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Fungal diversity in sandstone gorges of the Bohemian Switzerland National Park (Czech Republic): impact of climatic inversion

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The diversity of macrofungi in 8 sandstone gorges (narrow valleys bordered by sandstone walls, mostly covered by *Picea* forests with admixed *Fagus*, alt. 170–390 m) was assessed with respect to microclimatic data from 235 stations measuring temperature and soil moisture along the elevation gradient. In total, 253 species of macrofungi were found including some boreal-montane species, species preferring moist habitats and/or species of more or less natural vegetation. Microclimatically, the bottoms of gorges are significantly colder than their slopes and slope crests during the vegetation period (climatic inversion) and show higher soil moisture throughout the year. However, they are not significantly colder during the winter period and even show a higher average minimal temperature than the rest of gorges. Generally, bottoms of sandstone gorges function as „buffers" maintaining a stable, humid and rather cold microclimate and enabling the occurrence of some boreal-montane fungi and species requiring humid conditions. Climatic inversion is a phenomenon markedly influencing the distribution of fungi in the landscape and enabling extrazonal occurrence of some species.

Key words: macromycetes, ecology, microclimate, boreal-montane fungi.

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V osmi pískovcových roklích (nízko položených úzkých údolích mezi skalami, většinou porostlých smrčinami s příměsí buku) byla studována diverzita makromycetů a vyhodnocena s ohledem na mikroklimatická měření z 235 teplotně-vlhkostních čidel, rozmístěných podél výškového gradientu roklí. Bylo nalezeno 253 druhů hub; mezi nimi některé boreálně-montánní, vlhkomilné a na přirozené lesní porosty vázané druhy. Dna roklí jsou během vegetační sezóny výrazně chladnější než jejich svahy a horní hrany (inverze klimatu) a po celý rok mají největší půdní vlhkost. V zimě nejsou průkazně chladnější a dokonce vykazují větší průměrné minimální teploty než svahy a hrany. Dna roklí udržují stabilní, vlhké a poměrně chladné podmínky a umožňují tím výskyt některých boreálně-montánních a vlhkomilných druhů ve velmi nízkých polohách. Klimatická inverze je faktorem, který výrazně ovlivňuje rozšíření hub v krajině; umožňuje např. extrazonální výskyt některých druhů.

INTRODUCTION

Bohemian Switzerland National Park (České Švýcarsko in Czech) is an area of sandstones in the northern part of the Czech Republic (Fig. 1). On the German side the sandstone area is protected in the Saxon Switzerland National Park (Sächsische Schweiz in German). Both areas represent parts of a much bigger massif built by Cretaceous sandstones (Bohemian Cretaceous Basin). In places, the sandstones are penetrated by Tertiary volcanites (basaltic intrusions). Subsequent erosion has modelled the sandstones into blocks, walls, gorges, canyons, etc. (erosional landscape, Fig. 2). The geology, geomorphology and habitats of the area are described in several chapters of a book by Härtel et al. (2007).

The most important landscape elements of the Bohemian Switzerland NP are sandstone gorges – long and narrow valleys bordered by sandstone walls. The gorges are very interesting from the microclimatic point of view, as they are influenced by the phenomenon of climatic inversion (Sklenář et al. 2007). The bottom of the gorges is colder and more humid than their slopes and slope crests. This enables the occurrence of some psychrophilous organisms (montane and boreal-montane species) in Central Europe at altitudes of c. 170–400 m. Among fungi, the polypore *Phellinus nigrolimitatus* is an example (Holec 2009).

Microclimatic conditions of selected gorges have been analysed in detail since 2009 by the second author and his team. Simultaneously, the diversity of macrofungi has been studied by the first author. The aim of this paper is to assess the fungal diversity and distribution with respect to habitat conditions of the sandstone gorges, especially their microclimate. Such a study had not been performed before in the Czech Republic nor in other European countries.

MATERIAL AND METHODS

Selection of the studied gorges. In the Bohemian Switzerland NP (Fig. 1) occur hundreds of sandstone gorges. The 8 studied gorges (Fig. 2) were selected to represent different types in to the following parameters: distribution in the NP, geomorphology of the valleys (typical and distinctive – deep, narrow, long), orientation (both N–S and W–E), amount of nutrients in soil (poor and rich, according to the composition of their vegetation).

Habitat conditions of the studied gorges. The gorges were modelled by water erosion in quartzose sandstones of Cenomanian to Coniacian age (Mikuláš et al. 2007). The sandstones are composed of quartz grains with quartz cement, i.e. the soils developed on such a bedrock are acidic. The length of the studied gorges varies from 330 to 900 m, the depth from 9 to 82 m (Tab. 2). Small streams (c. 0.5–1 m broad), peaty deposits (up to 1 m deep) and living *Sphagnum* stands are present at bottom (Fig. 4) except for the Babylon gorge, which is dry or in places inhabited by shallow *Sphagnum* stands. Macroclimatically, the Bohemian Switzerland NP is moderately warm having a mean annual temperature of 7–8 °C. However, the gorges are significantly colder (Sklenář et al. 2007). The mean precipitation is 750–850 mm per year (Mikuláš et al. 2007). Their vegetation is formed by a mosaic of near-natural forest stands (Fig. 3) of the *Luzulo-Fagetum* association (bottom and slopes: *Fagus sylvatica*,

Picea abies, *Acer pseudoplatanus*, rarely *Abies alba*; sandstone rocks: *Pinus sylvestris*) and man-influenced *Picea abies* forests (Fig. 4) with admixed *Pinus sylvestris*, *Fagus sylvatica* and introduced *Pinus strobus*. Consequently, the vegetation of each gorge cannot be simply described by one phytosociological relevé.

Tab. 1. Studied gorges and their geographic position.

Name of the gorge	Code	Position of the lower end	Position of the upper end	Altitude (m) of the bottom	Main orientation
Zlé díry	ZD	50°52.931' N 14°22.764' E	50°52.844' N 14°22.322' E	280–350	W–E
Pryskyřičný důl	PR	50°53.563' N 14°24.402' E	50°53.284' N 14°24.756' E	310–350	N–S + W–E
Pytlácká rokle	PT	50°53.962' N 14°23.294' E	50°53.722' N 14°23.397' E	270–300	N–S
Rokle Kachního potoka	KP	50°51.795' N 14°18.520' E	50°51.434' N 14°18.807' E	170–250	NW–SE
Hauschengrund	HS	50°52.601' N 14°22.407' E	50°52.599' N 14°22.107' E	320–390	W–E
Rokle nad Dolským mlýnem	DM	50°50.811' N 14°20.816' E	50°50.672' N 14°20.811' E	200–250	N–S
Babylon	BB	50°52.354' N 14°22.737' E	50°52.369' N 14°22.963' E	290–330	W–E
Střelecká rokle	ST	50°53.253' N 14°20.819' E	50°52.985' N 14°20.463' E	270–340	SW–NE

Tab. 2. Basic characteristics of studied gorges. For codes of gorges, see Tab. 1. The proportion of broad-leaved trees, mainly beech (*Fagus sylvatica*), and amount of dead wood are given on a relative scale (+++: high, ++: medium, +: small), only for comparison of the gorges. The nutrient supply in the soil was assessed according to the composition of the vegetation.

gorge	length (m)	max. depth (m)	mean depth (m)	proportion of *Fagus* (relative values, only for comparison)	amount of dead wood (relative values, only for comparison)	soil (nutrient supply)	microclimatic measurements
BB	330	33	9	+	+	poor	+*
DM	400	56	12	+	+	moderately rich	–
HS	400	82	16	+++	+++	rich	+
KP	900	81	10	+	+++	rich	–
PR	850	82	18	+	++	poor	+
PT	550	53	10	+	++	rich	+
ST	800	82	18	+	++	poor	–
ZD	550	46	12	+++	+++	rich	+

* In the Babylon area, comprising a high number of small gorges, the mycologically studied gorge was different from the microclimatically studied one. However, their distance was only about 200 m and their geomorphology and vegetation were the same.

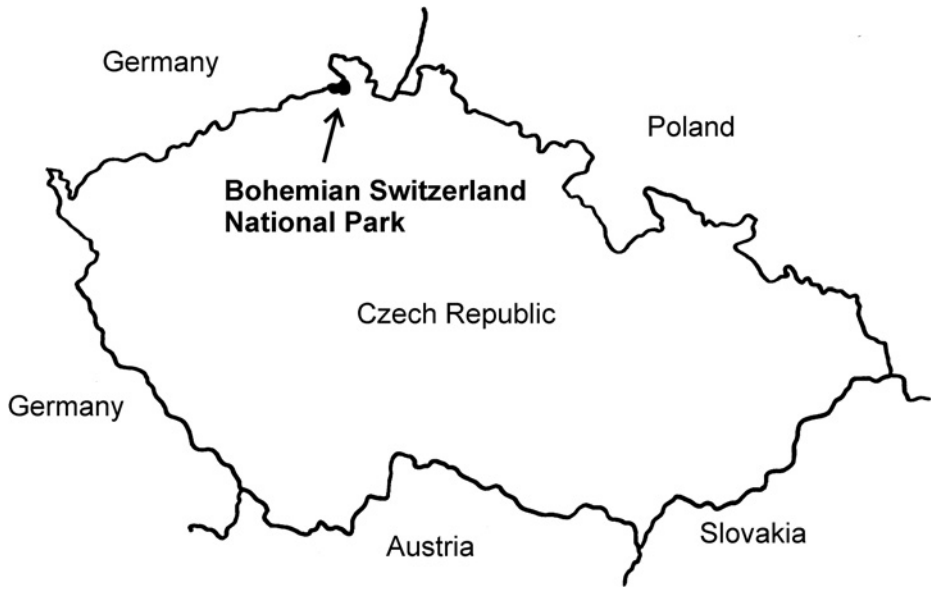

Fig. 1. Geographic position of Bohemian Switzerland National Park.

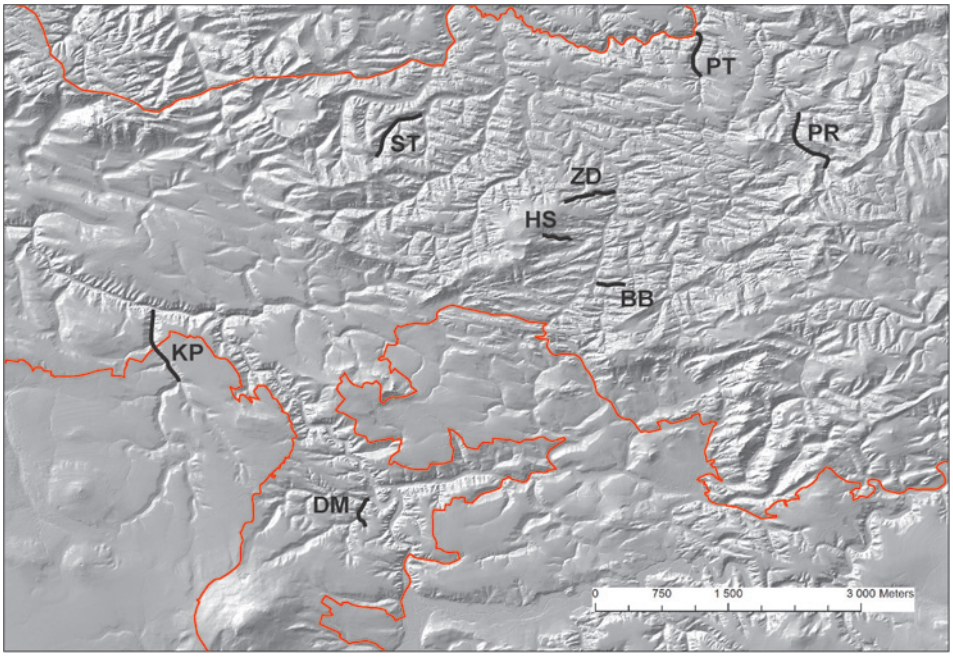

Fig. 2. Geographic position of the studied gorges in the Bohemian Switzerland National Park.
BB – Babylon, **DM** – Rokle nad Dolským mlýnem, **HS** – Hauschengrund, **KP** – Rokle Kachního potoka, **PR** – Pryskyřičný důl, **PT** – Pytlácká rokle, **ST** – Střelecká rokle, **ZD** – Zlé díry.

Mycological research. All gorges were visited five times: in early July 2009 (early summer aspect of fructification), early October 2009 (autumn aspect), early November 2009 (late autumn aspect), September 2010 (the richest autumn aspect) and August 2011 (summer aspect). Macrofungi were studied at the bottom of the gorges and lower parts of their slopes (under rocks or on the rocks up to a height of 2 m). Upper parts of slopes and their crests were not observed as the study was focused on fungi of the coldest parts of the gorges. All macrofungi were recorded (except for corticioid fungi, which were excluded for practical reasons), whereby rare or critical species were collected and dried. The dried specimens were studied microscopically for exact identification, using common methods (see e.g. Bas et al. 1988), identification keys (mainly Knudsen & Vesterholt 2008; Ryvarden & Gilbertson 1993, 1994), and contemporary taxonomic monographs of the individual fungal genera. Voucher specimens are kept in the mycological herbarium of the National Museum, Prague (PRM).

Long-term microclimatic measurements. The microclimatic conditions were studied using the thermal and soil moisture microclimatic stations (TMS1) developed by TOMST Ltd. (Prague, Czech Republic). The stations are stand-alone, fully automatic, measuring the temperature and soil moisture at an interval of 30 min. for several years. The temperature is measured by 3 sensors (15 cm above the ground, near the ground, 10 cm below the ground; see Wild et al. 2009 for a detailed description of the station). About 300 stations were installed in 2009 along the elevation gradient of 5 gorges (Tab. 2) in order to measure seasonal dynamics of microclimatic conditions of the gorges in detail (Wild et al. 2010). The temperature near the ground can strongly differ from the one measured in standard meteorological weather stations (Geiger et al. 2009) and is believed to be a better descriptor of a species' micro-environment (Ashcroft & Gollan 2011, Fridley 2009).

RESULTS AND DISCUSSION

Diversity of macrofungi

Number of species. The total number of macrofungi species found in all 8 gorges is 253 (see the list below). In the individual gorges the numbers are 63 to 124 (Tab. 3). The species-richest gorges are Zlé díry (124 species), Pryskyřičný důl (105), and Hauschengrund (95). Generally, the number of species in individual gorges is not high. This is caused by the fact that the gorges represent only narrow (10–20 m) and short (330–900 m) „tracts" and the vegetation is rather uniform in most of them (man-influenced *Picea* stands). The richness of the Zlé díry gorge is caused by a combination of several factors: diverse habitats (*Fagus*, mixed and *Picea* stands), well-preserved vegetation (highest percentage of near-natural habitats of the studied gorges) and rich supply of dead wood of several tree species (*Fagus*, *Picea*, *Abies*, *Acer*).

Species composition. The basic group of macrofungi in all gorges is formed by common species of mesic to wet *Picea* or *Fagus* forests (if *Fagus* is present). Some species growing among mosses on wet sandstone rocks (*Cyphellostereum laeve*, *Lichenomphalia umbellifera*, *Galerina* species) are very typical of the gorges. The number of lignicolous species in the gorges increases with the amount of dead wood, especially fallen trunks (Zlé díry, Hauschengrund, Rokle Kachního potoka).

Tab. 3. Numbers of macrofungi species in the studied gorges.

Gorge	2009 (3 visits) Jul, Oct, Nov	2010 (1 visit) Sep	2011 (1 visit) Aug	Total 2009–2011 (5 visits)
Zlé díry	82	80	20	**124**
Pryskyřičný důl	79	58	27	**105**
Pytlácká rokle	61	46	20	**83**
Rokle Kachního potoka	47	42	18	**67**
Hauschengrund	50	60	20	**95**
Rokle nad Dolským mlýnem	40	42	22	**63**
Babylon	49	45	21	**72**
Střelecká rokle	47	49	18	**75**

Distinctive species. The fungal diversity in each gorge was evaluated according to the presence of some distinctive fungi (Tab. 4): threatened species (included in the Red List of Czech macrofungi, see Holec & Beran 2006), boreal-montane species, species preferring moist habitats, species preferring more or less natural vegetation (old-growth forests) and species generally rare in the Czech Republic. It is evident that the species-richest gorges (Zlé díry, Pryskyřičný důl) are also the most valuable ones in quality (Fig. 7, Tab. 4), being rich in red-listed fungi, species preferring moist habitats and old-growth forests. Pytlácká rokle is also important as an example of a deep narrow gorge where boreal-montane species occur.

Some species-poorer gorges (Rokle nad Dolským mlýnem, Babylon; see Tab. 4, Fig. 7) have a low number of distinctive species. This is in correlation with their monotonous vegetation, which offers only a limited number of ecological niches for the macrofungi. The two gorges are inhabited by man-influenced *Picea* forests with minimal presence of deciduous trees and a low number of fallen trunks.

Oligoporus undosus and *Pholiota subochracea* (Fig. 6) are remarkable boreal-montane species having its ecological optimum in waterlogged or montane *Picea* forests (Holec 2001, Kotlaba 1984, Ryvarden & Gilbertson 1994). Their occurrence in Bohemian Switzerland NP is made possible by the climatic inversion at the bottom of the narrow sandstone gorges (see the discussion on microclimate). In spite of long-term mycological research in Bohemian Switzerland NP (2001–2011, unpublished reports by J. Holec, V. Antonín and their collaborators; depon. in: Administration of the Bohemian Switzerland NP, Krásná Lípa), the species were never found outside the bottom of the gorges presented here.

Except for fungi with such a distinctive ecology, species preferring moist conditions (high soil moisture and air humidity) were found in almost all gorges (Tab. 4).

Fig. 3. Sandstone gorge inhabited by near-natural forest composed of *Fagus sylvatica*, *Picea abies*, and *Acer pseudoplatanus* (Zlé díry). Such gorges are rare in the Bohemian Switzerland National Park at present.

Fig. 4. Most gorges in the Bohemian Switzerland National Park are inhabited by man-influenced *Picea* forest with undergrowth of *Sphagnum* and other mosses (example: Pytlácká rokle). Note the small stream at the bottom and wet sandstone rocks covered by mosses.

Fig. 5. *Pholiota subochracea*, Pytlácká rokle sandstone gorge (PRM 909920). Photo J. Holec.

Fig. 6. *Cortinarius sommerfeltii*, Zlé díry sandstone gorge (PRM 899308). Photo J. Holec.

Fungi of conservational value. From the viewpoint of nature conservation, the records of species protected by law (Antonín & Bieberová 1995) and Red-listed species (Holec & Beran 2006) are important. As shown in Tab. 4, most of the conservationally valuable species are lignicolous fungi. It clearly demonstrates the importance of dead wood (especially naturally fallen and slowly decaying trunks) as a substrate for endangered lignicolous species.

Tab. 4. Survey of distinctive species found in the gorges studied.
Cumulative results based on seasons 2009–2011. For a discussion on boreal-montane species, see the preceding paragraphs. The classification of fungi as species of moist habitats and species of old-growth forests is based on ecological data published in the Czech Red List (Holec & Beran 2006) and publications by Kotlaba (1984), Holec (2003, 2005), Krieglsteiner (2001, 2003), Papoušek (2004), Beran (2005), Adamčík et al. (2007), and Knudsen & Vesterholt (2008). For terminology concerning the naturalness of forests, see Vrška et al. (2011), for its mycological implications, see Holec (2008).

	Zlé díry	**Pryskyřičný důl**	**Rokle Kachního potoka**	**Pytlácká rokle**
Number of species	124	105	67	83
Number of distinctive species	14	12	5	4
Red-listed species (* simultaneously protected by law in the Czech Republic)	*Camarops tubulina*, Cyphellostereum laeve, Neobulgaria pura, Omphaliaster asterosporus, Pholiota subochracea, Pluteus phlebophorus, Pluteus umbrosus, Phyllotopsis nidulans*	*Hypholoma myosotis, Phyllotopsis nidulans, Pluteus phlebophorus*	*Camarops tubulina*, Gerronema strombodes, Neobulgaria pura*	*Cyphellostereum laeve, Pholiota subochracea, Oligoporus undosus*
Boreal-montane species	*Pholiota subochracea*			*Pholiota subochracea, Oligoporus undosus*
Species of habitats with high soil moisture and air humidity	*Cortinarius sommerfeltii, Cyphellostereum laeve, Lichenomphalia umbellifera, Pleurocybella porrigens*	*Galerina stordalii, Hypholoma myosotis, Pleurocybella porrigens*	*Cyphellostereum laeve, Dacryobolus karstenii*	*Cyphellostereum laeve, Pleurocybella porrigens*
Species of old-growth forests	*Camarops tubulina, Ischnoderma resinosum, Meripilus giganteus, Neobulgaria pura, Pluteus nanus, Pluteus phlebophorus, Pluteus umbrosus*	*Ischnoderma resinosum, Pluteus nanus, Pluteus phlebophorus*	*Camarops tubulina, Neobulgaria pura*	
Generally rare species		*Calocera furcata, Cudoniella acicularis, Hygrophoropsis rufa, Lepiota felina, Psathyrella olympiana*		

Tab. 4 – continuation

	Střelecká rokle	**Hauschengrund**	**Rokle nad Dolským mlýnem**	**Babylon**
Number of species	75	95	63	72
Number of distinctive species	4	3	3	2
Red-listed species (* simultaneously protected by law in the Czech Republic)	*Aleuria aurantia, Cortinarius rubellus*	*Cudoniella clavus*		*Aleuria aurantia*
Boreal-montane species				
Species of habitats with high soil moisture and air humidity	*Cortinarius rubellus, Pleurocybella porrigens*	*Pleurocybella porrigens*	*Dacryobolus karstenii*	
Species of old-growth forests		*Pseudocraterellus sinuosus*		
Generally rare species	*Cudoniella acicularis*		*Asterophora parasitica, Hygrophorus subviscifer*	*Gymnopus fuscopurpureus*

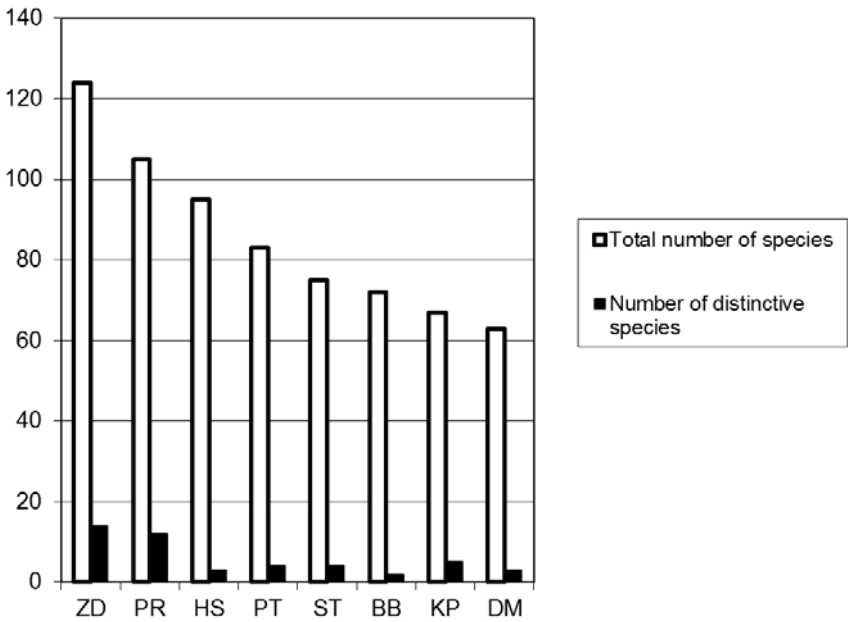

Fig. 7. Comparison of total numbers of species and numbers of distinctive species.
BB – Babylon, **DM** – Rokle nad Dolským mlýnem, **HS** – Hauschengrund, **KP** – Rokle Kachního potoka, **PR** – Pryskyřičný důl, **PT** – Pytlácká rokle, **ST** – Střelecká rokle, **ZD** – Zlé díry.

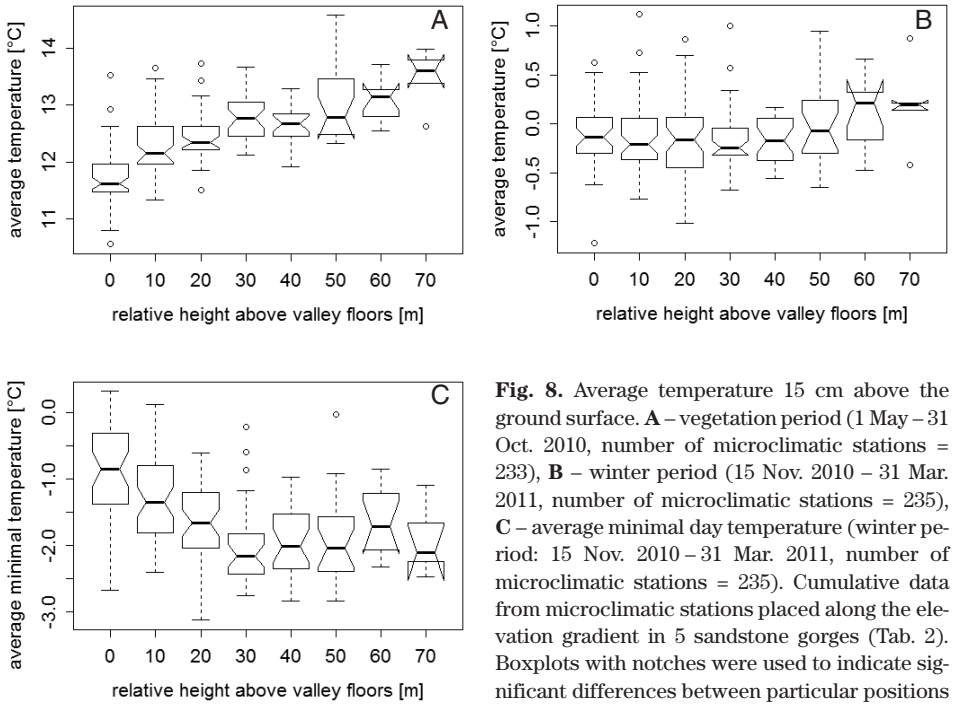

Fig. 8. Average temperature 15 cm above the ground surface. **A** – vegetation period (1 May – 31 Oct. 2010, number of microclimatic stations = 233), **B** – winter period (15 Nov. 2010 – 31 Mar. 2011, number of microclimatic stations = 235), **C** – average minimal day temperature (winter period: 15 Nov. 2010 – 31 Mar. 2011, number of microclimatic stations = 235). Cumulative data from microclimatic stations placed along the elevation gradient in 5 sandstone gorges (Tab. 2). Boxplots with notches were used to indicate significant differences between particular positions along the elevation gradient. Boxes in which the notches do not overlap are likely to have significantly different medians under the given test.

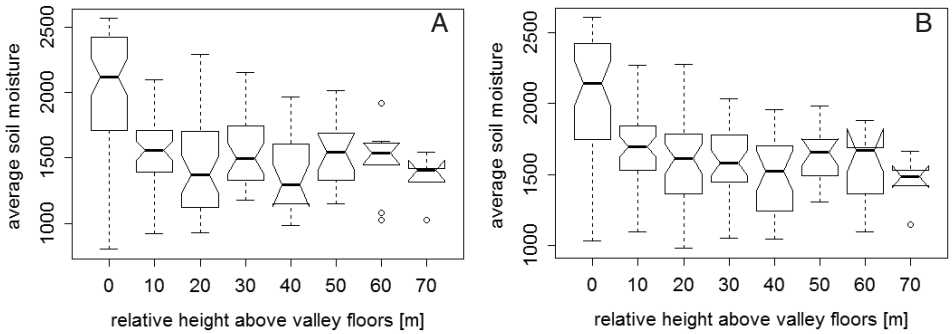

Fig. 9. Average soil moisture. **A** – vegetation period (1 May – 31 Oct. 2010, number of microclimatic stations = 233), **B** – winter period (15 Nov. 2010 – 31 Mar. 2011, number of microclimatic stations = 235). Soil moisture (axis y) is presented in the original unit – count of TDT pulses, which are fully comparable with other TMS1 microclimatic stations but need to be calibrated to volumetric water content for further ecological interpretations (for methodological details, see Wild et al. 2010). Only valley floors are significantly wetter than the rest of the valleys during both vegetation and winter periods. Boxplots with notches were used to indicate significant differences between particular positions along the elevation gradient. Boxes in which the notches do not overlap are likely to have significantly different medians under the given test.

Microclimate of sandstone gorges

In mountain regions, climatic inversion is often related to (nocturnal) cold air drainage and accumulation of cold air in lower-lying areas (Geiger et al. 2009). Previous short-term measurements carried out in the Bohemian Switzerland National Park (Sklenář et al. 2007) indicated that deep sandstone gorges do not function as mountain basins, so their effect on the climate could be rather buffering than polarising. Continuous long-term measurements support this idea (Wild et al. 2010). The floors of the gorges are significantly colder than their slopes and slope crests during the vegetation period (Fig. 8A). However, they are not significantly colder during the winter period (Fig. 8B) and even show a higher average minimal temperature than the rest of the gorges (Fig. 8C), very probably due to a lower exchange of heat fluxes of the sheltered ground surface, and longer lasting snow cover. The long-term measurements also confirmed a higher soil moisture at the bottom of the gorges during both vegetation and winter periods (Figs. 9 A, 9B). Differences between the gorges are small, but the deeper gorges tend to have a lower average temperature at the bottom.

Generally, bottoms of sandstone gorges in the Bohemian Switzerland NP (situated at a low altitude) function as „buffers“ maintaining a stable, humid and rather cold microclimate, enabling the occurrence of some boreal-montane fungi and species requiring humid conditions. On the contrary, the slopes and crests of the gorges exhibit microclimatic extremes such as severe frosts in winter and high temperatures connected with dryness in summer. Consequently, such species are not found there. Climatic inversion in interplay with tree layer composition is a phenomenon markedly influencing the distribution of fungi in the landscape and enabling the extrazonal occurrence of some species. The Bohemian Switzerland NP is a model area where this phenomenon is clearly developed in a landscape which is moderately warm macroclimatically but much colder microclimatically at bottoms of narrow and deep sandstone gorges.

List of macrofungi species in the 8 studied gorges

The list is arranged alphabetically according to fungal names. The names of substrates are abbreviated as follows: *Abies* – *Abies alba*, *Fagus* – *Fagus sylvatica*, *Picea* – *Picea abies*, *Pinus* – *Pinus sylvestris*, *Sorbus* – *Sorbus aucuparia*. For each species, its substrates or mycorrhizal partners in the Bohemian Switzerland National Park are mentioned. For codes of gorges, see Tab. 1. PRM is the acronym of the mycological herbarium, National Museum, Prague, where voucher specimens of some species are kept.

Aleuria aurantia 2; 2; BB, ST; strongly decayed wood on soil, in needles and moss under young *Picea* trees close to sand layer (deposited by heavy rains); PRM 922291.
Amanita battarrae 1; 1; ZD; under *Picea*.
Amanita citrina 7; 4; BB, DM, HS, ZD; in moss, in needles, under *Fagus* and *Picea*, under *Picea*.
Amanita fulva 8; 3; BB, PT, ZD; in moss, under *Picea*.
Amanita porphyrea 1; 1; BB; in moss.
Amanita rubescens 6; 5; DM, HS, KP, ST, ZD; on soil, under *Fagus* and *Picea*, under *Picea*.
Amanita spissa 2; 2; BB, HS; in moss, under *Picea*.
Amylostereum areolatum 1; 1; PR; *Picea*: fallen corticated trunk; PRM 922320.
Antrodia serialis 12; 5; BB, DM, HS, KP, PT; *Pinus*: fallen trunk without bark, *Picea*: fallen trunks without bark + fallen corticated trunks.
Antrodia sinuosa 2; 2; DM, PR; *Picea*: fallen decaying trunk + fallen trunk without bark.
Antrodiella serpula 1; 1; ZD; *Fagus*: fallen trunk without bark.
Antrodiella pallescens 1; 1; ST; *Fagus*: fallen trunk without bark.
Armillaria ostoyae 4; 3; KP, PR, ZD; *Abies*: fallen corticated trunk, *Picea*: on stump + at base of a living trunk.
Ascocoryne cylichnium 2; 1; PR; *Fagus*: fallen decaying trunk, *Picea*: fallen decaying trunk covered with mosses; PRM 922282.
Ascocoryne sarcoides 3; 2; HS, ZD; *Fagus*: fallen decaying trunk + fallen log + fallen corticated trunk.
Asterophora parasitica 2; 1; DM; old fruitbody of a *Russula*, old fruitbody of *Russula nigricans*; PRM 922312.
Auricularia auricula-judae 1; 1; ZD; *Fagus*: fallen trunk without bark.
Baeospora myosura 14; 7; BB, DM, KP, PR, PT, ST, ZD; fallen cone of *Picea*, cone of *Picea* lying on soil, cone of *Picea* hidden in soil.
Basidioradulum radula 3; 2; PR, PT; *Sorbus*: on stump, *Fagus*: logs of fallen corticated trunk.
Bisporella citrina 2; 1; PR; *Fagus*: fallen log + fallen decaying trunk.
Bjerkandera adusta 3; 2; ST, ZD; *Fagus*: fallen log + fallen log with bark + fallen trunk without bark.
Bolbitius reticulatus 2; 2; PT, ZD; *Fagus*: decaying log + fallen decaying trunk.
Boletus badius 23; 7; BB, DM, HS, KP, PR, PT, ST; in needles, under *Picea*, under *Fagus* and *Picea*.
Boletus erythropus 1; 1; ZD; in needles.
Bulgaria inquinans 3; 1; ZD; *Fagus*: fallen corticated trunk.
Calocera cornea 3; 2; HS, ZD; *Fagus*: fallen trunk without bark.
Calocera furcata 1; 1; PR; *Picea*: log of fallen trunk.
Calocera viscosa 20; 8; BB, DM, HS, KP, PR, PT, ST, ZD; *Picea*: on decaying stumps + wood in soil + roots of fallen trunk + roots of a dead trunk + decaying wood + decayed wood + in detritus + log lying on soil.
Camarops tubulina 5; 2; KP, ZD; *Picea*: fallen decaying trunk + fallen trunk without bark + at base of fallen decaying trunk; PRM 922308, PRM 922315, PRM 922318.
Cantharellus tubaeformis 7; 4; BB, DM, PR, PT; under *Picea*, in detritus, in moss, in needles.
Clavulina coralloides 7; 4; DM, HS, KP, ST; in soil, in detritus, in needles.
Clitocybe vibecina 11; 6; BB, DM, KP, PR, PT, ST; in living *Sphagnum* stand, in moss, in needles; PRM 922321.
Collybia cirrhata 6; 4; BB, PR, ST, ZD; in *Sphagnum*, in needles, in moss, in detritus, on decayed fruitbody in needles.
Collybia tuberosa 1; 1; PR; in moss.
Coprinus micaceus 2; 1; ZD; *Fagus*: fallen corticated trunk + fallen trunk without bark.
Cortinarius albovariegatus 1; 1; PT; in living *Sphagnum* stand; PRM 922286.
Cortinarius anomalus 2; 2; DM, ST; under *Picea* and *Pinus* (no *Betula*).
Cortinarius bataillei 13; 6; BB, HS, PR, PT, ST, ZD; under *Picea*, in living *Sphagnum* stand, in moss, in needles.
Cortinarius biformis 1; 1; PT; under *Picea*; PRM 922324.

Cortinarius brunneus 4; 3; BB, PT, ZD; in moss under *Picea*, in needles and *Sphagnum*, under *Picea*.
Cortinarius cinnamomeus 3; 2; ST, ZD; in moss, under *Picea*.
Cortinarius croceoconus 11; 7; BB, DM, KP, PR, PT, ST, ZD; under *Picea*, in living *Sphagnum* stand, in moss, in needles and moss.
Cortinarius croceus 1; 1; DM; under *Picea*.
Cortinarius decipiens 1; 1; ZD; under *Fagus*; PRM 922299.
Cortinarius diasemospermus 2; 2; HS, PR; under *Fagus*, under *Picea* (*Fagus* 10 m away).
Cortinarius erubescens 1; 1; HS; under *Fagus*; PRM 922302.
Cortinarius fasciatus 2; 1; PR; in living *Sphagnum* stand; PRM 922322.
Cortinarius flexipes var. *flexipes*; 9; 4; BB, PR, PT, ST; in living *Sphagnum* stand, under *Picea*.
Cortinarius flos-paludis 2; 2; BB, ST; under *Picea*; PRM 922288, PRM 922289.
Cortinarius gentilis 1; 1; PT; in needles.
Cortinarius junghuhnii 1; 1; BB; in living *Sphagnum* stand; PRM 922326.
Cortinarius malachius 1; 1; PT; in needles under *Picea*.
Cortinarius phoeniceus 1; 1; HS; under *Fagus*; PRM 899307.
Cortinarius rubellus 1; 1; ST; in *Sphagnum* and other mosses; PRM 922290.
Cortinarius sanguineus 5; 3; HS, PR, PT; in *Sphagnum*, under *Fagus* and *Picea*, under *Picea*; PRM 922325.
Cortinarius sommerfeltii 1; 1; ZD; in living *Sphagnum* stand; PRM 899308.
Crepidotus applanatus 2; 1; ZD; *Fagus*: fallen decaying trunk.
Crepidotus luteolus 1; 1; KP; *Acer pseudoplatanus*: fallen twig in detritus; PRM 922334.
Cudoniella acicularis 3; 2; PR, ST; *Betula*: decayed stump, decayed wood of a deciduous tree, wood of a decidous tree on soil; PRM 922281, PRM 922292.
Cudoniella clavus 1; 1; HS; on *Fagus* nut lying in a spring area; PRM 922304.
Cyphellostereum laeve 7; 3; KP, PT, ZD; in mosses on wet sandstone rocks, on *Dicranella* and liver moss (*Hepaticae*) on wet rock, in *Polytrichum* on wet sandstone rock; PRM 922285.
Cystoderma jasonis 18; 8; BB, DM, HS, KP, PR, PT, ST, ZD; in moss, in moss on a log, in moss on sandstone rock, *Picea*: decayed wood.
Dacryobolus karstenii 2; 2; DM, KP; *Picea*: on stump, *Pinus strobus*: fallen trunk without bark; PRM 922317, PRM 922310.
Daedaleopsis confragosa 3; 2; ST, ZD; *Fagus*: fallen log with bark + fallen corticated trunk.
Datronia mollis 2; 2; HS, ZD; *Fagus*: fallen trunk without bark + fallen log with bark.
Delicatula integrella 1; 1; KP; decaying wood in needles close to a stream.
Diplomitoporus lindbladii 9; 4; BB, DM, HS, PT; *Picea*: fallen decaying trunks + fallen corticated trunks + fallen trunks without bark; PRM 922309.
Entoloma cetratum 4; 2; KP, ZD; in detritus, in moss.
Entoloma conferendum 2; 2; KP, PT; in mosses and needles.
Exidia pithya 1; 1; ST; *Picea*: fallen corticated trunk.
Exidia nigricans 1; 1; ZD; *Fagus*: fallen trunk without bark.
Flammulaster carpophilus 1; 1; PR; *Fagus*: on fallen nut.
Fomes fomentarius 15; 5; HS, PR, PT, ST, ZD; *Betula pendula*: fallen trunk without bark, *Fagus*: fallen decaying trunks + fallen corticated trunks + fallen trunks without bark + living trunks + on stumps.
Fomitopsis pinicola 25; 8; BB, DM, HS, KP, PR, PT, ST, ZD; *Fagus*: fallen trunks without bark, *Picea*: on stumps + fallen trunks without bark + fallen decaying trunks + fallen corticated trunks.
Galerina calyptrata 1; 1; PT; in mosses on wet sandstone rock.
Galerina marginata 6; 3; HS, KP, ZD; *Picea*: fallen decaying trunks covered with mosses, *Fagus*: fallen decaying trunk + fallen corticated trunk + fallen trunk without bark.
Galerina paludosa 18; 6; BB, DM, PR, PT, ST, ZD; in living *Sphagnum* stand, in mosses and *Sphagnum*.
Galerina sideroides 4; 4; BB, PR, PT, ST; *Picea*: on wood + roots of a dead trunk + roots of fallen trunk; PRM 922329.
Galerina stordalii 1; 1; PR; in mosses on wet sandstone rock.

Ganoderma applanatum 10; 4; DM, HS, ST, ZD; *Fagus*: fallen decaying trunks + on stumps + logs of fallen corticated trunks + fallen corticated trunks + fallen trunks without bark, *Betula*: fallen logs + fallen corticated trunks.
Gerronema strombodes 1; 1; KP; *Picea*: wood in soil; PRM 922316.
Gloeophyllum abietinum 1; 1; PR; *Picea*: fallen trunk without bark.
Gloeophyllum odoratum 8; 3; DM, HS, KP; *Picea*: fallen decaying trunks + fallen corticated trunks + fallen trunks without bark.
Gloeophyllum sepiarium 6; 4; BB, PT, ST, ZD; *Picea*: fallen corticated trunks + fallen trunks without bark.
Gymnopilus penetrans 4; 4; BB, HS, PR, ZD; *Picea*: fallen decaying trunks + fallen trunks without bark, in detritus.
Gymnopilus picreus 9; 4; BB, DM, PR, PT; *Picea*: decaying wood + fallen decaying trunks + fallen trunks without bark, *Pinus*: fallen trunk without bark.
Gymnopus androsaceus 13; 7; BB, DM, HS, PR, PT, ST, ZD; in detritus, on needles.
Gymnopus aquosus 2; 2; PR, ZD; on fallen decaying leaves of *Fagus*.
Gymnopus confluens 2; 2; HS, ZD; in detritus, in fallen leaves.
Gymnopus fuscopurpureus 1; 1; BB; on fallen decaying leaves of *Fagus*; PRM 922330.
Gymnopus perforans 23; 8; BB, DM, HS, KP, PR, PT, ST, ZD; on needles.
Gymnopus peronatus 1; 1; HS; on fallen decaying leaves of *Fagus*.
Hapalopilus rutilans 1; 1; PR; *Fagus*: fallen log with bark.
Helvella crispa 1; 1; HS; *Fagus*: logs of fallen corticated trunk.
Heterobasidion parviporum 2; 2; KP, ST; *Picea*: fallen decaying trunk + roots of a dead trunk.
Hydnum rufescens 1; 1; HS; under *Fagus*.
Hygrophoropsis aurantiaca 2; 2; PR, ST; in moss, *Picea*: on stump.
Hygrophoropsis rufa 1; 1; PR; under *Picea*; PRM 899303.
Hygrophorus eburneus 1; 1; HS; under *Fagus*.
Hygrophorus olivaceoalbus 25; 8; BB, DM, HS, KP, PR, PT, ST, ZD; under *Picea*, under *Fagus* and *Picea*, in mosses, in living *Sphagnum* stand, in mosses and *Sphagnum*.
Hygrophorus penarius 3; 1; HS; under *Fagus*; PRM 922327.
Hygrophorus pustulatus 7; 6; BB, DM, HS, KP, PT, ZD; under *Picea*, in moss, in soil.
Hygrophorus subviscifer 1; 1; DM; under *Picea* (10 m from it are a small *Fagus* and young *Betula* trees on rock); PRM 922331.
Hyphodontia breviseta 2; 2; PR, PT; *Picea*: fallen corticated trunk + fallen trunk without bark; PRM 899304.
Hypholoma capnoides 5; 4; HS, KP, PR, ST; *Fagus*: fallen decaying trunk, *Picea*: fallen corticated trunk + fallen trunk without bark + log of fallen trunk.
Hypholoma elongatum 16; 6; BB, DM, PR, PT, ST, ZD; in living *Polytrichum*, in moss, in living *Sphagnum* stand; PRM 922332.
Hypholoma fasciculare 7; 3; PR, ST, ZD; *Fagus*: fallen decaying trunks + fallen corticated trunks + fallen trunks without bark + roots of fallen trunk, *Picea*: wood in soil.
Hypholoma marginatum 12; 6; BB, HS, KP, PR, PT, ZD; in detritus, *Picea*: logs lying on soil + fallen trunks without bark + fallen decaying trunks covered with mosses + fallen decaying trunks, on decaying wood, decayed wood of *Fagus* in soil.
Hypholoma myosotis 1; 1; PR; on peaty soil and needles close to a small stream under *Picea*; PRM 899306.
Hypholoma radicosum 1; 1; PR; *Picea*: log lying on soil.
Hypholoma sublateritium 5; 3; PR, ST, ZD; *Fagus*: wood in soil + fallen trunk without bark + fallen log with bark + fallen decaying trunk, *Sorbus*: fallen decaying trunk.
Hypholoma subviride 1; 1; PR; *Fagus*: fallen decaying trunk.
Hypholoma udum 1; 1; PR; on peat among *Sphagnum*; PRM 899305.
Hypocrea rufa 1; 1; PR; on old fruitbody of *Ischnoderma resinosum*; PRM 922313.

Hypoxylon fragiforme 1; 1; ZD; *Fagus*: logs of fallen corticated trunk.
Chroogomphus rutilus 1; 1; DM; under *Picea*.
Inocybe asterospora 1; 1; HS; under *Fagus*; PRM 922305.
Inocybe geophylla var. *geophylla*; 2; 1; HS; in soil, under *Fagus*.
Inocybe geophylla var. *lilacina* 1; 1; HS; on soil.
Inocybe lanuginosa 2; 2; BB, DM; on soil; PRM 899310.
Inocybe napipes 15; 7; BB, DM, HS, PR, PT, ST, ZD; in living *Sphagnum* stand, in moss, in sand, under *Picea*, under *Picea* and *Fagus*.
Inonotus nodulosus 1; 1; ZD; *Fagus*: fallen corticated trunk.
Ischnoderma resinosum 3; 2; PR, ZD; *Fagus*: fallen decayed trunks covered with mosses + fallen decaying trunk.
Kuehneromyces mutabilis 12; 4; PR, PT, ST, ZD; *Fagus*: fallen decaying trunks + fallen corticated trunks + fallen trunks without bark + logs of fallen corticated trunks, *Sorbus*: fallen corticated trunk, *Sorbus*: on fallen trunk.
Laccaria amethystea 12; 6; BB, HS, PR, PT, ST, ZD; in sand, under *Picea* and *Fagus*, under *Picea*, under *Fagus*, in moss on sandstone rock, in detritus.
Laccaria laccata 25; 8; BB, DM, HS, KP, PR, PT, ST, ZD; in moss on sandstone rock, under *Picea*, under *Fagus*, under *Picea* and *Fagus*, in moss, in living *Sphagnum* stand, in grass, in mosses on wet sandstone rock.
Lactarius camphoratus 4; 4; BB, DM, HS, ST; in moss, under *Fagus* and *Picea*.
Lactarius helvus 9; 6; BB, DM, PR, PT, ST, ZD; in moss, in *Sphagnum*, under *Picea*.
Lactarius lignyotus 1; 1; ZD; under *Picea*.
Lactarius rufus 7; 3; BB, ST, ZD; in living *Sphagnum* stand, in moss, in needles, under *Picea*.
Lactarius subdulcis 10; 4; BB, HS, PR, ZD; under *Fagus*, in moss.
Lactarius tabidus 17; 8; BB, DM, HS, KP, PR, PT, ST, ZD; in living *Sphagnum* stand, in moss, in mosses and *Sphagnum*, under *Picea*, in grass.
Lactarius turpis 1; 1; KP; under *Picea*.
Laetiporus sulphureus 1; 1; HS; *Fagus*: fallen trunk without bark.
Lenzites betulina 2; 2; HS, PT; *Betula pendula*: fallen corticated trunk, *Fagus*: fallen trunk without bark; PRM 922287.
Leotia lubrica 5; 4; BB, HS, KP, ZD; in moss and *Sphagnum*, in moss under *Fagus*, on soil under *Fagus*, in detritus.
Lepiota felina 1; 1; PR; on bark and detritus near fallen trunk of *Fagus*; PRM 922319.
Lepista flaccida 1; 1; HS; in detritus.
Lichenomphalia umbellifera 1; 1; ZD; in mosses on wet sandstone rock.
Lycoperdon perlatum 3; 2; PR, ZD; in soil, *Fagus*: fallen trunk without bark + fallen decayed trunk covered with mosses.
Lycoperdon pyriforme 1; 1; HS; *Fagus*: on stump.
Megacollybia platyphylla 5; 3; PR, PT, ST; wood in soil, decayed wood of *Fagus* in soil, in detritus, *Picea*: wood in soil.
Meripilus giganteus 1; 1; ZD; *Fagus*: roots of an old stump.
Mycena arcangeliana 5; 3; HS, PR, ZD; *Fagus*: fallen decayed trunk covered with mosses + fallen decaying log + fallen log with bark + fallen trunk without bark + wood in soil.
Mycena capillaris 1; 1; ZD; on fallen decaying leaves of *Fagus*.
Mycena cinerella 1; 1; ZD; on fallen decaying leaves of *Fagus*.
Mycena crocata 3; 1; HS; *Fagus*: wood in soil, in detritus.
Mycena epipterygia 4; 4; KP, PR, PT, ZD; among grass, in moss, *Picea*: decaying wood lying on soil.
Mycena galericulata 21; 8; BB, DM, HS, KP, PR, PT, ST, ZD; *Betula*: fallen decaying trunk + wood in soil + fallen trunk without bark, *Fagus*: fallen logs + wood in soil + fallen logs without bark+ fallen decaying trunks + decaying wood covered with mosses + fallen trunks without bark, *Picea*: log lying

on soil + fallen trunk without bark + fallen decaying trunk + fallen decaying log, fallen decaying trunk (deciduous tree) covered with mosses.

Mycena galopus 36; 8; BB, DM, HS, KP, PR, PT, ST, ZD; in mosses and *Sphagnum*, in needles, on fallen decaying leaves of *Fagus*, in detritus, in living *Sphagnum* stand.

Mycena haematopus 9; 4; HS, PR, ST, ZD; *Picea*: on stump, *Acer pseudoplatanus*: twig lying on soil, *Fagus*: fallen decaying trunks + fallen corticated trunks + fallen trunks without bark + on stumpa.

Mycena maculata 10; 6; BB, HS, PR, PT, ST, ZD; *Picea*: wood in soil + on stumps + fallen decaying trunks + decayed wood + decaying wood.

Mycena pura 1; 1; HS; in detritus.

Mycena rubromarginata 2; 2; BB, ZD; *Picea*: fallen trunk without bark, *Acer pseudoplatanus*: on bark chips.

Mycena sanguinolenta 7; 5; HS, KP, PR, PT, ZD; on fallen decaying leaves of *Fagus*, in needles, in detritus.

Mycena speirea 1; 1; ZD; *Fagus*: fallen decayed trunk covered with mosses; PRM 922296.

Mycena viridimarginata 10; 8; BB, DM, HS, KP, PR, PT, ST, ZD; *Picea*: wood in soil + decaying wood + fallen decaying trunks + fallen decaying trunks covered with mosses + fallen corticated trunks + on stumps.

Mycena zephirus 1; 1; ZD; in detritus.

Mycetinis alliaceus 1; 1; HS; in detritus.

Nectria cinnabarina 2; 1; ZD; *Fagus*: logs of fallen corticated trunk + fallen log with bark.

Neobulgaria pura 5; 2; KP, ZD; *Fagus*: fallen log with bark + fallen corticated trunk.

Oligoporus alni 4; 2; HS, ZD; *Fagus*: fallen logs + logs of fallen trunk without bark, *Fagus*: on fallen twig; PRM 922301.

Oligoporus caesius 17; 7; BB, DM, KP, PR, PT, ST, ZD; *Picea*: fallen trunks without bark + fallen corticated trunks + fallen decaying trunks.

Oligoporus fragilis 7; 5; BB, DM, KP, PR, PT; *Picea*: fallen trunks without bark + fallen decaying trunks.

Oligoporus guttulatus 10; 5; BB, KP, PR, PT, ST; *Picea*: fallen decaying trunks + fallen corticated trunks + fallen trunks without bark + on decayed stumps + roots of a fallen trunk.

Oligoporus lacteus 1; 1; DM; *Pinus strobus*: fallen trunk without bark; PRM 922311.

Oligoporus leucomallelus 1; 1; KP; *Pinus*: fallen trunk without bark; PRM 922307.

Oligoporus stipticus 14; 6; BB, KP, PR, PT, ST, ZD; *Picea*: fallen corticated trunks + fallen trunks without bark + on stumps + decaying wood.

Oligoporus tephroleucus 1; 1; ZD; *Picea*: fallen corticated trunk; PRM 922295.

Oligoporus undosus 1; 1; PT; *Picea*: cutting surface of fallen trunk; PRM 922328.

Omphaliaster asterosporus 1; 1; ZD; in moss on sandstone boulder; PRM 922333.

Panellus mitis 7; 4; BB, DM, PR, PT; *Picea*: log lying on soil + log of fallen trunk + fallen corticated trunk, *Larix decidua*: twig lying on soil, *Pinus*: logs of fallen trunk.

Paxillus involutus 26; 8; BB, DM, HS, KP, PR, PT, ST, ZD; in living *Sphagnum* stand, in moss, in moss on sandstone rock, under *Picea*.

Phaeolus schweinitzii 3; 3; BB, HS, KP; *Picea*: on stump + roots of a living trunk.

Phallus impudicus 4; 2; KP, PT; in detritus, in moss and soil, under *Picea*.

Phellinus hartigii 1; 1; HS; *Picea*: at base of a living trunk.

Phlebia radiata 2; 2; ST, ZD; *Fagus*: fallen log with bark + fallen trunk without bark.

Phlebia subochracea 1; 1; HS; *Picea*: fallen decaying trunk; PRM 922303.

Pholiota adiposa 1; 1; HS; *Fagus*: living trunk.

Pholiota flammans 2; 2; DM, KP; decaying trunk of a conifer, *Picea*: fallen decaying trunk.

Pholiota lenta 3; 3; HS, PT, ZD; in detritus, *Picea*: fallen trunk without bark.

Pholiota lubrica 1; 1; ZD; *Fagus*: fallen decaying trunk.

Pholiota mixta 2; 2; BB, KP; in moss on old forest path, in moss and detritus.

Pholiota scamba 2; 2; KP, ZD; *Picea*: fallen decaying trunk, strongly decayed wood of a conifer covered with mosses; PRM 922297.

Pholiota spumosa 2; 1; KP; *Picea*: wood in soil.
Pholiota squarrosa 2; 2; ST, ZD; *Fagus*: base of living trunk + fallen trunk without bark.
Pholiota subochracea 2; 2; PT, ZD; *Picea*: roots of an old stump, *Picea*: fallen decaying trunk covered with mosses; PRM 922284, PRM 922300.
Phyllotopsis nidulans 2; 2; PR, ZD; *Picea*: on stump, *Betula pendula*: fallen corticated trunk; PRM 922293.
Physisporinus sanguinolentus 4; 3; HS, PR, ZD; *Picea*: roots of a fallen trunk + decayed wood, *Fagus*: fallen log + fallen decaying trunk.
Piptoporus betulinus 3; 2; DM, PR; *Betula pendula*: fallen corticated trunk + fallen trunk without bark + fallen log with bark.
Pleurocybella porrigens 8; 5; HS, PR, PT, ST, ZD; *Picea*: wood in soil + decayed wood + decayed wood in *Sphagnum* + fallen decaying trunks + on stumps.
Pleurotus dryinus 1; 1; KP; *Picea*: living trunk.
Pleurotus pulmonarius 1; 1; ZD; *Fagus*: fallen corticated trunk.
Plicatura crispa 5; 3; PR, ST, ZD; *Fagus*: fallen log with bark + fallen corticated trunks + fallen trunks without bark.
Pluteus boudieri 1; 1; ZD; *Fagus*: fallen decaying trunk; PRM 922294.
Pluteus cervinus 8; 5; HS, PR, PT, ST, ZD; *Betula pendula*: fallen decaying trunk, *Fagus*: fallen decaying trunks + fallen corticated trunks + fallen trunks without bark.
Pluteus nanus 2; 2; PR, ZD; *Fagus*: fallen decayed trunk covered with mosses; PRM 922314.
Pluteus phlebophorus 3; 2; PR, ZD; *Fagus*: fallen decaying trunk.
Pluteus pouzarianus 8; 5; BB, DM, HS, PR, PT; fallen trunk of a conifer, *Picea*: fallen decaying trunks + fallen decaying trunks covered with mosses + fallen corticated trunks + on stump + wood in soil.
Pluteus umbrosus 2; 1; ZD; *Fagus*: fallen decayed trunk + fallen decayed trunk covered with mosses; PRM 922298.
Polyporus badius 1; 1; PR; *Fagus*: fallen decaying trunk.
Polyporus varius 1; 1; ZD; *Fagus*: fallen corticated trunk.
Psathyrella olympiana 1; 1; PR; fallen decayed trunk; PRM 922323.
Psathyrella piluliformis 2; 2; ST, ZD; *Fagus*: fallen corticated trunk + fallen trunk without bark.
Pseudocraterellus sinuosus 2; 1; HS; under *Fagus*; PRM 922306.
Pseudohydnum gelatinosum 2; 2; BB, DM; *Picea*: fallen decaying trunk.
Psilocybe crobulus 1; 1; HS; in detritus and on twig of *Fagus*.
Rhodocollybia butyracea f. *asema* 2; 2; HS, PT; in detritus, in needles.
Rhodocollybia distorta 1; 1; DM; in needles.
Rhodocollybia maculata 8; 5; DM, KP, PR, PT, ZD; in needles.
Rhytisma acerinum 1; 1; ZD; *Acer pseudoplatanus*: fallen leaves.
Rickenella fibula 4; 2; HS, ZD; in moss on soil, in mosses on wet sandstone rocks, *Fagus*: fallen decayed trunk covered with mosses, .
Russula acrifolia 1; 1; HS; under *Fagus* and *Picea*.
Russula betularum 1; 1; PR; in *Sphagnum* under *Picea* and *Betula*.
Russula densifolia 1; 1; DM; under *Picea*.
Russula emetica 19; 8; BB, DM, HS, KP, PR, PT, ST, ZD; under *Picea*, in needles, in moss on rock, in moss on soil, in living *Sphagnum* stand.
Russula fellea 3; 3; DM, HS, ZD; under *Fagus*, under *Picea* and *Pinus* (7 m from it is a young *Fagus* tree).
Russula fragilis 1; 1; PR; under *Picea*.
Russula chloroides 2; 1; KP; under *Picea*.
Russula mairei 2; 2; HS, ZD; under *Fagus*.
Russula nigricans 6; 2; HS, ST; under *Fagus*, under *Picea*, under *Fagus* and *Picea*.
Russula ochroleuca 30; 8; BB, DM, HS, KP, PR, PT, ST, ZD; on soil, under *Fagus*, under *Fagus* and *Picea*, under *Picea*, in *Sphagnum*.

Russula paludosa 2; 2; PR, PT; under *Picea*, in *Sphagnum*.
Russula romellii 1; 1; HS; under *Fagus*.
Russula turci 1; 1; HS; under *Picea*.
Russula xerampelina 1; 1; PT; under *Picea* and *Fagus*.
Scleroderma citrinum 24; 6; BB, DM, HS, PR, PT, ZD; *Picea*: fallen decaying trunk, under *Picea*, in needles, under *Fagus* and *Picea*, under *Picea* and *Pinus*, on mossy wood, in moss and detritus, in moss, on soil, *Picea*: decaying wood lying on soil, *Picea*: on stump, *Picea*: decaying wood,.
Serpula himantioides 5; 5; BB, DM, HS, KP, PT; *Pinus*: fallen trunk without bark + fallen corticated trunk, *Picea*: fallen decaying trunk + fallen trunk without bark.
Schizopora radula 1; 1; ST; *Fagus*: fallen log with bark.
Simocybe centunculus 1; 1; ZD; *Fagus*: fallen decaying trunk.
Skeletocutis amorpha 2; 2; KP, PR; *Picea*: fallen trunk without bark, *Pinus*: falen trunk without bark.
Skeletocutis carneogrisea 5; 4; BB, PR, PT, ZD; *Picea*: fallen corticated trunk.
Stereum hirsutum 5; 3; HS, PT, ZD; *Betula pendula*: fallen corticated trunk, *Fagus*: fallen trunk without bark + fallen log with bark + fallen corticated trunk.
Stereum rugosum 4; 1; ZD; *Fagus*: log of fallen trunk without bark + fallen trunk without bark + fallen decaying trunk + fallen log with bark.
Stereum sanguinolentum 8; 5; BB, KP, PR, PT, ST; *Picea*: fallen corticated trunks + fallen trunks without bark, *Pinus strobus*: fallen log.
Strobilurus esculentus 7; 7; BB, DM, HS, KP, PR, PT, ST; cones of *Picea* hidden in soil.
Tapinella panuoides 13; 8; BB, DM, HS, KP, PR, PT, ST, ZD; *Picea:* fallen decaying trunks + logs lying on soil + fallen corticated trunks + decaying wood + fallen trunks without bark, *Pinus strobus*: fallen trunk without bark.
Tephrocybe palustris 12; 6; BB, DM, PR, PT, ST, ZD; in *Polytrichum*, in living *Sphagnum* stand.
Thelephora terrestris 3; 2; KP, PR; in sand, among roots of *Picea*, in detritus.
Trametes gibbosa 1; 1; ZD; *Fagus*: logs of fallen corticated trunk.
Trametes hirsuta 3; 2; HS, ST; *Fagus*: fallen corticated trunk + fallen trunk without bark.
Trametes ochracea 2; 1; PT; *Betula pendula*: fallen corticated trunk.
Trametes versicolor 7; 4; HS, PR, ST, ZD; *Fagus*: fallen corticated trunks + fallen trunks without bark + fallen logs with bark.
Tremella encephala 3; 2; KP, ST; *Picea*: log of fallen trunk + fallen corticated trunk, *Pinus*: log lying on soil.
Tremella foliacea 1; 1; HS; *Fagus*: fallen log with bark.
Trichaptum abietinum 17; 6; BB, KP, PR, PT, ST, ZD; *Picea*: fallen corticated trunks + fallen trunks without bark + on stumps, *Pinus strobus*: fallen corticated trunk.
Tricholoma ustale 1; 1; HS; under *Fagus*.
Tricholomopsis decora 12; 7; BB, DM, HS, KP, PR, PT, ZD; *Pinus*: fallen decaying trunk, *Picea*: fallen trunks without bark + fallen decaying trunks + fallen decaying trunks covered with mosses; PRM 899309.
Tricholomopsis rutilans 3; 3; KP, PT, ST; in detritus, *Picea*: log lying in soil + wood in soil; PRM 922283.
Tylopilus felleus 7; 4; BB, DM, PT, ZD; under *Picea*.
Xerocomus chrysenteron 2; 1; DM; under *Picea*.
Xerocomus pruinatus 16; 8; BB, DM, HS, KP, PR, PT, ST, ZD; under *Picea* and *Fagus*, under *Fagus*, under *Picea*.
Xeromphalia campanella 12; 6; BB, DM, HS, KP, PR, ST; *Picea*: on decaying stumps + on decayed stumps covered with mosses + on decayed stumps + fallen decaying trunks + decayed wood + decaying wood.
Xylaria hypoxylon 3; 3; KP, PR, ZD; *Fagus*: fallen corticated trunks + fallen decaying trunks.

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