachodnie Mts, PL, forests near Zakopane, alt. 854–962 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Literature:** Hazslinszky (1885), Szyszyłowicz (1885), Schiffner (1911), Kulesza (1920), Suza (1937b), Šmarda (1938, 1940, 1944, 1961, 1976a), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a, 1960a), Boros et al. (1960), Duda & Váňa (1985c), Šoltés (1990, 2004), Blackburn et al. (1997), Cykowska (2006b, 2011), Klama (2008), Školek (2009), Šoltés & Školek (2010), Szweykowski & Klama (2010), Vončina et al. (2011).

**Note:** The reports of *Fuscocephaloziopsis* (= *Cephalozia*) *connivens* occurring in the Tatra Mts are based on an erroneous identification and belong to this species (compare remarks on *F. connivens* in this paper). One locality from the Belianske Tatry Mts published in Šmarda et al. (1962) belongs to *Mesoptychia badensis* (rev. J. Váňa, Duda & Váňa 1985c).

**New localities:** Belianske Tatry Mts: N slope on Mt Malý vrch, 49°15.999'N, 20°10.982'E, alt. 1205 m, leg. P. Górski, 26.06.2012 (POZNB 1195); Havrania dolina valley, lower part of Novy žlab gully, 49°15.951'N, 20°11.154'E, alt. 1225 m, leg. P. Górski, 26.06.2012 (POZNB 1235); Zlatý žlab gully, near stream, decaying log, 49°15.607'N, 20°12.640'E, 49°15.595'N, 20°12.633'E, alt. 1150 m, 1155 m, leg. P. Górski, 25.06.2012, 19.11.2012 (POZNB 1243, 1248, 1407, 1418); Podspádska dolina valley, W part, near Podspádski potok stream, decaying log, 49°16.440'N, 20°11.708'E, 49°16.284'N, 20°12.048'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1349, 1356, 1358, 1361); Tatry Zachodnie Mts, PL: between Chłabówka and Cyrhla, minerotrophic spring in forest, near Droga Oswalda Balzera road, 49°17.087'N, 20°00.719'E, 49°17.065'N, 20°00.753'E, alt. 990 m, 995 m, leg. P. Górski, 16.11.2012 (POZNB 1369, 1383); Żleb Zabijak gully (upper part of the Dolina Lejowa valley), 49°14.971'N, 19°50.899'E, decaying log, alt. 1250 m, leg. P. Górski, 20.11.2011 (POZNB 1044); Dolina Wyżnia Jarzábca valley, alt. 1500 m, leg. P. Górski, 28.09.2003 (POZNB 299); Dolina Chochołowska valley, Mt Ropa, *Plagiothecio-Picetum sphagnetosum*, alt. 1150 m, 1170 m, leg. P. Górski, 27.09.2003 (POZNB

305, 1522); Západné Tatry Mts, SL: upper, S part of Látaná dolina valley, below Sedlo Zábrať pass, *Polytrichum-Sphagnum* hummock, alt. 1650 m, leg. P. Górski, 18.07.2006 (POZNB 899, 903, 911); Račková dolina valley, Račkov Zadok, above Vyšné Račkove pleso lake, *Polytrichum-Sphagnum* hummock, 49°11.898'N, 19°48.206'E, alt. 1795 m, leg. P. Górski, 6.08.2012 (POZNB 1752); High Tatra Mts, SL: Dolina Bielych plies valley, rowan woods in upper montane belt, decaying log, 49°13.093'N, 20°14.562'E, alt. 1445 m, leg. P. Górski, 20.11.2012 (POZNB 1439); Mengusovská dolina valley, above Popradské pleso lake, near route to Mt Ostrva, alt. 1620 m, leg. P. Górski, 10.08.2010 (POZNB 1040); Bielovodská dolina valley, decaying log near route, *Plagiothecio-Piceetum*, alt. 1150 m, 1253 m, leg. P. Górski, 20.08.2009, 15.09.2009 (POZNB 927, 1029); Kôprovnicva valley, lower part, decaying log near unmarked path, 49°10.771'N, 19°55.646'E, alt. 1180 m, leg. P. Górski, 29.08.2014 (POZNB 1857); Kôprovnicva valley, spruce forest, near unmarked path, 49°11.023'N, 19°56.022'E, alt. 1315 m, leg. P. Górski, 29.08.2014 (POZNB 1861).

*Fuscocephaloziopsis pleniceps* (Austin) Váňa et L. Söderstr. [= *Cephalozia pleniceps* (Austin) Lindb.]

**Distribution:** BT 900–2148 (13); HT-SL 1615–2250 (12); HT-PL 1700–1810 (2); ZT-SL 1280–1900 (4); TZ-PL 850–1910 (11).

**Max.** High Tatra Mts, SL, Velická dolina valley, Kvetnicová veža tower, alt. 2250 m, leg. A. Šoltésová, 3.06.1983 (Šoltés 1990).

**Min.** Tatry Zachodnie Mts, PL, Zakopane, Pardałowka, alt. 850 m, leg. I. Szyszyłowicz sub *Cephalozia connivens*, 1882 (Szyszyłowicz 1885), rev. P. Górski (KRAM 45273).

**Literature:** Schiffner (1911), Müller (1912–1916), Boros (1951), Szweykowski (1957, 1958a, 1960a, 2006), Duda (1959), Boros et al. (1960), Šmarda (1961), Ježek & Vondráček (1962), Šmarda et al. (1962), Duda & Váňa (1986a), Šoltés (1990), Szweykowski & Buczkowska (2000), Balcerkiewicz et al. (2001), Cykowska (2006b, 2011), Szweykowski & Klama (2010).

**New localities:** Tatry Zachodnie Mts, PL: S part of Toporowy Staw Wyżni lake, 49°16.809'N, 20°01.790'E, alt. 1100 m, leg. P. Górski, 28.09.2011 (POZNB 506); Dolina Pyszniańska valley, below Pyszniańska Przełęcz pass, *Polytrichum-Sphagnum* hummock, alt. 1700 m, leg. P. Górski, 3.07.2004 (POZNB 933); Západné Tatry Mts, SL: Tomanovská dolina valley, below Tomanovské sedlo, on limestone rock, alt. 1650 m, leg. P. Górski, 27.08.2008 (POZNB 809); Roháčska dolina valley, near Nižný Roháčsky vodopád waterfall, on peat in *Plagiothecio-Piceetum sphagnetosum*, alt. 1280 m, leg. P. Górski, 24.07.2006 (POZNB 912); Račková dolina valley, Račkov Zadok, glacial cirque below Mt Jakubíná, 49°11.901'N, 19°48.153'E, alt. 1815 m, leg. P. Górski, 6.08.2012 (POZNB 1494); High Tatra Mts, SL: Dolina Bielych plies valley, Trojrohé pleso lake, peat-bog, 49°13.166'N, 20°13.810'E, alt. 1615 m, leg. P. Górski, 20.11.2012 (POZNB 1429); Kôprovnicva valley, upper part, rocks below Mt Krížne, 49°11.139'N, 19°57.447'E, alt. 1725 m, leg. P. Górski, 29.08.2014 (POZNB 1832); N slope on Mt Krížne (Liptovské kopy), *Polytrichum-Sphagnum* hummock, 49°10.983'N, 19°57.547'E, alt. 1895 m, leg. P. Górski, 30.08.2014 (POZNB 1926); N slope on Mt Predný Holý vrch (Liptovské kopy), *Polytrichum-Sphagnum* hummock, 49°10.983'N, 19°57.547'E, alt. 1925 m, leg. P. Górski, 30.08.2014 (POZNB 1865).

*Geocalyx graveolens* (Schrad.) Nees

**Distribution:** BT 1025–1105 (3\*); HT-SL 1030–1670 (2); HT-PL 925–1691 (7); ZT-SL –; TZ-PL 850–1320 (10).

**Max.** High Tatra Mts, PL, near W shore of Kurtkowiec lake, alt. 1691 m, leg. F. Lilienfeldówna, 14.09.1912 (Lilienfeldówna 1914a).

**Min.** Tatry Zachodnie Mts, PL, above Zakopane, Krupówki, alt. 850 m leg. I. Szyszyłowicz (Szyszyłowicz 1885). **Literature:** Krupa (1882, 1888), Szyszyłowicz (1885), Lilienfeldówna (1914a), Kulesza (1920), Szafer et al. (1927), Szweykowski (1957, 1958a), Szweykowski & Koźlicka (1974), Balcerkiewicz et al. (1978b), Šoltés (1989, 1990), Klama (2008), Szweykowski & Klama (2010).

**Note:** In Slovakia, *Geocalyx graveolens* is considered to be extinct (Ex category; compare Kubinská et al. 2001a, b). Below we present new localities for that country.

**New localities:** \* Belianske Tatry Mts, spruce forest near Błotne Siodło pass, near unmarked path, 49°15.940'N, 20°12.474'E, alt. 1105 m, leg. P. Górski, 19.11.2012 (POZNB 1392); Rígfánská dolina valley, spruce forest, near Rígfánský potok stream, 49°15.447'N, 20°13.734'E, 49°15.341'N, 20°13.700'E, alt. 1025 m, 1060 m, leg. P. Górski, 1.09.2014 (POZNB 1814, 1803); Tatry Zachodnie Mts, PL, between Chłabówka and Cyrhla, close to Chłabówka, near Droga Oswalda Balzera road, on stone near stream, 49°17.034'N, 20°00.471'E, alt. 950 m, leg. P. Górski, 16.11.2012 (POZNB 1396).

*Gymnocolea inflata* (Huds.) Dumort.

**Distribution:** BT –; HT-SL 1220–2600 (119); HT-PL 1150–2438 (35); ZT-SL 1600–2200 (9); TZ-PL 1150–1980 (8).

**Max.** (new loc.) High Tatra Mts, SL, below Mt Gerlachovská veža (ridge Malý Gerlach-Gerlachovský štít), 49°09.790'N, 20°08.057'E, alt. 2600 m, leg. P. Górski, 7.08.2013 (POZNB 1628).

**Min.** Tatry Zachodnie Mts, PL, Wyżni Toporowy Staw lake, alt. 1150 m, leg. J. Szweykowski, 5.09.1958 (Szweykowski 1960a).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865, 1885), Rehman (1864), Limpricht (1877a), Szyszylowicz (1885), Krupa (1882, 1888), Schiffner (1909b, 1915), Lilienfeldówna (1914b), Šmarda (1938, 1940, 1961, 1976a), Duda (1955a, 1962a), Hadač (1956), Szweykowski (1957, 1958a, 1960a, 1969, 2006), Wojterski (1957), Boros et al. (1960), Váňa & Duda (1965), Hadač et al. (1969a, b), Kubička (1969), Duda & Váňa (1981c), Šoltés (1984, 1989, 1990, 2002, 2004), Cykowska (2006b, 2008, 2011), Pukajová et al. (2006), Šoltés et al. (2006), Górski (2007a, b), Školek (2009), Šoltés & Školek (2010), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, SL: Mt Slavkovský štít, rock crevices on northern slope, 49°09.966'N, 20°11.029'E, alt. 2450 m, leg. P. Górski, 24.09.2010 (POZNB 636); N slope of Mt Končistá, 49°09.445'N, 20°06.815'E, alt. 2510 m, leg. P. Górski, 28.08.2014 (POZNB 1881).

*Gymnomitron adustum* Nees [= *Marsupella adusta* (Nees) Spruce]

**Distribution:** BT –; HT-SL 1650–2110 (20); HT-PL 1810–1970 (4); ZT-SL 1755–1830 (2); TZ-PL 1750 (1).

**Max.** High Tatra Mts, SL, Kotlina Piatic Spišských plies valley (upper part of Malá Studená dolina valley), rocks near Baranie pliesko lake, alt. 2110 m, leg. P. Górski, 27.08.2007 (POZNB 6, Górski & Váňa 2011).

**Min.** High Tatra Mts, SL, Javorová dolina valley, lower part of Zadná Javorová dolina valley, rubble, alt. 1650 m, leg. P. Górski, 21.08.2007 (POZNB 7, Górski & Váňa 2011).

**Literature:** Duda & Váňa (1978b), Górski & Váňa (2011).

**Note:** Data in old literature (Hazslinszky 1865, Lilienfeldówna 1914a, b, Szafer et al. 1927, Krajina 1933, Szweykowski 1958a, Šmarda 1961) were either based on erroneous identification or are unreliable (see Duda & Váňa 1978b, Söderström et al. 2002, Górski & Váňa 2011).

**New localities:** High Tatra Mts, SL: Svišťová (Bielovodská) dolina valley, Svišťové plieska lakes, rocky slopes with a northern exposure at the biggest lake, 49°10.883'N, 20°07.961'E, alt. 1925 m, leg. P. Górski, 26.09.2011 (POZNB 621); Veľka Studená dolina valley, Strelecké polia, 49°11.126'N, 20°10.730'E, alt. 2105 m, leg. P. Górski, 11.08.2011 (POZNB 660); Kačacia dolina valley, above and SW from Zelené Kačacie pleso lake, on stone, snowbed with *Pohlia ludwigii*, 49°10.328'N, 20°07.119'E, alt. 1725 m, leg. P. Górski, 28.09.2013 (POZNB 1718).

*Gymnomitron alpinum* (Gottsche ex Husn.) Schiffn. [= *Marsupella alpina* (Gottsche ex Husn.) Bernet]

**Distribution:** BT –; HT-SL 1600–2025 (25); HT-PL 1650–2060 (11); ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, PL: Dolinka pod Koľem valley, W slope of Mt Czuba Koľowa, alt. 2060 m, leg. J. Szweykowski, 28.06.1954 (Szweykowski 1960a); Dolinka Pod Koľem valley, S slope of Mt Mały Kozí Wierch, alt. 2060 m, leg. J. Szweykowski, 26.08.1956 (Szweykowski 1956e).

**Min.** High Tatra Mts, SL, Veľká Studená dolina valley, alt. 1600–1800 m, leg. A. Boros, 1–3.09.1940 (Duda & Váňa 1980b).

**Literature:** Schiffner (1911), Györfy (1924), Pawłowski et al. (1928), Szepesfalvy (1930b), Szweykowski (1956d, e, 1957, 1958a, 1960a, 2006), Šmarda (1961), Boros & Vajda (1962), Duda & Váňa (1980b), Šoltés (1984, 1989, 1990), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, SL: Bielovodská dolina valley, at the mouth of Litvorová dolina valley, plain, high rocky walls dripping with water, 49°10.529'N, 20°07.357'E, alt. 1750–1760 m, leg. P. Górski, 15.09.2009 (POZNB 300, 318, 319); Žabia Bielovodská dolina valley, rocks dripping with water below Bielovodské sedlo pass, alt. 1770 m, leg. P. Górski, 29.06.2010 (POZNB 160); Zlomisková dolina valley, sub-glacially eroded step of Rumanova dolinka valley descending to Kotlina Ľodového plesa, on rocks dripping with water, 49°09.878'N, 20°06.098'E, alt. 2025 m, leg. P. Górski, 4.08.2010 (POZNB 186); Malá Studená dolina valley, upper part, at the base of rocks descending from the sub-glacially eroded step in the upper kettle (near tourist trail), 49°11.277'N, 20°12.231'E, alt. 1730 m, leg. P. Górski, 22.09.2010 (POZNB 242); Malá Studená dolina valley, at the sub-glacially eroded step in the upper kettle, dripping rocky walls at waterfall descending from Kotlina Piatic Spišských plies valley, 49°11.309'N, 20°12.012'E, alt. 1930 m, leg. P. Górski, 6.11.2010 (POZNB 263); Čierna Javorová dolina valley, below rocky walls on Mt Malá Snehová veža, alt. 1635 m, leg. P. Górski, 25.08.2010 (POZNB 222);

High Tatra Mts, PL: Dolina Gašienicowa valley, rocky walls dripping with water, south of Zadni Staw Gašienicowy lake, 49°13.530'N, 20°00.477'E, alt. 1800 m, leg. P. Górski, 20.09.2010 (POZNB 244); Dolina Pięciu Stawów Polskich valley, E part of Pusta Dolinka valley, rocky walls, 49°12.963'N, 20°01.335'E, alt. 2000 m, leg. P. Górski, 24.08.2012 (POZNB 1136).

*Gymnomitrium apiculatum* (Schiffn.) Müll. Frib. ⇒ see under *Marsupella apiculata* Schiffn.

*Gymnomitrium brevissimum* (Dumort.) Warnst. [= *Marsupella brevissima* (Dumort.) Grolle]

**Distribution:** BT 1700–2148 (5); HT-SL 1700–2590 (122); HT-PL 1665–2055 (29); ZT-SL 1700–2200 (27); TZ-PL 1836–1950 (6).

**Max.** (new loc.) High Tatra Mts, SL, below Mt Gerlachovská veža (ridge Malý Gerlach-Gerlachovský štít), 49°09.790'N, 20°08.057'E, alt. 2590 m, leg. P. Górski, 7.08.2013 (POZNB 1629).

**Min.** (new loc.) High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, snow-bed near S shore of Przedni Staw Polski lake, alt. 1665 m, leg. P. Górski, 26.07.2005 (POZNB 568).

**Literature:** Schiffner (1911), Müller (1912–1916), Kulesza (1920), Pawłowski et al. (1928), Szepesfalvy (1930b), Krajina (1933), Šmarda (1937b, 1938, 1940, 1961, 1976a, b), Suza (1949), Duda (1955a), Szweykowski (1956e, 1957, 1958a, 1960a, 1996, 2006), Boros et al. (1960), Váňa & Duda (1965), Rejment-Grochowska (1971), Duda & Váňa (1979b), Balcerkiewicz (1984), Dúbravcová (1991), Górski (2009a), Szweykowski & Klama (2010).

**Note:** The locality reported by Górski (2004) is for *Marsupella funkii* (rev. P. Górski, 2012). This list includes 68 unpublished localities recorded by P. Górski.

*Gymnomitrium commutatatum* (Limpr.) Schiffn. [= *Marsupella commutata* (Limpr.) Bernet]

**Distribution:** BT –; HT-SL 1500–2500 (98); HT-PL 1550–2259 (14); ZT-SL 1600–2071 (12); TZ-PL 1550–2000 (6).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2500 m, leg. J. Šmarda (Šmarda 1961).

**Min.** High Tatra Mts, SL, Hlinská dolina valley, alt. 1500 m, leg. V. Komárková, 17.07.1962, det. J. Váňa (Duda & Váňa 1978b).

**Literature:** Limpricht (1877a, b, 1880b), Schiffner (1911, 1915), Müller (1912–1916), Szepesfalvy (1930b), Krajina (1933), Boros (1940, 1942, 1959), Duda (1955a, 1958, 1962a), Szweykowski (1956d, e, 1957, 1960a, 2006), Boros et al. (1960), Šmarda (1961, 1976a), Váňa & Duda (1965), Duda & Váňa (1978b), Peciar (1978), Szweykowski & Buczkowska (2000), Cykowska (2006b, 2008, 2011), Szweykowski & Klama (2010).

**Note:** Some reports of *Marsupella ustulata*, *M. emarginata*, *M. badensis* and *M. funkii* published by Šmarda (1938, 1940, 1944, 1961) and of *M. revoluta* (Duda 1962a) are based on erroneous identification and are for this species (all rev. J. Váňa, see Duda & Váňa 1978b).

**New localities:** High Tatra Mts, SL: Spádová dolinka valley, slabs of rock dripping with water, alt. 1955 m, leg. P. Górski, 25.08.2009 (POZNB 354); Rovienky valley, Zadné Rovienky, below rocky walls descending from Mt Svišťový štít, 49°11.276'N, 20°08.561'E, alt. 1760 m, leg. P. Górski, 25.09.2011 (POZNB 502); Štôlska dolina valley, upper part of the valley, below Lúčne sedlo pass, 49°09.095'N, 20°06.372'E, alt. 2025 m, leg. P. Górski, 10.08.2010 (POZNB 1501); Nefcerka valley, below Nižné Terianske pleso lake, 49°10.183'N, 20°00.337'E, alt. 1890 m, leg. P. Górski, 2.08.2011 (POZNB 652); E slope on Mt Huncovský štít, above route Skalnaté pleso–Veľká Svišťovka, alt. 1895 m, leg. P. Górski, 17.07.2011 (POZNB 630); Kačacia dolina valley, above Zelené Kačacie pleso lake, alt. 1825 m, leg. P. Górski, 22.08.2007 (POZNB 135); Kačacia dolina valley, near N shore of Zelené Kačacie pleso lake, alt. 1575 m, leg. P. Górski, 15.09.2009 (POZNB 343); Batizovská dolina valley, Nižná Batizovská roveň, 49°09.674'N, 20°07.592'E, alt. 2205 m, leg. P. Górski, 2.08.2010 (POZNB 179); Batizovská dolina valley, SE slope on Mt Končistá, 49°08.995'N, 20°07.421'E, alt. 2035 m, leg. P. Górski, 28.08.2014 (POZNB 1878); Mengusovská dolina valley, near route from Popradské pleso lake to Mt Ostrva, alt. 1675 m, 1680 m, leg. P. Górski, 10.08.2010 (POZNB 211, 191); below Mt Ostrva, alt. 1885 m, leg. P. Górski, 10.08.2010 (POZNB 199); Ťažká dolina valley, below Mt Pustá stráž, rocky walls dripping with water, alt. 1715 m, leg. P. Górski, 26.08.2009 (POZNB 350); Mlynická dolina valley, below rocky walls descending from Mt Štrbský štít, 49°09.973'N, 20°02.550'E, alt. 1975 m, leg. P. Górski, 12.08.2011 (POZNB 654); Temnosmrečinská dolina valley, on sub-glacially eroded step in the Piargová dolinka valley, 49°11.276'N, 20°02.642'E, alt. 1840 m, leg. P. Górski, 5.08.2011 (POZNB 657); Suchá (Javorová) dolina valley, scarp over Suchá voda stream, alt. 1730 m, leg. P. Górski, 18.08.2006 (POZNB 679); High Tatra Mts, PL: Dolina Pięciu Stawów Polskich valley, on stone neat stream flowing into Przedni Staw Polski lake, alt. 1655 m, leg. P. Górski, 26.07.2005 (POZNB 317); Dolina Pięciu Stawów Polskich valley, below Marchwiczna Przełęcz pass, alt. 1875 m, leg. P. Górski, 28.07.2005

(POZNB 326); Západné Tatry Mts, SL: Kamienistá dolina valley, in upper part of the valley, below main ridge Pyšné sedlo-Blyš, 49°11.663'N, 19°51.067'E, alt. 1825 m, leg. P. Górski, 25.08.2011 (POZNB 453); Bystrá dolina valley, near S shore of Dlhé Bystré pleso lake, 49°10.925'N, 19°50.612'E, alt. 1870 m, leg. P. Górski, 26.08.2011 (POZNB 458); Kobyla (below Mt Bystrá), 49°10.871'N, 19°50.986'E, alt. 1990 m, leg. P. Górski, 26.08.2011 (POZNB 673).

### *Gymnomitrium concinnatum* (Lightf.) Corda

**Distribution:** BT 1700–2143 (3); HT-SL 1000–2655 (357); HT-PL 1210–2438 (100); ZT-SL 1300–2250 (54); TZ-PL 1500–2150 (13).

**Max.** (new loc.) High Tatra Mts, SL, Mt Gerlachovský štít, alt. 2655 m, leg. P. Górski, 7.08.2013 (POZNB 1645).

**Min.** High Tatra Mts, SL, Slavkovský potok stream, alt. 1000 m, leg. J. Šmarda, 7.08.1953 (Duda & Váňa 1980b).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865), Rehman (1864), Limpricht (1877a), Krupa (1878, 1882), Szyszyłowicz (1885), Müller (1906–1911), Schiffner (1909b, 1910, 1911, 1915), Lilienfeldówna (1910), Szafer et al. (1927), Szepesfalvy (1930b), Krajina (1933), Šmarda (1937b, 1938, 1940, 1944, 1960b, 1961, 1976a), Suza (1949), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1956e, 1957, 1958a, 1960a, 1996, 2006), Szweykowski & Šmarda (1958), Boros et al. (1960), Váňa & Duda (1965), Rejment-Grochowska (1971), Szweykowski & Kožlicka (1977), Duda & Váňa (1980b), Peciar (1981), Balcerkiewicz (1984), Šoltés (1984, 1989, 1990, 2004), Blackburn et al. (1997), Cykowska (2006b, 2008, 2011), Górski (2007b, 2009a), Szweykowski & Klama (2010).

**Note:** A total of 105 unpublished localities recorded by P. Górski were included in this study.

**New localities:** High Tatra Mts, SL: Štrbina pod Kotlovým štítom (ridge Malý Gerlach-Gerlachovský štít), 49°09.675'N, 20°08.159'E, alt. 2560 m, leg. P. Górski, 7.08.2013 (POZNB 1625, 1632); below Mt Gerlachovská veža (ridge Malý Gerlach-Gerlachovský štít), 49°09.790'N, 20°08.057'E, alt. 2590 m, leg. P. Górski, 7.08.2013 (POZNB 1630); Mt Slavkovský štít, rock crevices on northern slope, 49°09.966'N, 20°11.029'E, alt. 2450 m, leg. P. Górski, 24.09.2010 (POZNB 235, 636); S slope on Mt Kriváň, below the summit, 49°09.642'N, 20°00.069'E, alt. 2390 m, leg. P. Górski, 29.09.2013 (POZNB 1695); Štôlska dolina valley, blocks of rock in the lower part of the valley, 49°08.936'N, 20°06.653'E, alt. 1935 m, leg. P. Górski, 10.08.2010 (POZNB 202); Važecká dolina valley, blocks of rock near SW shore of Krivánske Zelené pleso lake, 49°09.475'N, 20°00.526'E, alt. 2000 m, leg. P. Górski, 11.08.2010 (POZNB 204); Rumanova dolinka valley, near E shore of Vyšné Rumanovo plesko lake, 49°10.314'N, 20°06.048'E, alt. 2125 m, leg. P. Górski, 3.08.2010 (POZNB 9/2010); Kolová dolina valley, SEE and above Kolové pleso lake, base of rocky walls on Hrebeň Kolových veží, 49°13.106'N, 20°11.663'E, alt. 1645 m, leg. P. Górski, 28.08.2010 (POZNB 255); Ťažká dolina valley, upper kettle, rocky rubble below Mt Kačacia veža north from Gáleria Ganku, alt. 1820 m, leg. P. Górski, 24.08.2009 (POZNB 62/2009); Svišťová (Bielovodská) dolina valley, Vyšna Svišťová roveň (49°10.838'N, 20°08.132'E, alt. 1985 m) and Svišťové plieska lakes (49°10.883'N, 20°08.961'E, alt. 1925 m), leg. P. Górski, 26.09.2011 (POZNB 473, 487); Suchá (Javorová) dolina valley, scarp above Suchá voda stream, below valley step, alt. 1730 m, leg. P. Górski, 18.08.2006 (POZNB 678); Rovnícky valley, Zadné Rovnícky, highest kettle of the valley, 49°11.247'N, 20°09.205'E, alt. 1950 m, leg. P. Górski, 25.09.2011 (POZNB 604); Žabia Bielovodská dolina valley, above S shore of Vyšné Žabie Bielovodské pleso lake, alt. 1720 m, leg. P. Górski, 15.08.2009 (POZNB 721); Čierna Javorová dolina valley, Čierna záhrada (at the mouth of Ladova dolinka valley, alt. 1640 m) and Czarny Bandzioch (49°12.400'N, 20°11.654'E, alt. 2075 m), leg. P. Górski, 25–26.08.2010 (POZNB 168, 27/2010); Mięszowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.018'N, 20°03.920'E, alt. 2307 m, leg. P. Górski, 2.09.2014 (POZNB 1892); Západné Tatry Mts, SL, Hlboká (Jalovecká) dolina valley, Vrece, rocky rubble at the bottom of the valley, 49°12.324'N, 19°41.833'E, alt. 1770 m, leg. P. Górski, 17.07.2008 (POZNB 1/2008).

### *Gymnomitrium corallioides* Nees

**Distribution:** BT –; HT-SL 1550–2655 (102); HT-PL 1640–2499 (26); ZT-SL 1600–2200 (9); TZ-PL 2000 (2).

**Max.** (new loc.) High Tatra Mts, SL, Mt Gerlachovský štít, alt. 2655 m, leg. P. Górski, 7.08.2013 (POZNB 1643).

**Min.** High Tatra Mts, SL, slopes of Mt Slavkovský štít, alt. 1550 m, leg. A. Boros, 2.09.1940, det. K. Müller (Duda & Váňa 1979b).

**Literature:** Limpricht (1877a, b), Krupa (1978, 1882, 1888), Hazslinszky (1885), Szyszyłowicz (1885), Schiffner (1910, 1911), Györfőy (1911), Szepesfalvy (1930b), Krajina (1933), Šmarda (1937b, 1938, 1940, 1961, 1976a), Duda (1955a, 1958, 1962a), Szweykowski (1956e, 1957, 1958a, 1960a, 1996, 2006), Boros et al. (1960), Váňa & Duda (1965), Rejment-Grochowska (1971), Szweykowski & Kožlicka (1977), Peciar (1978), Duda & Váňa (1979b), Balcerkiewicz (1984), Cykowska (2008, 2011), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, SL: Mt Slavkovský štít, crevices on the northern slope, 49°09.966'N, 20°11.029'E, alt. 2450 m, leg. P. Górski, 24.09.2010 (POZNB 635); S slope on Mt Končistá, 49°09.228'N, 20°06.938'E, alt. 2375 m, leg. P. Górski, 28.08.2014 (POZNB 1873); S slopes on Mt Kriváň, below the summit, 49°09.724'N, 20°00.034'E, alt. 2465 m, leg. P. Górski, 29.09.2013 (POZNB 1704); Štôlska dolina valley, upper part of the valley, below Lúčne sedlo pass, 49°09.095'N, 20°06.372'E, alt. 2025 m, leg. P. Górski, 10.08.2010 (POZNB 234); Rovnícky valley, Zadné Rovnícky, alpine grassland, 49°11.262'N, 20°09.063'E, alt. 1910 m, leg. P. Górski, 25.09.2011 (POZNB 493); Rovnícky valley, Zadné Rovnícky, rocky rubble in the highest kettle, alpine grassland *Oreochloa-Juncetum* with *Racomitrium lanuginosum*, 49°11.247'N, 20°09.205'E, alt. 1950 m, leg. P. Górski, 25.09.2011 (POZNB 610); N slopes on Mt Ostrva, near tourist trail to Popradské pleso lake, alt. 1825 m, leg. P. Górski, 10.08.2010 (POZNB 210); N slopes on Mt Veľka Svišňovka, alt. 1970 m, leg. P. Górski, 30.08.2006 (POZNB 297); Veľka Studená dolina valley, blocks of rock west of Zbojnícka Chata hut, alt. 2020 m, leg. P. Górski, 24.08.2007 (POZNB 336); Kačacia dolina valley, at the base of Litvorová dolina valley, on a stone, 49°10.551'N, 20°07.274'E, alt. 1685 m, leg. P. Górski, 15.09.2009 (POZNB 732); Žabia Bielovodská dolina valley, above S shore of Vyšné Žabie Bielovodské pleso, alpine grassland *Oreochloa-Juncetum* with *Racomitrium lanuginosum*, alt. 1720 m, leg. P. Górski, 15.08.2009 (POZNB 735); High Tatra Mts, PL: Dolinka Buczynowa valley, blocks of rock in the bottom of the valley, alt. 1810 m, leg. P. Górski, 22.09.2005 (POZNB 339); Dolina Pięciu Stawów Polskich valley, below Marchwiczna Przełęcz pass, alt. 1875 m, leg. P. Górski, 28.07.2005 (POZNB 326, 723); below Szpiglasowa Przełęcz pass, on the side of the Dolina Pięciu Stawów Polskich valley, alt. 2090 m, leg. P. Górski, 17.08.2004 (POZNB 940); Dolina za Mnichem valley, alt. 1790 m, leg. P. Górski, 27.09.2007 (POZNB 331); Západné Tatry Mts, SL: W from Mt Kamiennista, above Pyšné sedlo pass, 49°11.786'N, 19°51.568'E, alt. 1865 m, leg. P. Górski, 25.08.2011 (POZNB 584); Mt Baranec, crevices on the northern slope, alt. 2140 m, leg. P. Górski, 21.07.2006 (POZNB 708).

### *Gymnomitrium obtusum* Lindb.

**Distribution:** BT –; HT-SL 1400–1600 (2); HT-PL –; ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, SL, Malá Studená dolina valley, alt. 1600 m, leg. J. Szurák sub *G. concinatum*, 12.07.1912, rev. J. Váňa (Szepesfalvy 1930b, Duda & Váňa 1979b).

**Min.** High Tatra Mts, SL, Veľka Studená dolina valley, alt. 1400 m, leg. J. Szurák, 10.07.1912 (Szepesfalvy 1930b, Duda & Váňa 1979b).

**Literature:** Szepesfalvy (1930b), Szweykowski (1957, 1958a), Pilous & Duda (1960), Szweykowski & Kožlicka (1977), Duda & Váňa (1979b).

**Note:** The locality published by Peciar (1978) is for *Gymnomitrium corallioides* (rev. J. Váňa, Duda & Váňa 1979b). The report of Peciar (1981) for the Západné Tatry Mts (SL) is unreliable.

### *Haplomitrium hookeri* (Sm.) Nees

**Distribution:** BT –; HT-SL –; HT-PL 1393–1785 (8); ZT-SL –; TZ-PL 1300–1625 (6).

**Max.** High Tatra Mts, PL, Dolina Gašienicowa valley, SW shore of Długi Staw Gašienicowy lake, 49°13'N, 20°00'E, alt. 1785 m, leg. J. Szweykowski, A. Bączkiewicz, 22.09.1992 (Bączkiewicz & Szweykowski 2001).

**Min.** Tatry Zachodnie Mts, PL, Mała Dolinka valley, 49°15'N, 19°56'E, alt. 1300 m, leg. J. Szweykowski, K. Buczkowska, A. Bączkiewicz, 20.09.1990 (Bączkiewicz & Szweykowski 2001).

**Literature:** Lilienfeldowna (1914b), Szweykowski (1957, 1958a, 1960a, 1962, 2006), Duda & Váňa (1968), Šoltés (1992), Bączkiewicz & Szweykowski (2001), Szweykowski & Klama (2010).

### *Harpanthus flotovianus* (Nees) Nees

**Distribution:** BT –; HT-SL 1090–2100 (39); HT-PL –; ZT-SL wa (1); TZ-PL 1150–1445 (4).

**Max.** High Tatra Mts, SL, Bystré sedlo pass, alt. 1900–2100 m, leg. J. Šmarda, 16.07.1958 sub *Leiocolea bantriensis* (Šmarda 1961), rev. J. Váňa (Duda & Váňa 1991).

**Min.** High Tatra Mts, SL, Tri Studničky, alt. 1090 m, leg. A. Vězda, 19.08.1947, det. J. Duda (Duda 1958, Duda & Váňa 1978b).

**Literature:** Szyszylowicz (1885), Krupa (1888), Krajina (1933), Šmarda (1938, 1961, 1976a), Szweykowski (1957, 1958a, c, 1960a, 1971, 1996, 2006), Duda (1958), Boros et al. (1960), Grolle (1965), Váňa & Duda (1965), Hadač et al. (1969b), Kubička (1969), Duda & Váňa (1978b), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, SL: Dolina Bielych Plies valley, kettle below the ridge between Predné Kopské sedlo and Mt Jahňací štít, alt. 1750 m, leg. P. Górski, 26.09.2007 (POZNB 397, 433); Kačacia dolina valley, near SE shore of Zelené Kačacie pleso lake, alt. 1575 m, leg. P. Górski, 22.09.2009 (POZNB 328); Kačacia dolina val-

ley, below rocky walls on the main ridge, alt. 1710 m, leg. P. Górski, 22.07.2007 (POZNB 724); Kačacia dolina valley, above and E from Zelené Kačacie pleso lake, 49°09.799'N, 20°06.269'E, alt. 1715 m, leg. P. Górski, 28.09.2013 (POZNB 1712); Tichá dolina valley, Zadna Tichá dolina valley, below Hladké sedlo pass, upstream part of Tichý potok, alt. 1815 m, leg. P. Górski, 29.07.2009 (POZNB 334).

### *Harpanthus scutatus* (F. Weber et D. Mohr) Spruce

**Distribution:** BT 960–1200 (8); HT-SL 1100 (2); HT-PL 925 (1); ZT-SL 800 (1); TZ-PL 1140 (1).

**Max.** Belianske Tatry Mts, slopes of Mt Havran, alt. 1200 m, leg. L. Vajda, 17.08.1963 (Duda & Váňa 1978a).

**Min.** Západné Tatry Mts, SL, Mihulčia dolina valley (N to Mt Osobita), alt. 800 m, leg. V. Peciar, det. J. Váňa (Peciar 1985).

**Literature:** Limpricht (1877a, b), Hazslinsky (1885), Szyszyłowicz (1885), Schiffner (1911), Duda (1955a), Szweykowski (1957, 1958a, 1971), Pilous & Duda (1960), Duda & Váňa (1978a), Peciar (1985), Klama (2008), Szweykowski & Klama (2010).

**Note:** The locality of this species in the Mengusovská dolina valley (High Tatra Mts, SL) cited by Šmarda (1961) actually belongs to *Mesoptychia* (= *Lophozia*) *bantriensis* (rev. J. Váňa, Duda & Váňa 1978a). Szyszyłowicz (1885) cited the locality of *Harpanthus scutatus* given by Limpricht (1877a, b), giving its altitude as 1485 m a.s.l. In the original study of Limpricht (l.c.); however, there is no information on the altitude.

**New localities:** Belianske Tatry Mts: Dolina Podspádska valley, near Podspádzki potok stream, decaying log, 49°16.378'N, 20°11.854'E, alt. 960 m, leg. P. Górski, 18.11.2012 (POZNB 1346); Dolina Podspádska valley, middle part, in a small valley of a stream flowing south from Podspádzki potok stream, decaying log, 49°16.284'N, 20°12.048'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1357); Žilty žľab gully, upper part of the gully, decaying log near stream, 49°15.595'N, 20°12.633'E, alt. 1155 m, leg. P. Górski, 19.11.2012 (POZNB 1403); Rígfarská dolina valley, decaying log near Rígfarský potok stream, 49°15.431'N, 20°13.738'E, 49°15.341'N, 20°13.700'E, alt. 1040 m, 1060 m, leg. P. Górski, 1.09.2014 (POZNB 1816, 1799).

### *Isopaches bicrenatus* (Schmidel ex Hoffm.) H. Buch [= *Lophozia bicrenata* (Schmidel ex Hoffm.) Dumort.]

**Distribution:** BT 1900 (1); HT-SL 1200–1350 (3); HT-PL 1900–1970 (3); ZT-SL 780–900 (2); TZ-PL 1770–1805 (3).

**Max.** High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, Dolinka pod Kołem valley, alt. 1970 m, leg. J. Szweykowski, 20.09.1955 (Szweykowski 1960a).

**Min.** (new loc.) Západné Tatry Mts, SL, Jalovecká dolina valley, mouth of the valley, trail slope, alt. 780 m, leg. P. Górski, 14.07.2008 (POZNB 395).

**Literature:** Krupa (1882), Šmarda (1938), Szweykowski (1957, 1958a, 1960a, 1996, 2006), Szweykowski & Kožlicka (1980), Peciar (1981), Duda & Váňa (1993), Kosiński (1999), Szweykowski & Klama (2010).

*Jamesoniella autumnalis* (DC.) Steph. ⇒ see under *Szyziella autumnalis* (DC.) Feldberg, Váňa, Hentschel et Heinrichs

*Jamesoniella undulifolia* (Nees) Müll. Frib.) ⇒ see under *Biantheridion undulifolium* (Nees) Konst. et Vilnet

### *Jungermannia atrovirens* Dumort.

**Distribution:** BT 1000–1950 (31); HT-SL 1065–1950 (4); HT-PL –; ZT-SL 800–1680 (8); TZ-PL 880–1880 (53).

**Max.** High Tatra Mts, SL, Velická dolina valley, Velická Proba, alt. 1950 m, leg. J. Szweykowski, 9.07.1957 (Szweykowski 1960a); Belianske Tatry Mts, Široké pole, alt. 1950 m, leg. F. Grüll (Duda 1962a).

**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Duda, J. Váňa, 15.09.1966 (Duda & Váňa 1969b).

**Literature:** Limpricht (1877a, b), Szyszyłowicz (1885), Krupa (1888), Schiffner (1911), Lilienfeldówna (1914a, b), Kulesza (1920), Pawłowski & Stecki (1927), Szafer & Sokołowski (1927), Vilhelm (1927), Šmarda (1938, 1940, 1958, 1960a, 1961, 1976a), Szweykowski (1957, 1958a, 1960a), Duda (1958, 1962a), Šmarda et al. (1962), Duda & Váňa (1969b), Rejment-Grochowska (1971), Váňa (1973a), Unar et al. (1984–1985), Peciar (1985), Blackburn et al. (1997), Szweykowski & Klama (2010).

**Note:** Some localities of this species published in studies of Suza (1937b), Šmarda (1938, 1940, 1961), Szweykowski (1960a) and Šmarda et al. (1962) belong to *Jungermannia polaris* (rev. J. Váňa, for details see Duda & Váňa 1969b).

**New localities:** High Tatra Mts, SL: Bielovodská dolina valley, calcareous boulder near route, above Bielovodská poľana glade, 49°13.559'N, 20°06.127'E, alt. 1065 m, leg. P. Górski, 9.08.2012 (POZNB 1228); Kolová dolina valley, calcareous rocks in upper montane belt, 49°13.671'N, 20°11.048'E, alt. 1490 m, leg. P. Górski, 1.09.2011 (POZNB 638); Belianske Tatry Mts: Havrania dolina valley, Havrania rovin, small rocks at the base of upper part of the valley, 44°15.379'N, 20°11.301'E, alt. 1460 m, leg. P. Górski, 26.06.2012 (POZNB 1615); Havrania dolina valley, lower part of Novy žľab gully, 49°15.951'N, 20°11.154'E, alt. 1225 m, leg. P. Górski, 26.06.2012 (POZNB 1618); Žltý žľab gully, upper part of the gully, calcareous rocks, 49°15.595'N, 20°12.633'E, alt. 1155 m, leg. P. Górski, 19.11.2012 (POZNB 1400); Tatry Zachodnie Mts, PL: SW part of Polana Kalatówki glade, calcareous rocks in spruce forest, 49°15.419'N, 19°57.754'E, alt. 1265 m, leg. P. Górski, 24.11.2011 (POZNB 882); Žľeb Zabijak gully (upper part of the Dolina Lejowa valley), 49°15.157'N, 19°50.989'E, alt. 1145 m, leg. P. Górski, 20.11.2011 (POZNB 858, 1610); Žľeb Zabijak gully (upper part of the Dolina Lejowa valley), spring with *Cratoneuron*, 49°15.107'N, 19°50.972'E, alt. 1180 m, leg. P. Górski, 20.11.2011 (POZNB 870, 1604); Žľeb Zabijak gully (upper part of the Dolina Lejowa valley), calcareous rocks, 49°15.053'N, 19°50.945'E, alt. 1215 m, leg. P. Górski, 20.11.2011, det. J. Váňa (POZNB 1564, 1603); Dolina Lejowa valley, mouth of the valley, 49°16.181'N, 19°50.537'E, alt. 965 m, leg. P. Górski, 20.11.2011 (POZNB 786); Dolina Stražyska valley, mouth of the valley, sloping trail, 49°16.375'N, 19°55.978'E, alt. 935 m, leg. P. Górski, 21.11.2011 (POZNB 1614); Dolina za Bramką valley, *Caricetum firmae*, 49°16.337'N, 19°55.022'E, alt. 970 m, leg., det. P. Górski, 21.11.2011, conf. J. Váňa (POZNB 1612); Dolina za Bramką valley, 49°16.593'N, 19°55.174'E, 49°16.584'N, 19°55.159'E, alt. 915 m, 920 m, leg. P. Górski, 21.11.2011 (POZNB 1598, 1581); Kalackie Koryto (Suchy Žľeb) gully, in the middle part, calcareous boulder, 49°15.357'N, 19°57.610'E, alt. 1335 m, leg. P. Górski, 24.11.2011 (POZNB 1596); Kobylarzowy Žľeb pod Maľoľacznikiem gully, lower part of the gully, calcareous rocks, 49°14.602'N, 19°54.428'E, alt. 1540 m, leg., det. P. Górski, 22.11.2011, conf. J. Váňa (POZNB 863, 1587, 1590); Dolina Chochołowska valley, near route to Mt Bobrowiec, alt. 1340 m, leg., det. P. Górski, 26.09.2006, conf. J. Váňa (POZNB 1531); Dolina Chochołowska valley, sloping trail in *Polysticho-Piceetum*, route from Polana Chochołowska glade to Mt Grzeń, alt. 1295 m, 1320 m, leg. P. Górski, 26.09.2006 (POZNB 681, 1602); Dolina Chochołowska valley, sloping trail at the mouth of the valley, alt. 880 m, leg. P. Górski, 18.09.2005 (POZNB 602); Dolina Kościeliska valley, Wąwóz Kraków gully, alt. 1035 m, 1085 m, leg. P. Górski, 21.09.2005 (POZNB 627, 1597); Dolina Kościeliska valley, near route to Polana na Stołach glade, 49°15.269'N, 19°51.703'E, alt. 1040 m, leg. P. Górski, 20.11.2011 (POZNB 1594); Dolina Kościeliska valley, calcareous rocks at the mouth of the valley, *Carici-Festucetum tatrae*, alt. 910 m, leg. P. Górski, 21.09.2005 (POZNB 677); Skupniów Uplaz, alt. 1500 m, leg., det. P. Górski, 16.09.2004, conf. J. Váňa (POZNB 1538).

### *Jungermannia borealis* Damsh. et Váňa

**Distribution:** BT –; HT-SL 1900 (1); HT-PL 1730 (1); ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, SL, Veľká Zmarzlá dolina valley, alt. 1900 m, leg. J. Váňa, 8.09.1967 (Váňa 1969).

**Min.** High Tatra Mts, PL, Dolina Rybiego Potoku valley, above Czarny Staw pod Rysami lake, Szeroki Zagon, rock walls with dripping water, in rock crevices, near route to Mt Rysy, 49°11'02"N, 20°04'46"E, alt. 1730 m, leg. P. Górski, 18.08.2004, det. J. Váňa (POZNB 1539, 1540, Váňa & Górski in Ellis et al. 2013b).

**Literature:** Duda & Váňa (1969b), Váňa (1969, 1973a), Damsholt & Váňa (1977), Váňa & Górski in Ellis et al. (2013b).

**Note:** The specimen from the locality Veľké Hincovo pleso lake (High Tatra Mts, SL, alt. 1965 m, leg. J. Růžička, 1957, det. J. Váňa, Váňa 1973a) is completely sterile and belongs to *Jungermannia pumila* (rev. J. Váňa, 2013, Váňa & Górski in Ellis et al. 2013b).

*Jungermannia confertissima* Nees ⇒ see under *Solenostoma confertissimum* (Nees) Schljakov

### *Jungermannia exsertifolia* Steph. subsp. *cordifolia* (Dumort.) Váňa

**Distribution:** BT –; HT-SL 1560–1800 (5); HT-PL 1260 (1); ZT-SL 1550 (1); TZ-PL –.

**Max.** High Tatra Mts, SL, Zlomisková dolina valley, alt. 1800 m (Šmarda 1961).

**Min.** High Tatra Mts, PL, Dolina Roztoki valley, on stone in Potok Roztoka stream, near route to Dolina Pięciu Stawów Polskich valley, 49°13.468'N, 20°04.241'E, alt. 1260 m, leg., det. P. Górski, 21.08.2012, conf. J. Váňa (POZNB 1459, KRAM, POZW; Górski & Váňa 2013).

**Literature:** Šmarda (1961), Boros & Vajda (1962), Duda (1962a), Duda & Váňa (1969b), Váňa (1973a), Górski & Váňa (2013).

**Note:** Szyszyłowicz (1885) recorded two localities for *Jungermannia exsertifolia* subsp. *cordifolia* in the Tatra Mts. One of them, located in the Tatry Zachodnie Mts (PL), actually belongs to *Jungermannia atrovirens* (rev. W.



Kulesza, Kulesza 1920); the other from the Slovak High Tatra Mts belongs to *J. pumila* (rev. J. Váňa, Duda & Váňa 1969b). There are three localities for *Jungermannia exsertifolia* subsp. *cordifolia* in the Tatra Mts, which are confirmed by herbarium material (for details compare Duda & Váňa 1969b, Górski & Váňa 2013).

*Jungermannia gracillima* Sm. ⇒ see under *Solenostoma gracillimum* (Sm.) R. M. Schust.

*Jungermannia hyalina* Lyell ⇒ see under *Solenostoma hyalinum* (Lyell) Mitt.

*Jungermannia leiantha* Grolle ⇒ see under *Liochlaena lanceolata* Nees

*Jungermannia obovata* Nees ⇒ see under *Solenostoma obovatum* (Nees) C. Massal.

### *Jungermannia polaris* Lindb.

**Distribution:** BT 1500–2154 (25); HT-SL 1700–1950 (2); HT-PL –; ZT-SL 1790 (1\*); TZ-PL 1400–1830 (3).

**Max.** Belianske Tatry Mts, Mt Havran, alt. 2154 m, leg. J. Šmarda sub *J. atrovirens*, rev. J. Váňa (Duda & Váňa 1969b).

**Min.** (new loc.) Tatry Zachodnie Mts, PL, Dolina Jaworzynki valley, Siodłowa Perć, near route to Murowaniec, in *Pinetum* 'calcicolum', alt. 1400 m, leg., det. P. Górski, 16.09.2004, conf. J. Váňa (POZNB 1537).

**Literature:** Szweykowski (1960a, 2006), Šmarda (1961, 1976a), Duda & Váňa (1969b), Váňa (1973a), Szweykowski & Klama (2010).

**Note:** Some localities for *Jungermannia atrovirens* cited by Suza (1937b), Šmarda (1938, 1940, 1961), Szweykowski (1960a) and Šmarda et al. (1962) belong to *J. polaris* (rev. J. Váňa, for details see Duda & Váňa 1969b).

**New localities:** \* Západné Tatry Mts, SL, N slope on Mt Sivý vrch, *Caricetum firmae*, alt. 1790 m, leg., det. P. Górski, 19.07.2008, conf. J. Váňa (POZNB 1589); Tatry Zachodnie Mts, PL, Kobylarzowy Žleb pod Małolącniakiem gully, upper part of the gully, 49°14.668'N, 19°54.757'E, alt. 1760 m, leg., det. P. Górski, 22.11.2011, conf. J. Váňa (POZNB 853); Belianske Tatry Mts, below Havranie sedlo pass, NW slope, alpine grassland, alt. 2100 m, leg. P. Górski, 26.06.2012 (POZNB 1551).

### *Jungermannia pumila* With.

**Distribution:** BT –; HT-SL 1000–2280 (22); HT-PL 950–2307 (13); ZT-SL 900–2000 (6); TZ-PL 1040–1480 (4).

**Max.** (new loc.) High Tatra Mts, PL, Mięguszowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.018'N, 20°03.920'E, alt. 2307 m, leg. P. Górski, 2.09.2014 (POZNB 1919).

**Min.** Západné Tatry Mts, SL, valley of the Trnovečanka stream, alt. 900 m, leg. J. Duda sub *J. subelliptica*, rev. J. Váňa in Duda & Váňa (1969b, see Duda 1955a).

**Literature:** Limpricht (1877a, b), Hazslinszky (1885), Szyszylowicz (1885), Krupa (1888), Kulesza (1920), Pawłowski et al. (1928), Boros (1951), Szweykowski (1957, 1958a, 1960a), Šmarda (1960a, 1961), Duda & Váňa (1969b), Váňa (1973a), Balcerkiewicz (1984), Klama (2008), Szweykowski & Klama (2010).

**Note:** The locality published by Duda (1955a) for *Jungermannia subelliptica* and some localities cited by Duda (1962a) for *J. obovata* (rev. J. Váňa, Duda & Váňa 1969b) belong to this species. The altitude of *J. pumila* provided by Szyszylowicz (1885) is approximate as the author was not sure of the true value.

**New localities:** High Tatra Mts, PL: Dolina Pięciu Stawów Polskich valley, below rocky walls descending from Mt Wyżni Liptowski Kostur, alt. 2005 m, leg. P. Górski, 25.07.2005 (POZNB 3/2005); below Mięguszowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.044'N, 20°04.101'E, alt. 2200 m, leg. P. Górski, 2.09.2014 (POZNB 1899); High Tatra Mts, SL, Veľka Studená dolina valley, rock crevices near Priečne sedlo pass, 49°11.323'N, 20°11.116'E, alt. 2280 m, leg. P. Górski, 11.08.2011, det. J. Váňa (POZNB 1506); Tatry Zachodnie Mts, PL, Dolina Wyżnia Chochołowska valley, Potok Chochołowski stream, on stone, alt. 1150 m, leg. P. Górski, 27.09.2003, conf. J. Váňa (POZNB 682, 684); Západné Tatry Mts, SL, Jamnícka dolina valley, on stone near Nižné Jamnícke pleso lake, alt. 1720 m, leg., det. P. Górski, 25.08.2008, conf. J. Váňa (POZNB 1552).

*Jungermannia sphaerocarpa* Hook.) ⇒ see under *Solenostoma sphaerocarpum* (Hook.) Steph.

*Jungermannia subelliptica* (Lindb. ex Kaal.) Levier ⇒ see under *Solenostoma subellipticum* (Lindb. ex Kaal.) R. M. Schust.

### *Kurzia trichoclados* (Müll. Frib.) Grolle

**Distribution:** BT wa (1); HT-SL 1300 (2); HT-PL 1465 (2–3); ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, PL, Dubrawiska (N slope on Mt Żółta Turnia), alt. 1465 m, leg. J. Szweykowski, 16.09.1955 (Szweykowski 1960a).

**Min.** High Tatra Mts, SL, Mt Grúnik, alt. 1300 m, leg. J. Šmarda sub *K. pauciflora*, rev. J. Duda (Šmarda 1938, Duda & Váňa 1986a).

**Literature:** Szweykowski (1960a, 2006), Duda & Váňa (1971c, 1985c), Szweykowski & Buczkowska (2000), Szweykowski & Klama (2010).

**Note:** Some reports of *Kurzia pauciflora* published by Šmarda (1938, rev. J. Duda, Duda & Váňa 1986a) and Šmarda (1944, rev. J. Váňa, Duda & Váňa 1971c, 1985c) are based on erroneous identification and belong to this species.

### *Lejeunea cavifolia* (Ehrh.) Lindb.

**Distribution:** BT 1040–1620 (18); HT-SL 1248–1950 (12); HT-PL 1025–1700 (4); ZT-SL 800–1500 (11); TZ-PL 1040–1710 (12).

**Max.** High Tatra Mts, SL, Velická dolina valley, Velická Proba, alt. 1950 m, leg. J. Szweykowski, 9.07.1957 (Szweykowski 1960a).

**Min.** Západné Tatry Mts, SL: Ráčkova dolina valley, alt. 800 m, leg. J. Šmarda (Šmarda 1937b, Duda 1955a); Jalovecká dolina valley, alt. 800 m, leg. J. Duda, 15.09.1966 (Duda & Váňa 1976a).

**Literature:** Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Schiffner (1910, 1911), Šmarda (1937b, 1958, 1961), Duda (1955a, 1958), Szweykowski (1957, 1958a, 1960a), Ježek & Vondráček (1962), Šmarda et al. (1962), Mickiewicz (1965), Szweykowski & Kožlicka (1974), Duda & Váňa (1976a), Peciar (1988), Blackburn et al. (1997), Klama (2008), Szweykowski & Klama (2010).

**Note:** The number of localities for this plant in the Tatry Zachodnie Mts (PL) is higher than indicated by the list presented (compare Szweykowski & Kožlicka 1974).

**New localities:** Belianske Tatry Mts, Rígfarská dolina valley, on teaching route in the Dolina Monková valley - Kopské sedlo pass, on shaded limestone rock, *Polysticho-Piceetum*, alt. 1040 m, leg. P. Górski, 19.08.2006 (POZNB 437); High Tatra Mts, PL, N slope on Mt Turnia Zwornikowa, climbing route “Lewy Filar Cubryny”, alt. 1660 m, leg. S. Szlagowski, 16.03.2012, det. P. Górski (POZNB 1572).

### *Lepidozia reptans* (L.) Dumort.

**Distribution:** BT 900–1450 (34); HT-SL 810–1732 (46); HT-PL 980–1900 (31); ZT-SL 800–1560 (8); TZ-PL 955–1770 (30).

**Max.** High Tatra Mts, PL, Mt Mięgoszowiecki Szczyt, alt. 1900 m, *Trifido-Distichetum tatricum*, table 6, relevé 2 (Pawłowski et al. 1928), –.

**Min.** Západné Tatry Mts, SL, above Žiar, alt. 800 m, leg. I. Pišút, 1975 (Kubinská & Pišút 1982).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1965), Rehman (1864), Fritze & Ilse (1870), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Schiffner (1909b, 1911, 1915), Lilienfeldówna (1914a), Kulesza (1920), Pawłowski et al. (1928), Krajina (1933), Šmarda (1938, 1958, 1976b), Duda (1955a), Szweykowski (1957, 1958a, 1960a), Ježek & Vondráček (1962), Váňa & Duda (1965), Hadač et al. (1969a), Šoltésová (1974), Šoltés (1976, 1989, 1990), Szweykowski & Kožlicka (1977), Peciar (1978, 1982), Wojterski et al. (1978), Šomšák (1979), Kubinská & Pišút (1982), Vidličková (1989), Blackburn et al. (1997), Wojterska et al. (2004), Górski (2007b, 2009a), Klama (2008), Szweykowski & Klama (2010), Vončina et al. (2011).

**New localities:** Tatry Zachodnie Mts, PL: SW part of Polana Kalatówki glade, at the mouth of Kalackie Koryto gully, calcareous rocks in spruce forest, 49°15.419'N, 19°57.754'E, alt. 1265 m, leg. P. Górski, 24.11.2011 (POZNB 874); Dolina Wielkie Koryciska valley, spruce forest *Polytricho-Piceetum*, alt. 955 m, leg. P. Górski, 18.09.2005 (POZNB 695); Belianske Tatry Mts: valley of the Čierny potok stream, near Čierny potok stream, 49°16.033'N, 20°11.702'E, alt. 1050 m, leg. P. Górski, 24.06.2012 (POZNB 1181, 1185); valley of the Čierny potok stream, below rocks on Biela stena (near unmarked route to Stará pofana glade), decaying log, 49°16.126'N, 20°11.733'E, alt. 1000 m, leg. P. Górski, 24.06.2012 (POZNB 1262); Zlatý žľab gully, near stream, decaying log, 49°15.607'N, 20°12.640'E, alt. 1150 m, leg. P. Górski, 25.06.2012 (POZNB 1250, 1252); lower part of Tristarský žľab gully, shaded calcareous rocks in spruce forest, 49°15.444'N, 20°12.747'E, alt. 1210 m, leg. P. Górski, 25.06.2012 (POZNB 1270).

*Liochlaena lanceolata* Nees [= *Jungermannia leiantha* Grolle]

**Distribution:** BT 945–1155 (8); HT-SL 1000–1500 (14); HT-PL 910–1640 (8); ZT-SL 860 (1\*); TZ-PL 930–1480 (7).

**Max.** High Tatra Mts, PL, Mt Miedziane, S slope, alt. 1640 m, leg. J. Szweykowski, 26.09.1983 (Chudzińska et al. 2001).

**Min.** \* Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, decaying log in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1666).

**Literature:** Hazslinszky (1860), Šmarda (1937b, 1938), Duda (1958), Szweykowski (1960a, 1969), Duda & Váňa (1969a), Váňa (1973b), Šoltés (1990), Chudzińska et al. (2001), Klama (2008), Szweykowski & Klama (2010).

**Note:** Krajina (1933) published 13 records of this species in the Mlynická dolina valley (High Tatra Mts, SL), at altitudes between 1560 and 2375 m a.s.l. In the herbarium materials revised for that work, there are no vouchers of this species (see Váňa & Duda 1965). *Liochlaena lanceolata* does not occur at higher altitudes in the Tatra Mts (Duda & Váňa 1969a, Szweykowski 2006); hence, data given by V. Krajina is considered unreliable and not included in the list presented. For the same reason, the locality in the Furkotská dolina valley (High Tatra Mts, SL, alt. 1840 m) published by Školek (2009) was omitted.

**New localities:** Belianske Tatry Mts: Dolina Hučava valley, upper part, decaying log near stream, 49°13.213'N, 20°18.394'E, alt. 945 m, leg. P. Górski, 19.11.2012 (POZNB 1435); Podspádska dolina valley, middle part, in a valley of small stream flowing south from Podspádski potok stream, decaying log, 49°16.284'N, 20°12.048'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1358); Podspádska dolina valley, W part, near Podspádski potok stream, decaying log, 49°16.440'N, 20°11.708'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1350); Ríglánska dolina valley, decaying log near Ríglánský potok stream, 49°15.171'N, 20°13.674'E, alt. 1100 m, leg. P. Górski, 1.09.2014 (POZNB 1820); Žltý žľab gully, upper part of the gully, decaying logs near stream, 49°15.607'N, 20°12.640'E, 49°15.595'N, 20°12.633'E, alt. 1150 m, 1155 m, leg. P. Górski, 25.06.2012, 19.11.2012 (POZNB 1249, 1409); Dolina Monková valley, alt. 1075 m, leg. P. Górski, 19.08.2006 (POZNB 973); Tatry Zachodnie Mts, PL: Dolina Kościeliska valley, Wąwóz Kraków gully, alt. 1050 m, leg. P. Górski, 21.09.2005 (POZNB 391); between Chłabówka and Cyrhla, minerotrophic spring in forest, near Droga Oswalda Balzera road, 49°17.087'N, 20°00.719'E, alt. 990 m, leg. P. Górski, 16.11.2012 (POZNB 1368).

*Lophocolea bidentata* (L.) Dumort. [incl. *Lophocolea coadunata* (Sw.) Mont.]  
[= *Chiloscyphus coadunatus* (Sw.) J. J. Engel et R. M. Schust.]

**Distribution:** BT 1095–1860 (6); HT-SL 880–1604 (4); HT-PL 865–975 (3); ZT-SL 750–1370 (4); TZ-PL 880–1210 (10).

**Max.** Belianske Tatry Mts, S slope of Mt Homola, alt. 1860 m, 5.08.1956, *Seslerietum tatrae*, relevé 152, page 105 (Hadač et al. 1969a).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horničková (Peciar 1978).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1965), Rehman (1864), Limpricht (1877a), Szyszyłowicz (1885), Kulesza (1920), Szweykowski (1957, 1958a, 1996), Hadač et al. (1969a, b), Peciar (1978), Šomšák (1979), Unar et al. (1984–1985), Šoltés (1990), Klama (2008), Szweykowski & Klama (2010), Cykowska & Smieja (2011).

**New localities:** Tatry Zachodnie Mts, PL: Dolina Lejowa valley, sloping trail, above Polana Huty Lejowe glade, 49°15.481'N, 19°51.185'E, alt. 1050 m, leg. P. Górski, 20.11.2011 (POZNB 819, 859); Dolina Wielkie Koryciska valley, spruce forest *Polysticho-Piceetum*, on soil, alt. 975 m, leg. P. Górski, 18.09.2005 (POZNB 930); Dolina Chochołowska valley, mouth of the valley, alt. 880 m, leg. P. Górski, 18.09.2005 (POZNB 1580); between Chłabówka and Cyrhla, calcareous rocks in forest, near Droga Oswalda Balzera road, 49°16.998'N, 20°00.639'E, alt. 965 m, leg. P. Górski, 16.11.2012 (POZNB 1364); above Kuźnice, Zgorzelec forest, near route to Dolina Gąsienicowa valley, sloping trail, 49°15.920'N, 19°59.173'E, alt. 1210 m, leg. P. Górski, 16.11.2012 (POZNB 1391); Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, calcareous outcrops in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1667)

*Lophocolea heterophylla* (Schrad.) Dumort. [= *Chiloscyphus profundus* (Nees) J. J. Engel et R. M. Schust.]

**Distribution:** BT 945–1500 (21); HT-SL 850–1875 (36); HT-PL 893–1625 (15); ZT-SL 1370–1520 (6); TZ-PL 830–1440 (19).

**Max.** High Tatra Mts, SL, Mlynická dolina valley, above Skok waterfall, rocky slopes below Mt Sátán, alt. 1875 m, leg. V. Krajina, 6.09.1931, *Geetum montani*, table 22, relevé 2 (Krajina 1933).

**Min.** Tatry Zachodnie Mts, PL, forest near Zakopane, leg. I. Szyszyłowicz, alt. 830 m (Szyszyłowicz 1885).

**Literature:** Hazslinszky (1865), Limpricht (1877a), Krupa (1882), Szyszyłowicz (1885), Schiffner (1909b, 1911, 1915), Kulesza (1920), Györfly (1924), Krajina (1933), Šmarda (1938, 1940, 1958, 1976b), Duda (1955a), Szweykowski (1957, 1958a, 1960a, 1967, 1996, 2006), Boros et al. (1960), Ježek & Vondráček (1962), Mickiewicz (1965), Balcerkiewicz (1978), Balcerkiewicz & Pawlak (1978a), Wojterski et al. (1978), Šomšák (1979), Peciar (1982), Unar et al. (1984–1985), Šoltés (1989, 1990), Wojterska et al. (2004), Górski (2009a), Szweykowski & Klama (2010), Vončina et al. (2011).

**New localities:** Belianske Tatry Mts: Dolina Hučava valley, upper part, 49°13.213'N, 20°18.394'E, alt. 945 m, decaying log near stream, leg. P. Górski, 19.11.2012 (POZNB 1433); Mt Čierny vrch, 49°15.993'N, 20°11.333'E, alt. 1305 m, spruce forest, decaying log, leg. P. Górski, 26.06.2012 (POZNB 1226); High Tatra Mts, SL, peat-bog near NW shore of Jamské pleso lake, alt. 1448 m, leg. P. Górski, 29.09.2013 (POZNB 1727).

*Lophocolea minor* Nees [= *Chiloscyphus minor* (Nees) J. J. Engel et R. M. Schust.]

**Distribution:** BT wa (1); HT-SL 1350–1400 (2); HT-PL –; ZT-SL 1630 (1); TZ-PL –.

**Max.** Západné Tatry Mts, SL, Žleb spod Diery, alt. 1630 m, 25.06.1969 (Unar et al. 1984–1985).

**Min.** High Tatra Mts, SL, Štrbské pleso lake, alt. 1350 m (Šmarda 1938).

**Literature:** Šmarda (1938, 1958), Szweykowski (1957), Unar et al. (1984–1985), Duda & Váňa (1986a).

**Note:** The locality for *Cephalozia pleniceps* published by Šmarda (1961; rev. J. Váňa, Duda & Váňa 1986a) belongs to this species.

*Lophozia ascendens* (Warnst.) R. M. Schust.

**Distribution:** BT 960–1450 (13); HT-SL 1000–1800 (10); HT-PL –; ZT-SL 800–1600 (13); TZ-PL 1000–1465 (7).

**Max.** High Tatra Mts, SL, Mt Osterva, alt. 1700–1800 m, leg. J. Šmarda (Šmarda 1961).

**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Váňa, 15.09.1966 (Duda & Váňa 1989c).

**Literature:** Boros (1951), Duda (1955a, b, 1962a), Szweykowski (1956c, 1957, 1958a, c, 1960a), Šmarda (1958, 1961, 1976a, b), Pilous & Duda (1960), Vajda (1971), Duda & Váňa (1989c), Blackburn et al. (1997), Szweykowski & Klama (2010).

**Note:** The locality given by Šmarda (1958) belongs to *Lophozia ventricosa* (rev. J. Váňa, J. Hubáčková, Duda & Váňa 1989c).

**New localities:** Belianske Tatry Mts: Tristarský žľab gully, spruce forest, E part of the gully, decaying log, 49°15.357'N, 20°12.709'E, alt. 1275 m, leg. P. Górski, 25.06.2012 (POZNB 1178); Mt Čierny vrch, decaying log, 49°15.993'N, 20°11.333'E, alt. 1305 m, leg. P. Górski, 26.06.2012 (POZNB 1225); Podspádska dolina valley, middle part, in a valley of a small stream flowing south from Podspádski potok stream, decaying log, alt. 960 m, 49°16.284'N, 20°12.048'E, leg., det. P. Górski, 18.11.2012, conf. J. Váňa (POZNB 1591); Ríglňanská dolina valley, decaying log near Ríglňanský potok stream, 49°15.238'N, 20°13.691'E, 49°15.167'N, 20°13.621'E, 49°15.071'N, 20°13.674'E, alt. 1070 m, 1095 m, 1135 m, leg. P. Górski, 1.09.2014 (POZNB 1773, 1780, 1786, 1788, 1796, 1923); High Tatra Mts, SL: Bielovodská dolina valley, above Poľana pod Vysokou glade, near unmarked route to Ťažká dolina valley, alt. 1365 m, leg. P. Górski, 26.08.2009 (POZNB 696); Dolina Bielych Plies valley, rowan woods in upper montane belt, alt. 1435 m, leg. P. Górski, 26.09.2007 (POZNB 394); Tatry Zachodnie Mts, PL: Dolina Strážyska valley, near route to Mt Giewont, decaying log, alt. 1455 m, leg. P. Górski, 11.09.2004 (POZNB 393); Dolina Chochołowska valley, Kulawiec, near route to Mt Trzydniowiański Wierch, decaying log, *Plagiothecio-Piceetum*, alt. 1465 m, leg. P. Górski, 27.09.2006 (POZNB 416); Západné Tatry Mts, SL: below Nižný Roháčsky Vodopád waterfall, on decaying log near Spáloný potok stream, *Plagiothecio-Piceetum sphagnetosum*, alt. 1280 m, leg. P. Górski, 24.07.2006 (POZNB 392); Mt Parzátczak (at Slovak side), decaying log, 49°15.535'N, 19°47.348'E, alt. 1450 m, leg. P. Górski, 30.09.2013 (POZNB 1689).

*Lophozia badensis* (Gottsche) Jörg. ⇒ see under *Mesoptychia badensis* (Gottsche) L. Söderstr. et Váňa

*Lophozia bantriensis* (Hook.) Jörg. ⇒ see under *Mesoptychia bantriensis* (Hook.) L. Söderstr. et Váňa

*Lophozia bicrenata* (Schmidel ex Hoffm.) Dumort. ⇒ see under *Isoptychia bicrenatus* (Schmidel ex Hoffm.) H. Buch

*Lophozia excisa* (Dicks.) Dumort. ⇒ see under *Lophozopsis excisa* (Dicks.) Konst. et Vilnet

*Lophozia guttulata* (Lindb.) A. Evans [= *Lophozia longiflora* auct.]

**Distribution:** BT 930–1780 (19); HT-SL 1000–2480 (69); HT-PL 1125–1960 (12); ZT-SL 800–2178 (28); TZ-PL 990–1945 (22).

**Max.** (new loc.) High Tatra Mts, SL, S slope on Mt Kriváň, below the summit, 49°09.742'N, 20°00.016'E, alt. 2480 m, leg. P. Górski, 29.09.2013 (POZNB 1736).

**Min.** Západné Tatry Mts, SL, Juráňova dolina valley, alt. 800 m (Peciar 1985).

**Literature:** Limpricht (1877a, b), Krupa (1882), Szyszłowicz (1885), Schiffner (1911), Lilienfeldówna (1914a, b), Vilhelm (1927), Šmarda (1938, 1940, 1961, 1976a, b), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a, c, 1960a, 1996, 2006), Váňa & Duda (1965), Unar et al. (1984–1985), Peciar (1985), Šoltés (1990), Kosiński (1999), Szweykowski & Buczkowska (2000), Cykowska (2006b, 2011), Šibík et al. (2006), Šoltés & Školek (2010), Szweykowski & Klama (2010).

**Note:** Some records for *Lophozia ascendens*, *L. wenzelii*, *L. bantriensis*, *L. incisa* and *L. opacifolia* published by Šmarda (1938, 1958, 1961), Peciar (1982), Váňa & Duda (1965) actually belong to this species; for details see Duda & Váňa (1989c, 1990a, 1991, 1992a, b).

**New localities:** Belianske Tatry Mts: valley of the Čierny potok stream, near Čierny potok, 49°16.033'N, 20°11.702'E, alt. 1050 m, leg. P. Górski, 24.06.2012 (POZNB 1181, 1185, 1188); Rígfarská dolina valley, decaying log near Rígfarský potok stream, 49°15.341'N, 20°13.700'E, 49°15.238'N, 20°13.691'E, 49°15.167'N, 20°13.621'E, alt. 1060 m, 1070 m, 1095 m, leg. P. Górski, 1.09.2014 (POZNB 1804, 1779, 1793); High Tatra Mts, SL: Javorová dolina valley, above Javorová polana glade, decaying log near route, 49°11.835'N, 20°09.321'E, alt. 1620 m, leg. P. Górski, 17.11.2012 (POZNB 1438); Javorová dolina valley, upper montane tree limit, decaying log near route, 49°12.621'N, 20°09.352'E, alt. 1440 m, leg. P. Górski, 17.11.2012 (POZNB 1447); Dolina Bielych plies valley, rowan woods in upper montane belt, decaying log, 49°13.093'N, 20°14.562'E, alt. 1445 m, leg. P. Górski, 20.11.2012 (POZNB 1440); Mengusovská dolina valley, above Popradské pleso lake, near route to Mt Ostrva, alt. 1620 m, leg. P. Górski, 10.08.2010 (POZNB 1040); High Tatra Mts, PL: Dolina Rybiego Potoku, above Wodogrzmoty Mickiewicza waterfall, near route to Morskie Oko lake, decaying log, *Plagiothecio-Piceetum*, alt. 1125 m, leg. P. Górski, 15.09.2004 (POZNB 333); Dolina Pięciu Stawów Polskich valley, above S shore of Zadní Staw Polski lake, alt. 1885 m, leg. P. Górski, 28.07.2005 (POZNB 947); Tatry Zachodnie Mts, PL: Dolina Pyszniańska valley, above Wielka Polana Ornaczańska glade, decaying log, alt. 1200 m, leg. P. Górski, 1.07.2004 (POZNB 945); Dolina Pyszniańska valley, below Pyszniańska Przełęcz pass, alt. 1700 m, leg. P. Górski, 3.07.2004 (POZNB 946); Żleb Zabijak gully (upper part of Dolina Lejowa valley), in middle part of the gully, 49°14.971'N, 19°50.899'E, alt. 1250 m, leg. P. Górski, 20.11.2011 (POZNB 1043); between Chlabówka and Cyrhla, minerotrophic spring in forest, near Droga Oswalda Balzera road, 49°17.087'N, 20°00.719'E, alt. 990 m, leg. P. Górski, 16.11.2012 (POZNB 1371); Západné Tatry Mts, SL: Teplý žľab gully, below Sedlo pod Osobitou pass, decaying log, *Dentario glanulosae-Fagetum*, alt. 1260 m, leg. P. Górski, 20.07.2006 (POZNB 729); Zadná Látná dolina valley, decaying log near route, alt. 1410 m, leg. P. Górski, 18.07.2006 (POZNB 900); Mt Parzátčzak (at Slovak side), decaying log, 49°15.535'N, 19°47.348'E, alt. 1450 m, leg. P. Górski, 30.09.2013 (POZNB 1732).

*Lophozia heterocolpos* (Thed. ex Hartm.) M. Howe ⇒ see under *Mesoptychia heterocolpos* (Thed. ex Hartm.) L. Söderstr. et Váňa

*Lophozia incisa* (Schrad.) Dumort. subsp. *incisa* ⇒ see under *Schistochilopsis incisa* (Schrad.) Konst.

*Lophozia incisa* (Schrad.) Dumort. subsp. *opacifolia* (Culm. ex Meyl.) R. M. Schust. et Damsh. ⇒ see under *Schistochilopsis opacifolia* (Culm. ex Meyl.) Konst.

*Lophozia longidens* (Lindb.) Macoun ⇒ see under *Lophozopsis longidens* (Lindb.) Konst. et Vilnet

*Lophozia longiflora* auct. ⇒ see under *Lophozia guttulata* (Lindb.) A. Evans

*Lophozia obtusa* (Lindb.) A. Evans ⇒ see under *Obtusifolium obtusum* (Lindb.) S. W. Arnell

*Lophozia opacifolia* Culm. ex Meyl. ⇒ see under *Schistochilopsis opacifolia* (Culm. ex Meyl.) Konst.

*Lophozia porphyroleuca* (Nees) Schiffn. ⇒ see under *Lophozia guttulata* (Lindb.) A. Evans

*Lophozia savicziae* Schjakov

**Distribution:** BT 1500 (1); HT-SL –; HT-PL 2020 (1); ZT-SL –; TZ-PL 1770–1860 (3).

**Max.** High Tatra Mts, PL, Dolina Gašienicowa valley, below Zawrat pass, alt. 2020 m, leg. J. Szweykowski, 3.08.1957 (Szweykowski 1960a).

**Min.** Belianske Tatry Mts, N slopes of Kozi chrbát, between Sedlo Pod Schody pass and Mt Faixová, alt. 1500 m, leg. J. Szweykowski, 22.07.1956 (Szweykowski 1960a).

**Literature:** Szweykowski (1960a, 2006), Szweykowski & Klama (2010).

*Lophozia silvicola* H. Buch

**Distribution:** BT –; HT-SL 1370–2210 (6); HT-PL 950–1800 (7); ZT-SL –; TZ-PL 1100–1945 (5).

**Max.** High Tatra Mts, SL, Velická dolina valley, alt. 2210 m, leg. A. Šoltésová, 13.08.1981 (Šoltés 1990).

**Min.** High Tatra Mts, PL, Chowańcówka stream valley, alt. 950 m (Klama 2008).

**Literature:** Szweykowski (1960a, b, 2006), Šoltés (1990), Cykowska (2006, 2011), Klama (2008), Szweykowski & Klama (2010).

**Note:** *Lophozia silvicola* occurs much more frequently in the Tatra Mts than is evident from published data. For a long time it was not considered to be a separate species. It can be separated from *L. ventricosa* with certainty only on the basis of oil-bodies and molecular data.

*Lophozia sudetica* (Nees ex Huebener) Grolle ⇒ see under *Pseudolophozia sudetica* (Nees ex Huebener) Konst. et Vilnet

*Lophozia ventricosa* (Dicks.) Dumort.

**Distribution:** BT 1030–1700 (10); HT-SL 1180–2480 (53); HT-PL 915–2430 (34); ZT-SL 950–2187 (13); TZ-PL 900–2030 (46).

**Max.** (new loc.) High Tatra Mts, SL, S slopes of Mt Kriváň, below the summit, 49°09.742'N, 20°00.016'E, alt. 2480 m, leg. P. Górski, 29.09.2013 (POZNB 1693).

**Min.** Tatra Zachodnie Mts, PL, Tatary near Zakopane, alt. 900 m, leg. T. Chałubiński (Szyszyłowicz 1885).

**Literature:** Hazslinszky (1860, 1865), Rehman (1864), Limpricht (1877a), Krupa (1882), Szyszyłowicz (1885), Schiffner (1911, 1915), Lilienfeldówna (1914a, b), Kulesza (1920), Krajina (1933), Šmarda (1938, 1961), Boros (1951), Duda (1955a), Szweykowski (1957, 1958a, 1960a, b), Ježek & Vondráček (1962), Váňa & Duda (1965), Hadač et al. (1969a), Kubiček et al. (1983), Balcerkiewicz (1984), Peciar (1988), Šoltés (1989), Blackburn et al. (1997), Kosiński (1999), Szweykowski & Buczkowska (2000), Wojterska et al. (2004), Cykowska (2006b, 2008, 2011), Šibík et al. (2006), Šoltés et al. (2006), Górski (2007b, 2009a), Klama (2008), Szweykowski & Klama (2010).

**Note:** Some reports of *Lophozia ascendens* occurring in the Belianske Tatry Mts by Šmarda (1958, page 73, rev. J. Váňa, J. Hubáčková; Duda & Váňa 1989c), of *L. bantriensis* in the Mengusovská dolina valley (High Tatra Mts, SL, Šmarda 1961, rev. J. Hubáčková, J. Váňa; Duda & Váňa 1991) and of *L. longidens* in the Slovak High Tatra Mts (Šmarda 1961, rev. J. Váňa, J. Hubáčková; Duda & Váňa 1992b) are based on erroneous identification and are for this species.

*Lophozia wenzelii* (Nees) Steph.

**Distribution:** BT 1390–2000 (4); HT-SL 1580–2590 (112); HT-PL 1380–2430 (40); ZT-SL 1520–2025 (18); TZ-PL 1400–2020 (21).

**Max.** (new loc.) High Tatra Mts, SL, below Mt Gerlachovská veža (ridge Malý Gerlach-Gerlachovský štít), 49°09.790'N, 20°08.057'E, alt. 2590 m, leg. P. Górski, 7.08.2013 (POZNB 1628).

**Min.** High Tatra Mts, PL, near E shore of Morskie Oko lake, alt. 1380 m, leg. J. Szweykowski, 28.08.1956 (Szweykowski 1960a).

**Literature:** Krupa (1882, 1888), Szyszyłowicz (1885), Schiffner (1911, 1915), Müller (1912–1916), Šmarda (1937b, 1961, 1976a), Boros (1951, 1959), Duda (1955a, 1959), Szweykowski (1957, 1958a, 1960a, 2006), Boros et al. (1960), Váňa & Duda (1965), Rejment-Grochowska (1971), Balcerkiewicz (1984), Šoltés (1990, 2002, 2004), Duda & Váňa (1992b), Blackburn et al. (1997), Szweykowski & Buczkowska (2000), Balcerkiewicz et al. (2001), Górski (2004, 2007a, b, 2009a), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Szweykowski & Klama (2010).

**Note:** The localities of this species cited by Duda (1962a) and Peciar (1982) belong to *Pseudolophozia* (= *Lophozia sudetica*) (rev. J. Váňa, J. Hubáčková, Duda & Váňa 1992b). A few localities for this species cited by Šmarda (1961) were based upon incorrect identification (see Duda & Váňa 1992b). The records published by Szyszyłowicz (1885, Polish Tatra Mts, peat-bog near Zakopane, alt. 850 m) and Peciar (1981, Slovak Tatra Mts, Mt Roháčce, alt. 1200 m) are considered unreliable. The current list includes 75 original localities in the Tatra Mts, recorded by P. Górski.

**New localities:** High Tatra Mts, SL: Štrbina pod Kotlovým štítom (ridge Malý Gerlach-Gerlachovský štít), 49°09.675'N, 20°08.159'E, alt. 2560 m, leg. P. Górski, 7.08.2013 (POZNB 1633); Drača dolinka valley, blocks of rock in the highest kettle in the valley, above Drače pleso lake, 49°09.902'N, 20°05.339'E, alt. 2050 m, leg. P. Górski, 5.08.2010 (POZNB 193); Zlomisková dolina valley, Železná kotlina basin, 49°09.836'N, 20°06.658'E, alt. 2080 m,

leg. P. Górski, 6.08.2010 (POZNB 214); Važecká dolina valley, blocks of rock near W shore of Krivánske Zelené pleso lake, 49°09.533'N, 20°00.537'E, alt. 2000 m, leg. P. Górski, 11.08.2010 (POZNB 217); Važecká dolina valley, blocks of rock near SW shore of Krivánske Zelené pleso lake, 49°09.475'N, 20°00.526'E, alt. 2000 m, leg. P. Górski, 11.08.2010 (POZNB 21/2010); Rumanova dolinka valley, near NE shore of Rumanovo pleso lake, 49°10.105'N, 20°05.982'E, alt. 2150 m, leg. P. Górski, 3.08.2010 (POZNB 226); Čierna Javorová dolina valley, Čierna záhrada, base of rocky walls at the mouth of Ladova dolinka valley, 49°12.411'N, 20°10.657'E, alt. 1660 m, leg. P. Górski, 25.08.2010 (POZNB 24/2010); Čierna Javorová dolina valley, Czarny Bandzioch, 49°12.400'N, 20°11.654'E, alt. 2075 m, leg. P. Górski, 26.08.2010 (POZNB 27/2010); Svišťová (Bielovodská) dolina valley, Zmarznutý kotel, rock blocks, alt. 2020 m, leg. P. Górski, 1.08.2006 (POZNB 10); Temnosmrečinská dolina valley, Piargová dolinka valley, glacial cirque below Mt Cubrina, 49°11.180'N, 20°02.703'E, alt. 1880 m, leg. P. Górski, 22.07.2008 (POZNB 10/2008); Kačacia dolina valley, Gierlachowski Ogród (upper glacial cirque), blocks of rock below Mt Zadný Gerlachovský štít, alt. 1975–1980 m, leg. P. Górski, 16.09.2009 (POZNB 133, 73/2009, 78/2009); Kačacia dolina valley, Želazny Ogród (upper glacial cirque), blocks of rock below Východná Železná brána pass, alt. 1985 m, leg. P. Górski, 16.09.2009 (POZNB 74/2009); Kačacia dolina valley, in gully coming down from Mt Zlobivá, alt. 1700 m, leg. P. Górski, 22.08.2007 (POZNB 6/2007); Hlinská dolina valley, plateau in the kettle below Vysné Kôprovské sedlo pass, alt. 1790 m, leg. P. Górski, 21.08.2006 (POZNB 146); Žabia Bielovodská dolina valley, blocks of rock near SE shore of Nižné Žabie Bielovodské pleso lake, alt. 1675–1681 m, leg. P. Górski, 14.08.2009 (POZNB 34/2009, 35/2009); Žabia Bielovodská dolina valley, snowbeds below walls on Mt Veľký Žabi štít, above S shore of Vyšné Žabie Bielovodské pleso lake, alt. 1730 m, leg. P. Górski, 15.08.2009 (POZNB 37/2009, 38/2009); Žabia Bielovodská dolina valley, rocky walls between Mlynárovo sedlo pass and Mt Veľký Žabi štít, alt. 1885 m, leg. P. Górski, 19.08.2009 (POZNB 52/2009, 53/2009); Ťažká dolina valley, upper kettle, blocks of rock on the slope between Mt Ganek and Mt Vysoká, alt. 1990 m, leg. P. Górski, 20.08.2009 (POZNB 57/2009); Ťažká dolina valley, upper kettle, above SE shore of Ťažké pleso lake, alt. 1670 m, leg. P. Górski, 24.08.2009 (POZNB 60/2009); Ťažká dolina valley, upper part of the lower kettle, blocks of rock below Mt Pustá stráž, alt. 1810–1825 m, leg. P. Górski, 24.08.2009 (POZNB 63/2009, 67/2009, 68/2009, 70/2009); Spádová dolinka valley, SW part of the glacial cirque, blocks of rock below the walls of Mt Malé Rysy, alt. 2020 m, leg. P. Górski, 25.08.2009 (POZNB 65/2009); Zadná Javorová dolina valley, in kettle below Mt Ostrý štít, alt. 2125 m, leg. P. Górski, 16.08.2006 (POZNB 28/2006); Zadná Javorová dolina, in kettle below the ridge of Ostrý štít -Javorový štít, alt. 2085 m, leg. P. Górski, 16.08.2006 (POZNB 32/2006); Zadná Javorová dolina valley, in kettle below Mt Javorový štít, above Žabie Javorové pleso lake, alt. 1970 m, leg. P. Górski, 16.08.2006 (POZNB 33/2006); Kolová dolina valley, upper part of Kotlinka pod Kolovym sedlom basin, below Kolové sedlo pass, 49°12.860'N, 20°12.075'E, alt. 2095 m, leg. P. Górski, 1.09.2011 (POZNB 465); Rovienky valley, Zadné Rovienky, alpine grassland *Trifido-Distichetum*, 49°11.262'N, 20°09.063'E, alt. 1910 m, leg. P. Górski, 25.09.2011 (POZNB 491); Rovienky valley, below rocky walls on Mt Predná Javorová veža, northern slope, 49°11.375'N, 20°08.523'E, alt. 1710 m, leg. P. Górski, 25.09.2011 (POZNB 582); Veľká Zmrzlá dolina valley, blocks of rock above sub-glacially eroded step, 49°12.260'N, 20°12.555'E, alt. 1900–1925 m, leg. P. Górski, 27.09.2011 (POZNB 548, 557); Veľká Zmrzlá dolina valley, blocks of rock on the sub-glacially eroded step in the upper kettle (Barania kotlina basin), 49°12.229'N, 20°12.411'E, alt. 2015 m, leg. P. Górski, 27.09.2011 (POZNB 698); Rumanova dolinka valley, blocks of rock at Vyšné Rumanovo pleso lake, 49°10.327'N, 20°06.061'E, alt. 2135 m, leg. P. Górski, 9.08.2011 (POZNB 570); Nefcerka valley, near SW shore of Vyšné Terianské pleso lake, 49°10.061'N, 20°01.219'E, alt. 2085 m, leg. P. Górski, 3.08.2011 (POZNB 606); Nefcerka valley, blocks of rock at base of walls on Mt Kriváň, 49°10.071'N, 19°00.163'E, alt. 1830 m, leg. P. Górski, 2.08.2011 (POZNB 642); Tatry Zachodnie Mts, PL: Dolina Jarzabcza valley, NW slopes of Mt Kończysty Wierch, alt. 1722 m, leg. P. Górski, 22.07.2009 (POZNB 4/2009); Dolina Starorobociańska valley, Zadnie Zagony, alt. 1700 m, leg. P. Górski, 11.08.2004 (POZNB 12/2004); Západné Tatry Mts, SL: Roháčska dolina valley, on soil between rocks at Horne Roháčske pleso lake, alt. 1720 m, leg. P. Górski, 24.07.2006 (POZNB 24); Kamenistá dolina valley, kettle below Blyšť, alt. 1845 m, leg. P. Górski, 29.08.2008 (POZNB 39/2008); Jamnícka dolina valley, in kettle below Žiarske sedlo pass, alt. 1800, leg. P. Górski, 20.07.2006 (POZNB 11/2006); ridge between Smrek and Žiarske sedlo pass, close to pass, alt. 2025 m, leg. P. Górski, 21.07.2006 (POZNB 14/2006); Račkova dolina valley, Račkov Zadok, near Vyšné Račkové pleso lake, 49°11.962'N, 19°48.312'E, alt. 1730 m, leg. P. Górski, 27.08.2011 (POZNB 457).

*Lophozopsis excisa* (Dicks.) Konst. et Vilnet [= *Lophozia excisa* (Dicks.) Dumort.]

**Distribution:** BT 1950–2000 (2); HT-SL 1246–1900 (4); HT-PL 1950 (1); ZT-SL 1400–1500 (2); TZ-PL 1815 (1).

**Max.** Belianske Tatry Mts, Mt Zadné Jatki, alt. 2000 m, leg. J. Szweykowski, 22.07.1956 (Szweykowski 1960a).

**Min.** High Tatra Mts, SL, Bielovodská dolina valley, alt. 1246–1732 m, leg. I. Szyszylowicz sub *L. capitata* (Szyszylowicz 1885), rev. W. Kulesza (Kulesza 1920).

**Literature:** Hazslinszky (1860), Szyszylowicz (1885), Kulesza (1920), Šmarda (1938), Szweykowski (1957, 1958a, 1960a, 1996, 2006), Szweykowski & Kožlicka (1980), Peciar (1981), Duda & Váňa (1992c), Kosiński (1999), Szweykowski & Klama (2010).

**Note:** The data presented by Hazslinszky (1865, 1885) are based on a misidentification and refer to *Pseudolophozia* (= *Lophozia*) *sudetica* (rev. J. Váňa, J. Hubáčková, Duda & Váňa 1992c). The report of *Lophozia capitata* published by Szyszylowicz (1885) belongs to *Lophozia excisa* (rev. W. Kulesza, Kulesza 1920, Duda & Váňa 1989a).

**New locality:** Západné Tatry Mts, SL, Jalovecká dolina valley, near route above Chata pod Náružím, alt. 1500 m, leg., det. P. Górski, 19.07.2008, conf. J. Váňa (POZNB 1556).

### *Lophozia longidens* (Lindb.) Konst. et Vilnet [= *Lophozia longidens* (Lindb.) Macoun]

**Distribution:** BT –; HT-SL 1100–2480 (10); HT-PL 975–1600 (4); ZT-SL 1285–1400 (2); TZ-PL 1000–1440 (3).

**Max.** (new loc.) High Tatra Mts, SL, S slopes of Mt Kriváň, below the summit, 49°09.742'N, 20°00.016'E, alt. 2480 m, leg. P. Górski, 29.09.2013 (POZNB 1699).

**Min.** High Tatra Mts, PL, Chowańcówka stream valley, alt. 975 m, leg. H. Klama (Klama 2008).

**Literature:** Szweykowski (1956d, e, 1957, 1960a, 1969, 2006), Duda (1962a), Šmarda (1976a), Duda & Váňa (1992b), Klama (2008), Szweykowski & Klama (2010).

**Note:** The locality of *Lophozia longidens* cited by Stachurska-Swakoń (2008) is for *Pseudolophozia* (= *Lophozia*) *sudetica* (rev. P. Górski, 2011). In the list presented, three localities of *L. longidens* cited by Kosiński (1999, inaccessible herbarium material) were not included. The locality in the Slovak High Tatra Mts cited by Šmarda (1961) belongs to *Lophozia ventricosa*, whereas that in the Belianske Tatry Mts (Šmarda 1961, Šmarda et al. 1962) belongs to *Crossocalyx hellerianus* (all rev. J. Váňa, J. Hubáčková, see Duda & Váňa 1992b).

**New localities:** Západné Tatry Mts, SL, Roháčska dolina valley, near Nižný Roháčsky Vodopád waterfall, on stone near stream, alt. 1285 m, leg. P. Górski, 24.07.2006 (POZNB 1652); High Tatra Mts, PL, scree above S shore of Czarny Staw pod Rysami lake, alt. 1600 m, leg. P. Górski, 18.08.2004, det. J. Váňa (POZNB 1114); High Tatra Mts, SL: Bielovodská dolina valley, above Poľana pod Vysokou glade, decaying log, *Plagiothecio-Piceetum*, 49°11.098'N, 20°07.001'E, alt. 1380 m, leg. P. Górski, 28.09.2013 (POZNB 1730, KRAM); Kôprovnicva valley, upper part, rocks below Mt Krížne, 49°11.157'N, 19°57.485'E, alt. 1740 m, leg. P. Górski, 29.08.2014 (POZNB 1846).

### *Mannia pilosa* (Hornem.) Frye et L. Clarck

**Distribution:** BT 1000–2100 (11); HT-SL –; HT-PL –; ZT-SL 1450–1900 (8); TZ-PL 1500 (1).

**Max.** Belianske Tatry Mts, Mt Ždiarska Vidla, alt. 2100 m, leg. J. Suza (Šmarda 1936).

**Min.** Belianske Tatry Mts, Havrania dolina valley, alt. 1000 m, leg. J. Šmarda, 10.07.1951 (Duda & Váňa 1974a).

**Literature:** Schiffner (1909a, b, 1910, 1911), Müller (1912–1916), Györfy (1924), Šmarda (1936, 1938, 1958, 1960a, 1961, 1976a), Szweykowski (1957, 1958a, 1960a, 2006), Šmarda et al. (1962), Rejment-Grochowska (1966), Duda & Váňa (1974a), Unar et al. (1984–1985), Szweykowski & Klama (2010).

**Note:** The locality cited by Boros et al. (1960) belongs to *Athalamia hyalina* (rev. J. Váňa, see Duda & Váňa 1974a).

### *Mannia triandra* (Scop.) Grolle

**Distribution:** BT –; HT-SL –; HT-PL –; ZT-SL 1655–1760 (4); TZ-PL –.

**Max.** Západné Tatry Mts, SL, Tomanovská dolina valley, Rozpadly hrebeň, alt. 1760 m, 6.07.1959, *Caricetum firmae*, table 15, relevé 4 (Unar et al. 1984–1985).

**Min.** Západné Tatry Mts, SL, Žleb spod Diery, Rozpadliny, alt. 1655 m, 18.08.1960, *Caricetum firmae*, table 15, relevé 8 (Unar et al. 1984–1985).

**Literature:** Keil (1956), Šmarda (1961), Duda & Váňa (1974a), Unar et al. (1984–1985).

### *Marchantia polymorpha* L. subsp. *montivagans* Bischl. et Boisselier

**Distribution:** BT 1080–2024 (13); HT-SL 1213–2090 (43); HT-PL 1100–1870 (10); ZT-SL 1360–1700 (7); TZ-PL 854–1987 (18).

**Max.** High Tatra Mts, SL: Mlynická dolina valley, Mt Štrbské Solisko, alt. 2090 m, leg. V. Krajina, 9.08.1931, *Oxyrio-Saxifragetum carpathicae*, table 10, relevé 13 (Krajina 1933); Mlynická dolina valley, above Capie pleso lake, below Bystré sedlo pass, alt. 2090 m, leg. V. Krajina, 1.09.1931, *Luzuletum alpino-pilosae*, table 12, relevé 3 (Krajina 1933).



**Min.** Tatry Zachodnie Mts, PL, forests near Zakopane, alt. 854–962 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885), ~.  
**Literature:** Szyszyłowicz (1885), Schiffner (1909b, 1911), Krajina (1933), Duda (1955a), Boros (1959), Szweykowski (1958c, 1960a, 2006), Boros et al. (1960), Šmarda (1960c, 1961, 1976b), Šmarda et al. (1962), Váňa & Duda (1965), Rejment-Grochowska (1966), Balcerkiewicz (1984), Unar et al. (1984–1985), Duda & Váňa (1992c), Blackburn et al. (1997), Górski (2007b, 2009a), Szweykowski & Klama (2010), Cykowska & Smieja (2011).

**New localities:** Tatry Zachodnie Mts, PL, Dolina Starorobociańska valley, Zadnie Zagony, Krzywy Żleb gully, alt. 1700 and 1780 m, leg. P. Górski, 12.07.2003 (POZNB 85/2003, 87/2003); Západné Tatry Mts, SL, Račkova dolina valley, Račkov Zadok, snow-bed, 49°11.748'N, 19°48.620'E, alt. 1700 m, leg. P. Górski, 21.07.2009 (POZNB 1579); High Tatra Mts, SL: Kačacia dolina valley, sandy shore of Zelené pleso Kačacie lake, alt. 1580 m, leg. P. Górski, 15.09.2009 (POZNB 1576); Kačacia dolina valley, above and E of Zelené pleso Kačacie lake, 49°09.799'N, 20°06.269'E, alt. 1715 m, leg. P. Górski, 28.09.2013 (POZNB 1714).

### *Marchantia polymorpha* L. subsp. *polymorpha* Bischl. et Boisselier

**Distribution:** BT 1100–1200 (1); HT-SL 1200 (2); HT-PL 985–1230 (3); ZT-SL 750–1000 (3); TZ-PL 1030–1560 (8).

**Max.** Tatry Zachodnie Mts, PL, Dolina Stare Szałasiska valley, 49°14'46"N, 19°59'48"E, alt. 1560 m, leg. A. Smieja, 22.07.2005 (Cykowska & Smieja 2011).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horničková (Peciar 1978).

**Literature:** Schiffner (1909b), Peciar (1978, 1982), Duda & Váňa (1992c), Klama (2008), Szweykowski & Klama (2010), Cykowska & Smieja (2011).

**Note:** Schiffner (1909b) emphasized that his collection from the Slovak High Tatra Mts shows the transitional features of both subspecies.

### *Marchantia polymorpha* L. (sensu lato)

In the list presented there are data referring to, without specification, one of the three subspecies of *Marchantia polymorpha*: Wahlenberg (1814), Hazslinszky (1860, 1865), Rehman (1864), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Schiffner (1908b, 1910, 1911), Györfy (1911), Szepesfalvy (1926), Szafer et al. (1927), Szafer & Sokołowski (1927), Pawłowski et al. (1928), Duda (1955a), Szweykowski (1957, 1958a), Hadač et al. (1969a), Šoltés (1976, 1989, 1990, 2006), Balcerkiewicz et al. (1978a), Balcerkiewicz & Pawlak (1978a), Šomšák (1979), Peciar (1982), Unar et al. (1984–1985), Kosiński (1999), Šoltés et al. (2006), Górski (2009a), Szweykowski & Klama (2010).

*Marsupella adusta* (Nees) Spruce ⇒ see under *Gymnomitrium adustum* Nees

*Marsupella alpina* (Gottsche ex Husn.) Bernet ⇒ see under *Gymnomitrium alpinum* (Gottsche ex Husn.) Schiffn.

### *Marsupella apiculata* Schiffn. [= *Gymnomitrium apiculatum* (Schiffn.) Müll. Frib.]

**Distribution:** BT –; HT-SL 1760–2000 (5); HT-PL 1770–2100 (2); ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, PL, Mt Waksmundzki Wierch, alt. 2100 m, leg. J. Szweykowski, 20.09.1955 (Szweykowski 1960a).

**Min.** High Tatra Mts, SL, Skalnaté pleso lake, alt. 1760–1860 m, leg. A. Boros, det. K. Müller sub *G. concinatum*, rev. J. Váňa (Duda & Váňa 1980b).

**Literature:** Szepesfalvy (1926), Szweykowski (1957, 1958a, 1960a, 2006), Szweykowski & Kožlicka (1977), Duda & Váňa (1980b), Balcerkiewicz (1984), Šoltés (1992), Szweykowski & Klama (2010).

**Note:** Two reports of *Gymnomitrium concinatum* in the High Tatra Mts (SL) published by Šmarda (1938) are based on erroneous identification and belong to this species (rev. J. Váňa, Duda & Váňa 1980b). Krajina (1933) recorded four localities for *G. apiculatum* in the Mlynická dolina valley (High Tatra Mts, SL). They are unreliable and thus not included in the list. The available herbarium material for one of those localities belongs to *G. corallioides* (rev. J. Váňa, Duda & Váňa 1980b). The report of Peciar (1981) of a locality in the Západné Tatry Mts (SL) is unreliable.

**New locality:** High Tatra Mts, SL, Zadná Javorová dolina valley, near SE shore of Žabie Javorové pleso lake, snow-bed, 49°11.438'N, 20°10.162'E, alt. 1890 m, leg., det. P. Górski, 14.08.2013, conf. J. Váňa (POZNB 1653).

*Marsupella aquatica* (Lindenb.) Schiffn.

**Distribution:** BT –; HT-SL 1600–1900 (20); HT-PL 1500–1710 (5); ZT-SL 1300–1600 (11); TZ-PL 1380–1395 (2).

**Max.** High Tatra Mts, SL, Malá Studená dolina valley, alt. 1700–1900 m, leg. A. Boros, 1.09.1940, det. K. Müller, J. Váňa (Duda & Váňa 1981a).

**Min.** Západné Tatry Mts, SL: Jamnícka dolina valley, waterfall, alt. 1300 m (Duda 1955a); Žiarska dolina valley, waterfall, alt. 1300–1400 m (Duda 1955a).

**Literature:** Limpricht (1877a), Krupa (1882, 1888), Lilienfeldówna (1914a, b), Schiffner (1915), Szepesfalvy (1926), Duda (1955a, 1958), Szweykowski (1960a), Šmarda (1961), Duda & Váňa (1981a), Peciar (1981).

**New localities:** Západné Tatry Mts, SL, above Nižný Roháčsky Vodopád waterfall, on stone in backwater of a stream, near route, alt. 1400 m, leg. P. Górski, 24.07.2006 (POZNB 408); High Tatra Mts, SL, Kobyliá dolina valley, near Kobyliá plesko lake, alt. 1750 m, leg. P. Górski, 29.07.2009 (POZNB 332); High Tatra Mts, PL: above Czarny Staw pod Rysami lake, rocky outcrop, alt. 1710 m, leg. P. Górski, 18.08.2004 (POZNB 398); above Morskie Oko lake, near route to Szpiglasowa Przełęcz pass, wet rocks, alt. 1500 m, leg. P. Górski, 16.08.2004 (POZNB 1084).

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

**Distribution:** BT –; HT-SL 1590–2590 (96); HT-PL 1790–2110 (17); ZT-SL 1770–1885 (3\*); TZ-PL 1775 (1\*).

**Max.** (new loc.) High Tatra Mts, SL, below Mt Gerlachovská veža (ridge Malý Gerlach-Gerlachovský štít), 49°09.790'N, 20°08.057'E, alt. 2590 m, leg. P. Górski, 7.08.2013 (POZNB 1627, 1628).

**Min.** High Tatra Mts, SL, Dolina Kežmarskej Bielej vody valley, above Čierne pleso lake, alt. 1590 m, leg. J. Szweykowski, 23.07.1956 (Szweykowski 1960a).

**Literature:** Szweykowski (1957, 1960a, 2006), Šmarda (1961), Duda & Váňa (1980b), Šoltés (1992), Szweykowski & Klama (2010).

**Note:** The data for the Mlynická dolina valley (High Tatra Mts, SL; nine localities) documented by Krajina (1933) were omitted in the list presented because they are unreliable. There are no specimens of *Marsupella boeckii* in the herbarium material collected by V. Krajina (Váňa & Duda 1965). Two reports of *Marsupella brevissima* published by Šmarda (1961) are based on an erroneous identification and belong to this species (rev. J. Váňa, Duda & Váňa 1979b, 1980b). Altogether, there are 13 localities recorded in the literature for *M. boeckii* in the High Tatra Mts. The list presented includes 104 unpublished records collected by P. Górski (only new localities for Západné Tatry Mts, Tatry Zachodnie Mts and selected ones for the Slovak High Tatra Mts were included).

**New localities:** \* Tatry Zachodnie Mts, PL, Dolina Starorobociańska valley, Szeroki Zagon, on stone, 49°12.145'N, 19°49.555'E, alt. 1775 m, leg. P. Górski, 23.07.2009 (POZNB 100); \* Západné Tatry Mts, SL: Spálená dolina valley, below Baníkovské sedlo pass, rocky walls near route, alt. 1875 m, leg. P. Górski, 19.07.2006 (POZNB 2/2006); Spálená dolina valley, below Mt Baníkov, alt. 1885 m, leg. P. Górski, 19.07.2006 (POZNB 3/2006); Hlboká (Jalovecká) dolina valley, Vreće, blocks of rock, 49°12.324'N, 19°41.833'E, alt. 1770 m, leg. P. Górski, 17.07.2008 (POZNB 1/2008, 44); Hlboká (Jalovecká) dolina valley, Vreće, blocks of rock below Mt Pachoľ'a, alt. 1895 m, leg. P. Górski, 20.07.2008 (POZNB 4/2008); High Tatra Mts, SL: Štrbina pod Kotlovým štítom (ridge Malý Gerlach-Gerlachovský štít), 49°09.675'N, 20°08.159'E, alt. 2560 m, leg. P. Górski, 7.08.2013 (POZNB 1625); Mt Lomnický štít, below the summit, south aspect, alt. 2580 m, leg. Z. Pilous [in voucher of *Kiaeria blyttii*, as an admixture, herbarium TANAP in Tatranská Lomnica], 8.10.1976, det. P. Górski (POZNB 983).

*Marsupella brevissima* (Dumort.) Grolle ⇒ see under *Gymnomitrium brevissimum* (Dumort.) Warnst.

*Marsupella commutata* (Limpr.) Bernet ⇒ see under *Gymnomitrium commutatum* (Limpr.) Schiffn.

*Marsupella condensata* (Angstr. ex C. Hartm.) Lindb. ex Kaal.

**Distribution:** BT –; HT-SL 1680–2560 (63); HT-PL 1750–2255 (20); ZT-SL –; TZ-PL –.

**Max.** (new loc.) High Tatra Mts, SL, Štrbina pod Kotlovým štítom (ridge Malý Gerlach-Gerlachovský štít), 49°09.675'N, 20°08.159'E, alt. 2560 m, leg. P. Górski, 7.08.2013 (POZNB 1625, 1626).

**Min.** High Tatra Mts, SL, Temnosmrečinská dolina valley, near Nižné Temnosmrečinské pleso lake, alt. 1680 m, leg. J. Šmarda, det. J. Váňa (Duda & Váňa 1979a).

**Literature:** Szepesfalvy (1926), Szweykowski (1956d, e, 1957, 1960a, 2006), Šmarda (1961, 1976a), Duda & Váňa (1979a), Szweykowski & Klama (2010), Górski & Váňa (2011).

**Note:** One report of *Marsupella adusta* published by Šmarda (1961) is based on an erroneous identification and belongs to this species (rev. J. Váňa, see Duda & Váňa 1979a). Based on the literature there are five localities for *M. condensata* in the High Tatra Mts. The presented list includes 78 unpublished localities recorded by P. Górski.

**New localities:** High Tatra Mts, SL: Batizovská dolina valley, blocks of rock near SE shore of Pliesko pod Kostolikom lake, 49°09.618'N, 20°07.281'E and 49°09.670'N, 20°07.312'E, alt. 2045 m, 2055 m, leg. P. Górski, 1.08.2010 (POZNB 2/2010, 1/2010); Zlomisková dolina valley, Kotlina Lodového plesa basin, blocks of rock above S shore of Lodové pleso lake, 49°09.695'N, 20°06.380'E, alt. 2005 m, leg. P. Górski, 5.08.2010 (POZNB 16/2010); Štôlska dolina valley, lower part of the valley (near Tatranská magistrála route), blocks of rock, 49°08.936'N, 20°06.653'E, alt. 1935 m, leg. P. Górski, 10.08.2010 (POZNB 176); Spádová dolinka valley, SW part of the glacial cirque, blocks of rock below Mt Malé Rysy, alt. 2020 m, leg. P. Górski, 25.08.2009 (POZNB 65/2009); Svišňová (Bielovodská) dolina valley, blocks of rock below Zmarznutý kotel, 49°10.749'N, 20°08.381'E, alt. 2025m, leg. P. Górski, 26.09.2011 (POZNB 486).

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

**Distribution:** BT –; HT-SL 1100–2633 (119); HT-PL 1135–2192 (58); ZT-SL 800–2000 (32); TZ-PL 1075–2050 (18).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2633 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800–1000 m, leg. J. Duda, 15.09.1966 (Duda & Váňa 1981b).

**Literature:** Limpricht (1877a, b), Krupa (1878, 1882, 1888), Hazslinszky (1885), Szyszyłowicz (1885), Schiffner (1910, 1915), Lilienfeldowna (1914a, b), Szepesfalvy (1926, 1930b), Krajina (1933), Šmarda (1937b, 1938, 1944, 1961), Duda (1955a, 1962a), Szweykowski (1957, 1958a, c, 1960a, 1996, 2006), Rejment-Grochowska (1971), Duda & Váňa (1981b), Šoltés (1990), Blackburn et al. (1997), Cykowska (2006b, 2011), Školek (2009), Szweykowski & Klama (2010), Górski & Váňa (2011).

**New localities:** High Tatra Mts, SL: Spádová dolinka valley, boulder dripping water, alt. 1945 m, leg. P. Górski, 25.08.2009 (POZNB 325); Kolová dolina valley, SEE from Kolové pleso lake, rocky walls below Hrebeň Kolových veží ridge, 49°13.106'N, 20°11.663'E, alt. 1645 m, leg. P. Górski, 28.08.2010 (POZNB 256, 259); Kolová dolina valley, croos walls in upper glacial cirque, wet rocky walls, alt. 1690 m, leg. P. Górski, 1.09.2011 (POZNB 1122); Čierna Javorová dolina valley, Čierna záhrada, base of rocky walls at the mouth of Ladova dolinka valley, 49°12.411'N, 20°10.657'E, alt. 1660 m, 1670 m, 1640 m, leg. P. Górski, 25.08.2010 (POZNB 24/2010, 166, 167); Čierna Javorová dolina valley, Čierne mlaki, bottom of the upper kettle in the valley, 49°12.646'N, 20°11.130'E, alt. 1840 m, leg. P. Górski, 26.08.2010 (POZNB 169); Čierna Javorová dolina valley, on stone in spruce forest *Plagiothecio-Piceetum*, alt. 1415 m, leg. P. Górski, 25.08.2010 (POZNB 268); Suchá (Javorová) dolina valley, alt. 1860 m, leg. P. Górski, 18.08.2006 (POZNB 38/2006); Zlomisková dolina valley, Kotlina Lodového plesa, rocky walls above E shore of Lodové pleso lake, 49°09.775'N, 20°06.591'E, alt. 2010 m, leg. P. Górski, 6.08.2010 (POZNB 17/2010); Zlomisková dolina valley, on sub-glacially eroded step in the Kotlina Lodového plesa basin, near stream, 49°09.739'N, 20°06.244'E, alt. 1925 m, leg. P. Górski, 9.08.2011 (POZNB 648); Kačacia dolina valley, alt. 1645 m, leg. P. Górski, 22.08.2007 (POZNB 7/2007); Kačacia dolina valley, rocky walls below Kačaci žlab gully, alt. 1770 m, leg. P. Górski, 28.09.2013 (POZNB 1711); Kačacia dolina valley, Gierlachowskie Spady - upper (SE) part of the lower glacial cirque, alt. 1755 m, leg. P. Górski, 16.09.2009 (POZNB 77/2009); Kačacia dolina valley, blocks of rock with a northern exposure, alt. 1700 m, leg. P. Górski, 22.08.2007 (POZNB 31); Kačacia dolina valley, in gully descending from Mt Zlobivá, alt. 1700 m, leg. P. Górski, 22.08.2007 (POZNB 6/2007); Kačacia dolina valley, near Zelené Kačacie pleso lake, alt. 1675 m, leg. P. Górski, 17.08.2006 (POZNB 427); Kačacia dolina valley, upper part of the valley, alt. 1800 m, leg. P. Górski, 16.09.2009 (POZNB 313); Litvorová dolina valley, rocky outcrops E of Litvorové pleso lake, alt. 1880 m, 1940 m, 1990 m, leg. P. Górski, 17.08.2006 (POZNB 36/2006, 34/2006, 35/2006); sub-glacially eroded step in the Litvorová dolina valley, high rocky walls dripping water, 49°10.529'N, 20°07.357'E, alt. 1750 m, leg. P. Górski, 15.09.2009 (POZNB 316); Bielovodská dolina valley, above Poľana pod Vysokou glade, on stone near route, alt. 1295 m, leg. P. Górski, 22.08.2007 (POZNB 692); Bielovodská dolina valley, near Horoložecké táborisko, on stone in spruce forest *Plagiothecio-Piceetum sphagnetosum*, alt. 1305 m, leg. P. Górski, 15.09.2009 (POZNB 319); Hincova dolina valley, near NW shore of Veľké Hincovo pleso lake, small rocks with a northern exposure, alt. 1945 m, leg. P. Górski, 12.08.2008 (POZNB 702); Temnosmrečinská dolina valley, rock walls between Nižné Temnosmrečinské pleso lake and Vyšné Temnosmrečinské pleso lake, alt. 1700 m, leg. P. Górski, 30.07.2009 (POZNB 31/2009); Temnosmrečinská dolina valley, below Nižné Temnosmrečinské pleso, rocky walls near route, alt. 1670 m, leg. P. Górski, 30.07.2009 (POZNB 28/2009); Kôprová dolina valley, Rázcestie pod Temnými Smrečinami, on stone near route, alt. 1465 m, leg. P. Górski, 30.07.2009 (POZNB 311); Malá Studená dolina valley, lower kettle in the valley, near tourist path, 49°11.277'N, 20°12.231'E, alt. 1730 m, leg. P. Górski, 22.09.2010 (POZNB 240); Malá Studená dolina valley, at the sub-glacially eroded step in the upper kettle in the valley (Kotlina Piatich Spišských Plies valley), rocks dripping water near waterfall, 49°11.321'N, 20°12.045'E, alt. 1930 m, leg. P. Górski, 6.11.2010 (POZNB 262); Hincova dolina valley, rocky outcrops near NW shore of Veľké Hincovo

pleso lake, alt. 1940 m, leg. P. Górski, 12.08.2008 (POZNB 28/2008); Żabia (Mengusovská) dolina valley, blocks of rock N of shore of Veľké Žabie pleso Mengusovské lake, on boulder above water line, alt. 1890 m, leg. P. Górski, 13.08.2008 (POZNB 27); Mlynická dolina valley, wet rocky walls below Sedlo nad Skokom pass, alt. 1880 m, leg. P. Górski, 15.08.2008 (POZNB 28); Ťažká dolina valley, upper part of the lower kettle, blocks of rock blocks below Mt Pustá stráž, alt. 1825 m, leg. P. Górski, 26.08.2009 (POZNB 71/2009); Ťažká dolina valley, lower kettle, slab of rock dripping water, alt. 1715 m, leg. P. Górski, 26.08.2009 (POZNB 347); Ťažká dolina, lower kettle, above and SE of SE shore of Ťažké pleso lake, alt. 1660 m, leg. P. Górski, 24.08.2009 (POZNB 301); Veľka Studená dolina valley, rocky walls between Dlhé pleso lake and Vareškové pleso lake, alt. 1815 m, leg. P. Górski, 23.08.2007 (POZNB 14/2007); Veľka Studená dolina valley, filed rock on tourist path, alt. 1680 m, leg. P. Górski, 24.08.2007 (POZNB 440); Veľka Studená dolina valley, walls dripping water near path, alt. 1685 m, leg. P. Górski, 28.08.2007 (POZNB 691); Žabia Bielovodská dolina valley, rocky walls between Mlynárovo sedlo pass and Mt Veľký Žabi štít, alt. 1885 m, leg. P. Górski, 19.08.2009 (POZNB 53/2009); Žabia Bielovodská dolina valley, above SE shore of Vyšné Žabie Bielovodské pleso lake, on rocky wall dripping water, alt. 1730 m, leg. P. Górski, 21.09.2009 (POZNB 307); Žabia Bielovodská dolina valley, Nižne Žabie Bielovodské pleso lake, on stone near N shore of the lake, alt. 1675 m, leg. P. Górski, 14.08.2009 (POZNB 718); Žabia Bielovodská dolina valley, on stone near N shore of Nižne Žabie Bielovodské pleso lake, alt. 1675 m, leg. P. Górski, 14.08.2009 (POZNB 330); Žabia Bielovodská dolina valley, rocky walls dripping water above SE shore of Vyšné Žabie Bielovodské pleso lake, alt. 1730 m, leg. P. Górski, 21.09.2009 (POZNB 348); Zadná Javorová dolina valley, upper part of the valley, rocky outcrops, alt. 1690 m, leg. P. Górski, 18.08.2006 (POZNB 432); High Tatra Mts, PL: Dolina Gašienicowa valley, blocks of rock above W shore of Czarny Staw Gašienicowy lake, alt. 1650 m, leg. P. Górski, 31.07.2003 (POZNB 94/2003); Dolina Gašienicowa valley, below the ridge of Grzędy, backwater near Kotlinowy Stawek lake, SW of Zielony Staw lake, 49°13.831'N, 19°59.695'E, alt. 1690 m, leg. P. Górski, 30.06.2010 (POZNB 157); Dolina Gašienicowa valley, above Zmarzły Staw lake, on stone near stream, alt. 1830 m, leg. P. Górski, 21.08.2005 (POZNB 563); Dolina Gašienicowa valley, above Zmarzły Staw lake, below Dolinka Kozia valley, alt. 1805 m, leg. P. Górski, 21.08.2005 (POZNB 564); Dolina Gašienicowa valley, backwater south-west of Zielony Staw lake, on big, boulder dripping water, 49°13.908'N, 19°59.794'E, alt. 1635 m, leg. P. Górski, 30.06.2010 (POZNB 154); Dolina Gašienicowa valley, in the cirque below Mt Świnica, above Czerwone Stawki, Grzędy, below rocky walls on Mt Skrajna Turnia, alt. 1870 m, leg. P. Górski, 20.08.2005 (POZNB 19/2005); Dolina Pięciu Stawów Polskich valley, rocky walls below Marchwiczna Przełęcz pass, alt. 1810 m, leg. P. Górski, 26.07.2005 (POZNB 9/2005); Dolina Roztoki, near Wielka Siklawa waterfall, rocks splashed with water, alt. 1560 m, leg. P. Górski, 8.2005 (POZNB 402, 429, 430, 562); Dolina za Mnichem valley, rocky walls below Wrota Chałubińskiego pass, alt. 1850 m, leg. P. Górski, 16.08.2004 (POZNB 17/2004); Dolina za Mnichem valley, rocky outcrop above Stawki Staszica lakes, alt. 1835 m, leg. P. Górski, 20.09.2005 (POZNB 32/2005); Dolina za Mnichem valley, where the paths to Wrota Chałubińskiego and Szpiglasowa Przełęcz pass cross, wet wall, alt. 1785 m, leg. P. Górski, 16.08.2004 (POZNB 352); Dolina Rybiego Potoku valley, above Wodogrzmoty Mickiewicza waterfall, rocky walls near route to Morskie Oko lake, alt. 1135 m, leg. P. Górski, 15.09.2004 (POZNB 285); Dolina Rybiego Potoku valley, near Morskie Oko lake, on rock near route, alt. 1405 m, leg. P. Górski, 18.08.2004 (POZNB 565); above Morskie Oko lake, near route to Szpiglasowa Przełęcz pass, wet rocks, alt. 1500 m, leg. P. Górski, 16.08.2004 (POZNB 1084); Západné Tatry Mts, SL: Dolina Parichvost valley, at the mouth of the valley, on rocky wall splashed with water, in *Plagiothecio-Piceetum*, alt. 1050 m, 1055 m, leg. P. Górski, 16.07.2008 (POZNB 703, 406); Dolina Parichvost valley, below Baníkovské sedlo pass, alt. 1700 m, leg. P. Górski, 16.07.2008 (POZNB 103); Hlboká (Jalovecká) dolina valley, Vreče, rock walls below Mt Pachofa, alt. 1810, 1815 m, leg. P. Górski, 20.07.2008 (POZNB 719, 3/2008); Jamnická dolina valley, above Jamnické Pleso Nižne lake, alt. 1760 m, leg. P. Górski, 25.08.2008 (POZNB 30); Mt Brestová, below the summit, on stone, alt. 1760 m, leg. P. Górski, 23.07.2006 (POZNB 435); above Nižný Roháčsky Vodopád waterfall, on stone in backwater of a stream, near route, alt. 1400 m, leg. P. Górski, 24.07.2006 (POZNB 408); Roháčska dolina valley, rocky walls near Horné Roháčske pleso lake, alt. 1730 m, leg. P. Górski, 24.07.2006 (POZNB 21/2006); Roháčska dolina valley, in the cirque below Mt Brestová, alt. 1720 m, leg. P. Górski, 23.07.2006 (POZNB 16/2006); Tatry Zachodnie Mts, PL: Dolina Starorobociańska valley, Zadnie Zagony, alt. 1700 m, leg. P. Górski, 11.08.2004 (POZNB 12/2004, 13/2004); Dolina Wyznia Chochołowska, rocky walls below Mt Łopata, alt. 1715 m, leg. P. Górski, 12.08.2004 (POZNB 14/2004); W slopes on Mt Jarząbicy Wierch, alt. 1795 m, leg. P. Górski, 28.09.2006 (POZNB 436); Dolina Starorobociańska valley, on stone near route, alt. 1220 m, leg. P. Górski, 24.07.2009 (POZNB 353); near Toporowy Staw Niżni lake, on stone in spruce forest *Plagiothecio-Piceetum*, 49°16.960'N, 20°01.827'E, alt. 1075 m, leg. P. Górski, 28.09.2011 (POZNB 509).

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

**Distribution:** BT 1400–2148 (11); HT-SL 900–2390 (101); HT-PL 1212–2252 (23); ZT-SL 800–2200 (31); TZ-PL 1070–1870 (23).

**Max.** (new loc.) High Tatra Mts, SL, S slopes of Mt Kriváň, below the summit, 49°09.642'N, 20°00.069'E, alt. 2390 m, leg. P. Górski, 29.09.2013 (POZNB 1702).

**Min.** Západné Tatry Mts, SL, under Mt Baranec, alt. 800 m, leg. J. Duda (Duda 1955a).

**Literature:** Rehman (1864), Limpricht (1877a, b), Krupa (1882), Hazslinszky (1885), Szyszylowicz (1885), Schiffner (1911), Lilienfeldówna (1914a), Kulesza (1920), Pawłowski et al. (1928), Krajina (1933), Šmarda (1937b, 1938, 1940, 1961), Boros (1951), Duda (1955a), Szweykowski (1957, 1958a, c, 1960a, 2006), Boros et al. (1960), Pilous & Duda (1960), Boros & Vajda (1962), Duda & Váňa (1980c, 1983b), Peciar (1982), Šoltés (1984, 1989, 1992), Górski (2009a), Szweykowski & Klama (2010).

**Note:** *Marsupella funckii* was frequently misidentified. Available herbarium material from the Slovak Tatra Mts was revised by J. Váňa (for details see Duda & Váňa 1983b). The altitude of the locality for *M. funckii* in the Nefcerka valley (High Tatra Mts, SL, above Terianske pleso lake, in the direction of Ostrá-Hrubý vrch, alt. 1947–2437 m; see Szyszylowicz 1885) is too high because the altitudes of both of the peaks are lower.

**New localities:** High Tatra Mts, SL: Rovenky valley, Zadné Rovenky, 49°11.248'N, 20°09.094'E, alt. 1925 m, leg. P. Górski, 25.09.2011 (POZNB 496); Kolová dolina valley, above (SEE from) Kolové pleso lake, below rocky walls on the Hrebeň Kolových veži ridge, 49°13.106'N, 20°11.663'E, alt. 1645 m, leg. P. Górski, 28.08.2010 (POZNB 250); Nefcerka valley, above E shore of Nižné Terianske pleso lake, 49°10.109'N, 20°00.840'E, alt. 1965 m, leg. P. Górski, 2.08.2012 (POZNB 1299); Nefcerka valley, below Nižné Terianske pleso lake, near unmarked path, 49°10.546'N, 20°00.673'E, alt. 1940 m, leg. P. Górski, 4.08.2012 (POZNB 1311); Kolová dolina valley, on the sub-glacially eroded step in the upper kettle, 49°13.168'N, 20°11.901'E and 49°13.181'N, 20°11.858'E and 49°13.168'N, 20°11.901'E, alt. 1705 m, 1715 m, 1755 m, leg. P. Górski, 1.09.2011 (POZNB 579, 666, 578); Važecká dolina valley, western part of lower kettle in the valley, 49°09.190'N, 20°00.320'E, alt. 1865 m, leg. P. Górski, 11.08.2010 (POZNB 208); Važecká dolina valley, unmarked path from the ridge of Na Pavlou to Dolina Wažecka valley, alt. 1895 m, leg. P. Górski, 11.08.2010 (POZNB 182); Važecká dolina valley, Jamski Kocioľ (eastern part of lower belt in the valley), on stone near water, peat-bog, 49°09.228'N, 20°00.480'E, alt. 1900 m, leg. P. Górski, 11.08.2010 (POZNB 200); Čierna Javorová dolina valley, Čierne mlaki, upper kettle in the valley, on boulders dripping water, 49°12.616'N, 20°11.130'E, alt. 1840 m, leg. P. Górski, 26.08.2010 (POZNB 258); Čierna Javorová dolina valley, below Čierné Javorové pleso lake, on stone near route, alt. 1495 m, leg. P. Górski, 25.08.2010 (POZNB 720); Čierna Javorová dolina valley, rocky rubble on the sub-glacially eroded step in upper kettle, alt. 1635 m, leg. P. Górski, 25.08.2010 (POZNB 581); Zadná Javorová dolina valley, W part, alpine grassland near route, 49°11.835'N, 20°09.321'E, alt. 1620 m, leg. P. Górski, 17.11.2012 (POZNB 1430); Svišťová (Bielovodská) dolina valley, in the upper part of the valley, 49°10.866'N, 20°08.230'E, alt. 1975 m, leg. P. Górski, 26.09.2011 (POZNB 475); Žabia Bielovodská dolina valley, blocks of rock near SE shore of Vyšné Žabie Bielovodské pleso lake, alt. 1715 m, leg. P. Górski, 15.08.2009 (POZNB 57); Mengusovská dolina valley, below Mt Ostrva, near route to Popradské pleso lake, alt. 1870 m, leg. P. Górski, 10.08.2010 (POZNB 190); Furkotská dolina valley, blocks of rock near N shore of Nižné Wahlenbergovo pleso lake, 49°09.607'N, 20°01.516'E, alt. 2060 m, leg. P. Górski, 12.08.2010 (POZNB 201, 219); Furkotská dolina valley, rocky walls near S shore of Vyšné Wahlenbergovo pleso lake, alt. 2150 m, leg. P. Górski, 10.08.2008 (POZNB 21/2008); Tatranská Magistrala, E of Mt Ostrva, trail slope, alt. 1960 m, leg. P. Górski, 10.08.2010 (POZNB 212); Zlomisková dolina valley, on the sub-glacially eroded step in the lower belt of Drača dolinka valley, near waterfall, on stone, alt. 2005 m, leg. P. Górski, 5.08.2010 (POZNB 216); Temnosmrečinská dolina valley, rocky walls between Nižné Temnosmrečinské pleso lake and Vyšné Temnosmrečinské pleso lake, 49°11.428'N, 20°02.074'E, alt. 1705 m, leg. P. Górski, 22.07.2008 (POZNB 6/2008); Mlynická dolina valley, blocks of rock in the upper, NE part of the valley, below rocky walls on Mt Veľka Capia veža, alt. 2100 m, leg. P. Górski, 11.08.2008 (POZNB 25/2008); Mlynická dolina valley, in a gully coming down from the Sedlo nad Skokom pass, alt. 1835 m, leg. P. Górski, 15.08.2008 (POZNB 355); Mlynická dolina valley, rocks above Capie pleso lake, 49°10.067'N, 20°02.032'E, alt. 2035 m, leg. P. Górski, 31.07.2012 (POZNB 1160); Bielovodská dolina, above Polanka pod Aniolami glade, on stone near route, alt. 1220 m, leg. P. Górski, 26.08.2009 (POZNB 304); Temnosmrečinská dolina valley, between Nižné and Vyšné Temnosmrečinské pleso lake, on stone near route, alt. 1710 m, leg. P. Górski, 22.07.2008 (POZNB 356); E slope on Mt Huncovský štít, above route Skalnaté pleso–Veľká Svišťovka, alt. 1895 m, leg. P. Górski, 17.07.2011 (POZNB 633); Zlomisková dolina valley, on the step in the upper belt – Kotlina Eodového plesa, near stream, 49°09.739'N, 20°06.244'E, alt. 1925 m, leg. P. Górski, 9.08.2011 (POZNB 648); Žabia Bielovodská dolina valley, below Nižné Žabie Bielovodské pleso, on stone near route, 49°12.117'N, 20°05.724'E, alt. 1668 m, leg. P. Górski, 5.11.2010 (POZNB 688); Spadová dolinka valley, on a stone in stream, 49°11.204'N, 20°05.659'E, alt. 1980 m, leg. P. Górski, 25.08.2009, det. J. Váňa (POZNB 1491); Dolina

Kežmarskej Bielej vody valley, SW part of Dolina Zeleného plesa valley, above and SW of Zelené pleso lake, near entrance to Veľká Zmrzlá dolina valley, rocky walls and rocky fissures, 49°12.325'N, 20°12.965'E, alt. 1665 m, leg. P. Górski, 20.11.2012, det. J. Váňa (POZNB 1519); High Tatra, PL: Dolina za Mnichem valley, rocky rubble at the bottom of the valley, alt. 1790 m, leg. P. Górski, 12.09.2004, 27.09.2007 (POZNB 149, 37/2007); Dolina za Mnichem valley, W slope on Mt Mnich, 49°11.632'N, 20°03.167'E, alt. 1885 m, leg. P. Górski, 28.08.2012 (POZNB 1574); below Wrota Chałubińskiego pass, rocky walls, 49°11.564'N, 20°02.727'E, alt. 1980 m, leg. P. Górski, 28.08.2012 (POZNB 1754); Dolina Gašienicowa valley, above Czarny Staw Gašienicowy lake, below rocky walls on Mt Kościelec, alt. 1630 m, leg. P. Górski, 31.07.2003 (POZNB 932); Dolina Gašienicowa valley, near Kurtkowiec lake, 49°13.750'N, 20°00.144'E, alt. 1695 m, leg. P. Górski, 30.06.2010 (POZNB 206); Dolina Gašienicowa valley, below Zawrat pass, on stone, 49°13.334'N, 20°01.138'E, alt. 1890 m, leg. P. Górski, 8.08.2012 (POZNB 1157); Západné Tatry Mts, SL: Roháčska dolina valley, near route Ťatliakova chata-Rákoň, *Pogonato-Oligotrichetum*, alt. 1550 m, leg. P. Górski, 25.08.2008 (POZNB 689); Hlboká (Jalovecká) dolina valley, on route to Mt Salatín, alt. 1700 m, leg. P. Górski, 17.07.2008 (POZNB 127); Hlboká (Jalovecká) dolina valley, Vreca, alt. 1740 m, leg. P. Górski, 19.07.2008 (POZNB 274); Jamnícka dolina valley, near W shore of Jamnícke Pleso Vyšné lake, alt. 1830 m, leg. P. Górski, 25.08.2008 (POZNB 35/2008); Kamenistá dolina valley, in the cirque below Mt Blyšť, alt. 1845 m, leg. P. Górski, 29.08.2008 (POZNB 39/2008); Dolina Parichvost, upper part of the valley, below Baníkovske sedlo pass, trail slope, alt. 1875 m, leg. P. Górski, 16.07.2008 (POZNB 312); Kamenistá dolina valley, below Pyšné sedlo pass, trail slope, *Pogonato-Oligotrichetum*, alt. 1615 m, leg. P. Górski, 29.08.2008 (POZNB 345); Kobyła (below Mt Bystrá), 49°10.832'N, 19°50.962'E, alt. 1955 m, leg. P. Górski, 26.08.2011 (POZNB 452); on ridge S of Mt Bystrá, *Trifido-Distichetum salicetosum herbaceae*, 49°11.221'N, 19°50.727'E, alt. 2175 m, leg. P. Górski, 26.08.2011 (POZNB 618); Gáborova dolina valley, trail slope near Gáborov potok stream, 49°11.595'N, 19°49.846'E, alt. 1720 m, leg. P. Górski, 26.08.2011 (POZNB 665); Tatry Zachodnie Mts, PL: Dolina Tomanowa valley, trail slope near route to Tomanowa Przełęcz pass, alt. 1580 m, leg. P. Górski, 27.08.2008 (POZNB 315); Dolina Jarzabcza valley, near route to Mt Trzydniowiański Wierch, alt. 1420 m, leg. P. Górski, 27.09.2006 (POZNB 561); Dolina Wyżnia Chochołowska valley, near route to Mt Wołowiec, alt. 1385 m, leg. P. Górski (POZNB 983); Toporowy Staw Niżni lake, near N shore of the lake, on route, 49°17.044'N, 20°01.822'E, alt. 1070 m, leg. P. Górski, 28.09.2011 (POZNB 620); Cyrhla, leg., det. I. Rejment-Grochowska, 1954, conf. P. Górski (WA).

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

**Distribution:** BT –; HT-SL 1670–2000 (5); HT-PL 1760–1830 (2); ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, SL, N slopes of Mt Veľká Svišťovka, alt. 1800–2000 m, leg. A. Boros, det. L. Vajda sub *M. varians* and *M. sprucei* (Boros et al. 1960), rev. J. Váňa (Duda & Váňa 1978b).

**Min.** High Tatra Mts, SL, Temnosmrečinská dolina valley, near lakes, alt. 1670 m, leg. J. Šmarda, 6.07.1959, det. J. Váňa (Duda & Váňa 1978b).

**Literature:** Szweykowski (1956d, 1957, 1958a, 1960, 2006), Duda & Váňa (1978b), Szweykowski & Klama (2010).

**Note:** The reports of *Marsupella varians* and *M. sprucei* from the Mt Veľká Svišťovka (High Tatra Mts, SL) published by Boros et al. (1960) are based on erroneous identification and they belong to this species (rev. J. Váňa, see Duda & Váňa 1978b). The data presented by Szyszyłowicz (1885), Limpricht (1877a, b) and Szepesfalvy (1930b) are based on misidentification (see Kulesza 1920, Duda & Váňa 1978b).

**New locality:** High Tatra Mts, SL, Žabia Bielovodská dolina valley, wet rocky walls E of Vyšné Žabie Bielovodské pleso lake, alt. 1785 m, leg. P. Górski, 19.08.2009 (POZNB 310).

### *Marsupella sphaelata* (Giesecke ex Lindenb.) Dumort.

**Distribution:** BT –; HT-SL 1400–2400 (126); HT-PL 1430–1980 (29); ZT-SL 1400–1950 (10); TZ-PL 1380–1685 (3).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2400 m, leg. V. Schiffner, 1905 (Schiffner 1915).

**Min.** High Tatra Mts, SL, Koprová dolina valley, alt. 1400 m, leg. J. Szepesfalvy, 7.1914 (Szepesfalvy 1926); Západné Tatry Mts, SL, Žiarská dolina valley, alt. 1400 m, leg. J. Duda, 12.09.1966 (Duda & Váňa 1980c).

**Literature:** Limpricht (1877a, b), Krupa (1882), Hazslinszky (1885), Szyszyłowicz (1885), Lilienfeldówna (1914a), Schiffner (1915), Szepesfalvy (1926), Šmarda (1937b, 1938, 1940, 1961), Suza (1951), Duda (1955a, 1958, 1962a), Doignon (1956), Szweykowski (1956e, 1957, 1958a, 1960a, 2006), Rejment-Grochowska (1971), Duda & Váňa (1980c), Kubinská & Pišút (1982), Balcerkiewicz (1984), Háberová & Šoltésová (1989), Blackburn et al. (1997), Šoltés et al. (2006), Górski (2009a), Szweykowski & Klama (2010).

**Note:** The report of *Scapania compacta* published by Habsztlinszky (1860, 1865, 1885), Limpricht (1877a) and Szyszyłowicz (1885) is based on an erroneous identification and belongs to this species (rev. J. Duda, Duda & Váňa 1971a; rev. J. Váňa, Duda & Váňa 1980c). In the presented list, 35 unpublished localities recorded by P. Górski are included.

**New localities:** High Tatra Mts, SL: Batizovská dolina valley, Nižna Batizovská roveň, on the sub-glacially eroded step in the upper kettle, near Batizovská skúška, 49°09.595'N, 20°07.657'E, alt. 2135 m, leg. P. Górski, 2.08.2010 (POZNB 4/2010); Batizovská dolina valley, Vyšna Batizovská roveň, dripping rocks, *Polytrichetum norvegici*, 49°09.576'N, 20°07.663'E, alt. 2120 m, leg. P. Górski, 2.08.2010 (POZNB 183); Čierna Javorová dolina valley, Čierne mlaki, bottom of the upper kettle in the valley, 49°12.646'N, 20°11.130'E, alt. 1840 m, leg. P. Górski, 26.08.2010 (POZNB 169); Spádová dolinka valley, boulder dripping water, alt. 1945 m, 1950 m, leg. P. Górski, 25.08.2009 (POZNB 323, 324).

### *Marsupella sprucei* (Limpr.) Bernet

**Distribution:** BT 1800–1900 (3); HT-SL 1565–2570 (53); HT-PL 1380–2255 (18); ZT-SL 1705–2250 (8); TZ-PL 1470–2060 (15).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2570 m, leg. R. Šoltés, 8.10.1976 (Šoltés 1990).

**Min.** High Tatra Mts, PL, near E shore of Morskie Oko lake, alt. 1380 m, leg. J. Szweykowski, 28.08.1956 (Szweykowski 1960a).

**Literature:** Limpricht (1881), Szyszyłowicz (1885), Müller (1906–1911), Krajina (1933), Šmarda (1938, 1940, 1944, 1961, 1976a), Duda (1955a, 1958), Hadač (1956), Szweykowski (1956d, 1957, 1958a, 1960a, 2006), Šoltés (1990, 2002), Blackburn et al. (1997), Šoltés et al. (2006), Szweykowski & Klama (2010).

**Note:** One locality for *Marsupella sparsifolia* reported by Limpricht (1877a, b), Szyszyłowicz (1885) and Szepesfalvy (1930b) is based on an erroneous identification and belongs to this species (rev. J. Váňa, for details see Duda & Váňa 1979b). The reports of *M. sprucei* published by Boros et al. (1960) belong to *Marsupella sparsifolia* and those presented by Šmarda (1937b) belong to *Gymnomitron* (= *Marsupella*) *brevissimum* (all rev. J. Váňa, for details see Duda & Váňa 1979b).

**New localities:** High Tatra Mts, SL: Štrbina pod Kotlovým štítom (ridge Malý Gerlach-Gerlachovský štít), 49°09.675'N, 20°08.159'E, alt. 2560 m, leg. P. Górski, 7.08.2013 (POZNB 1635); S slope on Mt Kriváň, below the summit, alt. 2450 m, leg. P. Górski, 29.09.2013 (POZNB 1707); Veľká Zmrzlá dolina valley, upper glacial cirque (Barania kotlina basin), *Trifido-Distichetum* with *Polytrichum piliferum*, 49°12.123'N, 20°12.410'E, alt. 2025 m, leg. P. Górski, 27.09.2011 (POZNB 539); Veľká Zmrzlá dolina valley, blocks of rock in Barania kotlina basin, 49°12.229'N, 20°12.411'E, alt. 2015 m, leg. P. Górski, 27.09.2011 (POZNB 700); Nefcerka valley, above E shore of Nižné Terianske pleso lake, on stone, 49°10.128'N, 20°00.886'E, alt. 1947 m, leg. P. Górski, 2.08.2011 (POZNB 574); Štôlska dolina valley, lower part of the valley, above Tatranska Magistrala, blocks of rock, 49°08.936'N, 20°06.653'E, alt. 1935 m, leg. P. Górski, 10.08.2010 (POZNB 187); Žabia Bielovodská dolina valley, blocks of rock near W shore of Nižné Žabie Bielovodské pleso lake, 49°11.951'N, 20°05.548'E, alt. 1680 m, leg. P. Górski, 14.08.2009 (POZNB 53); Žabia Bielovodská dolina, near S shore of Vyšné Žabie Bielovodské pleso lake, on stone near route, alt. 1690 m, leg. P. Górski, 15.08.2009 (POZNB 306); Žabia Bielovodská dolina, near SE shore of Vyšné Žabie Bielovodské pleso, on stone, alt. 1720 m, leg. P. Górski, 15.08.2009 (POZNB 327); Zlomisková dolina valley, Kotlina Lodového plesa basin, rock walls above S shore of Lodové pleso lake, 49°09.725'N, 20°06.391'E, alt. 1980 m, leg. P. Górski, 5.08.2010 (POZNB 15/2010); Kačacia dolina valley, 49°10.551'N, 20°07.274'E, alt. 1685 m, leg. P. Górski, 15.09.2009 (POZNB 270); Kačacia dolina valley, upper glacial cirque (Želazny Ogród), blocks of rock below Východná Železná brána pass, alt. 2015 m, leg. P. Górski, 16.09.2009 (POZNB 144); Nefcerka valley, above W shore of Vyšné Terianske pleso lake, 49°10.100'N, 20°01.184'E, alt. 2130 m, leg. P. Górski, 2.08.2012 (POZNB 1172); Litvorová dolina valley, rocky walls below Mt Litvorový štít, alt. 1835 m, leg. P. Górski, 15.09.2009 (POZNB 72/2009); Dolina Kežmarskej Bielej vody valley, lower part of Skrajny Lendacki Žleb gully, alt. 1655 m, leg. P. Górski, 25.09.2007 (POZNB 48); Drača dolinka valley, blocks of rock S of Drače pleso lake, 49°09.886'N, 20°05.477'E, alt. 2035 m, leg. P. Górski, 5.08.2010 (POZNB 215); Kolová dolina valley, near N shore of Kolové pleso lake, 49°13.258'N, 20°11.553'E, alt. 1565 m, leg. P. Górski, 28.08.2010 (POZNB 279); Mengusovská dolina valley, below Mt Ostrva, near route to Popradské pleso lake, alt. 1885 m, leg. P. Górski, 10.08.2010 (POZNB 189); Mlynická dolina valley, near E shore of Pleso nad Skokom lake, alt. 1785 m, leg. P. Górski, 15.08.2008 (POZNB 129); Mlynická dolina valley, near Nižné Kozie pleso lake, alt. 1920 m, leg. P. Górski, 11.08.2008 (POZNB 322); Veľka Studená dolina valley, Dolinka nad Vareškovým Plesom valley, alt. 1850 m, 1860 m, leg. P. Górski, 23.08.2007 (POZNB 10/2007, 5); Temnosmrečinská dolina valley, between Nižné Temnosmrečinské pleso lake and Vyšné Temnosmrečinské pleso lake, on stone, alt. 1705 m, leg. P. Górski, 22.07.2008 (POZNB 131); High Tatra Mts, PL: Dolina Gašienicowa valley, glacial cirque below Mt Świnica, 49°13.455'N, 20°00.443'E, alt. 1845 m, leg. P. Górski, 20.09.2010

(POZNB 267); Dolina Gąsienicowa valley, above Zmarzły Staw Gąsienicowy lake, blocks of rock, alt. 1820 m, leg. P. Górski, 2.08.2004 (POZNB 340); Dolina Gąsienicowa valley, rocky walls below Mt Skrajna Turnia, alt. 1870, leg. P. Górski, 20.08.2005 (POZNB 40); Dolina za Mnichem valley, rocky walls below Wrota Chałubińskiego pass, alt. 1850 m, leg. P. Górski, 16.08.2004 (POZNB 18/2004, 296); below Mięszowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.044'N, 20°04.019'E, alt. 2255 m, leg. P. Górski, 2.09.2014 (POZNB 1903); Západné Tatry Mts, SL: on peak of Mt Veľká Kamenista, 49°11.720'N, 19°52.219'E, alt. 2115 m, leg. P. Górski, 4.08.2012 (POZNB 1158); ridge between Mt Blyšť and Mt Bystrá, in crevices, 49°11.405'N, 19°50.519'E, alt. 2190 m, leg. P. Górski, 23.09.2010 (POZNB 249); west of Mt Kamenista, above Pyšné sedlo pass, 49°11.786'N, 19°51.568'E, alt. 1865 m, leg. P. Górski, 25.08.2011 (POZNB 585); Roháčska dolina valley, rocky walls near Horné Roháčske pleso lake, alt. 1730 m, leg. P. Górski, 24.07.2006 (POZNB 21/2006); Tatry Zachodnie Mts, PL: NW slope on Mt Kamenista, rocky crevices, 49°11.777'N, 19°52.052'E, 49°11.781'N, 19°52.079'E, alt. 2045 m, 2055 m, leg. P. Górski, 4.08.2012 (POZNB 1147, 1148); Dolina Chochołowska valley, near route to Mt Grzeń, on stone in spruce forest *Plagiothecio-Piceetum*, alt. 1470 m, leg. P. Górski, 26.09.2006 (POZNB 130); upper part of Dolina Pyszniańska valley, below Pyszniańska Przełęcz pass, on stone, 49°11.913'N, 19°51.378'E, alt. 1655 m, leg. P. Górski, 9.2010 (POZNB 280).

*Mesoptychia badensis* (Gottsche) L. Söderstr. et Váňa [= *Lophozia badensis* (Gottsche) Jörg.]

**Distribution:** BT 1623–2154 (9); HT-SL –; HT-PL –; ZT-SL 1000–1700 (4); TZ-PL 1802–1830 (2).

**Max.** Belianske Tatry Mts, Mt Havran, alt. 2154 m, leg. J. Šmarda sub *Lophozia collaris*, 20.07.1937, rev. J. Váňa (Duda & Váňa 1990c).

**Min.** Západné Tatry Mts, SL, Juráňova dolina valley, alt. 1000 m, leg. V. Peciar (Peciar 1988).

**Literature:** Šmarda (1951, 1960a, 1961, 1976a), Szweykowski (1957, 1960a, 1996, 2006), Duda (1958), Pilous & Duda (1960), Stuchlý (1964), Lisowski (1966), Peciar (1988), Duda & Váňa (1990c), Szweykowski & Klama (2010).

**Note:** One locality for *Lophozia mülleri* published by Šmarda (1938) belongs to this species (rev. J. Váňa, Duda & Váňa 1990c). Data presented by Peciar (1985) refer to *Mesoptychia bantriensis* (rev. J. Váňa, Duda & Váňa 1990c).

*Mesoptychia bantriensis* (Hook.) L. Söderstr. et Váňa [= *Lophozia bantriensis* (Hook.) Jörg., *Mesoptychia collaris* (Nees) L. Söderstr. et Váňa, *Leiocolea collaris* (Nees) Schljakov, *Lophozia collaris* (Nees) Dumort.]

**Distribution:** BT 800–2148 (69); HT-SL 918–2000 (20); HT-PL 1199–2200 (8); ZT-SL 750–2120 (41); TZ-PL 894–1830 (60).

**Max.** (new loc.) High Tatra Mts, PL, below Mięszowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.044'N, 20°04.101'E, alt. 2200 m, leg. P. Górski, 2.09.2014 (POZNB 1898).

**Min.** Západné Tatry Mts, SL, Juráňova dolina valley, alt. 750–800 m, leg. V. Peciar sub *Lophozia badensis* (Peciar 1985), rev. J. Váňa (Duda & Váňa 1990c).

**Literature:** Limpricht (1877a, b), Krupa (1882, 1888), Hazslinszky (1885), Szyszłowicz (1885), Schiffler (1908b, 1911), Lilienfeldówna (1914a), Kulesza (1920), Krajina (1933), Šmarda (1937b, 1938, 1940, 1956, 1958, 1960a, c, 1961, 1976a, b), Duda (1955a), Szweykowski (1957, 1958a, c, 1960a, 2006), Boros et al. (1960), Pilous & Duda (1960), Šmarda et al. (1962, 1971), Stuchlý (1964), Rejment-Grochowska (1971), Balcerkiewicz & Brzeg (1978), Peciar (1981, 1982, 1988), Balcerkiewicz (1984), Unar et al. (1984–1985), Duda & Váňa (1991), Chudzińska et al. (2001), Szweykowski & Klama (2010).

**Note:** The locality for this species in the Mengusovská dolina valley (High Tatra Mts, SL, Šmarda 1961) belongs to *Lophozia ventricosa* (rev. J. Hubáčková, J. Váňa, Duda & Váňa 1991), as does the locality for *Lophozia badensis* cited by Peciar (1985, rev. J. Váňa, Duda & Váňa 1990c). The data given by Krajina (1933) for *Lophozia mülleri* are based on a misidentification (Váňa & Duda 1965). *Mesoptychia bantriensis* is here accepted in a broad sense (incl. *M. collaris* (Nees) L. Söderstr. et Váňa), like f.e. in the checklist of Czech bryophytes (Kučera et al. 2012). This concept has until now not generally been accepted, but unpublished molecular data does not clearly separate both taxa. Nearly all the specimens from the Tatra Mts belong to the phase “*M. collaris*” (growing mostly on basic rocks), and only nine to “*M. bantriensis*” (mainly wet places; Limpricht 1877a, b, Krupa 1882, 1888, Szyszłowicz 1885, Szweykowski 1958c, 1960a, Balcerkiewicz 1984, Chudzińska et al. 2001).

**New localities:** High Tatra Mts, SL: Dolina Kežmarskej Bielej vody valley, SW part of Dolina Zeleného plesa valley, above and SW of Zelené pleso lake, near entrance to Veľká Zmrzlá dolina valley, rocky fissures, mylonites,



49°12.325'N, 20°12.965'E, alt. 1665 m, leg. P. Górski, 20.11.2012 (POZNB 1335); Bielovodská dolina valley, calcareous boulder near route, alt. 1080 m, leg. P. Górski, 15.09.2009, det. J. Váňa (POZNB 1588); Javorová dolina valley, calcareous boulder near route in lower part of the valley, alt. 1260 m, leg. P. Górski, 18.08.2006 (POZNB 745); Kolová dolina valley, calcareous rocks in spruce forest, lower part of the valley, near unmarked path to the lake, 49°13.644'N, 20°11.039'E, alt. 1500 m, leg. P. Górski, 1.09.2011 (POZNB 884); Belianske Tatry Mts: Dolina Hučava valley, middle part, calcareous rocks near stream, 49°13.190'N, 20°18.479'E, alt. 925 m, leg. P. Górski, 19.11.2012 (POZNB 1421); Dolina pod Košiare valley, calcareous rocks in lower part of Veľký Košiar, 49°14.488'N, 20°15.040'E, alt. 1285 m, leg. P. Górski, 27.06.2012 (POZNB 1292); Dolina pod Košiare valley, slightly above the junction of a stream coming from Jahňacia dolina valley with the Tokársky potok stream, calcareous rocks, 49°14.894'N, 20°15.548'E, alt. 1030 m, leg. P. Górski, 27.06.2012 (POZNB 1276); lower part of Tristarský žľab gully, shaded calcareous rocks in spruce forest, 49°15.444'N, 20°12.747'E, alt. 1210 m, leg. P. Górski, 25.06.2012 (POZNB 1175, 1267); Žltý žľab gully, upper part of the gully, calcareous rocks, 49°15.595'N, 20°12.633'E, alt. 1155 m, leg. P. Górski, 19.11.2012 (POZNB 1398); gully descending from Mt Nižný Havran, above SE part of Stará poľana glade, calcareous outcrops, 49°15.429'N, 20°11.858'E, alt. 1440 m, leg. P. Górski, 24.06.2012 (POZNB 1222); Tatry Zachodnie Mts, PL: between Chlabówka and Cyrhla, calcareous rocks in forest, near Droga Oswalda Balzera road, 49°16.998'N, 20°00.639'E, alt. 965 m, leg. P. Górski, 16.11.2012 (POZNB 1365); Dolina Chochołowska valley, Wyznia Chochołowska Brama, calcareous rocks near Schronisko Blaszyńskich hut, *Carici-Festucetum tatrae*, alt. 1040 m, leg. P. Górski, 8.08.2004 (POZNB 812); Dolina ku Dziurze valley, near Jaskinia Dziura cave, calcareous rocky walls, 49°16.309'N, 19°56.575'E, alt. 1005 m, leg., det. P. Górski, 21.11.2011, conf. J. Váňa (POZNB 963); Dolina Lejowa valley, calcareous rocks at mouth of the valley, 49°16.181'N, 19°50.537'E, alt. 965 m, leg. P. Górski, 20.11.2011 (POZNB 832, 834); Dolina Lejowa valley, above Polana Huty Lejowe glade, slope trail, 49°15.481'N, 19°51.185'E, alt. 1050 m, leg., det. P. Górski, 20.11.2011, conf. J. Váňa (POZNB 821); Dolina Stražyska valley, calcareous rocks at mouth of the valley, 49°16.255'N, 19°55.937'E, alt. 990 m, leg. P. Górski, 21.11.2011 (POZNB 956); Dolina za Bramką valley (at the end accessible to tourists), *Caricetum firmae*, 49°16.337'N, 19°55.022'E, alt. 970 m, leg., det. P. Górski, 21.11.2011, conf. J. Váňa (POZNB 958); Dolina za Bramką valley, shaded calcareous rocks in spruce forest, 49°16.494'N, 19°54.971'E, alt. 990 m, leg. P. Górski, 21.11.2011 (POZNB 959); Dolina za Bramką valley, calcareous rocky walls in lower part of the valley, 49°16.593'N, 19°55.174'E, alt. 915 m, leg. P. Górski, 21.11.2011 (POZNB 961); Kobylarzowy Żleb pod Małołączniakiem gully, lower part of the gully, 49°14.602'N, 19°54.428'E, alt. 1540 m, leg. P. Górski, 22.11.2011, det. J. Váňa (POZNB 1587); Kobylarzowy Żleb pod Małołączniakiem gully, upper part of the gully, 49°14.668'N, 19°54.757'E, alt. 1760 m, leg. P. Górski, 22.11.2011 (POZNB 849); Kobylarzowy Żleb pod Małołączniakiem gully, upper part of the gully, *Caricetum firmae*, 49°14.632'N, 19°54.649'E, alt. 1700 m, leg. P. Górski, 22.11.2011 (POZNB 837, 841); lower part of the Staników Żleb gully, calcareous rocks near stream, 49°16.168'N, 19°52.805'E, alt. 1075 m, leg. P. Górski, 22.11.2011 (POZNB 955); SW part of Polana Kalatówki glade, shaded calcareous rocks in spruce forest, 49°15.419'N, 19°57.754'E, alt. 1265 m, leg., det. P. Górski, 24.11.2011, conf. J. Váňa (POZNB 876); Żleb Zabijak gully (upper part of the Dolina Lejowa valley), middle part of the gully, 49°15.065'N, 19°50.960'E and 49°15.027'N, 19°50.934'E, alt. 1210 m, 1225 m, leg. P. Górski, 20.11.2011 (POZNB 950, 962, 972); Żleb Zabijak gully (upper part of the Dolina Lejowa valley), lower part of the gully, 49°15.157'N, 19°50.989'E and 49°15.103'N, 19°50.978'E, alt. 1145 m, 1180 m, leg. P. Górski, 20.11.2011 (POZNB 835, 936, 952); Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, calcareous outcrops in the middle part of the gully, 49°16.566'N, 19°46.396'E, alt. 890 m, leg. P. Górski, 30.09.2013 (POZNB 1675).

*Mesoptychia heterocolpos* (Thed. ex Hartm.) L. Söderstr. et Váňa [= *Lophozia heterocolpos* (Thed. ex Hartm.) M. Howe]

**Distribution:** BT 1380–2148 (7); HT-SL 1500–1950 (5); HT-PL 1735–2020 (3); ZT-SL 1300–1500 (2); TZ-PL 1140–1860 (11).

**Max.** Belianske Tatry Mts, N slope of Mt Ždiarska Vidla, alt. 2000–2148 m, leg. J. Szweykowski, 8.07.1957 (Szweykowski 1960a).

**Min.** Tatry Zachodnie Mts, PL, Wantule, alt. 1140 m, leg. J. Szweykowski, 16.09.1955 (Szweykowski 1956c).

**Literature:** Szweykowski (1956c, 1957, 1960a, 2006), Duda & Váňa (1989c), Balcerkiewicz et al. (2001), Szweykowski & Klama (2010).

**Note:** Three localities for *Leiocolea bantriensis* and *L. collaris* published by Šmarda (1961) are based on an erroneous identification and belong to this species (rev. J. Váňa, see Duda & Váňa 1989c, 1991). The data given by Kosiński (1999, one locality) based on phytocoenoses of *Luzuletum alpino-pilosae* are unreliable (no herbarium material).

**New localities:** Belianske Tatry Mts, above SE part of Stará poľana glade, gully descending from Mt Nižny Havran, calcareous outcrops, 49°15.467'N, 20°11.908'E, alt. 1380 m, leg. P. Górski, 24.06.2012 (POZNB 1242); High Tatra Mts, SL, Kôprovnicva valley, upper part, rocks below Mt Krížne, 49°11.128'N, 19°57.466'E, alt. 1735 m, leg. P. Górski, 29.08.2014 (POZNB 1853); Tatry Zachodnie Mts, SW part of Polana Kalatówki glade, high calcareous walls in spruce forest, at the mouth of Kalackie Koryto gully, 49°15.419'N, 19°57.754'E, alt. 1265 m, leg. P. Górski, 24.11.2011 (POZNB 935).

### *Metzgeria conjugata* Lindb.

**Distribution:** BT 1200–1360 (11); HT-SL Id (2); HT-PL –; ZT-SL 800–1300 (9); TZ-PL 854–1200 (16).

**Max.** Belianske Tatry Mts, Červená hlina, alt. 1360 m, leg. M. Vondráček, 8.1956 (Duda & Váňa 1989a).

**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Duda, J. Váňa, 15.09.1966 (Duda & Váňa 1989a).

**Literature:** Limpricht (1877a, b), Szyszyłowicz (1885), Duda (1955a, 1958), Szweykowski (1957, 1958a, 1968), Šmarda (1958, 1961), Šmarda et al. (1962), Hadač et al. (1969a), Peciar (1985), Duda & Váňa (1989a), Blackburn et al. (1997), Szweykowski & Klama (2010), Zubel et al. (2011).

**New localities:** Západné Tatry Mts, SL: Juráňova dolina valley, Tiesňavy, calcareous outcrops in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1659); Jalovecká dolina valley, on bark of *Acer pseudoplatanus*, near route to Mt Babky, alt. 1120, leg. P. Górski, 19.07.2008 (POZNB 924); Tatry Zachodnie Mts, PL: Dolina Lejowa valley, small calcareous rocks near the mouth of the valley, 49°16.181'N, 19°50.537'E, alt. 965 m, leg. P. Górski, 20.11.2011 (POZNB 833); Dolina ku Dziurze valley, near Jaskinia Dziura cave, at the end accessible to tourists, 49°16.318'N, 19°56.549'E, alt. 1005 m, leg. P. Górski, 21.11.2011 (POZNB 985); Dolina za Bramką valley, shaded high rocky walls in spruce forest, above (W) the main valley path, 49°16.494'N, 19°54.971'E, alt. 990 m, leg. P. Górski, 21.11.2011 (POZNB 986); Dolina za Bramką valley, at the end accessible to tourists (end of the path), 49°16.337'N, 19°55.022'E, alt. 970 m, leg. P. Górski, 21.11.2011 (POZNB 987).

### *Metzgeria furcata* (L.) Dumort.

**Distribution:** BT 1000–1400 (37); HT-SL 1100–1535 (3); HT-PL –; ZT-SL 800–1300 (7); TZ-PL 960–1140 (6).

**Max.** High Tatra Mts, SL, Mt Patria (above Mengusovská dolina valley), alt. 1535 m, leg. A. Zlatník, 1964, det. J. Duda (Duda & Váňa 1989b).

**Min.** Západné Tatry Mts, SL, Račkova dolina valley, at the mouth, alt. 800 m, leg. J. Šmarda, 7.1936 (Duda & Váňa 1989b).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1885), Rehman (1864), Fritze & Ilse (1870), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Schiffner (1911), Suza (1937b), Duda (1955a, 1958), Szweykowski (1957, 1958a, 1960a, 1968), Šmarda (1958, 1961, 1976a), Ježek & Vondráček (1962), Šmarda et al. (1962, 1971), Mickiewicz (1965), Hadač et al. (1969a), Duda & Váňa (1989b), Szweykowski & Klama (2010).

**New localities:** Západné Tatry Mts, SL, Jalovecká dolina valley, Bobrovecká hora, near route to Mt Babky, on bark, alt. 1115 m, leg. P. Górski, 19.07.2008 (POZNB 807); Belianske Tatry Mts: N slope on Mt Malý vrch, on bark of *Acer pseudoplatanus*, 49°16.014'N, 20°10.870'E, alt. 1185 m, leg. P. Górski, 26.06.2012 (POZNB 1220); Havrania dolina valley, mouth of the valley, on bark of *Acer pseudoplatanus*, 49°16.269'N, 20°10.922'E, alt. 1080 m, leg. P. Górski, 26.06.2012 (POZNB 1240).

### *Metzgeria pubescens* (Schrank) Raddi [= *Apometzgeria pubescens* (Schrank) Kuwah.]

**Distribution:** BT 1000–2148 (47); HT-SL 1080–1980 (11); HT-PL 1025–2110 (3); ZT-SL 900–1610 (13); TZ-PL 893–1980 (40).

**Max.** Belianske Tatry Mts, Mt Ždiarska Vidla, alt. 2148 m (Šmarda 1938, Szweykowski 1960a).

**Min.** Tatry Zachodnie Mts, PL, Dolina Stražyska valley, alt. 893 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Literature:** Hazslinszky (1859, 1860), Fritze & Ilse (1870), Limpricht (1877a), Krupa (1878), Szyszyłowicz (1885), Schiffner (1909b), Györfly (1911), Szafer et al. (1927), Šmarda (1936, 1937b, 1938, 1958, 1960a, 1961, 1976a), Duda (1955a, 1958, 1962a, 1965), Szweykowski (1956e, 1957, 1958a, 1960a, 1962, 1996, 2006), Ježek & Vondráček (1962), Šmarda et al. (1962), Mickiewicz (1965), Lisowski (1966), Rejment-Grochowska (1966), Hadač et al. (1969a), Šmarda et al. (1971), Šoltés (1976), Balcerkiewicz & Brzeg (1978), Peciar (1981, 1982), Duda & Váňa (1988a), Šoltés (1990), Blackburn et al. (1997), Cykowska (2008), Klama (2008), Szweykowski & Klama (2010).

**New localities:** Belianske Tatry Mts: Dolina pod Košiare valley, calcareous rocks in lower part of Veľký Košiar, 49°14.439'N, 20°14.948'E, alt. 1380 m, leg. P. Górski, 27.06.2012 (POZNB 1230); valley of the Čierny potok stream, below rocks on Biela stena (near unmarked route to Stará poľana glade), calcareous rocks, 49°16.077'N, 20°11.780'E, alt. 1060 m, leg. P. Górski, 24.06.2012 (POZNB 1200); gully descending from Mt Nižny Havran, above SE part of Stará poľana glade, calcareous rocks, 49°15.467'N, 20°11.908'E, alt. 1380 m, leg. P. Górski, 24.06.2012 (POZNB 1241); Havrania dolina valley, lower part of Novy žľab gully, 49°15.951'N, 20°11.154'E, alt. 1225 m, leg. P. Górski, 26.06.2012 (POZNB 1257); lower part of Tristarský žľab gully, shaded calcareous rocks in spruce forest, 49°15.444'N, 20°12.747'E, alt. 1210 m, leg. P. Górski, 25.06.2012 (POZNB 1269); Dolina pod Košiare valley, slightly above the junction of the stream from Jahňacia dolina valley with the Tokársky potok stream, calcareous rocks, 49°14.894'N, 20°15.548'E, alt. 1030 m, leg. P. Górski, 27.06.2012 (POZNB 1274); Žltý žľab gully, upper part of the gully, calcareous rocks, 49°15.595'N, 20°12.633'E, alt. 1155 m, leg. P. Górski, 19.11.2012 (POZNB 1399); Havrania dolina valley, Havrania rovien, small rocks on the step in the upper part of the valley, 49°15.379'N, 20°11.301'E, alt. 1460 m, leg. P. Górski, 26.06.2012 (POZNB 1617); High Tatra Mts, SL: Javorová dolina valley, below Javorová poľana glade, calcareous rocky boulder near route, *Plagiothecio-Piceetum*, alt. 1260 m, leg. P. Górski, 18.08.2006 (POZNB 369); Zadné Medodoly valley, Bránka, 49°14.303'N, 20°11.122'E, alt. 1205 m, leg. P. Górski, 22.10.2010 (POZNB 746); Bielowodská dolina valley, above and S of Bielowodská poľana glade, calcareous rocky boulder near route, alt. 1080 m, leg. P. Górski, 15.09.2009 (POZNB 826); Tatry Zachodnie Mts, PL: Dolina Lejowa valley, calcareous outcrops at the mouth of the valley, 49°16.633'N, 19°50.965'E, alt. 935 m, leg. P. Górski, 20.11.2011 (POZNB 782); Kobylarzowy Żleb pod Małolączniakiem gully, upper part, calcareous outcrops with northern exposure, 49°14.668'N, 19°54.757'E, alt. 1760 m, leg. P. Górski, 22.11.2011 (POZNB 856); Dolina Stražyska valley, calcareous outcrops at the mouth of the valley, 49°16.255'N, 19°55.937'E, alt. 990 m, leg. P. Górski, 21.11.2011 (POZNB 866); Żleb Zabijak gully (upper part of the Dolina Lejowa valley), shaded calcareous rocky walls, 49°15.103'N, 19°50.978'E, alt. 1180 m, leg. P. Górski, 20.11.2011 (POZNB 869); SW part of Polana Kalatówki glade, shaded calcareous rocks in spruce forest, mouth of Kalackie Koryto gully, 49°15.419'N, 19°57.754'E, alt. 1265 m, leg. P. Górski, 24.11.2011 (POZNB 873); between Chłabówka and Cyrhla, calcareous rocks in forest, near Droga Oswalda Balzera road, 49°16.998'N, 20°00.639'E, alt. 965 m, leg. P. Górski, 16.11.2012 (POZNB 1363); Dolina Stražyska valley, gully below (N) Skała Jelinka rock, 49°16.162'N, 19°55.899'E, alt. 995 m, leg. P. Górski, 21.11.2011 (POZNB 1595); Staników Żleb gully, shaded calcareous rocky walls in spruce forest, near stream, 49°16.168'N, 19°52.805'E, alt. 1075 m, leg. P. Górski, 22.11.2011 (POZNB 1599, 1607); Polana na Stołach glade, calcareous rocks in meadows, 49°14.977'N, 19°51.362'E, alt. 1340 m, leg. P. Górski 20.11.2011 (POZNB 1606); Západné Tatry Mts, SL: Jaloviecká dolina valley, Bobrovecká hora, near route to Mt Babky, alt. 1115 m, leg. P. Górski, 19.07.2008 (POZNB 808); Juráňova dolina valley, Válovec, calcareous outcrops in forest, 49°15.344'N, 19°46.812'E, alt. 1270 m, leg. P. Górski, 30.09.2013 (POZNB 1676); S slope on Mt Osobitá, exposed calcareous outcrops above Sedlo pod Osobitou pass, 49°15.561'N, 19°43.313'E, 49°15.606'N, 19°43.273'E, alt. 1555 m, 1610 m, leg. P. Górski, 1.10.2013 (POZNB 1681, 1688, 1696).

### *Metzgeria violacea* (Ach.) Dumort.

**Distribution:** BT –; HT-SL 1d (1); HT-PL –; ZT-SL –; TZ-PL 960 (2).

**Published localities:** High Tatra Mts, SL, precise location not given, leg. V. Gresčík, 4.1883, det. J. Duda (Duda 1965, Duda & Váňa 1988b); Tatry Zachodnie Mts, PL, Dolina Olczyckiego Potoku valley, precise location not given (Mickiewicz 1965).

**Literature:** Szweykowski (1957, 1968, 2006), Duda (1965), Mickiewicz (1965), Rejment-Grochowska (1966), Duda & Váňa (1988b), Szweykowski & Klama (2010).

**Note:** The localities for this species published by Szyszyłowicz (1885) belong to *Metzgeria furcata* (Szweykowski 1968, 2006).

**New locality:** Tatry Zachodnie Mts, PL, between Chłabówka and Cyrhla, close to Chłabówka, on bark of *Fagus sylvatica*, forest near Droga Oswalda Balzera road, 49°17.030'N, 20°00.431'E, alt. 960 m, leg., det. P. Górski, 16.11.2012, conf. J. Váňa (POZNB 1386).

### *Moerckia blytii* (Moerch) Brockm.

**Distribution:** BT 1200 (1); HT-SL 1670–2095 (30); HT-PL 1440–2005 (20); ZT-SL 1530–1720 (6); TZ-PL 1600 (2).

**Max.** High Tatra Mts, SL, Mlynická dolina valley, Mt Malé Solisko, alt. 2095 m, leg. V. Krajina, 20.08.1932, *Geetum montani*, table 22, relevé 5 (Krajina 1933).

**Min.** Belianske Tatry Mts, Dolina Siedmich prameňov valley, alt. 1200 m, leg. J. Šmarda (Šmarda 1961, Šmarda et al. 1962).

**Literature:** Krupa (1882, 1888), Szyszyłowicz (1885), Lilienfeldówna (1910), Szepesfalvy (1926), Krajina (1933), Boros (1941), Hadač (1956), Szweykowski (1956e, 1957, 1958a, c, 1960a, 1966, 2006), Duda (1958), Šmarda (1961, 1976b), Šmarda et al. (1962), Váňa & Duda (1965), Rejment-Grochowska (1966, 1971), Duda & Váňa (1968), Blackburn et al. (1997), Šoltés & Ciriaková (2010), Szweykowski & Klama (2010).

**Note:** Thirty six unpublished localities recorded by P. Górski were included in the list presented.

**New localities:** Západné Tatry Mts, SL: upper part of Kamienistá dolina valley, where the stream descending from the ridge of Kobyla joins the Kamienistý potok stream, 49°11.294'N, 19°51.400'E alt. 1710 m, leg. P. Górski, 29.08.2008 (POZNB 99); Jamnícka dolina valley, near W shore of Jamnícke Pleso Nižne lake, alt. 1720 m, leg. P. Górski, 25.08.2008 (POZNB 36/2008).

### *Moerckia flotowiana* (Nees) Schiffn.

**Distribution:** BT 1100–1600 (5); HT-SL 1400 (1); HT-PL –; ZT-SL –; TZ-PL 1d (1).

**Max.** Belianske Tatry Mts, Skalné vráta, alt. 1600 m, leg. A. Vězda, 15.08.1947, det. J. Váňa (Duda & Váňa 1968), leg. J. Szweykowski, 18.07.1956 (Szweykowski 1960a), leg. J. Šmarda (Šmarda 1961, Šmarda et al. 1962).

**Min.** Belianske Tatry Mts, Ždiar, Spod Šiky, alt. 1100 m, leg. J. Šmarda (Šmarda 1961).

**Literature:** Lilienfeldówna (1911, 1914a), Szweykowski (1957, 1958a, 1960a, 2006), Šmarda (1960a, 1961, 1976a), Šmarda et al. (1962), Duda & Váňa (1968), Szweykowski & Klama (2010).

**Note:** Probably all reports for the Tatra Mts belong to this species, not to *M. hibernica* (Hook.) Gottsche. Both taxa were correctly separated only recently (Crandall-Stotler & Stotler 2007).

### *Mylia anomala* (Hook.) Gray

**Distribution:** BT –; HT-SL 1350–1820 (23); HT-PL 1450–1860 (9); ZT-SL 1650–1750 (4); TZ-PL 965–1800 (8).

**Max.** (new loc.) High Tatra Mts, PL, Dolina Waksmundzka valley, slope of Mt Koszysta, *Polytrichum-Sphagnum* hummock, alt. 1860 m, leg. P. Górski, 22.08.2005 (POZNB 428).

**Min.** Tatry Zachodnie Mts, PL, Polana Molkówka glade, peat-bog, alt. 965 m, leg. J. Szweykowski, 19.08.1956 (Szweykowski 1960a).

**Literature:** Limpricht (1877a, b), Szyszyłowicz (1885), Schiffner (1909b), Lilienfeldówna (1914a), Györfly (1924), Krajina (1933), Šmarda (1938, 1961, 1976a), Szweykowski (1957, 1958a, 1960a, 1964, 2006), Váňa & Duda (1965), Hadač et al. (1969b), Kubička (1969), Duda & Váňa (1973a), Wojterski et al. (1978), Duda (1983), Cykowska (2006b, 2011), Pukajová et al. (2006), Šoltés et al. (2006), Šoltés & Školek (2010), Szweykowski & Klama (2010).

**Note:** One locality for *Mylia taylorii* published by Hazslinszky (1865) belongs to this species (rev. J. Váňa, Duda & Váňa 1973a).

**New localities:** Západné Tatry Mts, SL, upper, S part of Látaná dolina valley, below Sedlo Zábrať pass, *Polytrichum-Sphagnum* hummock, alt. 1650 m, leg. P. Górski (POZNB 899, 989); High Tatra Mts, SL: Ťažká dolina valley, upper part of the lower glacial cirque, blocks of rock below Mt Pustá stráž, *Polytrichum-Sphagnum* hummock, alt. 1785 m, leg. P. Górski, 24.08.2009 (POZNB 730); Veľka Studená dolina valley, above Vareškové pleso lake, alt. 1780 m, leg. P. Górski, 23.08.2007 (POZNB 693); Temnosmrečinská dolina valley, between Nižné Temnosmrečinské pleso lake and Vyšné Temnosmrečinské pleso lake, peat-bog, alt. 1705 m, leg. P. Górski, 30.07.2009 (POZNB 687); Dolina Bielych plies valley, Trojrohé pleso lake, 49°13.166'N, 20°13.810'E, peat-bog, alt. 1615 m, leg. P. Górski, 20.11.2012 (POZNB 1428); High Tatra Mts, PL: Dolina Gąsienicowa valley, Las Gąsienicowy forest, forest peat-bog, alt. 1450 m, leg. P. Górski, 19.08.2005 (POZNB 990); Dolina Pięciu Stawów Polskich valley, below Mt Kotelnica, 49°12.277'N, 20°01.171'E, alt. 1850 m, *Polytrichum-Sphagnum* hummock, leg. P. Górski, 23.08.2012 (POZNB 1751).

### *Mylia taylorii* (Hook.) Gray

**Distribution:** BT 850–1700 (58); HT-SL 980–2450 (115); HT-PL 935–1950 (62); ZT-SL 750–2060 (34); TZ-PL 955–2000 (29).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2200–2450 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horničková (Peciar 1981).

**Literature:** Rehman (1864), Hazslinszky (1865, 1885), Fritze & Ilse (1870), Limpricht (1877a), Krupa (1882), Szyszyłowicz (1885), Schiffner (1909b, 1911), Lilienfeldówna (1910), Györfly (1924), Szafer et al. (1927), Šmarda (1937b, 1938, 1944, 1958, 1961), Svoboda (1939), Boros (1951), Duda (1955a, 1958, 1962a), Doignon (1956), Szweykowski (1957, 1958a, c, 1960a, 1964), Wojterski (1957), Boros et al. (1960), Ježek & Vondráček (1962), Šmarda et al. (1962), Váňa & Duda (1965), Lisowski (1966), Hadač et al. (1969a), Duda & Váňa (1971c,

1973a), Rejment-Grochowska (1971), Wojterski et al. (1978), Peciar (1981, 1985), Kubinská & Pišút (1982), Balcerkiewicz (1984), Háberová & Šoltésová (1989), Šoltés (1989, 1990), Blackburn et al. (1997), Wojterska et al. (2004), Cykowska (2006b, 2011), Klama (2008), Szweykowski & Klama (2010).

**New localities:** Tatry Zachodnie Mts, PL, Dolina Wielkie Koryciska valley, in undergrowth in *Polystichum-Piceetum*, alt. 955 m, leg. P. Górski, 18.09.2005 (POZNB 695); Západné Tatry Mts, SL, Račkova dolina valley, Račkov Zadok, glacial cirque below Mt Jakubíná, 49°11.901'N, 19°48.153'E, alt. 1815 m, leg. P. Górski, 6.08.2012 (POZNB 1493); High Tatra Mts, PL, Dolina Rostoki valley, Wodogrzmoty Mickiewicza waterfall, 49°14.012'N, 20°05.321'E, alt. 1175 m, leg. P. Górski, 26.08.2012 (POZNB 1479); Belianske Tatry Mts: Havrania dolina valley, lower part of Nový žľab gully, 49°15.951'N, 20°11.154'E, alt. 1225 m, leg. P. Górski, 26.06.2012 (POZNB 1253, 1259, 1260); Žltý žľab gully, upper part of the gully, decaying log near stream, 49°15.595'N, 20°12.633'E, alt. 1155 m, leg. P. Górski, 19.11.2012 (POZNB 1406); N slope on Mt Malý vrch, 49°15.999'N, 20°10.982'E, alt. 1205 m, leg. P. Górski, 26.06.2012 (POZNB 1191); valley of the Čierny potok stream, near Čierny potok stream, 49°16.033'N, 20°11.702'E, alt. 1051 m, leg. P. Górski, 24.06.2012 (POZNB 1184); Dolina Podspádska valley, middle part, small valley of a stream flowing south from Podspádski potok stream, decaying log, 49°16.284'N, 20°12.048'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1357).

### *Nardia breidleri* (Limpr.) Lindb.

**Distribution:** BT –; HT-SL 1550–2024 (5); HT-PL 1778–1850 (6); ZT-SL –; TZ-PL –.

**Max.** (new loc.) High Tatra Mts, SL, Kotlina Piatich Spišských Plies valley, near NE shore of Vyšné Spišské pleso lake, 49°11.681'N, 20°11.813'E, alt. 2024 m, leg. P. Górski, 22.09.2010 (POZNB 236).

**Min.** High Tatra Mts, SL, Dolina Kežmarskej Bielej vody valley, near Zelené pleso lake, alt. ca 1550 m (Schiffner 1910, 1911; Györfy 1924; Duda & Váňa 1971a); at this locality *N. breidleri* was collected many times, first by I. Györfy (6.08.1909, 14.07.1910, 16.08.1915), later by A. Degen (15.07.1912), A. Boros (10.07.1933, 26.08.1938, 10.09.1940), J. Šmarda (13.07.1949), M. Rivola (15.07.1961), J. Váňa (8.09.1967) and recently by P. Górski (21.08.2009, POZNB 71 and 17.07.2011, POZNB 685).

**Literature:** Schiffner (1910, 1911), Györfy (1924), Šmarda (1937b, 1961), Duda (1955a), Szweykowski (1957, 1958a, c, 1960a, 2006), Váňa (1969, 1976), Duda & Váňa (1971a), Šoltés (1992), Szweykowski & Klama (2010).

**Note:** Krajina (1933) reports 12(!) localities for this very rare plant in the Mlynická dolina valley (High Tatra Mts, SL). Incomplete herbarium material from that area has been revised (Váňa & Duda 1965). All identifications were incorrect. A search by P. Górski in the Mlynická dolina valley indicates that *Nardia breidleri* does not occur there. The locality described in a phytosociological study by Pawłowski & Stecki (1927) in the Polish Tatry Zachodnie Mts (and calciferous phytocoenoses of *Saxifragetum perdurantis*) is unreliable (no herbarium material). This locality was later cited by Rejment-Grochowska (1971). Two localities in the Západné Tatry Mts (SL) published by Šmarda (1937b) are also doubtful. There are no specimens of this species in Moravian Museum (Brno, BRNM), where J. Šmarda deposited the majority of his collection from the Tatra Mts at least under this name. P. Górski did not find this species at localities described by J. Šmarda in the Západné Tatry Mts (Nová plesa and Mt Bystrá, alt. 2000–2200 m a.s.l.). The locality for *N. breidleri* in the Dolina za Mnichem valley (High Tatra Mts, PL, Szweykowski 1960a) still exists (leg. P. Górski: 20.09.2005, POZNB 117; 27.09.2007, POZNB 116; 28.08.2012, POZNB 1485). In the list presented, four unpublished localities recorded by P. Górski are included.

**New locality:** High Tatra Mts, PL, Dolina Gašienicowa valley, near SW shore of Zmarzly Staw Gašienicowy lake, 49°13.426'N, 20°01.328'E, alt. 1778 m, *Salicetum herbaceae*, leg. P. Górski, 21.09.2010 (POZNB 231).

### *Nardia compressa* (Hook.) Gray

**Distribution:** BT –; HT-SL –; HT-PL –; ZT-SL 1665 (1); TZ-PL –.

**Max. / Min.** Západné Tatry Mts, SL, Kamenistá dolina valley, below Pyšné sedlo pass, in the upper reaches of the Kamenistý potok stream, alt. 1665 m, leg., det. P. Górski, 30.08.2008, conf. J. Váňa (POZNB 126, POZW, KRAM, SAV, Górski 2010).

**Literature:** Duda & Váňa (1971a), Górski (2010).

**Note:** P. Górski visited this locality in 2012. *N. compressa* still grew there profusely (POZNB 1478, 49°11.349'N, 19°51.616'E, leg. P. Górski, 4.08.2012). Historical records from before 2010 erroneously refer to large forms of *Nardia scalaris* (rev. J. Váňa, see Duda & Váňa 1971a).

### *Nardia geoscyphus* (De Not.) Lindb.

**Distribution:** BT 2011 (1); HT-SL 1096–2270 (76); HT-PL 1380–2170 (18); ZT-SL 1300–2000 (15); TZ-PL 965–1685 (5).

**Max.** High Tatra Mts, SL, Bystré sedlo pass, alt. 2270 m, leg. V. Krajina, 3.09.1931, det. J. Váňa (Váňa & Duda 1965, Duda & Váňa 1972b).

**Min.** Tatry Zachodnie Mts, PL, Polana Molkówka glade, alt. 965 m, leg. J. Szweykowski, 19.08.1956 (Szweykowski 1960a).

**Literature:** Limpricht (1877a, b), Hazslinszky (1885), Krupa (1888), Szepesfalvy (1930a), Krajina (1933), Šmarda (1937b, 1938, 1961), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a, c, 1960a, 2006), Pilous & Duda (1960), Váňa & Duda (1965), Duda & Váňa (1972b), Váňa (1976), Šoltés (1990), Chudzińska et al. (2001), Szweykowski & Klama (2010).

**Note:** The locality on Mt Lomnický štít (High Tatra Mts, SL, alt. 2633 m, Szyszyłowicz 1885) belongs to *Solenostoma sphaerocarpum* (rev. P. Górski, KRAM 198179).

**New localities:** Západné Tatry Mts, SL, Bystrá dolina valley, near SE shore of Veľké Bystré pleso lake, 49°10.955'N, 19°50.585'E, alt. 1875 m, leg. P. Górski, 26.08.2011 (POZNB 616); High Tatra Mts, SL: Červená dolina valley, near Kežmarské Červené pleso lake, alt. 1810 m, leg. P. Górski, 25.09.2007, conf. J. Váňa (POZNB 1115); Temnosmrečinská dolina valley, NE shore of Vyšné Temnosmrečinské pleso lake, on stone near stream, 49°11.375'N, 20°02.342'E, alt. 1720 m, leg. P. Górski, 1.08.2012 (POZNB 1750); Dolina Kežmarskej Bielej vody valley, SW part of Dolina Zeleného plesa valley, above and SW of Zelené pleso lake, near entrance to Veľká Zmrzlá dolina valley, rocky fissures, 49°12.325'N, 20°12.965'E, alt. 1665 m, leg. P. Górski, 20.11.2012 (POZNB 1343); Veľká Zmrzlá dolina valley, upper glacial cirque - Barania Kotlinka basin, *Oreochloa-Juncetum* with *Polytrichum piliferum*, 49°12.161'N, 20°12.269'E, alt. 2085 m, leg. P. Górski, 27.09.2011 (POZNB 543); Kôprovnicová valley, upper part, rocks below Mt Krížne, 49°11.139'N, 19°57.447'E, 49°11.128'N, 19°57.466'E, alt. 1725 m, 1735 m, leg. P. Górski, 29.08.2014 (POZNB 1831, 1838, 1843, 1854); High Tatra Mts, PL: below Mt Kazalnica, rocks near route to Mięguszwowiecka Przełęcz pod Chłopkiem pass, 49°11.228'N, 20°03.988'E, alt. 1870 m, leg. P. Górski, 2.09.2014 (POZNB 1905); below Mięguszwowiecka Przełęcz pod Chłopkiem pass, rocky crevices, 49°11.042'N, 20°04.068'E, alt. 2235 m, leg. P. Górski, 2.09.2014 (POZNB 1918).

### *Nardia scalaris* Gray

**Distribution:** BT –; HT-SL 1000–2633 (264); HT-PL 965–2200 (123); ZT-SL 750–2184 (81); TZ-PL 980–2020 (64).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 1510–2633 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horničková (Peciar 1981).

**Literature:** Hazslinszky (1860, 1865, 1885), Rehman (1864), Limpricht (1877a, b), Krupa (1882, 1888), Szyszyłowicz (1885), Schiffner (1910, 1911, 1915), Lilienfeldówna (1914a, b), Kulesza (1920), Krajina (1933), Šmarda (1937a, 1938, 1956, 1961, 1976a), Suza (1949), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1957, 1958a, 1960a, 1996), Peciar (1959, 1981), Šmarda et al. (1959), Boros et al. (1960), Váňa & Duda (1965), Duda & Váňa (1972a), Váňa (1976), Wojterski et al. (1978), Kubinská & Pišút (1982), Balcerkiewicz (1984), Šoltés (1990, 2004), Kosiński (1999), Górski (2004, 2007b, 2008, 2009a), Stebel & Górski (2004), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Klama (2008), Szweykowski & Klama (2010).

**Note:** One report of *Nardia insecta* published by Boros (1951) belongs to this species (rev. J. Váňa, Duda & Váňa 1972a). In the list presented there are 123 unpublished localities recorded by P. Górski in the Tatra Mts.

**New localities:** High Tatra Mts, SL: Važecká dolina valley, blocks of rock near SE shore of Krivánske Zelené pleso lake, 49°09.455'N, 20°00.396'E, alt. 2000 m, leg. P. Górski, 11.08.2010 (POZNB 177); Kolová dolina valley, upper part of Kotlinka pod Kolovým sedlom basin, below Kolové sedlo pass, 49°12.860'N, 20°12.075'E, alt. 2095 m, leg. P. Górski, 1.09.2011 (POZNB 463); Batizovská dolina valley, Vyšná Batizovská roveň, dripping rocks, *Polytrichetum norvegici*, 49°09.576'N, 20°07.663'E, alt. 2120 m, leg. P. Górski, 2.08.2010 (POZNB 183); Štôlska dolina valley, upper part of the valley, below Lúčne sedlo pass, alt. 2070 m, leg. P. Górski, 10.08.2010 (POZNB 185); Zlomisková dolina valley, Kotlina Eodového plesa basin, rocky walls above E shore of Eodové pleso lake, 49°09.775'N, 20°06.591'E, alt. 2010 m, leg. P. Górski, 6.08.2010 (POZNB 18/2010); Veľka Studená dolina valley, Strelecké polia, 49°11.066'N, 20°10.913'E, alt. 2020 m, leg. P. Górski, 11.08.2011 (POZNB 668); Veľká Zmrzlá dolina valley, blocks of rock in Barania kotlina basin, 49°12.229'N, 20°12.411'E, alt. 2015 m, leg. P. Górski, 27.09.2011 (POZNB 710); Kotlina Piatich Spišských Plies valley, above W shore of Prostredné Spišské pleso lake, alt. 2000 m, leg. P. Górski, 27.08.2007 (POZNB 18/2007).

### *Nowellia curvifolia* (Dicks.) Mitt.

**Distribution:** BT 945–1400 (27); HT-SL 1000–1575 (21); HT-PL 975–1205 (6); ZT-SL 800–1650 (7); TZ-PL 995–1410 (6).

**Max.** Západné Tatry Mts, SL, Roháčské pleso lake, alt. 1650 m, leg. J. Šmarda, 8.08.1950 (Šmarda 1961, Duda & Váňa 1983c).

**Min.** Západné Tatry Mts, SL, Mihulčia dolina valley, alt. 800 m, leg. V. Peciar, 10.11.1977 (Peciar 1985, Duda & Váňa 1983c).

**Literature:** Rehman (1864), Limpricht (1877a), Krupa (1882, 1888), Szyszylowicz (1885), Schiffner (1911), Györfly (1924), Suza (1937b), Šmarda (1938, 1940, 1958, 1961, 1976a), Duda (1955a, 1958), Szweykowski (1956c, e, 1957, 1958a, 1960a, 1969, 1996), Ježek & Vondráček (1962), Šmarda et al. (1962), Grolle (1968), Duda & Váňa (1983c), Peciar (1985), Šoltés (1989, 1990), Klama (2008), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, PL: Dolina Roztoki valley, Wodogrzmoty Mickiewicza waterfall, 49°14.012'N, 20°05.321'E, alt. 1175 m, leg. P. Górski, 26.08.2012 (POZNB 1481); Dolina Roztoki valley, Las Roztoka forest, above Wodogrzmoty Mickiewicza waterfall, 49°13.771'N, 20°05.705'E, alt. 1205 m, leg. P. Górski, 26.08.2012 (POZNB 1482); Dolina Rybiego Potoku valley, Las pod Czubą forest, above Droga Oswalda Balzera road, decaying log, spruce forest *Plagiothecio-Piceetum*, alt. 1150 m, leg. P. Górski, 15.09.2004 (POZNB 333, 409); High Tatra Mts, SL: Javorová dolina valley, decaying log near route, *Plagiothecio-Piceetum*, alt. 1285 m, leg. P. Górski, 18.08.2006 (POZNB 407); Bielovodská dolina valley, decaying log near route, *Plagiothecio-Piceetum*, alt. 1235 m, leg. P. Górski, 20.08.2009 (POZNB 927); Kôprovnicka valley, decaying log at mouth of the valley, 49°10.594'N, 19°55.370'E, alt. 1095 m, leg. P. Górski, 29.08.2014 (POZNB 1855); Belianske Tatry Mts: Žltý žľab gully, upper part of the gully, decaying logs near stream, 49°15.595'N, 20°12.633'E, alt. 1145 m, 1150 m, leg. P. Górski, 25.06.2012, 19.11.2012 (POZNB 1250, 1251, 1416); valley of the Čierny potok stream, near Čierny potok stream, 49°16.033'N, 20°11.702'E, alt. 1051 m, leg. P. Górski, 24.06.2012 (POZNB 1182); N slope on Mt Malý vrch, decaying log, spruce forest, 49°15.999'N, 20°10.982'E, alt. 1205 m, leg. P. Górski, 26.06.2012 (POZNB 1191); Podspádska dolina valley, near Podspádski potok stream, decaying log, 49°16.402'N, 20°11.786'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1360); Dolina Hučava valley, upper part, decaying log near stream, 49°13.213'N, 20°18.394'E, alt. 945 m, leg. P. Górski, 19.11.2012 (POZNB 1432); Rígfänská dolina valley, decaying log near Rígfänský potok stream, 49°15.071'N, 20°13.674'E, alt. 1135 m, leg. P. Górski, 1.09.2014 (POZNB 1922); Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, decaying log in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1665); Tatry Zachodnie Mts, PL, Dolina za Bramką valley (end accessible to tourists), 49°16.452'N, 19°54.956'E, alt. 995 m, decaying log, leg. P. Górski, 21.11.2011 (POZNB 1742).

### *Obtusifolium obtusum* (Lindb.) S. W. Arnell [= *Lophozia obtusa* (Lindb.) A. Evans]

**Distribution:** BT 900–1750 (12); HT-SL 800–1715 (18); HT-PL 955–1900 (11); ZT-SL 1150 (1); TZ-PL 1100–1555 (6).

**Max.** High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, alt. 1900 m, leg. S. Balcerkiewicz, 12.09.1978, *Trifido-Distichetum salicetosum herbaceae*, table 9, relevé 9 (Balcerkiewicz 1984).

**Min.** High Tatra Mts, SL, Tatranské Matliare, valley of Kežmarská Biela voda stream, alt. 800 m, leg. L. Vajda, 12.07.1974 (Duda & Váňa 1990c).

**Literature:** Boros (1951), Szweykowski (1956c, 1957, 1958a, 1960a, 1996), Vajda (1971), Szweykowski & Kožlicka (1974), Wojterska et al. (1978), Balcerkiewicz (1984), Duda & Váňa (1990c), Šoltés (1990), Wojterska et al. (2004), Klama (2008), Szweykowski & Klama (2010).

**Note:** Some of the incorrect identifications of this species published by Boros et al. (1960) and Šmarda (1961) refer to *Pseudolophozia* (= *Lophozia*) *sudetica*, *Schljakovia* (= *Barbilophozia*) *kunzeana* and *Saccobasis* (= *Tritomaria*) *polita* (rev. J. Váňa, J. Hubáčková, see Duda & Váňa 1990c).

**New localities:** Belianske Tatry Mts, S slope on Mt Długi Wierch, in sub-peak area, slope trail, alt. 1080 m, 49°16.404'N, 20°12.225'E, leg. P. Górski, 18.11.2012 (POZNB 1389); High Tatra Mts, PL, Dolina Rybiego Potoku valley, Las pod Czubą forest, above Droga Oswalda Balzera road, *Plagiothecio-Piceetum*, alt. 1150 m, leg. P. Górski, 15.09.2004 (POZNB 405); upper part of the Roztoka valley, alt. 1612 m, 49°21.542'N, 20°05.263'E, leg. M. Wojterska, J. Strzelczyk, P. Górski, 6.08.2009, det. P. Górski (POZNB 1503); High Tatra Mts, SL, Kačacia dolina valley, above and E of Zelené Kačacie pleso lake, 49°09.799'N, 20°06.269'E, alt. 1715 m, leg. P. Górski, 28.09.2013 (POZNB 1713); Tatry Zachodnie Mts, PL, Dolina Pyszniańska valley, above Wielka Polana Ornaczańska glade, near Pyszniański Potok stream, alt. 1150 m, leg. H. Klama, B. Cykowska, P. Górski, 1.07.2004 (POZNB 982).

### *Odontoschisma elongatum* (Lindb.) A. Evans

**Distribution:** BT –; HT-SL 1560–1955 (11); HT-PL 1543–1910 (8); ZT-SL 1560–1650 (2); TZ-PL –.

**Max.** High Tatra Mts, SL, Mlynická dolina valley, Kozie pleso lake, alt. 1955 m, leg. V. Krajina, 16.08.1931, det. J. Duda sub *O. denudatum*, rev. J. Váňa (Duda & Váňa 1976a).

**Min.** High Tatra Mts, PL, Czarny Staw pod Rysami lake, alt. 1543 m, leg. F. Lilienfeldówna, 29.08.1912 (Lilienfeldówna (1914a, b)).

**Literature:** Lilienfeldówna (1914a, b), Szweykowski (1957, 1958a, 1960a, 2006), Duda (1962b), Váňa & Duda (1965), Rejment-Grochowska (1971), Duda & Váňa (1976a), Chudzińska et al. (2001), Szweykowski & Klama (2010).

**Note:** Two reports of *Odontoschisma denudatum* published by Duda (1962a) belong to this species (rev. J. Váňa, see Duda & Váňa 1976a). One locality for *Jungermannia schraderi* (= *Szygiella autumnalis*) recorded by Szyszyłowicz (1885) is based also on an erroneous identification and refers to *Odontoschisma elongatum* (rev. P. Górski, KRAM 198301). The list presented does not include the locality for *O. denudatum* cited by Vidličková (1989). In the Polish Tatra Mts Szweykowski (2006) collected only sterile individuals without gemmae. In the Slovak Tatra Mts, P. Górski twice collected individuals with gemmae, but without sexual organs.

**New localities:** High Tatra Mts, SL: Zlomisková dolina valley, Zlomisková roveň, peat-bog, 49°09.563'N, 20°05.932'E, alt. 1825 m, leg. P. Górski, 9.08.2011 (POZNB 991, 1582); Kolová dolina valley, above Kolove pleso lake, sub-glacially eroded step in the upper glacial cirque, 49°13.189'N, 20°11.857'E, alt. 1715 m, leg. P. Górski, 1.09.2011 (POZNB 992); Čierna Javorová dolina valley, Čierna záhrada, on sub-glacially eroded step in the upper glacial cirque, near waterfall, alt. 1620 m, leg. P. Górski, 25.08.2010 (POZNB 993); Temnosmrečinská dolina valley, NE shore of Vyšné Temnosmrečinské pleso lake, on stone and peat, near lake, 49°11.375'N, 20°02.376'E, alt. 1715 m, leg. P. Górski, 1.08.2012 (POZNB 1144); Nefcerka valley, below Nižné Terianske pleso lake, *Polytrichum-Sphagnum* hummock, 49°10.167'N, 20°00.214'E, alt. 1845 m, leg. P. Górski, 2.08.2012 (POZNB 1301, 1315); Žabia Bielovodská dolina, near N shore of Nižné Žabie Bielovodské pleso lake, between stones, in water, alt. 1675 m, leg. P. Górski, 14.08.2009, det. J. Váňa (POZNB 1532); High Tatra Mts, PL, Dolina Gašienicowa valley, below Zawrat pass, *Polytrichum-Sphagnum* hummock, 49°13.291'N, 20°01.137'E, alt. 1910 m, leg. P. Górski, 8.08.2012 (POZNB 1138).

*Odontoschisma fluitans* (Nees) L. Söderstr. et Váňa [= *Cladopodiella fluitans* (Nees) H. Buch]

**Distribution:** BT –; HT-SL 1355–1620 (4); HT-PL –; ZT-SL –; TZ-PL 1120 (1).

**Max.** (new loc.) High Tatra Mts, SL, Dolina Bielych plies valley, Trojrohé pleso lake, alt. 1620 m, leg. P. Górski, 26.09.2007 (POZNB 906).

**Min.** Tatra Zachodnie Mts, PL, Toporowy Staw Wyżni lake: alt. 1120–1150 m, leg. F. Lilienfeldówna, 10.08.1912 (Lilienfeldówna 1914a), leg. J. Szweykowski, 25.06.1954 (Szweykowski 1960a) and leg. P. Górski, 28.09.2011: S part (49°16.809'N, 20°01.790'E) and E part (49°16.773'N, 20°01.789'E) of the lake (POZNB 505, 619).

**Literature:** Lilienfeldówna (1914b), Szweykowski (1957, 1958a, 1960a, 1964, 2006), Váňa & Duda (1965), Rejment-Grochowska (1971), Šmarda (1976a), Duda & Váňa (1981b), Szweykowski & Klama (2010).

**Note:** In the Tatra Zachodnie Mts (PL), there is one locality in peat-bog on Toporowy Staw Wyżni lake. This plant was recorded there three times in the span of almost 100 years, between 1912 and 2011 (see above). The report of *Lophozia grandiretis* published by Krajina (1933) is based on erroneous identification and belong to *Odontoschisma fluitans* (rev. J. Duda, Duda 1986, Duda & Váňa 1981b, 1990c).

*Odontoschisma francisci* (Hook.) L. Söderstr. et Váňa [= *Cladopodiella francisci* (Hook.) Jörg.]

**Distribution:** BT –; HT-SL 1620–2150 (2); HT-PL 1725 (1\*); ZT-SL –; TZ-PL –.

**Max.** High Tatra Mts, SL, Kôprovské sedlo pass, alt. 2150 m (Šmarda 1961).

**Min.** High Tatra Mts, SL, Dolina Bielych plies valley, Trojrohé pleso lake, alt. ca 1620 m (Boros 1959, Boros et al. 1960, Szweykowski 1960a, Šmarda 1961).

**Literature:** Szweykowski (1957, 1960a, 1964), Boros (1959), Boros et al. (1960), Šmarda (1961, 1976a), Duda & Váňa (1981b), Šoltés (1992).

**Note:** The report of this species published by Vilhelm (1927) belongs to *Anastrepta orcadensis* (rev. T. Wiśniewski, Duda & Váňa 1981b). In 2012, P. Górski rediscovered *Odontoschisma francisci* at an earlier reported locality in a peat-bog near Trojrohé pleso lake, High Tatra Mts, SL (20.11.2012, 49°13.166'N, 20°13.810'E, alt. 1620 m, POZNB 1427).

**New locality:** \* High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, peat-bog near NE shore of Czarny Staw Polski, alt. 1725 m, leg. P. Górski, 12.08.2013 (POZNB 1648).



*Orthocaulis atlanticus* (Kaal.) H. Buch [= *Barbilophozia atlantica* (Kaal.) Müll. Frib.]

**Distribution:** BT –; HT-SL 1300–1950 (2); HT-PL 1680–2220 (20); ZT-SL 1700 (1); TZ-PL 1650–1945 (6).

**Max.** High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, alt. 2220 m, leg. S. Balcerkiewicz, 16.08.1976, *Minuartio-Oreochloëtum distichae*, table 2, relevé 3 (Balcerkiewicz 1984), –.

**Min.** (new loc.) Tatry Zachodnie Mts, PL, upper part of Dolina Wyżnia Jarzabcza valley, rocky boulders in glacial cirque below Mt Jarzabczy Wierch, alt. 1650 m, leg. P. Górski, 28.09.2006 (POZNB 892).

**Literature:** Szweykowski (1956d, 1960a, 1967, 2006), Šmarda (1961), Váňa (1969), Peciar (1978), Duda (1983), Balcerkiewicz (1984), Duda & Váňa (1984c), Szweykowski & Buczkowska (2000), Cykowska (2006b, 2011), Szweykowski & Klama (2010).

**Note:** One report of *Barbilophozia quadriloba* published by Šmarda (1961) is based on an erroneous identification and belong to this species (rev. J. Duda, Duda & Váňa 1984c). The locality for *O. atlanticus* in the Západné Tatry Mts (SL, Mt Sivý vrch, 1600 m a.s.l.) recorded by Peciar (1981) belongs to *Trilophozia* (= *Tritomaria*) *quinquedentata* (rev. J. Duda, Duda & Váňa 1984c).

**New localities:** High Tatra Mts, SL, Roviienky valley, rock rubble in the highest kettle, 49°11.296'N, 20°09.214'E, alt. 1950 m, mossy pillow with *Racomitrium lanuginosum*, leg. P. Górski, 25.09.2011 (POZNB 889); High Tatra Mts, PL: Dolina Pańszczyca valley, near the path in the bottom of the valley, below Mt Koszysta, *Oreochloë-Juncetum trifidi typicum*, leg. P. Górski, 22.08.2005 (POZNB 888); Dolina Gąsienicowa valley, blocks of rock above S shore of Czarny Staw Gąsienicowy lake, leg. P. Górski, 21.08.2005 (POZNB 887); Dolina Gąsienicowa valley, below Zawrat pass, rocky crevices with *Racomitrium lanuginosum*, 49°13.291'N, 20°01.137'E, alt. 1910 m, leg., det. P. Górski, 8.08.2012, conf. J. Váňa (POZNB 1593); Dolina Gąsienicowa valley, glacial cirque below Mt Świnica, alpine grassland, 49°13.398'N, 20°00.528'E, alt. 1905 m, leg. P. Górski, 30.08.2011 (POZNB 1546); Dolina za Mnichem valley, alpine grassland below Mt Mnich, 49°11.632'N, 20°03.167'E, alt. 1885 m, leg., det. P. Górski, 8.08.2012, conf. J. Váňa (POZNB 1547); Dolina Waksmundzka valley, *Oreochloë-Juncetum trifidi sphagnetosum*, alt. 1890 m, leg. P. Górski, 22.08.2005 (POZNB 896).

*Orthocaulis attenuatus* (Mart.) A. Evans [= *Barbilophozia attenuata* (Mart.) Loeske, *Neoorthocaulis attenuatus* (Mart.) L.Söderstr., De Roo et Hedd.]

**Distribution:** BT 1095–1580 (4); HT-SL 1350–2633 (49); HT-PL 965–1930 (21); ZT-SL 1000–2050 (23); TZ-PL 965–2090 (28).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2633 m, leg. I. Szyszylowicz (Szyszylowicz 1885).

**Min.** Tatry Zachodnie Mts, PL, Polana Molkówka glade, peat-bog, alt. 965 m, leg. J. Szweykowski, 19.08.1956 (Szweykowski 1960a); High Tatra Mts, PL, Palenica Białczańska, near Droga Oswalda Balzera road, alt. 965 m, leg. H. Klama (Klama 2008).

**Literature:** Hazslinszky (1860, 1965), Limpricht (1877a), Krupa (1882), Szyszylowicz (1885), Krajina (1933), Šmarda (1937b, 1938, 1940, 1961, 1976a), Suza (1937b), Duda (1955a, 1962a), Szweykowski (1957, 1958a, 1960a, b, 1967), Šmarda et al. (1962), Váňa & Duda (1965), Šoltés (1974), Peciar (1981, 1982), Balcerkiewicz (1984), Duda & Váňa (1984a), Šoltés (1989, 1990, 2006), Blackburn et al. (1997), Wojterska et al. (2004), Cykowska (2006b, 2011), Górski (2007b), Klama (2008), Szweykowski & Klama (2010).

*Orthocaulis binsteadii* (Kaal.) H. Buch [= *Barbilophozia binsteadii* (Kaal.) Loeske, *Neoorthocaulis binsteadii* (Kaal.) L. Söderstr., De Roo et Hedd.]

**Distribution:** BT –; HT-SL 1885–1890 (1\*); HT-PL 1920 (1); ZT-SL 1795 (1); TZ-PL 1730–1850 (9).

**Max.** High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, SE shore of Zadni Staw Polski lake, 49°12'38"N, 20°00'48"E, NE slope, alt. 1920 m, leg. B. Cykowska (Cykowska 2011).

**Min.** Tatry Zachodnie Mts, PL, Mt Trzydniowiński Wierch, below the top, 49°13'14"N, 19°48'15"E, NW slope, alt. 1730 m, leg. B. Cykowska (Cykowska 2011).

**Literature:** Szweykowski (1960a, b, 1964, 1996, 2006), Váňa (1969), Szweykowski & Buczkowska (2000), Cykowska (2006b, 2011), Szweykowski & Klama (2010), Górski *in* Ellis et al. (2012).

**New locality:** \* High Tatra Mts, SL, W and N slopes on Mt Predný Holý vrch (Liptovské kopy), *Polytrichum-Sphagnum* hummock, 49°11.393'N, 19°57.756'E, 49°11.399'N, 19°57.834'E, alt. 1885 m, 1890 m, leg. P. Górski, 30.08.2014 (POZNB 1875, 1868).

*Orthocaulis floerkei* (F. Weber et D. Mohr) H. Buch [= *Barbilophozia floerkei* (F. Weber et D. Mohr) Loeske, *Neoorthocaulis floerkei* (F. Weber et D. Mohr) L. Söderstr., De Roo et Hedde.]

**Distribution:** BT 1150–2148 (14); HT-SL 1250–2535 (97); HT-PL 1384–2438 (62); ZT-SL 1300–2250 (33); TZ-PL 1140–2101 (53).

**Max.** High Tatra Mts, SL, between Mt Kończista and Batizovská dolina valley, alt. 1794–2535 m, leg. I. Szyszylowicz (Szyszylowicz 1885); (new loc.) High Tatra Mts, SL, N slope of Mt Kończista, 49°09.445'N, 20°06.815'E, alt. 2510 m, leg. P. Górski, 28.08.2014 (POZNB 1880).

**Min.** Tatry Zachodnie Mts, PL, Chochołowska dolina valley, alt. 1140 m, leg. I. Szyszylowicz (Szyszylowicz 1885).

**Literature:** Rehman (1864), Limpricht (1877a, b), Krupa (1878, 1882), Szyszylowicz (1885), Schiffner (1909b, 1915), Lilienfeldówna (1910), Kulesza (1920), Vilhelm (1927), Pawłowski et al. (1928), Krajina (1933), Šmarda (1937b, 1938, 1940, 1944, 1958, 1961, 1976a), Boros (1951), Duda (1955a, 1962a), Hadač (1956), Szweykowski (1957, 1958a, c, 1960a, 1967, 1996, 2006), Boros et al. (1960), Váňa & Duda (1965), Vajda (1971), Šoltésova (1974), Šoltés (1976, 1990), Wojterski et al. (1978), Peciar (1981), Duda & Váňa (1983c), Balcerkiewicz (1984), Unar et al. (1984–1985), Blackburn et al. (1997), Kosiński (1999), Wojterska et al. (2004), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Górski (2007b, 2009a), Szweykowski & Klama (2010).

*Pedinophyllum interruptum* (Nees) Kaal.

**Distribution:** BT 900–1700 (35); HT-SL 1065–1260 (2\*); HT-PL 1025 (1); ZT-SL 860–1700 (10); TZ-PL 915–1825 (31).

**Max.** Tatry Zachodnie Mts, PL, Mt Giewont, Przełęcz Szerbera pass, alt. 1825 m, leg. J. Szweykowski, 9.09.1955 (Szweykowski 1960a).

**Min.** (new loc.) Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, calcareous outcrops in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1669).

**Literature:** Limpricht (1877a, b), Krupa (1882, 1888), Hazslinszky (1885), Szyszylowicz (1885), Šmarda (1938, 1958, 1960a, 1961, 1976a), Boros (1940, 1942), Szweykowski (1956c, 1957, 1958a, 1960a, 1964, 1996, 2006), Duda (1962a), Duda & Váňa (1983a), Peciar (1988), Blackburn et al. (1997), Chudzińska et al. (2001), Klama (2008), Szweykowski & Klama (2010).

**New localities:** \* High Tatra Mts, SL: Javorová dolina valley, calcareous boulder near route, alt. 1260 m, leg. P. Górski, 18.08.2006 (POZNB 1005); Bielowodská dolina valley, calcareous boulder near route, above Bielowodská poľana glade, 49°13.559'N, 20°06.127'E, alt. 1065 m, leg. P. Górski, 9.08.2012 (POZNB 1320); Belianske Tatry Mts: N slope of Mt Malý vrch, calcareous rocks in spruce forest, 49°15.999'N, 20°10.982'E, alt. 1205 m, leg. P. Górski, 26.06.2012 (POZNB 1194); valley of the Čierny potok stream, below rocks on Biela stena (near unmarked route to Stará poľana glade), 49°16.126'N, 20°11.733'E, alt. 1000 m, leg. P. Górski, 24.06.2012 (POZNB 1264); lower part of Tristarský žľab gully, shaded calcareous rocks in spruce forest, 49°15.444'N, 20°12.747'E, alt. 1210 m, leg. P. Górski, 25.06.2012 (POZNB 1266); Havrania dolina valley, Havrania roviem, small rocks, 44°15.379'N, 20°11.301'E, alt. 1460 m, leg. P. Górski, 26.06.2012 (POZNB 1282); Dolina Hučava valley, middle part, calcareous rocks near stream, 49°13.190'N, 20°18.479'E, alt. 925 m, leg. P. Górski, 19.11.2012 (POZNB 1424); Tatry Zachodnie Mts, PL: Dolina ku Dziurze valley, near Jaskina Dziura cave, 49°16.318'N, 19°56.549'E, alt. 1005 m, leg. P. Górski, 21.11.2011 (POZNB 994, 996); Dolina Lejowa valley, calcareous rocks at the mouth of the valley, 49°16.633'N, 19°50.965'E, alt. 935 m, leg. P. Górski, 20.11.2011 (POZNB 783, 784); Dolina za Bramką valley, high vertical rocky walls at mouth of the valley, 49°16.593'N, 19°55.174'E, 49°16.566'N, 19°55.090'E, 49°16.661'N, 19°55.206'E, alt. 915 m, 930 m, leg. P. Górski, 21.11.2011 (POZNB 1001, 998, 999, 1002); Dolina za Bramką (end accessible to tourists), rocky walls, *Caricetum firmae*, 49°16.337'N, 19°55.022'E, alt. 970 m, leg. P. Górski, 21.11.2011 (POZNB 1000); Dolina Chochołowska valley, Niżnia Chochołowska Brama, rocky walls, *Carici-Festucetum tatrae*, alt. 1010 m, leg. P. Górski, 8.08.2004 (POZNB 822); Dolina Chochołowska valley, Wyznia Chochołowska Brama, small calcareous rocks near former Schronisko Blaszyńskich hut, *Carici-Festucetum tatrae*, alt. 1040 m, leg. P. Górski, 8.08.2004 (POZNB 804); Dolina Wielkie Koryciska valley, calcareous rocky walls, alt. 990 m, leg. P. Górski, 29.09.2003 (POZNB 1006); Dolina Dudowa valley, Między Ścian, rocky walls, *Caricetum firmae*, alt. 1050 m, leg. P. Górski, 29.09.2003 (POZNB 1007); Staników Żleb gully (at the mouth), shaded rocky walls in spruce forest, near stream, 49°16.168'N, 19°52.805'E, alt. 1075 m, leg. P. Górski, 22.11.2011 (POZNB 1004); Dolina Małej Łąki valley, below the junction of paths to Przysłop Miętusi (blue) and Rówienki (yellow), 49°15.998'N, 19°54.056'E, alt. 1040 m, leg. P. Górski, 22.11.2011 (POZNB 995); Kobylarzowy Żleb pod Małołączniakiem gully, upper part, rocky walls with a northern

exposure, *Caricetum firmae*, 49°14.632'N, 19°54.649'E, alt. 1700 m, leg. P. Górski, 22.11.2011 (POZNB 840); SW part of Polana Kalatówki glade, high calcareous walls in spruce forest; at mouth of Kalackie Koryto gully, 49°15.419'N, 19°57.754'E, alt. 1265 m, leg. P. Górski, 24.11.2011 (POZNB 875, 997); Żleb Zabijak gully (upper part of the Dolina Lejowa valley), 49°14.921'N, 19°50.860'E, alt. 1290 m, leg. P. Górski, 20.11.2011 (POZNB 1003).

### *Pellia endiviifolia* (Dicks.) Dumort.

**Distribution:** BT 1250–1750 (4); HT-SL 850–1700 (6); HT-PL 935–1889 (9); ZT-SL 800–1671 (5); TZ-PL 880–1264 (11).

**Max.** High Tatra Mts, PL, Dolina Pięciu Stawów Polskich valley, alt. 1674–1889 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** Západné Tatry Mts, SL, Račková dolina valley, alt. 800 m (Šmarda 1937b).

**Literature:** Szyszyłowicz (1885), Krupa (1888), Schiffner (1909b, 1911, 1915), Györfy (1924), Szafer & Sokołowski (1927), Šmarda (1937b, 1938, 1960a, 1976a), Duda (1955a), Szweykowski (1957, 1958a, 2006), Pawłowski et al. (1960), Peciar (1981, 1982), Šoltés (1989, 1990), Szweykowski et al. (1995), Blackburn et al. (1997), Klama (2008), Szweykowski & Klama (2010).

**Note:** A map of the distribution of this species in the Polish Tatra Mts (without a list of localities) is in Szweykowski et al. (1995).

**New localities:** Tatry Zachodnie Mts, PL, Dolina Chochołowska valley, slope trail, mouth of the valley, alt. 880 m, leg. P. Górski, 18.09.2005 (POZNB 1012); Západné Tatry Mts, SL, Juráňova dolina valley, near Sedlo Umrlá pass, slope trail, 49°15.994'N, 19°45.925'E, alt. 985 m, leg. P. Górski, 30.09.2013 (POZNB 1724).

### *Pellia epiphylla* (L.) Corda

**Distribution:** BT –; HT-SL 1248–1800 (10); HT-PL 965–1587 (10); ZT-SL wa (1); TZ-PL 894–1704 (9).

**Max.** High Tatra Mts, SL, Furkotská dolina valley, alt. 1800 m, leg. J. Szepesfalvy, 7.1912 (Szepesfalvy 1926).

**Min.** Tatry Zachodnie Mts, PL, Dolina ku Dziurze valley, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865), Rehman (1864), Limpricht (1877a), Szyszyłowicz (1885), Lilienfeldówna (1914a), Schiffner (1915), Szepesfalvy (1926), Duda (1955a), Szweykowski (1957, 1958a, 2006), Pawłowski et al. (1960), Szweykowski et al. (1995), Blackburn et al. (1997), Klama (2008), Stachurska-Swakoń (2008), Górski (2009a), Szweykowski & Klama (2010).

**Note:** A map of the distribution of this species (as well as that of *P. borealis*) in the Polish Tatra Mts (without a list of localities) is in Szweykowski et al. (1995). *Pellia epiphylla* is here accepted in a broad sense (incl. *P. epiphylla* subsp. *borealis* (Lorb.) Messe). A long time ago these taxa were not separated; they differ only in chromosome number and molecular characteristics. Currently it is not possible to separate these taxa in older herbarium collections.

**New locality:** Tatry Zachodnie Mts, PL, between Chłabówka and Cyrhla, minerotrophic spring in forest, near Droga Oswalda Balzera road, alt. 990 m, leg. P. Górski, 16.11.2012 (POZNB 1370).

### *Pellia neesiana* (Gottsche) Limpr.

**Distribution:** BT 2000 (1); HT-SL 1000–2030 (36); HT-PL 1384–2090 (5); ZT-SL 900–2000 (10); TZ-PL 1100–1775 (17).

**Max.** High Tatra Mts, PL, Dolina Waksmundzka valley, slope between Mt Wołoszyn and Mt Koszysta, 49°13'46"N, 20°03'01"E, alt. 2090 m, leg. B. Cykowska (Cykowska 2011).

**Min.** Západné Tatry Mts, SL, Roháčska dolina valley, near Roháčský potok stream, alt. 900 m (Šmarda 1937b).

**Literature:** Szyszyłowicz (1885), Krupa (1888), Lilienfeldówna (1910), Schiffner (1911, 1915), Šmarda (1937b, 1940, 1960c, 1961), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1957, 1958a, c, 1960a, 2006), Váňa & Duda (1965), Peciar (1981), Šoltés (1984, 1989, 1990), Szweykowski et al. (1995), Górski (2009a), Cykowska (2011), Szweykowski & Klama (2010).

**Note:** A map of the distribution of this species in the Polish Tatra Mts (without a list of localities) is in Szweykowski et al. (1995).

**New localities:** Západné Tatry Mts, SL: Račková dolina valley, Račkov Zadok, unmarked path near Vyšné Račkove pleso lake, 49°11.962'N, 19°48.312'E, alt. 1730 m, leg. P. Górski, 27.08.2011 (POZNB 454); Bystrá dolina valley, near SE shore of Veľké Bystré pleso lake, 49°10.955'N, 19°50.585'E, alt. 1875 m, leg. P. Górski, 26.08.2011 (POZNB 615); Juráňova dolina valley, Válovec, below Sedlo Príslop pass, slope trail, 49°15.225'N, 19°47.170'E, alt. 1375 m, leg. P. Górski, 30.09.2013 (POZNB 1726); Tatry Zachodnie Mts, PL: Dolina Jarzabcza valley, NW slope on Mt Kończysty Wierch (Jarzabczy Kopieniec), alt. 1735 m, leg. P. Górski, 22.07.2009 (POZNB 6/2009); Dolina Starorobociańska valley, glacial cirque, below rocky walls descending from Mt

Starorobociański Wierch, E from Krzywy Żleb gully, alt. 1775 m, leg. P. Górski, 23.07.2009 (POZNB 12/2009, 1010); Dolina Chochołowska valley, route to Mt Grześ, near stream, alt. 1390 m, leg. P. Górski, 26.09.2006 (POZNB 1009); High Tatra Mts, SL: Żabia Bielovodská dolina valley, below rocky walls descending from Mt Mlynárove vidly, alt. 1755 m, leg. P. Górski, 16.08.2009 (POZNB 42/2009); Kolová dolina valley, upper glacial cirque, Kotlinka pod Kolovym sedlom basin, 49°13.070'N, 20°12.125'E, alt. 1875 m, leg. P. Górski, 1.09.2011 (POZNB 462); Huncovská kotlina valley, lower glacial cirque, alt. 1985 m, leg. P. Górski, 17.07.2011 (POZNB 626); Mlynická dolina valley, below rocky walls descending from Mt Malé Solisko, alt. 2030 m, leg. P. Górski, 15.08.2008 (POZNB 694); Javorová dolina valley, slope trail, alt. 1260 m, leg. P. Górski, 18.08.2006 (POZNB 1011); Dolina Kežmarskej Bielej vody valley, SW part of Dolina Zeleného plesa valley, above and SW of Zelené pleso lake, near entrance to Veľká Zmrzlá dolina valley, 49°12.325'N, 20°12.965'E, alt. 1665 m, leg. P. Górski, 20.11.2012 (POZNB 1338, 1345); Kačacia dolina valley, Kačaci žľab gully, 49°10.319'N, 20°07.080'E, alt. 1795 m, leg. P. Górski, 28.09.2013 (POZNB 1656); Kačacia dolina valley, above and E of Zelené Kačacie pleso lake, 49°09.799'N, 20°06.269'E, alt. 1715 m, leg. P. Górski, 28.09.2013 (POZNB 1715).

*Peltolepis quadrata* (Saut.) Müll. Frib.

**Distribution:** BT 800–2024 (15); HT-SL 2340 (2); HT-PL –; ZT-SL 1500–2000 (6); TZ-PL 1100–1850 (5).

**Max.** High Tatra Mts, SL, Priečne sedlo pass, alt. 2340 m, leg. J. Šmarda, 24.07.1938, 15.09.1959 (Šmarda 1961, Duda & Váňa 1973b).

**Min.** Belianske Tatry Mts, Havrania dolina valley, alt. 800 m, leg. J. Šmarda (Duda & Váňa 1973b).

**Literature:** Limpricht (1880a), Müller (1906–1911), Lilienfeldówna (1910), Györfy & Péterfi (1915), Šmarda (1940, 1958, 1960a, 1961, 1976a), Szweykowski (1957, 1958a, 1960a, 2006), Boros (1959), Boros et al. (1960), Šmarda et al. (1962), Rejment-Grochowska (1966, 1971), Duda & Váňa (1973b), Szweykowski & Kožlicka (1977), Szweykowski & Klama (2010).

**Note:** The report of *Fimbriaria pilosa* published by Šmarda (1938) belongs to this species (rev. J. Váňa, see Duda & Váňa 1973b).

*Plagiochila asplenioides* (L. emend. Taylor) Dumort.

**Distribution:** BT 980–2130 (78); HT-SL 810–1950 (39); HT-PL 910–2210 (30); ZT-SL 750–1820 (21); TZ-PL 850–2050 (87).

**Max.** Belianske Tatry Mts, Mt Ždiarska Vidla, alt. 2130 m, leg. J. Szweykowski, 19.07.1956 (Szweykowski 1960a).

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horničková (Peciar 1981).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865), Rehman (1864), Limpricht (1877a), Krupa (1878, 1882), Szyszyłowicz (1885), Schiffner (1908b, 1911, 1915), Györfy (1924), Pawłowski & Stecki (1927), Szafer et al. (1927), Pawłowski et al. (1928), Krajina (1933), Šmarda (1938, 1956, 1958, 1960b, 1976b), Duda (1955a), Hadač (1956), Szweykowski (1957, 1958b, 1960a, 1971, 2006), Šmarda et al. (1959), Ježek & Vondráček (1962), Mickiewicz (1965), Váňa & Duda (1965), Lisowski (1966), Hadač et al. (1969a), Šoltés (1976), Balcerkiewicz & Brzeg (1978), Balcerkiewicz & Pawlak (1978a), Balcerkiewicz et al. (1978b), Peciar (1978, 1981, 1982), Wojterski et al. (1978), Krzakowa & Szweykowski (1979), Šomšák (1979), Horvat et al. (1980), Balcerkiewicz (1984), Unar et al. (1984–1985), Šoltés (1990), Blackburn et al. (1997), Balcerkiewicz et al. (2001), Klama (2008), Stachurska-Swakoń (2008), Szweykowski & Klama (2010).

**New localities:** Belianske Tatry Mts, Dolina Podspádska valley, W part, near Podspádski potok stream, decaying log, 49°16.440'N, 20°11.708'E, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1351); Tatry Zachodnie Mts, PL: Dolina Lejowa valley, mouth of the valley, calcareous rocks, 49°16.181'N, 19°50.537'E, alt. 965 m, leg. P. Górski, 20.11.2011 (POZNB 85); Dolina Strážyska valley, mouth of the valley, calcareous rocks, 49°16.255'N, 19°55.937'E, alt. 990 m, leg. P. Górski, 21.11.2011 (POZNB 951); between Chlábówka and Cyrhla, calcareous rocks in forest, near Droga Oswalda Balzera road, 49°16.998'N, 20°00.639'E, alt. 965 m, leg. P. Górski, 16.11.2012 (POZNB 1367).

*Plagiochila porelloides* (Torrey ex Nees) Lindenb.

**Distribution:** BT 1000–2154 (11); HT-SL 850–2250 (18); HT-PL 910–2150 (23); ZT-SL 860–1650 (8); TZ-PL 939–1900 (36).

**Max.** High Tatra Mts, SL, Mt Kvetnicová veža, alt. 2250 m, leg. A. Šoltésová, 1.06.1983 (Šoltés 1990).

**Min.** High Tatra Mts, SL, Kežmarský les forest, alt. 850 m, *Brachythecio rivularis-Fontinalium antipyreticae*, table 13a, relevé 2, leg. R. Šoltés, 27.04.1983 (Šoltés 1984).

**Literature:** Szyszyłowicz (1885), Schiffner (1910, 1911), Duda (1955a), Peciar (1981), Šoltés (1984, 1989, 1990, 2006), Piękoś-Mirkowa & Łobaszewska (1990), Blackburn et al. (1997), Kosiński (1999), Wojterska et al. (2004), Šoltés et al. (2006), Szweykowski (2006), Górski (2007b), Cykowska (2008), Klama (2008), Szweykowski & Klama (2010), Cykowska & Smieja (2011).

**New localities:** Belianske Tatry Mts: peak of Mt Havran, 49°14.910'N, 20°11.857'E, alt. 2154 m, leg. P. Górski, 26.06.2012 (POZNB 1294); lower part of Tristarský žľab gully, calcareous rocks in spruce forest, 49°15.444'N, 20°12.747'E, alt. 1210 m, leg. P. Górski, 25.06.2012 (POZNB 1270); Dolina pod Košiare valley, calcareous rocks in lower part of Veľký Košiar, 49°14.439'N, 20°14.948'E, alt. 1380 m, leg. P. Górski, 27.06.2012 (POZNB 1173, 1285); Dolina pod Košiare valley, slightly above the junction of the stream from Jahňacia dolina valley with the Tokársky potok stream, calcareous rocks, 49°14.894'N, 20°15.548'E, alt. 1030 m, leg. P. Górski, 27.06.2012 (POZNB 1277); valley of the Čierny potok stream, below rocks on Biela stena (near unmarked route to Stará poľana glade), 49°16.126'N, 20°11.733'E, alt. 1000 m, leg. P. Górski, 24.06.2012 (POZNB 1263); High Tatra Mts, SL, Kolová dolina valley, calcareous rocks in spruce forest, 49°13.614'N, 20°11.052'E, alt. 1525 m, leg. P. Górski, 1.09.2011 (POZNB 928); Západné Tatry Mts, SL: Kamienistá dolina valley, below Pyšné sedlo pass, on stone in stream, 49°11.420'N, 19°51.609'E, alt. 1650 m, leg. P. Górski, 4.08.2012 (POZNB 1142); Roháčska dolina valley, Spaloný potok stream, on stone near Nižny Roháčsky vodopad waterfall, alt. 1275 m, leg. P. Górski, 24.07.2006 (POZNB 926); Juráňova dolina valley, Tiesňavy, calcareous outcrops in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1663); S slope on Mt Osobitá, exposed calcareous outcrops above Sedlo pod Osobitou pass, 49°15.606'N, 19°43.273'E, alt. 1610 m, leg. P. Górski, 1.10.2013 (POZNB 1688).

*Pleurocladula albescens* (Hook.) Grolle ⇒ see under *Fuscocephalozopsis albescens* (Hook.) Váňa et L. Söderstr.

### *Porella arboris-vitae* (With.) Grolle

**Distribution:** BT –; HT-SL –; HT-PL –; ZT-SL –; TZ-PL 980–1140 (3).

**Max.** Tatry Zachodnie Mts, PL, Dolina Chochołowska valley, alt. 1140 m, leg., det. I. Szyszyłowicz, conf. W. Kulesza (Szyszyłowicz 1885, Kulesza 1920).

**Min.** Tatry Zachodnie Mts, PL, Dolina Chochołowska valley, alt. 980 m, leg. J. Szweykowski, 21.04.1948 (Szweykowski 1960a).

**Literature:** Krupa (1882), Szyszyłowicz (1885), Kulesza (1920), Szweykowski (1957, 1958a, 1960a), Szweykowski & Klama (2010).

### *Porella cordaeana* (Huebener) Moore

**Distribution:** BT 1300–1600 (5); HT-SL 950–1800 (29); HT-PL 1384–1835 (5); ZT-SL 1560–1900 (4); TZ-PL 1040–1580 (20).

**Max.** Západné Tatry Mts, SL, Jamnícka dolina valley, Jamnícke plesá lakes, alt. 1900 m (Duda 1955a).

**Min.** High Tatra Mts, SL, near Tatranská Lomnica, the trunk of *Picea abies*, alt. 950 m, leg. R. Šoltés, 24.08.1976 (Šoltés 1990), ~.

**Literature:** Szyszyłowicz (1885), Krupa (1888), Kulesza (1920), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a, 1960a, 1962, 2006), Šmarda (1961), Váňa & Duda (1965), Duda & Váňa (1979b), Unar et al. (1984–1985), Šoltés (1989, 1990), Blackburn et al. (1997), Kosiński (1999), Szweykowski & Klama (2010).

**New localities:** Západné Tatry Mts, SL: Račkov Zadok, near route to Račkovo sedlo pass, on stone in stream, 49°12.122'N, 19°48.557'E, alt. 1865 m, leg. P. Górski, 27.08.2011 (POZNB 575); upper part of Kamienistá dolina valley, on stone near stream, alt. 1560 m, leg. P. Górski, 29.08.2008 (POZNB 713); Tatry Zachodnie Mts, PL: Dolina Starorobociańska valley, near route to Mt Ornak, on stone in stream, alt. 1565 m, leg. P. Górski, 24.07.2009 (POZNB 715); High Tatra Mts, SL: Zadná Tichá dolina valley, below Hladké sedlo pass, on stone in stream, alt. 1825 m, leg. P. Górski, 29.07.2009 (POZNB 701); High Tatra Mts, PL, Dolina Roztoki valley, below Wielka Siklawa waterfall, near route, on stone in stream, alt. 1455 m, leg. P. Górski, 22.09.2005 (POZNB 439).

### *Porella platyphylla* (L.) Pfeiff.

**Distribution:** BT 865–1950 (36); HT-SL 865–1700 (7); HT-PL 1580 (1); ZT-SL 900–2000 (7); TZ-PL 980–1680 (10).

**Max.** Západné Tatry Mts, SL, Mt Plačlivý Roháč, alt. 2000 m, leg. J. Váňa, 12.09.1966 (Duda & Váňa 1979a).

**Min.** High Tatra Mts, SL, near Tatranská Lomnica, alt. 865 m, leg. R. Šoltés, 27.05.1982, 5.06.1982 (Šoltés 1989, 1990); (new loc.) Belianske Tatry Mts, valley of the Čierny potok stream, Zadna polana glade, on bark of *Acer pseudoplatanus*, 49°16.408'N, 20°11.611'E, alt. 865 m, leg. P. Górski, 24.06.2012 (POZNB 1585).

**Literature:** Wahlenberg (1814), Hazslinszky (1860), Rehman (1864), Limpricht (1877a), Szyszyłowicz (1885), Lilienfeldówna (1914a), Schiffner (1915), Żmuda (1915), Suza (1937b), Duda (1955a, 1965), Szweykowski (1957, 1958a, 1960a, 1996, 2006), Šmarda (1958, 1961, 1976b), Ježek & Vondráček (1962), Šmarda et al. (1962), Mickiewicz (1965), Váňa & Duda (1965), Hadač et al. (1969a), Duda & Váňa (1979a), Peciar (1981), Unar et al. (1984–1985), Šoltés (1989, 1990), Šibík et al. (2006), Szweykowski & Klama (2010).

**New localities:** Tatry Zachodnie Mts, PL: Kobylarzowy Żleb pod Małołączniakiem gully, 49°14.630'N, 19°54.563'E, alt. 1680 m, leg. P. Górski, 22.11.2011 (POZNB 739); Dolina Chochołowska valley, Wyżnia Chochołowska Brama, calcareous rocks near former Schronisko Blaszyńskich hut, alt. 1040 m, *Carici-Festucetum tatrae*, leg. P. Górski, 8.08.2004 (POZNB 813); Dolina Kościeliska valley, Wąwóz Kraków gully (part not accessible to tourists), alt. 1070 m, on calcareous rocks, leg. P. Górski, 21.09.2005 (POZNB 1016); Dolina Kościeliska valley, Polana Stare Kościeliska glade, on bark of *Acer pseudoplatanus*, leg. P. Górski, 21.09.2005 (POZNB 1103); Západné Tatry Mts, SL, Mt Furkaska, calcareous outcrops, alt. 1491 m, leg. P. Górski, 30.09.2013 (POZNB 1721); Belianske Tatry Mts, Havrania dolina valley, mouth of the valley, on *Acer pseudoplatanus*, 49°16.269'N, 20°10.922'E, alt. 1080 m, leg. P. Górski, 26.06.2012 (POZNB 1233).

### *Preissia quadrata* (Scop.) Nees

**Distribution:** BT 800–2148 (87); HT-SL 950–2150 (26); HT-PL 1384–2075 (3); ZT-SL 800–2100 (35); TZ-PL 935–1830 (48).

**Max.** High Tatra Mts, SL, Kôprovské sedlo pass, alt. 2150 m, leg. J. Šmarda sub *Bucegia romanica*, 13.07.1958 (Šmarda 1960a, 1961), rev. J. Duda (see Duda & Váňa 1990c, 1992a).

**Min.** Belianske Tatry Mts, Tatranská Kotlina, alt. 800 m (Schiffner 1910, Györfy 1924); Západné Tatry Mts, SL: Račkova dolina valley, alt. 800 m (Šmarda 1937b, 1961; Duda 1955a); Jalovecká dolina valley, alt. 800 m, leg. J. Suza, 7. 1932, det. J. Šmarda (Duda & Váňa 1992a); Suchá dolina valley, alt. 800 m, leg. V. Peciar, 30.10.1976 (Duda & Váňa 1992a).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865, 1885), Rehman (1864), Krupa (1878), Szyszyłowicz (1885), Schiffner (1908b, 1909b, 1910, 1911), Lilienfeldówna (1910), Kulesza (1920), Györfy (1924, 1939), Šmarda (1937b, 1938, 1940, 1958, 1960a, 1961, 1976a), Duda (1955a, 1958), Szweykowski (1957, 1958a, 1960a, 1967, 1996, 2006), Keilová & Keil (1958), Szweykowski & Šmarda (1958), Vězda (1958), Boros et al. (1960), Šmarda et al. (1962), Rejment-Grochowska (1966, 1971), Hadač et al. (1969a), Peciar (1973, 1978, 1982, 1988), Balcerkiewicz et al. (1978b), Unar et al. (1984–1985), Šoltés (1990), Duda & Váňa (1992a), Blackburn et al. (1997), Kosiński (1999), Górski (2000a, 2007b), Szweykowski & Klama (2010), Górski et al. (2011).

**Note:** Some of the reports of *Bucegia romanica* cited by Šmarda (1960a, 1961) are based on an erroneous identification and refer to this species (rev. J. Duda, see Duda & Váňa 1990c). The localities for *Preissia quadrata* in the subnival belt of the Polish Tatra Mts (Cykowska 2008) belong to *Bucegia romanica* (rev. A. Stebel, see Górski et al. 2011). Some localities for *Preissia quadrata* cited by Szyszyłowicz (1885) belong to *B. romanica* (rev. W. Kulesza, Kulesza 1920). Szyszyłowicz (1885) reports a locality for this species on Mt Končistá (High Tatra Mts, SL, alt. 1794–2535 m), which may refer to the then unknown liverwort *Bucegia romanica*.

**New localities:** Tatry Zachodnie Mts, PL: Dolina Lejowa valley, calcareous rocks at the mouth of the valley, 49°16.181'N, 19°50.537'E, alt. 965 m, leg. P. Górski, 20.11.2011 (POZNB 868); Dolina Stražyska valley, gully below (N from) Skala Jelinka, 49°16.162'N, 19°55.899'E, alt. 995 m, leg. P. Górski, 21.11.2011 (POZNB 1745); Kobylarzowy Żleb pod Małołączniakiem gully, in low (at the mouth) part, rocky walls with N exposure, 49°14.624'N, 19°54.421'E, alt. 1505 m, leg. P. Górski, 22.11.2011 (POZNB 1746); Západné Tatry Mts, SL: Juráňova dolina valley, Tiesňavy, calcareous outcrops in the middle part of the gully, 49°16.566'N, 19°46.396'E, alt. 890 m, leg. P. Górski, 30.09.2013 (POZNB 1673); Mt Furkaska, alt. 1491 m, leg. P. Górski, 30.09.2013 (POZNB 1722); High Tatra Mts, SL: Bielovodská dolina valley, above (S of) Bielovodská poľana, calcareous boulder near the path, alt. 1080 m, leg. P. Górski, 15.09.2009 (POZNB 885); Kolová dolina valley, calcareous rocks in upper montane belt, 49°13.614'N, 20°11.052'E, alt. 1525 m, leg. P. Górski, 1.09.2011 (POZNB 1015).

### *Pseudolophozia sudetica* (Nees ex Huebener) Konst. et Vilnet [= *Lophozia sudetica* (Nees ex Huebener) Grolle]

**Distribution:** BT 1060–2154 (28); HT-SL 1000–2655 (630); HT-PL 925–2438 (239); ZT-SL 800–2200 (102); TZ-PL 960–2150 (73).

**Max.** (new loc.) High Tatra Mts, SL, Mt Gerlachovský štít, alt. 2655 m, leg. P. Górski, 7.08.2013 (POZNB 1646).

**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Duda, 15.09.1966 (Duda & Váňa 1995).

**Literature:** Hazslinszky (1865, 1885), Limpricht (1877a), Krupa (1878, 1882), Szyszyłowicz (1885), Schiffner (1909b, 1910, 1911, 1915), Lilienfeldówna (1914a), Györfly (1924), Krajina (1933), Šmarda (1937b, 1938, 1940, 1956, 1958, 1961, 1976a, b), Suza (1937b, 1951), Duda (1955a, 1962a), Hadač (1956), Szweykowski (1957, 1958a, 1960a, 1969, 2006), Szweykowski & Šmarda (1958), Boros et al. (1960), Šmarda et al. (1962, 1971), Váňa & Duda (1965), Pišút (1968), Rejment-Grochowska (1971), Peciar (1973, 1978, 1981, 1982), Wojterski et al. (1978), Balcerkiewicz (1984), Unar et al. (1984–1985), Háberová & Šoltésová (1989), Šoltés (1989, 1990, 2004, 2006), Duda & Váňa (1995), Blackburn et al. (1997), Kosiński (1999), Balcerkiewicz et al. (2001), Górski (2002b, 2004, 2007a, b, 2008, 2009a), Cykowska (2006b, 2008, 2011), Šibík et al. (2006), Šoltés et al. (2006), Klama (2008), Šoltés & Školek (2010), Szweykowski & Klama (2010).

**Note:** In the list presented there are 337 original localities for this species in the Tatra Mts recorded by P. Górski.

**New localities:** High Tatra Mts, SL: Štrbina pod Kotlovým štítom (ridge Malý Gerlach-Gerlachovský štít), 49°09.675'N, 20°08.159'E, alt. 2560 m, leg. P. Górski, 7.08.2013 (POZNB 1625); below Mt Gerlachovská veža (ridge Malý Gerlach-Gerlachovský štít), 49°09.790'N, 20°08.057'E, alt. 2590 m, leg. P. Górski, 7.08.2013 (POZNB 1628); Mt Kriváň, alt. 2496 m, leg. P. Górski, 29.09.2013 (POZNB 1709); N slopes below Mt Slavkovský štít, 49°09.966'N, 20°11.029'E, alt. 2450 m, leg. P. Górski, 24.09.2010 (POZNB 235, 636, 637); Tatry Zachodnie Mts, PL: below (N) from Toporowy Staw Wyżni lake, 49°16.841'N, 20°01.813'E, alt. 1095 m, leg. P. Górski, 28.09.2011 (POZNB 508); near Toporowy Staw Niżni lake, on stone in spruce forest *Plagiothecio-Piceetum*, 49°16.987'N, 20°01.840'E, alt. 1070 m, leg. P. Górski, 28.09.2011 (POZNB 536, 537).

### *Ptilidium ciliare* (L.) Hampe

**Distribution:** BT 800–2024 (69); HT-SL 850–2200 (180); HT-PL 1200–2375 (47); ZT-SL 850–2050 (27); TZ-PL 826–2100 (57).

**Max.** High Tatra Mts, PL, Mt Cubryna, alt. 2375 m, leg. B. Cykowska (Cykowska 2008).

**Min.** Belianske Tatry Mts, Tatranská Kotlina, alt. 800 m, leg. I. Györfly, 16.07.1910 (Schiffner 1911).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865), Krupa (1878), Szyszyłowicz (1885), Schiffner (1909b, 1911, 1915), Kulesza (1920), Pawłowski & Stecki (1927), Szafer et al. (1927), Krajina (1933), Suza (1937b, 1951), Šmarda et al. (1954, 1959, 1962, 1971), Duda (1955a, 1958, 1962a), Hadač (1956), Šmarda (1956, 1958, 1961), Szweykowski (1957, 1958a, 1960a, 1966, 1996, 2006), Wojterski (1957), Ježek & Vondráček (1962), Lisowski (1966), Hadač et al. (1969a), Vajda (1971), Šoltésová (1974), Šomšák (1979), Peciar (1981, 1988), Dúbravcová (1982), Kubinská & Pišút (1982), Kubíček et al. (1983), Balcerkiewicz (1984), Unar et al. (1984–1985), Duda & Váňa (1988b, c), Šoltés (1989, 1990), Szweykowski & Buczkowska (2000), Cykowska (2006b, 2008, 2011), Šibík et al. (2006), Šoltés et al. (2006), Školek (2009), Szweykowski & Klama (2010).

**Note:** The localities for this species cited by Limpricht (1877a) and Váňa & Duda (1965) belong to *Ptilidium pulcherrimum* (rev. L. Pujmanová, J. Váňa, see Duda & Váňa 1988c).

**New localities:** High Tatra Mts, SL: Veľká Zmrzlá dolina valley, blocks of rock above cross walls in the valley, 49°12.243'N, 20°12.574'E, alt. 1925 m, leg. P. Górski, 27.09.2011 (POZNB 556); Rovienny valley, Zadné Rovienny, blocks of rock, mossy pillows with *Racomitrium lanuginosum*, 49°11.247'N, 20°09.205'E, alt. 1950 m, leg. P. Górski, 25.09.2011 (POZNB 612); Mt Veľká Svišťovka, N slope, alt. 1940 m, leg. P. Górski, 30.08.2006 (POZNB 712); Zadná Javorová dolina valley, blocks of rock S of Žabie Javorové pleso lake, alt. 2010 m, leg. P. Górski, 16.08.2006 (POZNB 716); Svišťová (Bielovodská) dolina valley, upper part of the valley, 49°10.866'N, 20°08.230'E, alt. 1975 m, leg. P. Górski, 26.09.2011 (POZNB 975).

### *Ptilidium pulcherrimum* (Weber) Vain.

**Distribution:** BT 900–2100 (57); HT-SL 900–2000 (152); HT-PL 925–1500 (5); ZT-SL 750–1500 (34); TZ-PL 1140–1410 (7).

**Max.** Belianske Tatry Mts, Mt Ždiarska Vidla, alt. 2100 m (Suza 1937a).

**Min.** Tatry Zachodnie Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horníčková, 1969, det. V. Peciar (Peciar 1981, Duda & Váňa 1987a).

**Literature:** Hazslinszky (1865, 1885), Schiffner (1910, 1911), Györfly (1924), Suza (1937a, b, 1951), Šmarda (1938, 1940, 1958, 1961, 1976a, b), Duda (1955a, 1965, 1966), Szweykowski (1957, 1958a, 1960a, 1966, 2006), Boros et al. (1960), Ježek & Vondráček (1962), Šmarda et al. (1962, 1971), Peciar (1965, 1978, 1981, 1982, 1988), Šoltésová (1974, 1982), Boros & Komlodi (1975), Šoltés (1976), Kubinská & Pišút (1982), Kubíček et al. (1983), Unar et al. (1984–1985), Duda & Váňa (1987a), Šoltés (1989, 1990), Blackburn et al. (1997), Klama (2008), Szweykowski & Klama (2010).

**Note:** Some localities for *Ptilidium ciliare* cited by Limpricht (1877a) and Váňa & Duda (1965) belong to this species (rev. L. Pujmanová, J. Váňa, see Duda & Váňa 1988c).

**New localities:** High Tatra Mts, PL, Dolina Rostoki valley, Las Rostoka forest, above Wodogrzmoty Mickiewicza waterfall, 49°13.771'N, 20°05.705'E, alt. 1205 m, leg. P. Górski, 26.08.2012 (POZNB 1483); Tatrý Zachodnie Mts, PL, between Chlábówka and Cyrhla, near Droga Oswalda Balzera road, 49°17.087'N, 20°00.719'E, alt. 990 m, leg. P. Górski, 16.11.2012 (POZNB 1374).

### *Radula complanata* (L.) Dumort.

**Distribution:** BT 750–1800 (54); HT-SL 890–1685 (18); HT-PL 1025–1199 (6); ZT-SL 850–1671 (10); TZ-PL 821–1428 (38).

**Max.** Belianske Tatry Mts, Mt Bujačí vrch, alt. 1800 m, leg. J. Šmarda, 13.08.1954 (Šmarda 1956).

**Min.** Belianske Tatry Mts, Tatranská Kotlina, Dolina Hučava valley, alt. 750 m, leg. A. Boros, 19.07.1960 (Duda & Váňa 1978a).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1865), Rehman (1864), Limpricht (1877a), Krupa (1878, 1882), Szyszyłowicz (1885), Schiffner (1911, 1914), Lilienfeldówna (1914a), Györfy (1924, 1958), Vilhelm (1927), Suza (1937b), Duda (1955a), Hadač (1956), Šmarda (1956, 1958, 1961, 1976a, b), Szweykowski (1957, 1958a, 1960a, 1996), Ježek & Vondráček (1962), Šmarda et al. (1962, 1971), Mickiewicz (1965), Peciar (1965), Hadač et al. (1969a), Duda & Váňa (1978a), Šoltés (1989), Klama (2008), Szweykowski & Klama (2010).

**Note:** One report of *Scapania compacta* in the Belianske Tatry Mts cited by Vilhelm (1927) is based on an erroneous identification and belong to this species (rev. J. Duda, Duda & Váňa 1971a).

### *Radula lindenbergiana* Gottsche ex C. Hartm.

**Distribution:** BT 1240–2130 (6); HT-SL 1000–2200 (41); HT-PL 1384–2115 (10); ZT-SL 800–2100 (17); TZ-PL 931–1750 (18).

**Max.** High Tatra Mts, SL, Mlynická dolina valley, Mt Velké Solisko, alt. 2200 m, leg. V. Krajina, 4.08.1931, *Oxyrieto-Saxifragetum carpaticae*, table 10, relewé 14 (Krajina 1933).

**Min.** Západné Tatry Mts, SL, Račkova dolina valley, alt. 800 m, leg. J. Šmarda, 7.1936 (Šmarda 1937b, Duda 1955a, Duda & Váňa 1977b).

**Literature:** Szyszyłowicz (1885), Schiffner (1910), Györfy (1924, 1957), Krajina (1933), Šmarda (1937b, 1961), Duda (1955a, 1958), Szweykowski (1957, 1958a, c, 1960a, 1996), Váňa & Duda (1965), Rejment-Grochowska (1971), Duda & Váňa (1977b), Balcerkiewicz (1984), Peciar (1988), Cykowska (2008), Szweykowski & Klama (2010).

### *Reboulia hemisphaerica* (L.) Raddi

**Distribution:** BT 900–1950 (13); HT-SL ld (2); HT-PL –; ZT-SL 1300–2100 (9); TZ-PL 1025–1350 (6).

**Max.** Západné Tatry Mts, SL, Mt Kresanica, alt. 2100 m, leg. J. Suza, 7.1932, det. J. Šmarda (Duda & Váňa 1973a).

**Min.** Belianske Tatry Mts, Havrania dolina valley, alt. 900 m, leg. J. Šmarda, 11.07.1952 (Duda & Váňa 1973a).

**Literature:** Hazslinszky (1860), Limpricht (1877a), Krupa (1882), Szyszyłowicz (1885), Müller (1906–1911), Schiffner (1909b), Krajina & Suza (1929), Šmarda (1936, 1958, 1960a, 1961, 1976a), Szweykowski (1957, 1958a, 1960a, 1962), Ježek & Vondráček (1962), Šmarda et al. (1962), Rejment-Grochowska (1966), Duda & Váňa (1973a), Peciar (1988), Szweykowski & Klama (2010).

### *Riccardia latifrons* (Lindb.) Lindb.

**Distribution:** BT 1000–1364 (8); HT-SL 1000–1350 (10); HT-PL 1200 (1); ZT-SL 850–1400 (5); TZ-PL 995–1200 (11).

**Max.** Západné Tatry Mts, SL, Kamienistá dolina valley, alt. 1400 m, leg. J. Duda, 23.08.1954 (Duda 1955a, Duda & Váňa 1982a).

**Min.** Západné Tatry Mts, SL, Jamnícka dolina valley, alt. 850 m (Duda 1955a).

**Literature:** Krupa (1888), Schiffner (1911), Suza (1937b), Šmarda (1938, 1940, 1961, 1976a), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a), Ježek & Vondráček (1962), Mendelak (1977), Peciar (1978), Szweykowski & Kožlicka (1980), Duda & Váňa (1982a), Szweykowski & Klama (2010), Vončina et al. (2011).

**Note:** The data recorded by Szyszyłowicz (1885) belong to *Riccardia palmata* (rev. J. Szweykowski, M. Kožlicka, see Szweykowski & Kožlicka 1980).



**New localities:** Tatry Zachodnie Mts, PL: Żleb Zabijak gully (upper part of the Dolina Lejowa valley), 49°14.971'N, 19°50.899'E, decaying log, alt. 1250 m, leg. P. Górski, 20.11.2011 (POZNB 1044); Dolina za Bramką valley (end not accessible to tourists), 49°16.452'N, 19°54.956'E, alt. 995 m, decaying log, leg. P. Górski, 21.11.2011 (POZNB 1743); Belianske Tatry Mts, Rígfľanská dolina valley, decaying log near Rígfľanský potok stream, 49°15.238'N, 20°13.691'E, 49°15.167'N, 20°13.621'E, alt. 1070 m, 1095 m, leg. P. Górski, 1.09.2014 (POZNB 1781, 1783, 1786, 1791).

### *Riccardia multifida* (L.) Gray

**Distribution:** BT –; HT-SL –; HT-PL 925–1045 (5); ZT-SL 1300 (1); TZ-PL 955–1215 (5).

**Max.** Západné Tatry Mts, SL, Žiarska dolina valley, slopes of Mt Baranec, alt. 1300 m, leg. J. Duda, J. Váňa, 14.09.1966 (Pišút 1968, Duda & Váňa 1981c).

**Min.** High Tatra Mts, PL, Soľtysówka stream valley, wet soil in herb community, alt. 925 m, leg. H. Klama (Klama 2008).

**Literature:** Krupa (1888), Szweykowski (1957, 1958a, 1968, 2006), Pišút (1968), Duda & Váňa (1981c), Piękoś-Mirkowa & Łobaszewska (1990), Klama (2008), Szweykowski & Klama (2010).

**New localities:** Tatry Zachodnie Mts, PL: Żleb Zabijak gully (upper part of the Dolina Lejowa valley), 49°15.053'N, 19°50.945'E, alt. 1215 m, leg. P. Górski, 20.11.2011 (POZNB 1041); between Chłabówka and Cyrhla, minerotrophic spring in forest, near Droga Oswalda Balzera road, 49°17.087'N, 20°00.719'E, alt. 990 m, leg. P. Górski, 16.11.2012 (POZNB 1372); Dolina Wielkie Koryciska valley, *Arabio-Cratoneuretum*, alt. 955 m, leg. P. Górski, 18.09.2005 (POZNB 418).

### *Riccardia palmata* (Hedw.) Carruth.

**Distribution:** BT 800–1300 (19); HT-SL 800–1400 (10); HT-PL 930–1440 (14); ZT-SL 860–1400 (6); TZ-PL 900–1440 (42).

**Max.** Tatry Zachodnie Mts, PL, Las Gašienicowy forest, between Nižni and Wyžni Toporowy Staw lakes, alt. 1440 m, leg. J. Szweykowski, 16.09.1955 (Szweykowski 1960a); High Tatra Mts, PL, Dolina Gašienicowa valley, Las Gašienicowy forest, alt. 1440 m, leg. J. Szweykowski, 1954 (Mendelak 1977).

**Min.** Belianske Tatry Mts, slopes of Mt Havran, alt. 800 m, leg. J. Šmarda, 7.1952 (Duda & Váňa 1982b); High Tatra Mts, SL, Mt Baba, alt. 800 m, leg. A. Boros, 23.08.1963 (Duda & Váňa 1982b).

**Literature:** Wahlenberg (1814), Hazslinszky (1859, 1860, 1885), Limpricht (1877a), Krupa (1878), Szyszylowicz (1885), Lilienfeldówna (1914a), Szweykowski (1957, 1958a, 1960a, 1996), Šmarda (1958, 1961, 1976a, b), Duda (1962a), Šmarda et al. (1962), Mendelak (1977), Szweykowski & Kožlicka (1980), Duda & Váňa (1982b), Klama (2008), Szweykowski & Klama (2010), Vončina et al. (2011).

**New localities:** Tatry Zachodnie Mts, PL, Dolina Kościeliska valley, Wąwóz Kraków gully, decaying log, alt. 1070 m, leg. P. Górski, 21.09.2009 (POZNB 1024); Západné Tatry Mts, SL, Juráňova dolina valley, Tiesňavy, decaying log in lower part of the valley, 49°16.838'N, 19°46.293'E, alt. 860 m, leg. P. Górski, 30.09.2013 (POZNB 1661); High Tatra Mts, PL, Dolina Rybiego Potoku valley, near Wodogrzmoty Mickiewicza waterfall, decaying log, *Plagiothercio-Piceetum*, leg. P. Górski, 19.08.2004 (POZNB 1021); Belianske Tatry Mts, Rígfľanská dolina valley, decaying log at mouth of the valley, 49°15.631'N, 20°13.958'E, alt. 975 m, leg. P. Górski, 1.09.2014 (POZNB 1825).

### *Riccia sorocarpa* Bisch.

**Distribution:** BT –; HT-SL –; HT-PL –; ZT-SL 800–1500 (2); TZ-PL –.

**Max.** Západné Tatry Mts, SL, Červené vrchy, Diera, alt. 1500 m (Šmarda 1961).

**Min.** Západné Tatry Mts, SL, Dolina Jamnická valley, mouth of the valley, alt. 800 m (Duda 1955a).

**Literature:** Duda (1955a), Šmarda (1961).

### *Saccobasis polita* (Nees) H. Buch [= *Tritomaria polita* (Nees) Jörg.]

**Distribution:** BT 1200–1900 (2); HT-SL 1600–2000 (30); HT-PL 1380–2225 (13); ZT-SL –; TZ-PL 1760 (2).

**Max.** (new loc.) High Tatra Mts, PL, below Mięgoszowiecka Przełęcz pod Chłopkiem pass, 49°11.038'N, 20°04.084'E, alt. 2225 m, rock crevices, leg. P. Górski, 2.09.2014 (POZNB 1930).

**Min.** Belianske Tatry Mts, valley under Mt Havran, alt. 1200 m, leg. J. Šmarda, 10.07.1952 (Duda & Váňa 1983a).

**Literature:** Krupa (1888), Szweykowski (1956d, e, 1957, 1958a, 1960a, 1996, 2006), Szweykowski & Šmarda (1958), Boros et al. (1960), Šmarda (1960a, 1961, 1976a), Duda (1962a), Rejment-Grochowska (1971),

Szweykowski & Koźlicka (1980), Duda & Váňa (1983a), Balcerkiewicz (1984), Blackburn et al. (1997), Szweykowski & Klama (2010).

**Note:** Some localities for *Lophozia obtusa*, *Tritomaria quinquedentata* and *T. scitula* cited by Šmarda (1961) are based on erroneous identifications and belong to this species (see Duda & Váňa 1983a, 1990c).

**New localities:** Tatry Zachodnie Mts, PL, below Mt Kończysty Wierch, above Dudowe Stawki lakes, alt. 1760 m, leg. P. Górski, 11.08.2004 (POZNB 426); High Tatra Mts, PL: below Mt Kazalnica, rocks near route to Mięszowiecka Przełęcz pod Chłopkiem pass, 49°11.228'N, 20°03.988'E, alt. 1870 m, leg. P. Górski, 2.09.2014 (POZNB 1907); Dolina Pięciu Stawów Polskich valley, above SE shore of Wielki Staw lake, in stream, 49°12.179'N, 20°02.240'E, alt. 1785 m, leg. P. Górski, 24.08.2012 (POZNB 1488, 1489); Dolina Pięciu Stawów Polskich valley, wet rocky walls below mountain hostel, alt. 1620 m, leg. P. Górski, 26.07.2005 (POZNB 413); Dolina Rybiego Potoku valley, on wet stone near SE and SW shore of Morskie Oko lake, alt. 1340 m, 1400 m, leg. P. Górski, 18.08.2004 (POZNB 287, 414); High Tatra Mts, SL: Dolina Bielych Plies valley, wet rocky crevices, alt. 1800 m, leg. P. Górski, 26.09.2007 (POZNB 410, 424); Dolina Kežmarskej Bielej vody valley, N slope on Mt Veľká Svišťovka, near route, rocky crevices, alt. 1720 m, leg. P. Górski, 30.09.2006 (POZNB 412); Zadná Javorová dolina valley, wet rocky walls below Mt Javorovy štít, alt. 1970 m, leg. P. Górski, 16.08.2006 (POZNB 415); Temnosmrečinská dolina valley, near Vyšné Temnosmrečinské pleso lake, alt. 1710 m, leg. P. Górski, 22.08.2006 (POZNB 422, 423, 425); Temnosmrečinská dolina valley, NE shore of Vyšné Temnosmrečinské pleso lake, on stone near stream, 49°11.375'N, 20°02.342'E, alt. 1720 m, leg. P. Górski, 1.08.2012 (POZNB 1137); Nefcerka valley, lower glacial cirque, above Vyšný Nefcerský vodopád, near Nefcerský potok stream, 49°10.239'N, 20°00.035'E, alt. 1765 m, leg. P. Górski, 2.08.2012 (POZNB 1312); Ťažká dolina valley, lower glacial cirque, above SE shore of Ťažké pleso lake, alt. 1690 m, leg. P. Górski, 26.08.2009 (POZNB 1487).

### *Sauteria alpina* (Nees) Nees

**Distribution:** BT 1190–2000 (43); HT-SL 1630–1950 (6); HT-PL 2014 (1); ZT-SL 1480–2100 (18); TZ-PL 990–1830 (16).

**Max.** Západné Tatry Mts, SL, Červené vrchy, Mt Kresanica, alt. 2100 m, leg. J. Suza (Šmarda 1936).

**Min.** (new loc.) Tatry Zachodnie Mts, PL, Dolina Stražyska valley, calcareous outcrops at the mouth of the valley, 49°16.255'N, 19°55.937'E, alt. 990 m, leg., det. P. Górski, 21.11.2011, conf. J. Váňa (POZNB 1748).

**Literature:** Fritze & Ilse (1870), Limpricht (1877a, b, 1880a), Krupa (1882, 1888), Hazslinszky (1885), Szyszyłowicz (1885), Müller (1906–1911), Schiffner (1908b, 1909b, 1910), Lilienfeldówna (1910), Györfly (1924, 1958), Šmarda (1936, 1940, 1938, 1958, 1960a, 1961, 1976a), Boros (1940), Szweykowski (1957, 1958a, 1960a, 1966, 1996, 2006), Vězda (1958), Boros et al. (1960), Duda (1962a), Šmarda et al. (1962), Rejment-Grochowska (1966, 1971), Duda & Váňa (1973b), Peciar (1982), Blackburn et al. (1997), Szweykowski & Klama (2010).

**New locality:** Tatry Zachodnie Mts, PL, Kobylarzowy Źleb pod Małołączniakiem gully, lower part of the gully, 49°14.624'N, 19°54.421'E, alt. 1505 m, leg. P. Górski (POZNB 1747).

### *Scapania aequiloba* (Schwaegr.) Dumort.

**Distribution:** BT 800–2062 (104); HT-SL 1000–2300 (15); HT-PL 910–1560 (19); ZT-SL 800–1790 (18); TZ-PL 880–1830 (136).

**Max.** High Tatra Mts, SL, Zlomisková štrbina pass, alt. 2270–2300 m, leg. J. Šmarda (Šmarda 1961).

**Min.** Belianske Tatry Mts, Tatranská Kotlina, alt. 800 m, leg. J. Podpěra, 26.07.1922 (Duda & Váňa 1970a); Západné Tatry Mts, SL, Račkova dolina valley, alt. 800 m, leg. J. Šmarda, 7.1936 (Šmarda 1937b, Duda 1955a, Duda & Váňa 1970a).

**Literature:** Rehman (1864), Limpricht (1877a, b), Krupa (1882), Szyszyłowicz (1885), Schiffner (1908b, 1911), Lilienfeldówna (1914a), Šmarda (1937b, 1938, 1956, 1958, 1960a, b, 1961, 1976a), Suza (1937b), Hausbrandt (1949), Boros (1951), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a, 1960a, 2006), Boros et al. (1960), Ježek & Vondráček (1962), Šmarda et al. (1962), Duda & Váňa (1970a), Balcerkiewicz & Brzeg (1978), Peciar (1981), Unar et al. (1984–1985), Blackburn et al. (1997), Šoltés (2004), Klama (2008), Szweykowski & Klama (2010).

**Note:** One report of *Scapania aspera* cited by Boros (1942) belongs to this species (rev. J. Duda, Duda & Váňa 1970a). The list presented includes 151 unpublished localities obtained from the following herbaria: herb. Váňa (leg. J. Váňa, five stations), POZNB (leg. P. Górski, 97) and POZW (leg. J. Szweykowski, K. Buczkowska, A. Bączkiewicz, E. Chudzińska, 44), and WA (leg. F. Krawiec, I. Rejment-Grochowska, five).

*Scapania apiculata* Spruce

**Distribution:** BT 1000–1100 (2); HT-SL –; HT-PL –; ZT-SL 1150–1500 (2); TZ-PL wa (2).

**Max.** Západné Tatry Mts, SL, pass between Mt Osobitá and Suchá dolina valley, alt. 1500 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** Belianske Tatry Mts, near Javorinka stream, alt. 1000 m, leg. A. Boros, 2.09.1955 (Duda & Váňa 1968).

**Literature:** Szyszyłowicz (1885), Krupa (1888), Müller (1912–1916), Buch (1928), Hausbrandt (1949), Szweykowski (1957, 1958a, 2006), Šmarda (1961), Duda & Váňa (1968), Szweykowski & Klama (2010).

**Note:** P. Górski did not find this species in 2013 at the locality described by I. Szyszyłowicz in the Západné Tatry Mts, SL (see above).

*Scapania aspera* Bernet et M. Bernet

**Distribution:** BT –; HT-SL –; HT-PL –; ZT-SL 1400–1500 (2); TZ-PL 970–1330 (4\*).

**Max.** Západné Tatry Mts, SL, S slope of Mt Osobitá, alt. 1400–1500 m, leg. A. Boros, 19.08.1962 (Duda & Váňa 1970a).

**Min.** (new loc.) \* Tatry Zachodnie Mts, PL, Dolina za Bramką valley, end part available for tourism, 49°16.337'N, 19°55.022'E, calcareous rocks, *Caricetum firmae*, alt. 970 m, leg., det. P. Górski, 21.11.2011, conf. J. Váňa (POZNB 845).

**Literature:** Hausbrandt (1949), Szweykowski (1957, 1958a, 2006), Duda & Váňa (1970a), Szweykowski & Klama (2010).

**Note:** The presented list includes four unpublished localities from the Tatry Zachodnie and Západné Tatry Mountains collected by P. Górski (rev. J. Váňa). The localities of *Scapania aspera* from the Belianske Tatry Mts published by (i) Vilhelm (1927) and Boros (1942) belong to *Plagiochila porelloides* and *Scapania aequiloba*, respectively (rev. J. Duda, Duda & Váňa 1970a), (ii) Hausbrandt (1949, leg. Goetzen-Hausbrandt) belong to *Scapania aequiloba* (rev. P. Górski, WA). The locality from the the High Tatra Mts (SL, leg. J. Žebrowska, Hausbrandt 1949) refer to *Scapania undulata* (rev. P. Górski, WA) and from the High Tatra Mts (PL, leg. J. Krupa, Hausbrandt 1949) - *Scapania aequiloba* (rev. P. Górski, WA).

*Scapania brevicaulis* Taylor

**Distribution:** BT 1550–2062 (6); HT-SL 1700–1950 (11); HT-PL 2100 (1); ZT-SL 1500–1700 (5); TZ-PL 1480 (1).

**Max.** High Tatra Mts, PL, Szpiglasowa Przełęcz pass, mylonites, alt. 2100 m, leg. J. Szweykowski, 27.08.1956 (Szweykowski 1956d, 1960a).

**Min.** Tatry Zachodnie Mts, PL, Dolina Jarzabcza valley, above Hala Jarzabcza Wyżnia, granite rocks above stream, alt. 1480 m, leg. J. Szweykowski, 18.08.1956 (Szweykowski 1960a).

**Literature:** Krajina (1933), Szweykowski (1956d, 1957, 1960a, 2006), Boros (1959), Boros et al. (1960), Šmarda (1960a, 1961, 1976a), Duda & Váňa (1970c), Unar et al. (1984–1985), Šoltés (1992), Szweykowski & Klama (2010).

*Scapania calcicola* (Arnell et J. Perss.) Ingham

**Distribution:** BT 900–2062 (13); HT-SL –; HT-PL –; ZT-SL 1491–1610 (4\*); TZ-PL 920–1340 (9).

**Max.** Belianske Tatry Mts, Mt Hlúpy vrch, alt. 2062 m, leg. J. Šmarda, 15.07.1958 (Boros et al. 1960).

**Min.** Belianske Tatry Mts, Havrania dolina valley, alt. 900 m, leg. J. Šmarda (Šmarda 1961).

**Literature:** Hausbrandt (1949), Boros (1951), Duda (1955a), Szweykowski (1957, 1958a, 1960a, 1996, 2006), Boros et al. (1960), Šmarda (1960a, 1961, 1976a), Šmarda et al. (1962), Stuchlý (1964), Duda & Váňa (1968), Szweykowski & Klama (2010).

**Note:** The presented list includes eight unpublished localities from the Tatry Zachodnie and Západné Tatry Mountains recorded by P. Górski (POZNB).

**New locality:** \* Západné Tatry Mts, SL, S slope on Mt Osobitá, exposed calcareous outcrops above Sedlo pod Osobitou pass, 49°15.561'N, 19°43.313'E, alt. 1555 m, leg. P. Górski, 1.10.2013 (POZNB 1682).

*Scapania carinthiaca* J. B. Jack ex Lindb.

**Distribution:** BT 1100 (1); HT-SL –; HT-PL –; ZT-SL 900 (1); TZ-PL 1100 (1).

**Max.** Tatry Zachodnie Mts, PL, Dolina Stražyska valley, near Siklawica waterfall, alt. 1100 m, leg. J. Szweykowski, 18.08.1959 (Szweykowski 1960a); Belianske Tatry Mts, Ždiar, Spod Šiky, alt. 1100 m, leg. J. Šmarda (Šmarda 1961).

**Min.** Západné Tatry Mts, SL, near Trnovečanka stream, below Mt Baranec, alt. 900 m, leg. J. Duda, 12.07.1953 (Duda 1955a, b).

**Literature:** Duda (1955a, b), Szweykowski (1957, 1960a, 2006), Pilous & Duda (1960), Šmarda (1961), Duda & Váňa (1968), Szweykowski & Klama (2010).

**Note:** All localities for this species in the Tatra Mts are listed above.

### *Scapania compacta* (A. Roth.) Dumort.

**Distribution:** BT –; HT-SL 1600–2000 (6); HT-PL –; ZT-SL 1000 (2); TZ-PL wa (2).

**Max.** High Tatra Mts, SL, Hincovo pleso lake, alt. 1900–2000 m, leg. J. Podpěra sub *S. helvetica*, 21.07.1921, rev. J. Duda (Duda & Váňa 1971a).

**Min.** Západné Tatry Mts, SL, Tichá dolina valley, leg. J. Duda, 26.08.1954 (Duda & Váňa 1971a).

**Literature:** Krupa (1882, 1888), Hausbrandt (1949), Szweykowski (1957, 1958a), Šmarda (1961), Duda & Váňa (1971a), Šoltés (1990), Szweykowski & Klama (2010).

**Note:** The locality cited for this species in the Velická dolina valley (High Tatra Mts, SL, Hazslinszky 1885) belongs to *Anastrophyllum michauxii*, Dlhé pleso lake (High Tatra Mts, SL, Hazslinszky 1860, 1885, Limpricht 1877a, Szyszyłowicz 1885) to *Marsupella sphacelata*, Malá Studená dolina valley (High Tatra Mts, SL, Limpricht 1877a, Hazslinszky 1885, Szyszyłowicz 1885, Hausbrandt 1949) to *Scapania undulata* and that in the Belianske Tatry Mts (Vilhelm 1927) to *Radula complanata* (rev. J. Duda, Duda & Váňa 1971a).

### *Scapania crassiretis* Bryhn

**Distribution:** BT –; HT-SL 1760–2000 (7); HT-PL 1875–2090 (4); ZT-SL 2000 (1); TZ-PL wa (1).

**Max.** High Tatra Mts, PL, Dolina Waksmundzka valley, slope between Mt Wołoszyn and Mt Koszysta, 49°13'46"N, 20°03'01"E, alt. 2090 m, leg. B. Cykowska (Cykowska 2011).

**Min.** (new loc.) High Tatra Mts, SL, Kôprovnicva valley, upper part, rocks below Mt Krížne, 49°11.382'N, 19°57.518'E, alt. 1760 m, leg. P. Górski, 29.08.2014 (POZNB 1849).

**Literature:** Hausbrandt (1949), Szweykowski (1957, 1958a, 1960a, 2006), Boros et al. (1960), Duda & Váňa (1970c), Cykowska (2011), Szweykowski & Klama (2010).

**Note:** Material of this species for the two localities cited by Hausbrandt (1949) is deposited in the herbarium of University of Warsaw (WA, rev. P. Górski).

**New localities:** High Tatra Mts, SL, Nefcerka valley, below Nižné Terianske pleso lake, rocky wall dripping with water, 49°10.546'N, 20°00.673'E, alt. 1940 m, leg. P. Górski, 2.08.2012 (POZNB 1306); High Tatra Mts, PL: Dolina Gašienicowa valley, below Zawrat pass, rocky ledge with *Racomitrium lanuginosum*, 49°13.291'N, 20°01.137'E, alt. 1910 m, leg. P. Górski, 8.08.2012 (POZNB 1318); Dolina Waksmundzka valley, on wet stone in alpine grassland *Oreochloa-Juncetum sphagnetosum*, alt. 1875 m, leg. P. Górski, 22.08.2005 (POZNB 419); High Tatra, SL, N slope on Mt Veľká Svišťovka, near small stream, alt. 1940 m, leg. P. Górski, 30.09.2006 (POZNB 420).

### *Scapania curta* (Mart.) Dumort.

**Distribution:** BT 1832–2000 (3); HT-SL 1000–2100 (19); HT-PL 1384 (1); ZT-SL 850–2200 (17); TZ-PL 925–1825 (15).

**Max.** Tatry Zachodnie Mts, SL, Mt Bystrá, alt. 2200 m, leg. J. Šmarda (Šmarda 1937b).

**Min.** (new loc.) Západné Tatry Mts, SL, Jalovecká dolina valley, route to Mt Sivý vrch, *Plagiothecio-Piceetum*, trail slope, alt. 850 m, leg. P. Górski, 15.07.2008, conf. J. Váňa (POZNB 1127).

**Literature:** Szyszyłowicz (1885), Krupa (1888), Lilienfeldówna (1914b), Kulesza (1920), Šmarda (1937b, 1938, 1940, 1961), Hausbrandt (1949), Duda (1955a), Szweykowski (1957, 1958a, 1960a), Váňa & Duda (1965), Duda & Váňa (1969a), Peciar (1981, 1982), Balcerkiewicz et al. (2001), Górski (2004, 2009a), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, SL: Bielovodská dolina valley, near route, trail slope, alt. 1205 m, leg., det. P. Górski, 24.08.2009, conf. J. Váňa (POZNB 1124); Nefcerka valley, below Vyšný Nefcerský vodopád waterfall, unmarked path in dwarf mountain pine, alt. 1555 m, leg. P. Górski, 2.08.2012 (POZNB 1135); SW slope on Mt Predný Holý vrch (Liptovské kopy), near stream, 49°11.309'N, 19°57.740'E, alt. 1820 m, leg. P. Górski, 30.08.2014 (POZNB 1867); Tatry Zachodnie Mts, PL: Kulawiec, near route, alt. 1505 m, leg. P. Górski, 27.09.2006, det. J. Váňa (POZNB 1069); Dolina Wýžnia Jarzabcza valley, trail slope with *Nardia scalaris*, alt. 1515 m, leg., det. P. Górski, 27.09.2006, conf. J. Váňa (POZNB 1097); Západné Tatry Mts, SL: Jalovecká dolina valley, mouth of the valley, trail slope, alt. 885 m, leg., det. P. Górski, 15.07.2008, conf. J. Váňa (POZNB 1510);

Jamnická dolina valley, near Plačlivé pliesko lake, *Salicetum herbaceae*, alt. 1785 m, leg. P. Górski, 20.07.2006, det. J. Váňa (POZNB 1059); Juráňova dolina valley, Válovec, below Sedlo Príslop pass, trail slope, 49°15.225'N, 19°47.170'E, alt. 1375 m, leg. P. Górski, 30.09.2013 (POZNB 1723)

### *Scapania cuspiduligera* (Nees) Müll. Frib.

**Distribution:** BT 1030–2154 (64); HT-SL 1665–2040 (10); HT-PL 1393–2307 (4); ZT-SL 1500–1645 (4); TZ-PL 1040–1960 (18).

**Max.** (new loc.) High Tatra Mts, PL, Mięgusowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.018'N, 20°03.920'E, alt. 2307 m, leg. P. Górski, 2.09.2014 (POZNB 1889).

**Min.** (new loc.) Belianske Tatry Mts, Dolina pod Košiare valley, slightly above the junction of a stream from Jahňacia dolina valley with the Tokársky potok stream, calcareous rocks, 49°14.894'N, 20°15.548'E, alt. 1030 m, leg. P. Górski, 27.06.2012 (POZNB 1174).

**Literature:** Krupa (1882), Szyszyłowicz (1885), Suza (1937b), Šmarda (1938, 1940, 1956, 1960a, 1961, 1976a), Hausbrandt (1949), Szweykowski (1957, 1958a, b, 1960a, 2006), Duda (1958), Boros (1959), Boros et al. (1960), Šmarda et al. (1962), Váňa & Duda (1965), Duda & Váňa (1968), Szweykowski & Klama (2010).

**Note:** The list presented includes unpublished data recorded by J. Váňa (four stations, herb. Váňa) and P. Górski (24, POZNB).

### *Scapania gymnostomophila* Kaal.

**Distribution:** BT 1480–2154 (16); HT-SL 1665–1735 (3); HT-PL 1700–2307 (3); ZT-SL 1555–1687 (6); TZ-PL 965–1760 (7).

**Max.** (new loc.) High Tatra Mts, PL, Mięgusowiecka Przełęcz pod Chłopkiem pass, rocky crevices, 49°11.018'N, 20°03.920'E, alt. 2307 m, leg. P. Górski, 2.09.2014 (POZNB 1891).

**Min.** (new loc.) Tatry Zachodnie Mts, PL, Dolina Lejowa valley, calcareous rocks, mouth of the valley, 49°16.181'N, 19°50.537'E, alt. 965 m, leg. P. Górski, 20.11.2011 (POZNB 771).

**Literature:** Szweykowski (1956c, 1957, 1958b, 1960a, 1971, 2006), Boros (1959), Boros et al. (1960), Šmarda (1960a, 1961, 1976a), Duda & Váňa (1968), Peciar (1981), Szweykowski & Klama (2010), Górski & Váňa (2013).

**Note:** The list presented includes unpublished data recorded by J. Váňa (3 stations, herb. Váňa) and P. Górski (13, POZNB).

### *Scapania helvetica* Gottsche

**Distribution:** BT 1240–2100 (27); HT-SL 1560–2633 (69); HT-PL 1000–2200 (13); ZT-SL 900–2187 (13); TZ-PL 980–1960 (16).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2633 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** Západné Tatry Mts, SL, Trnovská dolina valley, alt. 900 m, leg. J. Šmarda (Šmarda 1961).

**Literature:** Szyszyłowicz (1885), Schiffner (1911), Lilienfeldówna (1914b), Kulesza (1920), Pawłowski et al. (1928), Krajina (1933), Hausbrandt (1949), Duda (1955a, 1962a), Szweykowski (1957, 1958a, c, 1960a, 2006), Boros (1959), Boros et al. (1960), Šmarda (1960a, 1961, 1976a), Duda (1962a), Šmarda et al. (1962), Váňa & Duda (1965), Boros & Vajda (1967), Duda & Váňa (1969a), Balcerkiewicz (1984), Šoltés et al. (2006), Klama (2008), Szweykowski & Klama (2010).

**Note:** The report of *Scapania irrigua* cited by Duda (1962a) belongs to this species (rev. J. Duda, Duda & Váňa 1969a).

### *Scapania irrigua* (Nees) Nees

**Distribution:** BT 1350 (3); HT-SL 800–1955 (11); HT-PL 893–1870 (7); ZT-SL 800–2000 (6); TZ-PL 850–1115 (6).

**Max.** Západné Tatry Mts, SL, Mt Baranec, alt. 2000 m, leg. J. Duda, 13.09.1966 (Duda & Váňa 1969b).

**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Váňa, 15.09.1966 (Duda & Váňa 1969b).

**Literature:** Krupa (1882, 1888), Szyszyłowicz (1885), Kulesza (1920), Šmarda (1938), Svoboda (1939), Hausbrandt (1949), Duda (1955a), Szweykowski (1957, 1958a), Boros et al. (1960), Váňa & Duda (1965), Duda & Váňa (1969b), Balcerkiewicz (1984), Piękoś-Mirkowa & Łobaszewska (1990), Šoltés (1990), Kosiński (1999), Szweykowski & Klama (2010).

**Note:** To this species belongs the records cited for *Scapania resupinata* in Szyszyłowicz (1885, rev. W. Kulesza, Kulesza 1920). The locality cited by Duda (1962a) refers to *S. helvetica* (rev. J. Duda, Duda & Váňa 1969a).

*Scapania mucronata* H. Buch

**Distribution:** BT 1300–2062 (6); HT-SL –; HT-PL –; ZT-SL 800 (2); TZ-PL 1160 (1).

**Max.** Belianske Tatry Mts, Mt Hlúpy, alt. 2062 m, leg. J. Šmarda, 15.07.1958 (Boros et al. 1960).

**Min.** Západné Tatry Mts, SL: forests below Mt Baranec, alt. 800 m, leg. J. Duda sub *S. curta*, 12.07.1953 (Duda 1955a, rev. J. Duda, Duda & Váňa 1969a); Jalovecká dolina valley, alt. 800 m, leg. J. Duda, J. Váňa, 15.09.1966 (Duda & Váňa 1969a).

**Literature:** Boros et al. (1960), Šmarda (1960a, 1961, 1976a), Szweykowski (1960a), Šmarda et al. (1962), Duda & Váňa 1969a), Szweykowski & Klama (2010).

*Scapania nemorea* (L.) Grolle

**Distribution:** BT 980 (1\*); HT-SL 900–1220 (6); HT-PL 1150–1175 (3); ZT-SL 1300 (1); TZ-PL 995 (3).

**Max.** Západné Tatry Mts, SL, Žiarska dolina valley, alt. 1300 m, leg. J. Váňa, 14.09.1966 (Duda & Váňa 1970c).

**Min.** High Tatra Mts, SL: Tatranská Lomnica, alt. 900 m, leg. A. Boros, 17.09.1940 (Duda & Váňa 1970c); Podspády, alt. 900 m, leg. A. Boros (Duda & Váňa 1970c).

**Literature:** Limpricht (1877a, b), Krupa (1878, 1882), Hausbrandt (1949), Szweykowski (1957, 1958a), Duda & Váňa (1970c), Šoltés (1989, 1990), Szweykowski & Klama (2010).

**New localities:** \* Belianske Tatry Mts, Podspádska dolina valley, in a valley of small stream flowing south from Podspádski potok stream, 49°16.284'N, 20°12.048'E, decaying log, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1359); Tatry Zachodnie Mts, PL, between Chłabówka and Cyrhla, minerotrophic spring in forest, near Droga Oswalda Balzera road, 49°17.065'N, 20°00.753'E, alt. 995 m, leg. P. Górski, 16.11.2012 (POZNB 1382); High Tatra Mts, PL: Dolina Roztoki valley, below Wodogrzmoty Mickiewicza waterfall, near route to mountain hostel Stara Roztoka, on stone in spruce forest *Plagiothecio-Piceetum sphagnetosum*, alt. 1150 m, leg. P. Górski, 13.09.2004, conf. J. Váňa (POZNB 1082); Dolina Roztoki valley, Wodogrzmoty Mickiewicza waterfall, 49°14.012'N, 20°05.321'E, alt. 1175 m, leg. P. Górski, 26.08.2012 (POZNB 1453).

*Scapania paludicola* Loeske et Müll. Frib.

**Distribution:** BT –; HT-SL –; HT-PL 1665 (1); ZT-SL –; TZ-PL 965 (1).

**Max.** High Tatra Mts, PL, Dolina Pięciu Stawów Polskich, near Wielki Staw lake, alt. 1665 m, leg. J. Szweykowski, 9.09.1958 (Szweykowski 1960a).

**Min.** Tatry Zachodnie Mts, PL, Polana Molkówka glade, alt. 965 m, leg. J. Szweykowski, 19.08.1956 (Szweykowski 1960a).

**Literature:** Szweykowski (1960a, 2006), Szweykowski & Klama (2010).

*Scapania paludosa* (Müll. Frib.) Müll. Frib.

**Distribution:** BT –; HT-SL 1585–1655 (2); HT-PL wa (1); ZT-SL –; TZ-PL 950–1410 (3).

**Max.** High Tatra Mts, SL, Temnosmrečinská dolina valley, alt. 1655 m, *Caltheto-Dicranellatum squarrosae*, table 26, relevé 91 (Hadač 1956), ~.

**Min.** Tatry Zachodnie Mts, PL, Polana Molkówka glade, ca 950 m, leg. F. Lilienfeldówna, T. Wilczyński, 17.08.1912 (Lilienfeldówna 1914a, b).

**Literature:** Lilienfeldówna (1914a, b), Hausbrandt (1949), Hadač (1956), Szweykowski (1957, 1958a, 1960a, 2006), Duda & Váňa (1971a), Rejment-Grochowska (1971), Szweykowski & Klama (2010).

**Note:** The report in Peciar (1981) of this species occurring in the Západné Tatry Mts (SL) should be checked.

*Scapania parvifolia* Warnst.

**Distribution:** BT 1610 (1); HT-SL 1600–2480 (16); HT-PL 1550–2090 (16); ZT-SL 800–2010 (7); TZ-PL 1610–2060 (21).

**Max.** (new loc.) High Tatra Mts, SL, S slope on Mt Kriváň, below the summit, 49°09.742'N, 20°00.016'E, alt. 2480 m, leg. P. Górski, 29.09.2013 (POZNB 1708, 1710).

**Min.** Západné Tatry Mts, SL, Račkova dolina valley, alt. 800 m (Šmarda (1961)).

**Literature:** Szweykowski (1956d, 1960a, 2006), Šmarda (1961, 1976a), Duda (1962a), Váňa & Duda (1965), Duda & Váňa (1969a), Šoltés (1990), Górski (2002b, 2007b, 2009a), Cykowska (2006b, 2011), Szweykowski & Klama (2010).

**New localities:** Západné Tatry Mts, SL: below Mt Bystrá, W slope, 49°11.791'N, 19°51.893'E, alt. 1970 m, leg. P. Górski, 4.08.2012 (POZNB 1570); Mt Predný Salatín, alt. 1780 m, leg., det. P. Górski, 23.07.2006, conf.

J. Váňa (POZNB 1126); below Žiarskie sedlo pass, on a ridge leadin up to Mt Smrek, *Oreochloa-Juncetum trifidi salicetosum herbaceae*, alt. 2010 m, leg. P. Górski, 21.07.2006, conf. J. Váňa (POZNB 1507); Račkova dolina valley, above Vyšné Račkove pleso lake, 49°12.000'N, 19°48.191'E, alt. 1765 m, *Polytrichum-Sphagnum* hummock, leg. P. Górski, 6.08.2012 (POZNB 1765); Tatry Zachodnie Mts, PL: Długi Uplaz, below Mt Grześ, trail slope, community with *Nardia scalaris*, route in *Pinetum mughi*, alt. 1610 m, leg., det. P. Górski, 26.09.2006, conf. J. Váňa (POZNB 1094); High Tatra Mts, SL: Štôlska dolina valley, below Lúčne sedlo pass, alpine grassland, alt. 2025 m, leg. P. Górski, 10.08.2010 (POZNB 1501); Temnosmrečinská dolina valley, above Vyšné Temnosmrečinské pleso lake, 49°11.299'N, 20°02.529'E, alt. 1750 m, rocky boulders, mossy pillows with *Racomitrium lanuginosum*, leg. P. Górski, 1.08.2012 (POZNB 1771); Kôprovnicva valley, upper part, rocks below Mt Krížne, 49°11.139'N, 19°57.447'E, alt. 1725 m, leg. P. Górski, 29.08.2014 (POZNB 1836); N slope on Mt Predný Holý vrch (Liptovské kopy), *Polytrichum-Sphagnum* hummock, 49°11.399'N, 19°57.834'E, alt. 1890 m, leg. P. Górski, 30.08.2014 (POZNB 1870); High Tatra Mts, PL, above Czany Staw pod Rysami lake, on stone near route to Mięszowiecka Przełęcz pod Chłopkiem pass, 49°11.384'N, 20°04.352'E, alt. 1635 m, leg. P. Górski, 2.09.2014 (POZNB 1921).

### *Scapania praetervisa* Meyl.

**Distribution:** BT 1480 (1\*); HT-SL –; HT-PL –; ZT-SL 1700 (1\*); TZ-PL 1685 (1).

**Max.** (new loc.) \* Západné Tatry Mts, SL, Červené vrchy, Javorový žľab gully, alt. 1700 m, leg. J. Váňa, 18.08.1995 (herb. Váňa).

**Min.** (new loc.) \* Bellianske Tatry Mts, Mt Faixová, alt. 1480 m, leg. J. Váňa, 1.09.1972 (herb. Váňa).

**Literature:** Szweykowski (1960a, 1996, 2006), Šmarda (1976a), Szweykowski & Klama (2010).

### *Scapania scandica* (Arnell et H. Buch) Macvivar

**Distribution:** BT 1000–1550 (5); HT-SL 1000–2064 (9); HT-PL 1830–2115 (4); ZT-SL 1000–2000 (7); TZ-PL 1090–1730 (4).

**Max.** High Tatra Mts, PL, Ciemnosmrečzyńska Przełęczka pass, 49°11'21"N, 20°02'59"E, alt. 2115 m, leg. B. Cykowska (Cykowska 2008).

**Min.** Západné Tatry Mts, SL, Tichá dolina valley, alt. 1000 m, leg. J. Duda, 26.08.1954 (Duda & Váňa 1969a); Žiarska dolina valley, alt. 1000 m, leg. J. Duda, 27.08.1954 sub *S. curta* (Duda 1955a), rev. J. Duda (Duda & Váňa 1969a); High Tatra Mts, SL, Podspády, near Javorinka stream, alt. 1000 m, leg. A. Boros, 2.09.1955 (Duda & Váňa 1969a).

**Literature:** Šmarda (1961), Váňa & Duda (1965), Duda & Váňa (1969a), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Szweykowski (2006), Szweykowski & Klama (2010).

**Note:** To this species belongs one locality for *Scapania curta* cited by Duda (1955a, rev. J. Duda, Duda & Váňa 1969a).

**New localities:** Tatry Zachodnie Mts, PL: Dolina Chochołowska valley, near route to Mt Grześ, trail slope, *Plagiothecio-Piceetum*, alt. 1460 m, leg. P. Górski, 26.09.2006, det. J. Váňa (POZNB 1093); Dolina Kościeliska valley, Wąwóz Kraków gully, decaying log, alt. 1090 m, leg. P. Górski, 21.09.2005, det. J. Váňa (POZNB 1056); Dolina Wyżnia Jarząbca valley, above Wyżnia Polana Jarząbca glade, trail slope, alt. 1180 m, leg. P. Górski, 27.09.2006, det. J. Váňa (POZNB 1092).

### *Scapania subalpina* (Nees ex Lindenb.) Dumort.

**Distribution:** BT wa (1); HT-SL 1000–2300 (86); HT-PL 1260–1905 (25); ZT-SL 1200–2000 (8); TZ-PL 1255–1700 (12).

**Max.** High Tatra Mts, SL, Mengusovské sedlo pass, alt. 2100–2300 m, leg. J. Šmarda, 12.09.1958 (Šmarda 1960a).

**Min.** High Tatra Mts, SL, near Studený potok stream, alt. 1000–1200 m, leg. A. Boros, 13.08.1963 (Duda & Váňa 1971a).

**Literature:** Hazslinszky (1860, 1865, 1885), Limpricht (1877a), Szyszyłowicz (1885), Schiffner (1911, 1915), Müller (1912–1916), Lilienfeldówna (1914a, b), Kulesza (1920), Krajina (1933), Šmarda (1938, 1960a, 1961), Hausbrandt (1949), Szweykowski (1956e, 1957, 1958a, 1960a, 1996, 2006), Duda (1962a), Váňa & Duda (1965), Duda & Váňa (1971a), Šoltés (1989, 1990, 2006), Blackburn et al. (1997), Školek (2009), Szweykowski & Klama (2010).

**Note:** The locality for *Scapania undulata* cited by Szyszyłowicz (1885) belongs to this species (Kulesza 1920). A total of 51 unpublished localities recorded by P. Górski were included in this study.

**New localities:** High Tatra Mts, SL: Spádová dolinka valley, alt. 1920 m, 1925 m, leg. P. Górski, 25.08.2009 (POZNB 1034, 1131); Ťažká dolina valley, below rocky walls on Mt Pustá stráž, near water from melting snow, alt. 1830 m, leg. P. Górski, 26.08.2008 (POZNB 1117); Zlomisková dolina valley, Zlomisková roveň, in water, alt. 1815 m, leg. P. Górski, 6.08.2010 (POZNB 1026); Žabia Bielovodská dolina valley, blocks of rock near S shore of Nižné Žabie Bielovodské pleso lake, alt. 1681 m, leg. P. Górski, 14.08.2009 (POZNB 35/2009); Žabia Bielovodská dolina valley, rocky walls with dripping water between Mlynárovo sedlo pass and Mt Veľký Žabi štít, alt. 1900 m, 1920 m, leg. P. Górski, 18.08.2009 (POZNB 48/2009, 1129); Nefcerka valley, lower glacial cirque, near Nefcerský potok stream, 49°10.239'N, 20°00.035'E, alt. 1765 m, leg. P. Górski, 2.08.2012 (POZNB 1296); Nefcerka valley, below Vyšný Nefcerský vodopád waterfall, unmarked path in montane dwarf pine, 49°10.375'N, 19°59.670'E, alt. 1600 m, leg. P. Górski, 2.08.2012 (POZNB 1300); Nefcerka, above Vyšný Nefcerský vodopád waterfall, near Nefcerský potok stream, 49°10.239'N, 20°00.035'E, alt. 1765 m, leg. P. Górski, 2.08.2012 (POZNB 1303); Tatry Zachodnie Mts, PL: Dolina Starobociańska valley, Zadnie Zagony, alt. 1700 m, leg. P. Górski, 11.08.2004 (POZNB 10/2004); Dolina Starobociańska valley, near route to Mt Ornak, on stone in water, alt. 1565 m, leg. P. Górski, 24.07.2009 (POZNB 1118); Západné Tatry Mts, SL: Spálená dolina valley, below rocky walls descending from Mt Baníkov, alt. 1885 m, leg. P. Górski, 19.07.2006 (POZNB 3/2006); Račkova dolina valley, near W shore of Vyšné Račkove pleso lake, in wet *Nardetum*, 49°11.988'N, 19°48.361'E, alt. 1730 m, leg. P. Górski, 27.08.2011 (POZNB 1119).

### *Scapania uliginosa* (Sw. ex Lindenb.) Dumort.

**Distribution:** BT –; HT-SL 1200–2000 (78); HT-PL 1520–1889 (16); ZT-SL 900–1855 (18); TZ-PL 1475 (2).  
**Max.** High Tatra Mts, SL: Hincovo pleso lake, alt. 1900–2000 m, leg. Podpěra sub *S. paludosa*, 21.07.1921, rev. J. Duda (Duda & Váňa 1971a); Mlynická dolina valley, alt. 1900–2000 m, leg. Podpěra, 26.07.1921 (Duda & Váňa 1971a).

**Min.** Západné Tatry Mts, SL, Račkova dolina valley, alt. 900 m (Šmarda 1961).

**Literature:** Limpricht (1877a, b), Krupa (1882, 1888), Szyszyłowicz (1885), Schiffner (1909b), Müller (1912–1916), Kulesza (1920), Vilhelm (1927), Krajina (1933), Šmarda (1937b, 1938, 1940, 1961, 1976a), Hausbrandt (1949), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1956c, 1957, 1958a, 1960a, 1996, 2006), Pišút (1968), Duda & Váňa (1971a), Rejment-Grochowska (1971), Balcerkiewicz (1984), Šoltés (1989, 1990), Blackburn et al. (1997), Šoltés et al. (2006), Školek (2009), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, PL: Dolina Gąsienicowa valley, below Grzędý ridge, near Kotlinowy Stawek lake, SW from Zielony Staw lake, 49°13.831'N, 19°59.695'E, alt. 1690 m, leg. P. Górski, 30.06.2010 (POZNB 158, 161, 162); Dolina Pięciu Stawów Polskich valley, in a stream flowing into Przedni Staw Polski lake, alt. 1665 m, leg. P. Górski, 26.07.2005 (POZNB 1058); Dolina Roztoki valley, near Wielka Siklawica waterfall, alt. 1650 m, leg. P. Górski, 22.09.2005 (POZNB 1028, 1031); High Tatra Mts, SL: Kolová dolina valley, near N shore of Kolové pleso lake, 49°13.258'N, 20°11.553'E, alt. 1565 m, leg. P. Górski, 28.08.2010 (POZNB 281); Temnosmrečinská dolina valley, in water, peat-bog between lakes, alt. 1710 m, leg. P. Górski, 22.08.2006 (POZNB 34, 1086); Temnosmrečinská dolina valley, below Nižné Temnosmrečinské pleso lake, alt. 1595 m, leg. P. Górski, 28.06.2010 (POZNB 1036); Temnosmrečinská dolina valley, near Vyšné Temnosmrečinské pleso lake, alt. 1705 m, leg. P. Górski, 28.06.2010 (POZNB 1080); Veľka Studená dolina valley, Dolina nad Vareškovým plesom valley, alt. 1850 m, leg. P. Górski, 23.08.2007 (POZNB 707); Žabia Bielovodská dolina valley, near S shore of Vyšné Žabie Bielovodské pleso lake, alt. 1695 m, leg. P. Górski, 29.06.2010 (POZNB 197); Žabia Bielovodská dolina valley, N shore of Nižné Žabie Bielovodské pleso, on stone in water, alt. 1675 m, leg. P. Górski, 14.08.2009 (POZNB 727); Zlomisková dolina valley, below Ladové pleso lake, 49°09.750'N, 20°06.155'E, spring with *Sweetia perennis*, alt. 1890 m, leg. P. Górski, 9.08.2011 (POZNB 1071, 1072); Západné Tatry Mts, SL: Roháčska dolina valley, above Nižný Roháčsky Vodopád waterfall, alt. 1400 m, leg. P. Górski, 24.07.2006 (POZNB 1033); Spálená dolina valley (lower part), below sub-glacially eroded step at Roháčske plesa lakes, alt. 1530 m, leg. P. Górski, 24.07.2006 (POZNB 1035); Račkova dolina valley, Račkov Zadok, near Račkove vodopády waterfall, near route, in streams, 49°11.430'N, 19°48.964'E, alt. 1600 m, leg. P. Górski, 26.08.2011 (POZNB 1089); Žiarska dolina valley, below Žiarske sedlo pass, alt. 1800 m, leg. P. Górski, 20.07.2006 (POZNB 1091).

### *Scapania umbrosa* (Schrad.) Dumort.

**Distribution:** BT 980–1200 (10); HT-SL 930–1670 (31); HT-PL 1199–1440 (5); ZT-SL 800–1500 (12); TZ-PL 1000–1480 (16).

**Max.** (new loc.) High Tatra Mts, SL, Temnosmrečinská dolina valley, below Nižné Temnosmrečinské pleso lake, rocks near route to lake, alt. 1670 m (P. Górski, 30.07.2009).



**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Váňa, 15.09.1966 (Duda & Váňa 1970a).

**Literature:** Limpricht (1877a, b), Krupa (1882, 1888), Szyszyłowicz (1885), Schiffner (1911), Lilienfeldówna (1914a), Krajina (1933), Šmarda (1938, 1958, 1961, 1976b), Hausbrandt (1949), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a, 1960a, 2006), Šmarda et al. (1962), Duda & Váňa (1970a), Szweykowski & Kožlicka (1974), Blackburn et al. (1997), Górski (2009a), Szweykowski & Klama (2010).

**Note:** The locality for this species cited by Vilhelm (1927) belongs to *Diplophyllum taxifolium* (rev. J. Duda, Duda & Váňa 1970a).

**New localities:** Belianske Tatry Mts: Podspádska dolina valley, middle part, valley of a small stream flowing south from Podspádski potok stream, 49°16.284'N, 20°12.048'E, decaying log, alt. 980 m, leg. P. Górski, 18.11.2012 (POZNB 1352); Rígfanská dolina valley, decaying log near Rígfanský potok stream, 49°15.167'N, 20°13.621'E, alt. 1095 m, leg. P. Górski, 1.09.2014 (POZNB 1790); High Tatra Mts, SL: Kôprová dolina valley, above Rázcestie pod Hlinskou, decaying log near route, alt. 1440 m, leg. P. Górski, 22.07.2008 (POZNB 705); Bielowodská dolina valley, Poľana pod Vysokou glade, 49°11.378'N, 21°06.943'E, alt. 1300 m, leg. P. Górski, 25.09.2011 (POZNB 901); Dolina Zadne Medodoly valley, alt. 1470 m, leg. P. Górski, 28.08.2010 (POZNB 1102); Javorová dolina valley, above Javorová polana glade, decaying log near route, 49°11.835'N, 20°09.321'E, alt. 1620 m, leg. P. Górski, 17.11.2012 (POZNB 1436); Dolina Bielych plies valley, rowan woods in upper montane belt, 49°13.093'N, 20°14.562'E, decaying log, alt. 1445 m, leg. P. Górski, 20.11.2012 (POZNB 1441); Javorová dolina valley, upper montane tree limit, 49°12.621'N, 20°09.352'E, decaying log near route, alt. 1440 m, leg. P. Górski, 17.11.2012 (POZNB 1445); Kôprovica valley, lower part, on stone near unmarked path, 49°10.771'N, 19°55.646'E, alt. 1180 m, leg. P. Górski, 29.08.2014 (POZNB 1882); Tatry Zachodnie Mts, PL, Dolina Kościeliska valley, Wąwóz Kraków gully, decaying log, alt. 1040 m, 1070 m, leg. P. Górski, 21.09.2009 (POZNB 1024, 1055); Západné Tatry Mts, SL, Lataná dolina valley, above Zábrať pass, alt. 1420 m, leg. P. Górski, 18.07.2006 (POZNB 360).

### *Scapania undulata* (L.) Dumort.

**Distribution:** BT wa (2); HT-SL 900–2300 (301); HT-PL 1000–1793 (21); ZT-SL 800–2200 (54); TZ-PL 1100–1750 (23).

**Max.** High Tatra Mts, SL, Mlynická dolina valley, Mt Hlinská Veža, alt. 2295–2300 m, leg. V. Krajina, 18.08.1932, *Festucetum versicoloris graniticum*, table 33, relevé 11 (Krajina 1933).

**Min.** Západné Tatry Mts, SL, Jalovecká dolina valley, alt. 800 m, leg. J. Duda, 15.09.1966 (Duda & Váňa 1972a).

**Literature:** Wahlenberg (1814), Hazslinszky (1859, 1860, 1865, 1885), Rehman (1864), Limpricht (1877a, b), Krupa (1878, 1882, 1888), Szyszyłowicz (1885), Schiffner (1909b, 1911, 1915), Lilienfeldówna (1914a, b), Kulesza (1920), Vilhelm (1927), Krajina (1933), Šmarda (1937b, 1940, 1938, 1960c, 1961, 1976a), Haubrandt (1949), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1957, 1958a, 1960a, 1996, 2006), Boros et al. (1960), Váňa & Duda (1965), Duda & Váňa (1971b, 1972a), Peciar (1978, 1981, 1982, 1988), Balcerkiewicz (1984), Šoltés (1984, 1989, 1990, 2006), Blackburn et al. (1997), Balcerkiewicz et al. (2001), Šoltés et al. (2006), Klama (2008), Górski (2009a), Školek (2009), Szweykowski & Klama (2010), Cykowska & Smieja (2011).

**Note:** The altitude for the locality for *Scapania undulata* in the Slovak High Tatra Mts (between Mt Ostrá and Mt Hrubý vrch, alt. 1947–2437 m; Szyszyłowicz 1885) is overestimated and the herbarium material collected at this locality belongs to *S. subalpina* (rev. P. Górski, KRAM 198431). The locality for *S. resupinata* cited by Szyszyłowicz (1885) belongs to *S. irrigua* (see Kulesza 1920).

**New localities:** High Tatra Mts, SL: Zlomisková dolina valley, near Ladové pleso lake, 49°09.750'N, 20°06.155'E, alt. 1865 m, leg. P. Górski, 5.08.2011 (POZNB 1076); Zlomisková dolina valley, lower glacial cirque, near stream, alt. 1815 m, leg. P. Górski, 6.08.2010 (POZNB 272); Drača dolinka valley, waterfall in lower part of the valley, alt. 2005 m, leg. P. Górski, 5.08.2010 (POZNB 275); Zadná Javorová dolina valley, in Javorinka stream, alt. 1590 m, leg. P. Górski, 16.08.2006 (POZNB 421); Suchá (Javorová) dolina valley, waterfall in lower part of the valley, alt. 1630 m, leg. P. Górski, 18.08.2006 (POZNB 1020); Dolina Bielych Plies valley, alt. 1800 m, leg. P. Górski, 26.09.2007 (POZNB 1030); Kolová dolina valley, above Kolové pleso lake, waterfall, 49°13.190'N, 20°11.701'E, alt. 1645 m, leg. P. Górski, 1.09.2011 (POZNB 1074); Važecká dolina valley, lower glacial cirque, alt. 1880 m, leg. P. Górski, 11.08.2010 (POZNB 1064); High Tatra Mts, PL, near SW shore of Czarny Staw pod Rysami lake, alt. 1600 m, leg. P. Górski, 18.08.2004 (POZNB 384); Západné Tatry Mts, SL: Račková dolina valley, Račkov Zadok, near Račkove vodopády, near route, in streams, 49°11.430'N, 19°48.964'E, alt. 1600 m, leg. P. Górski, 26.08.2011 (POZNB 1099); Račková dolina valley, near Račkove vodopády waterfall, 49°11.397'N, 19°48.870'E, alt. 1560 m, leg. P. Górski, 6.08.2012 (POZNB 1170); Hlboká (Jalovecká) dolina valley, *Arabido-Cratoneuretum*, alt. 1480 m, leg. P. Górski, 17.07.2008 (POZNB 1023, 1025).

*Schistochilopsis incisa* (Schrad.) Konst. [= *Lophozia incisa* (Schrad.) Dumort. subsp. *incisa*]

**Distribution:** BT 883–2024 (31); HT-SL 900–2154 (102); HT-PL 893–2115 (26); ZT-SL 1000–2000 (30); TZ-PL 1015–1840 (41).

**Max.** High Tatra Mts, SL, Furkotská dolina valley, Vyšné Wahlenbergovo pleso lake, alt. 2154 m, leg. J. Šmarda (Šmarda 1938).

**Min.** Belianske Tatry Mts, Belanská jaskyňa cave, alt. 883 m, leg. I. Györfy, 22.07.1910 (Schiffner 1911).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1965, 1885), Rehman (1864), Limpricht (1877a), Krupa (1878, 1882, 1888), Szyszyłowicz (1885), Schiffner (1911, 1915), Szurák (1911), Lilienfeldówna (1914a, b), Šmarda (1937b, 1938, 1940, 1958, 1961, 1976a), Suza (1937b), Duda (1955a), Hadač (1956), Szweykowski (1957, 1958a, c, 1960a, 1996, 2006), Boros et al. (1960), Šmarda et al. (1962, 1971), Vajda (1971), Szweykowski & Kožlicka (1974), Peciar (1982), Duda & Váňa (1990a), Blackburn et al. (1997), Chudzińska et al. (2001), Wojterska et al. (2004), Cykowska (2006b, 2008, 2011), Klama (2008), Szweykowski & Klama (2010).

**Note:** Some of the localities for this species cited by Šmarda (1961) belong to *Schistochilopsis* (= *Lophozia opacifolia*) (rev. J. Váňa, for details see Duda & Váňa 1992a).

*Schistochilopsis opacifolia* (Culm. ex Meyl.) Konst. [= *Lophozia incisa* (Schrad.) Dumort. subsp. *opacifolia* (Culm. ex Meyl.) R. M. Schust. et Damsh.]

**Distribution:** BT 1700–2000 (3); HT-SL 1630–2150 (39); HT-PL 1770–2259 (27); ZT-SL 1700–1920 (5\*); TZ-PL 1405–1980 (19).

**Max.** High Tatra Mts, PL, Mt Žabi Szczyt Wyżni, 49°11'16"N, 20°05'21"E, alt. 2259 m, leg. B. Cykowska (Cykowska 2008).

**Min.** Tatry Zachodnie Mts, PL, Dolina Jarząbcza valley, Rówień Jarząbcza, near stream, alt. 1405 m, leg. J. Szweykowski, 30.07.1957 (Szweykowski 1960a).

**Literature:** Szweykowski (1958c, 1960a, 1996, 2006), Boros (1959), Boros et al. (1960), Váňa & Duda (1965), Szweykowski & Kožlicka (1974), Šmarda (1976a), Balcerkiewicz (1984), Šoltés (1990), Duda & Váňa (1992a), Szweykowski & Buczkowska (2000), Balcerkiewicz et al. (2001), Chudzińska et al. (2001), Cykowska (2006b, 2008, 2011), Górski (2009a), Szweykowski & Klama (2010).

**Note:** The locality for this species cited by Šmarda (1961) belongs to *Trilophozia* (= *Tritomaria*) *quinquedentata* and *Lophozia guttulata* (rev. J. Váňa, Duda & Váňa 1992a). Some reports for *Lophozia incisa* and *L. bicrenata* cited by Šmarda (1938, 1940, 1961) are based on an erroneous identification and belong to *Schistochilopsis* (= *Lophozia opacifolia*) (rev. J. Váňa, for details see Duda & Váňa 1992a). The list presented includes 34 unpublished localities recorded by P. Górski.

**New localities:** \* Západné Tatry Mts, SL: Jalovecká dolina valley, Dolina Parichvost valley, below Baníkovské sedlo pass, alt. 1700 m, leg. P. Górski, 16.07.2008 (POZNB 103); Hlboká (Jalovecká) dolina valley, Vreče, below rocky slope on Mt Pachof'a, alt. 1815 m, leg. P. Górski, 20.07.2008 (POZNB 3/2008); Jamnická dolina valley, near W shore of Jamnické Pleso Vyšné lake, alt. 1830 m, leg. P. Górski, 25.08.2008 (POZNB 35/2008); Spálená dolina valley, below Baníkovské sedlo pass, rocky walls east of the path, alt. 1875 m, leg. P. Górski, 19.07.2006 (POZNB 2/2006); Spálená dolina valley, on slope below Mt Baníkov, alt. 1875 and 1920 m, leg. P. Górski, 19.07.2006 (POZNB 5/2006, 4/2006).

*Schljakovia kunzeana* (Huebener) Konst. et Vilnet [= *Barbilophozia kunzeana* (Huebener) Müll. Frib.]

**Distribution:** BT 1600–1800 (6); HT-SL 1685–2150 (16); HT-PL 1700–2375 (21); ZT-SL 1825–2040 (7); TZ-PL 965–2055 (35).

**Max.** High Tatra Mts, PL, Mt Cubryna, 49°11'16"N, 20°03'13"E, alt. 2375 m, leg. B. Cykowska (Cykowska 2008).

**Min.** Tatry Zachodnie Mts, PL, Polana Molkówka glade, peat-bog, alt. 965 m, leg. J. Szweykowski, 19.08.1956 (Szweykowski 1960a).

**Literature:** Limpricht (1877a, b), Krupa (1888), Müller (1906–1911), Lilienfeldówna (1914b), Szweykowski (1956a, 1957, 1958a, 1960a, b, 1962, 2006), Duda (1959, 1962a), Šmarda (1961), Váňa & Duda (1965), Rejment-Grochowska (1971), Duda & Váňa (1983b), Balcerkiewicz (1984), Szweykowski & Buczkowska (2000), Chudzińska et al. (2001), Cykowska (2006b, 2008, 2011), Szweykowski & Klama (2010).

**Note:** To this species belongs one of the localities cited for *Lophozia obtusa* by Šmarda (1961, rev. J. Váňa, J. Hubáčková, Duda & Váňa 1990c). *Schljakovia kunzeana* is reported most often in *Polytrichum-Sphagnum* hummocks. Observations of P. Górski indicate that plants of this species occur among blocks of rock (in clumps

of *Oreochloa-Juncetum typicum* and *Oreochloa-Juncetum racomitrietosum lanuginosi* grasslands) and even (one record) in a snow-bed with *Carex lachenalii* (compare with the localities listed below).

**New localities:** High Tatra Mts, PL: Dolina Waksmundzka valley, below Mt Koszysta, *Polytrichum-Sphagnum* hummock, alt. 1860 m, leg. P. Górski, 22.08.2005 (POZNB 396); Miegoszowiecka Przełęcz pod Chłopkiem pass, rocky crevices, 49°11.018'N, 20°03.920'E, alt. 2307 m, leg. P. Górski, 2.09.2014 (POZNB1886, 1890); below Miegoszowiecka Przełęcz pod Chłopkiem pass, rocky crevices, 49°11.038'N, 20°04.084'E, alt. 2225 m, leg. P. Górski, 2.09.2014 (POZNB 1911); Dolina Pięciu Stawów Polskich valley, below Mt Kotelnica, rocky crevices, *Oreochloa-Juncetum racomitrietosum lanuginosi*, alt. 1865 m, leg. P. Górski, 27.07.2005 (POZNB 897); Dolina Pięciu Stawów Polskich valley, *Polytrichum-Sphagnum* hummock below Szpiglasowa Przełęcz pass, 49°12.083'N, 20°02.415'E, alt. 1925 m, leg. P. Górski, 24.08.2012 (POZNB 1571); Dolina Gašienicowa valley, below Zawrat pass, *Polytrichum-Sphagnum* hummock, 49°13.291'N, 20°01.137'E, alt. 1910 m, leg. P. Górski, 8.08.2012 (POZNB 1153); High Tatra Mts, SL: Nefcerka valley, below Nižné Terianske pleso lake, *Polytrichum-Sphagnum* hummock, 49°10.167'N, 20°00.214'E, alt. 1845 m, leg. P. Górski, 2.08.2012 (POZNB 1327); N slope on Mt Krížne (Liptovské kopy), *Polytrichum-Sphagnum* hummock, 49°10.983'N, 19°57.547'E, 49°11.353'N, 19°57.942'E, alt. 1895 m, leg. P. Górski, 30.08.2014 (POZNB 1862, 1863); N slope on Mt Predný Holý vrch (Liptovské kopy), *Polytrichum-Sphagnum* hummock, 49°11.399'N, 19°57.834'E, 49°10.983'N, 19°57.547'E, alt. 1890 m, 1925 m, leg. P. Górski, 30.08.2014 (POZNB 1869, 1864); Temnosmrečinská dolina valley, near E shore of Vyšné Temnosmrečinské pleso lake, stony alpine grasslands dominated by *Vaccinium vitis-idaea*, 49°11.306'N, 20°02.448'E, alt. 1720 m, leg. P. Górski, 1.08.2012 (POZNB 1152); Piargová dolinka valley, 49°11.249'N, 20°02.585'E, alt. 1820 m, leg. P. Górski, 1.08.2012 (POZNB 1161); Žabia Bielovodská dolina valley, near N shore of Vyšné Žabie Bielovodské pleso lake, alt. 1685 m, leg. P. Górski, 31.07.2009 (POZNB 335); Svišťová dolina valley, Zmarznutý kotel, snow-bed with *Carex lachenalii*, alt. 2085 m, leg. P. Górski, 1.08.2006 (POZNB 400); Mlynická dolina valley, blocks of rock below Mt Malé Solisko, alt. 1950 m, leg. P. Górski, 15.08.2008 (POZNB 401); Roviienky, Zadné Roviienky, upper glacial cirque in the valley, alpine grassland *Oreochloa-Juncetum racomitrietosum lanuginosi*, 49°11.247'N, 20°09.205'E, alt. 1950 m, leg. P. Górski, 25.09.2011 (POZNB 611); Tatry Zachodnie Mts, PL: NW slopes on Mt Kamienista, rocky crevices in sub-peak area, 49°11.771'N, 19°52.052'E, 49°11.781'N, 19°52.079'E, alt. 2045 m, 2055 m, leg. P. Górski, 4.08.2012 (POZNB 1141, 1146); below Mt Kończysty Wierch, N slope, *Polytrichum-Sphagnum* hummock, alt. 1760 m, leg. P. Górski, 11.08.2004 (POZNB 426); Długi Uplaz ridge, below Mt Rakoń, alt. 1800 m, 3.07.1999, leg. P. Górski (POZNB 984); Západné Tatry Mts, SL: Jamnická dolina valley, above Jamnickie Pleso Vyšné lake, blocks of rock, alpine grassland *Oreochloa-Juncetum trifidi*, alt. 1840 m, leg. P. Górski, 25.08.2008 (POZNB 399); Jamnická dolina valley, near W shore of Vyšné Jamnické pleso lake, blocks of rock, alpine grassland *Oreochloa-Juncetum trifidi*, alt. 1830 m, leg. P. Górski, 25.08.2008 (POZNB 404); NW slope on Mt Smrek, *Polytrichum-Sphagnum* hummock, alt. 2040 m, leg. P. Górski, 21.07.2006 (POZNB 403); NW slope on Mt Predný Salatín, alt. 1825 m, leg. P. Górski, 24.07.2006 (POZNB 890).

*Schljakovianthus quadrilobus* (Lindb.) Konst. et Vilnet [= *Barbilophozia quadriloba* (Lindb.) Loeske]

**Distribution:** BT 900–2130 (17); HT-SL 2100–2300 (1); HT-PL 1800 (2); ZT-SL –; TZ-PL 1880 (1).

**Max.** High Tatra Mts, SL, Mengusovské sedlo pass, mylonitic rocks, alt. 2100–2300 m (Šmarda 1960a, 1961).

**Min.** Belianske Tatry Mts, Monkova dolina valley, alt. 900 m (Šmarda 1961).

**Literature:** Müller (1906–1911), Szweykowski (1957, 1958a, 1960a, 1967, 2006), Boros (1959), Boros et al. (1960), Šmarda (1960a, 1961, 1976a), Ježek & Vondráček (1962), Šmarda et al. (1962), Lisowski (1966), Váňa (1969), Duda & Váňa (1983b), Szweykowski & Klama (2010).

**Note:** The report of this species cited by Schiffner (1909b) belongs to *Orthocaulis* (= *Barbilophozia*) *floerkei* (rev. J. Duda, Duda & Váňa 1983b).

**New localities:** Belianske Tatry Mts: alpine grasslands below Havranie sedlo pass, N slope, 49°15.018'N, 20°11.482'E, alt. 1805 m, leg. P. Górski, 26.06.2012 (POZNB 1575); above SE part of Stará poľana glade, gully descending from Mt Nižny Havran, calcareous outcrops, 49°15.463'N, 20°11.935'E, 49°15.429'N, 20°11.858'E, alt. 1350 m, 1440 m, leg. P. Górski, 24.06.2012 (POZNB 1203, 1222).

*Solenostoma confertissimum* (Nees) Schljakov [= *Jungermannia confertissima* Nees]

**Distribution:** BT 1100–2148 (33); HT-SL 1400–2208 (19); HT-PL 2100 (1); ZT-SL 1400 (1); TZ-PL 1000–1910 (31).

**Max.** High Tatra Mts, SL, Lomnický hrebeň, alt. 2208 m, leg. A. Šoltésová, 16.08.1979, det. R. Šoltés (Šoltés 2002).

**Min.** Tatry Zachodnie Mts, PL, Dolina Małej Łąki valley, alt. 1000–1500 m, leg. A. Boros, det. J. Váňa (Váňa 1974).  
**Literature:** Boros (1951, 1959), Duda (1955a), Szweykowski (1957, 1960a, 2006), Boros et al. (1960), Boros & Vajda (1962), Duda & Váňa (1970c), Váňa (1974), Šmarda (1976a), Šoltés (2002), Szweykowski & Klama (2010).

**Note:** Some of the localities for *Jungermannia sphaerocarpa* cited by Duda (1955a, 1958), Šmarda (1938, 1961) and Szweykowski (1960a) are based on an erroneous identification and belong to this species (rev. J. Váňa, for details see Duda & Váňa 1970c). The data published by Krajina (1933) is unreliable and omitted (see Duda & Váňa l.c.). The information on the occurrence of this plant in phytocoenoses of *Luzuletum alpino-pilosae* (Kosiński 1999, herbarium material unavailable) is also unreliable. According to Váňa (1974), *Solenostoma confertissimum* includes data reported from the Tatra Mts as *Jungermannia jenseniana* (compare Duda & Váňa 1970c).

**New localities:** Belianske Tatry Mts: Havrania dolina valley, Havrania rovien, 49°15.379'N, 20°11.301'E, alt. 1460 m, leg. P. Górski, 26.06.2012 (POZNB 1283); Mt Ždiarska Vidla, N slope, alt. 2110 m, leg. P. Górski, 19.08.2006 (POZNB 362); High Tatra Mts, SL, Dolina Kežmarskej Bielej vody valley, SW part of Dolina Zeleného plesa valley, above and SW of Zelené pleso lake, near entrance to Veľká Zmrzlá dolina valley, rocky crevices, mylonitic rocks, 49°12.325'N, 20°12.965'E, alt. 1665 m, leg. P. Górski, 20.11.2012 (POZNB 1339); Tatry Zachodnie Mts, PL: Žleb Zabijak gully (upper part of the Dolina Lejowa valley), 49°15.107'N, 19°50.972'E, alt. 1180 m, leg. P. Górski, 20.11.2011 (POZNB 740); Kobyłarzewy Żleb pod Małolączniakiem gully, upper part of the gully, calcareous rocks with alpine grasslands *Caricetum firmae*, N slope, 49°14.632'N, 19°54.649'E and 49°14.668'N, 19°54.757'E, alt. 1700 m, 1760 m, leg. P. Górski, 22.11.2011 (POZNB 844, 850).

*Solenostoma gracillimum* (Sm.) R. M. Schust. [= *Jungermannia gracillima* Sm.]

**Distribution:** BT 1080–1100 (2); HT-SL 1000–2634 (21); HT-PL 1030–1995 (8); ZT-SL 750–2100 (16); TZ-PL 1040–1600 (9).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2634 m (Šmarda 1961).

**Min.** Západné Tatry Mts, SL: Pribylina, Potôčky, alt. 750 m, leg. J. Horničková (Peciar 1978); Juráňova dolina valley, alt. 750 m (Peciar 1985).

**Literature:** Limpricht (1877a, b), Krupa (1882, 1888), Szyszyłowicz (1885), Šmarda (1937b, 1938, 1961), Duda (1955a), Szweykowski (1957, 1958a, 1960a, 2006), Duda & Váňa (1971b), Váňa (1974), Peciar (1978, 1981, 1982, 1985, 1988), Šoltés (1990), Blackburn et al. (1997), Kosiński (1999), Górski (2007b, 2009a), Klama (2008), Szweykowski & Klama (2010).

**Note:** The locality recorded for this species in the Mlynická dolina valley (High Tatra Mts, SL, Váňa & Duda 1965) is for *Solenostoma sphaerocarpum* (rev. J. Váňa, Duda & Váňa 1971b).

**New localities:** Belianske Tatry Mts: S slope on Mt Długi Wierch, in sub-peak area, trail slope, alt. 1080 m, leg. P. Górski, 18.11.2012 (POZNB 1388); Tatry Zachodnie Mts, PL: Dolina Starorobociańska valley, Starorobociańska Polana glade, trail slope, alt. 1095 m, leg. P. Górski, 29.09.2006 (POZNB 1623); Dolina Jarzabcza valley, Pope John Paul II route, trail slope, alt. 1190 m, leg. P. Górski, 27.09.2006 (POZNB 1624); near route from Polana Chochołowska glade to Mt Grześ, below Łucznińska Przełęcz pass, alt. 1420 m, 1425 m, leg. P. Górski, 26.09.2006 (POZNB 976, 1621).

*Solenostoma hyalinum* (Lyell) Mitt. [= *Jungermannia hyalina* Lyell]

**Distribution:** BT –; HT-SL 1100–2000 (6); HT-PL –; ZT-SL 1000–1550 (3); TZ-PL 1100–1280 (2).

**Max.** High Tatra Mts, SL, Mt Veľká Svišťovka, alt. 1800–2000 m, leg. J. Šmarda, 14.07.1958 (Boros et al. 1960).

**Min.** Západné Tatry Mts, SL, Žiarská dolina valley, alt. 1000 m, leg. J. Duda, 27.08.1954, det. J. Váňa (Duda & Váňa 1971a).

**Literature:** Szweykowski (1957, 1960a, 2006), Boros et al. (1960), Šmarda (1961), Duda & Váňa (1971a), Váňa (1975b), Šoltés (1990), Szweykowski & Klama (2010).

**Note:** The localities cited by Schiffner (1915), Šmarda (1937b) and Duda (1955a) are for *Nardia scalaris* and *Solenostoma sphaerocarpum* (rev. J. Váňa, see Duda & Váňa 1971a).

*Solenostoma obovatum* (Nees) C. Massal. [= *Jungermannia obovata* Nees]

**Distribution:** BT 1580–1640 (2); HT-SL 775–2340 (77); HT-PL 1384–2140 (15); ZT-SL 800–2000 (18); TZ-PL 893–1945 (19).

**Max.** High Tatra Mts, SL, S slope on Mt Lomnický štít, alt. 2340 m, leg. R. Šoltés, 5.08.1982, *Andraeaetum nivale*, table 4, relevé 3 (Šoltés 1984).

**Min.** High Tatra Mts, SL, alt. 775 m, Stará Lesná, in stream, leg. R. Šoltés, 14.07.1982, *Brachythecio rivularis-Fontinalietum antipyreticae*, table 13a, relevé 1 (Šoltés 1989).

**Literature:** Limpricht (1877a, b), Hazslinszky (1885), Szyszyłowicz (1885), Krupa (1888), Lilienfeldówna (1914a), Schiffner (1915), Szepesfalvy (1926), Šmarda (1938, 1961), Duda (1955a, 1958, 1962a), Szweykowski (1957, 1958a, 1960a, 1996, 2006), Boros & Vajda (1962), Pišút (1968), Duda & Váňa (1971a), Rejment-Grochowska (1971), Váňa (1975b), Dúbravcová (1982), Šoltés (1984, 1989, 1990), Blackburn et al. (1997), Šoltés et al. (2006), Školek (2009), Szweykowski & Klama (2010), Cykowska (2011).

**Note:** One locality for *Jungermannia sphaerocarpa* cited by Šmarda (1961) belongs to this species (rev. J. Váňa, Duda & Váňa 1970a, 1971a).

**New localities:** High Tatra Mts, SL: Vefka Studená dolina valley, Dolinka nad Vareškovým Plesom valley, alt. 1850 m, leg. P. Górski, 23.08.2007 (POZNB 1524); Žabia Bielovodská dolina valley, near S shore of Nižné Žabie Bielovodské pleso lake, alt. 1675 m, leg. P. Górski, 14.08.2009 (POZNB 1527); Západné Tatry Mts, SL: glacial cirque below Mt Brestová, on N side, alt. 1725 m, leg. P. Górski, 23.07.2006 (POZNB 1534); Spálená dolina valley, upper part of the valley, above Roháčske vodopady waterfall, alt. 1400 m, leg. P. Górski, 24.07.2006 (POZNB 1543).

*Solenostoma sphaerocarpum* (Hook.) Steph. [= *Jungermannia sphaerocarpa* Hook.]

**Distribution:** BT 1832–2062 (2); HT-SL 1180–2633 (240); HT-PL 970–2259 (67); ZT-SL 900–2250 (35); TZ-PL 1035–2200 (37).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2633 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** Západné Tatry Mts, SL: Račkova dolina valley, alt. 900 m, leg. J. Šmarda (Šmarda 1937b, Duda 1955a); Trnovská dolina valley, under Mt Baranec, alt. 900 m, leg. J. Duda (Duda 1955a).

**Literature:** Rehman (1864), Limpricht (1877a), Krupa (1882, 1888), Hazslinszky (1885), Szyszyłowicz (1885), Schiffner (1909b, 1911, 1915), Kulesza (1920), Szafer et al. (1927), Vilhelm (1927), Krajina (1933), Šmarda (1937b, 1938, 1940, 1961), Duda (1955a, 1962a), Szweykowski (1956e, 1957, 1958a, 1960a, 2006), Szweykowski & Šmarda (1958), Boros et al. (1960), Váňa & Duda (1965), Hadač et al. (1969a, b), Váňa (1969, 1974), Duda & Váňa (1970a), Peciar (1978), Balcerkiewicz (1984), Šoltés (1984, 1990), Balcerkiewicz et al. (2001), Górski (2004, 2007b, 2009a), Cykowska (2006b, 2008, 2011), Šoltés et al. (2006), Klama (2008), Szweykowski & Klama (2010), Cykowska & Smieja (2011).

**Note:** The reports of *Jungermannia gracillima* cited by Váňa & Duda (1965) and of *Nardia geoscyphus* occurring on Mt Lomnický štít (High Tatra Mts, SL, Szyszyłowicz 1885) are based on erroneous identifications and belong to this species (rev. J. Váňa, Duda & Váňa 1971b, rev. P. Górski, 2013, KRAM). One locality for this species cited by Duda (1958) belongs to *Solenostoma confertissimum* (rev. J. Váňa, Duda & Váňa 1970a). The list presented includes 55 unpublished records of P. Górski.

**New locality:** High Tatra Mts, SL, upper part of Batizovský žlab gully, 49°09.639'N, 20°07.944'E, alt. 2350 m, leg. P. Górski, 7.08.2013 (POZNB 1636).

*Solenostoma subellipticum* (Lindb. ex Kaal.) R. M. Schust. [= *Jungermannia subelliptica* (Lindb. ex Kaal.) Levier]

**Distribution:** BT –; HT-SL 1850–1960 (2); HT-PL 1800 (1); ZT-SL 1950 (1); TZ-PL 1685 (1).

**Max.** High Tatra Mts, SL, Zelená Javorová dolina valley, below Mt Žabí Javorový vrch, alt. 1960 m, leg. A. Šoltésová, 29.07.1982 (Šoltés 1990), –.

**Min.** Tatry Zachodnie Mts, PL, Dolina Jarzabcza valley, NW slope on Mt Jarzabczy Wierch, alt. 1685 m, leg. J. Szweykowski, 5.08.1956 (Szweykowski 1960a).

**Literature:** Szweykowski (1957, 1960a), Šmarda (1961, 1976a), Duda & Váňa (1970c), Váňa (1975b), Šoltés (1990), Cykowska (2006b), Szweykowski & Klama (2010).

**Note:** The locality for this species cited by Duda (1955a) belongs to *Jungermannia pumila* (rev. J. Váňa, Duda & Váňa 1970c).

*Sphenolobus minutus* (Schreb.) Berggr. [= *Anastrophyllum minutum* (Schreb.) R. M. Schust.]

**Distribution:** BT 1060–2000 (31); HT-SL 900–2465 (122); HT-PL 1505–2438 (56); ZT-SL 900–2200 (20); TZ-PL 941–1900 (30).

**Max.** (new loc.) High Tatra Mts, SL, S slope on Mt Kriváň, below the summit, 49°09.724'N, 20°00.034'E, alt. 2465 m, leg. P. Górski, 29.09.2013 (POZNB 1731).

**Min.** Západné Tatry Mts, SL, Račkova dolina valley, alt. 900 m (Šmarda 1937b, Duda 1955a).

**Literature:** Wahlenberg (1814), Hazslinszky (1860), Limpricht (1877a), Krupa (1878, 1882), Szyszyłowicz (1885), Schifflner (1911, 1915), Szafer et al. (1927), Krajina (1933), Šmarda (1937b, 1938, 1940, 1956, 1958, 1961), Duda (1955a, 1958, 1962a), Hadač (1956), Szweykowski (1957, 1958a, 1960a, 1969), Wojterski (1957), Boros et al. (1960), Rivola (1962), Šmarda et al. (1962), Váňa & Duda (1965), Hadač et al. (1969a, b), Kubička (1969), Šoltés (1976, 1990), Wojterski et al. (1978), Peciar (1981, 1982), Duda & Váňa (1984c), Balcerkiewicz (1984), Unar et al. (1984–1985), Szweykowski & Buczkowska (2000), Górski (2004, 2007a, b), Cykowska (2006b, 2008, 2011), Šibík et al. (2006), Šoltés & Školek (2010), Szweykowski & Klama (2010).

**Note:** One report of *Tritomaria exsectiformis* occurring in the Belianske Tatry Mts cited by Šmarda et al. (1962) belongs to this species (rev. J. Duda, Duda & Váňa 1982a).

**New localities:** *A. minutum* var. *weberi*: Západné Tatry Mts, SL, Roháčska dolina valley, near Spalový potok stream, below Nižný Roháčsky vodopád waterfall, on rocky boulder, *Plagiothecio-Piceetum sphagnetosum*, alt. 1285 m, leg. P. Górski, 24.07.2006 (POZNB 321); Tatry Zachodnie Mts, PL, Dolina Wielkie Koryciska valley, middle part of the valley, on soil, *Polysticho-Piceetum*, alt. 955 m, leg. P. Górski, 18.09.2005 (POZNB 697).

*Sphenolobus saxicola* (Schrad.) Steph. [= *Anastrophyllum saxicola* (Schrad.) R. M. Schust.]

**Distribution:** BT –; HT-SL wa (1); HT-PL wa (1); ZT-SL 1835–2050 (3); TZ-PL 2100 (1).

**Max.** Tatry Zachodnie Mts, PL, Czerwone Wierchy ridge, precise location not given, alt. ca 2100 m (Krupa 1882).

**Min.** Západné Tatry Mts, SL, northwestern slope on Mt Predný Salatín, alt. 1835 m, leg. P. Górski, 23.07.2006, conf. J. Váňa (POZNB 725, Górski 2009b).

**Literature:** Krupa (1882), Szyszyłowicz (1885), Szweykowski (1957, 1958a, 2006), Szweykowski & Kožlicka (1980), Duda & Váňa (1983a), Górski (2009b), Szweykowski & Klama (2010).

*Szyziella autumnalis* (DC.) Feldberg, Váňa, Hentschel et Heinrichs [= *Jamesoniella autumnalis* (DC.) Steph.]

**Distribution:** BT 920–1200 (6); HT-SL –; HT-PL 920–1159 (10); ZT-SL 1400–1600 (1); TZ-PL 905–1185 (3).

**Max.** Západné Tatry Mts, SL, Roháčska dolina valley, alt. 1400–1600 m, leg. A. Boros, 18.08.1962, det. J. Váňa (Duda & Váňa 1970b).

**Min.** (new loc.) Tatry Zachodnie Mts, PL, Dolina Wielkie Koryciska valley, spruce forest *Polysticho-Piceetum*, on soil, alt. 905 m, leg. P. Górski, 18.09.2005 (POZB 417).

**Literature:** Krupa (1882, 1888), Szyszyłowicz (1885), Kulesza (1920), Szweykowski (1957, 1958a, 1971), Duda & Váňa (1970b), Klama (2008), Szweykowski & Klama (2010).

**Note:** Krajina (1933) reports a locality for this plant in the Mlynická dolina valley (High Tatra Mts, SL) at an altitude of 1475 m. However, the herbarium material was misidentified (see Váňa & Duda 1965). The highest locality (alt. 1674–1889 m a.s.l.) was recorded by Szyszyłowicz (1885) in the Dolina Pięciu Stawów Polskich valley (High Tatra Mts, PL) (revised and confirmed by W. Kulesza in 1919). Herbarium material from that locality, however, belongs to *Odontoschisma elongatum* (rev. P. Górski, KRAM 198301).

**New localities:** Belianske Tatry Mts: Podspádska dolina valley, W part, near Podspádski potok stream, 49°16.440'N, 20°11.708'E, alt. 980 m, decaying log, leg. P. Górski, 18.11.2012 (POZNB 1348); Ríglfanská dolina valley, decaying log near Ríglfanský potok stream, 49°15.447'N, 20°13.734'E, 49°15.238'N, 20°13.691'E, alt. 1025 m, 1070 m, leg. P. Górski, 1.09.2014 (POZNB 1812, 1777, 1784).

*Tetralophozia setiformis* (Ehrh.) Schljakov

**Distribution:** BT –; HT-SL 1536–2633 (28); HT-PL 1550–1975 (19); ZT-SL –; TZ-PL 1800 (1).

**Max.** High Tatra Mts, SL, Mt Lomnický štít, alt. 2200–2633 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885).

**Min.** High Tatra Mts, SL, Dolina Kežmarskej Bielej vody valley, between Zelené pleso and Čierne pleso lakes, alt. 1536 m (Wahlenberg 1814).

**Literature:** Wahlenberg (1814), Hazslinszky (1860, 1885), Limpricht (1877a), Szyszyłowicz (1885), Kulesza (1920), Szweykowski (1956b, c, e, 1957, 1958a, 1960a, 1964, 2006), Wojterski (1957), Boros (1959), Boros et al. (1960), Šmarda (1961, 1976a), Duda & Váňa (1982a), Górski (2007a, 2011), Szweykowski & Klama (2010).

**New localities:** High Tatra Mts, SL: Veľká Zmrzlá dolina valley, blocks of rock above subglacially eroded step in the Dolina Kežmarskej Bielej vody valley, 49°12.243'N, 20°12.574'E, alt. 1925 m, leg. P. Górski, 27.09.2011 (POZNB 614); Huncovská dolina valley, rocky rubble filling the valley bottom, alt. 1915 m, leg. P. Górski, 17.07.2011 (POZNB 683); High Tatra Mts, PL: Dolina Gąsienicowa valley, rocky rubble at the edge of the kettle below Mylna Przełęcz pass, mossy pillow with *Racomitrium lanuginosum*, 49°13.394'N, 20°00.731'E, alt. 1965 m,

leg. P. Górski, 30.08.2011 (POZNB 662); Dolina Gašienicowa valley, blocks of rock above NE shore of Długi Staw Gašienicowy lake, 49°13.634'N, 20°00.603'E, alt. 1800 m, leg. P. Górski, 20.09.2010 (POZNB 1109). Dolina Gašienicowa valley, glacial cirque below Świnicka Przełęcz pass, blocks of rock, 49°13.384'N, 20°00.429'E, alt. 1885 m, leg. P. Górski, 20.09.2010 (POZNB 1110).

*Trichocolea tomentella* (Ehrh.) Dumort.

**Distribution:** BT 800 (4); HT-SL 800–1000 (4); HT-PL 893–1259 (6); ZT-SL 750–800 (4); TZ-PL Id (1).

**Max.** High Tatra Mts, PL, forest between Roztoka and Wołoszyn, alt. 1259 m, leg. I. Szyszyłowicz (Szyszyłowicz 1885)

**Min.** Západné Tatry Mts, SL, Pribylina, Potôčky, alt. 750 m, leg. J. Horníčková, 4.05.1974, det. V. Peciar (Duda & Váňa 1977b).

**Literature:** Krupa (1878), Szyszyłowicz (1885), Schiffner (1911), Györfy (1924), Svoboda (1939), Duda (1955a, 1958), Szweykowski (1957, 1958a, 1966), Šmarda et al. (1962), Duda & Váňa (1977b), Peciar (1985), Klama (2008), Szweykowski & Klama (2010).

**Note:** Szafer et al. (1927) report a locality for this plant in the Polish Tatra Mts at an altitude of 1700–1760 m a.s.l., in a thicket of dwarf mountain pine. This record is unreliable (mistaken for *Ptilidium ciliare*?, herbarium material is missing).

*Trilophozia quinquedentata* (Huds.) Bakalín [= *Tritomaria quinquedentata* (Huds.) Buch.]

**Distribution:** BT 900–2100 (50); HT-SL 900–2655 (109); HT-PL 854–2499 (76); ZT-SL 850–2200 (34); TZ-PL 894–2030 (55).

**Max.** (new loc.) High Tatra Mts, SL, Mt Gerlachovský štít, alt. 2655 m, leg. P. Górski, 7.08.2013 (POZNB 1642).

**Min.** Západné Tatry Mts, SL, Jamnická dolina valley, alt. 850 m (Duda 1955a).

**Literature:** Wahlenberg (1814), Hazslinszky (1860), Rehman (1864), Limpricht (1877a), Krupa (1878, 1882), Szyszyłowicz (1885), Schiffner (1910, 1915), Šmarda (1937b, 1938, 1940, 1958, 1960a, 1961), Duda (1955a, 1962a), Szweykowski (1957, 1958a, 1960a, 2006), Boros et al. (1960), Šmarda et al. (1962, 1971), Váňa & Duda (1965), Lisowski (1966), Boros & Vajda (1967), Wojterski et al. (1978), Szweykowski & Kožlicka (1980), Duda & Váňa (1982c), Balcerkiewicz (1984), Šoltés (1984, 1990), Unar et al. (1984–1985), Blackburn et al. (1997), Balcerkiewicz et al. (2001), Cykowska (2006b, 2008, 2011), Šibík et al. (2006), Šoltés et al. (2006), Górski (2007a, 2009b), Klama (2008), Szweykowski & Klama (2010), Buczkowska et al. (2012).

**New localities:** Západné Tatry Mts, SL: Hlboká (Jalovecká) dolina valley, Vreče, blocks of rock, 49°12.324'N, 19°41.833'E, alt. 1770 m, leg. P. Górski, 17.07.2008 (POZNB 1/2008); Račková dolina valley, Račkov Zadok, blocks of rock near Vyšné Račkove pleso lake, alt. 1715 m, leg. P. Górski, 21.07.2009 (POZNB 3/2009); Tatry Zachodnie Mts, PL: Kobylarzowy Żleb pod Małofączniakiem gully, upper part, calcareous rocks, 49°14.668'N, 19°54.757'E, alt. 1760 m, leg. P. Górski, 22.11.2011 (POZNB 852); Żleb Zabijak gully (upper part of the Dolina Lejowa valley), on stone, 49°15.157'N, 19°50.989'E, alt. 1145 m, leg. P. Górski, 20.11.2011 (POZNB 860, 861); High Tatra Mts, SL: above Sedielko pass, 49°11.583'N, 20°10.900'E, alt. 2390 m, leg. P. Górski, 14.08.2013 (POZNB 1647); Veľka Studená dolina valley, Dolinka nad Vareškovým Plesom valley, alt. 1860 m, leg. P. Górski, 23.08.2007 (POZNB 12/2007); Rovenky valley, below rocky walls on Mt Predná Javorová veža, N slope, 49°11.375'N, 20°08.523'E, alt. 1710 m, leg. P. Górski, 25.09.2011 (POZNB 582); Rovenky valley, Zadné Rovenky, alpine grasslands *Oreochloa-Juncetum trifidi racomitrietosum lanuginosi*, 49°11.247'N, 20°09.205'E, alt. 1950 m, leg. P. Górski, 25.09.2011 (POZNB 611); Svišťová (Bielovodská) dolina valley, Vyšna Svišťová roveň, 49°10.838'N, 20°08.132'E, alt. 1985 m, leg. P. Górski, 26.09.2011 (POZNB 474); Svišťová (Bielovodská) dolina valley, Zmarznutý kotol, alt. 2060 m, leg. P. Górski, 1.08.2006 (POZNB 27/2006); Žabia Bielovodská dolina valley, above S shore of Vyšné Žabie Bielovodské pleso lake, alt. 1730 m, leg. P. Górski, 15.08.2009 (POZNB 39/2009); Piargová dolinka valley, in the glacial cirque below Mt Cubrina, alt. 1870 m, leg. P. Górski, 28.07.2009 (POZNB 19/2009); Nefcerka valley, blocks of rock below Mt Kriváň, 49°10.071'N, 19°00.163'E, alt. 1830 m, leg. P. Górski, 2.08.2011 (POZNB 645).

*Tritomaria exsecta* (Schmidel) Schiffn. ex Loeske

**Distribution:** BT 800–2000 (58); HT-SL 1000–2425 (44); HT-PL 925–2115 (13); ZT-SL 750–1700 (19); TZ-PL 1040–2120 (20).

**Max.** High Tatra Mts, SL, S slope on Mt Končistá, 49°09.316'N, 20°06.880'E, alt. 2425 m, leg. P. Górski, 28.08.2014 (POZNB 1879).

**Min.** Západné Tatry Mts, SL, Juráňova dolina valley, alt. 750 m (Peciar 1985).

**Literature:** Rehman (1864), Limpricht (1877a), Krupa (1882), Szyszylowicz (1885), Schiffner (1911), Lilienfeldowna (1914a), Šmarda (1937b, 1938, 1940, 1958, 1961, 1976b), Duda (1955a, 1962a), Szweykowski (1956e, 1957, 1958a, 1960a), Ježek & Vondráček (1962), Šmarda et al. (1962), Mickiewicz (1965), Peciar (1965, 1985), Váňa & Duda (1965), Hadač et al. (1969a, b), Rejment-Grochowska (1971), Szweykowski & Kožlicka (1974), Duda & Váňa (1982b), Šoltés (1990), Blackburn et al. (1997), Šoltés et al. (2006), Górski (2007b), Cykowska (2008), Klama (2008), Szweykowski & Klama (2010), Vončina et al. (2011).

**Note:** One locality of *Tritomaria exsectiformis* published by Boros et al. (1960) belongs to this species (rev. J. Duda, Duda & Váňa 1982a).

**New localities:** Tatry Zachodnie Mts, PL: below Mt Błyszcz, N slope, 49°11.604'N, 19°50.477'E, alt. 2120 m, leg. P. Górski, 23.09.2010 (POZNB 1106); Kobylarzowy Żleb pod Małołączniakiem gully, upper part of the gully, calcareous rocks with a northern exposure, 49°14.668'N, 19°54.757'E, alt. 1760 m, leg. P. Górski, 22.11.2011 (POZNB854); above Kobylarzowy Żleb pod Małołączniakiem gully, Czerwony Grzbiet, 49°14.677'N, 19°54.846'E, alt. 1820 m, leg. P. Górski, 22.11.2011 (POZNB 865); Dolina Kościeliska valley, Wąwóz Kraków gully, decaying log, alt. 1040 m, leg. P. Górski, 21.09.2005 (POZNB 1055); High Tatra Mts, SL: Štolska dolina valley, below Lúčne sedlo pass, 49°09.095'N, 20°06.372'E, alt. 2025 m, leg. P. Górski, 10.08.2010 (POZNB 234); Dolina Zadné Medodoly valley, 49°11.307'N, 20°09.951'E, alt. 1180 m, leg. P. Górski, 22.10.2010 (POZNB 266); Rovníčky valley, Zadné Rovníčky, rocky rubble in the highest kettle in the valley, *Oreochloa-Juncetum trifidi racomitrietosum lanuginosi*, 49°11.247'N, 20°09.205'E, alt. 1950 m, leg. P. Górski, 25.09.2011 (POZNB 608); Kolová dolina valley, calcareous rocks in upper montane belt, near route to lake, 49°13.644'N, 20°11.039'E, alt. 1500 m, leg. P. Górski, 1.09.2011 (POZNB 748); Bielowodská dolina valley, Pořana pod Vysokou glade, 49°11.378'N, 21°06.943'E, alt. 1300 m, leg. P. Górski, 25.09.2011 (POZNB 901); Bielowodská dolina valley, near route, *Plagiothecio-Piceetum*, alt. 1235 m, leg. P. Górski, 20.08.2009 (POZNB 927).

### *Tritomaria exsectiformis* (Breidl.) Schiffn. ex Loeske

**Distribution:** BT 1000–2062 (12); HT-SL 900–2655 (50); HT-PL 1745–2499 (10); ZT-SL 1000 (1); TZ-PL 1905 (1).

**Max.** (new loc.) High Tatra Mts, SL, Mt Gerlachovský štít, alt. 2655 m, leg. P. Górski, 7.08.2013 (POZNB 1644).

**Min.** High Tatra Mts, SL, above Tatranské Matliare, alt. 900 m, leg. J. Šmarda, 15.09.1952 (Duda & Váňa 1982a).

**Literature:** Krajina (1933), Šmarda (1938, 1940, 1961), Duda (1955a), Szweykowski (1957, 1958a, 1960a, 1996, 2006), Boros et al. (1960), Váňa & Duda (1965), Šoltésová (1974), Szweykowski & Kožlicka (1974), Šoltés (1976, 1990, 2002), Duda & Váňa (1982a), Balcerkiewicz (1984), Szweykowski & Buczkowska (2000), Šoltés et al. (2006), Cykowska (2008, 2011), Szweykowski & Klama (2010).

**Note:** One locality for *Tritomaria exsecta* on Mt Slavkovský štít (High Tatra Mts, SL, alt. 1900 m) cited by Šmarda (1961) belongs to this species (rev. J. Duda, Duda & Váňa 1982b).

**New localities:** High Tatra Mts, PL: Mięgusowiecka Przełęcz pod Chłopkiem pass, rock crevices, 49°11.018'N, 20°03.920'E, alt. 2307 m, leg. P. Górski, 2.09.2014 (POZNB 1895); on ridge between Wrota Chałubińskiego pass and Mt Szpiglasowy Wierch, close to Wrota Chałubińskiego pass, rocky crevices with northern exposure, 49°11.576'N, 20°02.619'E, alt. 2075 m, leg. P. Górski, 28.08.2012, conf. J. Váňa (POZNB 1517); High Tatra Mts, SL: S slope on Mt Kriváň, below the summit, 49°09.742'N, 20°00.016'E, alt. 2480 m, leg. P. Górski, 29.09.2013 (POZNB 1700); Rovníčky valley, Zadné Rovníčky, *Oreochloa-Juncetum trifidi*, 49°11.262'N, 20°09.063'E, alt. 1910 m, leg. P. Górski, 25.09.2011 (POZNB 490); Hlinská dolina valley, below Vyšné Kôprovské sedlo pass, rocky crevices, alt. 1815 m, leg. P. Górski, 21.08.2006 (POZNB 686); Zadná Javorová dolina valley, blocks of rock S of Žabie Javorové pleso lake, mossy pillow with *Racomitrium lanuginosum*, alt. 2010 m, leg. P. Górski, 16.08.2006 (POZNB 728); Mlynická dolina valley, blocks of rock E of Pleso nad Skokom lake, alt. 1820 m, leg. P. Górski, 15.08.2008 (POZNB 736); Nefcerka valley, rocky boulders S of Vyšné Terianske pleso lake, 49°09.938'N, 20°01.169'E, alt. 2125 m, leg. P. Górski, 2.08.2012 (POZNB 1317); Nefcerka valley, rocky boulders above E shore of Nižné Terianske pleso lake, 49°10.029'N, 20°01.000'E, alt. 2055 m, leg. P. Górski, 2.08.2011 (POZNB 1569).

*Tritomaria polita* (Nees) Jörg. ⇒ see under *Saccobasis polita* (Nees) H. Buch

*Tritomaria quinquedentata* (Huds.) Buch. ⇒ see under *Trilophozia quinquedentata* (Huds.) Bakalín

### *Tritomaria scitula* (Taylor) Jörg

**Distribution:** BT –; HT-SL 1700–2154 (2); HT-PL –; ZT-SL –; TZ-PL 1000 (1).

**Max.** High Tatra Mts, SL, Vyšné Wahlbergovo pleso lake, alt. 2154 m, leg. J. Šmarda sub *Barbilophozia floerkei*, rev. J. Duda (Duda & Váňa 1983a).

**Min.** Tatry Zachodnie Mts, PL, Czerwone Wierchy ridge, alt. 1000 m, leg. J. Szweykowski (Szweykowski 2006).



**Literature:** Szweykowski (1957, 2006), Duda & Váňa (1983a), Szweykowski & Klama (2010).

**Note:** The list presented includes only data based on revised herbarium material. This species is recorded occurring in the High Tatra Mts (Slovak part) by: (1) Krajina (1933, two localities in the Mlynická dolina valley; herbarium material unavailable; these localities were later cited by Boros 1951), (2) Šmarda (1961; three localities; herbarium material for two localities is unavailable, one – misidentified as *Saccobasis polita*, rev. J. Váňa in Duda & Váňa 1983a), (3) Boros & Vajda (1962: one locality; herbarium material unavailable), (4) Boros & Vajda (1967: one locality, misidentified as *Trilophozia* (= *Tritomaria*) *quinqudentata*, rev. J. Váňa in Duda & Váňa 1983a), (5) Blackburn et al. (1997; report unlikely to be correct).

### Species erroneously reported as occurring in the Tatra Mountains or for which occurrence on this massif is doubtful

*Asterella gracilis* (F. Weber) Underw. – Species reported occurring in the Belianske Tatry and Slovak High Tatra Mountains (Limpricht 1877a, b, Hazslinszky 1885, Szyszyłowicz 1885, Šmarda 1938, Boros 1941, Pilous & Duda 1960). Revised herbarium material for two localities in the Belianske Tatry Mts belong to *Peltolepis quadrata* (Saut.) Müll. Frib. (rev. J. Váňa, Duda & Váňa 1974a). Herbarium material for four localities has disappeared.

*Barbilophozia hyperborea* (R. M. Schust.) Potemkin – Species reported occurring in the Polish Tatra Mts (Chudzińska et al. 2001, Szweykowski 2006, Szweykowski & Klama 2010). Herbarium of Adam Mickiewicz University of Poznań (POZW) contains nine herbarium vouchers of this species, including eight collected in the Tatry Zachodnie Mts (altitudes ranging between 1280 m and 1600 m a.s.l.) and one in the High Tatra Mts (1970 m a.s.l.). Some specimens have features of *B. hyperborea* (e.g. somewhat broader leaves, shorter, fewer lacinia and more papillose cuticle). However, they do not have substantially bigger cells and have apiculate or acute leaf lobes (features absent in *B. hyperborea*). In our opinion, these specimens are only a form of *Orthocaulis floerkei* (F. Weber et D. Mohr) H. Buch with a more papillose cuticle. *Barbilophozia hyperborea* is a high arctic taxon not known to occur in Scandinavia; hence, it is unlikely to occur in the Tatra Mts, especially in montane or subalpine belts.

*Calypogeia fissa* (L.) Raddi – Species reported occurring in the Tatry Zachodnie Mts (PL) by Lilienfeldówna (1914a). Material for that locality, deposited in KRAM, belongs to *Calypogeia azurea* Stotler et Crotz (rev. P. Górski). The report of Blackburn et al. (1997) is unlikely.

*Cololejeunea rossettiana* (C. Massal.) Schiffn. – Species reported by Šmarda (1976a, b), in publications focused on general characteristics of the bryophyte flora and non-forest communities in the Tatra Mts. The presence of this species in the Tatra Mts is unlikely.

*Drepanolejeunea hamatifolia* (Hook.) Schiffn. – Species reported occurring at one locality in the Belianske Tatry Mts by Hazslinszky (1860). Identification of this species was corrected to *Cololejeunea calcarea* (Lib.) Schiffn. by Hazslinszky (1885). The possibility of *D. hamatifolia* occurring in the Tatra Mts has been questioned numerous times (Szyszyłowicz 1885, Szweykowski 1957, Duda & Váňa 1975b).

*Fossombronina wondraczekii* (Corda) Lindb. and *F. pusilla* (L.) Nees – Species cited by Krupa (1878) and Szyszyłowicz (1885). All localities are in synanthropic habitats that most likely do not occur in the Tatra Mts, i.e. in Podhale. Localities for *F. pusilla* described by Szyszyłowicz (1885) are located below Droga pod Reglami, which is at the lower border of the Tatra Mts. The locality for *F. wondraczekii* reported by Krupa (1878) is not supported by altitude data; it is in arable fields, probably in Kościelisko. Szyszyłowicz (1885) cites it, in an unwarranted way, with associated altitude of 939 m a.s.l., which may suggest the occurrence of this species in the Tatra Mts and the Dolina Kościeliska valley. Szweykowski & Klama (2010) include both species in the list of liverworts in the Tatra National Park (Poland).

*Heterogemma capitata* (Hook.) Konst. et Vilnet (= *Lophozia capitata* (Hook.) Macoun) – Species reported occurring in the Slovak High Tatra Mts by Szyszyłowicz (1885). The herbarium material belongs to *Lophozia excisa* (Dicks.) Konst. et Vilnet (rev. W. Kulesza, Kulesza 1920, Duda & Váňa 1989a).

*Hygrobella laxifolia* (Hook.) Spruce – Species erroneously cited as occurring in the Slovak High Tatra Mts by Boros (1942). The same author later corrected the identification (Boros 1944, see Duda & Váňa 1975a).

*Kurzia pauciflora* (Dicks.) Grolle – Species reported several times as occurring in the Tatra Mts (Limpricht 1877a, b, Szyszyłowicz 1885, Krupa 1888, Šmarda 1938, 1944). Revised herbarium material for the localities given by Šmarda (1938, 1944) belong to *Kurzia sylvatica* (Müll. Frib.) Grolle (rev. J. Duda in Duda & Váňa 1985c and rev. J. Váňa in Duda & Váňa 1971c). According to J. Duda (Duda & Váňa 1986a), the locality cited by Hazslinszky (1885) is highly doubtful. The occurrence of *Kurzia pauciflora* in the Tatra Mts is unlikely.

*Lophozia groenlandica* (Nees) Macoun (= *L. schusterana* Schljakov) – Species reported occurring at one locality in the Tatra Mts but without precise details of the locality (Szweykowski 2006, Szweykowski & Klama 2010). Herbarium of Adam Mickiewicz University of Poznań (POZW) contains a specimen collected and named by J. Szweykowski as *Lophozia* cf. *heteromorpha* R.M. Schuster et Damsh. It was collected in the Tatra Zachodnie Mts (PL) at an altitude of 1540 m a.s.l. (POZW 37644). The revised material belongs to *Pseudolophozia sudetica* (Nees ex Huebener) Konst. et Vilnet (= *Lophozia sudetica* (Nees ex Huebener) Grolle) (rev. J. Váňa).

*Mannia fragrans* (Balbis) Frye et L. Clark – Species reported occurring in the Tatra Zachodnie Mts (PL) by Fritze & Ilse (1870). The presence of this species in the Tatra Mts is unlikely.

*Nardia insecta* Lindb. – Species for which there are several reports of it occurring in the Tatra Mts (Boros 1951, Duda 1955a, Boros et al. 1960, Szweykowski 1960a, Šmarda 1961). Revised specimens for the localities described by Duda (1955a), Szweykowski (1960a) and Šmarda (1961) belong to *Nardia geoscyphus* (De Not.) Lindb. (rev. J. Váňa, Duda & Váňa 1971b, Váňa 1976), for the locality cited by Boros et al. (1960) belong to *Solenostoma confertissimum* (Nees) Schljak. (rev. J. Váňa, Duda & Váňa l.c.) and for the locality cited by Boros (1951) belong to *Nardia scalaris* Gray (rev. J. Váňa, Duda & Váňa 1971b, 1972a).

*Odontoschisma macounii* (Austin) Underw. – Species reported occurring in the Slovak High Tatra Mts (Krajina 1933, det. J. Dostál). Revised herbarium material for that locality belongs to *Nardia scalaris* Gray (rev. J. Váňa, see Duda & Váňa 1976a).

*Odontoschisma denudatum* (Mart.) Dumort. – Species reported several times as occurring in the Tatra Mts (Lilienfeldówna 1914a, b, Szweykowski 1958a, Boros & Vajda 1962, Duda 1962a, Váňa & Duda 1965, Vidličková 1989). The specimens collected in the Polish Tatra Mts cited by Lilienfeldówna (1914a, b) are deposited in the herbarium of Polish Academy of Sciences in Kraków (KRAM) and belong to *Odontoschisma elongatum* (Lindb.) A. Evans (rev. P. Górski 2013). Herbarium material collected in the Slovak Tatra Mts cited by Duda (1962a) and Váňa & Duda (1965) also belongs to *O. elongatum* (Lindb.) A. Evans (rev. J. Váňa, Duda & Váňa 1976a). It is unlikely this plant occurs in the Tatra Mts.

*Odontoschisma sphagni* (Dicks.) Dumort. – Species reported occurring in the Tatra Mts by Wahlenberg (1814), Limpricht (1877a), Szyszyłowicz (1885), Hazslinszky (1859, 1860, 1885) and Vilhelm (1927). It is unlikely this plant occurs in the Tatra Mts (Szweykowski 1957, Duda & Váňa 1976a).

*Porella obtusata* (Taylor) Trevis – Species reported as *Porella thuja* (Dicks.) Lindb. occurring in the Tatra Zachodnie Mts (PL) by Szyszyłowicz (1885). The specimen from that locality belongs to *P. arboris-vitae* (With.) Grolle (rev. W. Kulesza, Kulesza 1920).

*Porella pinnata* L. – Species reported as *Madotheca porella* Nees occurring in the Slovak High Tatra Mts (Hazslinszky 1965, 1885; later cited by Limpricht 1877a and Szyszyłowicz 1885). There is no herbarium material for this species and the record is probably for *Porella cordaeana* (Huebener) Moore (J. Duda in Duda & Váňa 1978b, Szweykowski 1958a).

*Scapania glaucocephala* (Taylor) Austin var. *scapanioides* (C. Massal.) Potemkin [= *S. scapanioides* (C. Massal.) Grolle] – This species is reported from one locality in the Tatra Zachodnie Mts (PL, Dolina Kościeliska valley, leg. J. Żebrowska; Hausbrandt 1949). Szweykowski (2006) has been unsuccessful in his search for herbarium material for that locality. In 2013, M. Graniszewska (curator of WA, University of Warsaw) found material for that locality (no. 19930) in the WA herbarium. The collection is sparse, the specimens are worn and sterile and belong to *Scapania* cf. *curta* (Mart.) Dumort. (rev. P. Górski).

*Scapania verrucosa* Heeg – Species erroneously reported from Poland (and the Tatra Mts) by Hausbrandt (1949, see Szweykowski 2006).

*Schistochilopsis grandiretis* (Lindb. ex Kaal.) Konst. (= *Lophozia grandiretis* (Lindb. ex Kaal.) Schiffn.) – Species reported in the Slovak High Tatra Mts by Krajina (1933, det. J. Dostál). Herbarium material for that locality belongs to *Odontoschisma* (= *Cladopodiella*) *fluitans* (Nees) L. Söderstr. et Váňa (rev. J. Duda, Duda 1986, Duda & Váňa 1990c).

*Solenostoma pusillum* (C. E. O. Jensen) Steph. (= *Jungermannia jenseniana* Grolle) – Species recorded in the Tatra Mts by Szweykowski (1960a), Šmarda (1961), Duda & Váňa (1970c) and Balcerkiewicz (1984). Herbarium material was misidentified (see Váňa 1974).

*Solenostoma paroicum* (Schiffn.) R. M. Schust. (= *Jungermannia paroica* (Schiffn.) Grolle) – Species recorded in the Slovak High Tatra Mts by Boros & Vajda (1962). Herbarium material for that locality belongs to *Mylia taylorii* (Hook.) Gray (rev. J. Duda, ver. J. Váňa, Duda & Váňa 1970c, Váňa 1975b).

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## Souhrn

Práce podává přehled současného stavu poznání flóry játrovek celého masivu Tater, nejvyššího horského masivu Karpat. Zahrnuta jsou veškerá data týkající se výskytu játrovek v Tatrách, publikovaná v letech 1814–2014, a dále údaje o položkách sbíraných prvním autorem v letech 2002–2014. Rozšíření jednotlivých druhů je uváděno odděleně pro pět částí: Belianské Tatry (celé na Slovensku), Vysoké Tatry (slovenská část), Vysoké Tatry (polská část), Západné Tatry (slovenská část) a Tatry Zachodnie (polská část). Pro každý druh je uvedeno výškové rozmezí výskytu a počet dosud zjištěných lokalit v každé části. Navíc jsou pro každý druh jmenovitě uváděny nejvyšší (výškové maximum) a nejnižší položené (výškové minimum) lokality. Nashromážděné údaje jsou založeny na více než 18500 údajích, zahrnujících 3600 původních údajů. V celé oblasti Tater bylo dosud nalezeno 194 druhů játrovek, což zahrnuje 131 druhů zjištěných v Belianských Tatrách, 178 druhů zjištěných ve Vysokých Tatrách a 179 druhů zjištěných v Západních Tatrách. Zhruba stejný počet druhů byl zjištěn na každé straně slovensko-polské hranice; 185 druhů se vyskytuje ve slovenské části, 184 druhů v polské části Tater. Flóra játrovek Tater byla v minulosti studována nerovnoměrně. Většina literárních údajů pochází ze slovenské části Tater, poslední údaj je ze Západních Tater. V předkládané práci je publikováno 9 druhů dosud neuváděných ze Západních Tater, 3 druhy dosud neuváděné ze slovenské části Vysokých Tater, 4 druhy dosud neuváděné z Belianských Tater a po dvou druzích dosud neuváděných z obou polských částí Tater – Tatry Wysokie a Tatry Zachodnie. Byla zjištěna první lokalita druhu *Odontoschisma* (*Cladopodiella*) *francisci* pro polskou část Tater. Navíc byly znovu nalezeny druhy považované na Slovensku za vyhynulé (*Cephaloziella varians* a *Geocalyx graveolens*). Data zjištěná v letech 2002–2014 umožnila podrobněji analyzovat frekvenci výskytu některých druhů zahrnutých v červených seznamech Polska a Slovenska. Speciálně byly označeny nejhojnější a nejvzácnější druhy Tater. Podrobně byla katalogizována flóra játrovek nejvyššího vrcholu Tater (a celých Karpat) – Gerlachovského štítu (2655 m n. m.) – a přílehlých hřebenu. Práce rovněž zahrnuje výsledky pátrání po nejvzácnějších druzích játrovek na jejich historicky uváděných lokalitách. Uvedeny jsou též originální lokality řady druhů játrovek, včetně nejvzácnějších, jako např. *Nardia breidlerii*, *Marsupella apiculata*, *M. sparsifolia*, *Eremonotus myriocarpus*, *Frullania fragilifolia*, *Odontoschisma* (= *Cladopodiella*) *francisci*, *Orthocaulis* (= *Barbilophozia*) *binsteadii*, *Fuscocephaloziopsis* (= *Cephalozia*) *catenulata*, *Scapania crassiretis* a *S. gymnostomophila*. Práce zahrnuje i seznam 22 druhů mylně uváděných z oblasti Tater. Na základě revize dokladových položek a dostupných dat byly z flóry játrovek Tater vyloučeny druhy *Barbilophozia hyperborea* (R. M. Schust.) Potemkin, *Lophozia groenlandica* (Nees) Macoun (= *L. schusterana* Schljakov) a *Scapania glaucocephala* (Taylor) Austin var. *scapanioides* (C. Massal.) Potemkin.

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