

BRYOFLORESTIC SURVEY OF THE SUMMIT
REGION OF THE EASTERN GIANT MTS.
(CZECH REPUBLIC)

Bryofloristický průzkum vrcholových partií východních
Krkonoš

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ABSTRACT

322 bryophyte taxa have been recorded during the 13-day bryofloristic inventory of the Czech part of summit region of the Eastern Giant Mts., carried out in 1998–2000. The results were compared with the voluminous historical record and partial herbarium revision. *Racomitrium macounii* subsp. *macounii* is reported for the first time from the Czech Republic, *Mnium ambiguum*, considered extinct from our flora, has been re-found. Site details for the most important finds are presented in addition to the complete list of taxa found during the survey on the 15 study sites. The changes in the bryoflora with respect to the historical record are briefly discussed.

Keywords: bryophytes, inventory, Red List, *Racomitrium macounii*, *Mnium ambiguum*, Giant Mts.

INTRODUCTION

The Giant Mts. belongs to the bryofloristically best-explored mountain ranges in Europe. Indeed, several species have been described from here in the very beginning of the scientific bryology at the turn of 18th and 19th centuries. The first more numerous records of interesting bryophyte species go back to Nees von Esenbeck and Flotow (1830s) but the “golden time of bryofloristics” started first with the surveys of Milde and Limpricht in 1850s to 1870s (Limpricht made his excursions more or less equally on the Czech and Polish side of the range, whereas Milde confined his research mainly to the Polish side) and continued with those of Cypers (1880–1920s), Schiffner and Velenovský (1890–1900s), who all collected mainly on the Czech side of the range. Vilhelm, Kavina, Kern, Wihan, Bauer and some other bryologists collected in the area in the first two decades of the 20th century in smaller extent. Since then, the surveys become scarcer, the most important having been those of Futschig (late 1930s, early 1940s and several excursions in 1960s) and Pilous (from the late 1940s to the end of 1950s, later collections have neither been published nor made available in public herbaria). An account on the historical survey of mosses in the Giant Mts. summarizes PILLOUS (1968), the relevant data for liverworts can be taken from DUDA (1967). Later FUTSCHIG (1966), VÁŇA (1967) and FUTSCHIG & VÁŇA (1969) published interesting bryofloristic records from the whole mountain range and HADAČ & VÁŇA (1967, 1969, 1972) included some interesting data in their accounts on spring and mire communities of the area. No further bryofloristic data have been published from the Czech side of the mountains, as far as we are aware. The bryofloristic survey of the Giant Mts. in fact never stopped but rather has remained unpublished, as in the case of J. Váňa, and more recently of P. Hájek (University Hradec Králové), who investigated the limestone and porphyry localities of the mountains.

Our survey started in 1998 as a bryophyte inventory carried out in the Úpská jáma cirque and its immediate surroundings, all on the Czech side of the range. Since then, we spent some 13 days on the field survey in the area of interest, which is described below. This inventory, though yet very limited in

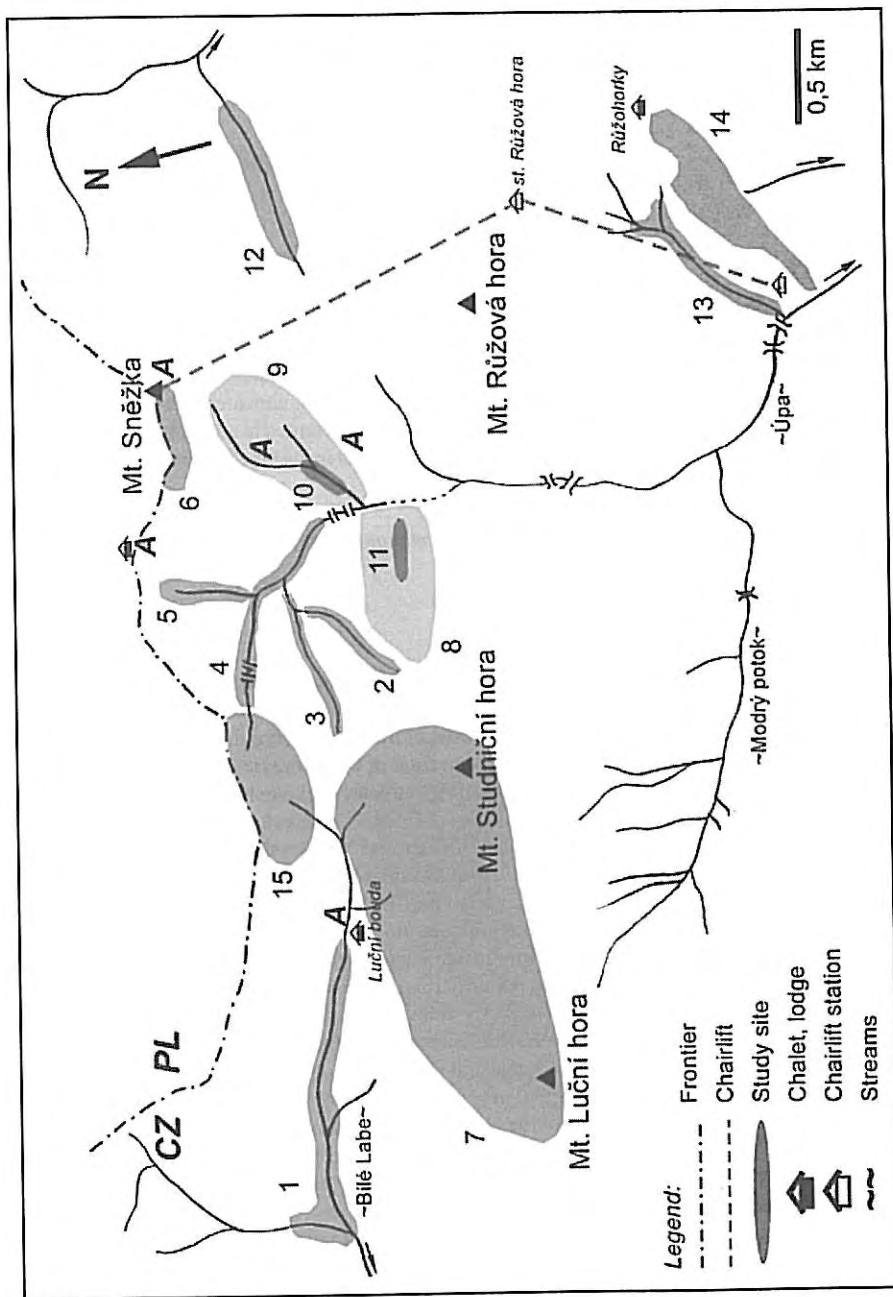


Fig. 1: Line sketch drawing of the investigated area
Náchý zkoumané oblasti

time and spatial extent, is the first of its kind in the Giant Mts. and definitely the first to claim the completeness of survey in the sense that the effort was exerted to make the taxa inventory lists as complete as possible. This is a rather strict difference from the historical record, as the floristics in the past usually comprised only species interesting to the authors. On the other hand, the literature search and revision of historical herbarium specimens is still incomplete for mosses, whereas the hepatics have been historically treated in the comprehensive series of Duda and Váňa (see below).

MATERIAL AND METHODS

The investigated area comprises about 8 km² (see map in Fig. 1). The 15 study sites (described below in Table 1 and depicted in Fig. 1) typically represent a several-hundred-metres long and several metres wide strip surveyed during one day of field work; some of them (sites No. 6, 10 and 11) were visited

Table 1: Description of the studied sites

No.	Study site	Altitude (m a.s.l.)	Description
1	Valley of Břlé Labe, uppermost part above the confluence with Stříbrná bystřina	1250–1420	W-facing brook valley principally above the treeline with numerous spring sites and sloping bogs on granites
2	Úpská jáma glacier cirque; valley of Lavinový potok	1050–1450	various habitats along the streams in the
3	Úpská jáma glacier cirque; valley of Sněžná strouha	1050–1350	glacier cirque, most notably numerous
4	Úpská jáma glacier cirque; valley of Úpa	1000–1370	spring sites and open rocks with seepage;
5	Úpská jáma glacier cirque; valley of Úpička	1080–1360	mostly acid silicates (granites, schists) but locally also more basic porphyry outcrops
6	Mt. Sněžka - rocks at the top and the west and south-east ridges	1470–1600	S-, SW- and SE-facing summit rocks of acid mica schist
7	Studniční and Luční hora Mts.	1430–1550	alpine meadows at the gentle slopes grown mostly with <i>Nardus stricta</i> , <i>Deschampsia cespitosa</i> , <i>Calamagrostis villosa</i> , <i>Carex bigelowii</i>
8	E slopes of Mt. Studniční hora: Čertův hřeben ridge, Čertova zahrádka and Čertova rokle ravines, upper parts; wooded slope down to the Úpa brook	940–ca. 1400	spruce- and dwarf pine-forested E slopes, acid mica schist and granites
9	S and W slopes of Sněžka and Růžová hora Mts. around the valley of Rudný potok	940–ca. 1400	spruce- and dwarf pine-forested S and W slopes, acid mica schist
10	"Rudník" – valley of Rudný potok brook, lower part around the brook with remnants of mining	1050–1150	mostly wet porphyry rocks, ± unshaded along the brook and shaded in the surrounding spruce forest
11	E slopes of Mt. Studniční hora: "Čertova zahrádka" ravines, lower parts	950–1100	several parallel E-facing ravines of both basic porphyries and acid mica schists
12	Důl pod Koulemi valley	1100–1330	Norwegian spruce and dwarf pine-forested E-facing valley of the supramontane belt; acid mica schist
13	Růžový důl valley	850–1050	Spruce-forested W-facing valley with numerous spring sites, rich in nutrients, around the brook; mostly gneisses
14	SW slopes below Růžohorky lodge and Pec pod Sněžkou	810–1200	spruce-forested slopes with occasional spring sites
15	Úpské rašeliněště mire	1420–1430	ombrotrophic raised bog
A	Anthropically affected sites (the most important depicted with "A" in the map)	950–1600	walls, concrete constructions, bare soil

repeatedly – the latter one three times. The altitudinal span exceeds 750 m (ca. 850–1602 m a.s.l.). The geological substratum is rather uniform, formed from very acid silicates, only at localities 10, 11 and in part also at the cirque localities 2–5 the porphyries occur, which contain more bases.

The bryophytes that could be safely identified in field were only recorded into the recording cards, the other plus those which herbarium record was felt to be desirable, were collected – in total about 1150 specimens. Empirical ecological notes were made on all collected specimens in the field including the altitude measured with a digital barometric altimeter. In 2000 collections, the geographical co-ordinates were acquired for collected specimens by means of GARMIN 12XL GPS receiver and are presented as *x* and *y* co-ordinates of the kilometric grid (M33 band) on S-1942 map datum (as printed on the map sheets 1:50 000 or 1:25 000 series of the “Český Klub Turistů”). The identification of critical groups was consulted with specialists. Herbarium specimens are at present deposited in the authors’ herbaria, cited in the text as Kučera or Buryová with their database filing numbers. The site details for specimens not directly cited in the text can upon request be obtained from the authors. Nomenclature in the text follows GROLLE & LONG (2000) for liverworts and VÁNA (1997) for mosses with a few exceptions, for which authorities are given in Table 2.

Though striving for completeness, we are aware of having made the survey somewhat uneven in the area, notably we preferred the habitats above the treeline, especially epilithic habitats, spring communities, stream banks, and less attention was paid e.g. to the forested slopes, the Úpské rašeliníšťe mire and roadside terrestrial communities. This means that some moss groups, e.g. the gemmiferous *Bryaceae* and some species of the forest floor or epixylous bryophytes may be underrepresented in our survey.

RESULTS

General comments

322 taxa have been recorded in the area during the survey, which makes about 37 % of the total country’s bryoflora. Recorded taxa are listed in Table 2 according to the study sites that were taken as a whole during the field survey (,the whole’ refers to the recording cards with certain limitations – localities 2 and 3 were recorded into one recording card, the recording card of the locality Nr. 5 is incomplete).

The composition of the bryoflora is expectedly rich in arcto-alpine and boreo-montane elements but only in those occurring on acidic substrata (liverwort families *Lophoziaceae*, *Scapaniaceae*, *Jungermanniaceae* and moss families *Polytrichaceae*, *Sphagnaceae*, *Dicranaceae*, *Bryaceae*, *Grimmiaceae*). The absence of thermophilous and basiphilous elements can likewise be expected, maybe less so the complete absence of epiphytes (no epiphytic *Orthotrichaceae*, *Frullaniaceae*, *Porellaceae*, *Radulaceae* etc.). It might be speculated about the impact of acidic rain which destroyed much of the spruce forests in the mountain range in the past decades but the investigated sites have probably never (in the last 150 years) been especially rich in epiphytes due to the absence of suitable substrates (e.g. older solitary broad-leaved trees), as can be judged from the poor historical record of *Orthotrichum* species (VONDRÁČEK 1993). Another habitat that is nearly missing in the area is the rotting wood in the forests, hence the absence of epixylic specialists like *Riccardia*, *Cephalozia catenulata*, and others.

It comes out from the list that at least a half of the taxa recorded in the area is relatively rare. 101 taxa of the natural habitats plus 9 in the anthropogenous habitats have only been recorded once and 55 taxa twice. On the other hand, only one species (*Dicranum scoparium*) was recorded at all 15 localities excluding the anthropically affected sites, and four others (*Lophozia sudetica*, *Oligotrichum hercynicum*, *Polytrichastrum formosum* and *Racomitrium sudeticum*) at 14 localities.

One of the taxa (*Racomitrium macounii* subsp. *macounii*) is reported here for the first time from our country, another (*Mnium ambiguum*) has been regarded extinct from our flora (VÁNA 1996). 59 other taxa (about 18 % of the Czech flora) have been included in the preliminary Red Lists of endangered species of the Czech Republic (VÁNA 1993, 1996), 19 of them regarded critically endangered.

Table 2: List of recorded taxa. Explanatory notes: +: species recorded and herbarized; R: taxon recorded only in recording cards. Locality codes follow Table 1. The letters in brackets after the species name (Ex, E, V, R, K) refer to the Red List categories Extinct, Endangered, Vulnerable, Rare and Insufficiently known of VAÑA 1993, 1996, respectively.

Taxon / Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A	# of occurrt
HEPATICAE																	
<i>Anastrepta orcadensis</i> (V)		+				+		+									3
<i>Anastrophyllum minutum</i>						+	R	R	R	+	+	R					7
<i>Aneura pinguis</i>		R	R	R	+					R	+						6
<i>Anthelia julacea</i> (R)	+	+	R	+								+					5
<i>Barbilophozia attenuata</i>								R					R	R			3
<i>Barbilophozia barbata</i>				R				+	R	R	R						5
<i>Barbilophozia floerkei</i>	+			+			+	+					+			+	6
<i>Barbilophozia hatcheri</i>	R			R	R		+	R	R	R	+	+	R	R			11
<i>Barbilophozia lycopodioides</i>	R	+		R		R		R	R	R	R	R	R	R			11
<i>Bazzania trilobata</i>											R						1
<i>Blepharostoma trichophyllum</i>		+	R						R	+	+		R	R			7
<i>Calypogeia azurea</i>	R	+	R	R			+	+	R	+	+	R	R	R			12
<i>Calypogeia integristipula</i>		R	R	+				R	R	+	R	R	R	+			10
<i>Calypogeia muelleriana</i>	R	+	R		+			R		+			+	+			8
<i>Calypogeia neesiana</i>				+					+				+		+		4
<i>Calypogeia sphagnicola</i>													+				1
<i>Cephalozia bicuspidata</i>	+	+	R	+			+	R	+	+	R	+	+	+	+		13
<i>Cephalozia leucantha</i>														+			1
<i>Cephaloziella cf. grimsulana</i> (R)				+													1
<i>Cephaloziella divaricata</i>				+		+				+							3
<i>Cephaloziella rubella</i> (V)										+							1
<i>Chiloscyphus pallescens</i>	+			+	+									+			4
<i>Chiloscyphus polyanthos</i>													R	R			2
<i>Cololejeunea calcarea</i> (E)											+						1
<i>Conocephalum conicum</i>					+					R			R	R			4
<i>Diplophyllum albicans</i>	+			R	R			R	R	+	+	R	R				9
<i>Diplophyllum obtusifolium</i>													+				1
<i>Diplophyllum taxifolium</i>		R	R	R		R		R	+	+	+						8
<i>Gymnocolea inflata</i>	+	+	+	R	R	+	+	R	+	+	R				+		12
<i>Gymnomitrium corallioides</i> (E)		+															1
<i>Harpanthus stotovianus</i> (V)	+						+				+		+				4
<i>Jungermannia confertissima</i> (V)											+						1
<i>Jungermannia hyalina</i>										+							1
<i>Jungermannia obovata</i>	+		+	+													3
<i>Jungermannia pumila</i>				+													1

Taxon / Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A	# of occurrt
<i>Jungermannia sphaerocarpa</i>	R	+		+				+	R	+		+	R				8
<i>Leiocolea bantriensis</i> ¹										+	+						2
<i>Lejeunea cavifolia</i>											+						1
<i>Lepidozia reptans</i>								R			R	R	R	R			5
<i>Lophocolea bidentata</i>													R	R			2
<i>Lophocolea heterophylla</i>		R	R	+				R	R	R			R	+			8
<i>Lophozia excisa</i>										+							1
<i>Lophozia incisa</i>												+	+	+			3
<i>Lophozia longidens</i>					+												1
<i>Lophozia longiflora</i>	+	+		+			+		+	+	+	+					8
<i>Lophozia obtusa</i> (V)													+				1
<i>Lophozia sudetica</i>	+	+	R	+	+	+	+	+	+	+	+	R	+		R		14
<i>Lophozia ventricosa</i>	R	+		+		R	+	R	+	+	+	R	R	R	R		13
<i>Lophozia wenzelii</i> (E)	+	+															2
<i>Marchantia polymorpha</i> subsp. <i>montivagans</i> Bischl. & Boisselier ²	+			+	+												3
<i>Marchantia polymorpha</i> cf. subsp. <i>ruderalis</i> Bischl. & Boisselier ²									R							+	2
<i>Marsupella alpina</i> (E)		+															1
<i>Marsupella emarginata</i>	+	+		+				R	R	+	+	R	+				9
<i>Marsupella emarginata</i> var. <i>aquatica</i>		+	+	+													3
<i>Marsupella sparsifolia</i> (E)	+																1
<i>Marsupella sphacelata</i>	+	+	R	+	R		+	+	R	+		+					10
<i>Marsupella sprucei</i> (E)						+											1
<i>Metzgeria furcata</i>										+							1
<i>Moerckia blyttii</i> (R)		+															1
<i>Mylia anomala</i>	+														+		2
<i>Mylia taylorii</i>								R			+	R			R		4
<i>Nardia scalaris</i>	R	+	R	R			R	R	+	+	+	+	R				11
<i>Pellia neesiana</i>					R		R		R		R	R	+	R			7
<i>Pellia</i> sp.	R			+						+							3
<i>Plagiochila asplenoides</i>											R		R	R			3
<i>Plagiochila porelloides</i>										+	+		R	R		+	5
<i>Porella platyphylla</i>																+	1
<i>Preissia quadrata</i>										+	R						2
<i>Ptilidium ciliare</i>				R		R			+	R	R		R	R			7
<i>Ptilidium pulcherrimum</i>					R			R	R	R	R	R	R	R			8
<i>Radula</i> cf. <i>complanata</i>										+	+						2

¹ including *L. collaris*

² both subspecies can be hardly distinguished according to the morphological characters only

Taxon / Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A	# of occur
<i>Riccardia multifida</i> (E)				+									+				2
<i>Scapania aequiloba</i>										+							1
<i>Scapania</i> cf. <i>mucronata</i>													+				1
<i>Scapania</i> cf. <i>praetervisata</i> (R)											+						1
<i>Scapania</i> cf. <i>helvetica</i> (E)										+							1
<i>Scapania curta</i>		+							+								2
<i>Scapania irrigua</i>	+			R	+				+	+	+						6
<i>Scapania paludicola</i> (V)	+																1
<i>Scapania paludosa</i> (R)	+		+												+		3
<i>Scapania subalpina</i>	+			+			+										3
<i>Scapania uliginosa</i>	+	+	R	+	R								+				6
<i>Scapania umbrosa</i>													+	+			2
<i>Scapania undulata</i>	+	+	R	+	+		R	+	R	+	R	R	+	R			13
<i>Tetralophozia setiformis</i> (E)						+											1
<i>Tritomaria quinquedentata</i>							+				R						2
MUSCI																	
<i>Amblystegium serpens</i>					+								R			+	3
<i>Amblystegium varium</i>																+	1
<i>Amphidium mougeotii</i>			+						+	+	+						4
<i>Andreaea frigida</i> (E)												+					1
<i>Andreaea rothii</i> subsp. <i>rothii</i> (V)						+											1
<i>Andreaea rothii</i> subsp. <i>falcata</i> (Schimp.) Lindb. (V)			+	+	+	+		+	+	+	+						8
<i>Andreaea rupestris</i> ³	+	R	R	+		+	R	R	R	+	+	R					11
<i>Atrichum tenellum</i> (V)													+				1
<i>Atrichum undulatum</i>	R			R									R	R			4
<i>Aulacomnium palustre</i>				R			R										2
<i>Barbula convoluta</i>																+	1
<i>Barbula unguiculata</i>																R	1
<i>Bartramia ithyphylla</i>										+							1
<i>Blindia acuta</i>		R	+	+	R			+	+	+	R	+					9
<i>Brachydontium trichodes</i> (V)	+			+													2
<i>Brachythecium albicans</i>													R	R			2
<i>Brachythecium mildeanum</i> (V)			+										+				2
<i>Brachythecium oedipodium</i> (V)													+	+			2
<i>Brachythecium plumosum</i>	+			+	+								+				4
<i>Brachythecium populeum</i>													R				1
<i>Brachythecium reflexum</i>	+		+	+			+						+	+			6
<i>Brachythecium rivulare</i>	+	R	R	R	+		R		+				+			R	9

³ including *A. alpestris* (R)

Taxon / Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A	# of occurr
<i>Brachythecium rutabulum</i>									+	R			+	R			4
<i>Brachythecium salebrosum</i>	R						+			+			R	R		+	6
<i>Brachythecium starkei</i>	+		+			+			+	+		+	+	+			8
<i>Brachythecium velutinum</i>	R						+	R	R	+		R	R	+			8
<i>Bryoerythrophyllum recurvirostrum</i>										+			R			R	3
<i>Bryum argenteum</i>						R							+			+	3
<i>Bryum caespiticium</i>										+	+		+			+	4
<i>Bryum capillare</i>										+				R			2
<i>Bryum cirrhatum</i> Hoppe & Hornsch.										+						+	2
<i>Bryum creberrimum</i>																+	1
<i>Bryum elegans</i> (V)										+							1
<i>Bryum</i> cf. <i>imbricatum</i>										+							1
<i>Bryum klinggraeftii</i> (E)														+			1
<i>Bryum muehlenbeckii</i> (E)			+	+	+												3
<i>Bryum pallens</i>		R	R							+				R		+	5
<i>Bryum pallescens</i>										+	+		+			+	4
<i>Bryum pseudotriquetrum</i>		R	R	+	R					+	+		+				7
<i>Bryum rubens</i> (V)														+			1
<i>Bryum subelegans</i>													R				1
<i>Bryum uliginosum</i> (E)										+							1
<i>Bryum violaceum</i>														+			1
<i>Bryum weigelii</i>	R	R	+	+													4
<i>Calliargon cordifolium</i>				+													1
<i>Calliargon stramineum</i>	+			R	R		+		+		R	R			+		8
<i>Campylium protensum</i>				+	+					+	+		+				5
<i>Campylophyllum halleri</i> (V)										+							1
<i>Campylopus flexuosus</i>											+						1
<i>Ceratodon purpureus</i>	+		+	R		R	R		R	+	R		R	+		+	11
<i>Cirriphyllum piliferum</i>													R	R			2
<i>Cratoneuron filicinum</i>													+		R		2
<i>Ctenidium molluscum</i>					+							+	+				3
<i>Cynodontium polycarpon</i>	R	R	+	+	+	+		+	+	R	+		R	+			12
<i>Cynodontium strumiferum</i>		+		R	+			R		+	+			+			7
<i>Dichodontium pellucidum</i>										+			R				2
<i>Dicranella cerviculata</i>	+	R	R			+	+	R	R	R	R	R	R	R		+	12
<i>Dicranella heteromalla</i>	+	R	R	R	+		+	+	R	+	+	R	R	R			13
<i>Dicranella palustris</i>	R	R	+	+	R					+			R				7
<i>Dicranella schreberiana</i> (V)														+			1
<i>Dicranella staphylina</i>														+			1

Taxon / Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A	# of occur r
<i>Dicranella subulata</i>										+							1
<i>Dicranella varia</i>										+						+	2
<i>Dicranodontium denudatum</i>					+				R		R	R	R	R	R		7
<i>Dicranoweisia crispula</i>		R	+		+	R				+	+						6
<i>Dicranum congestum</i> Brid.	+	+				+			+		+			+			6
<i>Dicranum flexicaule</i>		+	+			+	+				+	+					6
<i>Dicranum fuscescens</i>									+								1
<i>Dicranum majus</i> (E)	+										+						2
<i>Dicranum montanum</i>				R	+			R	R	R			R	R	R		8
<i>Dicranum polysetum</i>															+		1
<i>Dicranum scoparium</i>	+	+	+	R	+	+	+	+	+	+	+	R	+	R	+		15
<i>Dicranum undulatum</i> Schrad. ex Brid.																+	1
<i>Didymodon fallax</i>										+							1
<i>Didymodon rigidulus</i>																+	1
<i>Diphyscium foliosum</i>											+						1
<i>Distichium capillaceum</i>										+	+						2
<i>Distichium inclinatum</i> (E)										+							1
<i>Ditrichum cylindricum</i>										+			+	+			3
<i>Ditrichum flexicaule</i>											+						1
<i>Ditrichum gracile</i> (R)										+							1
<i>Ditrichum heteromallum</i>	+						+			+			+				4
<i>Ditrichum zonatum</i> (V)						+											1
<i>Encalypta ciliata</i>											+						1
<i>Encalypta streptocarpa</i>										R						R	2
<i>Eurhynchium angustirete</i>													R	R			2
<i>Fissidens dubius</i>										+	+			+			3
<i>Fissidens gymnanthus</i> (V)										+	+					+	3
<i>Fontinalis antipyretica</i>	R			R													2
<i>Fontinalis squamosa</i>	R																1
<i>Funaria hygrometrica</i>													R				1
<i>Grimmia atrata</i> (R)										+							1
<i>Grimmia curvata</i> (V)				+							+						2
<i>Grimmia donniana</i>		+		+	+	+			R	+	+			R			8
<i>Grimmia elongata</i> (R)			+	+		+				+							4
<i>Grimmia funalis</i> (V)				+							+						2
<i>Grimmia hartmanii</i>			+										R	R			3
<i>Grimmia incurva</i>			+			+	+			+							4
<i>Grimmia montana</i> (V)				+													1
<i>Grimmia muehlenbeckii</i> Schimp.														+			1
<i>Grimmia reflexidens</i> Müll. Hal.											+						1

Taxon / Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A	# of occure
<i>Gymnostomum aeruginosum</i>										+	+						2
<i>Herzogiella seligeri</i>													R	R			2
<i>Herzogiella striatella</i> (E)		+	+				+					+					4
<i>Heterocladium heteropterum</i>											+	R					2
<i>Homalothecium lutescens</i>										+							1
<i>Homalothecium sericeum</i>										+			R				2
<i>Hygrohypnum duriusculum</i> (De Not.) Jamieson (E)				+													1
<i>Hygrohypnum ochraceum</i>	+			+	+								+				4
<i>Hylocomium splendens</i>		+	R	R							R						4
<i>Hylocomium umbratum</i>												+					1
<i>Hymenostylium recurvirostrum</i>											+						1
<i>Hypnum cupressiforme</i>						R		R		+	+		+	R			6
<i>Hypnum lindbergii</i>													+				1
<i>Isothecium alopecuroides</i>									R	R			R	+			4
<i>Kiaeria blyttii</i> (V)	+			+	+	+	+		+		+						6
<i>Kiaeria starkei</i>	+			+	+	+	+								+		6
<i>Leptobryum pyriforme</i>																+	1
<i>Lescuraea incurvata</i>			+							+			+	+		+	5
<i>Mnium ambiguum</i> (Ex)													+			+	2
<i>Mnium hornum</i>								R	R	R	+	R	R	R			7
<i>Mnium spinosum</i>														+			1
<i>Mnium stellare</i>										+			R				2
<i>Neckera crispa</i>										+							1
<i>Oligotrichum hercynicum</i>	R	+	R	R		R	R	R	R	R	+	R	R	R	R		14
<i>Orthodontium lineare</i>								+	+					+			3
<i>Orthotrichum anomalum</i>																+	1
<i>Palustriella commutata</i>										+	+						2
<i>Palustriella falcata</i> (V)			+		+						+						3
<i>Paraleucobryum longifolium</i>	+	R	R		+			R	R	+				R			8
<i>Philonotis fontana</i>		R	+					+	R	+	+		R				7
<i>Philonotis seriata</i>	+	+	R	+	R		R	R	R	+			+	R			11
<i>Philonotis tomentella</i> Lor. (V)											+						1
<i>Plagiobryum zieri</i> (V)										+	+						2
<i>Plagiomnium affine</i>	R			R									+	+			4
<i>Plagiomnium cuspidatum</i>					+								R				2
<i>Plagiomnium medium</i> (V)	+												+				2
<i>Plagiomnium undulatum</i>													R				1
<i>Plagiothecium cavifolium</i>			+				R			+							3
<i>Plagiothecium curvifolium</i>	+	+		R			R	R	+	+	R	R	R	R			11
<i>Plagiothecium denticulatum</i>	+	R	+	+			R	R			+	+	+	R	R		11

Taxon / Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A	# of occur
<i>Plagiothecium denticulatum</i> var. <i>obtusifolium</i> (Turner) Moore			+	+									+				3
<i>Plagiothecium laetum</i>								R			R	R	R	R			5
<i>Plagiothecium nemorale</i>	+																1
<i>Plagiothecium platyphyllum</i>													+	+			2
<i>Plagiothecium ruthei</i>			+														1
<i>Plagiothecium succulentum</i>															+		1
<i>Plagiothecium undulatum</i>				R	R			R			R	R	R	R			7
<i>Pleurozium schreberi</i>	R					R		R	R	R	R	R	R	R			9
<i>Pogonatum aloides</i>													+				1
<i>Pogonatum urnigerum</i>	R			R		R	R				R		R	R			7
<i>Pohlia annotina</i>	+								+				+				3
<i>Pohlia bulbifera</i>																+	1
<i>Pohlia cruda</i>										+	+					R	3
<i>Pohlia drummondii</i>	+													+		+	3
<i>Pohlia filum</i> (V)																+	1
<i>Pohlia ludwigii</i> (E)	+			+													2
<i>Pohlia nutans</i>	+	+		+		+	+	R	R	+	R	R	R	R	+		13
<i>Pohlia prolifera</i>													+				1
<i>Pohlia wahlenbergii</i>	+		+	R				R	R	+	R		R		R		9
<i>Polytrichastrum alpinum</i> (Hedw.) G.L. Sm.	R	+	R		+	R	R	+	+	+	R	R	+	+			13
<i>Polytrichastrum formosum</i> (Hedw.) G.L. Sm.	+	R	R	+	R		+	R	+	R	+	R	+	R	R		14
<i>Polytrichastrum longisetum</i> (Sw. ex Brid.) G.L. Sm.	+	R	R	+			+	R	R		+		R	R	+		11
<i>Polytrichum commune</i>	+			+		+	R	+			R	R	R	R			9
<i>Polytrichum juniperinum</i>	R	R	R			R	+	R	R	R	R		R	R			11
<i>Polytrichum perigoniale</i>	+			+						+	+		R	+			6
<i>Polytrichum piliferum</i>	R	R	R	+		+	R	R	R	R	R		R	R	R		13
<i>Polytrichum strictum</i>	R	R	R	+			R	R							R		7
<i>Pseudoleskeella catenulata</i>										+							1
<i>Pseudotaxiphyllum elegans</i>	R	R	R	+	R	R		+		+	R	R	+				11
<i>Racomitrium aciculare</i>	+	R	R	+	+			R	R	R	R	R	R				11
<i>Racomitrium aquaticum</i>		+		+	R			+	+	R	+	R	+				9
<i>Racomitrium canescens</i>	+					+										+	3
<i>Racomitrium elongatum</i>	+			+			+										3
<i>Racomitrium fasciculare</i>	+	R	+	R		+	+		R	+	R	R	R				11
<i>Racomitrium lanuginosum</i>		+	R	R		+		R	R		+						7
<i>Racomitrium macounii</i> Kindb. subsp. <i>macounii</i>				+													1

Taxon / Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A	# of occur
<i>Racomitrium macounii</i> subsp. <i>alpinum</i> (E.Lawton) Frisvoll			+	+	+						+						4
<i>Racomitrium microcarpon</i>	+	+		+		+	+	+	R	+	+	R	R	R			12
<i>Racomitrium sudeticum</i>	+	+	+	+		+	+	+	+	+	+	R	+	R	+		14
<i>Racomitrium sudeticum</i> fo. <i>kindbergii</i> Frisvoll				+													1
<i>Rhabdoweisia crispata</i> (V)											+						1
<i>Rhabdoweisia fugax</i>					+	+			+	+	+	R					6
<i>Rhizomnium magnifolium</i>	+	+	+	+	+								+	+			7
<i>Rhizomnium punctatum</i>	+	R	R	R				R	R	R	R		+	R			10
<i>Rhodobryum roseum</i>				R									+				2
<i>Rhynchostegium murale</i>										+							1
<i>Rhynchostegium riparioides</i>													R				1
<i>Rhytidiadelphus loreus</i>				+				R	+		R	R	R				6
<i>Rhytidiadelphus squarrosus</i>	R	R	R					R				R	R	R			7
<i>Rhytidiadelphus subpinnatus</i>			+										+				2
<i>Rhytidiadelphus triquetrus</i>									R	R	R		R				4
<i>Sanionia uncinata</i>	R	R	+			+	R		+	+	R	R	+	+			11
<i>Schistidium apocarpum</i>						+				+			+			+	4
<i>Schistidium crassipilum</i>										+						+	2
<i>Schistidium dupretii</i> (K)						+	+		+	+	+					+	6
<i>Schistidium papillosum</i>										+	+						2
<i>Schistidium robustum</i>										+							1
<i>Schistidium trichodon</i> var. <i>nutans</i> H.H. Blom (E)										+							1
<i>Schistostega pennata</i>											+						1
<i>Seligeria donniana</i>										+							1
<i>Sphagnum balticum</i>															+		1
<i>Sphagnum brevifolium</i>							+	+									2
<i>Sphagnum capillifolium</i>	R	+		+			R	R			R	R	+				8
<i>Sphagnum centrale</i> (R)				+									+				2
<i>Sphagnum compactum</i>	R	+	+	R			R	R		+	+				+		9
<i>Sphagnum denticulatum</i>	+	+					+			+	+	+	+				7
<i>Sphagnum fallax</i>	+	+		+			+	+				+					6
<i>Sphagnum fimbriatum</i>				+										R		2	3
<i>Sphagnum flexuosum</i>		+		+			+					+	+		+		6
<i>Sphagnum fuscum</i>																+	1
<i>Sphagnum girgensohnii</i>	R	+	R	+			R	R	R	R	R	R	+	R			12
<i>Sphagnum inundatum</i>	+																1
<i>Sphagnum lindbergii</i> (V)	+	+		+			+								+		5
<i>Sphagnum magellanicum</i>															+		1

Taxon / Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A	# of occur
<i>Sphagnum majus</i>	+														+		2
<i>Sphagnum palustre</i>				+								+					2
<i>Sphagnum papillosum</i>				+													1
<i>Sphagnum quinquefarium</i>											+						1
<i>Sphagnum riparium</i>	R											+	R	R			4
<i>Sphagnum rubellum</i>	+															R	2
<i>Sphagnum russowii</i>	R	+		R			R	R	R		R	+	R	R	+		11
<i>Sphagnum squarrosum</i>	R	+	R				R	R		+	R	R	+	R			10
<i>Sphagnum subnitens</i> (V)			+	+							+						3
<i>Sphagnum subsecundum</i>		+															1
<i>Sphagnum tenellum</i>				+													1
<i>Sphagnum teres</i>	+																1
<i>Splachnum sphaericum</i> (V)		+														+	2
<i>Tetraphis pellucida</i>		R	R					R			R	R	+	+			7
<i>Thuidium tamariscinum</i>													R				1
<i>Tortella bambergi</i> (Schimp.) Broth.										+							1
<i>Tortella tortuosa</i>										+	+		R				3
<i>Tortula muralis</i>						R	R			R						R	4
<i>Trichostomum tenuirostre</i>											+		+				2
<i>Wamstorfia exannulata</i>	+		+								+						3
<i>Wamstorfia fluitans</i>	+	+					+				+	+			+		6
<i>Wamstorfia sarmentosa</i> (Wahlenb.) Hedenäs	+	R	R	+	R		+										6
Number of taxa	105	83	78	114	49	50	66	74	78	134	129	71	139	92	37	33	
Sums for related sites			161					100	186								

Annotations and site details for remarkable species found during the survey
Red List categories as in the caption to Table 2.

***Cololejeunea calcarea* (E)**

– Obrří důl: N-exposed porphyry rocks in the Čertova zahrádka ravine: Wet shaded rocks beneath an overhang, 1085 m a.s.l. 24. 9.1998 Kučera 3188.

Second verified record of this liverwort from the Giant Mts. (the other comes from the foothills near Křížlice; literature report from Špindlerův Mlýn is not evidenced by the herbarium specimen (DUDA in DUDA & VÁŇA 1975).

***Gymnomitrium corallioides* (E)**

– Obrří důl valley, Úpská jáma cirque, "Studniční stěna" rock face: siliceous rocks, 1350–1400 m a.s.l. 2. 6.1998 coll. Zdeněk Palice, Buryová 1711.

Previously known in the area only from the Sněžná strouha valley in the Úpská jáma cirque (coll. by Limpricht in 1869 – VÁŇA in DUDA & VÁŇA 1979b).

Jungermannia confertissima (V)

- Obří Důl: a ravine at ESE slopes of the Mt. Studniční hora, parallel to the “Čertova zahrádka” ravine (the 1st parallel ravine S of it) (S-1942 grid: x=3551.18, y=5622.08): on thin humus layer in a niche of an NE-facing porphyry rock, ca. 1055 m a.s.l. 8. 9.2000 Kučera 4355.
Recorded in the “Čertova zahrádka” already by Wihan in 1927 (VÁŇA in DUDA & VÁŇA 1970).

Jungermannia hyalina

- WSW slopes of Mt. Sněžka: the adits in the spruce forest on the W side of valley of the Rudný potok brook, ca. 100 m NNW of the lower pitheap (S-1942 grid: x=3551.7, y=5622.5): Wet shaded soil in the fissure of a porphyry rock, 1090–1110 m a.s.l. 6. 9.2000 Kučera 4237, det. J. Váňa.
Collected historically at Rudník also by Wihan and Duda (last time in 1956), also at “Kovářna” near Rudník and in Čertova zahrádka (VÁŇA in DUDA & VÁŇA 1971). Our specimen is extremely abnormally developed and sterile. Not included in the preliminary Red List but at least in Bohemia very rare and, in our opinion, threatened species.

Jungermannia pumila

- Úpská jáma cirque: By the brook Úpa above the confluence with Úpička: Granite stone in the brook, 1130 m a.s.l. 31. 8.1999 Kučera 3472, det. J. Váňa.

Not yet recorded in the investigated area, a single recent report from the Kotelná jáma cirque (Western Giant Mts.) was communicated to us by J. Váňa. Otherwise in the foothills (VÁŇA in DUDA & VÁŇA 1969b). As in the preceding species, more numerous records only from the NE Moravia.

Lophozia excisa

- Valley of Rudný potok brook, ± at the upper pitheap, ca. 1120 m a.s.l. 2. 9.1999 Kučera 3624.

Last reports from the Obří důl valley date back to Nees von Esenbeck (1836 and 1838, cited in VÁŇA & HUBÁČKOVÁ in DUDA & VÁŇA 1992), otherwise in the mountains known only from the Velká Kotelná jáma cirque.

Lophozia obtusa (V)

- Pec pod Sněžkou: Růžový důl valley, two close sites at the left bank of the brook beneath the chairlift 500 m NE-NNE of the chairlift lower station, on a vista (S-1942 grid: x=3552.29, y=5620.25 and x=3552.27, y=5620.24 respectively): open acid soil, 925–930 m a.s.l. 7. 9.2000 Kučera 4278, 4279; Buryová 2397 (conf. J. Váňa).

Not yet recorded from the investigated area (VÁŇA in DUDA & VÁŇA 1990), though known from the W part of the mountain range and Černý důl valley. The populations found in the Růžový důl valley were quite small and probably ephemeral.

Lophozia wenzelii (E)

- A brooklet by the Luční bouda chalet by the water reservoir (source area of the Bílé Labe brook): wet soil edges of the brooklet, 1415 m a.s.l. 26. 9.1998 Kučera 3270 (conf. J. Váňa).
- Úpská jáma cirque, upper part of Lavinový potok brook: among *Sphagnum*, ca. 1300 m a.s.l. 3. 6.1998 coll. J. Kučera & B. Buryová, herb. Kučera 2970, herb. Buryová 1650 (conf. J. Váňa).

Known in the area only from the Úpské rašeliniště mire, source area of the Úpa and the alpine meadow Bílá louka (VÁŇA & HUBÁČKOVÁ in DUDA & VÁŇA 1992).

Marsupella alpina (E)

- Úpská jáma cirque, upper part of the Lavinový potok brook, ca. 1250 m a.s.l. Wet inclined rock plate, 3. 6.1998 Kučera 2973, Buryová 1654 (det. J. Váňa).

Locality known since Limpricht's surveys (see FUTSCHIG & VÁŇA 1969), the hepatic seems to be thriving at the site.

Marsupella sparsifolia (E)

- Valley of Bílé Labe brook 600–700 m beneath the Luční bouda chalet, 1365 m a.s.l., wet siliceous stone by the brook, 1. 9.1999 Kučera 3586 (det. J. Váňa).

At probably the same or close site (reportedly 1400 m) collected already by Šmarda in 1945, other historical records in the area from the slopes of Mt. Studniční hora, Obří důl valley (probably the Úpská jáma cirque) an Mt. Sněžka, all of them prior to 1945 (VÁŇA in DUDA & VÁŇA 1980).

Marsupella sprucei (E)

- Several places at and around the path on the W ridge of Mt. Sněžka just below the top, between 1570 and 1600 m a.s.l., bare soil. 25. 9.1998 (Buryová 1841, 1844, 1845, Kučera 3217, 3221–3224) and 2. 6.1998 Buryová 1600–1, Kučera 2905 (det. J. Váňa).

All other sites known from literature (VÁŇA in DUDA & VÁŇA 1979b: Mt. Studniční hora, uppermost part of the Bílé Labe valley, Úpský vodopád waterfall, Rudník) were searched for the species without success.

Moerckia blyttii (R)

- Úpská jáma cirque, Lavinový potok brook, ca. 1250 m a.s.l.: wet humus on a boulder in the slope by the brook, 3. 6.1998 Kučera 2971, Buryová 1652.

Known from along the stream already from literature (VÁŇA in DUDA & VÁŇA 1968), the other historically known site (source area of the Bílé Labe brook, last collection from 1967) was searched through without success. Definitely a strongly endangered species in the area.

Riccardia multifida (E)

- Úpská jáma cirque: beneath the SE-facing rocks at the foot of the Horní Úpský vodopád waterfall: wet soil, 1215 m a.s.l. 31. 8.1999 Kučera 3494.
- Pec pod Sněžkou: Růžový důl valley, a forest source area 400–420 m NE-NNE of the chairlift lower station (S-1942 grid: x=3552.2, y=5620.19): Wet humus-rich mud beneath ferns in a spruce forest, ca. 910 m a.s.l. 7. 9.2000 Kučera 4268; dtto a source area at the left bank of the brook 110 m ENE of the chairlift line crossing over the brook (S-1942 grid: x=3552.38, y=5620.28): wet mud in the source area, 950 m a.s.l. 7. 9.2000 Kučera 4281.

Known historically from four other sites in the area – Kozi hřbety ridge, leg. Velenovský 1900; Obří důl valley – 1000 m, leg. Wihan 1926; slope of Mt. Sněžka, 1000 m, leg. Wihan 1928 and Rudník, 1000 m, leg. Wihan 1926 (VÁŇA in DUDA & VÁŇA 1981) – which were searched for the species without success.

Scapania aequiloba

- WSW slopes of Mt. Sněžka: valley of Rudný potok brook, L side ca. 100 m above the lower pitheap (above the confluence with L-sided tributary) (S-1942 grid: x=3551.8, y=5622.51): Shaded porphyry rock, ± W-facing at the L side of the brook, ca. 1090 m a.s.l. 6. 9.2000 Kučera 4234.

Known at the site since FURTSCHIG (1966) but obviously occurring only in a very small quantity (first discovered during our third visit at the site in 2000). Critically small population.

Scapania paludicola (V)

- Valley of Bílé Labe, peaty spring site beneath “Weberova cesta” footpath 0,5 km W of Luční bouda, 1400 m a.s.l. 23. 9.1998 Kučera 3137.
- Valley of Bílé Labe: by the brook beneath the Luční bouda chalet: Wet meadow by the brook, 1400 m a.s.l. 1. 9.1999 Kučera 3558; dtto at 1375 m a.s.l. on S exposed moist siliceous stone shaded by *Deschampsia cespitosa* turf, 1. 9.1999 Buryová 2307; dtto at 1360 m a.s.l. on acid soil below *Deschampsia cespitosa* turf, Buryová 2308.

Only one historical record from the area (Bílá louka, 1400 m, 1899 leg. Schiffner – cf. DUDA in DUDA & VÁŇA 1969b) but obviously under-recorded, as the species, though definitely not common, occurs at several places in the valley.

***Scapania paludosa* (R)**

- Úpské rašeliniště mire at the tour. path: wet soil among *Nardus* hummocks, 1430 m a.s.l. 3. 6.1998 coll. B. Buryová, J. Kučera, herb. Buryová 1617, herb. Kučera 2924.
- Úpská jáma cirque, by Sněžná strouha brook: sloping spring site, ca. 1100 m a.s.l. 4. 6.1998 Kučera 3018.
- Valley of Bílé Labe brook: beneath the broken impound 400–600 m beneath Luční bouda chalet: Wet site by the brook, 1380 m a.s.l. 1. 9.1999 Kučera 3577; dtto ca. 800 m beneath Luční bouda chalet, above the hovel: In wet grass by the brook, 1315 m a.s.l. 1. 9.1999 Kučera 3595; dtto above the confluence with Stříbrná bystřina: Spring site, 1270 m a.s.l. 1. 9.1999 Kučera 3600.
Surprisingly not yet recorded from the investigated area (DUDA in DUDA & VÁŇA 1971). Very scattered and never in large populations.

***Tetralophozia setiformis* (E)**

- W ridge of Mt. Sněžka: on bare soil by the path, 1510 m a.s.l. 25. 9.1998 Kučera 3210.
Locality known for a long time; collected also by B. Buryová probably at a close locality (but rather in the scree on the slope) already in 1995 (BURYOVÁ in ANONYMUS 1996).

***Andreaea frigida* (E)**

- SE slope of Mt. Sněžka, “Důl pod Koulemi” valley ca. 0.5 km above the confluence with Jelení potok brook: S facing shaded dripping rock by the brook, 1130 m a.s.l. 25. 9.1998 Buryová 1863, Kučera 3255.
The locality represents the only known site for the species in the Czech Republic, historical specimens from the valley present in PRC (coll. by Limpricht 1883 and Wihan 1923), the altitude given at the latter specimen is however 1300 m, where our search was fruitless.

***Andreaea rothii* subsp. *rothii* (V)**

- Mt Sněžka, W slope on the path (at the landmark 28/9), moderately wet rock, ca. 1500 m a.s.l. 2. 6.1998 Kučera 2909; dtto (SW-exposed rocks, 1490 m a.s.l.) 25. 9.1998 Buryová 1836, Kučera 3208 (both sites are probably identical).
One of the rarest taxa in the Czech Republic, known for a long time historically from Mt. Sněžka and from a single locality near Nové Město n. Metují (Z. Soldán, pers. comm.). Subsp. *falcata*, which grows even at the same rock, is morphologically perfectly distinct and not rare in the area, whereas subsp. *rothii* would deserve much stricter threat status.

***Brachydontium trichodes* (V)**

- Úpská jáma cirque: By the brook Úpa 150 m beneath the confluence with Úpička (S-1942 grid: x=3551.19, y=5622.69): Wet vertical face of a granite stone by the brook, 1070 m a.s.l. 31. 8.1999 Buryová 2303, Kučera 3464.
- Valley of Bílé Labe: wet stones along the brook bed, 1370 m a.s.l. 1. 9.1999 Buryová 2302.
The species has an unequal distribution in the Czech Republic, being not rare in the North-East of the country and much rarer in the rest of our mountains (cf. SOLDÁN 1991). It has been historically known from the valley of Bílé Labe but probably from a much lower altitude.

***Bryum muehlenbeckii* (E)**

- Though having been regarded critically endangered in our country (VÁŇA 1996), the species grows not sparsely in the area but until now recorded only from the cirque of Úpská jáma. Seven recorded sites lie along the streams on wet siliceous rocks, in altitudes between 1100 and 1240 m. Historically reported also from the upper part of the Bílé Labe brook (LIMPRICHT 1895).

***Bryum uliginosum* (E)**

- Valley of Rudný potok brook (WSW slope of Mt. Sněžka), between the pitheaps: Humus over

N-NW facing basic siliceous rocks, 1070 m a.s.l. 2. 9.1999 Kučera 3641; dtto at L side of the brook 20 m above the lower pitheap (S-1942 grid: x=3551.76, y=5622.44): Wet, shaded porphyry rock at the brook, ca. 1055 m a.s.l. 6. 9.2000 Kučera 4227.

An extremely rare species restricted to wet basic habitats in the montane belt, vanishing from Central Europe. The only record from the last (probably more than five) decades comes from the Slezské Beskydy Mts. (V. Plášek, pers. comm.). Not reported previously from the area.

Campylophyllum halleri (V)

– Valley of Rudný potok brook (SW slope of Mt. Sněžka), beneath the upper pitheap: W-facing basic siliceous rocks by the brook, ca. 1100 m a.s.l. 2. 9.1999 Kučera 3633.

Not a rare species throughout the Alps and Carpathians but due to the lack of suitable substrates restricted to a handful of localities in the Czech Republic (Giant Mts., Králický Sněžník and Hrubý Jeseník Mts.). The population at the locality, known since LIMPRICHT (1904) is extremely small and vulnerable.

Dicranum majus (E)

– Valley of Stříbrná bystřina above the confluence with Bílé Labe: humus layer over a siliceous stone near the brook, 1250 m a.s.l. 1. 9.1999 Kučera 3603.

– Obří Důl: a ravine at ESE slopes of the Mt. Studniční hora, parallel to the “Čertova zahrádka” ravine (beneath the 1st parallel ravine S of it) (S-1942 grid: x=3551.23, y=5622.06): On forest humus below trees, ca. 1030 m a.s.l. 8. 9.2000 Kučera 4346.

Extremely rare and vulnerable species, retreating in the last two centuries with the natural coniferous forests in Central Europe.

Distichium inclinatum (E)

– Valley of Rudný potok brook (SW slope of Mt. Sněžka), beneath the upper pitheap: In a fissure at the base of W-facing basic siliceous rocks, ca. 1100 m a.s.l. 2. 9.1999 Kučera 3628, 3629; dtto at W-facing basic siliceous rocks by the brook herb. Kučera 3631, 3632.

Historically known site for a long time, however, as in *Campylophyllum halleri*, one of a few in the country.

Ditrichum zonatum (V)

– Rocks S of the top of Mt. Sněžka: In a fissure of S-facing rock, beneath an overhang, 1565 m a.s.l. 25. 9.1998 Kučera 3245.

Probably extremely rare but taxonomically critical taxon; about three localities known from the Giant Mts. and one in the Hrubý Jeseník Mts. (I. Novotný pers. comm.).

Grimmia curvata (V)

Several populations recorded in the Čertova zahrádka ravine between ca. 1035 and 1100 m a.s.l. and beneath the “Horní Úpský vodopád” waterfall in the cirque of Úpská jáma (1160–1200 m a.s.l.).

Grimmia elongata (R)

Occurs at several sites in a greater number of relatively thriving populations (especially the S-facing rocks in the summit area of Mt. Sněžka between ca. 1490 and 1590 m a.s.l. and on several sites along the “Horní Úpský vodopád” waterfall and “Sněhový most” in the Úpská jáma cirque between 1175 and 1400 m a.s.l.; a single locality was recorded in the valley of Rudný potok brook between 1100 and 1150 m a.s.l.). Yet these sites together with the locality at Mt. Kotel in the western part of the mountain range are the only verified ones in the country. It is interesting that literature records and herbarium specimens of this species are much scarcer, which probably can best be explained by its inconspicuousness.

Grimmia funalis (V)

Recorded in rather abundant populations on little accessible porphyry rocks in the “Čertova

zahrádka" ravine between 1040 and 1060 m a.s.l.; in smaller quantity also on rocks ESE of the foot of the Horní Úpský vodopád waterfall. Historical records from Mt. Sněžka could not be confirmed in the field, neither were located the respective herbarium specimens.

Grimmia montana (V)

- Úpská jáma cirque: Rocks beneath (ESE of the foot of) Horní Úpský vodopád waterfall: S-facing inclined siliceous rocks, 1170 m a.s.l. 31. 8.1999 Kučera 3478; dttto in crevices of a large S-exposed rock face, 1175 m a.s.l. Buryová 1802.

Rare species in the Czech Republic that also would better fit the 'Rare' status in the Red List; the locality (together with an earlier collection of J. Váňa from 1240 m a.s.l.) represents the altitudinal maximum for the species in our country. This is the first report of the moss from the area but it was collected earlier and misidentified (see BURYOVÁ & KUČERA 1999).

Grimmia reflexidens [= *G. sessitana* De Not.]

For the list of sites see Buryová & Kučera 1999. The species would probably deserve the 'Rare' status on the Red List.

Herzogiella striatella (E)

- N slope of Mt. Studniční hora: on soil shaded by overhanging *Calamagrostis* and *Vaccinium*, ca. 1400 m a.s.l. 3. 6.1998 Buryová 1664.
- NW slope of Mt. Studniční hora above Luční bouda chalet: Soil beneath grass hummock overhang, ca. 1450 m a.s.l. 4. 6.1998 Kučera 2997.
- Úpská jáma cirque, uppermost part of the Lavinový potok brook: On soil by the brook, 1450–1500 m a.s.l. 3. 6.1998 Kučera 2944.
- Úpská jáma cirque, "Krkonošova zahrádka" below "Sněžný most": wet base of a boulder, ca. 1350 m a.s.l. 4. 6.1998 Kučera 3038; dttto on the vertical stone face + hanging, ca. 1300 m a.s.l. Buryová 1699.
- Uppermost part of the valley "Důl pod Koulemi", SSE of the top of Mt. Sněžka: Soil edges of the brooklet in the dwarf pines, 1320 m a.s.l. 25. 9.1998 Kučera 3252, Buryová 1853–4.

The rarity and threat status is quite hard to assess according to our data. The revision of the herbarium PRC, where most of the mosses from the area have been stored, revealed specimens from four localities in the area studied and two additional from the Western part of the Czech Giant Mts., all collected before 1920. The populations found are relatively small but do not appear critical.

Hygrohypnum duriusculum (E as *H. molle*)

- Úpská jáma cirque: near the Úpa brook: wet stone in brook, 1160 m a.s.l. 31. 8.1999 Buryová 1791.

We do not yet know the complete historical distribution of the species but apparently, it is now rare in the investigated area, though LIMPRICHT (1904) reports the species (including both *H. duriusculum* and *H. molle*) as "widely distributed from the ridges down to the foothills". The conspecificity of *H. duriusculum* and *H. molle*, suggested by GEISLER (1985) and others remains taxonomically unresolved at present.

Mnium ambiguum (Ex)

- Pec pod Sněžkou: Růžový důl valley, the riverbed of the Růžový potok brook 140 and 200 m ENE of the chairlift line crossing over the brook (S-1942 grid: x=3552.39, y=5620.31 and x=3552.45, y=5620.34 respectively): Among wet shaded siliceous stones of small weirs (probably with some mortar, as evidenced by the accompanying *Homalothecium sericeum*, *Tortella tortuosa* and *Trichostomum tenuirostre*), 950–960 and ca. 980 m a.s.l. 7. 9.2000 Kučera 4286, 4294; dttto, between spruce stamp roots in spruce forest, ca. 905 m a.s.l. 7. 9.2000 Buryová 2383.

According to VÁŇA (1998), the only record from the Czech Republic has been made from Mt. Králický Sněžník, where it was collected in 1912. Nevertheless, the herbarium revision of the species (which has been taxonomically critical prior to Koponen's revisions) has not yet been made and further records can be expected.

Plagiobryum zieri (V)

- Valley of Rudný potok brook (SW slope of Mt. Sněžka), at the upper pitheap: SW-facing basic siliceous rocks, over a humus layer, ca. 1120 m a.s.l. 2. 9.1999 Kučera 3626.
- Obří důl valley, “Čertova zahrádka” ravine: wet bare soil in E facing slope, 1085 m a.s.l. 24. 9.1998 coll. B. Buryová & J. Kučera, herb. Buryová 1829; dtto in a ravine at ESE slopes of the Mt. Studniční hora, parallel to the “Čertova zahrádka” ravine (2nd parallel ravine S of it) (S-1942 grid: x=3551.21, y=5622.05): Humus-filled niche of an ESE-facing porphyry rock, wet, ca. 1040–1050 m a.s.l. 8. 9.2000 Kučera 4336.

Rare in the area, though at least some of the populations in the Čertova zahrádka ravine are thriving. We have not yet evaluated the historical distribution but known at least from the Čertova zahrádka ravine (Ludwig's reports cited in VELENOVSKÝ 1897).

Plagiothecium platyphyllum

- Pec pod Sněžkou: SW slopes below Růžohorky, 500 m SW-WSW of Růžohorky lodge, 100 m WSW of a cabin (S-1942 grid: x=3552.69, y=5620.09): Wet soil along a brooklet just below its source, ca. 1160 m a.s.l. 5. 9.2000 Kučera 4216.
- Pec pod Sněžkou: Růžový důl valley, ca. 50 m above the confluence 290 m NE of the chairlift line crossing over the brook (S-1942 grid: x=3552.50, y=5620.42): Forest source area at the right bank of the brook, shaded wet acid soil, 1000–1010 m a.s.l. 7.9.2000 Kučera 4305, Buryová 2424.

The species is reported as scattered through most parts of our territory (JEDLIČKA 1954) but according to our experiences, quite rare even in the mountains.

Pohlia ludwigii (E)

We were able to verify the presence of the species at known localities above the Horní Úpský vodopád waterfall (Kučera 3524, 3526, 3529, Buryová 1827) and below the Luční bouda chalet by the Bílé Labe brook (Kučera 3550–3554, 3566, Buryová 2288–90). The ‘Critically endangered’ status can fortunately not be confirmed, as the species grows in rather thriving populations, though no more recorded with sporophytes, as present in the historical collections from the end of the 19th century.

Racomitrium macounii subsp. *alpinum*

The specimens collected in 1998 in Obří důl at “Čertova zahrádka” ravine and at “Krakonošova zahrádka” in the Úpská jáma cirque are listed in BURYOVÁ & KUČERA 1999. Additional sites:

- Úpská jáma cirque: rocks beneath (ESE of the foot of) the Horní Úpský vodopád waterfall, S-facing inclined siliceous rocks, 1175 m a.s.l. 31. 8.1999 Kučera 3482, Buryová 1794; dtto near Úpa brook: wet shaded rock, 1170 m a.s.l., Buryová 1795; dtto at seasonally wet SE exposed stone, 1215 m Buryová 1804–5; dtto at the lower part of Horní Úpský vodopád waterfall: E exposed rock with trickling water, 1230 m a.s.l. 31. 8.1999 Buryová 1807 and at 1245 m a.s.l., Buryová 1810.
- Úpská jáma cirque: by the Úpička brook at the foot of the waterfall: ± S-facing wet siliceous rock, 1175 m a.s.l. 2. 9.1999 Kučera 3650; dtto at 1205 m a.s.l. on wet inclined siliceous rock of the waterfall herb. Kučera 3662.

It seems that the species, though not recorded from our country before 1999, is not exceedingly rare in the area and their populations seem to be thriving.

Racomitrium macounii subsp. *macounii*

- Úpská jáma cirque: near the Úpa brook, 1100 m a.s.l., on wet stone, 31. 8.1999 coll. B. Buryová (herb. Buryová 1780, dupl. filed in KRAM).

Reported here for the first time from the Czech Republic from a single locality. The identity of the specimen was confirmed by Dr Halina Bednarek-Ochyra (Cracow, Poland). The taxon seems to be rare in contrast to the preceding taxon, as it is on the Polish side of the mountain range, where it is likewise known from a single locality (BEDNAREK-OCHYRA 1995).

Schistidium trichodon var. *nutans* (E)

- Valley of Rudný potok brook at the lower pitheap, on a porphyry stone, ca. 1050 m a.s.l. 2. 6.1998 Kučera 2832; dtto ca. 100 m above the pitheap, on shaded rock at the brook, ca. 1100 m a.s.l. 2. 6.1998 Kučera 2858 and ca. 250 m above the pitheap, on a rock at the brook, 1100–1150 m a.s.l. 2. 6.1998 Kučera 2881.

The locality is already known from Futschig (1966), only var. *nutans*, which seems to be rarer in our country, was recorded. The 'Critically Endangered' status of the species is obviously overestimated owing to the taxonomical problems in recognition of the taxon in the past.

Splachnum sphaericum (V)

- Úpská jáma cirque, above the Limprichtova skalka rock outcrop: on scat in *Trichophorum caespitosum*, ca 1400 m a.s.l. 3. 6.1998 Buryová 1657.
- Úpské rašeliniště mire near the boundary: On dung, 1430 m a.s.l. 3. 6.1998 coll. Z. Palice, herb. Kučera 2919.

The only member of *Splachnaceae* that has been regularly, though not commonly, recorded in the recent surveys (J. Váňa, pers. comm.). On the Polish side of the range records only from the 19th century (OCHYRA & SZMAJDA 1991).

Trichostomum tenuirostre

- Pec pod Sněžkou: Růžový důl valley, source area at the left bank of the brook 120 m ENE of the chairlift line crossing over the brook (S-1942 grid: x=3552.38, y=5620.29): Wet siliceous stones in the source area, 955 m a.s.l. 7. 9.2000 Kučera 4283. A few further populations were seen in the valley on mortar among the stones of the small cascades.
- Obří Důl: "Čertova zahrádka" ravine (the main ravine), fissure of N-facing porphyry rocks, 1080–1090 m a.s.l. 8. 9.2000 Buryová 2470.

Rare species, evidenced from about 20 scattered localities throughout the whole country. The records from the Giant Mts. date back to 1970 (Pec p. Sněžkou), 1900 (Mt. Kotel) and 1896 (Špindlerův Mlýn).

Taxa of uncertain identity found during the survey.

Cephaloziella grimsulana (R)

The species was, according to Duda (1978), collected in "in Čertova zahrádka near the waterfall of Úpa", i.e. probably not at the "Čertova zahrádka" but rather beneath the "Horní Úpský vodopád" waterfall by Velenovský in 1900. FURTSCHIG (1966) and VÁŇA (1967) collected it there, Váňa (pers. comm.) verified the presence of the species at the locality this year (2000). Our collection from the site is sterile and uncertain. Otherwise the species is known from two collections in Velká kotlina cirque of the Hrubý Jeseník Mts.

Radula lindenbergiana (E)

Collected at "Rudník" in 1956, further collections come from "Čertova zahrádka" (Velenovský, 1896 and Futschig, 1939), Horní Úpský vodopád waterfall (Velenovský, 1900), Sněžná strouha (Schiffner, 1897) and "Kovářna" (Šmarda, 1945) – the records were extracted from DUDA in DUDA & VÁŇA 1978. We only collected sterile plants of *Radula*, which could not be identified; Váňa (pers. comm.) confirmed us that at least some of the collections, including his unpublished records, were fertile.

Scapania helvetica (E)

- valley of Rudný potok brook, L side ca. 60–70 m above the lower pitheap (above the confluence with L-sided tributary); NNW-facing porphyry rock by the brook, ca 1075 m. 6. 9.2000 Buryová 2362 (det. J. Váňa).
- Collected in the Úpská jáma cirque by Schiffner in 1896 and by Velenovský in 1900 (DUDA in DUDA

& VÁŇA 1969a). Unpublished relocation of the species on several localities in the area was later made by J. Váňa (pers. comm.). Our specimen is not typical and sterile.

Scapania praetervisa (R)

– Obří Důl: a ravine at ESE slopes of the Mt. Studniční hora, parallel to the “Čertova zahrádka” ravine (2nd parallel ravine S of it) (S-1942 grid: x=3551.21, y=5622.05): E-facing porphyry rocks, ca. 1040–1050 m a.s.l. 8. 9.2000 Kučera 4337; 1st parallel ravine, ca. 1040–1050 m a.s.l., on soil in E-facing shaded wet fissure of porphyry rocks beneath an overhang, ass. with *Harpantulus flotowianus* 8. 9.2000 Buryová 2459 (both det. J. Váňa).

First record from the area (the species was otherwise in the Giant Mts. collected only at Mt. Kotel in 1967 (DUDA in DUDA & VÁŇA 1969a)). Very small population, identification uncertain (sterile material).

Historically recorded taxa not confirmed at their localities

Only taxa, regarded to be significant (i.e. considered to be rare and/or endangered in the area) were searched for in the literature search and herbarium revisions. Those revisions included the herbaria PRC, PR, BRNM, partly BRNU and OP in case of the families *Dicranaceae*, *Pottiaceae* and *Grimmiaceae* and only PRC in case of other moss families. The complete herbarium revision of liverworts was carried out and published by DUDA and VÁŇA (1967–1993) and thus not checked again in herbaria; the limitation of those revisions is represented by the already considerable time lapse between the first revisions in the late 1960s (mainly *Scapania*, *Jungermannia*) and today. Moreover, some of the bryophytes may have been included in the yet unpublished results of surveys made by Pilous, Váňa and others. All taxa were, often repeatedly so, searched for by the authors at the reported sites without success.

Anastrophyllum saxicola

The only herbarium-evidenced site in the area is Mt. Sněžka (collected by Flotow 1824, Limpricht 1876 and Schiffner s.d., cited in VÁŇA in DUDA & VÁŇA 1983a). Further literature records are from the Úpská jáma cirque, Obří pláň and Koží hřbetý ridge.

Barbilophozia atlantica

Collected in the uppermost part of Bílé Labe by Schiffner in 1895 (DUDA in DUDA & VÁŇA 1984). A remarkable, single record from the Czech Republic.

Barbilophozia kunzeana

Collected at “Pláň pod Sněžkou” (=Úpské rašeliniště mire) by Limpricht in 1871 and by Váňa in 1965 (DUDA in DUDA & VÁŇA 1983b), more recently also in 1995 (J. Váňa, pers. comm.).

Bazzania tricrenata

Collected in the past in the valley of Bílé Labe (Cypers in 1924), at Mt. Studniční hora (1400 m, Váňa in 1965) and in the Úpská jáma cirque (Kalenský s.d. and Váňa in 1965). All specimens are cited in DUDA in DUDA & VÁŇA 1989.

Gymnomitrium concinatum

Seven historical localities in the area (Weberova cesta track, coll. Kuťák 1901, valley of Bílé Labe, coll. Limpricht 1868, Kalenský 1906, Mt. Sněžka – collected by several bryologists between 1824 and 1929, Úpská jáma – coll. Limpricht 1869 and 1899 Schiffner (Lavinová strž), Čertova zahrádka – coll. Pilous 1933 and Rudník – coll. Limpricht 1870). No record of the species since 1929 (VÁŇA in DUDA & VÁŇA 1980). It seems that the species retreated dramatically in the area studied during the last 150 years.

Haplomitrium hookeri

Reported repeatedly from “Bílá louka” meadow near Luční bouda chalet and the uppermost course

of Bílé Labe brook (VÁŇA in DUDA & VÁŇA 1968 could then revise only the specimen collected by Schiffner (source area of Bílé Labe, 1410 m, 1909).

Mannia triandra

Collected at "Rudník" by Flotow in 1840 (VÁŇA in DUDA & VÁŇA 1974), the species has never been relocated at the site.

Marsupella adusta

Collected in the uppermost part of Bílé Labe by Limpricht, Schiffner and at last Futschig between 1879 and 1938 (VÁŇA in DUDA & VÁŇA 1979a). No further collection of this rare hepatic has been encountered in the Czech Republic since then.

Marsupella brevissima

Collected only on the Studniční hora Mt. by Limpricht in 1883 (VÁŇA in DUDA & VÁŇA 1979b, the only verified record from the Czech Republic).

Moerckia hibernica

Confirmed specimens older than 100 years – N slopes of Kozi hřbety ridge (coll. Velenovský in 1900) and between "Modrodolské boudy" chalets and Mt. Studničná (coll. Schiffner 1886). Literature records from the Úpská jáma cirque date back to 1910s (VÁŇA in DUDA & VÁŇA 1968).

Porella cordaeana

Collected in the Úpská jáma cirque *s. d.* by Wihan, in the "Čertova zahrádka" by Velenovský in 1896 and in the Obří důl valley, 1000 m by Wihan in 1930 (DUDA in DUDA & VÁŇA 1979b).

Scapania gymnostomophila

The species was first reported from Rudník by FUTSCHIG (1966) and its presence at the site was for the last time verified about 10–15 years ago (J. Váňa, pers. comm.). We cannot pretend that the population really vanished from the site as it has not been then so exactly located and the species has not been reported to grow in large patches.

Arctoa fulvella

The species was reported from several localities of the summit eastern part (Sněžné jámy on the Polish side, Studničná hora and Bílá louka – LIMPRICHT 1895, VELENOVSKÝ 1897), however all but one specimen were incorrectly determined. Indeed, the species was in the investigated area collected only "am Abfall des Brunnenberges gegen den Riesengrund, 1300 m", i.e. probably at the Studniční stěna cirque face, by Limpricht in 1876 (herb. BP).

Dicranum elongatum

Collected in the area probably only by Limpricht in 1865–1869 (Mt Sněžka, rim of the Sněžné jámy cirques, correctly identified specimens in BP). The specimen to the Cypers' record (CYPERS 1897) has not yet been located.

Dicranum spadicum

Collected on Mt. Sněžka by Limpricht in 1869 (then misidentified for *D. elongatum*). The specimen collected later by Váňa and published as *D. spadicum* by FRANKLOVÁ (1994) belongs to *D. flexicaule*.

Grimmia torquata

Distributed in the Pilous's exsiccate (Musci čechoslovenici exsiccati Nr. 1250) of a 1950 collection. No subsequent find of the species at the site has ever been made.

Grimmia unicolor

Velenovský collected the species in "Čertova zahrádka" in 1896 (herb. PRC), later Vilhelm's collections do not correspond to the taxon. Another specimen was collected by Baumgartner (1905, herb. OP) on rocks beneath the "Horní Úpský vodopád" waterfall. Both sites may be in fact identical as Velenovský, at least in 1896, probably meant the latter site by "Čertova zahrádka" (J. Váňa, pers. comm.).

Hygrohypnum smithii

LIMPRICHT (1904) reports the collections by Flotow, Sendtner, Wichura and himself; his specimens from the Kotelná jáma cirque were revised and confirmed by Váňa (unpubl.), his specimen from the Úpská jáma cirque was missing in herbarium BP (J. Váňa pers. comm.).

Hylocomium pyrenaicum

According to the herbarium specimens in PRC collected twice at "Čertova zahrádka" by Velenovský in 1896 and Vilhelm in 1898 and again by Velenovský beneath the "Horní Úpský vodopád" waterfall in 1900, LIMPRICHT (1895) reports the species "at numerous sites in the Giant Mts."

Hypnum callichroum

Correctly determined specimens in PRC were collected in the valley of Bílé Labe by Cypers (1888) and at "Čertova zahrádka" by Vilhelm (1898). According to LIMPRICHT (1904) at "many sites between 800 and 1440 m", the specimen reported by VELENOVSKÝ (1897) is missing in herbarium PRC.

Kiaeria falcata

There are rather many literature records of this species (see e.g. LIMPRICHT 1890, VELENOVSKÝ 1897), however almost all proved to have been based on misidentification. Only the specimens from the uppermost part of Bílé Labe valley are correctly determined, latest collection was made in 1923.

Kiaeria glacialis

The species was obviously collected only once at the Stříbrné návrší ridge in 1949 by Pilous and distributed in the exsiccate (Pilous, Musci čechoslovenici exsiccati Nr. 1099); it has not been re-found since then.

Palustriella decipiens

Collected in the area only at "Čertova zahrádka" by Velenovský in 1898. Further specimens from Špindlerův Mlýn (leg. Traxler, 1919) and from Mt. Kotel. (leg. Váňa, pers. comm.).

Polytrichastrum sexangulare (Flörke ex Brid.) G.L. Sm.

Rather numerous collections of the species in PRC were made by Schiffner, Bauer and Loeske between 1899 and 1923, a single specimen was also collected on Mt. Studniční hora (1400 m) by Wihan in 1928. LIMPRICHT (1895) cites also older collections back to Ludwig.

Saelania glaucescens

Collected by Pilous at "Čertova zahrádka" in 1946 (NOVOTNÝ 1993), not re-found since then.

Weissia wimmeriana

Reported from the "Čertova zahrádka" by Wichura (cited in LIMPRICHT 1890), confirmed there by Pilous (1949) and distributed in the exsiccate (Pilous, Musci čechoslovenici exsiccati Nr. 1050. A part of the exsiccate belongs nevertheless to *Weissia controversa*).

Recently collected taxa not verified at their sites by the authors

Following taxa are given, as the illustration of the fact that even repeated search for a certain taxon may not result in confirming the presence of a species at the historical locality. *Scapania gymmostomophila* from the preceding list could possibly be ranked within the following taxa but the time lapse since the last verification is longer, and the locality (not extending a few m²) was without success searched three times.

Anthelia juratzkana

Described from the Lavinový potok brook in the Úpská jáma cirque; we did not find exactly the site or we overlooked it – the species was verified at the site this year (2000) by J. Váňa (pers. comm.). Some sterile specimens of *Anthelia* we collected cannot be excluded of belonging to this taxon but we were not able to identify them.

Marsupella funckii

Collected sparsely in the area, mostly in the last century (valley of Bílé Labe – coll. Limpricht in 1871, “Čertova zahrádka” – coll. Velenovský in 1896 and 1900, in the Úpská jáma cirque – coll. Velenovský in 1900 and later Váňa in 1965 (Horní Úpský vodopád waterfall, 1320 m); all cited by VÁŇA in DUDA & VÁŇA (1983b). Verified at the latter site by J. Váňa (pers. comm.) this year (2000).

Scapania parvifolia

Grows allegedly at the same site as *Anthelia juratzkana* (FUTSCHIG & VÁŇA 1969) and was likewise verified at its site this year (2000) by J. Váňa (pers. comm.).

Historically reported taxa, not revised and not re-found during the survey

Jamesoniella undulifolia

Reported from Úpská jáma cirque and the Bílé Labe valley by Nees v. Esenbeck (collections by Flotow) (VÁŇA in DUDA & VÁŇA 1969a).

Lophozia opacifolia

Reported from “Čertova louka”, 1440 m, by Szweykowski & Kozlicka, collected in 1974 (VÁŇA in DUDA & VÁŇA 1992), the specimen could not be checked. This is the only report of the species from our country.

Bryum arcticum

Reported by LIMPRICHT (1895) from Mt. Sněžka; the corresponding specimen has not yet been studied.

Bryum schleicheri

The specimen cited in VELENOVSKÝ 1897 (source area of Úpa) is missing in herbarium PRC.

Pohlia obtusifolia

Reported from the surroundings of Luční bouda chalet and Rennerova bouda by VELENOVSKÝ (1897). The specimens in herbarium PRC belong to *P. nutans*, the species has nevertheless also been reported by Sendtner (cited in VELENOVSKÝ 1897) from the same site, whose specimen has not yet been checked.

Excluded historically reported taxa

Bryum turbinatum

The Velenovský's specimen from the source area of Úpa matches *Bryum weigeli*, the Traxler's specimen (Aupakessel, i.e. probably Horní Úpský vodopád) corresponds to *B. muehlenbeckii* and the Wihan's collection (Klein Aupa – Malá Úpa) is *B. pallens*. We are not aware of any other record from the area.

DISCUSSION

The acquired data will definitely serve as a foundation for future comparisons and analyses of dynamics, rather than allowing us to elaborate such analyses towards the past by ourselves, due to the incompleteness of historical data. Nevertheless, partial comparison can definitely be made. The most obvious and most secure difference from the historical state is the probable loss of several taxa. Ironically, the losses refer to some of the best preserved and most valuable sites, such as the uppermost course of the Bilé Labe brook (*Polytrichastrum sexangulare*, *Hypnum callichroum*, *Kiaeria falcata*, *Marsupella adusta*, *Moerckia hibernica*), the uppermost course of Úpa in the Úpská jáma cirque (*Grimmia unicolor*, *Hygrohypnum smithii*, *Hylocomium pyrenaicum*), slopes of Mt. Studniční hora including the cirque faces of Úpská jáma (*Marsupella brevissima*, *Arctoa fulvella*, *Gymnomitrium concinatum*), Čertova zahrádka (*Grimmia torquata*, *Hylocomium pyrenaicum*, *Palustriella decipiens*, *Hypnum callichroum*), Rudník (*Mannia triandra*, *Gymnomitrium concinatum*) or the top of Mt. Sněžka (*Dicranum elongatum*, *D. spadiceum*, *Gymnomitrium concinatum* – though here the missing species can still occur on the non-surveyed Polish side). This of course does not mean that these localities would be more severely affected by the succession and civilization changes but rather they are the only ones where the comparison could be made. It is almost guaranteed that most of those taxa really vanished from their historical localities, as the bryologists sought most of them in course of the whole 20th century; the absolute exclusion can however hardly be made due to the dimensions of moss patches in relation to the extent of the area and due to the possibility of spontaneous re-introduction from outside via airborne diaspores.

On the other hand, it is quite hard to say which species spread new in the area. The only guaranteed candidate is the invasive species *Orthodontium lineare*, first collected in the Czech Republic probably in 1964 and from the Giant Mts. known only from 4 localities outside the investigated area (SOLDÁN 1996). Now we recorded it several times at the forested slopes of Mt. Studniční hora and Rudný potok valley, up to ca. 1100m a.s.l.

The newly recorded *Racomitrium macounii* subsp. *macounii* would with a great probability be found in herbaria filed within other *Racomitrium* species, as it was the case of *Racomitrium macounii* subsp. *alpinum* or *Grimmia montana* (BURYOVÁ & KUČERA 1999). In addition, we found no previous reports of e.g. *Bryum creberrimum*, *B. uliginosum*, *Leptobryum pyriforme*, *Rhabdoweisia crispata* or *Trichostomum tenuirostre*, which may or may not mean that they were found for the first time in the study area. Previously under-recorded or unrecorded taxa of gemmiferous Bryaceae or taxonomically newly delimited *Schistidium* species may also well be found in herbaria. In most taxa of mosses, we are facing the problem of the non-existing herbarium revision, which we could carry out only in a very limited extent. The comparison of our data with the historical record could be made easier for hepatics thanks to the extensive revisions made by Duda and Váňa in the past. Newly recorded in the investigated area are e.g. *Cololejeunea calcarea*, *Jungermannia pumila* or *Scapania paludosa*.

The historical comparison of quantitative data on individual taxa is essentially impossible, as such data have never been recorded in the past. Hence only the retreat of taxa that were repeatedly and in larger quantities herbarized is striking, as in the case of *Gymnomitrium concinatum*, *Marsupella funckii*, *Polytrichastrum sexangulare*, *Kiaeria falcata*, *Hylocomium pyrenaicum* or *Hypnum callichroum*. It is tempting to speculate if the main reason for disappearance of those taxa are the spontaneous succession changes, civilization changes or the eradication by the bryologists themselves.

CONCLUSIONS

The results of our 3-years-survey with the inclusion of literature records and partial herbarium revision of material from the investigated area definitely brings the most comprehensive portrait of the bryoflora in the particular area of the summit region of the Eastern Giant Mts., relatively well known historically except the Růžový důl valley, for which we bring the first bryofloristic data. The area is both within our country as well as within Central Europe definitely ranked within the richest and best preserved

regions in terms of species diversity. Moreover, many of the species found during the survey are known only from here in the Czech Republic, as *Tetralophozia setiformis*, *Marsupella alpina*, *Andreaea frigida*, *Grimmia atrata*, *G. reflexidens*, *Racomitrium macounii* subsp. *macounii*; many others are only here found more commonly, as *Racomitrium macounii* subsp. *alpinum*, *Bryum muehlenbeckii*, *Grimmia elongata*, *Warnstorfia sarmentosa*, *Sphagnum lindbergii* or *Anthelia julacea*. The species richness is the more interesting as the diversity of substrates and hence the diversity of microhabitats is relatively low compared to the situation e.g. in the Alps.

The historical loss of bryophyte species in the area was documented to be fortunately relatively low. We were not able to verify about 30 species recorded in the past (about 9 % of the total record), whereof something between five and ten species have recently been recorded by other authors during their yet unpublished surveys. Moreover, the chance of verifying some other of the missing species in the future is relatively high, given the badly low ratio of surveyed and unsurveyed surface in the area. On the other hand, the population size of quite numerous species in the area seems to be critical, which will inevitably lead to further losses in the future. More than ten bryophyte species are reported for the first time here but it is hard to assess if they indeed never have been collected due to the yet incomplete herbarium revision of mosses.

SOUHRN

Jsou prezentovány výsledky inventarizačního bryofloristického průzkumu vrcholových partií české části východních Krkonoš, prováděného během 13 dnů v letech 1998–2000. Zájmové území tvořily lokality Úpská jáma, svahy Sněžky a Růžové hory, Důl pod Koulemi, horní část údolí Bílého Labe, Studniční a Luční hora, Úpské rašeliníště, Čertova zahrádka, Rudník, Růžový důl a svahy mezi Růžohorkami a Peci pod Sněžkou, tedy s výjimkou posledních dvou lokalit, které byly zřejmě bryologicky zdokumentovány poprvé, území poměrně dobře historicky známé. V území bylo zaznamenáno 322 taxonů mechorostů (přibližně 37 % bryoflóry ČR), z nich *Racomitrium macounii* subsp. *macounii* je z našeho území zde udáváno poprvé a *Mnium ambiguum* byl druh, považovaný za vyhynulý. 59 druhů je zařazených na předběžné verze Červených seznamů ohrožených druhů mechorostů. Výsledky naší dosud nejúplnější inventarizace území jsou srovnány s historickým stavem – literární údaje u jätrovek vycházejí z prací DUDA & VÁŇA (1967 a násl.), u mechů se opírají o výsledky částečně literární rešerše a vlastních revizí herbářového materiálu. 30 historicky udávaných druhů (asi 9 % celkového druhového bohatství) se nepodařilo ověřit, menší část z tohoto počtu však byla ověřena v posledních letech jinými autory.

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