

Bryoflora of selected localities of the Hrubý Jeseník Mts summit regions

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Abstract: The bryoflora of the only glacier cirque of the Hrubý Jeseník Mts. – Velká kotlina was surveyed in a detailed 3-year inventory in 2001–2003, along with several other similar localities of natural high-montane tree-less habitats: Malá kotlina, Petrovy kameny rocks, Tabulové skály rocks, Červená hora summit region and the Sněžné strže ravines at its eastern slopes. Velká kotlina cirque proved to be the species-richest locality of its kind in the Czech Republic, with 318 recently confirmed taxa and some 130 non-retrieved ones (of which 41 are doubtful unverified records). 219 taxa were recorded in the Malá kotlina cirque, from which only 45 historical records existed. Only 135 taxa were recorded in the ravines on the eastern slope of Mt Červená hora. The summit localities with numerous rock outcrops proved to be generally species-poor but harbouring important relic species of arctic-alpine floristic element, including *Dicranum spadiceum*, *Tortula mucronifolia*, *Pseudoleskeella tectorum*, *Mnium thomsonii*, *Gymnomitrium corallioides* and others. Unfortunately, the documented retreat of montane and particularly arctic-alpine species in the Hrubý Jeseník Mts seems to be considerably larger than in the Krkonoše Mts, which can be nevertheless partly attributed to the better historical knowledge of Jeseník's bryoflora compared to the Krkonoše Mts.

Keywords: bryophytes, the Sudetes, Hrubý Jeseník, threatened, arctic-alpine, the Czech Republic, fertility, abundance

Introduction

Intensive bryofloristic survey was realized in the glacial cirques and geomorphologically similar localities of the High Sudetes in the years 2001 – 2003 in the framework of a research grant 206/01/0411 of the Grant Agency of the Czech Republic. The results of the survey from the Krkonoše Mts were published earlier (Kučera et al. 2004a, b) and here we summarize the bryofloristic results from the localities of the Hrubý Jeseník Mts. This second highest mountain range is in many aspects different from the Krkonoše Mts. It is principally about one hundred metres lower, with the highest point (Mt Praděd) at 1491 m and the main eastern ridge reaching ca. 1350 – 1450 m, the western part of the mountains with only the highest points reaching 1400 m. Although only some 40' (about 70 – 80 km) more to the south (but some 110 km to the east), these mountains nevertheless were much more saved from the glacier action during the Ice Ages and hence the shaping of the relief is different despite the similar geological age, history and composition of rocks. The glacial cirques – or corries – as known from the Krkonoše Mts are principally absent with the only exception of cirque-shaped Velká kotlina on the south-eastern slope of the main eastern ridge, south of its summit part (Vysoká hole). From the bryofloristic point of view, biotopes equivalent to those of glacial cirque can however be found at the steep slopes of the highest peaks, where the avalanche action occurs regularly, not allowing the forest to overgrow. There are four such places on the main eastern ridge of the Hrubý Jeseník. The two larger ones (Velká kotlina and Malá kotlina), where at least some concave terrain shapes occur, were surveyed by us. The western part of the mountains has only one avalanche slope, on the eastern slope of Mt Červená hora. The ravines on that slope, called Sněžné strže, are however to a big extent forested, as the avalanches are infrequent and not very massive. Also, the shaping of the terrain is essentially not concave but anyway in the vicinity of the streams in the ravines at least some cirque-like habitats occur. We found the survey of these ravines useful for the purpose of comparison. In addition to the three main cirque-like localities, we made the

inventory of several well-known outposts of alpine bryoflora, mostly on exposed crags in the summit area of both western (Mt Červená hora, Mt Vozka) and eastern (Petrovy kameny, Tabulové skály) parts of the mountains.

Similarly as in the case of the Krkonoše Mts, the detailed bryofloristic inventory of any particular locality in the Hrubý Jeseník Mts has never been made, though the knowledge of at least one of them – Velká kotlina cirque – was substantially better than of any other of the localities surveyed during our inventory. Most of the historical records have been summarized in the published bryoflora of Hrubý Jeseník Mts (Šmarda 1952). The author himself significantly contributed to the knowledge of these mountains, where he collected mostly between 1945 and 1958. Second largest number of historical data could be retrieved from the several papers by J. Podpěra, who collected in the whole mountains mostly in the years 1904 – 1906. Other important sources of information come both from the regional botanists (e.g. H. Laus, J. Kalmus, G. Niessl, J. Hruby, T. Hein, F. Kern, F. A. Kolenati, F. Matouschek), as well as from the recognized bryologists, who surveyed the flora on more or less occasional excursions (J. Milde, K. G. Limpricht, O. Sendtner) and published their records mostly in larger floras (particularly the *Bryologia Silesiaca*, Milde 1869).

Methods

The main survey was performed at three cirque and cirque-like localities – Velká kotlina, Malá kotlina and Sněžné strže, minor inventories were performed at three other summit localities with rock formations – Petrovy kameny, Tabulové skály, Červená hora and Vozka. The main localities were parted into several variously large study sites according to prominent geomorphological features (individual ravines, surroundings of streams, homogeneous slopes etc.), the minor localities were not further divided. Individual study sites were surveyed by one or more authors (depending on the size, heterogeneity and estimated richness) during one whole day in the typical case (longer or shorter if necessary). The days of the survey and initials of surveying authors (BB stands for Blanka Shaw (Buryova), JK stands for J. Kučera and KO for J. Košnar) are given below.

Velká kotlina

Velká kotlina is the only locality in the Hrubý Jeseník Mts, which can be described as a corrie (glacial cirque) due to the markedly concave shapes of several parts. Larger contiguous rocks can be found only here. Velká kotlina provides the largest area of bryologically attractive sites owing to two major factors: the steepness of slopes, which does not allow the vegetation of vascular plants (especially grasses and blueberries) to develop, and the number of rocky habitats. The study sites, which we chose to contain all such bryologically promising areas (about 10 ha in total) are described in Table 1 and drawn over the map in Fig. 1. The prevailing geological substrate for most localities is phyllite. It often contains calcareous enrichments, providing base-rich habitats especially in sheltered fissures and along cracks, as well as in the minerotrophic spring sites. On the other hand, the bases from the dry low rock outcrops, e.g. in the sites VK4 and VK6, are nearly completely washed out, providing thus rather acidic conditions.

Tab. 1 Study sites in Velká Kotlina

Locality code	Description	Dates and authors of survey
VK1	'Beckeho skály': phyllitic rocks close to the right bank of the Moravice stream in the lower part of the cirque, 1170 – 1210 m a.s.l., 0.4 ha	23.9.2001 BB, JK, MZ, VP, 3.8.2002 BB
VK2	'Firbasova stráž': SSE slope to the south-west of the main ravine ('Vitáskova rokle') with numerous phyllitic rock outcrops, 1240 – 1360 m a.s.l., 2.0 ha	13.7.2001 VP, 21.9.2001 BB, JK, MZ, VP, 11.6.2002 BB, JK, MZ, VP
VK3	'Kolenatiho skály': mainly phyllitic rocks and steep SE slope to the north-east of the main ravine ('Vitáskova rokle'), 1220 – 1300 m a.s.l., 0.9 ha	10.7.2001 VP, 20.9.2001 JK, MZ, VP, 23.9.2001 VP, 4.8.2002 BB, JK, JV, VP, 5., 8.8.2002 VP
VK4	Upper part of 'Kratochvílova stráž' slope: steep SE slopes above the tree line, 1280 – 1340 m a.s.l., ca. 0.9 ha	3.8.2002 JV, VP, 5.8.2002 BB, JK, VP, 8.8.2003 JK, VP
VK5	'Kratochvílova stráž': SE slopes with numerous spring-sites, partly grown with shrubby willows and rowans, 1210 – 1280 m a.s.l., 1.2 ha	5.8.2002 JK, VP, 8.8.2003 JK, KO, MZ, VP

VK6	'Kunzova stráň': steep SE slopes above the treeline with numerous low phyllitic outcrops, 1310 – 1400 m a.s.l., 1.4 ha	14.7.2001 BB, JK, MZ, VP, 4.8.2002 BB, JK, JV, 8.8.2003 JK
VK7	Moravice: close surroundings of the main stream of the cique in its eastern part, mostly in the sparsely wooded belt, 1130 – 1330 m a.s.l., ca. 1.4 ha	9.7.2001 JK, 11., 14.7.2001 MZ, 23.9.2001 BB, JK, MZ, 1.8.2002 JK, JV, VP, 2.8.2002 VP, 3.8.2002 BB, JK, VP
VK8	'Podpěrovy skály': large, mainly phyllitic SE-facing rocks at the lowest part of the main ravine ('Vitáskova rokle'), stretching towards south-west, 1190 – 1230 m a.s.l., 0.17 ha	9.7.2001 JK, MZ, 10.7.2001 BB, JK, MZ, VP, 11.7.2001 BB, VP
VK9	'Suzova stěna': steep, ESE-facing, often wet rocky slopes, south-westwards to 'Mildeho skály' rocks, 1220 – 1290 m a.s.l., 0.7 ha	10.7.2001 BB, JK, MZ, VP, 15.7.2001 BB, JK, MZ
VK10	'Vitáskova rokle': main SE-facing ravine with larger, nearly contiguous, mainly phyllitic rocks, SE- to N-facing, 1200 – 1320 m a.s.l., 0.55 ha, together with 'Petříkova skála' – phyllitic crags at the mouth of the ravine (1175 – 1195 m a.s.l., 0.10 ha)	10.7.2001 MZ, VP, 11.7.2001 BB, JK, MZ, VP, 13.7.2001 BB, JK, MZ, VP

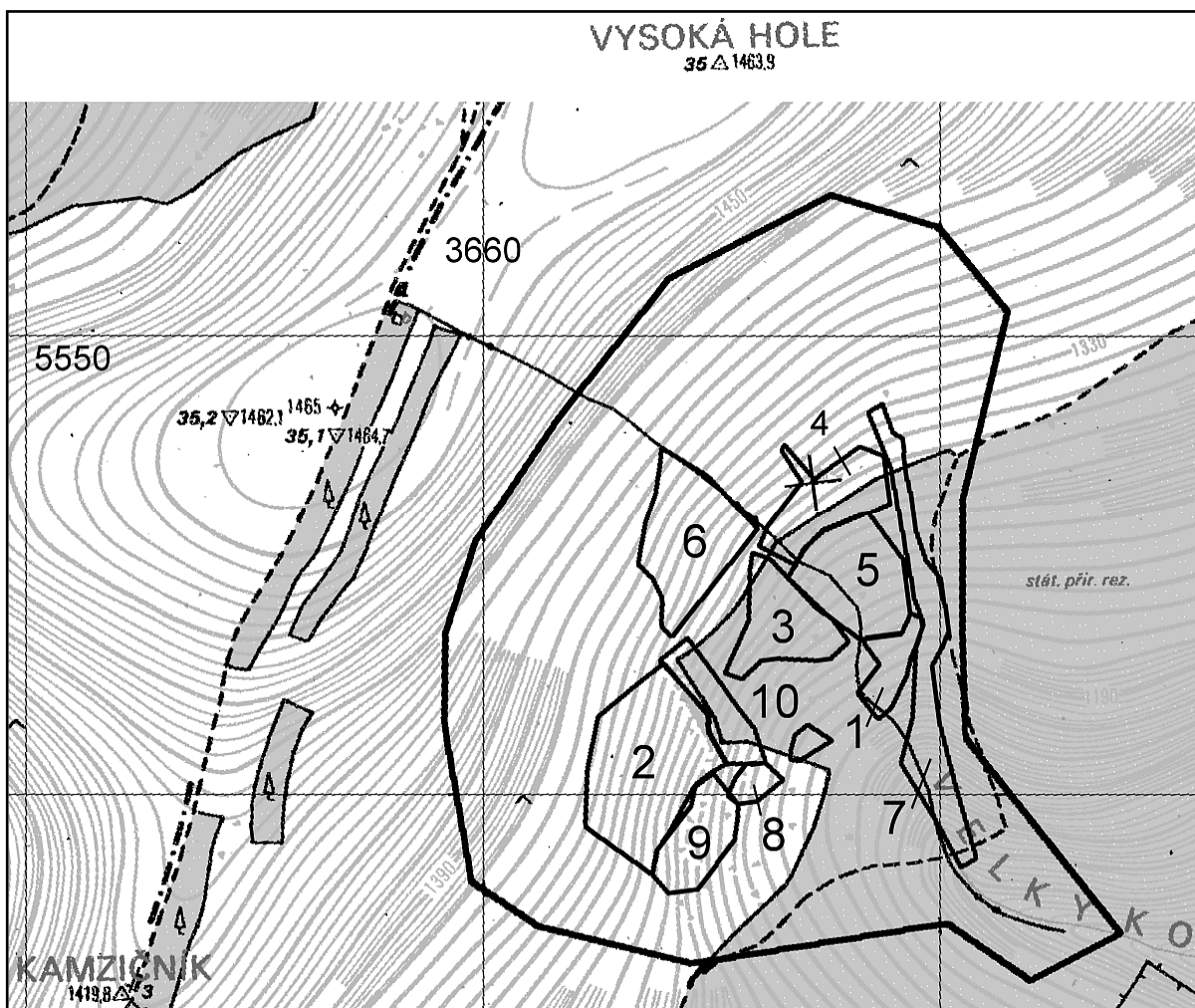


Fig. 1. Map of the study sites in the Velká kotlina cirque. The grid (with a 500 m spacing) refers to S-1942 system, M33 zone.

Malá kotlina

Malá kotlina lies on the same main ridge of the eastern part of the mountains as the Velká kotlina cirque. Both areas are very similar to each other, have the same orientation of slopes, and the same geological substrate (mostly slightly base-rich phyllite). Malá kotlina is only developed on a smaller scale. The slopes are gentler; there are no larger rocks, and the area of bryologically attractive sites with diminished competition from vascular

plants is somewhat smaller (about 9 ha, see Table 2). On the other hand, the spring sites are at least relatively much more abundant. The study sites are shown in Fig. 2.

Tab. 2 Study sites in Malá Kotlina

Locality code	Description	Dates and authors of survey
MK1	Surrounding of the north-easternmost stream, spring sites, partly grown with shrub willows, 1230 – 1340 m a.s.l., 1.31 ha	9.-10.6.2002 BB, JK, MZ, VP
MK2	Surrounding of the second south-westernmost stream, adjacent to MK6, partly grown with shrubs, numerous spring sites, 1210 – 1290 m a.s.l., 0.77 ha	22.9.2001, 10.6.2002 BB, JK, MZ, VP
MK3	Surrounding of the third south-westernmost stream between MK2 and MK4, 1215 – 1300 m a.s.l., 0.68 ha	22.9.2001, 10.6.2002 BB, JK, MZ, VP
MK4	Surrounding of the fourth stream from south-west, adjacent to MK3, 1220 – 1300 m a.s.l., 0.72 ha	8.6.2002, 10.6.2002 BB, JK, MZ, VP
MK5	Surrounding of a SSE-flowing stream west of MK1, 1230 – 1330 m a.s.l., 0.73 ha	9.6.2002 BB, JK, MZ, VP
MK6	South-westernmost part of the “cirque” above the central path, to the south-west of the first stream, steep slopes with numerous phyllitic rocks and outcrops, 1210 – 1280 m a.s.l., 0.52 ha	22.9.2001, 8.6.2002 BB, JK, MZ, VP
MK7	Lower part of the “cirque” beneath the central path, 1110 – 1200 m a.s.l., 4.37 ha	22.9.2001, 12.6.2002 BB, JK, MZ, VP

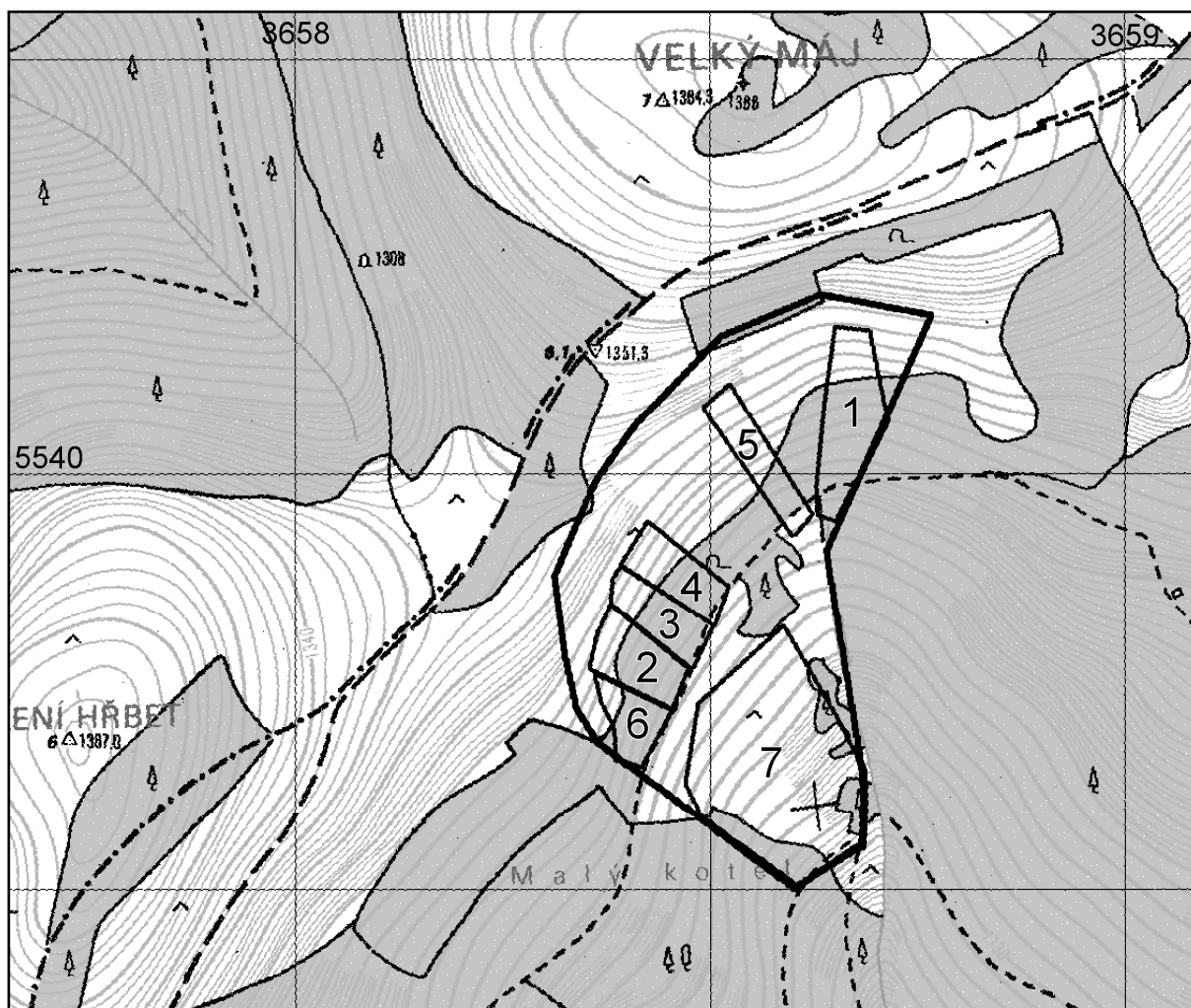


Fig. 2. Map of the study sites in the Malá kotlina cirque. The grid (with a 500 m spacing) refers to S-1942 system, M33 zone.

Červená hora and Sněžné strže

The ravines ‘Sněžné strže’ at the eastern slopes of Mt Červená hora only share with the preceding localities the occasional avalanche action. It prevents the spruce forest to grow closely to the periodical or (nearly) stable waterstreams (otherwise the slopes are wooded with spruce forest). The substrates (often gneiss, partly phyllite) are nearly completely acidic in contrast to the other sites. The western treeless slope of Mt Červená hora above Vřesová studánka, on the other hand, possesses several bryologically interesting rock formations of base-rich phyllite. Owing to the small steepness and absence of spring-sites, the slope is mostly covered with a dense lawn of vascular plants. The study sites are shown in Fig. 3.

Tab. 3 Study sites in Červená hora and Sněžné strže

Locality code	Description	Dates and authors of survey
ČH1	Treeless slopes with numerous mainly phyllitic base-rich rock outcrops above ‘Vřesová studánka’ at the slopes of Mt Červená hora, 1280 – 1320 m a.s.l., ca. 1.3 ha	6.6.2002 BB, JK, MZ, 9.8.2003 JK, KO, MZ, VP
ČH2	The middle of the ‘Sněžné strže’ ravines at the eastern slopes of Mt Červená hora, ca. 300 m NE of the summit, 1140 – 1290 m a.s.l., ca. 1.4 ha	6.8.2003 BB, KO, MZ, VP
ČH3	Southernmost ‘Sněžné strže’ ravines (Černý potok stream) at the eastern slopes of Mt Červená hora, ca. 300 m E of the summit, 1050 – 1290 m a.s.l., ca. 2.9 ha	6.6.2002 BB, JK, MZ, 5.8.2003 BB, KO, MZ, VP
ČH4	Northernmost of the ‘Sněžné strže’ ravines (Sněžný potok stream) at the eastern slopes of Mt Červená hora, ca. 750 m NNE of the summit, 1140 – 1250 m a.s.l., ca. 1.1 ha	7.8.2003 JK, KO, MZ, VP

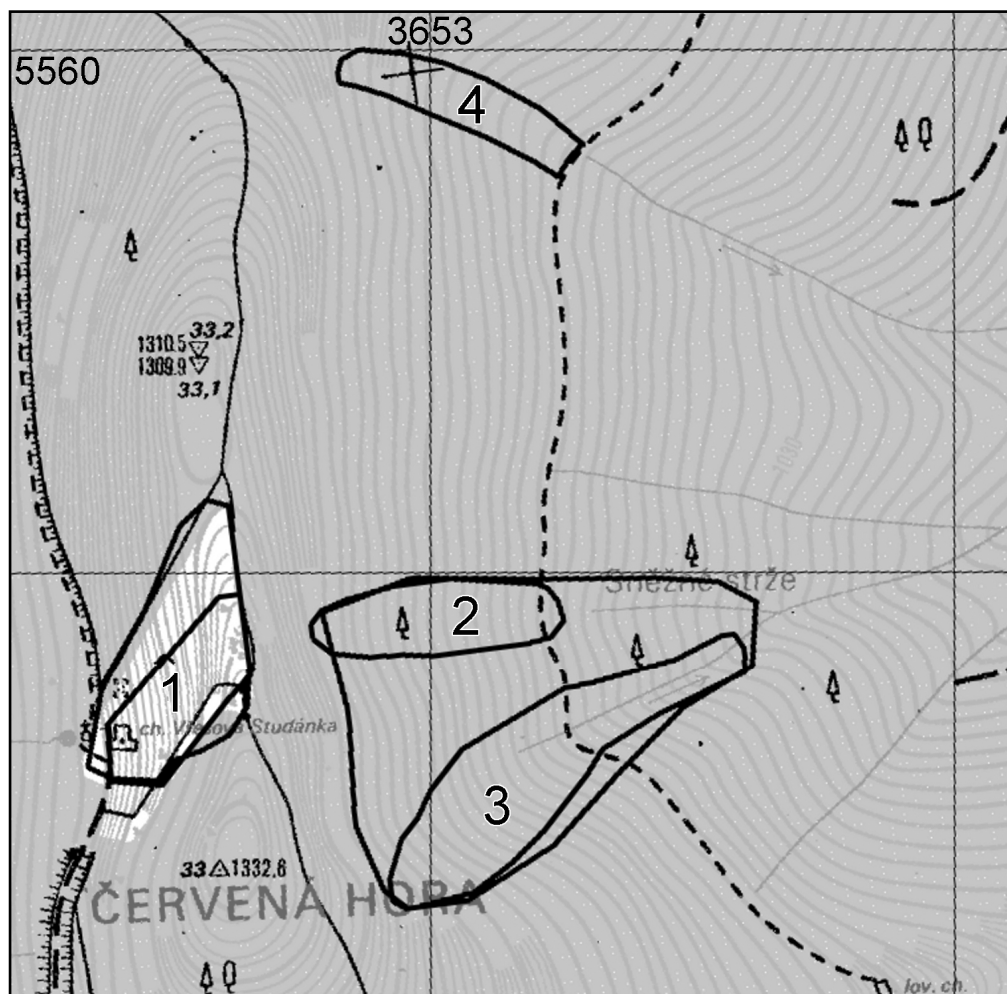


Fig. 3. Map of the study sites at Mt Červená hora with the Sněžné strže ravines. The grid (with a 500 m spacing) refers to S-1942 system, M33 zone.

Other localities

Other localities include two rock formations at the eastern summit ridge of the Hrubý Jeseník Mts (Petrovy kameny and Tabulové skály), along with the spring-rich NE slope below Petrovy kameny, and the rock formations at Mt Vozka in the western ridge of the mountains. The first three localities were surveyed in just one day. Except for the slope below the top of 'Petrovy kameny', they could be relatively well surveyed due to their small sizes. The acidic rock formations at Mt Vozka were not completely surveyed, as the main purpose of the visit was the inventory of the only known population of *Gymnomitrium corallioides* in the Hrubý Jeseník Mts.

Tab. 4 Other study sites

Locality code	Description	Dates and authors of survey
PK	'Petrovy kameny' – phyllitic rock formation (top) 1.6 km S of the top of Mt Praděd, and its nearest surroundings, 1430 – 1440 m a.s.l., ca. 0.7 ha	12.7.2001 BB, JK, MZ, VP
PKO	NE slope below 'Petrovy kameny' top, above the 'Ovčárna' chalet, slope with numerous spring-sites, 1320 – 1420 m a.s.l., ca. 1.9 ha	12.7.2001 BB, JK, MZ, VP
TS	'Tabulové skály' rocks, 300 – 450 m N of the top of Mt Praděd, 1430 – 1450 m a.s.l., ca. 0.4 ha	12.7.2001 BB, JK, MZ, VP
V	Mt Vozka, summit rock formations, ca. 1370-1380 m a.s.l., ca. 0.1 ha	9.8.2003 JK, MZ, VP

At all localities, the species were recorded into recording cards, together with empirical ecological data (substrate, shading etc.), and presence of sporophytes, perianths, or gemmae (the ecological data will be published elsewhere). At the sites visited in 2002 and 2003, the abundance of the recorded moss was estimated on a simple scale (0 for one record, 0.5 for 2 records, 1 for 3 – 4 records, 1.5 for 5 – 6 records and 2 for more records). Species that could not be identified in the field, and those, which specimen was felt to be of importance, were intentionally collected. In addition to the readings described above, they were localized using a hand-held GPS device (Garmin Etrex and Geko 301). In selected notable species the population size and number of produced sporophytes were estimated. The co-ordinates of the specimens are given in the Gauss-Krüger grid, M33 zone (central meridian of E015° = 3500 km false easting), S-1942 map datum. The specimens are deposited in the authors' herbaria or herbaria CBFS (in case of J. Kučera and J. Košnar), PRA or DUKE (B. Buryová), OP (V. Plášek) and SUM (M. Zmrhalová). Nomenclature in the text, as well as the Red List criteria (IUCN ver. 3.1) corresponds to Kučera & Váňa (2005) with a few specified exceptions.

Results

List of bryophytes recorded at the individual sites

Each item in the list contains the information about threat status according to Kučera & Váňa 2005, followed in the case of a new record of a taxon at a particular site with the abbreviation HJ+ (taxon new to Hrubý Jeseník Mts) or the locality code (see above) with + (e.g. VK+ for a new record to Velká kotlina cirque; the individual study sites could not be recognized). The positive occurrence at the individual study sites is followed by the indication of herbarization (H for herbarized material¹, N for uncollected records). If the information on abundance at the localities exists, it is written as an average value (Avg) at the localities (with the indication of number of records from which it was counted).

Anastrepta orcadensis **LC-att**; ČH3 (H); PK (H); TS (H); V (H)

Anastrophyllum minutum ČH1 (H), ČH2 (N), ČH3 (H); MK2 (H), MK6 (H); VK3 (H), VK5 (N), VK9 (H), VK10 (N); PK (H); Avg VK: 0.00 (1), Avg Ss: 0.00 (1)

Aneura pinguis (MK+); MK1 (N), MK2 (H), MK5 (N), MK6 (N), MK7 (H); VK1 (H), VK2 (N), VK3 (N), VK4 (H), VK6 (N), VK7 (N), VK8 (N), VK9 (H), VK10 (H); Avg VK: 1.23 (11), Avg MK: 1.00 (3)

Asterella gracilis **CR**; VK8 (H), VK10 (H)

¹ information about placement of individual vouchers can upon request be received from the first author

Blepharostoma trichophyllum ČH1 (N), ČH2 (N), ČH3 (N); MK2 (H), MK3 (N), MK5 (H), MK6 (H), MK7 (H); VK1 (H), VK3 (H), VK4 (H), VK5 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg Čh: 0.00 (1), Avg VK: 0.27 (11), Avg MK: 0.50 (1), Avg Ss: 0.00 (1)

Calypogeia azurea ČH2 (H), ČH3 (H), ČH4 (N); MK1 (N), MK2 (H), MK3 (H), MK4 (H), MK5 (H), MK6 (H), MK7 (H); VK1 (H), VK2 (N), VK3 (N), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK9 (H); Avg VK: 0.83 (9), Avg MK: 1.06 (18), Avg Ss: 0.88 (4)

Calypogeia integristipula (MK+); ČH1 (N), ČH2 (H), ČH3 (H), ČH4 (H); MK1 (N), MK2 (N), MK3 (H), MK4 (N), MK5 (N), MK6 (N), MK7 (N); VK1 (N), VK3 (H), VK4 (H), VK5 (H), VK6 (N), VK7 (N), VK8 (N), VK9 (N), VK10 (N); Avg Čh: 0.50 (2), Avg VK: 0.57 (7), Avg MK: 0.63 (8), Avg Ss: 1.00 (5)

Calypogeia muelleriana (MK+); ČH1 (H), ČH3 (N); MK2 (H), MK5 (N), MK6 (H); VK1 (N), VK2 (H), VK3 (N), VK4 (H), VK5 (H), VK6 (H), VK7 (H); Avg VK: 1.00 (3), Avg MK: 0.00 (1), Avg Ss: 2.00 (1)

Calypogeia neesiana (ČH+, MK+); ČH3 (H); MK4 (H)

Cephalozia bicuspidata ČH1 (H), ČH2 (H), ČH3 (H), ČH4 (H); MK1 (N), MK2 (H), MK3 (H), MK4 (H), MK5 (H), MK6 (N), MK7 (H); VK1 (H), VK2 (H), VK3 (N), VK4 (H), VK5 (N), VK6 (H), VK7 (H), VK8 (N), VK9 (H), VK10 (H); PK (H), PKO (H); TS (H); Avg Čh: 1.33 (3), Avg VK: 1.18 (11), Avg MK: 1.28 (16), Avg Ss: 1.00 (3)

Cephalozia lunulifolia (ČH+, VK+, TS+); ČH3 (H); VK1 (H), VK3 (H); TS (H)

Cephalozia divaricata ČH1 (H), ČH2 (H); MK2 (N), MK5 (H), MK6 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PK (H); V (H); Avg VK: 0.17 (3)

Cephalozia grimsulana **EN**; VK2 (H), VK6 (H), VK8 (H)

Cephalozia hampeana **LC-att** (HJ+, VK+); VK10 (H)

Cephalozia rubella VK10 (H)

Chiloscyphus coadunatus VK3 (N); Avg VK: 0.50 (1)

Chiloscyphus polyanthos var. *pallescens* **LC-att**; MK1 (H), MK2 (N), MK3 (H), MK4 (H), MK5 (H), MK6 (H), MK7 (H); VK1 (H), VK3 (H), VK4 (N), VK5 (H), VK6 (N), VK7 (H), VK10 (H); PKO (H); Avg VK: 1.00 (7), Avg MK: 0.92 (12)

Chiloscyphus polyanthos var. *polyanthos* MK1 (N), MK4 (N), MK5 (N); VK3 (N), VK4 (H), VK5 (H), VK7 (N), VK10 (N); Avg VK: 1.08 (6), Avg MK: 1.13 (4)

Chiloscyphus profundus ČH1 (N), ČH2 (H), ČH3 (N), ČH4 (N); MK1 (N), MK2 (H), MK3 (H), MK4 (N), MK5 (H), MK6 (H), MK7 (H); VK1 (N), VK3 (N), VK4 (N), VK5 (N), VK7 (N), VK10 (N); Avg Čh: 0.00 (1), Avg VK: 0.94 (8), Avg MK: 0.33 (12), Avg Ss: 1.00 (5)

Conocephalum conicum s.l.² MK1 (N), MK3 (N), MK4 (H), MK5 (H); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK5 (N), VK7 (N), VK8 (N), VK9 (H), VK10 (H); Avg VK: 0.45 (10), Avg MK: 0.36 (7)

Diplophyllum albicans ČH1 (N), ČH2 (N), ČH3 (H); MK3 (N); VK2 (H), VK3 (N), VK4 (N), VK9 (N), VK10 (N); PK (H); Avg Čh: 0.50 (2), Avg VK: 0.60 (5), Avg MK: 1.00 (1), Avg Ss: 1.00 (5)

Diplophyllum obtusifolium (VK+); ČH3 (H); MK2 (N), MK5 (H), MK6 (H); VK1 (H), VK3 (H), VK8 (H), VK9 (H), VK10 (H)

Diplophyllum taxifolium ČH1 (H), ČH2 (H), ČH3 (H), ČH4 (N); MK2 (H), MK3 (H), MK4 (H), MK5 (H), MK6 (N); VK1 (N), VK2 (H), VK3 (H), VK4 (N), VK5 (N), VK6 (H), VK8 (H), VK9 (N), VK10 (N); PK (H); Avg Čh: 1.00 (3), Avg VK: 1.06 (9), Avg MK: 0.67 (9), Avg Ss: 1.13 (4)

Gymnocolea inflata VK10 (H)

Gymnomitrium concinnatum **LR-nt** (ČH+); ČH2 (H); VK9 (H), VK10 (H); Avg Ss: 0.00 (1)

Gymnomitrium corallioides **EN**; V (H)

Haplomitrium hookeri **CR** (VK+); VK2 (H), VK4 (H)

Harpanthus flotovianus **LR-nt**; ČH3 (H); VK6 (H); PKO (H)

Jungermannia atrovirens **EN**; VK1 (H), VK3 (H), VK4 (H), VK6 (H), VK7 (H), VK8 (H), VK10 (H)

Jungermannia confertissima **EN**; VK10 (H)

Jungermannia hyalina **LR-nt** (VK+); VK2 (H), VK8 (H), VK9 (H)

Jungermannia leiantha **LR-nt**; MK2 (H); VK7 (H)

² *Conocephalum salebrosum* Szweyk., Buczkowska & Odrzykoski was not recognized at the time of survey and may have been included among the records, which have not been collected.

Jungermannia obovata ČH4 (N); VK2 (H), VK3 (N), VK4 (H), VK5 (H), VK6 (H), VK9 (H); PKO (H); Avg VK: 0.00 (1), Avg Ss: 0.00 (1)

Jungermannia pumila **LR-nt** (HJ+, MK+, VK+); MK2 (H); VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK8 (H)

Jungermannia sphaerocarpa ČH2 (N), ČH3 (H); VK9 (H), VK10 (H); Avg Ss: 0.00 (1)

Lejeunea cavifolia; MK6 (H); VK1 (H), VK3 (H), VK4 (N), VK7 (N), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.00 (2)

Lepidozia reptans ČH1 (N), ČH2 (N); MK4 (N), MK7 (N); VK3 (N), VK7 (N), VK10 (N); Avg Čh: 0.00 (1), Avg VK: 0.00 (3), Avg MK: 0.00 (1), Avg Ss: 0.50 (1)

Lophozia attenuata ČH3 (N); MK7 (N); Avg Ss: 0.00 (1)

Lophozia bantriensis MK2 (H), MK7 (H); VK1 (H), VK2 (N), VK3 (H), VK4 (H), VK5 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 1.50 (5)

Lophozia barbata (MK+, VK+); MK1 (N), MK2 (H), MK3 (N), MK5 (N), MK6 (N), MK7 (H); VK1 (N), VK2 (N), VK3 (H), VK6 (H), VK7 (N), VK8 (H), VK10 (H); Avg VK: 0.13 (4), Avg MK: 0.83 (3)

Lophozia bicrenata **LC-att** (ČH+); ČH1 (H)

Lophozia excisa **LC-att** (MK+, VK+, PK+); MK7 (H); VK2 (H), VK8 (H), VK9 (H), VK10 (H); PK (H)

Lophozia floerkei VK2 (H), VK6 (H), VK8 (H); TS (H)

Lophozia hatcheri (MK+); ČH1 (N), ČH2 (H); MK2 (H), MK3 (H), MK4 (H), MK6 (N); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK5 (N), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); PK (H); TS (H); Avg Čh: 1.00 (4), Avg VK: 0.71 (7), Avg Ss: 1.25 (2)

Lophozia heterocolpos **CR**; VK3 (H), VK10 (H)

Lophozia incisa **LC-att**; MK5 (H); VK1 (H)

Lophozia longidens **LC-att**; VK7 (H)

Lophozia longiflora ČH3 (H); MK2 (H), MK7 (H)

Lophozia lycopodioides ČH1 (H), ČH2 (H), ČH3 (H), ČH4 (H); MK1 (N), MK2 (H), MK3 (N), MK4 (N), MK5 (N), MK6 (H), MK7 (N); VK1 (N), VK2 (H), VK3 (N), VK4 (N), VK5 (N), VK6 (H), VK7 (N), VK8 (N), VK9 (H), VK10 (N); Avg Čh: 0.75 (2), Avg VK: 0.80 (10), Avg MK: 0.67 (9), Avg Ss: 1.00 (5)

Lophozia quadriloba **EN** (MK+); MK6 (H); VK1 (H), VK4 (H), VK8 (H), VK10 (H)

Lophozia sudetica ČH1 (H), ČH2 (H), ČH3 (H), ČH4 (H); MK1 (N), MK2 (N), MK3 (N), MK4 (N), MK5 (H), MK6 (H); VK1 (N), VK2 (H), VK3 (H), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PK (H); TS (H); V (H); Avg Čh: 1.50 (4), Avg VK: 1.57 (15), Avg MK: 1.06 (8), Avg Ss: 1.00 (3)

Lophozia ventricosa var. *silvicola* **LC-att** (HJ+, ČH+); ČH2 (H)

Lophozia ventricosa s.l. ČH1 (H), ČH2 (N), ČH3 (H), ČH4 (H); MK1 (N), MK2 (N), MK4 (H), MK5 (N), MK6 (N); VK3 (H), VK4 (N), VK5 (H), VK6 (N), VK7 (H), VK9 (N), VK10 (N); PK (H), PKO (H); TS (H); Avg Čh: 1.00 (2), Avg VK: 0.83 (3), Avg MK: 0.40 (5), Avg Ss: 1.50 (3)

Marchantia polymorpha s.l. MK2 (N), MK5 (N); VK6 (H), VK7 (N); Avg VK: 0.50 (1), Avg MK: 1.00 (1)

Marchantia polymorpha subsp. *montivagans* **DD** (HJ+, MK+, VK+); MK1 (N), MK4 (N), MK5 (H); VK3 (N), VK5 (H), VK10 (N); Avg VK: 0.50 (1), Avg MK: 0.00 (3)

Marsupella emarginata var. *aquatica* (ČH+); ČH3 (N); Avg Ss: 2.00 (1)

Marsupella emarginata var. *emarginata* ČH2 (N), ČH3 (H); MK5 (H); VK10 (H); Avg Ss: 1.17 (3)

Marsupella funckii **LR-nt**; MK2 (H), MK6 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK6 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.94 (8)

Marsupella sphacelata (ČH+); ČH2 (N), ČH3 (H); VK2 (H), VK6 (H), VK9 (H), VK10 (H); Avg Ss: 0.25 (2)

Metzgeria furcata VK5 (H), VK7 (H), VK9 (H), VK10 (N); Avg VK: 0.00 (2)

Moerckia blyttii **VU** (HJ+, ČH+); ČH3 (H)

Mylia taylorii ČH3 (H)

Nardia compressa **VU**; ČH3 (H); Avg Ss: 2.00 (1)

Nardia geoscyphus **LC-att**; ČH3 (H); VK2 (H), VK3 (H), VK8 (H), VK9 (H); PKO (H)

Nardia scalaris ČH1 (N), ČH2 (H), ČH3 (H), ČH4 (N); MK4 (N), MK5 (N), MK6 (N); VK2 (N), VK3 (H), VK6 (N), VK8 (N), VK10 (H); TS (H); Avg Čh: 0.50 (3), Avg VK: 1.00 (1), Avg MK: 0.17 (3), Avg Ss: 1.25 (4)

Pellia endiviifolia (MK+); MK7 (H); VK1 (H), VK3 (H), VK7 (H), VK9 (H); Avg VK: 0.50 (2)

Pellia neesiana ČH2 (H), ČH3 (N), ČH4 (H); MK1 (N), MK2 (N), MK3 (N), MK4 (H), MK5 (N), MK7 (N); VK1 (H), VK2 (H), VK3 (N), VK4 (N), VK5 (N), VK6 (N), VK7 (N), VK8 (N), VK9 (N), VK10 (H); Avg VK: 1.64 (7), Avg MK: 1.00 (10), Avg Ss: 1.50 (2)

Pellia sp. ČH2 (N), ČH3 (N), ČH4 (N); MK1 (N), MK3 (N), MK4 (N), MK6 (N), MK7 (N); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK5 (N), VK6 (H), VK7 (N), VK10 (H); Avg VK: 1.21 (7), Avg MK: 1.10 (5), Avg Ss: 1.25 (2)

Plagiochila asplenioides MK1 (N), MK2 (N), MK4 (N), MK6 (H), MK7 (N); VK1 (N), VK3 (H), VK5 (N), VK7 (N), VK10 (N); Avg VK: 0.63 (4), Avg MK: 0.00 (2)

Plagiochila porelloides (HJ+, ČH+, MK+, VK+, PK+); ČH1 (H), ČH2 (N); MK1 (N), MK2 (H), MK3 (N), MK4 (H), MK5 (N), MK6 (N), MK7 (N); VK1 (N), VK2 (N), VK3 (H), VK4 (H), VK5 (N), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PK (N); Avg Čh: 1.00 (2), Avg VK: 1.07 (14), Avg MK: 0.75 (8), Avg Ss: 0.00 (1)

Porella cordaeana **LR-nt**; MK6 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (N), VK7 (H), VK8 (H), VK10 (H); PK (H); Avg VK: 0.63 (4)

Porella platyphylla VK1 (H), VK3 (N); Avg VK: 0.50 (1)

Preissia quadrata ČH1 (N); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK6 (N), VK8 (H), VK9 (H), VK10 (H); Avg Čh: 1.00 (2), Avg VK: 0.25 (4)

Ptilidium ciliare ČH1 (H), ČH2 (N), ČH3 (N), ČH4 (N); MK1 (N), MK2 (N), MK3 (N), MK4 (N), MK5 (N), MK6 (N); VK1 (H), VK2 (N), VK3 (N), VK4 (N), VK9 (N), VK10 (N); PK (N); Avg Čh: 0.50 (1), Avg VK: 0.33 (3), Avg MK: 0.25 (4), Avg Ss: 0.83 (3)

Ptilidium pulcherrimum (MK+); ČH1 (N), ČH2 (N), ČH3 (N), ČH4 (N); MK1 (N), MK2 (N), MK3 (N), MK4 (N), MK5 (N), MK7 (N); VK1 (N), VK3 (N), VK5 (N), VK7 (H); Avg Čh: 0.00 (1), Avg VK: 0.88 (8), Avg MK: 0.29 (7), Avg Ss: 0.67 (3)

Radula complanata s.l.³ VK2 (H), VK3 (N), VK4 (N), VK5 (H), VK7 (N), VK8 (H), VK10 (H); Avg VK: 0.93 (7)

Radula complanata VK8(H), VK9 (H)

Radula lindenberghiana **LR-nt** (MK+); MK6 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (N), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.75 (2)

Reboulia hemisphaerica **LR-nt** (VK+); VK8 (H)

Riccardia chamedryfolia **EN** (HJ+, VK+); VK4 (H), VK6 (H)

Riccardia cf. *chamedryfolia* MK4 (H)

Riccardia incurvata **VU** (HJ+, VK+); VK2 (H)

Riccardia multifida **LC-att** (MK+, VK+); MK3 (H), MK4 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK8 (H); Avg VK: 1.25 (2), Avg MK: 0.75 (4)

Riccia sorocarpa (HJ+, MK+, VK+); MK6 (H); VK8 (H)

Scapania aequiloba **LC-att** (MK+); MK6 (H); VK1 (N), VK4 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.00 (2)

Scapania calcicola **VU** (HJ+, VK+); VK9 (H)

Scapania curta VK9 (H)

Scapania cuspiduligera **EN**; VK2 (H), VK3 (H), VK8 (H), VK9 (H), VK10 (H)

Scapania gymnostomophila **EN** (HJ+, ČH+, VK+); ČH1 (H); VK3 (H)

Scapania helvetica **CR**; VK6 (H)

Scapania irrigua ČH2 (N), ČH3 (N); MK2 (H), MK3 (H), MK4 (H), MK6 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); PKO (H); Avg VK: 0.75 (2), Avg Ss: 0.25 (2)

Scapania mucronata **LC-att** (ČH+); ČH2 (H)

Scapania cf. *mucronata* ČH3 (H)

Scapania nemorea VK3 (N); Avg VK: 0.50 (1)

Scapania paludicola **VU**; MK2 (H), MK4 (H), MK7 (H); VK1 (H), VK3 (N), VK4 (H), VK6 (H), VK7 (H); Avg VK: 1.00 (1)

Scapania paludosa **VU** (PK+); PKO (H)

Scapania praetervisa **VU** (HJ+, MK+, VK+); MK6 (H); VK2 (H), VK3 (H), VK8 (H), VK9 (H), VK10 (H)

Scapania cf. *praetervisa* VK8 (H)

³ *Radula complanata* or *R. lindenberghiana* without gametangia

Scapania scandica **DD** (VK+); VK3 (H)
Scapania sp. [sect. *Curtae* (Müll.Frib.) H.Buch]; MK6 (H); VK10 (H)
Scapania sp.; ČH3 (H); VK3 (H), VK4 (H), VK8 (H)
Scapania uliginosa (ČH+, MK+); ČH3 (N); MK6 (H); VK3 (N), VK6 (N); Avg VK: 0.50 (1), Avg Ss: 1.00 (1)
Scapania umbrosa ČH3 (H); VK7 (H); Avg Ss: 0.00 (1)
Scapania undulata ČH2 (N), ČH3 (N), ČH4 (H); MK2 (H), MK3 (H), MK4 (N), MK5 (N), MK6 (H), MK7 (N); VK1 (N), VK2 (H), VK3 (N), VK4 (H), VK5 (H), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); PKO (H); TS (H); Avg VK: 0.83 (6), Avg MK: 1.00 (6), Avg Ss: 1.25 (2)
Tritomaria exsecta **LC**; VK1 (H), VK8 (H)
Tritomaria exsectiformis **LC-att** (HJ+, VK+); VK3 (H), VK7 (H), VK10 (H)
Tritomaria quinquedentata MK3 (N), MK6 (H), MK7 (N); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK6 (H), VK8 (H), VK9 (H), VK10 (H); PK (H); Avg VK: 0.00 (1), Avg MK: 0.00 (2)
Amblystegium fluviatile (MK+); MK5 (H)
Amblystegium radicale **LC-att** (HJ+, MK+); MK7 (H)
Amblystegium serpens MK7 (H)
Amblystegium tenax **LC-att** (MK+); MK5 (H); VK7 (H)
Amphidium lapponicum **VU**; ČH1 (H); VK2 (H), VK6 (H), VK8 (H), VK9 (H), VK10 (H)
Amphidium mougeotii; MK2 (N), MK6 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (N), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.94 (9)
Andreaea cf. *alpestris* VK9 (H)
Andreaea rothii subsp. *rothii* **VU**; VK1 (H), VK3 (H); Avg VK: 1.50 (1)
Andreaea rupestris ČH1 (N), ČH2 (H), ČH3 (H), ČH4 (N); MK2 (N), MK3 (N), MK4 (N), MK6 (N); VK1 (H), VK2 (N), VK3 (H), VK4 (N), VK6 (N), VK8 (N), VK9 (H), VK10 (H); PK (H); Avg Čh: 1.67 (3), Avg VK: 0.95 (10), Avg MK: 0.83 (3), Avg Ss: 1.13 (4)
Anoetangium aestivum **VU**; VK8 (H), VK9 (H), VK10 (H)
Anomobryum julaceum var. *concinatum* **CR**; VK8 (H), VK9 (H), VK10 (H)
Anomodon rugelii **VU**; VK1 (H), VK3 (H), VK5 (H), VK7 (H), VK10 (H)
Atrichum tenellum **LC-att**; VK5 (H), VK9 (H)
Atrichum undulatum var. *undulatum* ČH2 (N), ČH4 (N); MK1 (N), MK2 (N), MK3 (N), MK4 (H), MK5 (N), MK6 (N), MK7 (N); VK1 (N), VK2 (H), VK3 (N), VK4 (H), VK5 (H), VK7 (N), VK8 (N), VK9 (N), VK10 (N); Avg VK: 1.14 (11), Avg MK: 0.50 (11), Avg Ss: 0.50 (2)
Aulacomnium palustre MK2 (H), MK6 (H), MK7 (H)
Barbula convoluta MK6 (H); VK6 (H)
Barbula unguiculata (HJ+, MK+); MK6 (H)
Bartramia ithyphylla ČH1 (H); MK2 (H), MK6 (N); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK6 (N), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PK (H); Avg VK: 1.15 (10)
Blindia acuta ČH1 (H); MK2 (H), MK3 (N), MK4 (N), MK6 (H); VK1 (H), VK2 (H), VK3 (N), VK4 (H), VK5 (H), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.82 (14), Avg MK: 0.50 (2)
Brachydontium trichodes **LC-att** (ČH+, MK+, VK+); ČH2 (N), ČH3 (H), ČH4 (H); MK5 (H); VK6 (H); Avg MK: 0.00 (1), Avg Ss: 1.00 (2)
Brachythecium albicans ČH1 (H); MK7 (H); Avg Čh: 0.00 (1)
Brachythecium geheebii **EN**; VK7 (H), VK10 (H)
Brachythecium glareosum ČH1 (N); MK6 (H); VK1 (H), VK3 (N), VK10 (H); Avg Čh: 0.00 (1), Avg VK: 0.50 (1)
Brachythecium oedipodium **LC-att** (ČH+, MK+); ČH1 (H), ČH3 (H); MK2 (H), MK7 (H)
Brachythecium plumosum MK6 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (N), VK5 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 1.17 (6)
Brachythecium populeum MK3 (H), MK6 (N), MK7 (N); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK5 (H), VK7 (H), VK9 (H), VK10 (H); Avg VK: 0.50 (2)
Brachythecium reflexum ČH1 (H), ČH2 (H), ČH3 (H), ČH4 (N); MK1 (H), MK2 (N), MK3 (H), MK4 (N), MK5 (H), MK6 (H), MK7 (H); VK1 (N), VK3 (H), VK4 (H), VK5 (H), VK6 (N), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 1.50 (17), Avg MK: 0.92 (13), Avg Ss: 1.50 (2)
Brachythecium rivulare MK1 (N), MK2 (H), MK3 (H), MK4 (H), MK5 (H), MK6 (N), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (N), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PKO (H); Avg VK: 1.60 (10), Avg MK: 1.08 (18)

Brachythecium salebrosum ČH1 (H), ČH3 (N); MK3 (H), MK6 (H), MK7 (H); VK5 (H), VK7 (N), VK10 (H); Avg VK: 1.00 (1), Avg MK: 0.00 (2), Avg Ss: 0.50 (1)

Brachythecium starkei **LC-att**; ČH1 (N), ČH2 (H); MK4 (N), MK5 (H), MK7 (H); VK2 (H), VK3 (H), VK5 (H), VK7 (H), VK10 (H); Avg Čh: 0.00 (1), Avg Ss: 1.00 (1)

Brachythecium velutinum ČH1 (H); MK1 (N), MK3 (N), MK4 (N), MK6 (N), MK7 (N); VK1 (N), VK2 (N), VK3 (N), VK4 (N), VK5 (H), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); PK (H); Avg VK: 0.50 (2), Avg MK: 0.00 (3)

Brachythecium sp.; MK6 (H); VK3 (H), VK4 (H), VK6 (H)

Bryoerythrophyllum ferruginascens **LR-nt**; VK2 (H), VK4 (H), VK8 (H), VK9 (H), VK10 (H)

Bryoerythrophyllum recurvirostrum VK2 (H), VK4 (H), VK6 (H), VK8 (H), VK10 (H); PK (H); Avg VK: 0.00 (2)

Bryum alpinum **LR-nt**; MK6 (H); VK2 (H), VK4 (N), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.50 (1)

*Bryum archangelicum*⁴ **DD**; ČH1 (H)

Bryum argenteum MK2 (N), MK3 (N), MK6 (N); Avg MK: 0.50 (1)

Bryum caespiticium VK8 (H), VK10 (H)

Bryum capillare MK5 (H), MK6 (H); VK1 (N), VK2 (N), VK3 (N), VK8 (N)

*Bryum elegans*⁵ **LC-att** (MK+); MK6 (N), MK7 (H); VK2 (H), VK3 (H), VK4 (H), VK6 (H), VK10 (H); Avg VK: 0.00 (1)

Bryum mildeanum **DD** (VK+); VK2 (H)

Bryum moravicum (MK+, PK+); MK3 (N), MK7 (N); VK3 (H), VK7 (N), VK8 (H), VK10 (H); PK (H); Avg VK: 1.00 (1), Avg MK: 0.00 (1)

Bryum muehlenbeckii **LC-att** (MK+); MK1 (N), MK4 (H); VK1 (H), VK2 (H), VK3 (H), VK6 (H), VK8 (H), VK9 (H), VK10 (H); Avg MK: 0.50 (1)

Bryum pallens MK4 (H), MK5 (H), MK6 (N); VK2 (H), VK3 (H), VK6 (H), VK7 (N), VK10 (H); Avg VK: 0.75 (2)

Bryum pallescens ČH1 (H); MK6 (H); VK1 (H), VK3 (H), VK4 (H), VK6 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.00 (1)

Bryum pseudotriquetrum ČH2 (H); MK1 (H), MK2 (H), MK3 (N), MK4 (H), MK5 (H), MK6 (H), MK7 (N); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (N), VK10 (H); PKO (H); Avg VK: 1.85 (20), Avg MK: 1.03 (16)

Bryum rubens (HJ+, VK+); VK7 (H)

Bryum schleicheri **CR**; MK1 (H), MK5 (H)

Bryum weigelii **LC-att**; MK1 (N), MK2 (H), MK4 (H), MK5 (H), MK6 (N), MK7 (H); VK2 (N), VK4 (N), VK6 (H), VK7 (N), VK10 (H); PKO (H); Avg VK: 0.75 (2), Avg MK: 0.44 (8)

Bryum sp.; MK4 (H), MK6 (H); VK8 (H), VK10 (H)

Calliargon cordifolium VK3 (N); Avg VK: 0.50 (1)

Calliargonella cuspidata (MK+, VK+); MK1 (N), MK2 (N), MK3 (H), MK4 (N), MK5 (H), MK6 (N), MK7 (H); VK1 (H), VK2 (H), VK3 (N), VK4 (H), VK5 (H), VK7 (N); Avg VK: 1.08 (6), Avg MK: 1.00 (10)

Campylium protensum MK1 (H), MK2 (H), MK3 (H), MK4 (H), MK5 (H), MK6 (H), MK7 (H); VK1 (N), VK2 (N), VK3 (H), VK4 (H), VK5 (H), VK6 (N), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 1.00 (8), Avg MK: 0.25 (4)

Campylium stellatum **LR-nt**; MK1 (H), MK2 (H), MK3 (N), MK4 (H), MK6 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 1.70 (5), Avg MK: 1.00 (2)

Ceratodon purpureus ČH1 (H), ČH2 (N); MK1 (N), MK2 (N), MK3 (N), MK4 (N), MK5 (N), MK6 (H), MK7 (H); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK5 (H), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); PK (H); Avg Čh: 0.00 (1), Avg VK: 0.79 (7), Avg MK: 0.17 (9), Avg Ss: 0.25 (2)

Cirriphyllum piliferum MK6 (N), MK7 (N); VK1 (N), VK4 (N), VK5 (H), VK7 (N); Avg VK: 0.20 (5)

Climacium dendroides (MK+, VK+); MK1 (N), MK2 (N), MK3 (N), MK4 (N), MK5 (N), MK6 (H), MK7 (H); VK1 (N), VK3 (N), VK4 (N), VK5 (N), VK7 (N), VK8 (H), VK10 (H); Avg VK: 0.83 (12), Avg MK: 0.40 (10)

⁴ regarded synonymous to *B. amblyodon* Müll.Hal. (see Kučera & Váňa 2005 for details)

⁵ including *B. stirtonii*

Coscinodon cribrosus (VK+); VK8 (H)
Cratoneuron filicinum (MK+); MK1 (H), MK5 (N); VK1 (H); Avg MK: 2.00 (1)
Ctenidium molluscum (MK+); MK2 (H), MK3 (H), MK6 (N); VK1 (N), VK2 (H), VK3 (N), VK4 (H), VK5 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.53 (16), Avg MK: 1.00 (4)
Cynodontium gracilescens VU; VK3 (H), VK4 (H), VK5 (H), VK6 (H)
Cynodontium polycarpon; ČH1 (N), ČH2 (N); MK1 (N), MK2 (N), MK3 (N), MK4 (N), MK5 (H), MK6 (H), MK7 (N); VK1 (H), VK2 (H), VK3 (H), VK4 (N), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PK (H); TS (H); V (H); Avg Čh: 1.00 (1), Avg VK: 1.13 (24), Avg MK: 1.22 (9), Avg Ss: 0.50 (2)
Cynodontium strumiferum ČH1 (H); VK2 (H), VK3 (H), VK6 (H), VK10 (H)
Cynodontium tenellum DD; VK3 (H), VK10 (H)
Cynodontium sp.; MK6 (H); VK2 (H), VK8 (H)
Dichodontium palustre (ČH+, MK+); ČH3 (N); MK1 (N), MK2 (H), MK3 (N), MK4 (H), MK5 (H), MK6 (N), MK7 (N); VK1 (N), VK2 (H), VK3 (H), VK4 (N), VK5 (H), VK6 (H), VK7 (N), VK8 (N), VK9 (N), VK10 (N); Avg VK: 0.86 (11), Avg MK: 0.96 (13), Avg Ss: 0.00 (1)
Dichodontium pellucidum ČH2 (N); MK1 (N), MK3 (N), MK4 (N), MK5 (H), MK6 (N), MK7 (N); VK1 (N), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK7 (N), VK8 (H), VK9 (N), VK10 (H); Avg VK: 1.36 (7), Avg MK: 0.36 (7), Avg Ss: 2.00 (1)
Dicranella cerviculata ČH1 (N), ČH2 (N), ČH3 (N); MK1 (N), MK5 (H); VK3 (H), VK5 (N), VK10 (H); PK (H); Avg Čh: 1.00 (1), Avg VK: 0.00 (2), Avg Ss: 0.75 (4)
Dicranella heteromalla ČH2 (H), ČH3 (H), ČH4 (N); MK1 (N), MK2 (N), MK3 (H), MK4 (N), MK5 (N), MK6 (H), MK7 (H); VK1 (N), VK2 (H), VK3 (N), VK4 (N), VK5 (N), VK6 (H), VK7 (H), VK10 (N); PK (H); Avg VK: 0.82 (11), Avg MK: 0.67 (15), Avg Ss: 1.25 (4)
Dicranella cf. *heteromalla* VK2 (H)
Dicranodontium denudatum ČH2 (N), ČH3 (H); MK1 (N), MK2 (N), MK4 (N), MK6 (N); VK1 (N), VK3 (N), VK7 (H), VK10 (N); Avg VK: 0.33 (3), Avg MK: 0.00 (1), Avg Ss: 0.88 (4)
Dicranoweisia crispula ČH1 (H); VK2 (H), VK3 (H), VK6 (H), VK8 (H), VK9 (H), VK10 (H); PK (N); Avg Čh: 1.00 (2), Avg VK: 0.50 (1)
Dicranum bonjeanii LR-nt; VK8 (H), VK10 (H)
Dicranum flagellare LC-att (ČH+); ČH1 (H)
Dicranum flexicaule (ČH+); ČH1 (N); PK (H); V (H); Avg Čh: 2.00 (1)
Dicranum fuscescens ČH3 (H); Avg Ss: 0.00 (1)
Dicranum majus VU (PK+); ČH3 (H); PK (H)
Dicranum montanum ČH1 (N), ČH2 (N), ČH3 (N), ČH4 (H); MK1 (N), MK2 (N), MK3 (N), MK4 (H), MK5 (N), MK6 (H), MK7 (H); VK1 (H), VK3 (H), VK4 (N), VK5 (H), VK7 (H), VK8 (N), VK10 (N); Avg Čh: 1.25 (2), Avg VK: 1.34 (16), Avg MK: 0.46 (14), Avg Ss: 1.13 (4)
Dicranum polysetum MK6 (H)
Dicranum scoparium ČH1 (H), ČH2 (H), ČH3 (H), ČH4 (N); MK1 (N), MK2 (H), MK3 (N), MK4 (H), MK5 (N), MK6 (H), MK7 (N); VK1 (H), VK2 (H), VK3 (N), VK4 (N), VK5 (N), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PK (H); TS (H); Avg Čh: 1.63 (4), Avg VK: 1.11 (14), Avg MK: 0.93 (14), Avg Ss: 1.50 (3)
Dicranum spadiceum CR; TS (H)
Dicranum tauricum (HJ+, VK+); VK7 (H)
Didymodon rigidulus var. *rigidulus* VK10 (H)
Diphyscium foliosum LC-att; ČH2 (H), ČH4 (N); VK2 (H), VK4 (H), VK8 (H), VK9 (H); Avg Ss: 0.00 (1)
Distichium capillaceum ČH1 (N); VK8 (H), VK9 (N), VK10 (H); PK (H); Avg Čh: 0.75 (2)
Distichium inclinatum VU; VK8 (H)
Ditrichum flexicaule LC-att; VK8 (H); PK (H)
Ditrichum gracile LC-att (HJ+, ČH+, VK+); ČH1 (N); VK3 (N), VK8 (H), VK10 (H); Avg Čh: 0.00 (1), Avg VK: 0.50 (1)
Ditrichum heteromallum ČH1 (N), ČH2 (N), ČH3 (H); MK1 (H); VK2 (H), VK3 (H), VK9 (H), VK10 (H); Avg Čh: 0.75 (2), Avg Ss: 0.50 (3)
Ditrichum lineare LC-att; ČH3 (H); VK9 (H); PKO (H); Avg Ss: 0.00 (1)
Ditrichum pusillum LC-att; ČH1 (H), ČH3 (H); VK3 (H); PKO (H)
Ditrichum zonatum EN (HJ+, VK+); VK6 (H)
Encalypta ciliata LR-nt; VK2 (H), VK3 (H), VK8 (H), VK9 (H), VK10 (H)

Encalypta raptocarpa **EN**; VK3 (H), VK8 (H), VK10 (H); PK (H)
Encalypta streptocarpa VK10 (H)
Encalypta vulgaris VK8 (H)
Encalypta sp. VK8 (H)
Eurhynchium angustirete MK6 (H)
Eurhynchium hians (MK+); MK5 (H), MK7 (N); VK1 (H), VK7 (H)
Fissidens adianthoides **LC-att**; MK2 (H), MK4 (H), MK6 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.89 (9), Avg MK: 0.50 (2)
Fissidens bryoides VK2 (H)
Fissidens dubius var. *dubius* ČH1 (H); VK2 (H), VK3 (H), VK4 (H), VK8 (H), VK9 (N), VK10 (H); Avg Čh: 0.25 (2), Avg VK: 0.50 (1)
Fissidens osmundoides **LC-att**; MK2 (H), MK3 (N), MK6 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (N), VK5 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.57 (7), Avg MK: 1.00 (1)
Fissidens pusillus **LC-att** (HJ+, VK+); VK3 (H), VK5 (H), VK7 (H); Avg VK: 0.50 (1)
Fissidens taxifolius (VK+); VK8 (H)
Funaria hygrometrica MK2 (N), MK3 (N), MK4 (H), MK6 (N), MK7 (N); Avg MK: 0.10 (5)
Grimmia alpestris **VU**; VK1 (N), VK2 (H), VK3 (H), VK6 (H), VK8 (H), VK10 (H)
Grimmia anodon **EN** (HJ+, VK+); VK8 (H)
Grimmia anomala **VU**; MK+; MK5 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.17 (3)
Grimmia donniana ČH1 (N); VK9 (H), VK10 (H); TS (H); Avg Čh: 0.00 (1)
Grimmia funalis **LC-att**; ČH1 (H); VK1 (H), VK3 (N), VK8 (H), VK9 (N), VK10 (H); PK (N); TS (H); Avg VK: 0.00 (1)
Grimmia hartmanii ČH1 (H), ČH2 (H); MK1 (H), MK2 (N), MK5 (H), MK6 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 1.29 (14), Avg Ss: 0.50 (1)
Grimmia incurva ČH1 (H), ČH3 (N); PK (H); V (H); Avg Čh: 2.00 (1)
Grimmia muehlenbeckii HJ+, MK+, VK+; MK2 (H); VK1 (H), VK3 (H), VK8 (H), VK9 (H), VK10 (H)
Grimmia ovalis VK+; VK1 (H)
Grimmia pulvinata ČH1 (H); Avg Čh: 1.00 (1)
Grimmia ramondii **LC-att** (ČH+, MK+); ČH2 (H), ČH3 (H); MK2 (H), MK4 (H); VK2 (H), VK3 (H), VK4 (H), VK6 (H), VK9 (H), VK10 (H); Avg VK: 0.83 (3), Avg Ss: 0.50 (1)
Grimmia torquata **VU**; VK3 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.00 (1)
Gymnostomum aeruginosum (PK+); ČH1 (H); VK1 (H), VK3 (H), VK8 (H), VK9 (H), VK10 (H); PK (N); Avg Čh: 0.00 (1), Avg VK: 0.00 (1)
Hedwigia ciliata MK6 (H); VK3 (H), VK10 (H); Avg VK: 0.50 (1)
Herzogiella seligeri ČH1 (N), ČH2 (N); MK7 (N); VK7 (H); Avg Čh: 0.00 (1), Avg VK: 1.50 (1), Avg MK: 0.00 (1), Avg Ss: 0.00 (1)
Herzogiella striatella **LR-nt** (MK+); ČH2 (H), ČH3 (H); MK2 (N), MK3 (H), MK4 (H), MK5 (H); VK2 (H), VK3 (N), VK4 (H), VK5 (H), VK7 (H); Avg VK: 0.38 (4), Avg MK: 0.50 (9), Avg Ss: 0.25 (2)
Heterocladium dimorphum **VU** (MK+); MK6 (H), MK7 (N); VK2 (H), VK3 (H), VK5 (N), VK9 (H), VK10 (H); Avg VK: 0.50 (1)
Heterocladium heteropterum ČH2 (N), ČH4 (N); MK3 (H), MK5 (N), MK6 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (N), VK6 (H), VK7 (N), VK8 (H), VK10 (H); Avg VK: 0.79 (7), Avg MK: 0.50 (2), Avg Ss: 0.75 (2)
Homalothecium philippeanum **LC-att** (VK+); VK10 (H)
Homalothecium sericeum VK1 (H), VK3 (H), VK8 (N), VK10 (N); PK (N); Avg VK: 1.00 (1)
Homomallium incurvatum VK7 (H)
Hygrohypnum luridum **LC-att**; VK7 (H)
*Hygrohypnum molle*⁶ **LR-nt** (MK+); MK5 (H), MK7 (H); VK1 (H), VK7 (H)
Hygrohypnum ochraceum MK2 (H); VK3 (N), VK5 (H), VK6 (H), VK7 (H); Avg VK: 1.00 (2)

⁶ including *H. duriusculum*

Hylocomium pyrenaicum **VU**; ČH1 (H); MK2 (H), MK6 (H), MK7 (H); VK1 (H), VK3 (H), VK4 (H), VK7 (H), VK10 (H); PKO (H); Avg VK: 0.25 (2)

Hylocomium splendens ČH1 (N), ČH2 (N), ČH3 (N); MK2 (N), MK3 (N), MK4 (N), MK6 (N), MK7 (H); VK1 (N), VK3 (N), VK4 (N), VK7 (H), VK8 (N), VK9 (N), VK10 (H); Avg Čh: 1.50 (2), Avg VK: 0.67 (6), Avg MK: 0.33 (3), Avg Ss: 0.50 (1)

Hymenostylium recurvirostrum **LR-nt**; VK10 (H)

Hypnum andoi (HJ+, MK+); MK3 (H)

Hypnum cupressiforme var. *cupressiforme* ČH2 (N); MK2 (N), MK3 (H), MK4 (H), MK5 (N), MK6 (N), MK7 (N); VK1 (N), VK3 (H), VK5 (N), VK6 (N), VK7 (N), VK8 (H); Avg VK: 0.17 (6), Avg MK: 0.38 (8), Avg Ss: 0.50 (1)

Hypnum cupressiforme var. *julaceum* **DD** (HJ+, VK+); VK8 (H), VK9 (H)

Hypnum cupressiforme var. *subjulaceum* **LR-nt**; ČH1 (H), ČH2 (H); VK3 (N), VK7 (N), VK8 (H), VK9 (H), VK10 (H); PK (H); Avg Čh: 1.00 (1), Avg VK: 1.00 (2)

Hypnum pallescens **LC**; ČH2 (H), ČH3 (N); VK1 (H), VK3 (H), VK5 (H), VK7 (H); Avg VK: 0.00 (1), Avg Ss: 0.00 (1)

Hypnum pratense **LR-nt** (MK+); MK7 (H)

Isopterygiopsis muelleriana **CR**; VK1 (H), VK2 (H), VK8 (H), VK9 (H), VK10 (H)

Isopterygiopsis pulchella **CR**; VK1 (H), VK7 (H), VK10 (H)

Isothecium alopecuroides (MK+, VK+); MK6 (H); VK3 (H), VK4 (N), VK5 (N), VK8 (H), VK10 (H); Avg VK: 0.38 (8)

Kiaeria blyttii (MK+); ČH1 (N), ČH3 (H); MK3 (N), MK5 (N); VK2 (N); PK (H); TS (H); Avg Čh: 2.00 (1), Avg MK: 0.25 (2)

Kiaeria starkei ČH1 (H); VK2 (H), VK6 (H), VK10 (H)

Lescuraea incurvata ČH2 (H); MK1 (N), MK2 (H), MK3 (H), MK5 (H), MK6 (H); VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (N), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 1.21 (7), Avg MK: 0.25 (4)

Lescuraea mutabilis **EN**; ČH2 (H); MK7 (H)

Mnium lycopodioides **LR-nt** (HJ+, ČH+, MK+, VK+, TS+); ČH1 (H); MK6 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK8 (H), VK10 (H); TS (H)

Mnium marginatum VK4 (H)

Mnium spinosum ČH1 (H); MK2 (H), MK6 (H); VK1 (N), VK2 (N), VK4 (H), VK6 (N), VK7 (H), VK8 (H), VK9 (N), VK10 (H); PK (H); Avg Čh: 1.00 (1), Avg VK: 0.67 (3)

Mnium stellare ČH1 (N); VK3 (N), VK8 (H), VK10 (H); PK (N); Avg Čh: 0.00 (1), Avg VK: 1.00 (1)

Mnium thomsonii **CR**; ČH1 (H)

Myurella julacea **EN**; VK1 (H), VK2 (H), VK3 (N), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.00 (1)

Neckera crispa PK (N)

Oligotrichum hercynicum ČH1 (N), ČH2 (H), ČH3 (H), ČH4 (N); MK1 (N), MK5 (H); VK2 (H), VK3 (N), VK6 (N), VK9 (H), VK10 (N); PKO (H); Avg Čh: 0.50 (1), Avg VK: 0.92 (6), Avg MK: 0.13 (4), Avg Ss: 1.50 (2)

Orthodontium lineare (HJ+, MK+); MK5 (H)

Orthothecium intricatum; ČH1 (N); VK1 (N), VK3 (H), VK6 (H), VK7 (N), VK9 (H), VK10 (H); PK (H); Avg Čh: 1.00 (1), Avg VK: 0.50 (2)

Orthotrichum cupulatum var. *cupulatum* **LC-att** (HJ+, ČH+); ČH1 (H)

Orthotrichum pallens (MK+); MK7 (H); VK1 (H), VK3 (H), VK7 (H); Avg VK: 0.00 (1)

Orthotrichum sp. VK1 (H); PK (H)

Palustriella commutata MK1 (H), MK4 (H), MK5 (H), MK6 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (N); Avg VK: 1.80 (5), Avg MK: 1.00 (10)

Palustriella decipiens **LR-nt**; MK1 (H), MK2 (H), MK3 (H), MK4 (H), MK5 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PKO (H); Avg VK: 1.33 (9), Avg MK: 0.00 (3)

Palustriella falcata MK1 (H), MK2 (H), MK3 (H), MK4 (N), MK5 (H), MK6 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (N), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PKO (H); Avg VK: 1.73 (13), Avg MK: 0.57 (7)

Paraleucobryum longifolium ČH1 (N), ČH2 (H), ČH3 (H); MK6 (H), MK7 (H); VK1 (H), VK3 (H), VK4 (N), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (N), VK10 (H); PK (N), PKO (H); Avg Čh: 1.00 (1), Avg VK: 0.94 (9), Avg Ss: 1.17 (3)

Philonotis calcarea VK4 (H)
Philonotis fontana ČH2 (H); MK1 (H), MK2 (H), MK3 (H), MK4 (H), MK5 (H), MK6 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK6 (N), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 0.95 (10), Avg MK: 0.69 (8)
Philonotis cf. *fontana* MK3 (N); Avg MK: 1.50 (1)
Philonotis seriata ČH4 (H); MK1 (H), MK2 (H), MK3 (H), MK4 (H), MK5 (H), MK6 (N), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK9 (N); PKO (H); Avg VK: 1.41 (17), Avg MK: 0.83 (12), Avg Ss: 2.00 (1)
Philonotis tomentella VU (MK+); MK1 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK6 (H), VK8 (H), VK10 (H)
Plagiobryum zieri VU; VK8 (H), VK9 (N), VK10 (H)
Plagiomnium affine ČH1 (H), ČH2 (N), ČH3 (H), ČH4 (N); MK1 (N), MK2 (N), MK3 (H), MK4 (N), MK5 (N), MK6 (H), MK7 (N); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK5 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg Čh: 1.00 (1), Avg VK: 0.88 (12), Avg MK: 0.58 (12), Avg Ss: 1.50 (2)
Plagiomnium cuspidatum VK1 (H), VK3 (H), VK7 (N), VK8 (H), VK10 (H); Avg VK: 0.50 (2)
Plagiomnium elatum LC-att; MK1 (H), MK6 (H), MK7 (H); VK1 (H), VK3 (H), VK8 (H), VK10 (H)
Plagiomnium ellipticum LC-att (HJ+, MK+, VK+); MK4 (H), MK7 (H); VK1 (H), VK3 (H), VK4 (H), VK5 (H), VK7 (H)
Plagiomnium medium LR-nt (MK+); MK4 (H), MK5 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK6 (H), VK7 (H), VK9 (N); Avg VK: 0.00 (1), Avg MK: 0.50 (3)
Plagiomnium undulatum MK1 (H), MK3 (N), MK4 (N), MK5 (N), MK7 (N); VK1 (H), VK3 (N), VK4 (N), VK7 (H), VK10 (H); Avg VK: 1.17 (6), Avg MK: 0.25 (6)
Plagiopus oederianus EN; VK8 (H), VK9 (H), VK10 (H)
Plagiothecium cavifolium ČH1 (H), ČH3 (H); MK3 (N), MK4 (H), MK6 (H), MK7 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); PK (H); Avg VK: 1.00 (2), Avg MK: 0.25 (2), Avg Ss: 0.50 (1)
Plagiothecium curvifolium ČH1 (H), ČH2 (H), ČH3 (H), ČH4 (H); MK1 (H), MK2 (N), MK3 (N), MK4 (N), MK5 (N), MK6 (H), MK7 (H); VK1 (N), VK2 (H), VK3 (N), VK4 (N), VK5 (H), VK7 (N), VK9 (N), VK10 (N); Avg VK: 0.80 (5), Avg MK: 0.40 (10), Avg Ss: 0.88 (4)
Plagiothecium denticulatum var. *denticulatum* ČH1 (N), ČH2 (N), ČH3 (N), ČH4 (H); MK1 (N), MK2 (N), MK3 (H), MK4 (H), MK5 (N), MK6 (N), MK7 (H); VK1 (H), VK2 (N), VK3 (H), VK4 (N), VK6 (N), VK7 (N), VK10 (H); PK (H); TS (H); Avg Čh: 1.00 (3), Avg VK: 0.94 (8), Avg MK: 0.55 (11), Avg Ss: 0.88 (4)
Plagiothecium cf. *denticulatum* MK6 (H)
Plagiothecium denticulatum var. *obtusifolium* LR-nt (HJ+, MK+, VK+); MK5 (H); VK10 (N)
Plagiothecium laetum (MK+); ČH1 (N), ČH2 (H), ČH3 (H); MK1 (N), MK2 (H), MK3 (N), MK4 (N), MK5 (N), MK6 (H), MK7 (H); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK5 (H), VK7 (N), VK10 (H); Avg Čh: 1.50 (1), Avg VK: 0.78 (9), Avg MK: 0.35 (10), Avg Ss: 0.88 (4)
Plagiothecium nemorale ČH1 (H), ČH2 (H); VK5 (H), VK8 (H), VK9 (H)
Plagiothecium cf. *nemorale* VK5 (H)
Plagiothecium platyphyllum LC-att; ČH4 (H); Avg Ss: 2.00 (1)
Plagiothecium ruthei LC-att (VK+); VK6 (H)
Plagiothecium succulentum (ČH+, VK+); ČH1 (H), ČH2 (H), ČH4 (H); VK1 (H), VK3 (N), VK8 (H), VK10 (H); Avg VK: 0.50 (1)
Plagiothecium cf. *succulentum* VK3 (H)
Plagiothecium undulatum ČH3 (H); Avg Ss: 1.00 (3)
Pleurozium schreberi ČH1 (H), ČH2 (N), ČH3 (N), ČH4 (N); MK1 (N), MK2 (N), MK3 (N), MK4 (N), MK5 (N), MK6 (N), MK7 (N); VK1 (N), VK2 (N), VK4 (N), VK5 (N), VK7 (N), VK8 (N), VK10 (N); Avg Čh: 1.33 (3), Avg VK: 0.50 (3), Avg MK: 0.50 (7), Avg Ss: 0.88 (4)
Pogonatum aloides ČH2 (H), ČH3 (H); MK1 (N), MK7 (N); VK3 (N), VK7 (N); Avg VK: 0.25 (2), Avg Ss: 0.00 (1)
Pogonatum urnigerum ČH1 (N), ČH2 (N), ČH3 (N), ČH4 (N); MK1 (N), MK3 (N), MK4 (N), MK5 (H), MK6 (N), MK7 (N); VK1 (N), VK2 (H), VK3 (N), VK4 (N), VK5 (N), VK6 (N), VK7 (N), VK8 (N), VK10 (H); PKO (H); TS (H); Avg Čh: 0.50 (1), Avg VK: 0.78 (9), Avg MK: 0.33 (6), Avg Ss: 0.88 (4)

Pohlia cruda ČH1 (H); MK3 (N), MK6 (N); VK1 (N), VK2 (N), VK3 (N), VK4 (N), VK8 (H), VK10 (H); PK (H); Avg Čh: 0.50 (2), Avg VK: 1.00 (4), Avg MK: 0.50 (1)

Pohlia drummondii PKO (H)

Pohlia elongata **LR-nt** (MK+, TS+); ČH3 (H); MK7 (H); VK1 (H), VK3 (H), VK7 (N), VK8 (H), VK10 (H); TS (H); Avg VK: 0.00 (1)

Pohlia cf. *elongata* VK3 (H)

Pohlia longicollis **CR** (TS+); TS (H)

Pohlia nutans subsp. *nutans* ČH1 (N), ČH2 (H), ČH3 (H), ČH4 (H); MK1 (N), MK2 (H), MK3 (N), MK4 (H), MK5 (H), MK6 (H), MK7 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); PK (H); Avg Čh: 1.83 (3), Avg VK: 1.24 (17), Avg MK: 1.15 (13), Avg Ss: 1.00 (5)

Pohlia nutans subsp. *schimperi* **LR-nt** (HJ+, MK+); MK4 (H), MK5 (H), MK6 (H)

Pohlia sp.; MK4 (H); VK2 (H), VK3 (H), VK9 (H)

Pohlia wahlenbergii var. *glacialis* (Brid.) Warb.; MK5 (H); VK3 (H), VK5 (H), VK6 (H)

Pohlia wahlenbergii var. *wahlenbergii* ČH3 (N); MK1 (N), MK3 (N), MK5 (H), MK7 (N); VK1 (N), VK3 (N), VK6 (N), VK7 (N), VK9 (N), VK10 (N); PKO (H); Avg VK: 0.60 (5), Avg MK: 0.08 (6), Avg Ss: 0.00 (1)

Polytrichastrum alpinum ČH1 (H), ČH2 (H), ČH3 (H); MK1 (H), MK2 (H), MK4 (N), MK5 (H), MK6 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (N), VK5 (H), VK6 (N), VK7 (N), VK8 (H), VK9 (N), VK10 (H); PK (H); Avg Čh: 1.75 (2), Avg VK: 0.88 (4), Avg MK: 0.00 (1), Avg Ss: 1.25 (4)

Polytrichastrum formosum ČH1 (H), ČH2 (N), ČH3 (H), ČH4 (N); MK1 (H), MK2 (N), MK3 (N), MK4 (H), MK5 (H), MK6 (H), MK7 (N); VK1 (H), VK2 (H), VK3 (N), VK4 (N), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (N), VK10 (N); TS (H); Avg Čh: 1.63 (4), Avg VK: 1.33 (18), Avg MK: 0.87 (15), Avg Ss: 1.17 (3)

Polytrichastrum longisetum ČH3 (H), ČH4 (H); MK1 (H), MK3 (H), MK4 (H), MK5 (N), MK7 (H); VK2 (H), VK3 (H), VK6 (H), VK10 (H); PK (H); Avg VK: 0.00 (1), Avg MK: 0.13 (8)

Polytrichastrum pallidisetum **LC-att** (MK+, VK+); ČH2 (H); MK7 (H); VK7 (H)

Polytrichum commune ČH2 (N), ČH3 (H), ČH4 (N); MK1 (N), MK2 (N), MK4 (H), MK5 (N), MK6 (H), MK7 (N); VK2 (H), VK3 (N), VK4 (N), VK7 (H); TS (H); Avg VK: 0.80 (5), Avg MK: 0.67 (3), Avg Ss: 0.88 (4)

Polytrichum juniperinum ČH1 (H), ČH2 (N), ČH3 (N); MK1 (N), MK2 (N), MK4 (N), MK5 (H), MK6 (H), MK7 (H); VK1 (N), VK2 (N), VK3 (H), VK4 (N), VK6 (H), VK10 (H); Avg Čh: 0.50 (1), Avg VK: 0.88 (8), Avg MK: 0.17 (6), Avg Ss: 0.50 (1)

Polytrichum perigoniale ČH2 (H), ČH4 (H); MK4 (H), MK5 (H); VK2 (H), VK5 (H), VK6 (H)

Polytrichum piliferum ČH1 (H), ČH2 (H), ČH3 (N); MK2 (N), MK3 (N), MK4 (N), MK6 (H), MK7 (N); VK1 (N), VK2 (H), VK3 (H), VK4 (N), VK6 (H), VK8 (H), VK9 (H), VK10 (H); PK (N); V (H); Avg Čh: 0.83 (3), Avg VK: 1.19 (13), Avg MK: 0.75 (4), Avg Ss: 0.50 (3)

Polytrichum strictum TS (H)

Pseudocalligeron trifarium **CR** (HJ+, VK+); VK4 (H), VK5 (H)

Pseudoleskeella nervosa ČH2 (N); MK7 (N); VK1 (N), VK3 (H), VK7 (H), VK8 (H), VK9 (N), VK10 (H); PK (H); Avg VK: 0.50 (2), Avg Ss: 0.50 (2)

Pseudoleskeella rupestris **VU** (HJ+, ČH+, VK+, PK+); ČH1 (H); VK10 (H); PK (H)

Pseudoleskeella tectorum **CR** (HJ+, VK+, PK+); VK3 (H); PK (H)

Pseudotaxiphyllum elegans ČH2 (H), ČH3 (H), ČH4 (H); MK2 (H), MK3 (H), MK4 (H), MK5 (H), MK6 (H); VK1 (H), VK2 (H), VK3 (H), VK4 (N), VK5 (N), VK6 (N), VK7 (N), VK8 (H), VK10 (N); Avg VK: 1.00 (10), Avg MK: 0.57 (7), Avg Ss: 0.75 (2)

Pterigynandrum filiforme ČH1 (N), ČH2 (H); MK6 (N), MK7 (N); VK1 (N), VK2 (N), VK3 (H), VK7 (H), VK8 (H), VK10 (H); PK (H); Avg Čh: 0.00 (1), Avg VK: 1.00 (1), Avg Ss: 1.00 (1)

Racomitrium aciculare ČH2 (N), ČH4 (H); MK3 (H), MK5 (H), MK6 (H), MK7 (N); VK1 (H), VK2 (H), VK3 (H), VK4 (N), VK6 (N), VK7 (N), VK8 (N), VK9 (H), VK10 (N); Avg VK: 0.93 (7), Avg MK: 0.80 (5), Avg Ss: 0.50 (2)

Racomitrium aquaticum (MK+); ČH2 (N), ČH3 (H), ČH4 (N); MK2 (H), MK3 (N), MK4 (N), MK5 (N), MK6 (H), MK7 (H); VK1 (N), VK2 (H), VK3 (N), VK4 (N), VK7 (H), VK9 (H), VK10 (H); Avg VK: 0.67 (3), Avg MK: 0.67 (6), Avg Ss: 1.25 (4)

Racomitrium canescens VK2 (H), VK6 (H), VK8 (N), VK10 (H)

Racomitrium elongatum (ČH+, MK+); ČH2 (H); MK2 (H), MK6 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (N), VK6 (N), VK8 (N), VK9 (H), VK10 (H); Avg VK: 1.14 (7), Avg Ss: 2.00 (1)

Racomitrium fasciculare ČH1 (H), ČH2 (N), ČH3 (H); VK6 (N); PK (H); Avg Čh: 0.50 (2), Avg Ss: 0.75 (4)

Racomitrium lanuginosum ČH1 (H), ČH2 (H); VK2 (N), VK3 (N), VK8 (N), VK9 (H), VK10 (N); PK (N); TS (H); V (H); Avg Čh: 1.50 (2), Avg VK: 1.00 (2), Avg Ss: 1.00 (1)

Racomitrium macounii subsp. *alpinum* VK1 (H), VK2 (H), VK4 (H), VK6 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 1.00 (1)

Racomitrium microcarpon ČH1 (H), ČH2 (H), ČH3 (H); MK2 (H), MK5 (H); VK4 (H); PKO (H)

Racomitrium sudeticum ČH1 (H), ČH2 (H), ČH3 (H), ČH4 (N); MK1 (N), MK2 (H), MK3 (N), MK4 (H), MK5 (H), MK6 (H), MK7 (N); VK1 (H), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (H); PK (N); TS (H); Avg Čh: 1.75 (4), Avg VK: 1.47 (16), Avg MK: 1.22 (9), Avg Ss: 1.25 (4)

Racomitrium sudeticum fo. *kindbergii* Frisvoll MK3 (N); Avg MK: 2.00 (1)

Rhabdoweisia fugax ČH1 (N); MK5 (H), MK6 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (N), VK5 (N), VK6 (H), VK7 (N), VK8 (H), VK9 (H), VK10 (N); Avg Čh: 1.00 (1), Avg VK: 1.31 (8)

Rhizomnium magnifolium **LC-att** (HJ+, MK+, VK+); MK6 (H), MK7 (H); VK1 (N), VK4 (N), VK5 (H), VK6 (H), VK7 (H), VK10 (N); Avg VK: 0.63 (4)

Rhizomnium punctatum ČH1 (N), ČH2 (N), ČH3 (N), ČH4 (H); MK1 (H), MK2 (N), MK3 (N), MK4 (H), MK5 (N), MK6 (H), MK7 (N); VK1 (N), VK2 (H), VK3 (N), VK4 (N), VK5 (H), VK7 (H), VK8 (N), VK9 (H), VK10 (H); PK (N); Avg Čh: 0.25 (2), Avg VK: 1.30 (15), Avg MK: 0.83 (15), Avg Ss: 0.83 (3)

Rhodobryum roseum ČH4 (N); MK1 (N), MK4 (H), MK5 (N), MK6 (N), MK7 (N); VK1 (N), VK2 (N), VK3 (N), VK4 (N), VK5 (H), VK7 (H), VK9 (H), VK10 (N); Avg VK: 0.95 (10), Avg MK: 0.14 (7), Avg Ss: 0.00 (1)

Rhynchostegium murale (VK+); VK7 (H), VK10 (H); Avg VK: 1.00 (1)

Rhynchostegium rotundifolium **VU** (HJ+, VK+); VK3 (H)

Rhytidiadelphus loreus ČH2 (H), ČH3 (H), ČH4 (N); MK4 (N); Avg MK: 0.00 (1), Avg Ss: 1.13 (4)

Rhytidiadelphus squarrosus ČH1 (N), ČH3 (N), ČH4 (N); MK1 (H), MK3 (N), MK4 (N), MK5 (H), MK7 (H); VK1 (N), VK3 (N), VK4 (N), VK7 (N); Avg Čh: 0.00 (2), Avg VK: 0.33 (3), Avg MK: 0.50 (2), Avg Ss: 0.25 (2)

Rhytidiadelphus subpinnatus **LC-att** (ČH+, MK+, VK+); ČH2 (H), ČH3 (H), ČH4 (N); MK5 (H), MK7 (H); VK1 (N), VK3 (N), VK7 (H); Avg VK: 0.50 (4), Avg Ss: 0.00 (1)

Rhytidiadelphus triquetrus ČH1 (N), ČH2 (H); MK4 (N), MK6 (H), MK7 (N); VK7 (N), VK10 (N); Avg Čh: 0.00 (1), Avg VK: 0.00 (1), Avg Ss: 0.00 (1)

Rhytidium rugosum VK10 (H)

Saelania glaucescens **EN**; VK6 (H), VK10 (H)

Sanionia uncinata ČH1 (H), ČH2 (N), ČH3 (N); MK1 (N), MK2 (N), MK3 (H), MK4 (H), MK5 (N), MK6 (N), MK7 (N); VK1 (N), VK3 (N), VK4 (N), VK5 (N), VK6 (N), VK7 (N), VK8 (N), VK9 (N), VK10 (N); PK (N); Avg Čh: 0.75 (2), Avg VK: 0.88 (8), Avg MK: 0.69 (16), Avg Ss: 1.00 (3)

Schistidium apocarpum VK1 (H), VK2 (H), VK4 (H), VK6 (H), VK8 (H), VK9 (H), VK10 (H); PK (H)

Schistidium cf. *apocarpum* VK8 (H)

Schistidium confertum **VU** (MK+); MK6 (H); VK1 (H), VK2 (H), VK6 (H), VK8 (H), VK10 (H); Avg VK: 0.67 (3)

Schistidium confusum **DD** (HJ+, MK+, VK+); MK6 (H); VK10 (H)

Schistidium crassipilum (HJ+, ČH+, VK+, PK+); ČH1 (H); VK5 (H), VK8 (H); PK (H), PKO (H)

Schistidium cf. *crassipilum* VK8 (H)

Schistidium dupretii (HJ+, ČH+, VK+); ČH1 (H); VK9 (N), VK10 (H)

Schistidium lancifolium **DD** (VK+); VK2 (H), VK10 (H)

Schistidium papillosum (MK+, PK+); MK6 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (N), VK8 (H), VK9 (H), VK10 (H); PK (H); Avg VK: 0.00 (1)

Schistidium pruinatum **LR-nt** (HJ+, MK+, VK+); MK6 (H); VK1 (H), VK8 (H)

Schistidium rivulare **LR-nt**; VK10 (H)

Schistidium robustum (HJ+, ČH+); ČH1 (H)

Schistidium sp. ČH1 (H); MK7 (N); VK1 (H), VK2 (H), VK6 (H)

Schistidium trichodon var. *nutans* **LC-att** (HJ+, ČH+); ČH1 (H)
Schistidium trichodon var. *trichodon* **LC-att** (HJ+, ČH+); ČH1 (H)
Schistostega pennata (MK+); MK7 (N); TS (H)
Scorpidium cossonii **LR-nt** (MK+); MK7 (H); VK4 (H)
Seligeria pusilla **VU** (HJ+, ČH+); ČH1 (H)
Seligeria recurvata (HJ+, VK+); VK2 (H), VK8 (H), VK10 (H)
Sphagnum capillifolium ČH2 (N), ČH3 (H); MK2 (H), MK4 (H); VK2 (H), VK6 (H); PK (H); TS (H);
 Avg Ss: 0.00 (1)
Sphagnum centrale **LC-att** (MK+); MK2 (H)
Sphagnum compactum MK2 (N), MK6 (H); VK2 (H), VK4 (N), VK5 (H); Avg VK: 0.00 (1)
Sphagnum denticulatum (ČH+); ČH2 (N), ČH3 (H); MK2 (H), MK7 (H); Avg Ss: 0.83 (3)
Sphagnum fallax (MK+, VK+); ČH3 (H); MK1 (H), MK2 (H), MK4 (H), MK6 (H), MK7 (N); VK3
 (N); Avg VK: 0.50 (1), Avg Ss: 0.75 (2)
Sphagnum fimbriatum (MK+); MK4 (H)
Sphagnum flexuosum (HJ+, TS+); TS (H)
Sphagnum girgensohnii ČH1 (N), ČH2 (H), ČH3 (H), ČH4 (N); MK1 (N), MK2 (H), MK3 (H), MK4
 (N), MK5 (N), MK6 (H), MK7 (N); VK1 (N), VK3 (N), VK4 (N); Avg Čh: 0.00 (1), Avg VK:
 1.25 (2), Avg MK: 0.42 (6), Avg Ss: 0.88 (4)
Sphagnum inundatum **LR-nt** (VK+); VK4 (H)
Sphagnum palustre ČH3 (H); MK6 (H); VK3 (N); Avg VK: 0.50 (1), Avg Ss: 1.00 (1)
Sphagnum papillosum (ČH+, MK+); ČH3 (H); MK2 (H)
Sphagnum quinquefarium (ČH+); ČH1 (H), ČH3 (H)
Sphagnum russowii (MK+, VK+); ČH2 (N), ČH3 (H); MK1 (N), MK2 (H), MK4 (H), MK6 (N), MK7
 (N); VK1 (N), VK2 (H), VK3 (N), VK4 (H), VK10 (H); Avg VK: 0.83 (3), Avg MK: 0.50 (3),
 Avg Ss: 1.25 (4)
Sphagnum squarrosum (MK+); ČH3 (N); MK2 (N), MK6 (N), MK7 (N); VK4 (N); Avg VK: 0.00 (1),
 Avg Ss: 1.00 (1)
Sphagnum subnitens **LC-att**; MK3 (H), MK4 (H), MK6 (H), MK7 (H); VK1 (H), VK3 (H), VK5 (H),
 VK7 (N), VK8 (H), VK9 (N); Avg VK: 0.17 (3)
Sphagnum subsecundum MK2 (H), MK6 (H); VK4 (H)
Sphagnum teres (MK+, VK+, TS+); MK3 (H), MK4 (H), MK6 (H), MK7 (N); VK1 (H), VK2 (H),
 VK3 (H), VK4 (N), VK5 (H), VK6 (H), VK7 (N); TS (H); Avg VK: 0.50 (5)
Sphagnum warnstorffii **LR-nt** (MK+); MK5 (H); VK4 (H)
Splachnum sphaericum **LR-nt**; ČH2 (H); MK6 (H); VK1 (H)
Straminergon stramineum MK3 (H); VK4 (H); Avg VK: 1.00 (1)
Syntrichia ruralis (VK+); VK1 (H), VK2 (H), VK3 (H), VK8 (H), VK10 (H); PK (H); Avg VK: 1.00
 (1)
Taxiphyllum wissgrillii (VK+); VK8 (H)
Tetraphis pellucida ČH1 (N), ČH2 (N), ČH3 (H), ČH4 (N); MK1 (N), MK2 (N), MK3 (N), MK4 (N),
 MK5 (N), MK6 (N), MK7 (H); VK3 (N), VK4 (N), VK5 (N), VK7 (H), VK10 (N); Avg Čh:
 0.33 (3), Avg VK: 0.50 (5), Avg MK: 0.64 (7), Avg Ss: 1.00 (3)
Thamnobryum alopecurum s.l.⁷ VK1 (N), VK3 (N), VK7 (N), VK10 (N); Avg VK: 0.75 (2)
Thamnobryum neckeroides **DD** (HJ+, MK+, VK+); MK6 (H); VK1 (H), VK2 (H), VK10 (H)
Thuidium philibertii (VK+); VK8 (H), VK9 (H)
Thuidium recognitum (HJ+, MK+); MK7 (H)
Thuidium tamariscinum MK2 (H), MK3 (H), MK6 (H); VK3 (H), VK5 (H); Avg MK: 0.50 (2)
Tortella bambergeri (HJ+, VK+); VK1 (H), VK8 (N), VK10 (H)
Tortella tortuosa ČH1 (H); MK3 (N), MK6 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (H), VK5 (N),
 VK6 (N), VK7 (N), VK8 (H), VK9 (N), VK10 (H); PK (H); TS (H); Avg Čh: 1.00 (2), Avg VK:
 0.75 (12), Avg MK: 0.50 (1)
Tortula hoppeana **EN**; VK6 (H), VK10 (H)
Tortula mucronifolia **CR**; PK (H)
Trichodon cylindricus (MK+); MK4 (H); VK5 (H), VK6 (H), VK7 (H)
Trichostomum crispulum **LC-att** (ČH+); ČH1 (H)

⁷ probably all identical to *T. neckeroides* but not all plants were checked as the taxon was recognized as late as in course of the survey, see the note to *T. neckeroides*

Trichostomum tenuirostre LC-att (ČH+, MK+); ČH2 (H); MK1 (H), MK2 (H), MK3 (H), MK4 (N), MK5 (H), MK6 (H), MK7 (H); VK1 (N), VK2 (H), VK3 (H), VK4 (H), VK5 (H), VK6 (H), VK7 (H), VK8 (H), VK9 (H), VK10 (H); Avg VK: 1.05 (11), Avg MK: 0.92 (12)

Warnstorfia fluitans TS (H)

Weissia controversa var. *controversa* (MK+); MK6 (H)

Weissia controversa var. *wimmeriana* VU (MK+); MK2 (H), MK6 (H); VK2 (H), VK4 (H), VK8 (H), VK9 (H), VK10 (H)

Weissia sp.⁸ VK2 (H), VK6 (H), VK8 (H), VK9 (H)

Summarization for the study sites⁹

The counts include the above listed subspecies and varieties. Uncertain identifications are only included if they clearly add to the number of species (e.g. if *Schistidium crassipilum* and *S. cf. crassipilum* were recorded, only one of them is taken into the count but if *Orthotrichum* sp. was recorded as a sole member of *Orthotrichum*, it adds to the species count).

	VK1	VK2	VK3	VK4	VK5	VK6	VK7	VK8	VK9	VK10
Liverwort taxa	40	37	55	37	28	34	38	41	41	52
Moss taxa	114	104	136	102	75	80	104	115	91	152
Total	154	141	191	139	103	114	142	154	132	204
Total for Velká kotlina	318 (86 liverworts / 232 mosses)									

	MK1	MK2	MK3	MK4	MK5	MK6	MK7
Liverwort taxa	18	31	21	26	26	33	24
Moss taxa	58	73	66	73	74	107	91
Total	76	104	87	99	100	140	115
Total for Malá kotlina	219 (53 liverworts / 166 mosses)						

	ČH1	ČH2	ČH3	ČH4	PK	TS
Liverwort taxa	21	27	36	14	14	9
Moss taxa	84	69	62	34	51	22
Total	105	96	98	48	65	31
Total for 'Sněžné strže'	135 (43 liverworts / 92 mosses)					

Details for important taxa:

1) Critically endangered taxa

Asterella gracilis

- Velká kotlina cirque: rocks at the lower end of 'Vitáskova rokle' ravine, 780 m S of the top of Mt Vysoká hole [E3660.301, N5549.52], humus over inclined E-facing base-rich schist rocks, 1220 m a.s.l., 9.7.2001 coll. J. Kučera (JK 8557) & M. Zmrhalová (MZ 9507, 9541); dtto, 760 m S of the top of Mt Vysoká hole [E3660.293, N5549.536], in a niche of a NE-facing phyllite rock, half-shaded, ca. 1215 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8705); rocks ca. 80 m above the mouth of 'Vitáskova rokle' ravine, 710 m S of the top of Mt Vysoká hole [E3660.235, N5549.587], base of a rock, 1183 m a.s.l., 10.7.2001 coll. V. Plášek (VP 10734); 'Vitáskova rokle' ravine, ca. 140 m above the mouth, 660 m S of the top of Mt Vysoká hole [E3660.226, N5549.633], E-facing slope beneath the rocks, humus over small phyllite rock outcrops, half-shaded, 1305 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8859)

One of the rarest and most strongly endangered liverworts of the Czech Republic, Velká kotlina is one of our two recently (and three historically) known localities. Interestingly, although the population is not critically small (at least four microsites with mostly dozens of

⁸ sterile plants, belonging probably to one of the preceding taxa

⁹ not given for sites PKO and V, as the inventory at these sites was incomplete

thalli), it has not been collected here for more than 100 years (1870 coll. Limpricht, Duda & Váňa 1974a). Other reports of this species from Hrubý Jeseník Mts exist from the same locality in Kalmus & Niessl (1871) and from the Tabulové skály rocks in Kolenati (1860). The specimens of Kolenati were however never found and many of his reports appear doubtful.

Haplomitrium hookeri

- Velká kotlina cirque: ESE slopes SSW of the upper part of the main ravine ('Fiekovy ohlasy'), 830 m S of the summit of Mt Vysoká hole and 570 m ENE of the summit of Mt Kamzičník [E3660.14, N5549.47], ESE-facing flushed unshaded phyllitic rock outcrops, in the water, on thin soil layer & on decaying grass over the flushed phyllitic outcrop, 1330 m a.s.l., 11.6.2002 coll. J. Kučera (JK 10921) & B. Buryová (BB 4677); dtto, sloping springs W of Moravice stream, on S exposed slope, 500 m SSE of the top of Mt Vysoká hole, above a big reed spring site [E3660.41, N5549.82], E-facing bank of a stream, on moist half-shaded site within mosses, 1290 m a.s.l., 5.8.2002 coll. B. Buryová (BB 4014)

Perhaps the biggest surprise of the survey in the Hrubý Jeseník Mts, the first population consisted of some 250 stems in 11 clumps, whereas the second one contained only a few plants. *Haplomitrium* was reported from these mountains only by Spatzier in Kalmus & Niessl (1871) from three localities (vicinity of the village Železná, Malá Morávka and of Vidly). All of these reports, unsupported by specimens, appear extremely doubtful (Duda & Váňa 1968).

Lophozia heterocolpos

- Velká kotlina cirque, central part [E3660.313, N5549.677], rock, 1260 m a.s.l., 4.8.2002 coll. J. Váňa (JV 14); dtto, rocks ca. 80 m above the mouth of 'Vitáskova rokle' ravine, 700 m S of the top of Mt Vysoká hole [E3660.265, N5549.598], shaded ledge of an ESE-facing schist rock, beneath an overhang, on humus layer, ca. 1250 m a.s.l., 13.7.2001 coll. J. Kučera (JK 9440)

A very rare species, known historically from about 10 localities in the Czech Republic (Duda & Váňa 1989b), recently recorded only twice – in the valley of Bílá Opava of the Hrubý Jeseník (Zmrhalová 2005) and in the Velká Kotelní jáma cirque of the Krkonoše Mts (Kučera & al. 2004a). The populations were extremely small, containing only individual plants. They can be also overlooked due to the very small size.

Scapania cf. *helvetica* (ster.)

- Velká kotlina cirque: 'Kunzova stráň' slope, 460 m S of the top of Mt Vysoká hole [E3660.233, N5549.839], wet phyllite rock outcrop in the SE slope, in a fissure at a horizontal face, 1365 m a.s.l., 14.7.2001 coll. J. Kučera (JK 8868), teste J. Váňa

The species has been earlier regarded as proven only from the Krkonoše Mts (Duda & Váňa 1969a), however literature reports existed from Velká kotlina of the Hrubý Jeseník as well (Šmarda 1961). This specimen was unfortunately without perianth, so that the possible confusion with other species of the sect. *Curtae* cannot be fully excluded. The population contained only about 10 – 20 stems.

Anomobryum julaceum var. *concinatum*

- Velká kotlina cirque: 'Suzova stěna' precipice, ca. 100 m SW of the mouth of 'Vitáskova rokle' ravine, 830 m S of the top of Mt Vysoká hole [E3660.247, N5549.465], ledges of ESE-facing phyllite rock outcrops in the slope, on soil, ca. 1240 m a.s.l., 15.7.2001 coll. J. Kučera (JK 8907)
- Velká kotlina cirque: rocks ('Podpěrovy skály') SW of the lower end of 'Vitáskova rokle' ravine, 800 m S of the top of Mt Vysoká hole [E3660.274, N5549.495], small ledges on a phyllite rock outcrop in the SE slope, half-shaded, 1215-1220 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8626); dtto, 800 m S of the top of Mt Vysoká hole [E3660.30, N5549.51], damp humus in fissure of vertical phyllitic rock & inclined wet phyllite base rich rock face, SSE-facing site, 1225 m a.s.l., 10.7.2001 coll. B. Buryová (BB 4083, 4086-8, 4090); dtto, 'Vitáskova rokle' ravine, ca. 120 m above the mouth, 660 m S of the top of Mt Vysoká hole [E3660.24, N5549.63], open periodically wet humus over N-facing inclined phyllitic rock face, in NE slope, 1295 m a.s.l., 13.7.2001 coll. B. Buryová (BB 4156)

This species has been historically known only from two localities in the Czech Republic – Velká kotelná jáma in the Krkonoše Mts and Velká kotlina of the Hrubý Jeseník. It has been discovered independently at both of these localities in 1951 (Pilous 1951, Šmarda 1951) and has not been seen since then. All recently discovered populations in the Velká kotlina are extremely small, consisting of several to several dozens plants, mostly intermixed among other mosses. Interestingly, var. *julaceum* probably does not occur in the Czech Republic at all.

Bryum schleicheri

- Malá kotlina cirque (MK1): NE part of the cirque, 1000 m ENE of the summit of Jelení hřbet and 430 m SSE of the summit of Velký Máj [E3658.651, N5548.066], in a brooklet, SSE slope, little shaded, 1285 m a.s.l., 9.6.2002 coll. J. Kučera (JK 10878); dtto, 1010 m ENE of the summit of Jelení hřbet and 420 m SSE of the summit of Velký Máj [E3658.652, N5548.083], in a brooklet, SSE slope, little shaded, wet soil, 1290 m a.s.l., 9.6.2002 coll. J. Kučera (JK 10879); dtto, 410 m SSE of the summit of Velký Máj [E3658.649, N5548.086], in a brooklet, SSE slope, little shaded, wet soil, 1295 m a.s.l., 9.6.2002 coll. J. Kučera (JK 10880); dtto, along a brooklet in the N part of the cirque, 1000 m ENE of the summit of Jelení hřbet and 477 m SSE of the summit of Velký Máj [E3658.707, N5548.028], bank of a brook, 1267 m a.s.l., 10.6.2002 coll. V. Plášek (VP 11545); dtto, 460 m SSE of the summit of Velký Máj [E3658.669, N5548.052], wet bank of a brook, 1275 m a.s.l., 9.6.2002 coll. V. Plášek (VP 11573); dtto, 480 m SSE of the summit of Velký Máj and 500 m ENE of the turistic path crossing above the cirque [E3658.694, N5548.058], wet soil in stream, in SSW slope just beneath timberline, 1280 m a.s.l., 9.6.2002 coll. B. Buryová (BB 4644); dtto, 520 m ENE of the turistic path crossing above the cirque [E3658.709, N5548.066], sloping spring site by stream, on mineral-sandy soil, in S slope just above timberline; 1285 m a.s.l., 10.6.2002 coll. B. Buryová (BB 4647); Malá kotlina cirque (MK5): along the left tributary to a brooklet in the N part of the cirque, 910 m ENE of the summit of Jelení hřbet and 470 m SSE of the summit of Velký Máj [E3658.58, N5548.00], on wet soil in a flush, 1260 m a.s.l., 9.6.2002 coll. J. Kučera (JK 10871), M. Zmrhalová (MZ 11377) & B. Buryová (BB 4631)

This species has been reported from several localities of both Krkonoše and Hrubý Jeseník Mts but the revision of all available specimens did not prove any single correctly identified specimen – the misidentifications mostly included *Bryum pseudotriquetrum* or *B. turbinatum*. Our records from Malá kotlina may thus be the first and only verified records from the Czech Republic. The populations were mostly relatively rich, counting several to many dm². It is interesting that in spite of a targeted search in spring-sites of the larger Velká kotlina cirque, *B. schleicheri* was not found.

Dicranum spadiceum

- ‘Tabulové skály’ rock formation, 370 m NNW of the top of Mt Praděd [E3659.747, N5552.945], fissure of a SSE-facing schist rock, half-shaded, ass. with *Polytrichum juniperinum*, *Racomitrium lanuginosum*, ca. 1455 m a.s.l., 12.7.2001 coll. J. Kučera (JK 8800), M. Zmrhalová (MZ 10071) & B. Buryová (BB 4402)

The species has been known until now from only three historical collections in the Czech Republic – Niessl’s one (s.d. but probably from the 1860s – 1870s) from the Petrovy kameny rocks (Franklová 1994, teste Kučera, BRNU!), Schenk’s (also undated but necessarily in the period between the 1900s to 1930s) from the Tabulové kameny rocks (Pilous 1961, non vidi) and Limpricht’s one from Mt Sněžka in the Krkonoše Mts (BP!, coll. K.G. Limpricht 26.7.1869 sub *Dicranum scoparium* var. *alpestre* Milde, rev. R. Ochyra sub *D. elongatum* but obviously belonging to *D. spadiceum*). Franklová (1994) cited another specimen from Mt Sněžka (coll. Váňa 1967) but the revision proved the misidentification for *D. scoparium*. The population from the Petrovy kameny rocks has unfortunately obviously disappeared. The population of the Tabulové skály rocks is critically small, about 1 dm² in a single patch, but seemingly stable.

Isopterygiopsis muelleriana

- Velká kotlina cirque: ‘Beckeho skály’ rocks, 650 m SSE of the top of Mt Vysoká hole [E3660.419, N5549.665], horizontally on ledge of a SSE facing phyllite outcrop, 1200 m a.s.l., 23.9.2001 coll. M. Zmrhalová (MZ 10429)

- Velká kotlina cirque: ‘Firbasova stráň’ slope, 680 m S of the top of Mt Vysoká hole [E3660.204, N5549.621], moist shaded niche at base of base-rich phyllitic rock outcrop, in ESE slope in upper part of the cirque, 1340 m a.s.l., 21.9.2001 coll. B. Buryová (BB 4505)
- Velká kotlina cirque: rocks (‘Podpěrovy skály’) SW of the lower end of ‘Vitáskova rokle’ ravine, 788 m S of the top of Mt Vysoká hole [E3660.29, N5549.503], in shady niche of E-facing phyllite rock, 1220 m a.s.l., 10.7.2001 coll. M. Zmrhalová (MZ 9570); dtto, 760 m S of the top of Mt Vysoká hole [E3660.27, N5549.535], horizontally on humus layer in niche at base of a NE-facing phyllite rock, shaded, 1245 m a.s.l., 11.7.2001 coll. M. Zmrhalová (MZ 9976); dtto, between ‘Podpěrovy skály’ rocks and ‘Suzova stěna’ precipice, 840 m S of the top of Mt Vysoká hole [E3660.263, N5549.448], vertically bellow the grass on E slope, 1220 m a.s.l., 15.7.2001 coll. M. Zmrhalová (MZ 10428)

Only recently discovered species in the Czech Republic (from the Krkonoše Mts, Kučera & Ochyra 2003), several small colonies were discovered in the collected material from the Velká kotlina and valley of Bílá Opava in the Hrubý Jeseník Mts (Zmrhalová 2005). Unfortunately no detailed information is available about the state of the population, as all specimens were collected without recognizing the species in the field.

Isopterygiopsis pulchella

- Velká kotlina cirque: ‘Beckeho skály’ rocks, 650 m SSE of the top of Mt Vysoká hole [E3660.419, N5549.665], horizontally on ledge of a SSE facing phyllite outcrop, 1200 m a.s.l., 23.9.2001 coll. M. Zmrhalová (MZ 10429); dtto, spring slope and outcrops on the right & above the waterfall, 670 m SSE of the top of Mt Vysoká hole [E3660.469, N5549.663], mineral soil and rootlets over a S-facing moist half-shaded gneiss outcrop, 1200 m a.s.l., 3.8.2002 coll. B. Buryová (BB 3952)
- Velká kotlina cirque: ravine of the Moravice brook, ca. 10 mts above the small cascade, right bank, 660 m SSE of the summit of Mt Vysoká hole [E3660.476, N5549.672], vertical phyllitic rock at the bank, E-facing, sprayed, 1205 m a.s.l., 3.8.2002 coll. J. Kučera (JK 10974)
- Velká kotlina cirque: rocks at the mouth of ‘Vitáskova rokle’ ravine, 760 m S of the top of Mt Vysoká hole [E3660.27, N5549.535], 1245 m a.s.l., 11.7.2001 coll. M. Zmrhalová vertically in niche beneath vegetation in a NE-facing slope, shaded (MZ 9975) & horizontally on ledge of a phyllite rock outcrop in the S slope (MZ 10226)

Very rare species in the Czech Republic, known only from a very few sites of the Krkonoše and Hrubý Jeseník Mts. The other recent record was made by the authors in the eastern Krkonoše Mts. and in the valley of Bílá Opava of the Hrubý Jeseník Mts. (Kučera & al. 2004b, Zmrhalová 2005). Unfortunately no detailed information is available about the state of the population, as all specimens were collected without recognizing the species in the field.

Mnium thomsonii

- W slopes of Mt Červená hora above ‘Vřesová studánka’, 160 m N of the summit [E3652.785, N5559.372], shaded fissure of base-rich phyllitic rock outcrop, sheltered by an overhang, W-facing, 1315-1320 m a.s.l., 9.8.2003 coll. J. Kučera (JK 11075); dtto, [E3652.777, N5559.373], shaded base of base-rich phyllitic rock outcrop, N-facing, 1315 m a.s.l., 6.6.2002 coll. M. Zmrhalová (MZ 11356), 9.8.2003 coll. J. Kučera (JK 11077), M. Zmrhalová (MZ 11452) & J. Košnar (KO 113)

Very rare species, known recently only from here and from Mt Kotel in Krkonoše Mts. (Kučera & al. 2004a), reported from the ‘Vřesová studánka’ already by Šmarda (1952), otherwise from several other localities (‘Mt Šerák, Velká kotlina, ‘Keilich’, Mt Praděd) but no specimens were located and the earlier identification might well include confusions with *M. lycopodioides*.

Pohlia longicollis

- ‘Tabulové skály’ rock formation, 370 m NNW of the top of Mt Praděd [E3659.749, N5552.941], fissure of a SE-facing schist rock, half-shaded, 1455 m a.s.l., 12.7.2001 coll. M. Zmrhalová (MZ 10082)

Historical reports exist for this rare species from Velká kotlina (Milde 1861ff., Podpěra 1906), Petrovy kameny rocks (Milde 1861, leg. Sendtner), Mt Malý Děd (Milde 1856 ff., coll. Sendtner), Mt Praděd (Hruby 1914) and Vřesová studánka (Hein 1874) but no specimens were located. No other recent occurrences of the species are known to the authors.

Pseudocalliergon trifarium

- Velká kotlina cirque: sloping springs W of Moravice stream, on SSE exposed slope, 510 m SSE of the top of Mt Vysoká hole [E3660.40, N5549.81], wet humus and decaying *Eriophorum angustifolium* & *Carex echinata* in a spring site, + *Campyllum stellatum*, 1285 m a.s.l., 5.8.2002 coll. B. Buryová (BB 4028)
- Velká kotlina cirque: westernmost part of ‘Kratochvílova stráň’ slope, 595 m S - SSE of the summit of Mt Vysoká hole and 870 m ENE of the summit of Mt Kamzičník [E3660.36, N5549.72], inclined on humus layer over a SSE-facing flat phyllite rock outcrop, temporary flushed, slightly shaded, 1250 m a.s.l., 8.8.2003 coll. M. Zmrhalová (MZ 11482)

A species newly discovered in the Hrubý Jeseník Mts., earlier recorded in North Moravia only near Vidnava and otherwise from the Bohemo-Moravian Highlands, always in rich fens at the lower altitudes. The spring-sites at the slopes of the northern part of Velká kotlina are definitely base-rich and match the conditions known to support the occurrence of this species in the Alps, Scandinavia or the British Isles. The species is not known to survive at any other of its earlier localities in the country, making the occurrence here highly significant from the conservation point of view.

Pseudoleskeella tectorum

- ‘Petrovy kameny’ rock formation, SE side, central part [E3660.048, N5551.001], fissures of a SE-facing mica schist rock, 1435 m a.s.l., 12.7.2001 coll. J. Kučera (JK 8770) & M. Zmrhalová (MZ 10038)
- Velká kotlina cirque: ‘Finckeho stráň’ slope, 653 m S of the top of Mt Vysoká hole [E3660.322, N5549.65], rock, 1209 m a.s.l., 4.8.2002 coll. V. Plášek (VP 10952)

The two finds represent the first Moravian records of this extremely rare species, known otherwise recently only from the Hradčanské stěny sandstone rocks in Northern Bohemia (Müller & Rätzel 2005). Prior to our survey it was even considered to belong among the extinct taxa of our flora (Váňa 1995), later version of red lists already incorporated the records from the Hrubý Jeseník Mts. (Kučera & Váňa 2003).

Tortula mucronifolia

- ‘Petrovy kameny’ rock formation, SE side, central part [E3660.048, N5551.001], fissures of a SE-facing mica schist rock, 1435 m a.s.l., 12.7.2001 coll. J. Kučera (JK 8768), M. Zmrhalová (MZ 10038), V. Plášek (VP 10778) & B. Buryová (BB 4388).

The species has been known to grow at this site as the only one in the whole country (Hein’s record from Mt Červená hora is regarded highly doubtful) since the beginning of bryological exploration of the area (Sendtner 1840 and following authors) but has not been reported during the last 50 years. The population seems to be still relatively thriving, covering several dm².

2) Endangered taxa

Cephaloziella grimsulana

- Velká kotlina cirque: ‘Firbasova stráň’ slope, 770 m S of the top of Mt Vysoká hole [E3660.173, N5549.534], wet phyllite rock outcrops in the E slope, NE facing, 1320 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9013)
- Velká kotlina cirque: ‘Kunzova stráň’ slope by the springs of Moravice, 470 m S of the top of Mt Vysoká hole [E3660.237, N5549.83], inclined face of open wet phyllitic rock outcrop, in SE slope above timberline, 1360 m a.s.l., 14.7.2001 coll. B. Buryová (BB 4426)

The species has been collected twice in Velká kotlina, 1947 by J. Šmarda, and 1971 by J. Váňa (Duda 1978). It is otherwise known in the country only from the Úpská jáma cirque in the Krkonoše Mts. The size of the population has not been estimated more precisely.

Gymnomitrium corallioides

- Mt Vozka: summit rocks 35 m SW of the summit [E3650.781, N5560.132], SSW-facing rock beneath an overhang, half-shaded vertical face, 1370-1375 m a.s.l., 9.8.2003 coll. J. Kučera (JK 11078), M. Zmrhalová (MZ 11457) & V. Plášek (VP 11000)

The locality of the species has been known since the Podpěra's record (Podpěra 1906), known otherwise in these mountains from Mt Keprník and 'Tabulové skály' rocks at Mt Praděd (Duda & Váňa 1979). We were not able to find the species at the latter locality during our survey (last verified record from 1946).

Jungermannia atrovirens

- Velká kotlina cirque: 'Beckeheho skály' rocks – central part, 680 m SSE of the top of Mt Vysoká hole [E3660.459, N5549.652], SE-facing phyllite rocks, vertical half-shaded face near the base, dripping, 1195 m a.s.l., 23.9.2001 coll. J. Kučera (JK 9110); dtto, on S exposed slope, right of the waterfall, 690 m SSE of the top of Mt Vysoká hole [E3660.47, N5549.66], wet half-shaded fissure of S-facing vertical gneiss outcrop near the waterfall, 1195 m a.s.l., 3.8.2002 coll. B. Buryová (BB 3944)
- Velká kotlina cirque: right bank of Moravice brook close to 'Beckeheho skály' rocks, 660 m SSE of the top of Mt Vysoká hole [E3660.479, N5549.673], wet, shaded, vertical face of a phyllite rock at the brook, beneath an overhang, 1205 m a.s.l., 23.9.2001 coll. J. Kučera (JK 9114)
- Velká kotlina cirque: 'Finckeheho stráž' slope, 630 m S-SSE of the top of Mt Vysoká hole [E3660.381, N5549.676], wet SE-facing phyllite rock at a small waterfall, 1230 m a.s.l., 20.9.2001 coll. J. Kučera (JK 8943); dtto, ca. 150 m NE of the main ravine, 550 m S of the summit of Mt Vysoká hole and 850 m ENE of the summit of Mt Kamzičník [E3660.311, N5549.748], wet fissure of a phyllitic rock outcrop in the SSE slope, half-shaded, 1290 m a.s.l., 4.8.2002 coll. J. Kučera (JK 11007)
- Velká kotlina cirque: 'Kratochvílova stráž' slope, 470 m SSE of the summit of Mt Vysoká hole and 960 m NE of the summit of Mt Kamzičník [E3660.38, N5549.843], flush with *Pinguicula*, *Parnassia*; half-shaded wet soil, 1305 m a.s.l., 5.8.2002 coll. J. Kučera (JK 11022)
- Velká kotlina cirque: rocks ('Podpěrovy skály') SW of the lower end of 'Vitáskova rokle' ravine, 790 m S of the top of Mt Vysoká hole [E3660.278, N5549.499], on phyllite rock, 1230 m a.s.l., 10.7.2001 coll. M. Zmrhalová (MZ 9595); dtto, in shady fissure of vertical SE-facing phyllite rock, 1230 m a.s.l., 10.7.2001 coll. M. Zmrhalová (MZ 9600)
- Velká kotlina cirque: rocks ca. 80 m above the mouth of 'Vitáskova rokle' ravine, 710 m S of the top of Mt Vysoká hole [E3660.27, N5549.585], wet soil beneath dripping NE-facing schist rocks, half-shaded, ca. 1250 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8804) & M. Zmrhalová (MZ 10099)
- Velká kotlina cirque: upper end of the 'Vitáskova rokle' ravine – 'Šmardova skála' rock, 600 m S of the top of Mt Vysoká hole [E3660.214, N5549.698], vertical, dripping, mossy, E-facing phyllite rock; beneath an overhang, half-shaded, 1330 m a.s.l., 14.7.2001 coll. J. Kučera (JK 8890); dtto, above 'Šmardova skála' rock, 590 m S of the top of Mt Vysoká hole [E3660.206, N5549.709], on wet phyllite outcrop in a spring site, 1340 m a.s.l., 14.7.2001 coll. J. Kučera (JK 8889)

Velká kotlina might well represent the only non-threatened locality of the species in the country, where it is otherwise extremely rare; here the population is abundant and thriving (compare Duda & Váňa 1969b).

Jungermannia confertissima

- Velká kotlina cirque: rocks shortly above the mouth of 'Vitáskova rokle' ravine, 740 m S of the top of Mt Vysoká hole [E3660.278, N5549.554], 1230 m a.s.l., in a niche of a NE-facing phyllite rock, wet vertical facelet (JK 8722) and in the fissure of a wet, NE-facing phyllite rock, 1230 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8723); dtto, rocks ca. 60 m above the mouth of 'Vitáskova rokle' ravine, 730 m S of the top of Mt Vysoká hole [E3660.28, N5549.563], ledge of a wet, SE-facing schist rock, thin humus layer, 1235 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8757)

Very rare species in the Czech Republic, bound to moderately base-rich sites mostly in the higher mountains; collected in Velká kotlina already (and until now only) by Limpricht in 1870 (Duda & Váňa 1970), otherwise known in these mountains from near the road between Jeseník and Rejvíz (coll. Duda 1955, Duda & Váňa l.c.). Collected at several sites in the cirque, hence probably not directly threatened, though the population was nowhere extensive.

Lophozia quadriloba

- Malá kotlina cirque: rock outcrops ca. 20 m SW of the SE flowing stream in the W part of the cirque, 680 m E of the top of Mt Jelení hřbet [E3658.407, N5547.692], wet phyllite rock outcrop in the ESE slope, vertical facelet, 1235 m a.s.l., 22.9.2001 coll. J. Kučera (JK 9061); dtto, ca. 50 m SW of the SE flowing stream, 670 m E of the top of Mt Jelení hřbet [E3658.399, N5547.668], shaded wet humus over a dripping ESE-facing phyllite rock outcrop, 1235 m a.s.l., 22.9.2001 coll. J. Kučera (JK 9072) & M. Zmrhalová (MZ 10340); dtto, [E3658.403, N5547.681], moist phyllite rock, 1230 m a.s.l., 8.6.2002 coll. V. Plášek (VP 11570)
- Velká kotlina cirque: 'Kratochvílova stráň' slope (ca. 50 m WSW of the course of Moravice), 480 m SSE of the summit of Mt Vysoká hole and 980 m NE of the summit of Mt Kamzičník [E3660.407, N5549.841], shaded base of a SSE-facing phyllitic rock outcrop, 1295 m a.s.l., 5.8.2002 coll. J. Kučera (JK 11018); dtto, 510 m SSE of the summit of Mt Vysoká hole and 960 m ENE of the summit of Mt Kamzičník [E3660.401, N5549.81], mosses over a wet SE-facing vertical phyllitic rock outcrop at the edge of a flush, half-shaded, 1285 m a.s.l., 5.8.2002 coll. J. Kučera (JK 11028); dtto, 540 m S of the top of Mt Vysoká hole [E3660.35, N5549.77], in *Tortella tortuosa*, hanging from moist shaded E-facing gneiss outcrop, 1280 m a.s.l., 5.8.2002 coll. B. Buryová (BB 4030)
- Velká kotlina cirque: 'Beckeho skály' rocks, on SE exposed slope above the waterfall, 670 m SSE of the top of Mt Vysoká hole [E3660.47, N5549.66], on decaying *Molinia* over SE-facing gneiss outcrop, inclined moist half-shaded site & horizontal periodically wet site shaded by grass, 1200 m a.s.l., 3.8.2002 coll. B. Buryová (BB 3953-4)
- Velká kotlina cirque: rocks ('Podpěrovy skály') at the lower end of 'Vitáskova rokle' ravine, 780 m S of the top of Mt Vysoká hole [E3660.316, N5549.522], open, E-facing base-rich schist rocks, 1200 m a.s.l., 10.7.2001 coll. B. Buryová (BB 4389); dtto, SW of the lower end of 'Vitáskova rokle' ravine, 800 m S of the top of Mt Vysoká hole [E3660.276, N5549.498], half-shaded, wet, flushed soil in the SE slope, 1220 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8636) & M. Zmrhalová (MZ 9591); dtto, rocky SE slope ca. 80 m above the mouth of 'Vitáskova rokle' ravine, 710 m S of the top of Mt Vysoká hole [E3660.266, N5549.587], wet mossy ledge of SE-facing phyllite rocks, half-shaded, ca. 1250 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8830); dtto, ca. 90 m above the mouth of 'Vitáskova rokle' ravine, 720 m S of the top of Mt Vysoká hole [E3660.27, N5549.58], among mosses in spring site, steep NE slope among base-rich phyllitic rock outcrops, 1270 m a.s.l., 13.7.2001 coll. B. Buryová (BB 4142)

The species was for long time known only from one site (Šmarda 1952, Duda & Váňa 1983b) in the Hrubý Jeseník Mts, allegedly collected by Šmarda in 1949 in the Moravice valley at an altitude of 900 m. We have revised again the specimen (BRNM) and concluded that according to accompanying species (*Fissidens adianthoides*, *Campylium stellatum*, *Climacium dendroides*, *Ditrichum gracile*), the specimen must have been collected elsewhere, very probably at one of the recent collecting site in the Velká kotlina cirque, where Šmarda collected the same day, according to other specimens. Also, we found that the collections from Velká kotlina, labelled or later revised (Duda & Váňa 1983c) as *L. (Barbilophozia) floerkei*, belong to *L. quadriloba* (see under *L. floerkei* in the 'Excluded taxa'). It appears that *L. quadriloba* occurs regularly, although always in small patches, on the wet, slightly base-rich rocks, and in the flushes of both Velká and Malá kotlina cirques.

Riccardia chamedryfolia

- Velká kotlina cirque: 'Kratochvílova stráň' slope, 470 m SSE of the summit of Mt Vysoká hole and 960 m NE of the summit of Mt Kamzičník [E3660.38, N5549.843], flush with *Pinguicula*, *Parnassia*; half-shaded wet soil, 1305 m a.s.l., 5.8.2002 coll. J. Kučera (JK 11022)
- Velká kotlina cirque: 'Kunzova stráň' slope by the springs of Moravice, 460 m S of the top of Mt Vysoká hole [E3660.25, N5549.835], on decaying vegetation in wet SE spring slope above timberline, 1360 m a.s.l., 14.7.2001 coll. B. Buryová (BB 4421)
- (uncertain identification) Malá kotlina cirque: central part of the cirque, along a brooklet (R bank), 760 m ENE of the summit of Jelení hřbet and 550 m S of the summit of Velký Máj [E3658.458, N5547.899], wet soil at the brook, 1270 m a.s.l., 8.6.2002 coll. J. Kučera (JK 10847)

Little known and little documented species, not yet collected in the Hrubý Jeseník Mts., probably overlooked to a certain extent but definitely rarer than *R. multifida*, with which it was sometimes associated here.

Scapania cuspiduligera

- Velká kotlina cirque: rocks ('Podpěrovy skály') SW of the lower end of 'Vitáskova rokle' ravine, 780 m S of the top of Mt Vysoká hole [E3660.286, N5549.516], ESE-facing phyllite rocks, on wet vertical face beneath an overhang, 1215-1220 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8582); dtdo, 799 m S of the top of Mt Vysoká hole [E3660.264, N5549.502], rock, 1196 m a.s.l., 10.7.2001 coll. V. Plášek (VP 10819) & B. Buryová (fissure of S-facing inclined phyllitic rock, 1220 m a.s.l., BB 4093 & open wet fissures of vertical SE-facing phyllitic rock, 1225 m a.s.l., BB4095); dtdo, 760 m S of the top of Mt Vysoká hole [E3660.27, N5549.535], on thin humus layer in horizontal ledge of a N-facing phyllite rock, 1245 m a.s.l., 11.7.2001 coll. M. Zmrhalová (MZ 9985)
- Velká kotlina cirque: rocks shortly above the mouth of 'Vitáskova rokle' ravine, 750 m S of the top of Mt Vysoká hole [E3660.287, N5549.543], fissure of a wet, vertical, ESE-facing phyllite rocks beneath an overhang, shaded, 1220 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8713); dtdo, 740 m S of the top of Mt Vysoká hole [E3660.275, N5549.551], fissure of a wet, NE-facing phyllite rock, 1230 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8726); 'Vitáskova rokle' ravine, ca. 50 m above the mouth of 'Vitáskova rokle' ravine, 740 m S of the top of Mt Vysoká hole [E3660.28, N5549.557], humus layer on overhang of wet shaded phyllitic rock, 1240 m a.s.l., 11.7.2001 coll. B. Buryová (BB 4374); dtdo, ca. 60 m above the mouth of 'Vitáskova rokle' ravine, 730 m S of the top of Mt Vysoká hole [E3660.288, N5549.569], base of an E-facing schist rock outcrop, open, slightly wet, 1230 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8748); dtdo, [E3660.28, N5549.563], damp, inclined schist rock outcrops in the ESE slope, 1235 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8740); dtdo, ca. 80 m above the mouth of 'Vitáskova rokle' ravine, 710 m S of the top of Mt Vysoká hole [E3660.27, N5549.585], fissure of sunny, ENE-facing schist rocks, ca. 1250 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8805); dtdo, ca. 130 m above the mouth, 670 m S of the top of Mt Vysoká hole [E3660.238, N5549.629], on soil beneath a grass tussock near the rock base, NE-facing, shaded, 1285 m a.s.l., 14.7.2001 coll. J. Kučera (JK 8847); dtdo, NE rocky slope of the 'Vitáskova rokle' ravine, ca. 120 m above the mouth, 680 m S of the top of Mt Vysoká hole [E3660.235, N5549.615], fissures of NE-facing vertical phyllite rocks, slightly wet and sheltered, 1290 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8843)
- Velká kotlina cirque: 'Finckeho stráň' slope, 580 m S of the top of Mt Vysoká hole [E3660.308, N5549.72], E-facing phyllite rocks, in a half-shaded dry fissure, thin humus layer, ca. 1285 m a.s.l., 20.9.2001 coll. J. Kučera (JK 8985)
- Velká kotlina cirque: 'Firbasova stráň' slope, 840 m S of the top of Mt Vysoká hole [E3660.175, N5549.462], fissure of a phyllite rock outcrop in the E slope, 1300 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9005)

The species grows in relative abundance on the moderately base-rich phyllitic rocks throughout the Velká kotlina cirque, yet we were unable to find it at any other locality. Remarkably, it has only been collected earlier from this site only by Šmarda (1952, rev. Duda, unpublished).

Scapania gymnostomophila

- Velká kotlina cirque: 'Finckeho stráň' slope, 590 m S of the top of Mt Vysoká hole [E3660.309, N5549.707], E-facing phyllite rocks, on an overhanging face, shaded, moist, 1280 m a.s.l., 20.9.2001 coll. J. Kučera (JK 8978), 4.8.2002 coll. J. Váňa (JV 14)
- W slopes of Mt Červená hora above 'Vřesová studánka', 160-170 m N of the summit [E3652.789, N5559.384], W-facing phyllite rock outcrop fissure, moist, half-shaded, on thin humus layer, 1310 m a.s.l., 6.6.2002 coll. B. Buryová (BB 4580); dtdo, vertically on a N-facing phyllite rock (north boundary of the rock), fully shaded, 1315 m a.s.l., 9.8.2003 coll. M. Zmrhalová (MZ 11453)

This rare liverwort has been reported here for the first time from the Hrubý Jeseník Mts., earlier known only from 'Rudník' in Krkonoše Mts. and two lowland localities in the southwestern Moravia (Duda & Váňa 1968, Hradflek in Anonymus 1996). It seems that this tiny liverwort that never grows in large patches may be easily overlooked.

Brachythecium geheebii

- Velká kotlina cirque: 'Petříkova skála' rock at the mouth of 'Vitáskova rokle' ravine, 750 m S of the top of Mt Vysoká hole [E3660.37, N5549.56], S-facing base of phyllitic rock, shaded by vegetation, 1180 m a.s.l., 11.7.2001 coll. B. Buryová (BB 4115); rocks at the mouth of 'Vitáskova rokle' ravine, 760 m S of the top of Mt Vysoká hole [E3660.293, N5549.536], E-facing phyllite rocks, half-shaded inclined face, ca. 1215 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8701); 'Vitáskova rokle' ravine, ca. 120 m above the mouth, 670 m S of the top of Mt Vysoká hole [E3660.24, N5549.63], humus over NE-facing vertical phyllitic rock face by brook, open, periodically wet, 1290 m a.s.l., 13.7.2001 coll. B. Buryová (BB 4153); ravine of the

Moravice brook, beech forest at a small cascade (left bank) 670 m SSE of the summit of Mt Vysoká hole [E3660.478, N5549.666], horizontally on bark, half-shaded base of *Acer pseudoplatanus*, 1195 m a.s.l., 3.8.2002 coll. J. Kučera (JK 10964)

All localities have been found in a proximity (within some 250 m) in the lower part of the Velká kotlina. Older reports from here exist by Limpricht (1876, coll. Schulze), Podpěra (1932, coll. already 1904) and Šmarda (1952), it was otherwise found in Malá kotlina (Duda 1950) and several other localities of the Hrubý Jeseník Mts (Šmarda 1952).

Ditrichum zonatum

- Velká kotlina cirque: ‘Kunzova stráň’ slope between the springs of Moravice and the upper end of ‘Vitáskova rokle’ ravine, 510 m S of the top of Mt Vysoká hole [E3660.211, N5549.791], inclined face of a phyllite rock outcrop in the SE slope, 1360 m a.s.l., 14.7.2001 coll. J. Kučera (JK 8876) & V. Plášek (VP 10807); dtto, [E3660.215, N5549.80], horizontally on ledge of phyllite rock outcrop in the SE slope, 1375 m a.s.l., 14.7.2001 coll. M. Zmrhalová (MZ 10154)

The second record (the other was made by Podpěra, undated on Mt Šerák, Novotný 2008) of the species in the Hrubý Jeseník Mts. (and outside the Krkonoše Mts. altogether).

Encalypta raptocarpa

- ‘Petrovy kameny’ rock formation, SE side, central part [E3660.057, N5550.989], fissure in a ledge of SE-facing mica schist rocks, sheltered by an overhang, 1435 m a.s.l., 12.7.2001 coll. J. Kučera (JK 8781)
- Velká kotlina cirque: ‘Finckeho stráň’ slope, 590 m S of the top of Mt Vysoká hole [E3660.309, N5549.707], E-facing phyllite rocks, on a ledge beneath an overhang, shaded, 1280 m a.s.l., 20.9.2001 coll. J. Kučera (JK 8979)
- Velká kotlina cirque: rocks (‘Podpěrovy skály’) SW of the lower end of ‘Vitáskova rokle’ ravine, 780 m S of the top of Mt Vysoká hole [E3660.289, N5549.519], fissure of a sunny E-facing phyllite rock, ca. 1215 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8575); dtto, at the lower end of ‘Vitáskova rokle’ ravine, 780 m S of the top of Mt Vysoká hole [E3660.301, N5549.52], humus over inclined E-facing base-rich schist rocks, 1220 m a.s.l., 9.7.2001 coll. J. Kučera (JK 8556)
- Velká kotlina cirque: ‘Vitáskova rokle’ ravine, ca. 140 m above the mouth, 660 m S of the top of Mt Vysoká hole [E3660.226, N5549.633], half-shaded fissures of a NE-facing phyllite rock ledges, 1300 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8851); dtto, fissures of E-facing phyllite rock beneath an overhang, 1305 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8856)

Both localities have been historically known for the species (Milde 1861, reporting the collection of F. Wimmer from Petrovy kameny in 1823 and following authors) but probably not collected in the last 50 years.

Grimmia anodon

- Velká kotlina cirque: rocks (‘Podpěrovy skály’) SW of the lower end of ‘Vitáskova rokle’ ravine, 780 m S of the top of Mt Vysoká hole [E3660.289, N5549.519], ledges of sunny, E-facing phyllite rocks, ca. 1215 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8578); dtto, [E3660.286, N5549.516], damp ledges of SE-facing phyllite rocks, 1215-1220 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8586)

New record for the Hrubý Jeseník Mts., found at two very close sites in only a few meters distance. The population was nevertheless relatively extensive, covering several dm².

Lescuraea mutabilis

- Malá kotlina cirque: bottom of the cirque just above the lower horizontal track, 930 m SSE of the summit of Velký Máj and 910 m E of the summit of Mt Jelení hřbet [E3658.635, N5547.537], half-shaded horizontal stem of a beech at the edge of closed forest, 1115 m a.s.l., 12.6.2002 coll. J. Kučera (JK 10929) & B. Buryová (BB 4694); dtto, [E3658.651, N5547.544], half-shaded horizontal stem of a beech at the edge of closed forest, 1115 m a.s.l., 12.6.2002 coll. B. Buryová (BB 4691)
- Sněžné strže ravines: third ravine from the south, 335 m NE of the summit of Mt Červená hora, E slope [E3653.02, N5559.47], shaded moist bark of a horizontal beech trunk, 1200 m a.s.l., 6.8.2003 coll. B. Buryová (BB 4062); dtto, 360 m NE of the summit of Mt Červená hora, beech trees left of the E flowing stream [E3653.06, N5559.46], on young branches of beech near the ground (covered by late snow), deeply shaded by tree leaves, 1175 m a.s.l., 6.8.2003 coll. B. Buryová (BB 4054); dtto, 370 m NE of the summit of

Mt Červená hora, beech trees left of the E flowing stream [E3653.08, N5559.46], bark of a horizontal beech trunk, basal part, 1170 m a.s.l., 6.8.2003 coll. B. Buryová (BB 4052)

Nowadays extremely rare species that has retreated drastically from the subalpine belt of our mountain ranges of the High Sudetes in course of the 20th century. Historically collected from several sites in the Hrubý Jeseník Mts. (Šmarda 1952), including the ones confirmed by us.

Myurella julacea

- Velká kotlina cirque: ‘Beckeho skály’ rocks, 650 m SSE of the top of Mt Vysoká hole [E3660.424, N5549.659], on humus layer in inclined ledge of sunny phyllite rock outcrop in the ESE slope, 1195 m a.s.l., 23.9.2001 coll. M. Zmrhalová (MZ 10288) & V. Plášek (VP 10910)
- Velká kotlina cirque: ‘Firbasova stráň’ slope above the brink of ‘Vitáskova rokle’ ravine, 660 m S of the top of Mt Vysoká hole [E3660.2, N5549.636], SE-facing phyllite rock outcrops, thin humus layer over an inclined face, moist, half-shaded, ca. 1330 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9044-5); dtto, vertical facelet, open, dry, ca. 1330 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9040, 9043) & V. Plášek (VP 10851); dtto, 670 m S of the top of Mt Vysoká hole [E3660.194, N5549.625], vertical face of a half-shaded phyllite rock outcrop at an E-facing slope, 1330 m a.s.l., 21.9.2001 coll. M. Zmrhalová (MZ 10277)
- Velká kotlina cirque: ‘Petříkova skála’ rocks at the mouth of ‘Vitáskova rokle’ ravine, 755 m S of the top of Mt Vysoká hole [E3660.382, N5549.554], rock, 1172 m a.s.l., 11.7.2001 coll. V. Plášek (VP 10748)
- Velká kotlina cirque: rocks (‘Podpěrovy skály’) SW of the lower end of ‘Vitáskova rokle’ ravine, 780 m S of the top of Mt Vysoká hole [E3660.286, N5549.516], fissure of an SE-facing phyllite rock, 1215-1220 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8585); dtto, [E3660.29, N5549.503], , 1225 m a.s.l., 10.7.2001 coll. M. Zmrhalová (MZ 9577, 9562); dtto, in fissure of E-facing phyllite rock, 1225 m a.s.l., 10.7.2001 coll. M. Zmrhalová (MZ 10467); dtto, [E3660.3, N5549.51], humus in S-facing vertical phyllitic rock fissure, moist, shaded, 1225 m a.s.l., 10.7.2001 coll. B. Buryová (BB 4078)
- Velká kotlina cirque: ‘Vitáskova rokle’ ravine, ca. 140 m above the mouth, 660 m S of the top of Mt Vysoká hole [E3660.226, N5549.633], half-shaded fissures of a NE-facing phyllite rock, 1300 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8849, 8850)
- Velká kotlina cirque: beneath ‘Mildeho skály’ rocks, ca. 150 m SW of the mouth of ‘Vitáskova rokle’ ravine, 890 m S of the top of Mt Vysoká hole [E3660.232, N5549.401], E-facing phyllite rocks, fissures beneath an overhang, 1250 m a.s.l., 15.7.2001 coll. J. Kučera (JK 8926)

Known since the earliest bryological surveys from the Velká kotlina (Milde 1861 and following authors), the occurrence on the Petrovy kameny rock formation could however not be confirmed during our survey.

Plagiopus oederianus

- Velká kotlina cirque: ‘Suzova stěna’ precipice, 865 m S of the top of Mt Vysoká hole [E3660.247, N5549.425], horizontally in ledge of a phyllite rock outcrop in the E slope, 1240 m a.s.l., 15.7.2001 coll. M. Zmrhalová (MZ 10190)
- Velká kotlina cirque: rocks (‘Podpěrovy skály’) SW of the lower end of ‘Vitáskova rokle’ ravine, 800 m S of the top of Mt Vysoká hole [E3660.3, N5549.51], humus in S-facing vertical phyllitic rock fissure, moist, shaded, 1225 m a.s.l., 10.7.2001 coll. B. Buryová (BB 4078); dtto, [E3660.29, N5549.503], horizontally on ledge of E-facing phyllite rock, 1220 m a.s.l., 10.7.2001 coll. M. Zmrhalová (MZ 9576) & V. Plášek (VP 10766)
- Velká kotlina cirque: ‘Vitáskova rokle’ ravine, rocks ca. 60 m above the mouth, 730 m S of the top of Mt Vysoká hole [E3660.28, N5549.563], fissure of an E-facing half-shaded schist rock, 1235 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8735); dtto, ca. 80 m above the mouth of ‘Vitáskova rokle’ ravine, 727 m S of the top of Mt Vysoká hole [E3660.274, N5549.574], rock, 1238 m a.s.l., 13.7.2001 coll. V. Plášek (VP 10791); dtto, ca. 140 m above the mouth, 660 m S of the top of Mt Vysoká hole [E3660.226, N5549.633], half-shaded fissures of a NE-facing phyllite rock ledges, 1300 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8852); dtto, rocky SE slope ca. 80 m above the mouth of ‘Vitáskova rokle’ ravine, 710 m S of the top of Mt Vysoká hole [E3660.266, N5549.587], sheltered niche in dripping, SE-facing phyllite rocks, shaded, ca. 1250 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8834); dtto, among mosses in spring site, steep NE slope among base-rich phyllitic rock outcrops, 1270 m a.s.l., 13.7.2001 coll. B. Buryová (BB 4143)

Confirmation of earlier known occurrence (Milde 1861 and following authors) of this relatively rare species in our country; the population here is not very extensive.

Saelania glaucescens

- Velká kotlina cirque: rocky SE slope ca. 90 m above the mouth of ‘Vitáskova rokle’ ravine, 720 m S of the top of Mt Vysoká hole [E3660.284, N5549.574], hanging on humus over an E-facing phyllite rocks, 1250 m a.s.l., 13.7.2001 coll. M. Zmrhalová (MZ 10113); dtto, 730 m S of the top of Mt Vysoká hole [E3660.27, N5549.57], on humus layer over E-facing phyllitic rock outcrop, open, moist, 1270 m a.s.l., 13.7.2001 coll. B. Buryová (BB 4145); dtto, ca. 80 m above the mouth of ‘Vitáskova rokle’ ravine, 722 m S of the top of Mt Vysoká hole [E3660.256, N5549.579], rock, 1217 m a.s.l., 13.7.2001 coll. V. Plášek (VP 10793); dtto, [E3660.274, N5549.574], rock, 1238 m a.s.l., 13.7.2001 coll. V. Plášek (VP 10792); dtto, ca. 90 m above the mouth of ‘Vitáskova rokle’ ravine, 710 m S of the top of Mt Vysoká hole [E3660.266, N5549.583], on thin humus layer in both horizontal and inclined ledges of E-facing phyllite rocks, 1270 m a.s.l., 13.7.2001 coll. M. Zmrhalová (MZ 10109)
- Velká kotlina cirque: upper end of the ‘Vitáskova rokle’ ravine – rocks SW of the ‘Šmardova skála’ rock, 610 m S of the top of Mt Vysoká hole [E3660.2, N5549.685], on humus in a grass tussock, ledge of a N-facing phyllite rock, half-shaded, 1335 m a.s.l., 15.7.2001 coll. J. Kučera (JK 8900)

Also a confirmation of the occurrence known since Sendtner (1840). The species grows here in fertile turfs on the larger phyllitic rocks of the Vitáskova rokle ravine in a rather limited population.

Tortula hoppeana (= *Desmatodon latifolius* var. *latifolius*)

- Velká kotlina cirque: ‘Kunzova stráž’ slope, 500 m S of the top of Mt Vysoká hole [E3660.22, N5549.799], humus layer on open vertical SE-facing phyllitic rock outcrop, in SE slope above timberline, 1360 m a.s.l., 14.7.2001 coll. B. Buryová (BB 4434)
- Velká kotlina cirque: rocks ca. 80 m above the mouth of ‘Vitáskova rokle’ ravine, just beneath the upper edge, 710 m S of the top of Mt Vysoká hole [E3660.257, N5549.581], humus on a ledge of a SE-facing phyllite rock, ca. 1275 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8825); dtto, hole [E3660.274, N5549.574], humus on a ledge of a SE-facing phyllite rock, 1238 m a.s.l., 13.7.2001 coll. V. Plášek (VP 10790); dtto, rocky SE slope ca. 90 m above the mouth of ‘Vitáskova rokle’ ravine, 710 m S of the top of Mt Vysoká hole [E3660.266, N5549.583], on humus layer in horizontal ledge of N-facing phyllite rocks, 1270 m a.s.l., 13.7.2001 coll. M. Zmrhalová (MZ 10111); dtto, horizontal ledge of a SE-facing phyllite rock, slightly shaded, 1270 m a.s.l., 13.7.2001 coll. M. Zmrhalová (MZ 10134); dtto, ca. 100 m above the mouth of ‘Vitáskova rokle’ ravine, 720 m S of the top of Mt Vysoká hole [E3660.26, N5549.57], thick humus layer over SE-facing phyllitic rock outcrop, open, dried, 1280 m a.s.l., 13.7.2001 coll. B. Buryová (BB 4147)

Known historically from the Velká kotlina and Petrovy kameny rock formation, collected here already by Sendtner (Sendtner 1840).

3) Vulnerable taxa (selection)

Amphidium lapponicum

- Velká kotlina cirque: rocks (‘Podpěrovy skály’) SW of the lower end of ‘Vitáskova rokle’ ravine, 770 m S of the top of Mt Vysoká hole [E3660.30, N5549.52], fissures of E-facing base-rich schist rocks, partly beneath an overhang, 1210-1220 m a.s.l., 9.7.2001 coll. J. Kučera (JK 8524, 8525, 8548, 8550), V. Plášek (VP 10731, 10743), M. Zmrhalová (MZ 9534); dtto, rocks ca. 50-60 m above the mouth of ‘Vitáskova rokle’ ravine, 730-740 m S of the top of Mt Vysoká hole [E3660.28, N5549.56], fissure and base of an E-facing schist rock outcrop, open, slightly wet, 1230 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8730, 8751); dtto, ‘Vitáskova rokle’ ravine, ca. 120-140 m above the mouth, 660-670 m S of the top of Mt Vysoká hole [E3660.23, N5549.63], fissures of NE-facing phyllite rocks, 1300 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8855), B. Buryová (BB 4150), M. Zmrhalová (MZ 10117, 10123); dtto, ‘Firbasova stráž’ slope above the brink of ‘Vitáskova rokle’ ravine, 670 m S of the top of Mt Vysoká hole [E3660.20, N5549.63], ca. 1330 m a.s.l., inclined phyllite rock outcrops, E-facing, open, dry, 21.9.2001 coll. J. Kučera (JK 9038); dtto, upper end of the ‘Vitáskova rokle’ ravine – rocks SW of the ‘Šmardova skála’ rock, 610 m S of the top of Mt Vysoká hole [E3660.21, N5549.69], fissure of E-facing phyllite rocks, half-shaded, 1330 m a.s.l., 14.7.2001 and 15.7.2001 coll. J. Kučera (JK 8893, 8896), V. Plášek (VP 10800); dtto, beneath ‘Mildeho skály’ rocks, ca. 150 m SW of the mouth of ‘Vitáskova rokle’ ravine, 890 m S of the top of Mt Vysoká hole [E3660.23, N5549.40], E-facing phyllite rocks, fissures beneath an overhang, 1250 m a.s.l., 15.7.2001 coll. J. Kučera (JK 8927), M. Zmrhalová (MZ 10187)
- W slopes of Mt Červená hora above ‘Vřesová studánka’, 160 m N of the summit [E3652.78, N5559.37], shaded fissure of base-rich phyllitic rock outcrop, sheltered by an overhang, WNW-facing, ca. 1320 m a.s.l., 9.8.2003 coll. J. Kučera (JK 11074), J. Košnar (KO 111)

While the species has a relatively stable population at the rocks of the Velká kotlina cirque, it is extremely rare elsewhere in the Hrubý Jeseník and even in the Krkonoše Mts. The population at Mt Červená hora does not exceed a cover of several cm², similarly as it was the case of the colonies in the Krkonoše Mts. (Kučera & al. 2004a). Historical reports exist from the Petrovy kameny and Tabulové skály rocks (Podpěra 1906), the specimens were however not found in herbaria and the species does not seem to have survived at these localities.

Dicranum majus

- Rock outcrops ca. 60 m NW of the ‘Petrovy kameny’ rock formation [E3659.993, N5551.031], on humus layer over inclined NW-facing mica schist rock outcrops, 1430 m a.s.l., 12.7.2001 coll. J. Kučera (JK 8799) & M. Zmrhalová (MZ 10069)
- Sněžné strže ravines: small ridge in second ravine from the south beneath a horizontal track, 365 m ENE of the summit of Mt Červená hora [E3653.14, N5559.35], on humus in spruce wood, 1140 m a.s.l., 5.8.2003 coll. B. Buryová (BB 4042)
- Sněžné strže ravines: southernmost ravine 235 m E of the summit of Mt Červená hora [E3653.033, N5559.229], on humus beneath blueberries in moist shaded NNE slope with *Pinus mugo*, 1250 m a.s.l., 6.6.2002 coll. B. Buryová (BB 4565)

Reported from the Sněžné strže ravines already by Matouschek (1904) but the specimen has not been found. Otherwise reported from Vřesová studánka, valley of Moravice and Velká kotlina (Podpěra 1906, Hruby 1914, Šmarda 1952) but none of the specimens could be located.

Pseudoleskeella rupestris

- ‘Petrovy kameny’ rock formation, NW side, central part [E3660.047, N5551.011], overhanging facelet of a mica schist rock overhang, N-facing, open, 1430 m a.s.l., 12.7.2001 coll. J. Kučera (JK 8793); dtto, fissure of a mica schist rock, SE-facing, open (JK 8795); dtto, SE side, central part [E3660.046, N5550.981], horizontally on thin humus layer in niche of a SE-facing mica schist rock, 1438 m a.s.l., 12.7.2001 coll. M. Zmrhalová (MZ 10052) & V. Plášek (VP 11002); dtto, SE side, SW part [E3660.043, N5550.984], fissures in an inclined face of SE-facing mica schist rock, sheltered by an overhang, 1435 m a.s.l., 12.7.2001 coll. J. Kučera (JK 8775)
- NW slopes of Mt Červená hora above ‘Vřesová studánka’, 170 m N of the summit [E3652.78, N5559.382], inclined in a fissure of a W-facing phyllite rock, half shaded, 1315 m a.s.l., 6.6.2002 coll. M. Zmrhalová (MZ 11517); dtto, W slope along the touristic path, 160 m NNW of the top of Mt Červená hora [E3652.784, N5559.387], half-shaded ledge on SSW-facing phyllite rock, base-rich, 1315 m a.s.l., 9.8.2003 coll. J. Košnar (KO 116), J. Kučera (JK 11068), B. Buryová (BB 4579) & M. Zmrhalová (MZ 11452, 11526)
- Velká kotlina cirque: rocks at the mouth of ‘Vitáskova rokle’ ravine, 760 m S of the top of Mt Vysoká hole [E3660.301, N5549.536], inclined face of an E-facing phyllite rock, 1225 m a.s.l., 11.7.2001 coll. M. Zmrhalová (MZ 9969)
- Velká kotlina cirque: ‘Vitáskova rokle’ ravine, ca. 140 m above the mouth, 660 m S of the top of Mt Vysoká hole [E3660.226, N5549.633], inclined ledge of an E-facing phyllite rock beneath an overhang, 1305 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8858)
- Velká kotlina cirque: rocks at the mouth of ‘Vitáskova rokle’ ravine, 760 m S of the top of Mt Vysoká hole [E3660.301, N5549.536], vertical face of a NE-facing phyllite rock, shaded, 1225 m a.s.l., 11.7.2001 coll. M. Zmrhalová (MZ 9970)

Not reported from the Hrubý Jeseník Mts yet, this little known species in Central Europe has only recently been recognized in our country (Váňa 1995) in the collections from the Krkonoše Mts. It is probably much more widely distributed in the montane regions on base-rich substrates.

Rhynchostegium rotundifolium

- Velká kotlina cirque: ‘Finckeho stráž’ slope, 640 m S of the top of Mt Vysoká hole [E3660.345, N5549.659], on small phyllite stone beneath the ferns, 1235 m a.s.l., 20.9.2001 coll. J. Kučera (JK 8960)

Interesting record of the uncommon, rather thermophilous moss, the first one in the Hrubý Jeseník Mts.

Schistidium confertum

- Malá kotlina cirque: rock outcrops near the SE flowing stream in the W part of the cirque, 660 m E of the top of Mt Jelení hřbet [E3658.386, N5547.723], fissure of open phyllitic rock outcrop ledge, in ESE slope in upper part of the cirque, 1255 m a.s.l., 22.9.2001 coll. B. Buryová (BB 4515)
- Velká kotlina cirque: ‘Beckeho skály’ rocks – W part, 700 m SSE of the top of Mt Vysoká hole [E3660.423, N5549.611], SE-facing phyllite rocks, inclined unshaded face, 1185 m a.s.l., 23.9.2001 coll. J. Kučera (JK 9102), B. Buryová (BB 4533) & M. Zmrhalová (MZ 10311); dtto, 670 m SSE of the top of Mt Vysoká hole [E3660.47, N5549.66], fissure of open periodically wet gneiss rock outcrop, 1205 m a.s.l., 3.8.2002 coll. B. Buryová (BB 3959)
- Velká kotlina cirque: ‘Firbasova stráž’ slope, 860 m S of the top of Mt Vysoká hole [E3660.175, N5549.438], open, dry phyllite rock outcrop in the E slope, E face, 1300 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9002); dtto, above the brink of ‘Vitáskova rokle’ ravine, 660 m S of the top of Mt Vysoká hole [E3660.2, N5549.636], SE-facing phyllite rock outcrops, vertical facelet, open, dry, ca. 1330 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9048); dtto, 670 m S of the top of Mt Vysoká hole [E3660.2, N5549.631], inclined phyllite rock outcrops, SE-facing, open, dry, ca. 1330 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9032); dtto, 680 m S of the top of Mt Vysoká hole [E3660.204, N5549.621], inclined open ESE-facing phyllitic rock outcrop, in ESE slope in upper part of the cirque, 1340 m a.s.l., 21.9.2001 coll. B. Buryová (BB 4500)
- Velká kotlina cirque: ESE slopes SSW of the upper part of the main ravine (‘Fiekovy ohlasy’), 820 m S of the summit of Mt Vysoká hole and 580 m ENE of the summit of Mt Kamzičník [E3660.147, N5549.485], sunny phyllitic rock outcrop, ESE-facing, unshaded, 1325 m a.s.l., 11.6.2002 coll. J. Kučera (JK 10906, 10913, 10914); dtto, 570 m ENE of the summit of Mt Kamzičník [E3660.139, N5549.48], fissure of sunny inclined phyllitic rock outcrop, ESE-facing, 1330 m a.s.l., 11.6.2002 coll. J. Kučera (JK 10918); dtto, 800 m S of the summit of Mt Vysoká hole and 600 m ENE of the summit of Mt Kamzičník [E3660.172, N5549.505], inclined on an ESE-facing phyllite rock outcrop, slightly shaded, 1320 m a.s.l., 11.6.2002 coll. M. Zmrhalová (MZ 11343)
- Velká kotlina cirque: rocks at the lower end of ‘Vitáskova rokle’ ravine, 780 m S of the top of Mt Vysoká hole [E3660.307, N5549.521], open, inclined E-facing base-rich schist rock, 1205 m a.s.l., 9.7.2001 coll. J. Kučera (JK 8503, 8505, 8510-2); dtto, [E3660.289, N5549.519], ledges of sunny, E-facing phyllite rocks, ca. 1215 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8580); dtto [E3660.286, N5549.516], damp ledges of SE-facing phyllite rocks, 1215-1220 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8587, 8588); dtto, 800 m S of the top of Mt Vysoká hole [E3660.3, N5549.51], humus layer over dry open inclined phyllitic rock face, 1225 m a.s.l., 10.7.2001 coll. B. Buryová (BB 4081, 4082); dtto, rocks ca. 70 m above the mouth of ‘Vitáskova rokle’ ravine, 730 m S of the top of Mt Vysoká hole [E3660.276, N5549.572], fissure of dry SE-facing vertical phyllitic rock, 1250 m a.s.l., 13.7.2001 coll. B. Buryová (BB 4404); dtto, upper end of the ‘Vitáskova rokle’ ravine – rocks SW of the ‘Šmardova skála’ rock, 610 m S of the top of Mt Vysoká hole [E3660.2, N5549.685], ledge of N-facing phyllite rocks, half-shaded, 1335 m a.s.l., 15.7.2001 coll. J. Kučera (JK 8899); dtto, fissure of open dry phyllitic rock outcrop, in SE slope above timberline, 1320 m a.s.l., 14.7.2001 coll. B. Buryová (BB 4451)

Earlier reports of this species from the localities cannot be accepted without revision, as the species was not correctly understood by older authors. Nevertheless, it is not uncommon on open phyllitic rocks in Velká kotlina (and sparsely occurs, due to the shortage of suitable substrates, also in the Malá kotlina), typically associated with *S. pruinosum*, and rarely also with *Grimia anodon* and *G. ovalis*.

Weissia controversa var. *wimmeriana*

- Malá kotlina cirque: rock outcrops near the SE flowing stream in the W part of the cirque, 660 m E of the top of Mt Jelení hřbet [E3658.392, N5547.727], wet phyllite rock outcrop in the ground level, ESE face, 1250 m a.s.l., 22.9.2001 coll. J. Kučera (JK 9083); dtto, 670 m E of the top of Mt Jelení hřbet [E3658.39, N5547.689], vertical face of an E-facing phyllite rock outcrops, 1235 m a.s.l., 22.9.2001 coll. M. Zmrhalová (MZ 10337)
- Malá kotlina cirque: central part of the cirque, 662 m E of the summit of Jelení hřbet and 639 m S of the summit of Velký Máj [E3658.388, N5547.796], humus at an outcrop, 1270 m a.s.l., 10.6.2002 coll. V. Plášek (VP 11555)
- Malá kotlina cirque: SW part of the cirque, 670 m E of the summit of Jelení hřbet and 780 m S of the summit of Velký Máj [E3658.399, N5547.668], wet edge of ESE-facing phyllite rock outcrops, inclined face, 1225 m a.s.l., 8.6.2002 coll. J. Kučera (JK 10857)
- Velká kotlina cirque: ‘Kratochvílova stráž’ slope (ca. 50 m WSW of the course of Moravice), 480 m SSE of the summit of Mt Vysoká hole and 980 m NE of the summit of Mt Kamzičník [E3660.411, N5549.837], in a dried-up gully, SSE slope, shaded soil, 1290 m a.s.l., 5.8.2002 coll. J. Kučera (JK 11009)

- Velká kotlina cirque: sloping springs W of Moravice stream, on S exposed slope, 500 m SSE of the top of Mt Vysoká hole, above a big reed spring site [E3660.41, N5549.83], humus layer over an open mesic inclined face of gneiss outcrop, 1290 m a.s.l., 5.8.2002 coll. B. Buryová (BB 4008)
- Velká kotlina cirque: rocks at the lower end of ‘Vitáskova rokle’ ravine, 770 m S of the top of Mt Vysoká hole [E3660.303, N5549.526], fissures of E-facing half-shaded base-rich schist rock, thin humus layer, 1215 m a.s.l., 9.7.2001 coll. J. Kučera (JK 8528); dtto, 780 m S of the top of Mt Vysoká hole [E3660.313, N5549.519], base of open, E-facing base-rich schist rocks, thin humus layer, 1200 m a.s.l., 9.7.2001 coll. J. Kučera (JK 8493); dtto, 1205 m a.s.l., 9.7.2001 coll. J. Kučera (JK 8500); dtto, rocky SE slope in ‘Vitáskova rokle’ ravine, 665 m S of the top of Mt Vysoká hole [E3660.245, N5549.625], on humu layer over a of NE-facing phyllite boulder, inclined, shaded, 1300 m a.s.l., 13.7.2001 coll. M. Zmrhalová (MZ 10119)
- Velká kotlina cirque: ESE slopes SSW of the upper part of the main ravine (‘Fiekovy ohlasy’), 826 m S of the summit of Mt Vysoká hole and 585 m ENE of the summit of Mt Kamzičník [E3660.167, N5549.481], soil on an outcrop, 1279 m a.s.l., 21.9.2001 coll. V. Plášek (VP 10843)
- Velká kotlina cirque: ‘Firbasova stráň’ slope, 775 m S of the top of Mt Vysoká hole [E3660.181, N5549.519], wet humus over an phyllite rock outcrop in the E slope, inclined, 1320 m a.s.l., 21.9.2001 coll. M. Zmrhalová (MZ 10205); dtto, 826 m S of the top of Mt Vysoká hole [E3660.133, N5549.487], soil, 1287 m a.s.l., 11.6.2002 coll. V. Plášek (VP 10918); dtto, 660 m S of the top of Mt Vysoká hole [E3660.2, N5549.64], bare soil beneath vegetation, in SE slope in upper part of the cirque, ca. 1330 m a.s.l., 22.9.2001 coll. B. Buryová (BB 4188)
- Velká kotlina cirque: rocks (south of ‘Podpěrovy skály’, beneath ‘Firbasova stráň’) S of the lower end of ‘Vitáskova rokle’ ravine, 800 m S of the top of Mt Vysoká hole [E3660.271, N5549.484], on vertical face of a SE-facing phyllite outcrop, 1235 m a.s.l., 10.7.2001 coll. M. Zmrhalová (MZ 9935)

This taxon seems to be relatively common in the rock fissures of both Velká and Malá kotlina but otherwise it was recorded only at two other sites in the Hrubý Jeseník Mts. and in the Krkonoše Mts.

3) Near threatened taxa (selection)

Gymnomitrium concinnatum

- Sněžné strže ravines, second ravine from the south, [E3652.921, N5559.427], rock outcrop, 1203 m a.s.l., 6.8.2003 coll. V. Plášek (VP 10993)
- Velká kotlina cirque: rocks ca. 80 m above the mouth of ‘Vitáskova rokle’ ravine, 700 m S of the top of Mt Vysoká hole [E3660.259, N5549.599], E-facing schist rock outcrop in the slope, moist, half-shaded, ca. 1260 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8815); dtto, N-facing phyllite rock face near base, half-shaded (JK 8810); dtto, [E3660.267, N5549.588], vertical face of NE-facing phyllite rocks, 1270 m a.s.l., 13.7.2001 coll. M. Zmrhalová (MZ 10104); dtto, ca. 90 m above the mouth of ‘Vitáskova rokle’ ravine, 720 m S of the top of Mt Vysoká hole [E3660.271, N5549.567], vertical face of E-facing phyllite rocks, 1255 m a.s.l., 13.7.2001 coll. M. Zmrhalová (MZ 10112)
- Velká kotlina cirque: rocky SE slopes SSW of the lower end of ‘Vitáskova rokle’ ravine, 820 m S of the top of Mt Vysoká hole [E3660.261, N5549.479], fissure of an E-facing acid schist rock, unshaded, 1225 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8675); dtto, inclined face of an E-facing rock, niche beneath an overhang, 1230 m a.s.l. (JK 8676); dtto, [E3660.268, N5549.475], nearly vertical wet face of a schist rock outcrop, E-facing, beneath an overhang, 1220 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8679)
- Velká kotlina cirque: rocks (south of ‘Podpěrovy skály’, beneath ‘Firbas side’) S of the lower end of ‘Vitáskova rokle’ ravine, 790 m S of the top of Mt Vysoká hole [E3660.254, N5549.498], on inclined face of a SE-facing phyllite outcrop, 1250 m a.s.l., 10.7.2001 coll. M. Zmrhalová (MZ 10073)

Not rare and historically known on the rocks in the central part of the Velká kotlina cirque, the locality in the Sněžné strže ravines is new.

Reboulia hemisphaerica

- Velká kotlina cirque: rocks (‘Podpěrovy skály’) SW of the lower end of ‘Vitáskova rokle’ ravine, 800 m S of the top of Mt Vysoká hole [E3660.3, N5549.51], moist half-shaded humus in niche beneath an overhang of SW-facing phyllitic rock, 1225 m a.s.l., 10.7.2001 coll. B. Buryová (BB 4080)

Found new in the Velká kotlina cirque, historical localities from the Hrubý Jeseník Mts include Mt Šumárník (coll. Šmarda 1955, Duda & Váňa 1973), Mt Smrčník (Vězda 1961), Jelení hřbet ridge (coll. J. Vicherek 1958) and valley of Merta (coll. J. Vicherek 1958). This is,

along with e.g. *Rhynchostegium rotundifolium*, another example of thermophilous element in the flora of Velká kotlina.

Bryum alpinum

- Malá kotlina cirque: rock outcrops in the SE slope along the right bank of a SE flowing stream in the W part of the cirque, 700 m E of the top of Mt Jelení hřbet [E3658.416, N5547.687], horizontally on humus over ESE-facing phyllite rock outcrops, 1200 m a.s.l., 22.9.2001 coll. M. Zmrhalová (MZ 10323); dtto, SE flowing stream in the W part of the cirque at the footbridge, right bank, 702 m E of the top of Mt Jelení hřbet [E3658.436, N5547.718], rock, 1185 m a.s.l., 22.9.2001 coll. V. Plášek (VP 10857)
- Velká kotlina cirque: 'Firbasova stráň' slope, 830 m S of the top of Mt Vysoká hole [E3660.165, N5549.471], inclined face of open moist phyllitic rock outcrop, in E slope, 1310 m a.s.l., 21.9.2001 coll. B. Buryová (BB 4478)
- Velká kotlina cirque: 'Suzova stěna' precipice, ca. 60 m SW of the mouth of 'Vitáskova rokle' ravine, 810 m S of the top of Mt Vysoká hole [E3660.273, N5549.489], wet ledges of SE-facing phyllite rocks, 1220 m a.s.l., 15.7.2001 coll. J. Kučera (JK 8901); dtto, 810 m S of the top of Mt Vysoká hole [E3660.26, N5549.488], fissure of a wet schist rock, 1230 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8668)
- Velká kotlina cirque: rocks ('Podpěrovy skály') SW of the lower end of 'Vitáskova rokle' ravine, 780 m S of the top of Mt Vysoká hole [E3660.301, N5549.514], humus over inclined face of phyllite rock outcrop in the S slope, 1215 m a.s.l., 15.7.2001 coll. M. Zmrhalová (MZ 10173); dtto, 790 m S of the top of Mt Vysoká hole [E3660.273, N5549.507], dripping phyllite rock outcrop in the SE slope beneath the rocks, 1225 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8610); dtto, at the lower end of 'Vitáskova rokle' ravine, 770 m S of the top of Mt Vysoká hole [E3660.303, N5549.526], fissures of E-facing half-shaded base-rich schist rock, thin humus layer, 1215 m a.s.l., 9.7.2001 coll. J. Kučera (JK 8529)
- Velká kotlina cirque: 'Vitáskova rokle' ravine, rocks ca. 70 m above the mouth, beneath the upper edge, 720 m S of the top of Mt Vysoká hole [E3660.265, N5549.571], humus over SE-facing phyllite rock outcrops in the slope, slightly wet, ca. 1270 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8826)

The species has been reported by Šmarda (1952) from Velká kotlina and earlier by Limpricht (1895) generally from the Hrubý Jeseník Mts. It is not uncommon on the larger rocks in both surveyed cirques.

Dicranum bonjeanii

- Velká kotlina cirque: rocks ('Podpěrovy skály') SW of the lower end of 'Vitáskova rokle' ravine, 800 m S of the top of Mt Vysoká hole [E3660.274, N5549.495], humus over SE-facing inclined phyllite rock outcrop, 1215-1220 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8625) & M. Zmrhalová (MZ 9588); dtto, [E3660.279, N5549.492], on wet humus over a ledge of a dripping SE-facing phyllite rock, 1215 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8630)
- Velká kotlina cirque: rocks ca. 70 m above the mouth of 'Vitáskova rokle' ravine, beneath the upper edge, 730 m S of the top of Mt Vysoká hole [E3660.27, N5549.57], on wet soil, E slope, little shaded, 1270 m a.s.l., 13.7.2001 coll. B. Buryová (BB 4138); dtto, ca. 90 m above the mouth of 'Vitáskova rokle' ravine, 720 m S of the top of Mt Vysoká hole [E3660.27, N5549.58], wet soil layer on base-rich phyllitic rock outcrop, E-facing, inclined, open, 1270 m a.s.l., 13.7.2001 coll. B. Buryová (BB 4137)

Known historically from the Velká kotlina cirque (collected already by Sendtner 1839 [Milde 1861]) – the species is mostly typical of rich fens but here it grows on several sites on the wet, moderately base-rich rocks.

Herzogiella striatella

- Sněžné strže ravines: second ravine from the south at a horizontal track, 350 m NE of the summit of Mt Červená hora [E3653.075, N5559.445], on half-shaded decaying wood, ca. 1170 m a.s.l., 6.8.2003 coll. J. Košnar (KO 70); dtto, 330 m ENE of the summit of Mt Červená hora [E3653.111, N5559.332], shaded humus over vertical NE-facing phyllite stone face, ca. 1170 m a.s.l., 7.8.2003 coll. J. Košnar (KO 88); dtto, 270 m ENE of the summit of Mt Červená hora [E3653.055, N5559.316], half-shaded humus over vertical N-facing phyllite stone face, ca. 1200 m a.s.l., 7.8.2003 coll. J. Košnar (KO 90)
- Malá kotlina cirque: central part of the cirque, on multiple places 710-770 m ENE of the summit of Jelení hřbet and 560-650 m S of the summit of Velký Máj [E3658.40-46, N5547.82-92], mostly on shaded soil under the blueberries, 1260-1300 m a.s.l., 22.9.2001 coll. J. Kučera (JK 9090), B. Buryová (BB 4526), M. Zmrhalová (MZ 10365), V. Plášek (VP 10871); 8.6.2002 coll. B. Buryová (BB 4611, 4615), J. Kučera (JK 10848,10850),10.6.2002 coll. M. Zmrhalová (MZ 11271), J. Kučera (JK 10893-4,10896)

- Malá kotlina cirque: along a brooklet in the N part of the cirque, 890 m ENE of the summit of Jelení hřbet and 400 m S-SSE of the summit of Velký Máj [E3658.541, N5548.066], on mineral soil, niche beneath vegetation at a SSE-facing slope, fully shaded, 1305 m a.s.l., 9.6.2002 coll. M. Zmrhalová (MZ 11301); dtto, 1320 m a.s.l., MZ 11300.
- Velká kotlina cirque: ‘Firbasova stráž’ slope, 700-710 m S of the top of Mt Vysoká hole [E3660.17, N5549.59], on humus hanging over an E-facing phyllite rock outcrop, shaded by vegetation, 1340 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9026), M. Zmrhalová (MZ 10270), V. Plášek (VP 10846)
- Velká kotlina cirque: ‘Kratochvílova stráž’ slope, several sites between E3660.34-44 and N5549.68-83, 1210-1310 m a.s.l., 3.8.2002 coll. J. Váňa (JV 12), 5.8.2002 coll. V. Plášek (VP 10971), 8.8.2003 coll. J. Košnar (KO 39, 52) & M. Zmrhalová (MZ 11493)
- Velká kotlina cirque: along the Moravice brook, several sites between E3660.46-49 and N5549.57 (1160 m), 5549.67 (1200 m), 5549.75 (1240 m), 5549.88 (1310 m), 3.8.2002 coll. J. Kučera (JK 10973, 10978), B. Buryová (BB 3928), V. Plášek (VP 10930)

One of the earlier nearly forgotten taxa in the Hrubý Jeseník Mts. – it was richly collected by old authors (Sendtner, Milde) and lastly by Podpěra (1906) but then Šmarda (1952) was not able to find the species in the whole mountain range. Obviously, he just did not know the species sufficiently to recognize it, as we were able to relocate it at many suitable localities of all surveyed sites.

Hypnum pratense

- Malá kotlina cirque: lowermost part of the cirque, 805 m S-SSE of the summit of Velký Máj and 840 m E of the summit of Mt Jelení hřbet, right side of the Kotelný potok brook [E3658.575, N5547.656], horizontally on decaying trunk, SE-facing slope, slightly shaded, 1165 m a.s.l., 12.6.2002 coll. M. Zmrhalová (MZ 11242)

Interesting record of a moss usually found at lowland rich fens.

Pohlia nutans subsp. *schimperi*

- Malá kotlina cirque: SW part of the cirque, 660 m E of the summit of Jelení hřbet and 750 m S of the summit of Velký Máj [E3658.388, N5547.704], phyllite rock outcrop, SE-facing, not shaded, little damp, 1250 m a.s.l., 8.6.2002 coll. J. Kučera (JK 10853)
- Malá kotlina cirque: central part of the cirque, 740-750 m ENE of the top of Mt Jelení hřbet and 515-570 m S of the top of Mt Velký Máj [E3658.43-45, N5547.88-93], on old grass and humus in the SE slope and on thin humus layer over phyllite rock outcrop, 1265-1295 m a.s.l., 8.6.2002 coll. J. Kučera (JK 9580-2), M. Zmrhalová (MZ 11294), V. Plášek (VP 11574), B. Buryová (BB 2903), 10.6.2002 coll. J. Kučera (JK 9585-6)
- Malá kotlina cirque: eastern part of the cirque, 890 m ENE of the top of Mt Jelení hřbet and 400-440 m SSE of the top of Mt Velký Máj [E3658.54, N5548.02-06], on soil over a phyllite rock ledge and on acid humus in the SE slope, 1290-1310 m a.s.l., 9.6.2002 coll. J. Kučera (JK 9583-4), B. Buryová (BB 2902), M. Zmrhalová (MZ 11313)

Earlier not recognized taxon (Köckinger & al. 2005), proven to occur at a variety of suitable sites, mostly in the high mountains of our country. Interestingly, we were not yet able to find it in the Velká kotlina cirque, whereas it grows relatively abundantly in the slopes of Malá kotlina.

Schistidium pruinosum

- Malá kotlina cirque: rock outcrops ca. 50 m SW of the SE flowing stream in the W part of the cirque, 660 m E of the top of Mt Jelení hřbet [E3658.391, N5547.72], horizontally in fissures of an E-facing phyllite rock outcrop, 1250 m a.s.l., 22.9.2001 coll. M. Zmrhalová (MZ 10351)
- Velká kotlina cirque: ‘Beckeho skály’ rocks – W part, 700 m SSE of the top of Mt Vysoká hole [E3660.426, N5549.621], E-facing phyllite rocks, vertical unshaded face, small fissures, 1190 m a.s.l., 23.9.2001 coll. J. Kučera (JK 9105); rocks (‘Podpěrovy skály’) SW of the lower end of ‘Vitáskova rokle’ ravine, 780 m S of the top of Mt Vysoká hole [E3660.286, N5549.516], damp ledges of SE-facing phyllite rocks, 1215-1220 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8588); dtto [E3660.289, N5549.519], ledges of sunny, SE-facing phyllite rocks, ca. 1215 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8576); dtto [E3660.299, N5549.519], sunny E-facing phyllite rocks, ca. 1210 m a.s.l., 10.7.2001 coll. J. Kučera (JK 8569); dtto [E3660.309, N5549.514], inclined, open E-facing base-rich schist rocks, 1215 m a.s.l., 9.7.2001 coll.

J. Kučera (JK 8542); dtto [E3660.307, N5549.521], open, inclined E-facing base-rich schist rock, 1205 m a.s.l., 9.7.2001 coll. J. Kučera (JK 8504)

Another little known and earlier not distinguished species, probably most commonly occurring on the sunny siliceous rocks.

Schistidium rivulare

- Velká kotlina cirque: rocky SE slope in ‘Vitáskova rokle’ ravine, 650 m S of the top of Mt Vysoká hole [E3660.246, N5549.642], on inclined face of NE-facing phyllite boulder by a stream, ca. 1290 m a.s.l., 13.7.2001 coll. M. Zmrhalová (MZ 10122) & V. Plášek (VP 10799)

Scorpidium cossonii

- Velká kotlina cirque: ‘Kratochvílova stráň’ slope, 510 m SSE of the summit of Mt Vysoká hole and 960 m ENE of the summit of Mt Kamzičník [E3660.401, N5549.81], sloping base-rich flush, grown with reed, *Eriophorum angustifolium* & *Pinguicula*; half-shaded, 1285 m a.s.l., 5.8.2002 coll. J. Kučera (JK 11029)
- Malá kotlina cirque: lower part of the cirque, 860 m S of the summit of Velký Máj and 860 m E of the summit of Mt Jelení hřbet [E3658.586, N5547.595], on wet humus and decaying grass at a brooklet in the SE slope, 1140 m a.s.l., 12.6.2002 coll. J. Kučera (JK 10942) & B. Buryová (BB 4703)

Earlier reports of *S. revolvens* from these sites probably refer to this taxon, not commonly or correctly recognized in previous decades.

Splachnum sphaericum

- Velká kotlina cirque: ‘Beckeho skály’ rocks – central part, 699 m SSE of the top of Mt Vysoká hole [E3660.446, N5549.624], moist soil, 1151 m a.s.l., 23.9.2001 coll. V. Plášek (VP 10912)
- Malá kotlina cirque: spring area of a SE flowing stream in the W part of the cirque, 650 m E of the top of Mt Jelení hřbet [E3658.378, N5547.724], horizontally on wet humose soil shaded by vegetation, a SE-facing slope, 1260 m a.s.l., 22.9.2001 coll. M. Zmrhalová (MZ 10359)
- Sněžné strže ravines: third ravine from the south, 305 m NE of the summit of Mt Červená hora [E3652.982, N5559.454], inclined on humose soil in an E-facing slope, half shaded, 1225 m a.s.l., 6.8.2003 coll. M. Zmrhalová (MZ 11418)

Not very commonly recorded species from the Hrubý Jeseník Mts., not yet reported from either of localities.

4) Data deficient taxa (selection)

Scapania scandica

- Velká kotlina cirque: ‘Finckeho stráň’ slope, 660 m S-SSE of the top of Mt Vysoká hole [E3660.37, N5549.648], rock, 1220 m a.s.l., 20.9.2001 coll. V. Plášek (VP 10885)

Only one historical report from the Hrubý Jeseník Mts. (upper cours of Branná) by Šmarda (1961), the respective specimen was not available during the revision (Duda & Váňa 1969a).

Bryum amblyodon

- W slopes of Mt Červená hora above ‘Vřesová studánka’, 160-170 m N of the summit [E3652.789, N5559.381], on thin humus layer over phyllite rock ledge, half-shaded, NW-facing, 1310 m a.s.l., 6.6.2002 coll. J. Kučera (JK 10828)

Regarded as common by Limpricht (1876) but not found by recent authors. Podpěra (1973) even described a new variety (*Bryum inclinatum* var. *paulii*) according to a specimen collected by Paul at ‘Vřesová studánka’ in 1879.

Bryum mildeanum

- Velká kotlina cirque: ‘Firbasova stráň’ slope, 740 m S of the top of Mt Vysoká hole [E3660.194, N5549.562], dripping phyllite rock outcrop in the E slope, fissure, 1310 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9017)

Little known species, not yet reported from the Velká kotlina cirque but collected e.g. in Branná by Podpěra 1905 (rev. Kučera, BRNM!); further reported by Podpěra (1953) from Mt Červená hora.

Cynodontium tenellum

- Velká kotlina cirque: ‘Finkeho stráň’ slope, 630 m S-SSE of the top of Mt Vysoká hole [E3660.385, N5549.677], fissure of a small SE-facing phyllite rock in the SE slope, 1230 m a.s.l., 20.9.2001 coll. J. Kučera (JK 8947), V. Plášek (VP 10889) & M. Zmrhalová (MZ 10228)
- Velká kotlina cirque: ‘Vitáskova rokle’ ravine, ca. 100 m above the mouth, 680 m S of the top of Mt Vysoká hole [E3660.248, N5549.614], fissure of a vertical NE-facing phyllite rock, sheltered by an overhang, half-shaded, 1275 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8835)

Collected in the Velká kotlina already by Sendtner (Kalmus 1867) and Podpěra (1906, specimen seen in BRNM!).

Schistidium confusum

- Malá kotlina cirque: rock outcrops ca. 30 m SW of the SE flowing stream in the W part of the cirque, 670 m E of the top of Mt Jelení hřbet [E3658.4, N5547.682], wet phyllite rock outcrop in the ESE slope, ESE face, 1235 m a.s.l., 22.9.2001 coll. J. Kučera (JK 9067)
- Velká kotlina cirque: ‘Vitáskova rokle’ ravine, ca. 140 m above the mouth, 660 m S of the top of Mt Vysoká hole [E3660.226, N5549.633], inclined ledge of an E-facing phyllite rock beneath an overhang, 1305 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8857)

Little known species, not distinguished earlier from other taxa of *S. apocarpum* complex.

Schistidium lancifolium

- Velká kotlina cirque: ‘Firbasova stráň’ slope, 840 m S of the top of Mt Vysoká hole [E3660.175, N5549.462], fissure of a phyllite rock outcrop in the E slope, 1300 m a.s.l., 21.9.2001 coll. J. Kučera (JK 9007); ‘Petříkova skála’ rocks at the mouth of ‘Vitáskova rokle’ ravine, 750 m S of the top of Mt Vysoká hole [E3660.375, N5549.557], base of a moist, shaded, schist rock, vertical face, 1180 m a.s.l., 11.7.2001 coll. J. Kučera (JK 8683)

Similarly as the preceding species, not distinguished earlier from other taxa of *S. apocarpum* complex, more common in the north-eastern part of the Czech Republic.

Thamnobryum neckeroides

- Malá kotlina cirque: rock outcrops ca. 50 m SW of the SE flowing stream in the W part of the cirque, 660 m E of the top of Mt Jelení hřbet [E3658.391, N5547.67], overhanging ESE-facing phyllite rock outcrop along a small stream, wet shaded face, 1240 m a.s.l., 22.9.2001 coll. J. Kučera (JK 9074)
- Velká kotlina cirque: ‘Beckeho skály’ rocks – W part, 700 m SSE of the top of Mt Vysoká hole [E3660.423, N5549.611], SE-facing phyllite rocks, moist, shaded overhanging face at rock’s base, 1185 m a.s.l., 23.9.2001 coll. M. Zmrhalová (MZ 10290); ESE slopes SSW of the upper part of the main ravine (‘Fiekovy ohlasy’), 780 m S - SSW of the summit of Mt Vysoká hole and 585 m ENE of the summit of Mt Kamzičník [E3660.143, N5549.533], horizontally on wet mineral soil beneath a SE-facing flushed phyllite rock outcrop in a spring area, fully shaded, 1340 m a.s.l., 11.6.2002 coll. M. Zmrhalová (MZ 11354); rocks ca. 80 m above the mouth of ‘Vitáskova rokle’ ravine, 700 m S of the top of Mt Vysoká hole [E3660.258, N5549.593], fissure of a dripping, E-facing phyllite rock beneath an overhang, ca. 1270 m a.s.l., 13.7.2001 coll. J. Kučera (JK 8820)

Newly recognized taxon (Mastracci 2003). As we were not aware of this taxon during our field survey, not all *Thamnobryum* plants were checked. All collected specimens proved to belong to *T. neckeroides*, so that the occurrence of *T. alopecurum* s.str. at the localities is not certain.

Localities of interesting taxa outside the above described localities

Lophozia ascendens

- Nature reserve ‘Bučina pod Františkovou myslivnou’, SW part, 140 m NE of ‘Františkova myslivna’ lodge [E3657.369, N5549.647], decaying beech log, vertically, S-exposed, shaded, 1130 m a.s.l., 7.6.2002 coll. J. Kučera (JK 10831) & M. Zmrhalová (MZ 11501); dtto, 130 m NE of ‘Františkova myslivna’ lodge

[E3657.392, N5549.627], decaying beech log, inclined, ENE-exposed, half shaded, 1130 m a.s.l., 7.6.2002 coll. M. Zmrhalová (MZ 11512); dtto, 180 m NE of 'Františkova myslivna' lodge [E3657.366, N5549.653], decaying beech log in the beech forest, 1105 m a.s.l., 7.6.2002 coll. V. Plášek (VP 10913); dtto, 210 m NE of 'Františkova myslivna' lodge [E3657.406, N5549.718], decaying beech log, vertically, N-exposed, half shaded, 1100 m a.s.l., 7.6.2002 coll. M. Zmrhalová (MZ 11516); dtto, 240 m NNE of 'Františkova myslivna' lodge [E3657.419, N5549.735], decaying beech log on the right bank of a brooklet in the beech forest, E slope, shaded, moist, 1090 m a.s.l., 7.6.2002 coll. J. Kučera (JK 10834); dtto, 250 m NE of 'Františkova myslivna' lodge [E3657.464, N5549.71], decaying beech log in the beech forest, E slope, half-shaded, moist, 1080 m a.s.l., 7.6.2002 coll. J. Kučera (JK 10833)

The species was earlier collected only by the springs of Hučivá Desná at Mt Vozka (Duda & Váňa 1989b) but it grows in relative abundance in this old-growth forest.

Brachythecium geheebii

– Nature reserve 'Bučina pod Františkovou myslivnou', SW part, 150 m ENE of 'Františkova myslivna' lodge [E3657.4, N5549.613], N-facing bark of dead standing *Fagus sylvatica* trunk, open, moist; old-grown beech forest in ENE slope, 1120 m a.s.l., 7.6.2002 coll. B. Buryová (BB 4583)

In addition to this and the above described records from the Velká kotlina cirque, the species was recently recorded from the Městské skály ridge near Šumperk (Kučera 2007).

Historically reported species without recent records

Number of species not found at individual localities varied vastly. However, most of the species that were not re-found at their historical locality were found on another studied site within the mountains. Hence we are reporting here only species that were not found at any of the localities during our survey, or those, which seem to be extremely rare in the region.

a) revised and probable records

Apometzgeria pubescens

Červená hora, coll. F. Kern (Matouschek 1904); Vřesová studánka (Limpricht 1876). No specimen found during the revision (Duda & Váňa 1988).

Bazzania tricrenata

Velká kotlina (Kolenati 1860, Podpěra 1907, Šmarda 1952); slope of Červená hora (coll. Vězda, Vězda 1955). No specimen found during the revision (Duda & Váňa 1989b), however Zmrhalová (2008) could confirm the species recently growing at Mt Břidličná hora.

Bazzania trilobata

On rocks above 'Vřesová studánka', Velká kotlina (Šmarda 1952). Interestingly, this common species was not recorded during our survey, Šmarda's records could not be revised (Duda & Váňa 1990a).

Cephalozia catenulata

Petrovy kameny (coll. J. Spatzier, Kalmus & Niessl 1871); Sněžné jámy (Matouschek 1903). Specimens not found (Duda & Váňa 1986b); the record from the Petrovy kameny rocks is ecologically doubtful.

Cephalozia leucantha

Ovčárna below Petrovy kameny, 1300 m (leg. K. G. Limpricht 1870, J. Duda 1969 – rev. Duda & Váňa 1986b).

Cephalozia lunulifolia

Ovčárna below Petrovy kameny, 1300 m (leg. J. Duda 1969 – rev. Duda & Váňa 1985); Petrovy kameny (leg. Limpricht 1870 (Limpricht 1872; partim sub *C. catenulata* et *C. connivens*), V. Pospíšil 1971 – rev. Duda & Váňa 1985).

Cephalozia pleniceps

Velká kotlina (1934 leg. K. Preis, herb. PRC – rev. Duda & Váňa 1986a); Vřesová studánka (Kern 1914) – specimen not found.

Frullania dilatata

Petrovy kameny (1889 leg. P. Hora – rev. Duda & Váňa 1977a); Červená hora (1876 leg. J. Paul – rev. Duda & Váňa 1977a).

Gymnocolea inflata

Sněžné jámy (Matouschek 1901, Podpěra 1906) – no specimen found (Duda & Váňa 1981).

Harpanthus scutatus

Červená hora (1883 leg. J. Paul – rev. Duda & Váňa 1978a). The record most likely refers to the lower, forest zone of the mountain.

Jungermannia gracillima

Velká kotlina (1868 coll. J. Kalmus & 1912 coll. F. Schenk, omnia sub *Nardia scalaris* – rev. Duda & Váňa 1971).

Lophozia attenuata

Petrovy kameny (1861 leg. J. Kalmus – rev. Duda & Váňa 1984a); Tabulové skály (leg. Zdeněk 1884, specimen not found).

Lophozia longidens

Vřesová studánka (1879 leg. J. Paul – rev. Duda & Váňa 1992).

Lophozia obtusa

The slope beneath ‘Petrovy kameny’ (1971 leg. V. Pospíšil – rev. Duda & Váňa 1990b).

Marsupella sparsifolia

Velká kotlina (1946 leg. J. Šmarda sub *M. funckii* – rev. Duda & Váňa 1980).

Marsupella sphacelata

Petrovy kameny (perhaps rather near ‘Ovčárna’ (1870 leg. K. G. Limpricht – rev. Duda & Váňa 1980).

Metzgeria conjugata

Velká kotlina (1904 leg. J. Podpěra, 1911 leg. J. Hruby & 1931 leg. J. Otruba – rev. Duda & Váňa 1989a).

Mylia taylorii

Velká kotlina (1931 leg. F. Otruba – rev. Duda & Váňa 1973; leg. J. Spatzier – Kalmus & Niessl 1871, leg. J. Podpěra – Podpěra 1906 – not revised by Duda & Váňa l. c.); Tabulové skály (Podpěra 1906) – not revised by Duda & Váňa l. c.

Porella arboris-vitae

Červená hora (1879 leg. J. Paul – rev. Duda & Váňa 1978b).

Trichocolea tomentella

Velká kotlina (1937 leg. F. Otruba – rev. Duda & Váňa 1977b)

Anoetangium aestivum

Similarly as in the case of *Amphidium lapponicum*, the species has a relatively stable population at the rocks of Velká kotlina cirque but no other recent locality of the species is known in the country. Historical records exist from the Petrovy kameny rocks (leg. Sendtner – Milde 1862 ff., Kalmus 1867), the specimens were not found.

Anomodon attenuatus

Velká kotlina (Laus 1910); Vřesová studánka (Hruby 1914). Specimens not revised.

Anomodon longifolius

Velká kotlina (Laus 1910, Hruby 1914); Vřesová studánka (leg. F. Kern – Matouschek 1904). Specimens not revised.

Anomodon rugelii

Červená hora (leg. J. Paul – Šmarda 1952)

Anomodon viticulosus

Vřesová studánka (Hruby 1914, specimen not revised); Velká kotlina (leg. Podpěra – rev. Šnajdrová 1988).

Antitrichia curtispindula

Petrovy kameny (leg. Sendtner, Milde, Podpěra – Sendtner 1840, Milde 1869, Podpěra 1906); Velká kotlina (Laus 1910). Specimens not revised.

Bryum algovicum

Velká kotlina (Milde sec. Šmarda 1952, Laus 1910). Specimens not revised.

Bryum archangelicum

Velká kotlina (Podpěra 1907, Laus 1910); Tabulové skály (1946 leg. J. Šmarda sub *B. inclinatum*, BRNM! – rev. J. Kučera).

Bartramia halleriana

Velká kotlina (Milde 1854 ff., Reichardt 1858, Kolenati 1860, Hein 1874, Laus 1910). Specimens not revised.

Bryum bimum

Velká kotlina (Milde 1862 ff., Podpěra 1906). Specimens not revised.

Bryum funckii

Velká kotlina (Sendtner 1840). Specimen not revised.

Bryum intermedium

Velká kotlina (Milde 1856). Specimen not revised.

Bryum kunzei

Velká kotlina (Šmarda 1952). Specimen not revised.

Bryum turbinatum

Velká kotlina (Sendtner 1840, Milde 1869, Limpricht 1876, not seen; revised specimen from VK collected by J. Kurková 1974 (BRNM!, rev. J. Kučera).

Bryum uliginosum

Velká kotlina (Reichardt 1858, Milde 1856); Červená hora (leg. F. Schenk sec. Šmarda 1952). Specimens not revised.

Buxbaumia aphylla

Velká kotlina (Laus 1910). Specimen not revised.

Calliargon giganteum

Velká kotlina (leg. Podpěra 1904 – rev. B. Dvořáková (Dvořáková 1990); Šmarda 1950, not revised).

Calliargonella lindbergii

Velká kotlina (Kalmus 1867). Specimen not revised.

Campylophyllum halleri

Rocks below 'Vřesová studánka' (Podpěra 1906, Šmarda 1952). Specimens not revised.

Dicranella subulata

Ovčárna (Podpěra 1906 (PR! – rev. J. Kučera), Hruby 1914; 1912 leg. F. Schenk – BRNM! – rev. J. Kučera); Velká kotlina (Laus 1910 – not seen; 1934 leg. J. Otruba – BRNM! – rev. J. Kučera); Tabulové skály (Hruby 1914 – specimen not found)

Dicranodontium uncinatum

'Geschenke, an der Brünnelheide', ca. 1300 m (1884 leg. F. Kern – herb. BP! – rev. J. Kučera)

Dicranum elongatum

Petrovy kameny (leg. Sendtner sec. Kalmus 1867, specimen not found; leg. Podpěra – Podpěra 1906, specimen not found); Velká kotlina (Podpěra 1906; specimen not found); Vřesová studánka (leg. T. Hein sec. Kalmus 1867, specimen not found; leg. Hruby – Hruby 1914, specimen not found).

Drepanocladus aduncus

Velká kotlina (Sendtner 1840, Laus 1910); Petrovy kameny (Kalmus 1867). Specimens not revised.

Encalypta affinis

Velká kotlina (Sendtner 1840 – perhaps all later authors referring to that collection. The specimen was not found); Petrovy kameny (Sendtner 1840 – perhaps all later authors referring to that collection. The specimen was not found but there exists an unpublished specimen from the locality in BRNM, collected by A. Latzel in 1876, which was correctly identified).

Encalypta trachymitria

Velká kotlina (1904 leg. J. Podpěra – Podpěra 1906; specimen revised by Z. Soldán)

Eurhynchium crassinervium

Velká kotlina (1929 leg. J. Otruba (BRNM!), revised by J. Kučera)

Funaria hygrometrica

Velká kotlina (Laus 1910); Petrovy kameny; Vřesová studánka (Kalmus 1867); Červená hora (leg. J. Paul sec. Matouschek 1901). Specimens not revised.

Grimmia caespiticia

Velká kotlina (Limpricht 1876 – teste J. Kučera (leg. K.G. Limpricht 1870, BRNU!); allegedly also collected by Matouschek, Kern (Matouschek 1904), Podpěra (1906), Laus (1910) but no specimen was found. However, collected unconsciously by Pokluda (7.6.1964, BRNM!) as *G. alpestris*)

Grimmia elatior

Velká kotlina (Podpěra 1906 – teste J. Kučera (specimen in BRNM, coll. VII.1904); Petrovy kameny (Limpricht 1873 (coll. 1870, not revised), Podpěra 1906 – teste J. Kučera (coll. 1905 & 1906, specimens in BRNM), leg. R. Vaněk 1936 (BRNM!, teste J. Kučera), leg. J. Šmarda 1946 & 1947 (BRNM!, teste J. Kučera), J. Duda 1949 (OP!, teste J. Kučera), V. Pospíšil (BRNM!, teste J. Kučera)); Tabulové skály (1946 & 1947 leg. J. Šmarda (BRNM!, teste J. Kučera)); Vřesová studánka (1947 leg. J. Šmarda (BRNM!, teste J. Kučera))

Grimmia longirostris

Petrovy kameny (Limpricht 1876). Specimen not revised. Ecologically possible record despite the common misunderstanding of this taxon by older authors.

Hamatocaulis vernicosus

Velká kotlina (Schenk, coll. 1932, rev. T. Štechová – SLO!). Specimens to records of Sendtner 1840, Matouschek 1901, Laus 1910 were not found, the specimens to records from VK and from the slope below 'Petrovy kameny' of Podpěra (1906) belong to *Scorpidium cossonii* (PR!, rev. J. Kučera), similarly as in the case of the specimen from Kotlina na Jeseníku, VII.1904 coll. J. Podpěra, herb. PR – est *Scorpidium cossonii*, rev. J. Kučera; pod Peteršteinem [=Petrovy kameny] na Jeseníku, VIII.1904 coll. J. Podpěra, herb. PR – est *Scorpidium cossonii*, rev. J. Kučera.

Helodium blandowii

Velká kotlina, 1200 m, close to the stream (Podpěra 1906 ff.)

Hylocomium umbratum

Vřesová studánka (coll. J. Spatzier, Kalmus 1867; Milde 1869). Specimens not revised.

Hypnum callichroum

Vřesová studánka (Kolenati 1860, Milde 1861 ff.); Velká kotlina (Kolenati 1860). Specimens not revised.

Hypnum revolutum

Petrovy kameny (Sendtner 1840, Kalmus 1867). The revision of Sendtner's specimen in herb. M (rev. J. Kučera) proved the correct identification, the plants however belong to var. *dolomiticum*. The specimen of Kalmus was not found.

Lescuraea saxicola

Petrovy kameny (leg. Kern 1884 sec. Podpěra 1906). Podpěra's specimen from the locality, collected 1912 (PR!, rev. J. Kučera), belongs nevertheless to *Brachythecium populeum*.

Leucodon sciuroides

Petrovy kameny (Kalmus 1867, Milde 1869). Specimens not revised.

Mnium hornum

Tabulové skály (1937 leg. J. Otruba – rev. V. Pospíšil (Pospíšil 1981)).

Mnium spinulosum

Velká kotlina (Laus 1910, Hruby 1914; 1934 leg. J. Otruba – rev. V. Pospíšil (Pospíšil 1981)); Červená hora (Milde 1869, Kalmus & Niessl 1871, Juratzka 1882, Podpěra 1906). Podpěra's specimen revised by Pospíšil (Pospíšil 1981).

Neckera complanata

Velká kotlina (Laus 1910); Petrovy kameny (Šmarda 1952). Specimens not revised.

Orthotrichum alpestre

Velká kotlina (Podpěra 1906, Laus 1910). Podpěra's specimen revised by Vondráček (Vondráček 1993). The species was recently confirmed at a nearby locality at the altitude of 880 m a.s.l. (Plášek 2007).

Orthotrichum rupestre

Petrovy kameny (Milde 1856, Podpěra 1906); Velká kotlina (Hein 1874, Podpěra 1906 revised by Vondráček (Vondráček 1993), Laus 1910). Other specimens not revised.

Orthotrichum speciosum

Červená hora (Matouschek 1901), Vřesová studánka (Kalmus 1867, Milde 1869, Hein 1874, Hruby 1914; Podpěra's collection from 1904 identified by Vondráček (1993)); Petrovy kameny (Limpricht 1876); Velká kotlina (Matouschek 1901, Laus 1910, Hruby 1914; Schenk's collection from 1933 identified by Vondráček (1993)).

Orthotrichum stramineum

Velká kotlina (Laus 1910, Hruby 1914); Vřesová studánka (Matouschek 1904, Hruby 1914), Červená hora (leg. J. Paul 1879 – revised by Vondráček (1993); Matouschek 1901).

Paludella squarrosa

Velká kotlina (1936 leg. R. Leidolf – revised by Soldán (Soldán 1987)).

Platyhypnidium riparioides

Velká kotlina (Milde 1854 ff., Laus 1910). Specimens not revised.

Pohlia ludwigii

Petrovy kameny, Ovčárna (Juratzka 1882); Velká kotlina (Limpricht 1876, Juratzka 1882). Specimens not revised. The records were regarded somewhat improbable but recently Zmrhalová (2005) confirmed the occurrence of the species at the nearby locality in the valley of Bílá Opava.

Pseudoleskeella catenulata

Above Vřesová studánka (Šmarda 1952); Petrovy kameny (Šmarda 1952); Velká kotlina (Limpricht 1876, Laus 1910, Šmarda 1952). Specimens not revised.

Ptychodium plicatum

Velká kotlina (Podpěra 1906 ff., Laus 1910). Specimens not revised.

Rhabdoweisia crispata

Malá kotlina (Matouschek 1901); Velká kotlina (Kolenati 1860, Milde 1854; none of these specimen could be revised, however a specimen of *Rh. crispata* was found in the collection of J. Kurková from 1974, identified as *Trichostomum tenuirostre*).

Scorpidium revolvens

Malá kotlina (Podpěra 1908, Šmarda 1952); Velká kotlina (Milde 1862, Podpěra 1908, Laus 1910, Hruby 1914, Šmarda 1952). Specimens not revised, probably misidentifications for *S. cossonii*, still occurring at the localities.

Serpoleskea subtilis

Červená hora (leg. J. Paul – Matouschek 1902, Šmarda 1952); Velká kotlina (Laus 1910). Specimens not revised.

Sphagnum contortum

Malá kotlina (Duda 1950). Specimen not revised.

Sphagnum magellanicum

Velká kotlina – „am Grunde des Grossen Kessels“ (Hruby 1914). Specimen not revised.

Sphagnum rubellum

Velká kotlina – (Šmarda 1949 ff.). Specimen not revised.

Tomentypnum nitens

Malá kotlina (Šmarda 1950); Velká kotlina (Podpěra 1906, Hruby 1914, Šmarda 1952). Specimens not revised.

Tortula obtusifolia

Velká kotlina (coll. Podpěra sec. Šmarda 1952). Specimen not found.

Ulota bruchii

Vřesová studánka; Velká kotlina (Matouschek 1901, Podpěra 1906, Hruby 1914, Šmarda 1952). Specimens not revised.

Ulota crispa

Vřesová studánka (Hruby 1914); Velká kotlina (Laus 1910, Hruby 1914). Specimens not revised.

Warnstorfia fluitans

Vřesová studánka (Kalmus 1867, Milde 1869); Velká kotlina (Matouschek 1902, Laus 1910, Šmarda 1952). Specimens not revised.

b) doubtful records

Anastrophyllum saxicola

Velká kotlina (Kessel), coll. J. Spatzier (Kalmus & Niessl 1871), Praděd (Kolenati 1860). Doubtful records (already noted by Šmarda 1952), the specimens were never found (Duda & Váňa 1983a).

Cephalozia connivens

Sněžné jámy (Matouschek 1904, Podpěra 1906). Specimens not found (Duda & Váňa 1988), the record is ecologically doubtful.

Jamesoniella autumnalis

Velká kotlina (coll. J. Spatzier, Kalmus & Niessl 1871). Specimen not found, with respect to the author not a very probable record.

Lophozia bicrenata

Velká kotlina (Hruby 1914) – no specimen found (Duda & Váňa 1993), the record may be regarded doubtful with respect to the author.

* *Bryum erythrocarpum* Schwägr.

Velká kotlina (Milde 1856 ff.). Unfortunately it is impossible without a revision to assign the record to any of the currently recognized taxa from the complex.

Andreaea rupestris var. *papillosa* (Lindb.) Podp.

Above 'Vřesová studánka' (Podpěra 1906). Doubtful record (nearly certainly not corresponding with the current understanding of the taxon), specimens not found.

Atrichum undulatum var. *gracilisetum*

Velká kotlina (Laus 1910). Records of Podpěra (1906) refer to the valley below the cirque. Specimens not revised.

Brachythecium campestre

Petrovy kameny (Šmarda 1952). Doubtful record, specimens not revised.

Brachythecium laetum

Velká kotlina (Laus 1910). Doubtful record, specimens not revised.

Bryum dichotomum

Velká kotlina (Milde 1869 sub *Bryum atropurpureum* Bruch & Schimp.). Specimen not revised but the historical understanding of the illegitimate *Bryum atropurpureum* was commonly not identical with the modern understanding of *B. dichotomum*.

Campyliadelphus chrysophyllus

Velká kotlina (leg. Šmarda 1964 – rev. M. Meixnerová (Meixnerová 1990)). Doubtful record, specimen not revised.

Cnestrum alpestre

Petrovy kameny (Milde 1863 ff.); Velká kotlina (Heufler 1857, Kolenati 1860). Very doubtful records, specimens not found.

Dicranoweisia cirrata

Petrovy kameny (Podpěra 1906). Specimen not revised, ecologically very improbable record.

Dicranum fulvum

Velká kotlina (Laus 1910). Specimen not revised, ecologically very improbable record.

Dicranum spurium

Velká kotlina (Laus 1910). Specimen not revised, ecologically very improbable record.

Eurhynchium speciosum

Velká kotlina (Milde 1856). Specimen not revised, ecologically improbable record.

Fontinalis squamosa

'Moraquellen im Kessel' (Kolenati 1860). Specimen not revised. The record seems to be ecologically possible but many of the other records of this author are extremely improbable and no other author ever reported this species from the cirque.

Grimmia laevigata

Petrovy kameny (Šmarda 1952). Specimen not revised, ecologically very improbable record.

Hookeria lucens

Vřesová studánka (Hein 1874). Specimen not revised, with respect to the author a very doubtful record.

Hygrohypnum alpestre

Velká kotlina (Milde 1862, Kalmus 1867). The Milde's record of the species is the only one from the Czech Republic. Unfortunately, the specimens were never found and therefore not revised, the occurrence of the species in the Hrubý Jeseník Mts. does not seem to be very probable. Therefore the species has been excluded from our bryoflora by Kučera & Váňa (2003).

Hypnum fertile

Velká kotlina (Laus 1910). Doubtful record with respect to the author.

Hypnum vaucheri

Petrovy kameny (Milde 1869). Specimen not revised, ecologically very improbable record.

Kiaeria falcata

Doubtful records from Petrovy kameny (Kolenati 1860), Tabulové skály (Kolenati 1860, Podpěra 1906) and Velká kotlina (Sendtner 1840, Laus 1910, Milde 1861 ff.), which could not be verified, as the specimens have probably been lost. The revision of existing specimens (e.g. collections of Podpěra (1904, PR) from Petrovy kameny and Velká kotlina, rev. J. Kučera) proved the misidentification for *Dicranella heteromalla*, records of Kolenati and Laus are generally regarded as little credible and the Sendtner's and Milde's collections have unfortunately not been found.

Meesia uliginosa

Vřesová studánka (Hein 1874). Very doubtful record, specimen not revised.

Mnium blyttii

Petrovy kameny (Limpricht 1883 (collected 1870), Podpěra 1906); Velká kotlina (Šmarda 1952). Specimens not found, doubtful records.

Molendoa sendtneriana

Velká kotlina (Podpěra 1906, Šmarda 1952). Šmarda's collection (BRNM!, rev. J. Kučera) belongs to *Gymnostomum aeruginosum*, Podpěra's specimens have probably been lost.

Neckera pennata

Velká kotlina (1904 leg. J. Podpěra – det. by O. Kafková (Kafková 1988)). Specimen not revised by us, the occurrence is nevertheless regarded as doubtful.

Oncophorus virens

Velká kotlina (Kolenati 1860); Vřesová studánka, by the way to the Červenohorské sedlo (Hein 1874). Very doubtful records, specimens were never found. The occurrence of the species in the Czech Republic has never been credibly proven; hence it was excluded from our flora by Kučera & Váňa (2003).

Orthotrichum affine

Petrovy kameny (Limpricht 1876). Specimen not revised, the occurrence of this species at the site seems to be nevertheless doubtful.

Orthotrichum striatum

Vřesová studánka (Hruby 1914); Velká kotlina (Laus 1910). Specimens not revised, the record may be regarded doubtful with respect to the author.

Paraleucobryum sauteri

Velká kotlina (Laus 1910). Doubtful record, specimen not found.

Philonotis marchica

Velká kotlina (Kolenati 1860, cited by Milde 1861). Specimens not revised, ecologically improbable occurrence, doubtful record with respect to the author.

Pohlia obtusifolia

Petrovy kameny (Podpěra 1906); Tabulové skály (Šmarda 1954); Velká kotlina (Laus 1910, Podpěra 1906, Šmarda 1952). Specimens not found. With respect to the ecology and the misidentification of the taxon by Podpěra in other case (specimen from Mt Vozka), the record may be regarded as doubtful. Šmarda adopted probably the same concept of the taxon as Podpěra, and the records of Laus are regarded generally doubtful.

Pseudocalliergon lycopodioides

Velká kotlina (Milde 1854 ff., Laus 1910). Specimens not found, with respect to ecology a very improbable record.

Pylaisia polyantha

Velká kotlina (Hruby 1914, Laus 1910). Specimens not revised, the records are very improbable with respect to the authors and ecology.

Racomitrium heterostichum

Vřesová studánka (Hein 1874, Limpricht 1876, Milde 1869, Vězda 1955); Malá kotlina (leg. A. Zdenek – Matouschek 1901); Velká kotlina (Kalmus 1867 (leg. J. Spatzier), Hein 1874, Limpricht 1876, Milde 1869, Podpěra 1906, Laus 1910); Tabulové skály (Podpěra 1906) Specimens not revised, probably belonging to other species of *R. heterostichum* agg. (*R. sudeticum* or *R. microcarpon*).

Scorpidium scorpioides

Petrovy kameny (Podpěra 1906); Velká kotlina (Podpěra 1906, Laus 1910). Specimens not revised, improbable records.

Sphagnum cuspidatum

Velká kotlina – „Heide rechts von den Kesselfelsen“ (Hruby 1914). Specimen not revised, with respect to the ecology and author an improbable record.

Sphagnum riparium

Velká kotlina – (Podpěra 1913, „Heide rechts von den Kesselfelsen“, Hruby 1914). Specimens not revised.

Syntrichia montana

Vřesová studánka (Matouschek 1904); Petrovy kameny (Limpricht 1876, Matouschek 1904). Specimens not revised, extremely improbable record.

Syntrichia sinensis

Petrovy kameny (Sendtner 1840). Specimen not found, even in herb. M. Ecologically extremely improbable record (moreover the only one from the Czech Republic), the misidentification is possible for *S. norvegica* (not yet recorded from the Hrubý Jeseník Mts.) or a form of *S. ruralis*.

Tayloria splachnoides

Velká kotlina (Kolenati 1860). Specimen not revised. The historical occurrence in the cirque is possible, however Kolenati's records are regarded extremely doubtful and the specimens were never found.

Tortella inclinata

Velká kotlina (Milde 1856). Specimen not revised, ecologically a rather improbable record.

Trematodon ambiguus

Velká kotlina (Kolenati 1860). Specimen not revised, ecologically a rather improbable record and moreover Kolenati's records are regarded very doubtful.

Ulota coarctata

Červená hora (Matouschek 1904); Vřesová studánka (Hruby 1914); Velká kotlina (Laus 1910, Hruby 1914). Specimens not found, with respect to the authors doubtful records.

Weissia brachycarpa

Vřesová studánka, Velká kotlina (Šmarda 1952). Specimens not revised, ecologically a rather improbable record.

Historically reported species excluded from the studied sites of Hrubý Jeseník

In this category, we are reporting species that could be excluded from the particular site after the revision of respective specimens. Some of the species could, however, be found elsewhere (see the above categories).

Calypogeia neesiana

Hrubý Jeseník: cat. rivi Bílá Opava, 8.7.1946 coll. J. Šmarda, herb. BRNM – est *Calypogeia integristipula*, rev. J. Duda (Duda & Váňa 1987); Hrubý Jeseník: mons Velký Klínovec, VII.1947 coll. J. Šmarda, herb. BRNM – est *Calypogeia integristipula*, rev. J. Duda (Duda & Váňa 1987); Hrubý Jeseník: Vřesová Studánka, VII.1947 coll. J. Šmarda, herb. BRNM – est *Calypogeia integristipula*, rev. J. Duda (Duda & Váňa 1987).

Cephaloziella varians

Hrubý Jeseník: Velká kotlina, 2.9.1971 coll. J. Váňa, herb. Váňa – est *Cephaloziella grimsulana* (Duda 1978); Velká Kotlina, VII.1947 coll. J. Šmarda, herb. BRNM – est *Cephaloziella grimsulana* (Duda 1978).

Gymnomitrium obtusum

Hrubý Jeseník: Tabulové skály, 8.7.1946 coll. J. Šmarda, herb. BRNM – est *Gymnomitrium corallioides*, rev. J. Váňa (Duda & Váňa 1979); Hrubý Jeseník: Vozka, 20.7.1946 coll. J. Šmarda, herb. BRNM – est *Gymnomitrium corallioides*, rev. J. Váňa (Duda & Váňa 1979).

Lophozia floerkei

Hrubý Jeseník: loc. Vřesová studánka, 2.7.1946 coll. J. Šmarda, herb. BRNM – est *Lophozia hatcheri*, rev. J. Duda (Duda & Váňa 1984b); Hrubý Jeseník: loc. Vřesová studánka, VI.1906 coll. J. Podpěra, herb. PR – est *Lophozia hatcheri*, rev. J. Duda (Duda & Váňa 1984b); Hrubý Jeseník: m. Červená hora, VI.1906 coll. J. Podpěra, herb. PR – est *Lophozia hatcheri*, rev. J. Duda (Duda & Váňa 1983c); Hrubý Jeseník: m. Vysoká hole, 12.7.1946 coll. J. Šmarda, herb. BRNM – est *Lophozia hatcheri*, rev. J. Duda (Duda & Váňa 1983c); Hrubý Jeseník: Petrovy kameny, 7.8.1946 coll. J. Šmarda, herb. BRNM – est *Lophozia hatcheri*, rev. J. Duda (Duda & Váňa 1984b); Hrubý Jeseník: rupes Tabulové kameny, VI.1906 coll. J. Podpěra, herb. PR – est *Lophozia hatcheri*, rev. J. Duda (Duda & Váňa 1983c); Hrubý Jeseník: rupes Tabulové kameny, VI.1906 coll. J. Podpěra, herb. PR – est *Lophozia hatcheri*, rev. J. Duda (Duda & Váňa 1984b); Hrubý Jeseník: Velká kotlina, 19.4.1910 coll. J. Hruby, herb. BRNM – est *Tritomaria quinquentata*, rev. J. Duda (Duda & Váňa 1982); Hrubý Jeseník: Velká kotlina, VII.1904 coll. J. Podpěra, herb. PR – est *Lophozia hatcheri*, rev. J. Duda (Duda & Váňa 1983); Hrubý Jeseník: Velká kotlina, 31.7.1949 coll. J. Šmarda, herb. BRNM rev. J. Duda (Duda & Váňa 1983c) – est *Lophozia quadriloba* (rev. J. Váňa 2003); dtto, 14.8.1962 coll. J. Váňa, herb. Váňa (rev. J. Duda sub *L. floerkei* (Duda & Váňa 1983c) – est *Lophozia quadriloba* (rev. J. Váňa 2003); The specimen from „m. Praděd, Hungerwiese“, 1860 coll. F.A. Kolenati, BRNU (rev. J. Duda (Duda & Váňa 1983c) is however probably correctly identified.

Lophozia wenzelii

Hrubý Jeseník: dev. Jiřfho chata prope vicum Vidly, 1.5.1948 coll. A. Vězda, herb. OP – est *Lophozia sudetica*, rev. J. Hubáčková & J.Váňa (Duda & Váňa 1992); Hrubý Jeseník: turf. in m. M. Jezerník, VII.1947 coll. J. Šmarda, herb. BRNM – est *Lophozia longiflora*, rev. J. Hubáčková & J. Váňa (Duda & Váňa 1992); Hrubý Jeseník: Velká kotlina, 21.7.1949 coll. J. Šmarda, herb. BRNM – est *Lophozia bantriensis*, rev. J. Hubáčková & J.Váňa (Duda & Váňa 1992); Hrubý Jeseník: Velká kotlina, 31.7.1949 coll. J. Šmarda, herb. BRNM – est *Lophozia bantriensis*, rev. J. Hubáčková & J.Váňa (Duda & Váňa 1992).

Mannia fragrans

Hrubý Jeseník: vallis Velká kotlina, VIII.1905 coll. J. Podpěra, herb. PR – est *Asterella gracilis*, rev. J. Váňa (Duda & Váňa 1974a).

Odontoschisma sphagni

Vřesová studánka (coll. J. Spatzier, Kalmus & Niessl 1871), Mt Praděd (coll. J. Spatzier, Kalmus & Niessl 1871, coll. Podpěra, Podpěra 1906); Velká kotlina (coll. Kern 1874, Matouschek 1904). Although the specimens were not found (Duda & Váňa 1976), the occurrence of the species can quite safely be excluded based on the known ecology and distribution.

Pleurocladula albescens

Petrovy kameny, Tabulové skály (Kolenati 1860). Specimens were not found but the records (the only known from the Czech Republic) are regarded extremely doubtful with respect to the author, the species' known ecology and distribution, therefore the species was excluded from our bryoflora by Kučera & Váňa 2003.

Arctoa fulvella

Bründelhaide na Jeseníku [=Vřesová studánka], VI.1906 coll. J. Podpěra, herb. PR – est *Blindia acuta*, rev. J. Kučera; Peterstein im Gesenke [=Petrovy kameny], VII.1907 coll. J. Podpěra, herb. PR – est *Blindia acuta*, rev. J. Kučera; Peterstein [=Petrovy kameny], VIII.1905 coll. J. Podpěra, herb. PR – est *Dicranoweisia crispula*, rev. J. Kučera; summo montis Fuhrmannstein [=Mt Vozka], VII.1905 coll. J. Podpěra, herb. PR – est cf. *Ditrichum heteromallum*, rev. J. Kučera; Vysoké Jeseníky: Kolštýn: v údolí Branné, VII.1947 coll. J. Šmarda, herb. BRNM – est *Dicranella heteromalla*, rev. J. Kučera; Vysoké Jeseníky: Velká kotlina, 12.7.1946 coll. J. Šmarda, herb. BRNM – est *Kiaeria starkei*, rev. J. Kučera.

Bryum neodamense

Vys. Jeseníky: Velká Kotlina: prameniska nad skalami, 12.7.1946 coll. J. Šmarda, herb. BRNM – est *Bryum weigelii*, rev. J. Kučera.

Didymodon spadiceus

Hrubý Jeseník: Velká kotlina, VII.1947 coll. J. Šmarda, herb. BRNM – est *Amphidium mougeotii*, rev. J. Kučera.

Gymnostomum calcareum

Hr. Jeseník: Velká kotlina, 12.7.1946 coll. J. Šmarda, herb. BRNM – est *Gymnostomum aeruginosum*, rev. J. Kučera; Vys. Jeseníky: v údolí Tiché Desné, JV kóty 621, VII.1946 coll. J. Šmarda, herb. BRNM – est *Gymnostomum aeruginosum*, rev. J. Kučera.

Plagiobryum demissum

Velká kotlina (Šmarda 1952). The revision of the corresponding specimen proved the misidentification for *P. zieri*, therefore the species was excluded from our bryoflora (Váňa 1998).

Racomitrium ericoides

Gesenke: am Hausberg gegen die Schweizerei [=Švýčárna], 30.8.1887 coll. J. Paul, herb. BRNM – est *Racomitrium elongatum*, rev. J. Kučera; Hr. Jeseník: Velká kotlina, VII.1947 coll. J. Šmarda, herb. BRNM – est *Racomitrium elongatum*, rev. J. Kučera; Jeseníky: na lesní cestě poblíž Františkovy myslivny, VII.1947 coll. J. Šmarda, herb. BRNM – est *Racomitrium elongatum*, rev. J. Kučera.

Syntrichia virescens

Petrovy kameny (Milde 1871; specimen not found. The collection reported by Pospíšil (1987) belongs to *S. ruralis* (BRNM!, rev. J. Kučera). The specimen from Velká kotlina (leg. Podpěra (Pospíšil 1987)) has not been revised but probably again the misidentification for a small form of *S. ruralis*.

Trichostomum crispulum

Kotlina na Jeseníku, VI.1906 coll. J. Podpěra, herb. PR – est *Weissia* sp., rev. J. Kučera.

Discussion

The results of floristic surveys are generally difficult to compare with other data, provided that the authors and surveyed localities are not identical, which is nearly always the case. Our survey in 2001–2003 was the first systematic inventory of the bryologically most attractive localities in the summit areas of the Hrubý Jeseník Mts., despite the tremendous amount of earlier bryofloristic records, which nevertheless never intended to survey evenly the localities, paying attention to both rare and common species and recording their abundance. Any remarks on the size of populations and more precise specification of site conditions are extremely rare in earlier literature until present. Hence we can mostly compare only the presence/absence data, and even this with many considerations: in case of the more common species, we have at best a general report on occurrence in the region. Some bryophyte groups of taxa were either not recognized at all earlier (*Schistidium apocarpum* agg., *Pohlia annotina* agg.) or were intentionally or unconsciously omitted or overlooked by some authors (notably omitted were the records of hepatics by many earlier bryologists).

Among individual records, three of the recorded taxa (*Haplomitrium hookeri*, *Mnium lycopodioides*, *Pseudoleskeella tectorum*) were believed to be extinct in the red lists existing prior to the survey (Váňa 1993, 1995). *Mnium lycopodioides* proved to be a rather widely scattered taxon in our country, which led to the downgrading of its threat status to Lower Risk in the last evaluation (Kučera & Váňa 2005). Both *Haplomitrium hookeri* and *Pseudoleskeella tectorum* are very rare bryophytes in Central Europe outside the Alps, although their localisation is notably difficult due to their inconspicuous nature. They can easily be overlooked or perhaps even misidentified in the latter case for some common species including *Amblystegium serpens*.

Comparing the species numbers at individual localities, and comparison with the numbers assessed at the surveyed localities of the Krkonoše Mts. (Kučera 2004a,b), we can confirm the extreme bryofloristic richness of the Velká kotlina cirque, with nearly 320 recently found, and at least 400 historically occurring bryophyte taxa. The richest localities of the Krkonoše Mts. (cirques at Mt Kotel and in the Labský důl valley), fully comparable in area, yielded about 290, respectively 270, recently found taxa, and some 300 records with

inclusion of the historical ones. On the other hand, we were able to show that the difference in the floristic richness between the Velká kotlina of the Hrubý Jeseník Mts. and the cirques of the Krkonoše Mts. is by far not as big as reported earlier. The historical sources reported some 200 taxa from the cirque of the Krkonoše Mts.; our compilation yielded 330 species from the Velká kotlina. This difference can to a certain extent be attributed to the by far better historical record, and a considerable amount of erroneous and doubtful records, in the Velká kotlina. Nevertheless, the position of the richest locality remains with the reasons only partly known – we can speculate about the co-action of “ideal” substrate (base-rich calcareous phyllites, providing locally both acid, neutral and base-rich conditions), variety of microtopographical conditions, and perhaps also the somewhat lower altitude, and the site history, which included more stable and less severe conditions in the Hrubý Jeseník Mts. The importance of microtopography and its diversity for the floristic richness can be demonstrated in the ideal way in the comparison between Velká and Malá kotlina. Both localities are situated on the same mountain ridge at the nearly identical altitude, are comparably large, with the identical aspect, and geological substrate. Yet the Malá kotlina has only slightly over two thirds of the species number found in the Velká kotlina (compared are the recent numbers, due to the very different historical record), less than any of the cirques in the Krkonoše Mts. Here the only obvious difference is the paucity of rock habitats, which probably accounts for the absence of nearly a hundred species. A still smaller variety in microtopography and only acidic substrates account for again drastically less recorded species in the Sněžné strže ravines (136 recently recorded bryophyte taxa, i.e. not even two thirds of the record of the Malá kotlina, and 43% of the record of the Velká kotlina). The recent bryophyte richness at individual sublocalities ranged between 103 and 204 (mostly 130 – 150) in the Velká kotlina, between 76 and 140 (mostly between 80 and 110) in Malá kotlina, and between 48 and 98 in the Sněžné strže (two of the three ravines had 96 and 99 species). Compared to the localities of the Krkonoše Mts. (between 45 and 162 species at the sub-localities of Mt Kotel, 89 – 172 species at those of the Labský důl valley, and between 81 and 157 at the sub-localities of the Úpská jáma cirque), we can see that the richness at smaller units is very similar, though again mostly somewhat higher in the Velká kotlina.

An attempt at comparison of our bryofloristic data with earlier records is presented in Fig. 4, compiled after individual localities. Mt Červená hora (summit region and their north-western slopes above Vřesová studánka) had to be united with the Sněžné strže ravines on the eastern slopes, and the rock formation of Petrovy kameny had to be united with the eastern slope beneath it towards Ovčárna, due to the commonly not distinguished historical records. The graphs show the degree of historical bryofloristic exploration and the proportion of vanished taxa, which both are obviously very different at the studied localities. While this situation is relatively similar in the Velká kotlina cirque and at Mt Červená hora, with roughly one half of the species pool being confirmed at the sites, one quarter of being found new (with a significant proportion of taxa with likely historical occurrence), and one quarter being non-retrieved, the bryoflora of the Malá kotlina cirque consists of 80% of newly recorded taxa and only 4% non-retrieved, showing its fundamental under-exploration in the past. Just on the opposite side lies the summarization for the Petrovy kameny rocks and slopes beneath, where 56% of their historical bryoflora was not retrieved, showing the alarming degradation of their earlier bryoflora. It needs to be admitted that our intensity of survey at the Petrovy kameny rocks and their surroundings was somewhat lower than at other sites, which might account for a part of non-retrieved species, but we do not believe that the overall picture would be significantly different after the additional survey. The comparison with our survey at the localities in the Krkonoše Mts. (Kučera et al. 2004a, b) shows a very similar percentage of confirmed species at the historically relatively well-known localities Velká kotlina and Červená hora in the Hrubý Jeseník Mts., and Mt Kotel and the cirques of the Labský důl valley in the Krkonoše Mts. A smaller proportion of newly recorded species and a larger proportion of non-retrieved species and doubtful records in the Hrubý Jeseník Mts., show a better

historical surveillance of the Jeseník localities, and perhaps larger changes in the bryoflora of the Hrubý Jeseník Mts. The extreme differences in the newly recorded and non-retrieved taxa in the Malá kotlina cirque, and at the Petrovy kameny rocks and slopes, have no comparable counterpart in the surveyed localities of the Krkonoše Mts. The percentage of non-retrieved taxa in the Velká kotlina and Červená hora roughly equals that of the bryoflora of Mt Sněžka in the Krkonoše Mts., where we described a relatively high negative anthropic impact, which together with the the adverse effect of climatic warming in the last 150 years caused to a large extent the documented loss on the bryophyte taxa. We can argue that despite the same percentage of non-retrieved taxa at these two localities of the Hrubý Jeseník Mts., the real loss of taxa and the influence of global warming or anthropic impact is smaller because of the better historical knowledge of the Jeseník's flora. Moreover it is probable that a higher number of reported taxa from the Jeseník localities were misidentified. On the other hand, the loss of bryophyte taxa at the Petrovy kameny rock formation compared to the historical state is indeed alarming. If we look at the non-retrieved taxa, there is a significant proportion of arctic-alpine taxa that probably vanished due to the shift in climatic conditions along with the huge anthropic impact (e.g. at Petrovy kameny *Amphidium lapponicum*, *Anoetangium aestivum*, *Cynodontium gracilescens*, *Cynodontium tenellum*, *Dicranum elongatum*, *D. spadiceum*, *Encalypta affinis*, *Grimmia elatior*, *Hypnum revolutum* var. *dolomiticum*, *Isopterygiopsis muelleriana*, *I. pulchella*, *Lescurea saxicola*, *Myurella julacea*, *Pohlia elongata* subsp. *polymorpha*, *P. longicollis*, *Tortula hoppeana* – to name just those, which historical occurrence we consider to be probable or is evidenced by the herbarium specimens).

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Note added in proof: The specimen No. 4454 collected by Blanka Shaw (Buryová) considered as *Sphagnum auriculatum* was later identified as *Sphagnum contortum* (rev. Jonatan Shaw).

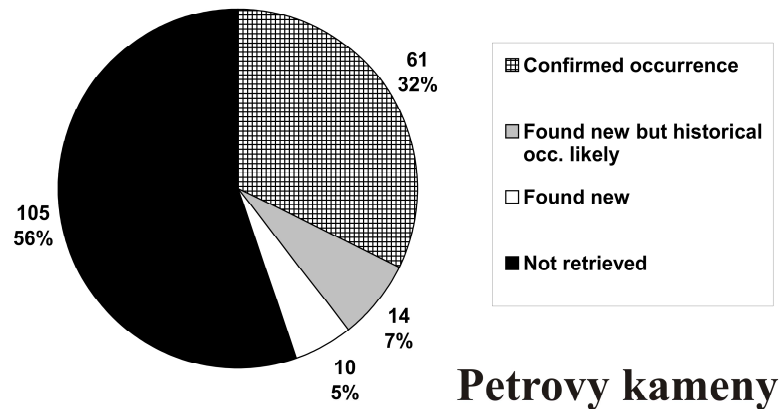
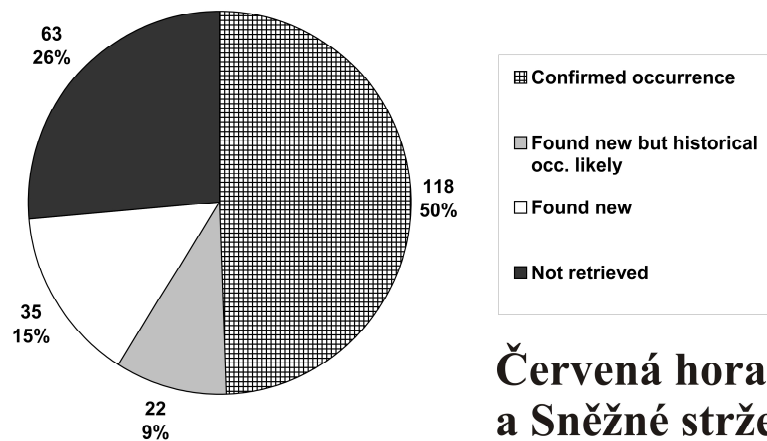
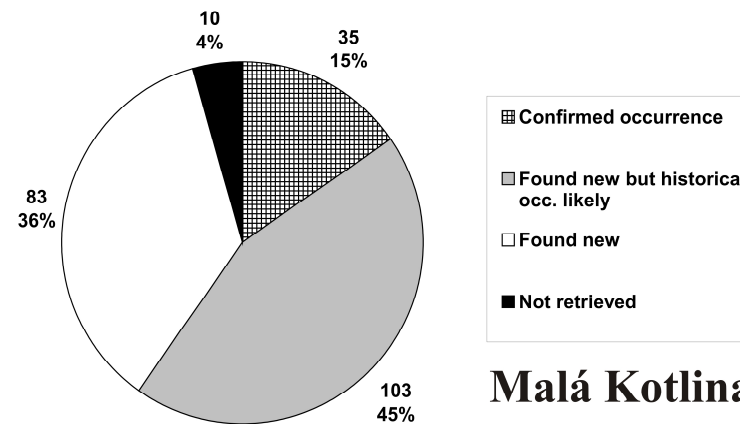
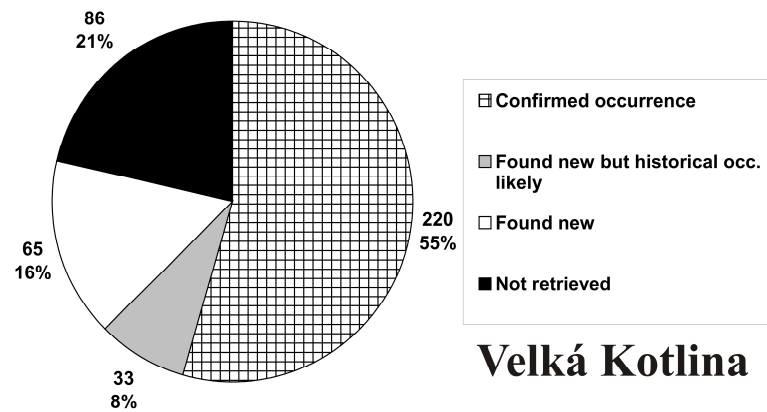


Fig. 4. Comparison of historical records with our data based on the presence of the taxa. Doubtful records and proven misidentification are excluded from the historical data.

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