

Epiphytic lichens of Stužica (E Slovakia) in the context of Central European old-growth forests

Jan VONDRÁK*, Jiří MALÍČEK, Jaroslav ŠOUN & Václav POUSKA

Abstract: VONDRÁK, J., MALÍČEK, J., ŠOUN, J. & POUSKA, V. 2015. Epiphytic lichens of Stužica (E Slovakia) in the context of Central European old-growth forests. – *Herzogia* 28: 104–126.

Based on recent lichen inventories, we report 230 epiphytic and epixylic species in the Slovakian old-growth beech-dominated Stužica forest. Microlichens represent 75% of species. By comparison, lichen lists of only three other Central European forests exceed 200 species, and none of them reached 230. Lichen diversity is very unequally distributed in Stužica; the extensive south-facing slopes are poor in species, whereas damp brook valleys and upper parts of slopes above 1000 m alt. are rich. Some rare macrolichens were collected in Stužica about 50 years ago but could not be relocated during the present survey.

Twelve species are new to Slovakia: *Epigloea urosperma*, *Graphis macrocarpa*, *Kirschsteiniothelia recessa*, *Lecidea sanguineoatra*, *Lepraria ecorticata*, *Micarea nigella*, *Opegrapha trochodes*, *Parmotrema arnoldii*, *Pertusaria waghornei*, *Ramonia chrysophaea*, *Sclerophora amabilis* and *Tetramelas chloroleucus*. Three recorded species were considered regionally extinct in Slovakia: *Arthonia byssacea*, *Sclerophora coniophaea* and *Sclerophora farinacea*.

Zusammenfassung: VONDRÁK, J., MALÍČEK, J., ŠOUN, J. & POUSKA, V. 2015. Die epiphytischen Flechten von Stužica (Ostslowakei) im Kontext zentraleuropäischer Altwälder. – *Herzogia* 28: 104–126.

Zweihundertdreißig borken- und holzbewohnende Flechten werden basierend auf aktuellen Bestandsaufnahmen aus dem slowakischen, von Rotbuche dominierten Altwald Stužica gemeldet. 75% der Arten sind Kleinflechten. Die Flechtenlisten von nur drei anderen zentraleuropäischen Altwäldern übersteigen 200 Arten, aber keine von ihnen erreicht 230. Die Flechtendiversität ist sehr unterschiedlich verteilt in Stužica. Die weitläufigen, südexponierten Hänge sind artenarm, währenddessen feuchte Bachtäler und die in über 1000 m Seehöhe liegenden oberen Hänge artenreich sind. Einige seltene Großflechten wurden in Stužica noch vor mehr als 50 Jahren gesammelt, konnten aber im Zuge der aktuellen Studie nicht mehr gefunden werden.

Die folgenden zwölf Arten sind neu für die Slowakei: *Epigloea urosperma*, *Graphis macrocarpa*, *Kirschsteiniothelia recessa*, *Lecidea sanguineoatra*, *Lepraria ecorticata*, *Micarea nigella*, *Opegrapha trochodes*, *Parmotrema arnoldii*, *Pertusaria waghornei*, *Ramonia chrysophaea*, *Sclerophora amabilis* und *Tetramelas chloroleucus*. Die drei Flechten *Arthonia byssacea*, *Sclerophora coniophaea* und *Sclerophora farinacea* wurden in der Slowakei bereits als ausgestorben geführt.

Key words: Beech forest, DCA, diversity inventory, Eastern Carpathians, forest conservation, lichenised fungi, microlichens, Sørensen's similarity index, Stuzhytsia, Ukraine, virgin forest.

Introduction

Lichen inventories in various woodland areas provide data for forest conservation, but few such inventories have been published for Central Europe (e.g. DMYTROVA et al. 2013, GUTTOVÁ & PALICE 2004, GUTTOVÁ et al. 2012, HAFELLNER & KOMPOSCH 2007, MALÍČEK & PALICE

* Corresponding author

2013). Other detailed inventories of various Central European old-growth woodlands have been made recently, but their data are unpublished (Table 1; Fig. 1). Here we present a lichen list for the Slovakian virgin forest Stužica and compare its outstanding lichen diversity with other Central European old-growth woodlands.

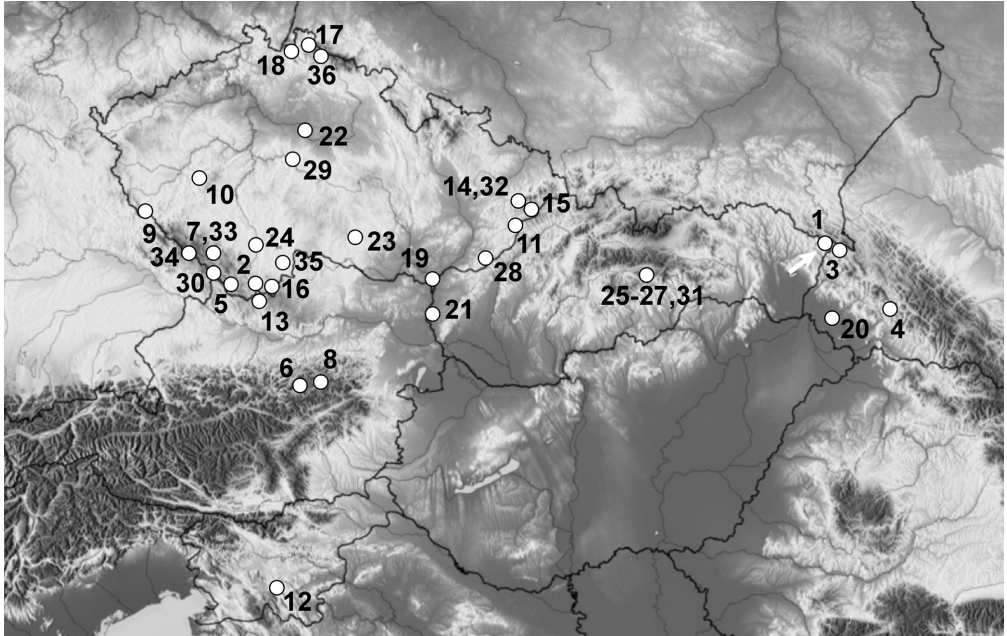


Fig. 1: Localities of Central European old-growth forest inventories. Numbers correspond to Table 1. White arrow shows Stužica.

The national nature reserve Stužica is a virgin beech-fir woodland in the NE corner of Slovakia, in Bukovské vrchy upland. It is the largest virgin forest in Slovakia, but it is only a smaller part (761 ha) of an old-growth forest complex, most of which is in Ukraine – Regional landscape reserve Stuzhytsia with 2492 ha (STOYKO & KOPACH 2012). It belongs to the largest old-growth forest remnants in Europe. The Slovakian part was studied in the past and its lichen diversity inventory has been published (PIŠŮT & LACKOVIČOVÁ 1992) with additions by PIŠŮT (1995) and PIŠŮT et al. (2007). The Ukrainian part has also been surveyed (KONDRATYUK et al. 1998, MOTIEJŪNAITE et al. 1999, KONDRATYUK & COPPINS 2000).

The altitude of Slovakian Stužica ranges from 650 to 1200 m. *Fagus sylvatica* dominates at all altitudes. *Acer pseudoplatanus* occurs at all altitudes, but is abundant only in patches, mainly at upper altitudes (often on scree). *Abies alba* is frequent at lower altitudes but almost absent in the uppermost part, while *Sorbus aucuparia* occurs only in the uppermost parts. *Ulmus glabra* is usually represented by young trees which mostly follow valley bottoms. *Fraxinus excelsior* and *Corylus avellana* are present only in the lower part, in the valley of the river Stužica. Only one tree of *Acer platanoides* was observed. Most of the stands are tall with high canopies, but the uppermost forests (c. >1100 m alt.) consist of low, contorted trees with low branching. The annual precipitation is about 1200 mm, the annual

average temperature about 4–6 °C (<http://globus.sazp.sk/atlassr/>). The main part of the territory is on a steep south-facing slope and so is very dry, with a low abundance of epiphytic macrolichens. Bedrock consists of sandstone and schist that is generally acidic but probably with base-rich intrusions.

Not all of the 630 ha is formed by virgin forests. Large areas, e.g. along the Stuzica River, are young forests that originated after clear cuts during the Second World War. During this period, a railway was built in the Stuzica River valley to facilitate timber production (<http://en.pralesy.sk>). These young beech forests have distinctly smaller tree diameters and are characterized by scattered *Betula*, *Salix caprea* and *Picea abies*, the latter only in the lowest part of the valley.

Material and methods

Epiphytic and epixylic lichens (Appendix 1, upper part), lichenicolous fungi and non-lichenised microfungi were recorded (Appendix 1, bottom), but only data on lichens, facultatively lichenised fungi (e.g. *Arthopyrenia salicis*), the non-lichenised genus *Chaenothecopsis*, and *Microcalicium disseminatum* were analysed.

Data from Stuzica (Slovakian part)

Slovakian part of Stuzica is delimited as the area of the National Nature Reserve Stuzica (<http://uzemia.enviroportal.sk/main/detail/cislo/687>). We considered three sources of recent lichen diversity data. (1) Records from our first field trip on 26–27th October 2013 (J. Malíček & J. Vondrák, about 10 hours). (2) Records from our second field trip on 5–8th June 2014 (J. Šoun & J. Vondrák, about 20 hours). (3) Records by Zdeněk Palice from 2002 (partly published in Pišút et al. 2007). These three data sets are independent in Appendix 1 and in Fig. 2, but they are lumped for analyses (e.g. Figs 3, 4, Table 2).

In our field trips we tried to include all microhabitats, but canopies and the upper parts of trunks are difficult to study. This problem was partly solved by examination of fallen twigs and by occasionally climbing trees. However, during our second field trip we took advantage of windfalls from a recent storm, so we were able to study these microhabitats fairly effectively.

Material was identified using routine methods. TLC analysis (ORANGE et al. 2010) was done for specimens indicated by an asterisk in Appendix 1. Voucher specimens are deposited in the herbarium PRA (Jan Vondrák) and private herbaria of the other authors. Vouchers are named by author acronyms in Appendix 1.

Literature data have been extracted from Pišút & Lackovičová (1992), Pišút (1995), Pišút et al. (2007) and DIEDERICH et al. (2008). To make the extracted data more reliable, we revised voucher material collected by Ivan Pišút (available in BRA and SAV). Extracted data from the Slovak part are compared with our recent data, to detect possible turnover in lichen species, though with caution as the data samplings are not comparable.

Extraction of data from Stuzhytsia (Ukrainian part)

The lichen list of Stuzhytsia was extracted from recent lichen inventories (KONDRATYUK et al. 1998a, KONDRATYUK & COPPINS 2000, MOTIEJŪNAITE et al. 1999). Three other publications (COPPINS et al. 1998, KONDRATYUK et al. 1998b, COPPINS et al. 2005) largely contain data duplicates and do not provide additional relevant information. Except for MOTIEJŪNAITE et al. (1999), these papers are poorly organised and it is difficult to obtain correct data about the

records. Many listed records refer to sites outside Stuzhytsia. For some species it is unclear whether they even occur in the territory, no substrate is specified for some records and there are no data at all about vouchers. Some missing information and clarifications were provided by B. J. Coppins (personal communication). Additional data from Stuzhytsia have been extracted from COPPINS et al. (2008), CZARNOTA & COPPINS (2000), HILITZER (1939–1940), SÉRUSIAUX et al. (2001), TIBELL (1971) and TRETIACH (2014).

Data from other Central European old-growth forests

To evaluate the similarity with other Central European old-growth woodlands, we extracted data on the presence/absence of lichen species (excluding lichenicolous fungi and epiphytic microfungi) from 34 sites: 16 forests dominated by beech, 6 lowland deciduous forests, 5 deciduous forests on scree, 7 coniferous forests (Table 1, Fig. 1). This data set consists of 610 species with 3900 occurrences. The number of species was counted and compared with Stuzica (Fig. 3, upper part). Sørensen's similarity index (SØRENSEN 1948) was used for comparison of presence/absence data (Table 1; Fig. 3, lower part). Presence/absence data were also analysed using Detrended Correspondence Analysis (DCA) with downweighting of rare species in Canoco 5 (TER BRAAK & ŠMILAUER 2012) to display similarities of sites in species assemblages (Fig. 4).

Nomenclature

Names not included in the Slovakian checklist (GUTTOVÁ et al. 2013) are listed with author abbreviations in Appendix 1.

Results

Epiphytic lichen diversity in Slovakian Stuzica

230 epiphytic and epixylic lichen species have recently been recorded in the Slovakian Stuzica (Appendix 1), which is slightly more than was recorded in the Ukrainian Stuzhytsia (see Appendix 1 and Table 1). Another 10 species of non-lichenised epiphytic microfungi or lichenicolous fungi are listed (Appendix 1, bottom). Nine lichen species were reported from Stuzica in the past but not confirmed recently (see Discussion). We found high diversity in the genera *Biatora* (6 species), *Chaenothecopsis* (3), *Fuscidea* (3), *Gyalecta* (4), *Hypogymnia* (4), *Lecanora* (18), *Nephroma* (3), *Opegrapha* (6), *Pertusaria* (9) and *Sclerophora* (5). On the other hand, we found few species and very low abundances in beard lichens and some fruticose lichens, *Bryoria* (1), *Evernia* (1), *Ramalina* (1) and *Usnea* (2), and also in nitrophilous lichens, e.g. *Physcia* (3), *Physconia* (1) and *Xanthoria* s.lat. (2).

We found the following lichenised fungi, which are not included in the recent checklist of Slovakian lichens (GUTTOVÁ et al. 2013): *Bacidia pycnidiata* (already published by MALÍČEK et al. 2014), *Caloplaca flavocitrina* (FAČKOVCOVÁ et al. 2014), *Fuscidea pusilla* (GUTTOVÁ et al. 2012a), *Graphis macrocarpa*, *Lecanora persimilis* (GUTTOVÁ et al. 2012b), *Lecidea sanguineoatra*, *Lepraria ecorticata*, *Melaspilea gibberulosa* (published from Slovakia by e.g. ZAHLBRUCKNER 1923, as *M. deformis*), *Micarea nigella*, *Opegrapha trochodes*, *Parmotrema arnoldii*, *Pertusaria waghornei*, *Ramonia chrysophaea*, *Sclerophora amabilis* and *Tetramelas chloroleucus*. Lichenicolous *Epigloea urosperma* and the non-lichenised saprophytic corticolous fungus *Kirschsteiniothelia recessa* are also new to Slovakia.

Table 1: Selected characteristics of recently surveyed Central European old-growth forest remnants used for comparison with Stuzica (first locality in the list). Sørensen similarity indexes ≥ 0.5 are in bold. Ratio of conifers: 0 – rare or absent; 1 – mixed with deciduous trees; 2 – dominant.

Nr on Fig. 1	forest type	locality	Nr of lichen taxa	Shared taxa with Stuzica	Sørensen Similarity Index to Stuzica	altitude (m)	ratio of conifers	Source
1	beech-fir	Stuzica (SK)	230	230	1.00	970	1	PIŠŮT et al. (2007), this paper
2	beech-fir	Žofinský prales (CZ)	223	133	0.58	780	1	MALÍČEK & PALICE (2013)
3	beech-fir	Stuzhitsa (UKR)	218	162	0.73	850	1	KONDRATYUK et al. (1998), KONDRATYUK & COPPINS (2000), MOTIEJŮNAITÉ et al. (1999)
4	beech-fir	Ugolka (UKR)	197	127	0.59	880	0	DYMYTROVA et al. (2013)
5	beech-spruce-fir	Hraničnick (CZ)	188	123	0.59	1150	1	Z. Palice (unpublished)
6	beech-spruce-fir	Rotwald (A)	175	105	0.52	1180	1	TÜRK & BREUSS (1994), BILOVITZ (2007)
7	beech-fir	Boubínský prales (CZ)	140	98	0.53	1040	1	E. Budějcká (unpublished)
8	beech-fir	Neuwald (A)	127	84	0.47	950	1	HAFELLNER & KOMPOSCH (2013)
9	beech	Čerchov (CZ)	106	89	0.53	900	0	O. Peksa (unpublished)
10	beech	Chejlava (CZ)	90	78	0.48	580	0	O. Peksa (unpublished)
11	beech-fir	Razula (CZ)	90	80	0.50	785	1	our unpublished data
12	beech-fir	Rajhenavski Rog (SLO)	87	63	0.39	885	1	BILOVITZ et al. (2011)
13	beech-fir	Luxensteinwand (A)	85	71	0.45	850	1	MALÍČEK et al. (2013)
14	beech	Čertův mlýn (CZ)	77	70	0.45	1070	1	our unpublished data
15	beech-fir	Hojná Voda (CZ)	67	66	0.44	840	1	MALÍČEK et al. (2013)
16	beech-fir	Salajka (CZ)	57	54	0.37	765	1	our unpublished data
17	beech	Jizerskohorské bučiny (CZ)	40	36	0.26	740	0	our unpublished data
18	beech	Karlové bučiny (CZ)	30	26	0.20	440	0	our unpublished data
19	floodplain	Soutok Moravy a Dyje (CZ)	212	123	0.56	150	0	our unpublished data
20	floodplain	Otok, Mukachevo (UKR)	159	98	0.50	190	0	our unpublished data
21	floodplain	Horný les (SK)	101	67	0.40	140	0	our unpublished data
22	floodplain	Libický luh (CZ)	71	58	0.38	200	0	our unpublished data
23	oak-hornbeam	Oslava a Chvojnice (CZ)	130	130	0.50	350	0	J. Šoun (unpublished)
24	oak-hornbeam	Hluboká (CZ)	81	81	0.40	400	0	our unpublished data
25	mixed on scree	Cigánka (SK)	148	88	0.46	700	0	GUTTOVÁ & PALICE (2005)
26	mixed on scree	Hrdzavá (SK)	104	71	0.42	860	0	GUTTOVÁ & PALICE (1999)
27	mixed on scree	Javorníková dolina (SK)	95	70	0.43	790	0	GUTTOVÁ & PALICE (2002)
28	mixed on scree	Javořina (CZ)	77	66	0.43	750	0	our unpublished data
29	mixed on scree	Ve Studeném (CZ)	64	56	0.38	375	0	our unpublished data
30	spruce	Trojmezna (CZ)	147	76	0.40	1275	2	our unpublished data
31	spruce	Fabova hoľa (SK)	114	71	0.41	1380	2	GUTTOVÁ et al. (2012)
32	spruce	Kněhyně (CZ)	64	42	0.28	1130	2	our unpublished data
33	spruce	Boubín - top (CZ)	58	39	0.27	1280	2	our unpublished data
34	spruce	Reschbach Klause (DE)	58	39	0.27	1140	2	our unpublished data
35	peat-bog pine	Červené blato (CZ)	62	39	0.27	470	2	our unpublished data
36	peat-bog spruce, pine	Rašeliniště Jizery (CZ)	52	32	0.22	850	2	MALÍČEK & VONDRÁK (2014)

Arthonia byssacea, *Sclerophora coniophaea*, and *S. farinacea* were considered regionally extinct in Slovakia (Pišúť et al. 2001). We recorded 55 species that are considered critically endangered or endangered by Pišúť et al. (2001), for instance the rare old-growth forest macrolichens *Hypotrachyna revoluta*, *Leptogium cyanescens*, *Leptogium saturninum*, *Lobaria pulmonaria*, *Menegazzia terebrata*, *Nephroma bellum*, *N. parile*, *N. resupinatum* and *Parmelina pastillifera*. Further noteworthy records of microlichens are *Belonia herculina*, *Biatora ocelliformis*, *B. vernalis*, *Buellia erubescens*, *Caloplaca substerilis*, *Coenogonium luteum*, *Gyalecta carneola*, *G. truncigena*, *Ochrolechia pallescens*, *Parmeliella triptophylla*, *Ramonia luteola* and *Rinodina degeliana*.

Table 2 summarises our data about epiphytic and epixylic lichens in Stučica. Epixylic lichens are few; only 14 species are restricted to wood. The dominant tree species, *Abies alba*, *Acer pseudoplatanus* and *Fagus sylvatica* harbour the main part of the epiphytic lichen diversity. Surprisingly few lichen species were found on *Ulmus glabra*. Microlichens dominate our species list (75%). Among reproductive strategies, vegetative dispersal dominates. It is the preferred strategy in 52% of species and it is more frequent in canopies, or on tree trunks in lit forests of higher altitudes. Our list includes many lichens with trentepohlioid photobiont (37 species), but they are not equally distributed. While they are dominant in some shaded habitats

Table 2: Selected characteristics of lichen diversity in Slovakian Stučica (i.e. 230 recently recorded species). Substrate abbreviations are as in the Appendix 1. “Substrate specialists” means species recorded from only one type of substrate.

Substrate preferences								
	AA	AP	FE	FS	SA	UG	“dry wood”	“wet wood”
nr of species	50 (22%)	122 (53%)	30 (13%)	155 (68%)	24 (10%)	16 (7%)	24 (10%)	23 (10%)
nr of specialists	11 (4.8%)	20 (8.7%)	5 (2.2%)	38 (16.6%)	1 (0.4%)	0	4 (1.7%)	10 (4.4%)
Growth forms								
	fruticose	foliose	microlichens (crusts)					
nr of species	13 (6%)	44 (19%)	171 (75%)					
Reproductive strategies								
	vegetative diaspores prevail		reproduction by spores prevails			both types frequent		
nr of species	119 (52%)		90 (39%)			20 (9%)		
Photobionts								
	green globose cells		trentepohlioid	cyanobacteria		others		
nr of species	171 (73%)		37 (16%)	11 (5%)		13 (6%)		
Prevailing systematic units								
	Arthoniomycetes		Eurotiomycetes	Lecanoromycetidae		Ostropomycetidae		
nr of species	14 (6.1%)		8 (3.5%)	145 (63.3%)		38 (16.6%)		
Slovakian Red list categories (Pišúť et al. 2001)								
	RE	EN + CR		VU	new for Slovakia			
nr of species	3 (1%)	55 (24%)		22 (9.5%)	10 (4%)			
Frequency of occurrence in the protected area Stučica								
	rare (≤ 3 records)		sparse (4-10 records)		frequent (>10 records)			
nr of species	78 (34%)		90 (39%)		61 (27%)			

in valley bottoms at lower altitudes, many species are scarcer at higher altitudes. Only eleven species have cyanobacteria, but that is a high number for Central European forests (more in the discussion).

Unequal distribution of lichen diversity in Slovakian Stuzica

More than half of the area is rather poor in lichens. This includes south-facing slopes below c. 1000 m altitude, which are obviously dry, and where many trees, including those with very thick trunks, are almost without lichens. Ancient firs here are also poor in species: usually they have only xerophilous pin-headed lichens and a few other common species. Most of the species found on beeches or on wood are common and are also frequent in secondary forests.

The lichen diversity hot spots are humid valleys with a watercourse at lower altitudes and humid slopes and mountain ridges above 1000 m, but the lichen composition in these two environments is different. At lower altitudes microlichens dominate (at least on the lower parts of trunks), and many have trentepohlioid photobiont; e.g. *Arthonia helvola*, *Coenogonium luteum*, *Dictyocatenulata alba*, *Gyalecta flotowii* and *G. truncigena*. Also some cyanolichens were found mostly in valleys, e.g. *Collema flaccidum*, *Leptogium cyanescens* and *Nephroma parile*. Rare parmelioid macrolichens (*Hypotrachyna revoluta* and *Parmotrema arnoldii*) were recorded at low altitudes, but in the upper, and probably more sunlit, parts of trunk.

Macrolichens are abundant at higher altitudes in Stuzica, and even south facing slopes, which are dry and almost without epiphytic lichens at low altitudes, support well-lit forests with rich lichen communities above about 1000 m. Many rare macrolichens were restricted (or almost restricted) to altitudes above 1000 m: *Hypogymnia vittata*, *Leptogium saturninum*, *Lobaria pulmonaria*, *Melanelixia glabra*, *Menegazzia terebrata*, *Nephroma bellum*, *N. resupinatum* and *Parmelina pastillifera*. Upper altitudes also have some montane lichens, such as *Frutidella pullata*, *Lecanora subintricata* and *Pycnora leucococca*.

Distinct but unidentified taxa

Bacidia cf. *viridescens*. Our specimen resembles *B. viridescens*: thallus areolate, without any propagules; hypothecium slightly brownish to colourless; epihymenium olive, K⁻; excipulum largely colourless but with orange-brown area at the top, K⁺ darkening; ascospores acicular, c. 40 × 1.5 μm. However, *B. viridescens* is not thought to be epiphytic, so our specimen may belong to another, perhaps undescribed taxon.

Lecanora cf. *farinaria*. Three samples of a sorediate crust from Stuzica contain atranorin and roccellic acid, alone or together with an unknown fatty acid. This crust is usually sterile, but one "*Lecanora subfusca*-type" apothecium was found. Morphologically, it strongly resembles *L. farinaria*, an oceanic species restricted mainly to wood and acid bark (TØNSBERG 1992). Our samples are identical with *L. farinaria* in the character of soralia, sorediate apothecial margin, large crystals in amphithecium and in chemistry. However, the epihymenium in our fertile specimen belongs to the *chlarotera*-type (coarse granules mainly at paraphyses tips, soluble in HNO₃ after several minutes) and the thallus is thick and frequently verrucose. The species is probably undescribed.

Pertusaria alpina and *P. constricta*. It is not clear to us whether these are distinct species and here we do not distinguish between them. They are said to differ slightly in thallus thickness and in the shape of the base of apothecial warts (ERICHSEN 1936). Both are rare in Central Europe. According to ERICHSEN (1936) and WIRTH et al. (2013), they have slightly different ecology. *Pertusaria alpina* prefers young trees and branches whereas *P. constricta* occurs on trunks, usually of beeches. PIŠŮT & LACKOVIČOVÁ (1992) reported *P. alpina* in Slovakian Stuzica, but KONDRATYUK et al. (1997) reported both taxa from Ukrainian Stuzhytsia.

Placynthiella cf. *dasaea*. This is probably an undescribed sorediate *Placynthiella* without gyrophoric acid and morphologically similar to *P. dasaea* (TØNSBERG, personal communication). According to our collections from the Czech Republic and Slovakia, it is distributed in well-lit forests in montane regions on acidic bark of beeches, where it sometimes dominates lichen communities. It possesses one or two compounds of aliphatic character. (They are not necessarily fatty acids; one of the spots on TLC plates has a slightly coloured tinge.)

Rinodina freyi and *R. septentrionalis*. SHEARD (2010) distinguishes these, but notes that young but fertile thalli of *R. freyi* may be indistinguishable from *R. septentrionalis*. Our specimen includes only two small thalli with few apothecia and seems closer to *R. septentrionalis*: the thallus is not areolate but of broadly-spreading verrucae; apothecia are scattered, with constricted bases. Our specimen was on smooth bark of a twig, which also fits *R. septentrionalis*. However, *R. septentrionalis* is a boreal/arctic lichen, whereas *R. freyi* would be expected in our region.

Vezdaea cf. cobria. Our specimen from rough bark of old beech consists of a sterile thallus formed of numerous gonocysts. As in *V. cobria*, the gonocysts are formed by only one photobiont cell, but the cell diameter (10–40 µm), is larger than expected for that species.

Revision of voucher specimens corresponding to literature data

We have revised specimens collected in Slovakian Stučica by Ivan Pišút (available in BRA and SAV) and by Zdeněk Palice (PRA). Most material was correctly identified, but specimens called *Cetrelia olivetorum*, *Lecanora cinereofusca*, *Parmelia elegantula* and *Pertusaria flavida* belong to other species. We confirmed the identification of several specimens of *Usnocetraria oakesiana* and *Parmotrema crinitum* containing well-developed and large thalli. However, we did not collect these two macrolichen species ourselves.

List of revised samples: *Arthopyrenia salicis* (PRA ZP6433, as *Arthopyrenia* sp.), *Belonia herculina* (BRA CR11697), *Calicium viride* (BRA CR11698), *Cetrelia monachorum* (SAV, s.n., as *C. olivetorum*), *Collema flaccidum* (BRA CR11699), *Flavoparmelia caperata* (BRA CR11700, as *Parmelia* c.), *Fuscidea cyathoides* (BRA CR11701), *Graphis pulverulenta* sensu NEUWIRTH & APTROOT 2011 (BRA CR11702, as *Graphis scripta*), *Lecanora argentata* (BRA CR11704, CR11705), *L. carpinea* (SAV, s.n.), *L. pulicaris* (SAV, s.n., as *L. cinereofusca*), *L. subcarpinea* (BRA CR11706, as *L. nemoralis*), *Leptogium cyanescens* (BRA CR11707 – CR11709), *L. lichenoides* (BRA CR11710 – CR11712), *Lobaria pulmonaria* (BRA CR11714), *Mycobilimbia tetramera* (PRA ZP6432), *Nephroma bellum* (BRA CR11719), *N. resupinatum* (BRA CR11721 – CR11723), *Melanelixia glabratula* (BRA CR11713 – CR11718, as *Parmelia elegantula*), *Ochrolechia androgyna* (BRA CR11018), *Parmelia saxatilis* (BRA CR11727, CR11728), *Parmelia sulcata* (BRA CR11729), *Parmotrema crinitum* (BRA CR11730 – CR11734, as *Parmelia* c.), *Pertusaria albescens* (BRA CR11735), *P. amara* (BRA CR11736), *P. coccodes* (BRA CR11737), *P. coronata* (BRA CR11741, as *P. flavida*), *Phlyctis argena* (BRA CR11742), *Platismatia glauca* (BRA CR11743), *Pseudevernia furfuracea* (BRA CR11744), *Pyrenula nitida* (BRA CR11745 – CR11747), *Ramalina pollinaria* (BRA CR11748), *Thelotrema lepadinum* (BRA CR11750 – CR11753), *Usnocetraria oakesiana* (BRA CR11724 – CR11726, as *Cetraria* o.), *Varicellaria hemisphaerica* (BRA CR11754 – CR11756, as *Pertusaria hemisphaerica*), unidentified lichen (BRA CR11738 – CR11740, as *Pertusaria flavida*, isidia absent but thallus sorediate; soredia c 15–25 µm diam.; thallus K+ yellowish, KC+ yellow-orange, C+ orange, Pd-, UV+ dark orange; TLC: atranorin, usnic acid, zeorin).

Discussion

Lichen diversity in Slovakian Stučica (previous versus our data)

Unfortunately, we cannot reasonably compare turnover of microlichens between our and previous data sets, because microlichens were significantly under-recorded in previous studies (Fig. 2). We recorded 115 new microlichen species in Stučica. Some epiphytic macrolichens recorded in Stučica in the past (PIŠÚT & LACKOVIČOVÁ 1992) were not found by us: *Cladonia polydactyla*, *C. squamosa*, *Heterodermia speciosa*, *Nephromopsis laureri*, *Parmotrema crinitum*, *Peltigera hymenina*, *Phaeophyscia pusilloides*, *Punctelia subrudecta*, and *Usnocetraria oakesiana*. We saw voucher specimens only for some of these (see the results), which makes comparison of datasets difficult. For instance, the record of *Nephromopsis laureri* may be based on incorrectly identified *Usnocetraria oakesiana*, and *Peltigera hymenina* may be *P. degenii*, which does occur in Stučica.

However our reassessment of vouchers for *Nephroma bellum* (one specimen), *N. resupinatum* (4), *Usnocetraria oakesiana* (3) and *Parmotrema crinitum* (5), including well-developed, unharmed lichens, suggests that some of the old-forest macrolichens have retreated or perhaps even disappeared. Of these, we recorded only one well-developed thallus of *N. bellum* and

a few small thalli of *N. resupinatum*. We recorded some macrolichens for the first time, e.g. *Leptogium saturninum*, *Nephroma parile* and *Parmotrema arnoldii*, but most of them were extremely rare in Stučica, usually recorded from one site only.

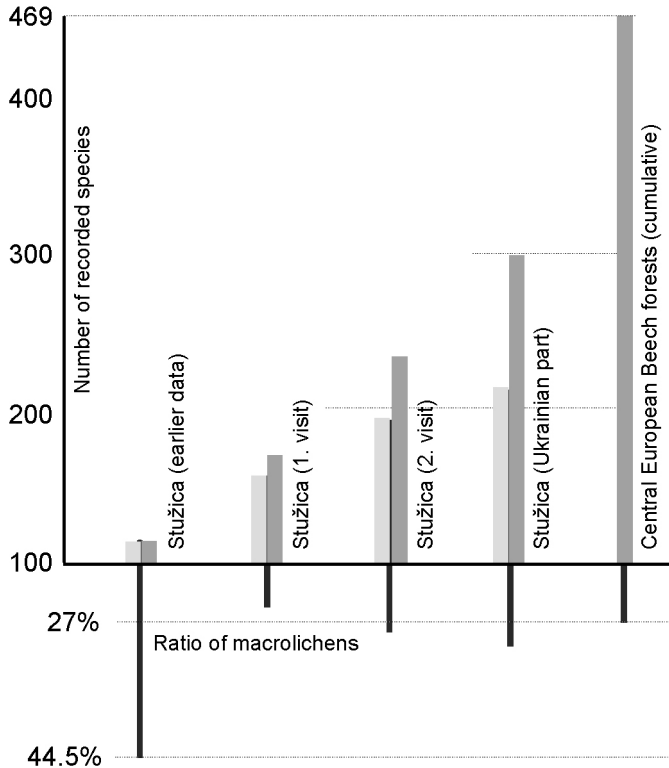


Fig. 2: Lichen diversity captured in particular surveys of Stučica forest (pale columns) and cumulative number of species (dark columns). Ratios of macrolichens are shown in the bottom as a measure of survey quality.

Comparison of lichen diversity in Slovakian Stučica and Ukrainian Stuzhytsia

The Ukrainian part has been thoroughly surveyed (see the Methods). Appendix 1 shows differences in species lists between Slovakian and Ukrainian parts. Surprisingly, the lists differ considerably, mainly in microlichens, e.g. in the genera *Eopyrenula* and *Megalaria*. 48 species known from the Ukrainian part were not recorded from Slovakian Stučica; vice versa for 60 species. Because the woodland appears to be fairly homogeneous, this suggests that surveys of both territories were not complete. However, the difference between the two parts is distorted and exaggerated by inconsistent identifications of particular lichens. The lichen called *Caloplaca chrysophthalma* in the Ukrainian dataset is probably the same as our *C. flavocitrina*. Other examples are Ukrainian *Haematomma ochroleucum* (perhaps *Lecanora thysanophora*), *Caloplaca cerina* (possibly *C. monacensis*), *C. ulcerosa* (almost certainly *C. substerilis*), *C. chlorina* (almost certainly *C. turkuensis*) etc. Almost 300 species were found in both parts of Stučica, which is more than 65% of the epiphytic lichen diversity known in beech-dominated forests in Central Europe (Fig. 2). The Ukrainian part is expected to have

more species, because it is approximately four times larger and has more diverse topography and microclimate.

Lichen diversity in Slovakian Stužica versus other Central European old-growth forests

The number of species recorded in the Slovakian part of Stužica is the highest among Central European old-growth forest localities included in Table 1 and Fig. 3. Only three other forest inventories report more than 200 epiphytic and epixylic species. One of them is the Ukrainian part of Stužica, which is also the closest in species composition, with Sørensen's similarity index 0.72 (details discussed above).

Another locality with more than 200 species is a beech-fir forest Žofínský prales (MALÍČEK & PALICE 2013), but its species composition is rather different. It is dominated by lichen crusts. Macrolichens constitute only 20% of species and few rare, old-growth forest macrolichens are present, e.g. *Cetrelia cetrarioides*, *Lobaria pulmonaria* and *Menegazzia terebrata*. However beard lichens and some fruticose species are more diverse: *Alectoria sarmentosa*, *Evernia* (2 species), *Ramalina* (2) and *Usnea* (6), mainly because natural spruce stands are present, unlike Stužica. Cyanolichens are distinctly fewer in Žofínský prales, except for epiphytic/epixylic *Peltigera* (6). Among microlichens, it differs for instance in higher diversity of *Biatora* (10) and *Micarea* (13), but lower diversity of *Fuscidea* (0) and *Gyalecta* (1), and absence of *Belonia herculina*, common in Stužica. Žofínský prales also has a high amount of dead wood and thus a higher diversity of epixylic species.

The third forest inventory reaching 200 species was done in the flood-plain forest “Soutok Moravy a Dyje” (VONDRÁK et al., unpublished). Its species composition is different (Fig. 4), but not very much (Sørensen similarity index 0.56). The flood-plain forest differs in the absence of rare parmelioid macrolichens and cyanolichens and in the high abundance and diversity of nitrophilous species. Characteristic genera are *Anisomeridium*, *Arthonia*, *Bacidia*, *Bacidina*, *Lithothelium*, *Phaeophyscia*, *Physcia*, *Physconia* and *Schimatomma*.

Almost 200 species were recorded in the East Carpathian beech forest Ugolka – Shyrokyi Luh (DYMÝTROVA et al. 2013), but the inventory does not include lichens on wood. Among Central European beech forest inventories, this includes the highest number of cyanolichens and rare macrolichens: *Collema* (2 species), *Hypotrachyna revoluta*, *Leptogium* (4), *Lobaria* (2), *Menegazzia terebrata*, *Nephroma* (2), *Pannaria conoplea*, *Parmeliella triptophylla*, *Parmotrema* (3), *Peltigera* (5), including the rare *Peltigera collina*, and *Sticta fuliginosa*. In comparison with Stužica, it has e.g. fewer *Arthonia* (4), *Fuscidea* (0) and *Sclerophora* (2), but it includes *Arthopyrenia* (3), *Megalaria laureri* and *Thelopsis* (2). A high number of rare macrolichens was recorded also from the largest Austrian beech dominated virgin forest, Rotwald (TÜRK & BREUSS 1994, BILOVITZ 2007).

The species composition of Central European beech dominated forests is fairly uniform, and resembles that of mixed forests on scree, but lowland forest types and montane coniferous forests differ, and they form clusters not mixed with the two former types in the DCA ordination (Fig. 4). Carpathian localities nr. 3, 4, 25, 26 and 27 and localities 6 and 12 in the Alps group together with Stužica (loc. 1) in DCA. These localities are mixed forests but their common characters are not entirely clear. They are mostly species-rich with occurrence of rare macrolichens and cyanolichens and an abundance of lichen crusts characteristic of old-growth forests.

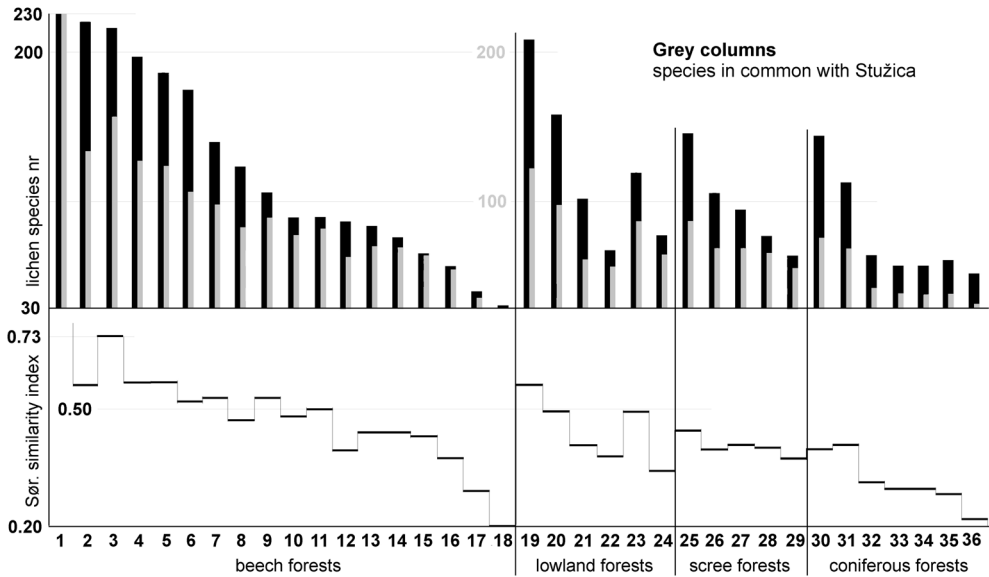


Fig. 3: Upper chart: number of lichen species captured in 36 lichen inventories of Central European old-growth forests (black columns); number of species shared with Stuzica (thin grey columns). Lower chart: Sørensen similarity index of each locality to Stuzica. Numbers on x-axis correspond to Table 1.

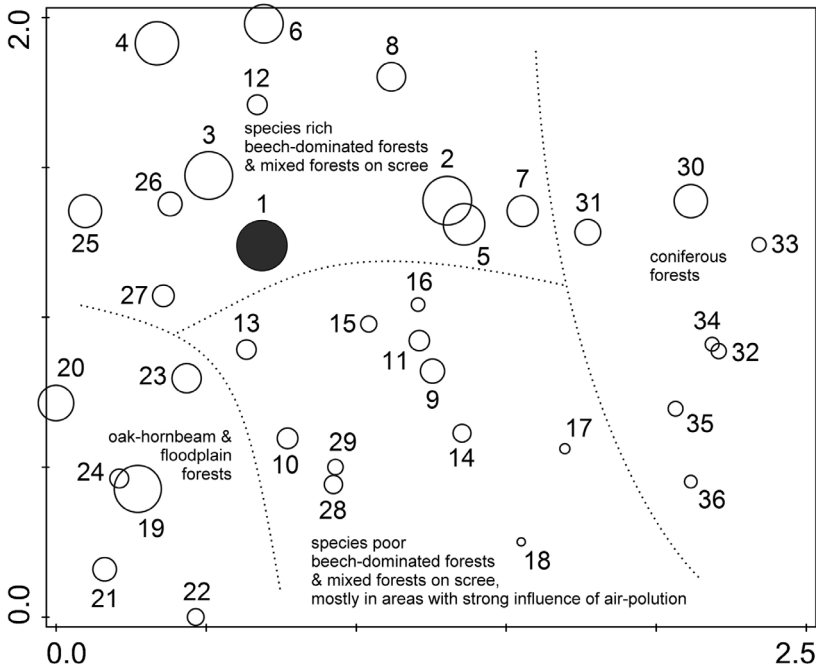


Fig. 4: DCA ordination diagram showing similarities in lichen species composition among Central European old-growth forest localities. The first two axes are shown, explaining 19.7% of the variability in species data. Numbers correspond to Table 1. The size of circles corresponds to the number of species. Black circle is Stuzica.

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Addresses of the authors

Jan Vondrák, Institute of Botany, Academy of Sciences of the Czech Republic, Zámek 1, 252 43 Průhonice, Czech Republic. Department of Botany, Faculty of Science, University of South Bohemia, Branišovská 31, 370 05, České Budějovice, Czech Republic. Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 129, 165 21 Praha 6 - Suchdol, Czech Republic. E-mail: j.vondrak@seznam.cz

Jiří Malíček, Charles University in Prague, Faculty of Sciences, Department of Botany, Benátská 2, 128 01 Praha 2, Czech Republic.

Jaroslav Šoun, The West Bohemian Museum in Pilsen, Kopeckého sady 2, 301 00 Plzeň, Czech Republic.

Václav Pouska, Faculty of Forestry and Wood Sciences, Czech University of Life Sciences Prague, Kamýcká 129, 165 21 Praha 6 - Suchdol, Czech Republic.

Appendix 1: Lichen species recorded in the whole of Stuzica including Slovakian and Ukrainian parts. Taxa newly recorded in the Slovakian part are in bold. Previous data adopted from [1] PIŠŮT & LACKOVIČOVÁ (1992), [2] PIŠŮT (1995), [3] PIŠŮT et al. (2007), [4] KONDRATYUK et al. (1998), [5] KONDRATYUK & COPPINS (2000), [6] MOTIEJŮNAITE et al. (1999), [7] HILITZER (1939–1940), [8] TIBELL (1971), [9] DIEDERICH et al. (2008), [10] SÉRUSIAUX et al. (2001), [11] CZARNOTA & COPPINS (2000), [12] COPPINS et al. (2005), [13] COPPINS et al. (2008), [14], TRETIACH (2014). Abundance assessment is based on our field experiences: rare – recorded 1-3 times; sparse – recorded 4-10 times; frequent – recorded more than 10 times. Substrates: AA – *Abies alba*; AI – *Alnus incana*; AP – *Acer pseudoplatanus*; APlat – *A. platanoides*; BP – *Betula pendula*; CB – *Carpinus betulus*; FE – *Fraxinus excelsior*; FS – *Fagus sylvatica*; SA – *Sorbus aucuparia*; SC – *Salix caprea*; UG – *Ulmus glabra*. Substrate data from our survey together with substrate data from previous inventories are included. JM, JŠ and JV are acronyms of the authors followed by the number of collected specimens (if collected more than once); asterisk indicates samples with TLC data; “rec.” means recorded without voucher specimens.

Taxa	Substrates	Previous data from Slovak / Ukrainian part	our data (2013 / 2014)	Abundance assessment
<i>Absconditella lignicola</i>	AA (rotten wood)	[1]/[5]	JV, JM / rec.	frequent
<i>Acrocordia gemmata</i>	AP, FS	[1]/[5]	JV(3), JM / rec.	frequent in lower altitudes
<i>Agonimia allobata</i>	AP (base of trunk)	0/[5]	non / JŠ	rare
<i>Agonimia reptata</i>	AP, FS, UG (bases of trunks)	0/[5,11]	JV(2), JM(2) / JŠ, JV	frequent
<i>Agonimia tristicula</i>	FS (among mosses)	0/[4,5]	JV / rec.	rare
<i>Amandinea punctata</i>	AP, FS, wood of AA snags	0/[4,5]	JV(3), JM / JŠ, JV	frequent on lit AP bark
<i>Anaptychia ciliaris</i>	APlat, FS	0/[5,7]		not recorded
<i>Anisomeridium polypori</i>	AP, FS, UG	[3]/[4,5, sub <i>A. nyssae-genum</i>]	JV(2) / JŠ	frequent
<i>Arthonia byssacea</i>	AP	0/[4,5]	non / JV	rare
<i>Arthonia didyma</i>	AA, AP, FS	0/[4,5]	JV / JV	sparse in lower altitudes
<i>Arthonia helvola</i>	AA, AP, FS (bases of trunks)	0/0	JV / JŠ, JV	sparse in lower altitudes
<i>Arthonia mediella</i>	AP, FS	0/[4,5]		not recorded
<i>Arthonia radiata</i>	FE, FS	0/[4,5]	JM / rec.	sparse
<i>Arthopyrenia punctiformis</i>	AI	0/[4,5]		not recorded
<i>Arthopyrenia salicis</i>	FS (branch & young trunk)	[Palice 6433!; not published]/[5, outside Stuzhytsia]		not recorded

Taxa	Substrates	Previous data from Slovak / Ukrainian part	our data (2013 / 2014)	Abundance assessment
<i>Arthonia ruana</i>	FS	0/[4,5 sub <i>Arthothelium r.</i>]		not recorded
<i>Arthonia spadicea</i>	AA, AP, FS	0/[4,5]	JV / JŠ	frequent
<i>Arthonia vinoso</i>	AA, AP, FS	0/[5]	JM / JŠ, JV(3)	sparse
<i>Bacidia circumspecta</i>	FS	[3]/[4,5]	non / JV(3)	sparse
<i>Bacidia incompta</i>	AP (weathered wood of old hollow trunk)	[3]/0		rare
<i>Bacidia pycnidiat</i> Czarnota & Coppins	AP (mosses on bark)	0/0	JV / non	rare
<i>Bacidia rosella</i>	AP, FS	0/[5]	rec. / non	rare
<i>Bacidia rubella</i>	AP, FS	[1]/[4,5]	JV / JV	frequent
<i>Bacidia subincompta</i>	AP, FE, FS, UG	[3]/[4,5]	JV(5) / JŠ, JV(3)	frequent
<i>Bacidia cf. viridescens</i>	FS	0/0	non / JV	rare
<i>Bacidia viridifarinoso</i>	AP	0/[5]		not recorded
<i>Bacidina phacodes</i>	FS	0/0	JM, JV(2) / rec.	sparse
<i>Bacidina sulphurella</i> (Samp.) M.Hauck & V.Wirth	AP, FS	0/[4,5 sub <i>B. arnoldiana</i>]	rec. / rec.	sparse
<i>Baeomyces rufus</i>	AA (wet base of trunk), rotten wood	0/0	rec. / rec.	rare
<i>Belonia herculina</i>	AP, FS, (SC), bases of trunks	[1,3]/[4,5]	JM, JV(2) / JŠ	frequent
<i>Biatora chrysantha</i>	AA, AP, FS (partly on bark mosses)	[3]/[4,5]	JV(3) / JV	sparse
<i>Biatora efflorescens</i>	AP, FS, SA	0/0	JV / JŠ	frequent in higher altitudes
<i>Biatora globulosa</i>	FS, GU, wood of snags	0/[4, sub <i>Catillaria g.</i>]	JM, JV / JV(3, with albinomorph)	sparse
<i>Biatora ocelliformis</i>	FS	0/[4,5]	JM / JV(2)	sparse
<i>Biatora vernalis</i>	AP, FS (mossy bark)	[3]/[5]	JM, JV(4) / JŠ, JV(2)	frequent in lower altitude; mostly in valleys
<i>Biatora veteranorum</i>	AA (bark and wood of snags)	[3, sub <i>Catillaria alba</i>]/[4, sub <i>C. alba</i>]	JM, JV / JV	sparse
<i>Biatoridium monasteriense</i>	FS, UG (partly on bark mosses)	[3]/[4,5]	JM(2), JV(3) / JV(2)	sparse
<i>Bilimbia sabuletorum</i>	FS (bark mosses)	0/[4, sub <i>Mycobilimbia s.</i>]	JM, JV / JV	sparse
<i>Bryoria bicolor</i>	mossy bark and rocks	0/[7, sub <i>Alectoria b.</i>]		not recorded
<i>Bryoria fuscescens</i>	AA, FS	[1]/[7, sub <i>Alectoria jubata</i>]	non / JV	rare
<i>Buellia disciformis</i>	FS	0/[5]	JM(2) / JV	sparse
<i>Buellia erubescens</i>	FS	0/[4, unclear note]	non / JV	rare
<i>Buellia griseovirens</i>	AP, FE, FS, SA	0/[4,5]	JV / JŠ (fertile), JV(2)	frequent
<i>Buellia schaeereri</i>	AP	0/[4,5]		not recorded
<i>Calicium glaucellum</i>	dry wood of snags	0/[4,5]	rec. / rec.	sparse
<i>Calicium salicinum</i>	AP, dry wood of snags	[1]/[4,5]	rec. / rec.	sparse
<i>Calicium viride</i>	AA, AP	[1]/[4,5]	non / rec.	rare
<i>Caloplaca cerina</i>	AP	0/[4,5]		not recorded
<i>Caloplaca chrysophthalma</i>	APlat	0/[4, possibly <i>C. flavocitrina</i>]		not recorded
<i>Caloplaca flavocitrina</i> (Nyl.) H.Olivier	AP	0/[4, sub <i>C. citrina</i>]	JV / non	rare
<i>Caloplaca herbidella</i>	AP, (FS)	[1]/[4,5]	JM, JV / JŠ, JV	sparse, in higher altitudes
<i>Caloplaca substerilis</i>	AP, FS	0/[5, sub <i>C. ulceroso</i>]	JV(3) / JV	sparse

Taxa	Substrates	Previous data from Slovak / Ukrainian part	our data (2013 / 2014)	Abundance assessment
<i>Caloplaca turkuensis</i>	AP, FS	0/[4, sub <i>C. chlorina</i>]	non / JV	sparse in higher altitudes (mostly sterile)
<i>Candelaria concolor</i> s.str.	FA (canopy)	0/[4,5]	non / rec.	rare
<i>Candelariella efflorescens</i> s.str.	AP, FS, SA, UG	0/0	JV(2) / JŠ, JV(2)	frequent
<i>Candelariella reflexa</i> s.str.	FS	[1, s.lat.]/[4,5, s.lat.]	JV / JŠ	rare
<i>Candelariella xanthostigma</i>	AP, FS, SA, UG	[1]/[4,5]	rec. / rec.	sparse
<i>Catillaria nigroclavata</i>	FE	0/0	non / JV	rare
<i>Cetrelia cetrarioides</i>	FS	0/0	JV / JŠ*	rare
<i>Cetrelia monachorum</i>	AP, FS	[1, sub <i>C. olivetorum</i>]/[4, sub <i>C. olivetorum</i>]*	JM, JV(3) / JŠ*	frequent in higher altitudes
<i>Chaenotheca brachypoda</i>	FS (bark), dry wood of snags	0/[4,5]	rec. / rec.	sparse
<i>Chaenotheca brunneola</i>	AA (bark), dry wood of snags	0/[4,5]	JV / JV	sparse
<i>Chaenotheca chrysocephala</i>	AA, AP	[1]/[4,5]	rec. / rec.	sparse
<i>Chaenotheca ferruginea</i>	AA	0/[4, unclear note]	rec. / rec.	sparse
<i>Chaenotheca furfuracea</i>	FS (dry bases of trunks)	0/[5]	rec. / rec.	sparse
<i>Chaenotheca stemonea</i>	AA	0/0	JM* / rec.	rare
<i>Chaenotheca trichialis</i>	AA (bark and dry wood of snags)	0/[4,5]	rec. / rec.	sparse
<i>Chaenotheca xyloxena</i>	wood of AA snags	0/[4,5]	JV / JV	frequent
<i>Chaenothecopsis debilis</i> (Sm.) Tibell	wood of AA snags	0/0	non / JV	rare
<i>Chaenothecopsis epithallina</i>	?	0/[4,5]		not recorded
<i>Chaenothecopsis pusilla</i>	APlat	0/[4,5]		not recorded
<i>Chaenothecopsis pusiola</i>	AA (wood)	0/[4, unclear note]	JV / non	sparse
<i>Chaenothecopsis savonica</i> (Räsänen) Tibell	AA, lichenicolous on <i>Chaenotheca brunneola</i>	0/0	JV / non	rare
<i>Chrysothrix candelaris</i>	AA, AP	0/[4,5]	non / JV	rare
<i>Cladonia chlorophaea</i> s.lat.	AP, FS, SC (trunk bases)	[1]/[4,5]	non / rec.	sparse
<i>Cladonia coniocraea</i> (incl. <i>C. ochrochlora</i>)	AA, BP, FS, PA, SA, SC (mossy bark and wood)	[1]/[4,5]	JV(2) / rec.	frequent
<i>Cladonia digitata</i>	AA, FS (wood and bark at trunk bases)	[1]/[4,5]	rec. / rec.	frequent
<i>Cladonia fimbriata</i>	AA, FE, FS, PA, SA (rotten wood and mossy bark)	[1]/[5]	rec. / rec.	frequent
<i>Cladonia macilentata</i>	mossy, rotten wood	0/0	non / JV	rare
<i>Cladonia polydactyla</i>	bark at base of FS	[1]/0		not confirmed
<i>Cladonia pyxidata</i>	AP (trunk bases)	[1, on soil]/[4,5]	rec. / JV(2)	sparse
<i>Cladonia squamosa</i>	AP (bark at trunk base)	[1]/0		not recorded; sparse in higher altitude [1]
<i>Coenogonium luteum</i>	FS	0/[4,5 sub <i>Dimerella lutea</i>]	non / JV	rare in lower altitudes
<i>Coenogonium pineti</i>	AA, AP, BP, FS, UG (usually bases of trunks), rotten wood	[1]/[4,5 sub <i>Dimerella</i> p.]	JV / rec.	frequent
<i>Collema flaccidum</i>	AP, FS, sandstone	[1]/[4,5]	rec. / rec.	rare
<i>Cyphelium karelicum</i>	AA	0/[8, coll. Hilitzer 1926]		not recorded

Taxa	Substrates	Previous data from Slovak / Ukrainian part	our data (2013 / 2014)	Abundance assessment
<i>Dictyocatenulata alba</i>	AA, AP, FS, SC, UG (bases of trunks), sandstone	[9]/0	JM, JV / JŠ	frequent in lowest parts in valleys
<i>Diploschistes muscorum</i>	AP (<i>Cladonia squamules</i> at trunk base)	[1]/0	non / JŠ	rare in higher altitudes (Kamenná Lúka)
<i>Diplotomma albostrum</i> s.lat.	AP	0/0	JV / non	rare
<i>Eopyrenula leucoplaca</i>	FS	0/[4,5]		not recorded
<i>Evernia divaricata</i>	PA	0/[7]		not recorded
<i>Evernia prunastri</i>	AP, FE	[1]/[4,5]	rec. / JV	sparse
<i>Fellhanera gyrophorica</i>	FS (also on bark mosses)	[3,10]/[4, sub <i>Fellhanera</i> sp.; 10]		rare
<i>Felhanera</i> cf. <i>subtilis</i>	FS	0/[4, possibly <i>F. ochracea</i>]		not recorded
<i>Flavoparmelia caperata</i>	FS	[1, sub <i>Parmelia</i> c.]/[4,5]	non / rec.	rare
<i>Frutidella pullata</i>	FS	[3, sub <i>Lecidea</i> p.]/0	non / JV	sparse in higher altitudes (at ridge)
<i>Fuscidea arboricola</i>	FS	0/[4,5]	JV / JV	rare
<i>Fuscidea cyathoides</i> var. <i>corticola</i> (Fr.) Kalb	(AP), FS (mostly canopies)	[1,3]/[5, outside Stuzhytsia]	JM, JV(3) / JV(2)	frequent
<i>Fuscidea pusilla</i>	SA	0/[4,5]	non / JV*	sparse in higher altitudes
<i>Graphis macrocarpa</i> (Pers.) Röhl.	AA	0/0	JV / non	probably rare
<i>Graphis pulverulenta</i> (Pers.) Ach. (incl. older records of <i>Graphis scripta</i> s.lat.)	AA, AP, BP, CA, FE, FS, SC, UG	[1]/[4,5]	JV / JŠ, JV	frequent in lower altitudes, rare at ridge
<i>Gyalecta carneola</i>	FS	0/[4,5, outside Stuzhytsia]	JV / non	rare
<i>Gyalecta flotowii</i>	FS	[1,3]/[4,5]	JM(2) / JŠ, JV(2)	rare
<i>Gyalecta truncigena</i>	FS	0/[4,5]	JV / non	rare
<i>Gyalecta ulmi</i>	AP	0/[4,5]	JV / non	rare
<i>Haematomma ochroleucum</i>	AP, FS	0/[4,5]		not recorded
<i>Heterodermia speciosa</i>	AI, CB, FS	[1]/[6;7, sub <i>Anaptychia</i> s.]		extinct?; alt. 1150 m (coll. Pišút 1966)
<i>Hypocenomyce caradocensis</i>	wood of snag	0/[4,5]	rec. / non	rare
<i>Hypocenomyce scalaris</i>	AA, (FS), wood of snags	[1]/[4,5]	rec. / rec.	frequent
<i>Hypogymnia farinacea</i>	AA	0/[4;7, sub <i>Parmelia bitteriana</i>]	rec. / rec.	sparse
<i>Hypogymnia physodes</i>	AA, AP, FS, SA, SC, PA	[1]/[4;7, sub <i>Parmelia</i> p.]	rec. / rec.	frequent
<i>Hypogymnia tubulosa</i>	AA, FS	0/[4;7, sub <i>Parmelia</i> t.]	rec. / rec.	sparse
<i>Hypogymnia vittata</i>	AA, FS	[1]/[7, sub <i>Parmelia</i> v.]	JV / rec.	rare in highest altitudes (one tree at 1100 m alt.)
<i>Hypotrachyna revoluta</i>	FS	0/[4,5]	non / JV(2) (revised by B. Coppins as <i>H. afrorevoluta</i>)	sparse
<i>Lecania croatica</i>	AP, FE, FS, UG	0/[4, sub <i>Biatora punctiformis</i> , nom.ined.]	JM(3), JV(3) / JŠ, JV	frequent in lower altitudes
<i>Lecania cyrtellina</i>	UG	0/[4,5]		not recorded
<i>Lecania naegeli</i>	FE	0/0	non / JV	rare
<i>Lecanora albella</i>	AA, FS	0/0	non / JŠ, JV(2)	sparse
<i>Lecanora allophana</i>	?	0/[4,5]		not recorded
<i>Lecanora argentata</i> (incl. <i>L. subrugosa</i>)	AP, FE, FS	[1]/[4,5]	JM / rec.	frequent
<i>Lecanora carpinea</i>	AP, FS*	[1]/[4,5]		rare?

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<i>Lecanora chlarotera</i>	AP, FE	0/[4,5]	JM / JV	rare
<i>Lecanora cinereofusca</i>	FS	[1, one specimen in SAV revised as <i>L. pulicaris</i>]/[4,5]		not recorded
<i>Lecanora conizaeoides</i>	AA, FS, PA, wood of snags	[1]/[4,5]	rec. / rec.	frequent
<i>Lecanora expallens</i>	AA, AP	0/[4,5]	JM / JV*	frequent
<i>Lecanora cf. farinaria</i>	AP	0/[5, <i>Lecanora farinaria</i>]	JM* / JV(2)*	sparse in higher altitudes, at ridge
<i>Lecanora glabrata</i>	FE, FS	0/[4,5]	rec. / JŠ	frequent in lower altitudes
<i>Lecanora hagenii</i>	AP, APlat	[1]/[5, sub <i>L. umbrina</i>]	JV / JV	sparse
<i>Lecanora intumescens</i>	AP, FS	[1]/0	JV / JV	sparse
<i>Lecanora leptyroides</i>	AP, FE (twig), FS	0/[4,5,6]	JM(2) / JV	sparse
<i>Lecanora persimilis</i> (Th. Fr.) Arnold	FE (twigs)	0/0	non / JV	rare
<i>Lecanora pulicaris</i>	AP, FS, SA, AA, wood of snags	[1]/[4,5]	JV(2) / JV	frequent (but usually in FS canopies)
<i>Lecanora saligna</i>	wood of snags	0/[4,5]	rec. / rec.	sparse
<i>Lecanora sarcopoidoides</i>	AA	0/0	JM / non	rare
<i>Lecanora subcarpineae</i>	FS	[1, sub <i>L. nemoralis</i>]/0		?
<i>Lecanora subintricata</i>	AP	0/0	non / JV	sparse in higher altitudes, at ridge
<i>Lecanora symmicta</i> s.lat.	AP	[1]/[5]		?
<i>Lecanora thysanophora</i>	FS	0/0	non / JV*	frequent
<i>Lecidea erythrophaea</i>	AP, FE	0/[5]	JV / JV(2)	sparse
<i>Lecidea sanguineoatra</i> (Wulfen) Ach.	FS (wood of twig on forest floor)	0/0	non / JV	rare
<i>Lecidella elaeochroma</i> (incl. <i>L. achristotera</i> and <i>L. euphorea</i>)	AP, FE, FS	[1]/[4,5]	JM / JV	frequent
<i>Lecidella elaeochroma f. soralifera</i> (Erichsen) D.Hawksw.	AP	0/0	JV / non	rare
<i>Lecidella flavosorediata</i>	AP	0/[5]	JM* (fertile) / JV (fertile)	rare, in higher altitudes
<i>Lepraria ecorticata</i> (J.R.Laundon) Kukwa	FS	[Palice 12140, not published]*0		sparse?
<i>Lepraria incana</i>	AA, AP, FS	[1]/[4,5]	non / JV	frequent
<i>Lepraria lobificans</i>	AP, FE, FS, UG	0/[4]	JM / JV(2)*	frequent
<i>Lepraria rigidula</i>	AP, FS	[3]/[4,5]		not recorded
<i>Leptogium cyanescens</i>	FS (among mosses at trunk bases)	[1]/[4,5]	JV / JŠ	sparse
<i>Leptogium gelatinosum</i>	APlat, FE, FS	0/[4,5]		not recorded
<i>Leptogium lichenoides</i> s.str.	AP, FS (among mosses at trunk bases)	[1]/[4,5]	JM, JV / rec.	frequent
<i>Leptogium saturninum</i>	AP	0/[5]	non / JV	rare in uppermost altitude, at ridge (one record), 49°05'28"N, 22°32'47"E
<i>Lobaria pulmonaria</i>	AP, FS	[1]/[4,5]	rec. / rec.	frequent in higher altitudes
<i>Lopadium disciforme</i>	AP, FS	0/[4,5]	rec. / rec.	sparse
<i>Loxospora elatina</i>	AA (at base of trunk in brook valley)	0/[5, outside Stuzhytsia]	non / JV	rare
<i>Megalaria laureri</i>	AI, AP	0/[4,5]		not recorded
<i>Megalaria pulvereae</i>	FS	0/[4,5]		not recorded

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<i>Melanelixia glabra</i>	FS	0/[4,5, sub <i>Melanelia</i> g.]	non / JV	rare at higher altitude (collected at Polish side of ridge)
<i>Melanelixia glabrata</i>	AP, FS, SA, SC, UG	[1, sub <i>Parmelia</i> g.]/[4,5, sub <i>Melanelia</i> g.]	rec. / rec.	frequent
<i>Melanelixia subaurifera</i>	AP, FE, SC (usually canopies)	0/[4,5, sub <i>Melanelia</i> s.]	rec. / rec.	sparse
<i>Melanohalea elegantula</i>	AP	[1, sub <i>Parmelia</i> e.; specimens in BRA are <i>M. glabrata</i>]*/[5]		not recorded
<i>Melanohalea exasperata</i>	FS (canopy)	0/[4,5, sub <i>Melanelia</i> e.]	non / JV	rare
<i>Melanohalea exasperatula</i>	FS, FE	0/[4,5, sub <i>Melanelia</i> e.]	non / rec.	sparse
<i>Melaspilea gibberulosa</i>	AP, FS	0/[4,5]	JM(2), JV(3) / JV(2)	sparse
<i>Menegazzia terebrata</i>	AP, FS	[1]/[4,5;7, sub <i>Parmelia pertusa</i>]	JV / rec.	rare
<i>Micarea adnata</i>	wood of stump	0/[4,12]		not recorded
<i>Micarea botryoides</i>	AA (stump), FS (bark, wood)	0/[6]	JM / non	rare
<i>Micarea denigrata</i>	wood	0/[4,5]		not recorded
<i>Micarea micrococca</i> (incl. <i>M. byssacea</i>)	FS, rotten wood	0/0	JV / JV(2)*	frequent
<i>Micarea misella</i>	rotten wood	0/0	JM / JV	sparse
<i>Micarea nigella</i> Coppins	AA (rotten wood)	0/0	JV / JV	sparse
<i>Micarea nitschkeana</i>	?	0/[4, unclear note]		not recorded
<i>Micarea peliocarpa</i>	AA (bark at trunk base, rotten wood)	[1]/[4,5]	JM, JV / JV(2)	sparse
<i>Micarea prasina</i> s.str.	AA (rotten wood)	0/[4,5, possibly <i>M. prasina</i> s.lat.]	JM*, JV / non	sparse
<i>Microcalicium disseminatum</i> (Ach.) Vain.	AA	0/0	non / rec.	frequent
<i>Multiclavula mucida</i>	rotten wood of AA, FS	0/0	JM / rec.	sparse
<i>Mycobilimbia carneoalbida</i>	AP, APlat, FS	0/[4,5 sub <i>Biatora</i> c.]		not recorded
<i>Mycobilimbia epixanthoides</i>	FS	0/[4,5, sub <i>Biatora</i> e.]		not recorded
<i>Mycobilimbia pilularis</i>	AP, FS	0/[4,5, sub <i>Biatora sphaeroides</i>]		not recorded
<i>Mycobilimbia tetramera</i>	FS (on bark mosses)	[3]/0		rare
<i>Nephroma bellum</i>	AP, FS	[1]/0	non / JV	rare in uppermost altitudes (one record), 49°5'29"N, 22°32'48"E
<i>Nephroma parile</i>	AP, FS, trunk bases close to brook	0/[4,5]	non / rec.	rare in valley bottoms (two records), 49°05'08"N, 22°32'09"E
<i>Nephroma resupinatum</i>	AP, FS	[1]/0	non / JV	rare in uppermost altitudes (two records), 49°05'15"N, 22°33'29"E
<i>Nephromopsis laureri</i>	AA, FS	[1, sub <i>Cetraria</i> l.]/[5,6]		not recorded
<i>Normandina pulchella</i>	AP, FS	[1]/[4,5,7]	JV / rec.	sparse, more frequent in higher altitudes
<i>Ochrolechia androgyna</i>	AA, AP, FS	[1]/[4,5]	non / JV(3)	sparse, more frequent in higher altitudes
<i>Ochrolechia arborea</i>	AI, FS	0/[5 (Coppins 19529, det Kukwa)]		not recorded
<i>Ochrolechia microstictoides</i>	FE, FS	0/[5]		not recorded

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<i>Ochrolechia pallescens</i>	AP	0/0	non / JV*	rare in higher altitudes, at ridge
<i>Ochrolechia subviridis</i>	FS	0/[5]		not recorded
<i>Ochrolechia turneri</i>	AP	0/0	non / JV*	rare in higher altitudes
<i>Opegrapha niveoatra</i>	AA, AP, FS	0/[4,5]	JV(3) / JV(2)	frequent
<i>Opegrapha rufescens</i>	AP, FS, FE	[1]/[4,5]	JV / JV	sparse
<i>Opegrapha trochodes</i>	AP (bark), FS (wood)	0/[5,13]	non / JV(2)	rare
<i>Opegrapha varia</i>	AA, AP, FS, wood of snags	[1, sub <i>O. lichenoides</i> , 3]/[4,5]	JM, JV / JV	frequent
<i>Opegrapha vermicellifera</i>	AP, FS	[3]/[4,5]	JV / non	sparse
<i>Opegrapha viridis</i>	FS	0/[4,5]	non / JV	frequent in lower altitudes
<i>Opegrapha vulgata</i>	FS	[3, specimen in PRA is <i>O. niveoatra</i>]/[5]		not recorded
<i>Parmelia saxatilis</i>	AP, FS, SA	[1]/[4,5]	rec. / JŠ*(s.str.)	frequent
<i>Parmelia submontana</i>	AP, FS, SA	[1]/[4,5]	JV / rec.	sparse
<i>Parmelia sulcata</i>	AP, FS, SA	[1]/[4,5]	rec. / JV	sparse; more frequent in higher altitudes
<i>Parmeliella triptophylla</i>	FS, FE	[1]/[4,5;7, sub <i>P. coral-linoides</i>]	JV / JŠ, JV	sparse; in valleys and at ridge
<i>Parmelina pastillifera</i>	AP, FS	0/[4,5]	JM, JV / JŠ	sparse in higher altitudes
<i>Parmelina quercina</i>	FS	0/[5;7, sub <i>Parmelia q.</i>]		not recorded
<i>Parmelina tiliacea</i>	AP, FS	[1, sub <i>Parmelia t.</i>]/[4,5;7, sub <i>Parmelia scortea</i>]	rec. / rec.	frequent in higher altitudes
<i>Parmeliopsis ambigua</i>	AA, AP, BP, FS, SA	[1]/[4,5,7]	rec. / rec.	frequent; mostly in higher altitudes
<i>Parmeliopsis hyperopta</i>	AP, FS, SA	[1]/0	rec. / rec.	frequent in higher altitudes
<i>Parmotrema arnoldii</i>	FS, AP (canopy)	0/[6]	non / JV	rare
<i>Parmotrema crinitum</i>	FS	[1, sub <i>Parmelia c.</i>]/[4,5;7, sub <i>Parmelia c.</i>]		several records, last in 1966
<i>Parmotrema perlatum</i>	CB	0/[4,5, sub <i>P.chinense</i> ; 7, sub <i>Parmelia trichotera</i>]		not recorded
<i>Peltigera collina</i>	?	0/[5]		not recorded
<i>Peltigera degenii</i>	FS (mossy trunk bases), sandstone	0/[4,5, outside Stuzhytsia]	non / JV	rare in higher altitudes
<i>Peltigera horizontalis</i>	FS	0/[4,5]		not recorded
<i>Peltigera hymenina</i>	FS, AI	[1]/[5, outside Stuzhitsa]		not recorded
<i>Peltigera polydactylon</i>	FS	0/[4,5]		not recorded
<i>Peltigera praetextata</i>	AP, FS (at bases of trunks)	[1]/[4,5]	rec. / rec.	frequent
<i>Pertusaria albescens</i>	AP, FS, SA	[1]/[4,5]	non / JV	frequent in higher altitudes
<i>Pertusaria alpina</i> (incl. <i>P. constricta</i>)	AP, FS	[1]/[4,5]	JV / JV	sparse
<i>Pertusaria amara</i>	AP, FS, SC	[1]/[4,5]	rec. / JV	sparse
<i>Pertusaria coccodes</i>	AP, FS	[1]/[4,5]	non / JV(3)	sparse in higher altitudes, at ridge
<i>Pertusaria coronata</i>	AP, FS	[1]/[4,5]	JM, JV / non	sparse
<i>Pertusaria flavida</i>	AA, AP, FS	[1, specimens in BRA are other species]/0		not recorded
<i>Pertusaria hymenea</i>	FS	[1]/[4,5]	JV / non	sparse
<i>Pertusaria leioplaca</i>	FS	0/[4,5]	JM(2), JV(2) / non	frequent
<i>Pertusaria pertusa</i>	FS	[1]/[4,5]		?

Taxa	Substrates	Previous data from Slovak / Ukrainian part	our data (2013 / 2014)	Abundance assessment
<i>Pertusaria pupillaris</i>	AP	0/[4,5]	JM, JV / rec.	sparse
<i>Pertusaria waghornei</i> Hulting	FS	0/0	non / JV	rare
<i>Phaeophyscia ciliata</i>	?	0/[4, unclear note]		not recorded
<i>Phaeophyscia endococcina</i>	FS	0/[5]		not recorded
<i>Phaeophyscia endophoenicea</i>	AP, FS	[1]/[4,5]	rec. / rec.	frequent
<i>Phaeophyscia orbicularis</i>	AP, FS	[1]/[4,5]	rec. / non	sparse
<i>Phaeophyscia pusilloides</i>	FS	[2,3]/0		not recorded; at Kamenná Lúka, alt. 1150m [2]
<i>Phlyctis argena</i>	AP, FE, FS, SA, UG	[1]/[4,5]	rec. / rec. (also fertile)	frequent
<i>Physcia adscendens</i>	AP, FE, FS	[1]/[4,5]	rec. / rec.	sparse, frequent only on <i>Fraxinus</i>
<i>Physcia stellaris</i>	FE	0/[4,5, outside Stuyhytsia]	rec. / JV	sparse
<i>Physcia tenella</i>	AP, FE	0/[4,5]	rec. / rec.	rare, frequent only on <i>Fraxinus</i>
<i>Physconia distorta</i>	FS	0/[4,5]		not recorded
<i>Physconia enteroxantha</i>	FS	0/[4,5]		not recorded
<i>Physconia grisea</i>	AP, FS	0/[4,5]		not recorded
<i>Physconia perisidiosa</i>	FS	[1]/[4,5]	non / rec.	sparse in higher altitudes, at ridge
<i>Piccolia ochrophora</i>	AP, FS	0/0	JV / rec.	rare
<i>Placynthiella cf. dasaea</i>	(AP), FS	0/0	non / JŠ, JV(2)*	frequent in higher altitudes (often in canopies)
<i>Placynthiella dasaea</i>	rotten wood, (FS)	0/[4,5, sub <i>Sacomorpha d.</i>]	rec. / non	sparse
<i>Placynthiella icmalea</i>	rotten wood	0/[4,5, sub <i>Sacomorpha i.</i>]	rec. / rec.	frequent
<i>Platismatia glauca</i>	AP, FS, SA	[1]/[4,5;7, sub <i>Cetraria g.</i>]	rec. / rec.	sparse in lower altitudes, frequent at ridge
<i>Porina aenea</i>	AP, FS	0/[4,5]	JV / JV	frequent
<i>Porina leptalea</i>	AP	0/[4,5, outside Stuzhytsia]	JV / non	rare
<i>Porina pseudohibernica</i>	CB, FS	0/[4,5, sub <i>Zamenhofia hibernica</i> ; 14]		not recorded
<i>Pseudevernia furfuracea</i>	AA, AP, FS, SA	[1]/[4,5]	rec. / rec.	sparse in lower altitudes, frequent at ridge
<i>Punctelia subrudecta</i> (incl. <i>P. jeckeri</i>)	FS	[1, sub <i>Parmelia s.</i>]/[4,5]		recently not confirmed
<i>Pycnora leucococca</i>	AP	0/0	non / JV	rare in higher altitudes, at ridge
<i>Pyrenula laevigata</i>	AP, CB, FS	0/[4,5]		not recorded
<i>Pyrenula nitida</i>	AP, FS	[1]/[4,5]	rec. / JV	frequent
<i>Pyrrhospora querneae</i>	AP	0/[4,5]		not recorded
<i>Ramalina farinacea</i>	AP, FS	[1]/[4,5]	rec. / rec.	sparse
<i>Ramalina fastigiata</i>	AP	0/[4,5]		not recorded
<i>Ramalina fraxinea</i>	?	0/[4, unclear note]		not recorded
<i>Ramalina pollinaria</i>	AP, FS	[1]/[4,5]	rec. / rec.	sparse
<i>Ramonia chrysophaea</i>	AP, UG	0/[4,5]	non / JV(2)	sparse
<i>Ramonia luteola</i>	FS	0/[5, unclear note]	JV / non	rare
<i>Reichlingia leopoldii</i>	AP, CB	0/[4,5]		not recorded
<i>Rinodina degeliana</i>	AP	0/0	non / JV	rare
<i>Rinodina efflorescens</i>	AP, AI	0/[4,5]		not recorded

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<i>Rinodina griseosoralifera</i>	FS, UG	0/[4,5]		not recorded
<i>Rinodina septentrionalis</i> (incl. <i>R. freyi</i>)	FE (twigs)	0/0	non / JV	rare
<i>Ropalospora viridis</i>	AP, FE, FS	0/[4,5, sub <i>Fuscidea</i> v.]	JM*, JV(3) / JV(2)*	frequent
<i>Sclerophora amabilis</i> (Tibell) Tibell	FS	0/0	non / JŠ, JV	rare
<i>Sclerophora contiophaea</i>	AP	0/0	JV / JŠ	rare
<i>Sclerophora farinacea</i>	FS	0/0	non / JŠ, JV	rare
<i>Sclerophora pallida</i>	Aplat, FS	0/[4,5]	non / JŠ	rare
<i>Sclerophora peronella</i>	AP, FS (wood of snags)	0/0	JM / non	rare
<i>Scolicosporum chlorococcum</i>	FS	[1]/[4,5]		rare?
<i>Scolicosporum sa-rothamni</i>	FE, FS (canopy)	0/[4,5]	non / JV	sparse
<i>Scolicosporum umbrinum</i>	FE, FS	0/[4,5]	JV(2) / JV	frequent in FS canopies
<i>Sticta fuliginosa</i>	mossy trees	0/[7]		not recorded
<i>Strangospora pinicola</i>	AA	0/0	non / JV	sparse in AA canopies
<i>Strigula stigmatella</i>	AP, FS, UG (mossy bark), sandstone	[3]/[4,5]	JM(3), JV / JŠ, JV	frequent
<i>Tetramelas chloroleucus</i> (Körb.) A.Nordin	FS	0/0	non / JV	rare in higher altitudes, at ridge
<i>Thelidium zwackhii</i>	AG (exposed roots)	0/[6]		not recorded
<i>Thelocarpon epibolom</i>	rotten wood	0/0	JV / rec.	sparse
<i>Thelotrema lepadinum</i>	(AA), FS	[1,3]/[4,5]	JV / rec.	frequent in lower altitudes
<i>Trapelia corticola</i>	AA, FS, rotten wood	[3]/[4,5]	JV / JV	sparse
<i>Trapeliopsis flexuosa</i>	FS (bark), rotten wood	0/[4,5]	non / JV(2)	sparse
<i>Trapeliopsis gelatinosa</i>	rotten wood	0/0	JV / non	sparse
<i>Trapeliopsis granulosa</i>	rotten wood	0/0	rec. / non	sparse
<i>Trapeliopsis pseudogranulosa</i>	rotten wood	0/[4,5]	JM / non	rare
<i>Trapeliopsis viridescens</i>	AA (bark), rotten wood	0/[4,5]	rec. / JV	frequent
<i>Tuckermannopsis chlorophylla</i>	FS	0/0	rec. / rec.	sparse in higher altitudes
<i>Usnea dasyypoga</i>	AA, FS	[1, sub <i>U. filipendula</i>]/[5, outside Stuzhytsia]	non / rec.	rare in uppermost altitude
<i>Usnea hirta</i>	?	0/[4, unclear note]		not recorded
<i>Usnea subfloridana</i>	FE	0/[5, outside Stuzhytsia]	non / rec.	rare
<i>Usnocetraria oakesiana</i>	AA, FS	[1, sub <i>Cetraria</i> o.]/[7, sub <i>Cetraria</i> o.]		not recorded
<i>Varicellaria hemisphaerica</i>	AA, AP, FS	[1,3]/[4] sub <i>Pertusaria h.</i>	JM, JV(2) / JV(2)	sparse
<i>Verrucaria bryoctona</i>	FS (on mosses at base of trunk)	0/0	non / JV	rare
<i>Veizdaea aestivalis</i>	AP, FS (on bark mosses)	[3]/[4,5]		rare
<i>Veizdaea cf. cobria</i> Giralt, Poelt & Suanjak	FS	0/0	non / JV	rare
<i>Violella fucata</i>	AA, FS (bark), PA (wood of snag)	0/[4, sub <i>Mycoblastus sterilis</i>]	JM, JV / JV	sparse
<i>Vulpicida pinastri</i>	FS	[1, sub <i>Cetraria</i> p.]/[4;7, sub <i>Cetraria</i> p.]	rec. / rec.	frequent in uppermost altitudes, at ridge
<i>Xanthoria parietina</i>	AP, FS (canopy)	[1]/[4, unclear note]	rec. / rec.	rare
<i>Xanthoria polycarpa</i>	FS (canopy)	0/[5, outside Stuzhytsia]	non / rec.	rare

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Lichenicolous fungi and epiphytic microfungi				
<i>Anisomeridium macrocarpum</i> (Körb.) V.Wirth	FS	0/0	non / JV(2)	sparse
<i>Arthonia</i> sp.	FS, lichenicolous on <i>Melanelixia glabrata</i>	[in sample BRA CR11713, unpublished]/0		rare?
<i>Cornutispora lichenicola</i>	?	0/[5]		not recorded
<i>Dactylospora parasitica</i>	FS, lichenicolous	0/[4,5]		not recorded
<i>Dactylospora</i> sp.	FE, not lichenicolous	0/0	JV / non	rare
<i>Epigloea wrosperma</i> Döbbeler	on <i>Placynthiella icmalea</i>	0/0	JM / non	rare
<i>Hysteropatella prostii</i>	UG	0/[4]		not recorded
<i>Kirschsteiniothelia</i> (cf.) <i>aethiops</i>	AA, FS	0/[4,5, outside Stuzhytsia]	JV(4) / JV	frequent
<i>Kirschsteiniothelia recessa</i> (Cooke & Peck) D.Hawksw.	AA	0/0	non / JV	frequent
<i>Lichenocodium erodens</i>	on various epiphytic lichens	0/[5,6]		not recorded
<i>Lichenocodium lecanorae</i>	on <i>Hypogymnia physodes</i>	0/[5,6]		not recorded
<i>Massarina corticola</i>	AP	0/[5]		
<i>Melaspilea proximella</i> (Nyl.) Nyl.	AA	0/0	JV(2) / rec.	frequent
<i>Muellerella hospitans</i>	lichenicolous, AP, FS	0/[5]		not recorded
<i>Mycocalicium subtile</i>	dry wood of snags	0/[6]	rec. / JV	frequent
<i>Peridiothelia fuliguncta</i>	AP	0/[4]		not recorded
<i>Phoma lobariae</i>	on <i>Lobaria</i>	0/[5]		not recorded
<i>Polydesmia lichenis</i>	on <i>Peltigera</i>	0/[5]		not recorded
<i>Rebentischia pomiformis</i>	AP	0/[5]		not recorded
<i>Sarea difformis</i> (Fr.) Fr.	AA (resin)	0/0	non / JV	sparse
<i>Sarea resinae</i>	AA, PA (resin)	0/[5,6]	non / JV	sparse
<i>Sphinctrina turbinata</i>	FS, on <i>Pertusaria</i>	0/[4,5]		not recorded
<i>Tremella cladoniae</i>	on <i>Cladonia coniocraea</i>	0/[4,6]		not recorded
<i>Tremella hypogymniae</i>	on <i>Hypogymnia physodes</i>	0/[6]		not recorded
<i>Tremella lichenicola</i>	on <i>Violella fucata</i>	0/[4,5, probably outside Stuzhytsia]		not recorded