Lichens of the virgin forest reserve Žofínský prales (Czech Republic) and surrounding woodlands

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Žofín virgin forest in the Novohradské hory Mts is one of the most valuable woodland localities in the Czech Republic. This old reserve covering 102 ha is dominated by beeches, spruces, and silver firs. We have explored the nature reserve (its virgin forest including the protection zone) as well as managed forests and avenues in the surrounding area. Žofinský prales nature reserve is currently the area with the highest diversity of epiphytic and epixylic lichens in the Czech Republic. In total, 312 lichenized, 14 lichen-allied and 11 lichenicolous fungi species were recorded in a broad area of Žofín woodland region. 267 species altogether were recorded from the reserve, including three recently published taxa not confirmed by us. Fifteen lichenized fungi (Arthonia excipiendra, Biatora ligni-mollis, Candelariella xanthostigmoides, Cliostomum leprosum, Fellhanera gyrophorica, Fuscidea pusilla, Lecania croatica, Lecanora thyssanophora, Lecidella subviridis, Micarea parva, Mycobilimbia pilularis, Opegrapha trochothes, Rhaphidicyrtis trichosporella, Rinodina degeliana and R. excrescens) and two lichen-allied fungi often associated with algae (Kirschsteiniothelia aethiops and Peridiothelia fuliguncta) are reported for the first time from the Czech Republic. Several suboceanic species, and many rare and critically endangered lichens regarded sometimes as old-growth indicator species, have been recorded. Macrolichens are relatively rare in the reserve in comparison to similar habitats in the neighbouring Šumava Mts. The reserve serves as an important source of diaspores for surrounding woodlands. Several rare lichens appear to have spread from the virgin forest into the surrounding “old” forests (which are more or less extensively managed). Forty-six interesting, rare or poorly known lichenized and lichen-allied taxa are discussed in more detail, sometimes amended with additional records from other regions of the Czech Republic and Slovakia. Five species are new for Slovakia (Agonimia flabelliformis, Biatora albohyalina, B. mendax, Lecidella subviridis and Rinodina degeliana).


auszubreiten. Sechsundvierzig interessante, seltene oder wenig bekannte lichenisierte und flechtenähnliche Taxa werden diskutiert und teils mit zusätzlichen Verbreitungsangaben aus anderen Regionen Tschechiens und der Slowakei ergänzt. Agoninia flabelliformis, Biatora albohyalina, B. mendax, Lecidella subviridis und Rinodina degeliana sind neu für die Slowakei.

**Key words:** Epiphytic and epixylic lichens, biodiversity, old-growth forest, sorediate lichenized Ascomycota, Slovakia.

**Introduction**

Virgin and old-growth forests are among the most strongly endangered ecosystems in the Czech Republic. Their distribution is concentrated in South Bohemia (Šumava Mts) and Northern Moravia (Beskydy Mts). Several more or less preserved old-growth forest areas are dispersed in other mountain regions all over the country. In fact, only a few of them have developed almost without human encroachments. Boubinský prales in the Šumava Mts. and Žofínský prales in the Novohradské hory Mts belong to the most valuable, quite well-preserved virgin-like forests. The main problem of these ecosystems is their quite small area which does not exceed 1 km² for a single reservation. Old-growth forests are regarded as the refugia for sensitive epiphytic and epixylic lichens. Especially in South Bohemia, the impact of acid rain in the past was not as destructive as in other parts of the Czech Republic (Moldan 1990). This is one of the main reasons of regionally well developed epiphytic lichen communities in south-Bohemian woodlands. Our research has been focused on a detailed survey of the Žofínský prales National Nature Reserve and different types of forests in its surrounding area. We tried to compare species richness and composition in selected areas of 0.25 ha, which include intensively managed, extensively managed, primeval and at the same time deciduous, coniferous and mixed forests. This study uses a floristic data set recorded during our field research on selected 0.25 ha square areas in addition to full-area survey of the reserve and several other floristic records. A comparison of the variability of lichen diversity between different types of forest in the region will be elaborated separately in another study.

**Material and methods**

Our field research was performed between 2009 and 2011. Several additions originate from the autumn field meeting of lichenologists and bryologists in October 2012. Lichens were collected and identified by standard methods. Chemical analyses were performed by TLC (in solvents A, B’ and C) according to the methods summarized by Orange et al. (2001). An asterisk “*” marks the analysed specimens. Specimens are deposited in the herbaria of J. Maliček (JM), Z. Palice (ZP – PRA) and several duplicates in PRC. Some data were provided by F. Berger (FBe), F. Bouda (FB – PRM), O. Peksa (OP – PL), and J. Vondrák (JV – CBFS). Selected critical specimens were revised by specialists. Lichen nomenclature and categories of the Red List follow Liška & Palice (2010) with exceptions of four accepted recent nomenclatoric changes: Gyalecta fagicola (Baloch et al. 2010), Melanelixia glabratula (Arup & Sandler Berlin 2011), Varicellaria hemisphaerica (Schmitt et al. 2012) and Violella fucata (Spribille et al. 2011). Lichenicolous fungi, lichen allied fungi, and lichenized fungi missing in that paper are given with authorships. Non-lichenized fungi (lichenicolous and lichen-allied fungi traditionally studied by lichenologists) are marked by “#”. Lichens new to the Czech Republic are indicated by an exclamation-mark „!“. Taxa recorded in the reserve Žofínský prales are highlighted – in bold. GPS coordinates are defined in the WGS-84 system.
Basic characteristic of the study area

Žofín Virgin Forest National Nature Reserve (total area 102 ha) is located in the Novohradské hory Mts, at the southern border of the Czech Republic. It is one of the oldest reserves in Europe, with a core area (74.5 ha) that has been under strict protection since 1838. The reserve is a well-preserved remnant of natural spruce-silver fir-beech forest. Its altitude ranges from 735 to 830 m a.s.l. Topography is rather simple: the ridge in the southern part of the reserve gives way to gentle slopes and a flat plateau with several wetlands and peat springs areas. Annual precipitation varies between 800 and 950 mm, and mean annual temperature is 4.3 °C (Průša 1985, Albrecht et al. 2003). The geological bedrock of the whole area is formed by middle-grained, biotite-rich granodiorite of the Weinsberg-type (Pavlíček 2004). Groups of stones and small shaded rocky outcrops are distributed in several places within the reserve. The northern and eastern border is lined by the brook Tisový potok. Few other tributaries of this brook are dispersed in the protected area. Galio odorati-Fagetum, a mesotrophic beech forest, is the most common vegetation type (Boublík et al. 2009). Tree layer is mainly composed of Fagus sylvatica (49%), Picea abies (45%), and Abies alba (5%) according to the basal area of living trees in the core area (74.5 ha) in 1997 (Kenderes et al. 2009, Král et al. 2010). However, according to total number of living trees in the core area Fagus sylvatica covers 68%, Picea abies 29%, and Abies alba 2% (Král et al. 2010). Průša & Vokoun (1984) list from the core area (50.5 ha) similar numbers: Fagus (79%), Picea (15%) and Abies (5%). Acer pseudoplatanus, A. platanoides (very rarely), and Ulmus glabra (rarely) are intermixed in the core part and do not exceed 1%. The oldest silver firs and spruces reach ages between 300 and 400 years (Albrecht et al. 2003). Woodlands in the surrounding of the Žofín Virgin Forest are intensively or extensively managed. Middle-aged and older spruce forests (60–110 years) predominate, exceptionally older monocultures, but less than 120 years (with one exception). Beech forests are less common but locally forming continuous stands, their age reaching up to 200 years.

Although there has been no organized forestry in the area since 1838, like many other forest reserves in Europe the Žofín Virgin Forest has a history of human impacts over the last 170 years (Průša 1985). After a windfall caused by a serious storm, dead trees were extracted from the damaged belt, which was then replanted with Norway spruce between 1810 and 1820. During the first half of 20th century dead tree removal was documented several times. Another important although indirect human impact on the reserve is related to the problems caused by large herbivores. Žofín was part of a game reserve from 1849 to 1940s. The density of large herbivores increased further after the Second World War. In order to weaken the resulting extremely strong browsing effect on the dynamics of regeneration in the reserve, an attempt was made to control game density by hunting, and the whole reserve was fenced in 1991 (Kenderes et al. 2009). In 2007, a large area of the virgin forest has been affected by windfall caused by the strong windstorm “Kyrill”. All fallen trees have been left for natural processes. The above mentioned fence protection of the reserve and the wind-catastrophic event have reinforced the natural trend of changing proportion of dominant trees during last decades in favour of Fagus which is evidently quickly increasing due to massive spontaneous regeneration in many parts of the reserve. On the other hand, overall number of standing living Picea trees has drastically decreased in large spots.

History of the lichenological survey

An overview of lichens in the Novohradské hory Mts was published by Peksa et al. (2004). The authors did not deal with saxicolous lichens and recorded 168 epiphytic and epixylic
species. They extensively explored the most valuable and protected forest reserves in the area: Žofínský prales and Hojná Voda Virgin Forests, natural monuments with fragments of old-growth beech and scree forests ‘Ulrichov’ and ‘Myslivna’ and a raised peat-bog ‘Pohořské rašeliniště’. Apart of that, many records come from avenues and solitary trees by road-sides in the surroundings of settlements. In total, 95 lichen species have been reported from area around Žofín settlement, of which about half (47 species) occurred in the reserve. *Arthonia leucopellaea*, *Bacidia biatorina*, *B. incompta*, *Biatora fallax*, *Gyalecta flootwii*, *Hypogymnia vittata*, *Lecanactis abietina*, *Lecanora albella*, *Lobaria pulmonaria*, *Lopadium disciforme*, *Menegazzia terebrata*, *Peltigera degenii*, *Thelotrema lepadinum* and *Usnea florida* represent the most valuable records. Several localities at the Czech and Austrian side of the Novohradské hory Mts were visited during the bryo-lichenological meeting in 2012 (MALÍČEK
Fig. 2: Aerial photo of Žofín virgin forest; the border-line of the reserve is indicated by red (scale = 200 m).

Fig. 3: Southern part of the virgin forest dominated by beeches.
et al. 2013). The authors recorded 239 lichenized and 19 lichenicolous and lichen-allied fungi. They explored e.g. the old-growth private forest Luxensteinwand in Austria and the small virgin forest Hojná voda. Several single findings from the study area are mentioned in other papers: Svrcék & Kubička (1971), Kuthan (1981), Liška & Pišút (1995), Liška et al. (1996), Kocourková-Horáková (1998), Palice (1999), Albrecht et al. (2003), Jansová & Soldán (2006), Svoboda & Peška (2006), Malíček et al. (2010), Malíček et al. (2011), Guzow-Krzeminska et al. (2012) and Vondrák et al. (2013). Records from the above mentioned works are not included in the list with the exception of taxa based on our recent collections or those taxa that we did not confirm during recent inventories.

Localities
1 Žofínský prales National Nature Reserve, old-growth fir/beech/spruce forest, alt. 735 – 830 m
2 Žofín – solitary old deciduous trees in and nearby the settlement, alt. 745 – 760 m [the point refers to localities n. 12, 1c and 12f in Peška et al. 2004]
3 managed spruce forest between Pivonické skály Mt. (932 m) and Smrčina Mt. (910 m), 2 km SW of Žofín settlement, 48°39'48”N/14°40'22”E, alt. 910 m
glade on WSW facing slope of the Smrčina Mt. (910 m), 2.2 km SW of Žofín settlement, 48°39'37”N/14°40'26”E, alt. 860 m
5 mixed beech-spruce forest at the top plateau of the Smrčina Mt. (910 m), 1.9 km SW of Žofín settlement, 48°39'44”N/14°40'38”E, alt. 900 m
6 forest clearing on SE facing slope of the Smrčina Mt. (910 m), 2 km SW-SSW of Žofín settlement, 48°39'34”N/14°40'46”E, alt. 860 m
7 beech forest on E facing slope of the Smrčina Mt. (910 m), 1.7 km SW-SSW of Žofín settlement, 48°39'43”N/14°40'50”E, alt. 890 m
8 spruce forest on NNE facing slope of the Smrčina Mt. (910 m), 1.4 km SW-SSW of Žofín settlement, 48°39'56”N/14°40'51”E, alt. 865 m
9 old spruce forest at SE foot of Smrčina Mt. (910 m), ESE facing slope, just N of “Huťský rybník” pond, 1.9 km SSW of Žofín settlement, 48°39'31”N/14°41'00”E, alt. 830 m
10 old beech forest on ENE facing slope of the Smrčina Mt. (910 m), 1.4 km SSW-SW of Žofín settlement, 0.8 km N of “Huťský rybník” pond, 48°39'49”N/14°40'59”E, alt. 880 m
11 young beech forest on ENE facing slope in the valley of Huťský potok, 1.2 km SSW of Žofín settlement, 1 km NNE of “Huťský rybník” pond, 48°39'51”N/14°41'19”E, alt. 810 m
12 spruce-beech forest on N facing slope of an unnamed hill (897 m), 0.7 km ENE of Huťský rybník, 2 km S of Žofín settlement, 48°39'27”N/14°41'29”E, alt. 880 m
13 managed spruce forest on SW facing slope c. 0.5 km WSW of the top of Stříbrný vrch Mt. (936 m), 0.9 km ESE of Huťský rybník, 2.6 km S of Žofín settlement, 48°39'06”N/14°41'37”E, alt. 860 m
14 fragment of old beech forest on NNW facing slope of the valley of Huťský potok, 1.6 km S of Žofín settlement, 0.9 km NE of Huťský rybník pond, 48°39'39”N/14°41'34”E, alt. 815 m
15 old beech forest on S facing slope of Točník Mt. (903 m), 0.7 km SSW-SW of the top, 1.3 km NNW of Žofín settlement, 48°41'11”N/14°41'16”E, alt. 830 m
16 beech forest on N facing slope of an unnamed hill (897 m), 0.9 km NE-ENE of Huťský rybník, 1.8 km S of Žofín settlement, 48°39'31”N/14°41'36”E, alt. 880 m
17 young shaded spruce forest on a plain c. 0.2 – 0.3 km SW of the top of Stříbrný vrch Mt. (936 m), 1.1 km ESE of Huťský rybník, 2.6 km S-SSE of Žofín settlement, 48°39'07”N/14°41'50”E, alt. 915 m
18 beech forest on N-facing slope of the Stříbrný vrch Mt. (936 m), just 150 m N-NNW of the top, 2.3 km SSE of Žofín settlement, 48°39'18”N/14°41'56”E, alt. 920 m
19 managed spruce forest on S-SSE facing slopes of the Stříbrný vrch Mt. (936 m), 0.6 – 0.7 km from the top, 3 km SSE of Žofín settlement, 48°38'53”N/14°42'04”E, alt. 890 m
20 old beech forest on S facing slope of Točník Mt. (903 m), 0.5 km S of the top, 1.3 – 1.4 km N of Žofín settlement, 48°41'14”N/14°41'36”E, alt. 850 m
21 young deciduous forest on S-facing slopes 0.9 km SSE of the point Stříbrný vrch Mt. (936 m) near abandoned settlement “Skelná Huť”, 3.3 km SSE of Žofín settlement, 48°38’44”N/14°42’07”E, alt. 860 m
22 beech forest with intermixed spruce on N-facing slopes of an unnamed hill (809 m), just NNE of the point, 0.5 km NE of Žofín settlement, 48°40’39”N/14°41’58”E, alt. 805 m
23 valley of Černá brook, forest clearing on S-facing slopes at foothill of the Točník Mt. (903 m), c. 1.1 km SSE of the top, 0.9 km NNE-NE of Žofín settlement, 48°40’56”N, 14°41’58”E, alt. 785 m
24 spruce forest on S-SSE-facing slopes of the point Točník Mt. (903 m), 0.7–0.8 km SE of the point, 1.4 km NNE of Žofín settlement, 48°41’11”N/14°41’58”E, alt. 860 m
25 beech forest on S-facing slope of the forested ridge (809 m) 0.7–0.8 km E of Žofín settlement, 0.7 km SW of Zlatá Ktiš pond, 48°40’26”N/14°42’13”E, alt. 810 m
26 young spruce forest on E-facing slope in a valley of an unnamed tributary of Lužnice stream, 0.7 km ESE of the Stříbrný vrch Mt. (936 m), 2.8 km SSE-SE of Žofín settlement, 48°39’06”N/14°42’31”E, alt. 860 m
27 spruce-beech forest on SE-facing slope at foothill of Točník Mt. (903 m), 1.1–1.2 km SE of the top, 1.2–1.3 km NNE-NE of Žofín settlement, 48°41’03”N/14°42’11”E, alt. 800 m
28 managed spruce forest on E-facing slope at foothill of the Stříbrný vrch Mt. (936 m), 0.7–0.8 km E of the top, 2.6 km SSE-SE of Žofín settlement, 48°39’14”N/14°42’34”E, alt. 860 m
29 managed spruce forest on N-NNE facing slopes just 0.3 km SSW of Zlatá Ktiš pond, 1 km E-ENE of Žofín settlement, 48°40’39”N/14°42’26”E, alt. 820 m
30 old beech-spruce forest on W-facing slope at foothill of the crest of Stubenberg Mt., in the end valley of “Tisový p.” brook, 2.2 km SE of Žofín settlement, 48°39’34”N/14°42’42”E, alt. 850 m
31 young mixed forest on SW-facing slopes beneath the Jelení hřbet crest, 1.3 km SE of Točník Mt. (903 m), 1.5 km NE of Žofín settlement, 48°41’06”N/14°42’24”E, alt. 800 m
32 spruce forest on SW-SSW facing slopes 0.5–0.6 km S of Zlatá Ktiš pond, 1.3 km E of Žofín settlement, 48°40’25”N/14°42’40”E, alt. 805 m
33 glade on SSW facing slopes beneath Jelení hřbet crest, 0.6 km N-NNE of Zlatá Ktiš pond, 1.7–1.8 km NE of Žofín settlement, 48°41’03”N/14°42’46”E, alt. 835 m
34 beech forest on NW-facing slope of Žofínský prales, 1.9–2 km ESE-SE of Žofín settlement, 48°40’02”N/14°43’01”E, alt. 850 m
35 beech forest on W-facing slope E-NE of Žofínský prales, 1.8–1.9 km ESE of Žofín settlement, 48°40’09”N/14°43’00”E, alt. 840 m
36 beech forest on W-facing slope NE of Žofínský prales, 0.9 km SE of Zlatá Ktiš pond, 1.8–1.9 km E-ESE of Žofín settlement, 48°40’21”N/14°43’05”E, alt. 805 m
37 managed spruce forest on SW-facing slopes 0.5 km ENE of Zlatá Ktiš pond, 1.8 km ENE of Žofín settlement, 48°40’47”N/14°43’01”E, alt. 795 m
38 valley of Černá brook, spruce forest on SSW-facing slopes just 0.5–0.6 km E of Zlatá Ktiš pond, 1.9 km ENE of Žofín settlement, 48°40’39”N/14°43’08”E, alt. 780 m
39 small sand pit along the road 2 km SE of Žofín settlement, 48°39’36.5”N/14°42’37”E, alt. 805 m
40 dead spruces on bank of “Tisový p.” brook next to the NW border of Žofínský prales, 48°40’08.5”N/14°42’06.5”E, alt. 735 m
41 meadow near SW border of Žofínský prales National Nature Reserve, 48°40’12.5”N/14°42’15.5”E, alt. 740 m

List of taxa

#Abrothallus bertianus De Not. – 1; on thallus of Melanelixia glabratula on bark of Fagus in uppermost part of the reserve (ZP/14574)

Absconditella celata (DD) – 1, 38; on hard, slowly decaying wood of Picea in humid microsites, lying trunk as well as cutting-flat of stump (ZP/13147, 15007)

Absconditella delutula (NT) – 1; collected twice in the primeval forest, a pioneer on recently exposed surfaces of granite stones (ZP/14365, 14673 – with Micarea sp.)

Absconditella lignicola (LC) – 1, 4, 7–14, 20, 26, 27, 30, 35, 36, 38; very common on various types of dead wood (JM/2047, 2052, 2675; ZP/12794, 13178, 13218, 13729, 13737, 13739, 13740, 13759, 13883, 13891, 13894, 13906, 13932, 14410, 15009)
Agonimia flabelliformis Halda, Guzow-Krzemińska & Czarnota – 1; rarely recorded on Fagus, on wood of decaying snag and bark at base of living trees (JM/2083 – isotype; ZP/12763 – holotype, 13736, 14515)

Agonimia repleta (DD) – 1, 7, 10, 12, 15, 20, 22, 35; frequent to scattered on bases and exposed roots of Fagus sylvatica, rarely on bark of Acer pseudoplatanus and once at foot of huge dead Picea, also on wood or terricolous, common in old-growth forest (JM/2011, 2044, 2048, 2702, 2825; ZP/12800, 12802, 13244, 13734, 13736, 13863, 14035, 14039, 14525, 14542, 14670)

*Agyrium rufum* (Pers.) Fr. – 1; a lichen-allied fungus, local in the reserve on wet, slowly decaying wood in boggy sites and on wooden fence (JM/3493; ZP/14411)

Alectoria sarmentosa (CR) – 1; several thalli found on branches of dead lying Picea on bank of Tisový brook (JM/3546; PRC; ZP/13862, 13897, 14035, 14039, 14525, 14542, 14670)

Amandinea punctata (LC) – 1, 2, 21, 25, 31, 34; scattered on bark and wood of Acer pseudoplatanus, Fagus sylvatica and Fraxinus excelsior, in primeval forest recorded on Ulmus only (JM/3546; PRC; ZP/13862, 13897, 14035, 14039, 14525, 14542, 14670)

Anisomeridium polypori (LC) – 1, 10, 21, 22, 31, 34; frequent in old-growth forest, on bark of Fagus, Picea, Ulmus, Acer pseudoplatanus, rarely found with perithecia; scattered outside the reserve, especially on Fagus (JM/3546; PRC; ZP/13862, 14061, 14687, 14749)

Arthonia didyma (VU) – 1, 5, 16, 35, 36; in old beech or mixed forests on bark of Fagus, Ulmus, Acer pseudoplatanus and Picea (JM/2061, 2071, 2821; ZP/14155, 14341, 14419, 15618)

Arthonia mediella (VU) – 1* [PEKSA et al. 2004: 293], 2, 20; on bark of Fagus (ZP/13102)

Arthonia rubella (VU) – 1; rare, on weathered/spongy bark of old Fagus and Ulmus in N and E part of the reserve (JM/1998, 3507; ZP/1285, 14623, 14891)

Bacidia biatorina (CR) – 2 [PEKSA et al. 2004: 293]

Bacidia circumspecta (CR) – 1, 35; rare in the reserve, on bark of Fagus (JM/2671, 2826; ZP/12863, 13743, 13766)

Bacidia inompta (CR) – 1; rare, on weathered/spongy bark of old Fagus and Ulmus in N and E part of the reserve (JM/1998, 3507; ZP/1285, 14623, 14891)

Bacidia laurocerasi (RE>CR) – 1, 5; rare, on smooth bark of Fagus and Acer pseudoplatanus in S and E part of the reserve and managed mixed forest (JM/3140; ZP/13717, 13745, 13788, 14472, 14760)

Bacidia rubella (VU) – 1, 2; scattered, on bark of Fagus, Acer platanoides and Ulmus (JM/2077; ZP/14554)

Bacidia subincompta (VU) – 1, 2; scattered, on bark of Fagus, Ulmus, Acer pseudoplatanus, and Aesculus hippocastanum (JM/3593; ZP/13604, 14400, 14720)

Bacidia vermifera (CR) – 1; recorded once on Fagus in SE part of the reserve (ZP/13907)

Bacidina chloroticula (LC) – 9, 30, 33, 38; on hard wood of stumps of Picea and Fagus (JM/1977, 2819, 2975; ZP/13107, 13157, 13871)

Bacidina inundata (VU) – 1; rare, on granite stones in the brook (JM/2682)

Bacidina neosquamulosa (DD) – 2; recorded once on solitary Ulmus (ZP/13614)
**Bacidina phacodes** (EN) – 1; on weathered bark of *Fagus* (JM/3587, 5448; ZP/13189, 14644)

**Bacidina sulphurella** (LC) – 1; frequent on decaying bryophytes, wood and bark (JM/3490; ZP/12798, 13171, 13780, 14418, 14524, 14545, 14589, 14676)

**Baeomyces rufus** (LC) – 1, 9, 10, 14, 34, 37, 38, 39; frequent on soil and siliceous stones, rarely found on stumps and exposed roots

**Biatora albohyalina** (EN) – 1; recorded several times on smooth bark of *Fagus* (JM/2072; ZP/13161, 14534, 14570)

**Biatora chrysantha** (VU) – 1, 2, 7, 10, 12, 14, 22, 25, 27, 34; especially on bryophytes at bases of *Fagus*, scattered in the reserve (JM/1951, 1962, 2703; ZP/13221, 13707, *13889, 14391, 14394)

**Biatora fallax** (EN) – 1, 2, 12, 16, 28, 34, 35; on bark and bryophytes (mainly at bases) on trees and snags of *Fagus* and *Picea*, local in the reserve and scattered in old managed beech forests (JM/1989, 2062, 2838, 2844; ZP/14641, 14655, 14728, *14740); previously published both within and outside the reserve by Peksa et al. (2004)

**Biatora globulosa** (VU) – 1, 2, 34; local, on bark of *Acer pseudoplatanus* and *Ulmus* (JM/2810, 3141, 3527, 3558; ZP/14357, 14583)

**Biatora helvola** (EN) – 1, 7; scattered on bark of *Fagus* (JM/2005, 2041; ZP/14562)

**Biatora ligni-mollis** T.Sprib. & Printzen (!) – 1; recorded three times both on hard and soft wood, as well as bark of *Abies* and *Picea* in wetland areas of the reserve (ZP/13577, 13706, *14609)

**Biatora mendax** (CR) – 1; recorded once on bark of *Fagus* in S part of the reserve (ZP/14731)

**Biatora ocelliformis** (EN) – 1; scattered on bark of *Fagus*, once collected on a planted *Fraxinus* (JM/1987, 3492; ZP/12804, 14156, 14557, 14571)

**Biatora veteranorum** (EN) – 1, 10, 21; frequent on wood and bark of *Abies* and *Picea* in the old-growth forest where frequently with apothecia, recorded twice outside the reserve on wood of decaying stumps (JM/2679, 2847, 2973, 2984, 5450; PRC; ZP/13712, 13909, 14375, 14753)

**Biatoridium monasteriense** (VU) – 1; scattered on weathered bark of *Fagus* and *Ulmus* (JM/1995, 3504; ZP/14457)

**Bryoria capillaris** (CR) – 1, 40; abundant on branches of *Picea* (JM/*2691, *3418, 3522)

**Bryoria fuscescens** (VU) – 1, 2, 13 (cf.), 38; rare, on *Picea abies* (JM/*3581)

**Bryoria implexa** s. str. (EN) – 1, 40; chemotype with psoromic acid, abundant on branches of *Picea* (JM/*2692, *3498, *3515, *3521)

**Buellia disciformis** (VU) – 15, 20; on bark of *Fagus* (ZP/13130, 13212)

**Buellia erubescens** (CR) – 1, 20; scattered on bark of *Fagus* (JM/1983, 2674, 3555; ZP/12803, 13213)

**Buellia griseovirens** (LC) – 1, 2, 5, 10, 12, 14, 15, 20, 22, 25, 27, 30, 34–36; common on bark of deciduous trees, especially on *Fagus* (ZP/13182)

**Buellia schaereri** (VU) – 1; collected once on bark of old *Picea* in E part of the reserve (ZP/14679)

**Calicium glaucellum** (NT) – 1; found once on wood of *Picea* snag in valley of a brooklet in W part of the reserve (ZP/14595)

**Calicium salicinum** (VU) – 1, 7, 30; mainly on wood (deciduous trees as well as conifers), also on bark (*Fagus* and *Ulmus*), scattered in the reserve (JM/2043, 3513)

**Calicium viride** (VU) – 1; scattered on bark of *Fagus*, *Abies*, *Ulmus* and *Acer pseudoplataninus* (JM/3136)

**Caloplaca cerinella** (VU) – 1; recorded once on bark of old *Fagus* in a well-lit site in S part of the reserve (ZP/14548)

**Caloplaca chrysodeta** (NT) – 1; recorded once on dry bark of old *Fagus* (JM/1984; ZP/13165)

**Caloplaca lucifuga** (EN) – 1; recorded once on bark of *Ulmus* (ZP/14698)

**Caloplaca obscurella** (NT) – 2; on bark of *Acer platanoides* and *A. pseudoplataninus* (JM/1973; ZP/12806)
[Candelariella efflorescens s. l. – 1, 2, 12, 25, 31, 41; on fallen branch of Fagus and bark of Acer pseudoplatanus, Fagus, Fraxinus and Sambucus racemosa (ZP/13864); sterile sorediate specimens may belong in part or all of them to C. xanthostigmoides)]

Candelariella subdeflexa (DD) – 2; on bark of Ulmus (JV/7918)

Candelariella vitellina (LC) – 2 [PEKSA et al. 2004: 293]

Candelariella xanthostigma (LC) – 1, 2; in the primeval forest recorded only once on bark of well-lit Fagus


Catillaria nigroclavata (VU) – 2; on bark of Acer pseudoplatanus (ZP/15669 – with Candelariella xanthostigmoides)

Catinaria atropurpurea (EN) – 1, 2, 14, 30; on hard decaying wood and bark of Acer platanoides (JM/2986, 3597; ZP/13800 – with Gyralideopsis helvetica, ZP/15689)

Cetrelia cetrarioides (EN) – 1, 27; at one site in the primeval forest on Acer pseudoplatanus together with Lobaria pulmonaria, one small thallus on bark of old Fagus outside the reserve (JM/*2801, *3540; ZP/*14068)

Cetrelia monachorum (DD) – 1; scattered in the primeval forest on mossy bark and thick branches of Fagus, both standing and broken lying trunks (JM/*2073, *3553; ZP/*12762, *12954, *13801)

[Cetrelia olivetorum (DD) – this taxon in a strict sense was not confirmed for this area, specimens published by PEKSA et al. (2004) deposited in PRC refer to C. cetrarioides]

Chaenotheca brachypoda (VU) – 1, 35; scattered on wood of dead trunks (JM/1991, 2000, PRC)

Chaenotheca brunnea (NT) – 1, 10; rare on stumps and snags of Abies and Picea (JM/3582; ZP/13705, 13755)

Chaenotheca chlorella (EN) – 1; scattered on dead trunks and snags of Fagus and Abies or on bark of Ulmus (JM/2003, 3589; ZP/13167)

Chaenotheca chrysoscelopha (NT) – 1, 2, 4, 9, 12, 28, 30, 34, 35; especially on bark of Picea, rare also on deciduous trees (e.g. Ulmus) (JM/2846)

Chaenotheca ferruginea (LC) – 1, 2, 5, 8, 9, 12, 13, 18–20, 22–25, 28–30, 32, 34–38; common, especially on bark of Picea, also on wood, dry twigs and exposed roots of wind-blown tree (spreading onto soil) (JM/2999, PRC)

Chaenotheca furfuracea (LC) – 1, 34; common in the reserve, usually on very bases of various trees as well as exposed roots of wind-blown trees, often spreading onto detritus and soil (JM/3145)

Chaenotheca sphaerocephala (CR) – 1; recorded twice on shaded bark at base of old Abies, in boggy sites in NW part of the reserve and in the valley of Tisový brook near N border of the reserve (JM/3531; ZP/14405)

Chaenotheca stemonea (VU) – 1; recorded on bark of Ulmus, dead trunk of Fagus and as a sterile thallus at foot of old Picea (JM/3511; ZP/*13704)

Chaenotheca trichialis (NT) – 1, 16, 32; on dead wood and bark of various trees (JM/2842)

Chaenotheca xylophila (VU) – 1, 7, 30; in the reserve scattered on dead wood, mainly on snags (JM/3543; ZP/13725)

[#Chaenothecopsis viridireagens (Nádv.) Alb.Schmidt – 1; on dry wood of Picea stump (ZP/13705 – with Chaenotheca brunnea)]

Cheiromycina flavelliformis (DD) – 1; on bark of Fagus near Tisový brook, only a few sporodochia intermingled within the sample of Biatora ocelliformis (ZP/14571); the species was previously reported outside the reserve from bark of Fraxinus (PEKSA et al. 2004)

Chrysothrix candelaris (VU) – 1, 2; scattered on Abies and Fagus, in the Žofín settlement on Quercus robur

Cladonia cenotea (LC) – 1, 9, 24, 27, 30, 36, 37; on bases of Picea, rare on stumps and decaying trunks (JM/3557)

[Cladonia chlorophaeas s. l. (LC) – 1, 6, 10, 14; on bases of trees, stumps and soil]

Cladonia chlorophaeas s. str. (LC) – 1; on decaying wood of lying trunk (ZP/*14653)
Cladonia coniocraea (LC) – 1, 2, 3–38; very common, especially on bases of trees, stumps, decaying trunks and soil (ZP/13169, 14047)

Cladonia digitata (LC) – 1, 4–6, 8–10, 12–15, 20, 22–38; very common in similar habitats as C. coniocraea (JM/2968)

Cladonia fimбриata (LC) – 1, 3–6, 8–10, 12–15, 18–20, 23–33, 35–38; common in similar habitats as C. coniocraea (ZP/14750)

Cladonia furcata (LC) – 1; recorded once in the reserve

Cladonia floerkeana (LC) – 38; on base of Picea (JM/1966)

Cladonia macilenta (LC) – 1, 4, 6, 8, 9, 24, 31, 33, 36, 37; on bases of trees, stumps and soil

Cladonia meroclorophora (DD) – 9, 23; on stumps and base of Picea (JM/*1953, *2996; PRC)

Cladonia norvegica (VU) – 1, 3, 8, 9, 12–14, 18–20, 23, 24, 26–29, 32, 36–38; common in spruce and spruce-beech forests on decaying wood and bases of trees, quite a rare species in the reserve (JM/1954, 2057; PRC; ZP/13236)

Cladonia ochrochlora (LC) – 1, 14; rare on bases of trees, usually not distinguished from C. coniocraea (JM/3538 – rev. T. Ahti)

Cladonia squamosa (LC) – 1, 13, 14; on wood and bark of Picea, on base of Fagus and on stumps (JM/2985 – det. T. Ahti; ZP/*13903, 14314)

Clistostomum leprosum (Räsänen) Holien & Tønsberg (!) – 1; recorded at two microlocalities in SW and W part of the reserve, on dry bark of both living trees and snags of Abies, material fertile (one specimen with apothecia and pycnidia, another one with pycnidia) (ZP/14531, 14544)

Coenogonium pineti (LC) – 1, 2, 3, 5, 8–19, 21, 22, 24–32, 34–37; very common on various types of acidic bark and decaying wood (ZP/12789, 13723, 13727, 13778, 13919, 14052)

Cryptodiscus foveolaris (Rehm) Rehm – 10; a lichen-allied fungus; on wood of fallen branch of Fagus (ZP/13937)

Cryptidula hippocastani (DC.) R.C.Harris – 5; a lichen-allied ascolocular fungus; on smooth bark of Fagus (ZP/13920)

Dictyocatenulata alba (DD) – 1, 12, 14, 27; a synnematous lichenized hyphomycete; at very bases of Fagus, scattered in the old-growth forest and managed beech forests (JM/1985; ZP/12761)

Elixia flexella (DD) – 1; on soft wood of snag of Picea (ZP/14615)

Enterographa zonata (VU) – 1; on vertical to overhanging shaded surfaces of granite boulder within the forest (ZP/*14747)

Epigloeoa cf. renitens (Grumm.) Döbb. – 1; a lichen-allied algicolous fungus, on slowly decaying wood of lying trunk of a conifer in a well-lit place; the ascospores are somewhat broader than reported for this species (ZP/14348)

Evernia divaricata (CR) – 1; collected once on fallen twig of Abies (?) in NW part of the reserve in the area of small wetland with predominating firs (JM/3517)

Evernia prunastri (NT) – 1, 2, 25; on bark of various deciduous trees

Fellhanera bouteillei (CR) – 1, 40; scattered in humid microsites on needles and twigs of Picea, abundant in the valley of Tisový brook, outside the reserve along the road to the Žofín settlement (JM/2693, 3146, 3497; PRC; ZP/13585, 13637, 14072)

Fellhanera gyrophorica Sérus., Coppins, Diederich & Scheid. (!) – 1; recorded once on bark at base of old Picea in NE part of the reserve (ZP/13160); since the specimen is rather small the presence of gyrophoric acid was tested by spot C reaction

Fellhanera subtilis (NT) – 1; on decaying wood of a conifer (ZP/14622)

Fellhaneropsis vezdae (VU) – 1, 36; in old-growth forest a common pioneer on bark and wood of various trees in humid and shaded microsites (Acer pseudoplatanus, Fagus, Picea, Ulmus), switching also to decaying bryophytes, usually forming only pycnidia (JM/1988, 2006, 2822, 2979; ZP/12795, 13162, 13172, 14316, 14339, 14412, 14564, 14683, 14713, 14738)

Flavoparmelia caperata (EN) – 2; on bark of Quercus
Fuscidea arborecola (DD) – 12, 14; on bark of Fagus (JM*/2991; ZP*/13934)
Fuscidea pusilla Tønsberg (!) – 29; on bark of Picea (JM*/1958)

Graphis scripta s. l. (VU) – 1, 5, 7, 10–12, 14–16, 20, 22, 25, 27, 30, 34–36; common on bark of Fagus, rare on Acer pseudoplatanus and Fraxinus, in primeval forest recorded once on bark at base of old Picea (JM/2050; ZP/14646, 14737)

Gregorella humida (Kullh.) Lumbsch – 39; recorded as sterile thallus on acid soil (ZP/14284)

Gyalecta fagicola (Hepp) Kremp. [syn. Pachyphiale fagicola] (EN) – 2; on bark of Acer platanoides (ZP/12799; JV/10116)

Gyalecta flotowii (CR) – 1; scattered in the reserve, on weathered bark of old Fagus, Acer platanoides and Ulmus (JM/1997, 3548; PRC; ZP/13163, 13183, 14523, 14654, 14694)

Gyalecta truncigena (CR) – 2; recorded once on the weathered bark of Acer platanoides (ZP/15547)

Gyalideopsis helvetica (DD) – 1, 20; rare on decaying wood (JM/*1960, 2087; PRC; ZP/13800)

Halecania viridescens (DD) – 2, 31; on smooth bark of deciduous trees (Acer pseudoplatanus, Fraxinus, Ulmus) in well-lit sites (JM/2814; ZP/15667)

Hypocenomyce caradocensis (LC) – 1, 8, 9, 12, 13, 20, 24, 28–30, 32, 35–38; common on Picea in well-lit spruce forests

Hypocenomyce scalaris (LC) – 1, 2b, 3–5, 8–10, 12, 13, 15, 20, 24, 25, 27–31, 33–38; common on wood and bark, especially on Picea (ZP/13103)

Hypogymnia farinacea (VU) – 1* [JANSOVÁ & SOLDÁN 2006: 76]; the phytosociological relevé record by JANSOVÁ & SOLDÁN (2006) is surprisingly the only known report of the species from the reserve. In the Novohradské hory Mts it was recorded from two additional localities, on bark of deciduous trees in managed forests (PEKSA et al. 2004).

Hypogymnia physodes (LC) – 1, 2, 3–10, 12–38, 40; very common on various trees

Hypogymnia tubulosa (NT) – 1, 2, 25, 40; in the old-growth forest mainly on twigs of Picea

Hypogymnia vittata (EN) – 1; on bark of Picea (ZP/14275)

Icmadophila ericetorum (EN) – 1; recorded rarely on a strongly decaying stump of a conifer (JM/3556, ZP/13754)

Jamesiella anastomosans (DD) – 1, 5, 12, 18; scattered on decaying wood, twigs of Picea and base of Fagus, also on wooden fence, usually only with thlasidia (JM/2064, 2659; PRC; ZP/12855, 13720, 13751, 14063, 14066, 14333, 14369)

Japewia subaurifera (NT) – 1; on wood of Picea branch (ZP/14451)

#Kirschsteiniothelia aethiops (Berk. & M.A.Curtis) D.Hawksw. – 1; a non-lichenized saprophytic corticolous species, recorded once on shaded bark of Ulmus (ZP/14714, rev. A. Aptroot)

#Kirschsteiniothelia recessa (Cooke & Peck) D.Hawksw. (!) – 1; recorded twice on bark of Abies (ZP/13789, 14329 – det. A. Aptroot)

Lecanactis abietina (EN) – 1, 38; frequent on bark at bases of Picea and Abies, rare on Fagus (JM/1992, 3530; PRC; ZP/13741)

Lecanora albella (EN) – 1, 2, 14, 20; rare on bark of Fagus (JM/1968, 2075, 2992; ZP/13782)

Lecanora argentata (NT) – 1, 2, 5, 7, 10, 12, 14, 15, 20, 22, 25, 27, 30, 34, 35; common especially on bark of Fagus (JM/1961, 1963, 1969, 1972, 1980, 2080, 3489; ZP/13912, 14648)

Lecanora carpine (NT) – 1, 2, 21, 25 (cf.); on branches of Fraxinus and Fagus (JM/2680)

Lecanora chlorotera (LC) – 21, 31; on Fraxinus (JM/2815, 2853); records by PEKSA et al. (2004) from virgin forest and the Žofín settlement are incorrect and refer to L. argentata
Lecanora compallens (DD) – 1; recorded on bark of Fagus and hard wood of Picea snag (JM/*2079; ZP/*13941)

Lecanora conizaedoids (LC) – 1, 2, 3, 5, 7–10, 12–16, 18–38; very common on various organic acidic substrates (mainly on twigs), scattered in the old-growth forest (ZP/13732, 13779, 14424)

Lecanora expallens (LC) – 1, 2, 5, 10, 14 (cf.), 25, 30 (cf.), 34; mostly on bark of Fagus and Abies, rare on wood of standing dead trunks and snags (JM/*3486, *3495; PRC; ZP/*13577 – with Biatora ligni-mollis, *14656)

Lecanora filamentosa (VU) – 38; on the rootplates of wind-blown Picea (ZP/13176)

Lecanora glabrata (DD) – 5; on bark of Fagus (JM/*2965)

Lecanora intumescens (VU) – 1, 14, 25, 35, 36; rare on bark of Fagus (JM/1981, 2820, 2829, 2834; PRC; ZP/*14533)

Lecanora leptyrodes (DD) – 31; on bark of Fraxinus (JM/2816)

Lecanora persimilis (NT) – 21, 31, 41; on bark of Fraxinus excelsior, Sambucus racemosa and Sorbus aucuparia (JM/2852)

Lecanora phaeostigma (DD) – 1; on wood of Picea snag (ZP/14607)

Lecanora pulicaris (LC) – 1, 5, 10, 11 (cf.), 12, 14, 16, 23, 25, 27, 30, 31, 33, 34, 36–38; common especially on bark of Fagus, rare in the reserve (JM/1970, 2059, 2665)

Lecanora saligna s. l. (LC) – 10, 31; on dead wood and twigs (JM/2811)

Lecanora saligna s. str. (LC) – 1, 30; on bark of Picea and wood of Fagus snag (JM/3529; ZP/*13878)

Lecanora sarcopidoides (DD) – 1, 38; on hard wood of a stump and on bark of Picea and Abies in the old-growth forest, on exposed roots outside the reserve (JM/1957; ZP/13156, 13173, 13732 – with Lecanora conizaedoids, *13785)

Lecanora symmicta (NT) – 38; on the rootplates of wind-blown Picea (ZP/13153)

Lecanora thysanophora R.C.Harris (!) – 1; scattered on bark of Fagus (JM/*2683; ZP/12860, *13344, *13345, *14539)

Lecidea ahlesii (Körb.) Nyl. – 1; on intermittantly inundated stones in the bedrock of Tisový brook, (JM/3537; ZP/14659)

Lecidea huxariensis (DD) – 33; on hard wood of the stump of Picea (JM/2818)

Lecidea leprarioides (EN) – 1; recorded on wood and bark of Picea and Abies (JM/3496, ZP/13195, *14603)

Lecidea lithophila (NT) – 1; on half-shaded granite boulder in forest and on wet granite stone in bedrock of the Tisový brook (ZP/*14661 (cf.), *14366 (cf.), 14395)


Lecidea pullata (NT) – 10, 20, 23; rare on bark of Fagus and on bark of the stump of Picea (ZP/*13870)

Lepraria sanguineoatra (EN) – 1; over mosses at the base of Fagus in E part of the reserve (JM/3552; JV/7914)

Lepraria turgidula (VU) – 1; recorded once on wood of Picea, closely associated with Lepraria leprarioi-des (ZP/*14603)

Lecidella elaeochroma (NT) – 1, 2, 5, 7, 14, 15, 20, 22, 25, 31, 35; scattered in beech forests on bark of Fagus, in the reserve recorded once on Ulmus (JM/2817; ZP/13928 – as L. achrtothera, 14352)

Lecidella flavosorediata (VU) – 2, on bark of solitary Acer platanoides and Acer pseudoplatanus (ZP/15669 – with Candelariella xanthostigmoaides)

Lecidella subviridis Tønsberg (!) – 10, 15, 16, 30; recorded four times in managed forests, on bark of Fagus (JM/*2060, *2977; ZP/*13168, *13885)

Lepraria sp. – 1–38; very abundant on various substrates

Lepraria corticata (DD) – 1; on bark of various trees (JM/*2663, *3584, *3505)

Lepraria incana (LC) – 1, 2, 23; common on various substrates (JM/*1959, *3580; ZP/*14675, *14736)
Lepraria jackii (LC) – 1; on bark of Abies (JM/*3518)
Lepraria lobificans (LC) – 1, 2, 11, 16; very common on various substrates, under-recorded (JM/*3508; ZP/14417, *14520, *14722)
Lepraria rigidula (LC) – 1, 2; on mossy trunks of Fagus (ZP/14387, *14739)
Lepraria vouauxii (LC) – 2 [Peksa et al. 2004: 294]

Leptogium teretiusculum (EN) – 1; a small fragment of thallus at base of Fagus in E part of the reserve (ZP/13728 – rev. A. Guttová)

Lichenomphalia umbellifera (LC) – 1, 13, 24, 29, 31, 37; frequent on moribund wood of decaying stumps (ZP/14036)

Lobaria pulmonaria (CR) – 1; only one thallus recorded on Acer pseudoplatanus on the bank of the Tisový brook near N border of the reserve

Lopadium disciforme (EN) – 1, 35; frequent in the reserve on both younger and older Fagus trees, rare on bark of other trees (Acer pseudoplatanus, Ulmus, Picea/Abies) at humid microsites, often sterile (JM/1979, 3512; PRC; ZP/13164, 14516, 14669)

Loxospora elatina (VU) – 1, 5, 12, 25, 27, 30, 34, 35; scattered on bark of Fagus and Picea/Abies (JM/2007, 2667, 2802; ZP/*13873, *13888)

Macentina abscondita (LC) – 1, 2; on weathered bark of Fagus and Acer platanoides (ZP/15678)

Macentina dictyospora (LC) – 1, 12, 16; on weathered bark of Fagus and Picea, and on decaying wood (JM/2055; ZP/13735, 13902, 14526)

Melanelixia glabratula (Lamy) Arup & Sandler [syn. M. fuliginosa p. p. max.] (LC) – 1, 2, 5, 7, 12, 14–16, 20–22, 25, 27, 30, 31, 34, 35; common, especially on bark of Fagus (ZP/14732)

Melanelixia subargentifera (VU) – 2 [Peksa et al. 2004: 295]

Melanelixia subaurifera (VU) – 2; on bark of Acer platanoides

Melanohalea exasperatula (LC) – 2; on branch of Quercus robur

Menegazzia terebrata (CR) – 1; rare in the reserve in its E part, recorded on bark of Fagus (6 trees) and Acer pseudoplatanus (1 tree) (JM/3554; ZP/14724)

Micarea adnata (CR) – 1, 24, 28, 29; on bark at bases of Picea, Abies and rarely on Fagus, also on strongly decaying wood at humid microsites of the reserve, few times recorded on bark of younger trees in managed spruce forests (JM/2662, 2670, 2786, 2845; PRC; ZP/13210, 13757, 13765, 14048, 14688, 14716)

Micarea botryoides (LC) – 1; collected once on dry sheltered wood of rootplates of wind-blown tree, fertile! (ZP/14758)

Micarea byssacea (DD) – 29; on decaying wood of lying Picea trunk (ZP/*13240)

Micarea cinerea (RE>CR) – 1; collected twice on wood near the brook, recorded once on bark of Fagus in N part of the reserve (JM/3586, 3592; PRC; ZP/14125)

Micarea denigrata (LC) – 4, 9, 10, 14, 20, 30, 31, 36, 38; mainly on hard desiccated wood, single records from bark and fallen branch of Fagus and on the rootplate of wind-blown tree (ZP/13190, 13193, 13217, 13925, 14064)

Micarea hedlundii (EN) – 1; recorded several times on moribund wood of conifers in N part of the reserve (JM/2008; ZP/12940, 14704)

Micarea lathinella (LC) – 1; on recently exposed granite stones, collected once on by soil impregnated roots of dead Fagus (ZP/13714, 14358, 14367)

Micarea lutulata (VU) – 1; on overhanging granite stone by the Tisový brook (ZP/14370 – with Micarea sylvicola)

Micarea melaena (LC) – 1; found twice on decaying wood of stump of Abies and exposed roots of Picea (JM/3590; ZP/13930)

Micarea micrococca (LC) – 1, 3, 5, 8–12, 15, 17–20, 22, 24–29, 30–38; one of the most common lichens especially on decaying wood, as well as on bark and branches/twigs of Picea and Fagus (JM/*2038, *2045, *2056, 2661, 2673, 2789, 2796; ZP/12764, 12783, *13129, *13890, 13895, 13916, 14406)
Micarea misella (LC) – 1, 4, 9, 10, 13, 14, 20, 27, 30, 31, 36–38; common on decaying wood, often without apothecia (JM/2009, 2791, 2970, 3003, 3524; PRC; ZP/12805, 13220, 13222, 13253, 13777, 13868, 13899, 14445, 14709)

Micarea myriocarpa (NT) – 1; recorded once on soil impregnated roots of wind-blown Picea in the valley of Tisový brook (JM/3532; ZP/14759)

Micarea nigella (DD) – 1, 11, 13; on decaying soft wood of Picea and Abies (JM/2067; ZP/13718, 13769, 13784, 13933, 13938, 14328, 14342)

Micarea parva Coppins (!) – 1; on freshly exposed granite stone beneath a wind-blown tree in central part of the reserve (ZP/14322)

Micarea peliocarpa (LC) – 1, 24; recorded several times on decaying wood and on bark of Fagus (JM/2787, 3591; ZP/*13258, 13856)

[ Micarea prasina s. l. (LC) – 1–38; very common on decaying wood, bark and twigs ]

Micarea prasina s. str. (LC) – 1, 21; on decaying (often strongly moribund) wood and on bark of older trees (rarely), rather common in the virgin forest, certainly collected only once in a managed forest, nevertheless many of the field records filed as M. prasina s. l. may belong here (JM/*2848, *3528, *3598, *5449; ZP/*12942, *13234, 13240, *13730, *13731, *13750, *13758, *13764, *13798, *13875, 14686, 14707, 14726)

Micarea sylvicola (LC) – 1, 10; common on siliceous stones near ground, also on shaded bark and slowly decaying wood (JM/2681, 3149; ZP/13177, 13715, 13896, 14370, 14431, 14605)

Micarea synotheoides (CR) – 1; recorded once on bark of young Fagus in E part of the reserve (ZP/13768)

Micarea viridileprosa (NT) – 26; on decaying trunk (JM/2056)

#Microcalicium ahlneri Tibell – 1; on dead wood of Fagus in central part of the reserve (OP/s.n.)

#Microcalicium arenarium (Hampe ex A.Massal.) Tibell – 1; on roots, parasitic on thallus of Psilolechia clavulifera (JM/3526; ZP/14536)

#Microcalicium disseminatum (Ach.) Vain. – 1; on bark of Abies (JM/2843; ZP/15624)

#Mniaecia nivea (P.Crouan & H.Crouan) Boud. – 1; associated with decaying Riccardia sp. and other liverworts on moribund wood of a conifer trunk (ZP/12787)

Multiclavula mucida (EN) – 1, 5, 8, 9, 38; on wet, strongly decaying wood of Picea and Fagus, scattered in the virgin forest as well as in managed forests (JM/1978, 2054, 2076, 2998; PRC; ZP/13043)

Mycobilimbia pilularis (Körb.) S.Ekman & Printzen (!) – 1; recorded once on nutrient rich bark of Fagus on margin of a boggy microsite in central part of the reserve (ZP/14535)

#Myccocalicium subtile (Pers.) Szatala – 1, 4; on wood of stump of Picea (JM/2969; PRC)

Nephromopsis laureri (CR) – 1; found twice on twigs of Picea along the Tisový brook (JM/3583)

Ochrolechia androgyina (VU) – 1, 2, 14, 25, 27, 30, 35; on bark of Fagus, Picea and Abies, abundant in the old-growth forest; following the new taxonomy of Ochrolechia androgyina s. l. by Kukwa (2011) our specimens belong to O. androgyina s. str. (= chemotype B sensu Tønsberg 1992) (JM/*1990, *2685, *2690, 2797; ZP/*13803)

Ochrolechia microstictoides (VU) – 1, 18, 38 (cf.); on bark of Fagus and wood or bark of Picea (JM/*2066, *3519; ZP/13847)

Ochrolechia turneri (VU) – 2; on bark of Acer pseudoplatanus (JM/*3551)

Opegrapha nivea (NT) – 1, 34; on bark of Acer pseudoplatanus, Fagus, Ulmus and old Picea, quite frequent in the reserve (JM/2070, 2809, 2837, 3143; ZP/12790, 14313, 14538, 14568, 14639, 14651, 14657, 14680, 14705, 14744)

Opegrapha rufescens (VU) – 1; on bark of Fagus (JM/2678)

#Opegrapha thelotrematis Coppins – 1; on thallus of Thelotrema lepadinum (FBe/26774)

Opegrapha trochodes Coppins, F.Berger & Ertz (!) – 1; scattered on shaded and weathered bark of Fagus trunks and snags, also on Ulmus and Acer pseudoplatanus (JM/2664, 3545; ZP/13763, 14519, 14551, 14608, 14708)
Opegrapha varia (NT) – 1, 2, 35; on dry bark of Fagus, Acer platanoides and Ulmus, also on wood and bark of snags, rather frequent in the reserve (JM/1999, 2002, 2830, 3514; ZP/13159, 13188, 14521, 14677, 14743)

Opegrapha vermicellifera (VU) – 1; recorded on wood of Fagus snag and at the base of a living Ulmus (ZP/13152, 14647)

Opegrapha viridis (EN) – 1, 22; very rare on bark of Fagus, in SE part of the reserve (JM/1965; ZP/13911)

Parmelia saxatilis (LC) – 1, 2, 14, 22, 25, 27, 30, 35, 36; rather common on bark of Fagus, in the reserve also on other phorophytes; we did not distinguish Parmelia ernstiaae which was recorded in the reserve by Peksa et al. (2004)

Parmelia submontana (EN) – 1; recorded once on fallen trunk of Fagus

Parmelia sulcata (LC) – 1, 2, 5, 10, 21, 25; mostly on branches of Fagus

Parmeliopsis ambigua (LC) – 1, 2, 5, 7, 9, 10, 12, 14, 15, 16, 20, 22, 25, 27, 30, 34–36, 38; common especially on Fagus and Picea (JM/2995)

Parmeliopsis hyperopta (NT) – 1, 6, 9, 10, 12, 14, 30; on bark of Picea and Fagus (JM/2997)

Peligeria canina (VU) – 1; collected once on dead lying trunk above a small brook (JM/3588)

Peligeria degeni (VU) – 1; scattered on bases and dead lying trunks of Fagus (JM/2684, 3137, 3534; ZP/13804)

Peligeria didactyla (LC) – 2, 38; on soil (ZP/13146)

Peligeria horizontalis (EN) – 1, 7; at bases of Fagus and lying trunks (JM/2049, 3138; PRC)

Peligeria neopolydactyla (EN) – 1; recorded at humid microsites on decaying lying trunks, bases of trees and boulders covered by bryophytes (ZP/13721, 13781, 14361, 14540)

Peligeria polydactylon (VU) – 1; recorded once on dead lying trunk (JM/2688)

Peligeria praetextata (NT) – 1, 35; in the reserve relatively frequent at bases of Fagus trees and lying trunks (JM/1994, 1996, 2827; ZP/13708, 14612)

#Peridiothelia fuliguncta (Norman) D.Hawksw. – 1; collected once on weathered bark of Fagus (ZP/13719 – det. A. Aptroot)

Pertusaria albscens (NT) – 2; on bark of Acer platanoides

Pertusaria amara (NT) – 1, 2, 14, 20, 25, 27, 30, 34–36; mostly on bark of Fagus (JM/1976; ZP/14543)

Pertusaria coccodes (VU) – 1, 2, 14, 20, 30, 34, 35; on bark of Fagus and Fraxinus (JM/1975, 2840, 3579; ZP/*14577)

Pertusaria constricta (CR) – 1, 5; collected twice on bark of Fagus (JM/2677; ZP/*13892)

Pertusaria coronata (VU) – 1, 5, 7, 22, 25; on bark of Acer pseudoplatanus and Fagus (JM/1964, 2040, 3594; ZP/14273, 14334, *14512)

Pertusaria hymenea (EN) – 1; collected twice on bark of Fagus in S part of the reserve (ZP/13927, 14518)

Pertusaria leioplaea (VU) – 1, 5, 15, 20, 22, 25, 34 (cf.), 35; scattered on Fagus (JM/2836, 2841, 3585; ZP/13216, 13219)

Pertusaria pertusa (EN) – 1, 5, 7; rare, on smooth bark of Fagus (JM/2042, 3488; ZP/13749, *13904, 14530, 14550, 14733)

Pertusaria pupillaris (VU) – 1, 27, 30; rare on bark of Fagus and Abies (JM/2800, 3533; ZP/13924, *14610)

Phaeophyscia endophoenicea (EN) – 1, 2, 15, 35; rare on bark of Fagus in the old-growth forest and in well-lit beech forests and avenues (JM/3509; ZP/14555; JV/10117)

Phaeophyscia nigricans (LC) – 2; on bark of Acer pseudoplatanus (ZP/15669 – with Candelariella xanthostigmoides)
Phaeophyscia orbicularis (LC) – 2, 14; on bark of Acer platanoides, A. pseudoplatanus and on base of Fagus

Phaeophyscia punctum (A.Massal.) Rambold, Triebel & Coppins – 1; on thallus of Cladonia coniocraea and C. digitata on decaying wood of Picea/Abies (ZP/14053; FBe/26773)

Phylactis argena (LC) – 1, 5, 7, 20, 22, 25, 27, 34–36; especially on bark of Fagus, abundant in the reserve (JM/2081, *2088; ZP/13783)

Physcya adscendens (LC) – 2, 21 (cf.); on bark of Acer pseudoplatanus and Fraxinus

Physcya dubia (LC) – 2; on bark of Acer pseudoplatanus

Physcya stellaris (VU) – 2, 21; on branch of Fraxinus and Acer pseudoplatanus

Physcya tenella (LC) – 1, 2, 12, 31 (cf.), 35, 36, 41; on bark of Fagus, Acer pseudoplatanus and Picea

Physconia distorta (VU) – 2 [Peksa et al. 2004: 295]

Physconia enteroxantha (VU) – 2; on bark of Acer pseudoplatanus (ZP/15608)

Physconia perisidiosa (VU) – 2; on bark of Acer pseudoplatanus

Piccolia ochrophora (NT) – 2; on bark of Acer pseudoplatanus (ZP/15669 – with Candelariella xanthostigmoïdes)

Placynthiella dasaea (LC) – 1, 3–16, 18–20, 22, 23, 27, 29, 30, 32, 37, 38; common on decaying wood, rare on bark of Picea abies and Fagus trees (JM/2039, *2669, 2792, *2798, *3596; ZP/13149, 13242, 13787, 13881, *13913, 13989, 13996, 14727; analysed samples det. T. Tønsberg)

Placynthiella icmalea (LC) – 1, 3–16, 18–39; very common on decaying wood and on bases of trees, noted once on freshly exposed siliceous stone near the ground (ZP/13184, 13192, 13238, 13762, 13964)

Placynthiella oligotropha (LC) – 6, 20, 23, 33, 39; on soil, especially on clear-cuts

Placynthiella uliginosa (LC) – 9, 10, 20, 27; rare on soil in open forests (JM/2793)

Platismatia glauca (NT) – 1, 2, 7, 9, 12–14, 22, 24–30, 32, 36–38; frequent on Fagus and Picea

Porina aenea (LC) – 1, 5, 7, 10–12, 14–16, 21, 22, 25, 31, 34–36; common especially on Fagus; in the reserve collected also on Abies (ZP/14331)

Porina chlorotica (LC) – 1; scattered on shaded siliceous rocks and stones (ZP/14613, 15666)

Porina leptalea (EN) – 1; scattered in the reserve on bark of Fagus (JM/2983, 5473; ZP/13922, 14619, 14645, 14725)

Porpidia aff. crustulata – 39; on small siliceous stones (JM/3502 – det. A. Jabłońska)

Porpidia macrocarpa (LC) – 1, 39; abundant on granite stones along the Tisový brook (JM/3151 – rev. A. Jabłońska, 3503 – det. A. Jabłońska; ZP/14572 (cf.), 14606)

Porpidia soredizodes (LC) – 1; on siliceous stones along the brook; the second specimen richly fertile (JM/3150 – rev. A. Jabłońska; ZP/*14640)

Pseudevernia furfuracea (NT) – 1, 2, 3, 5, 7–10, 16, 17, 19, 23–26, 28, 29, 32, 34, 35, 37, 38, 40; a common species especially on branches of Picea

Psilolechia clavulifera (LC) – 1; on exposed roots (JM/2981, 3525; ZP/13738)

Psilolechia lucida (LC) – 1; scattered on shaded overhanging surfaces of siliceous boulders

Psoroglaena stigonemoides (DD) – 1; recorded once on shaded bark of Ulmus in N part of the reserve (ZP/14741)

Punctelia jeckeri (VU) – 2 [Peksa et al. 2004: 296, as Punctelia subrudecta]; specimens reported by Peksa et al. (2004) as P. subrudecta held in PRC belong here

Pyrenula laevigata (RE>CR) – 1; recorded once on smooth bark of old Fagus in E part of the reserve (ZP/13701)

Pyrenula nitida (EN) – 1, 5, 7, 10, 15, 16, 20, 22, 25, 34–36; very abundant in the old-growth forest, scattered in managed beech forests mostly on old Fagus trees

Ramalina farinacea (VU) – 1, 2, 25, 31, 35 (cf.); scattered on various deciduous trees (JM/2069, 3541)

Ramalina fastigiata (EN) – 2; on bark of Acer pseudoplatanus and A. platanoides
Ramalina fraxinea (EN) – 2; on bark of Acer pseudoplatanus and A. platanoides

Ramalina pollinaria (NT) – 1, 2; scattered on various deciduous trees (JM/3135)

Reichlingia leopoldii (DD) – 1; on bark of Acer pseudoplatanus (ZP/14179)

Rhaphidicyrtis trichosporella (Nyl.) Vain. (!) – 1; scattered on bark of old Fagus trees (JM/2978; ZP/12941, 14541, 14682, the last two specimens rev. B. Aguirre-Hudson)

Rhizocarpon reductum (LC) – 1; on freshly naked granite stone (ZP/14552)

Rinodina degeliana Coppins (!) – 1, 2, 5; on bark of Acer pseudoplatanus, A. platanoides and Fagus (JM/3595; JV/10108 – fertile!; ZP/*12858, *13901, 14513, *14522, *14561, 15636 – fertile!)

Rinodina efflorescens (VU) – 1, 2; on bark of Fagus and Acer pseudoplatanus in well-lit sites (ZP/14575 – fertile!, 15689 – with Catinaria atropurpurea)

Rinodina excrescens Vain. (!) – 2; abundant and fertile on bark of single trees of old Fraxinus and Quercus (JM/1974; ZP/*12679 – det. H. Mayrhofer, 15658)

Rinodina freyi H. Magn. – 21; on branch of Fraxinus excelsior (JM/2852 – with Lecanora persimilis, det. H. Mayrhofer)

Rinodina pityrea (LC) – 2, on bark of Ulmus (JV/7921)

Rinodina pyrina (VU) – 31, 41; on bark of young Fraxinus and Sambucus racemosa (JM/3550)


Sarcosagium campestre (LC) – 1; recorded once on decaying trunk of Abies

Schismatopora periclineum (EN) – 1; collected once on bark of Ulmus in N part of the reserve (ZP/14667)

Sclerophora pallida (CR) – 1; recorded once on old Acer platanoides in S part of the reserve (ZP/14556)

Sclerophora peronella (EN) – 1; on wood in hollow trunk of old Picea in N part of the reserve (FB/400)

Scoliciosporum chlorococcum (LC) – 1, 2, 3, 5, 7, 10–12, 14–16, 20, 25, 29–31, 34, 35, 38; frequent on bark of Fagus and Picea (JM/2828; ZP/13742, 13917)

Scoliciosporum sarothamni (LC) – 1, 9–12, 14–16, 20, 21, 24, 31, 36, 38, 41; frequent especially on Fagus (JM/2813, 2993; ZP/13995)

Scoliciosporum schadeanum (DD) – 1, 14, 25; on smooth bark of Fagus, probably partly overlooked (JM/2082, 2835, 2994, as Bacidia hemipolia, 5474; ZP/12768)

#Sphinctrina turbinata (Pers.) De Not. – 5; on thallus of Pertusaria pertusa on bark of Fagus (ZP/13904 – filed under Pertusaria pertusa)

Steinia geophana (LC) – 1, 9, 14; on wet decaying wood (JM/2988, 3001; ZP/13174)

#Stictis radiata (L.) Pers. – 1; a lichen-allied fungus; on bark of Ulmus (JM/3601; ZP/14649)

Strangospora moriformis (NT) – 10; on wood of a stump of Fagus (ZP/13925 – with Micarea denigrata)

#Taeniolella delicata M.S.Christ. & D.Hawksw. – 1; on thallus of Ropalospora viridis (FBe/26771)

Thelencella vezdae (NT) – 21; collected once on bark of Fraxinus (JM/2851)

Thelecarpon epibolum (LC) – 1, 5, 8, 9, 14, 17, 25, 27, 30; on dead wood, especially on stumps (JM/2053, 2833, 2967, 2987; ZP/13786, 13910, 13936, 14038)

Thelecarpon intermediellum (NT) – 1, 10; on decaying wood of Fagus and Picea (?) (ZP/12791, 13874)

Thelecarpon laureri (LC) – 2 [PEKSA et al. 2004: 296]

#Thelecarpon lichenicola (Fuckel) Poelt & Hafellner – 1; on algal layer coverings freshly exposed small stones (ZP/13998, as Ahlesia l.)

#Thelecarpon strasseri Zahlbr. – 9; on soil, associated with algae; possibly an extreme morphological form of the preceding species (JM/3002)

Thelopsis rubella (CR) – 1; recorded on three trees in S part of the reserve (twice on Fagus and once on Acer platanoides) (JM/2676; ZP/13752, 14546)

Theletrema lepadinum (EN) – 1, 25, 27; common in the reserve on Fagus, recorded also on Abies, Acer pseudoplatanus, Picea and Ulmus (JM/2001, 2010)
**Trapelia coarctata** (LC) – 1; on intermittently splashed stones along the brook and on freshly exposed siliceous stones (JM/3148; ZP/14681)

**Trapelia corticola** (EN) – 1, 10, 12, 21; scattered on bark of *Picea* and *Fagus*, and on wood of decaying stumps (JM/2849, 2972; PRC; ZP/13185, 14386)

**Trapelia glebulous** (LC) – 1, 12; on freshly exposed siliceous stones and on fallen branch of *Fagus* (ZP/13861)

**Trapelia placodioides** (LC) – 1; on stones along the Tisový brook (JM/3147)

**Trapeliopsis flexuosa** (LC) – 1, 2, 4, 9, 11, 14–16, 23, 30, 31, 33, 36; on dead wood, rare on bark (ZP/13879)

**Trapeliopsis gelatinosa** (NT) – 10, 14, 27; on soil and decaying wood, rare on bark (ZP/13879)

**Trapeliopsis glaucolepidea** (NT) – 1, 7, 10, 23–25, 27–29, 33, 34, 36, 37; on decaying wood and bark at base of *Abies* (JM/1945, 1952, 2790; ZP/12786, 13186, 14049)

**Trapeliopsis granulosa** (LC) – 1, 4, 5, 10, 12, 13, 14 (cf.); mostly on decaying wood (JM/2687, 2812; ZP/13158)

**Trapeliopsis pseudogranulosa** (LC) – 12, 17, 22, 24, 34, 37; on decaying wood, soil, and bark at bases of trees (JM/2788, 2824, 2966; PRC; ZP/13187)

**Trapeliopsis viridescens** (VU) – 1, 21, 29; on strongly decaying wood of *Picea, Fagus* and *Abies*, quite common at humid microsites in the reserve (JM/3549; ZP/13211, 13782)

#*Tremella hypogymniae* Diederich & M.S.Christ. – 1; on thallus of *Hypogymnia physodes* (FBe/26772)

#*Tremella lichenicola* Diederich – 1, 15, 20; a frequent parasite of *Violella fucata* (ZP/13079, 13080)

#*Trichonectria anisospora* (Lowen) van den Boom & Diederich – 1; on thallus of *Hypogymnia physodes* (FBe/26772)

**Tuckermannopsis chlorophylla** (NT) – 1, 2, 28, 38, 40; in the reserve scattered on twigs of *Picea*

**Usnea dasypoga** (VU) – 1, 2; common on branches of *Picea* (JM/*2086 – rev. P. Clerc, *3542 – rev. P. Clerc)

**Usnea florida** (EN) – 1* [Peksa et al. 2004: 296]

**Usnea glabrescens** (EN) – 1; one thallus collected in the valley of Tisový brook near N border of the reserve, the specimen belongs to the “fulvoreagens” morphotype (JM/*3539 – det. P. Clerc)

**Usnea hirta** (VU) – 1, 2, 40; on branches of dead *Picea*, found with apothecia (JM/*3500, PRC)

**Usnea scabrata** (CR) – 1, 36 (cf.), 37, 38; on *Abies, Picea* and *Fagus*, especially on branches, frequent in the reserve (JM/1950, *3516)

**Usnea subfloridana** (EN) – 1, 40; common on branches of *Picea*, on *Quercus robur* in front of entry to the reserve, both chemotypes detected by TLC (JM/*2068, *2689, *3499, *3500 – det. P. Clerc; ZP/*14274, *14528, *14553)

**Varicellaria hemisphaerica** (Flörke) I.Schmitt & Lumbsch [syn. *Pertusaria h.*] (EN) – 1, 34; scattered on bark of *Fagus* in the reserve, rarely found on bark of *Ulmus* and *Abies/Picea* snug, one poorly developed thallus collected on *Acer pseudoplatanus* outside the old-growth forest (JM/2074, *2808; ZP/*14594)

**Verrucaria corticola** (DD) – 1; on exposed root of *Fagus* (ZP/13791)

**Verrucaria dolosa** (LC) – 1; on periodically inundated stone in the bedrock of Tisový potok brook and on freshly exposed stones below the wind-blown beech tree in central-eastern part of the reserve (ZP/14343, 14365 – with *Absconditella delutula*)

**Verrucaria funckii** (VU) – 1; rare on inundated stones in Tisový brook (JM/3536, 3600)

**Verrucaria hydrela** (VU) – 1; common on inundated stones in Tisový brook and an unnamed brooklet (JM/3535, 3599; ZP/14338, 14364)

**Verrucaria margacea** (VU) – 1; on splashed granite stones in upper part of the reserve (ZP/14407)

**Vezdaea aestivalis** (NT) – 1; on mossy bark of *Fagus* (JV/10121)

**Violella fucata** (Stirt.) T.Sprib. [syn. *Mycoblastus fucatus*] (LC) – 1, 5, 7, 9, 10, 12, 14–16, 20, 22, 25, 27, 30, 34–36; common on bark of *Fagus* and twigs of *Picea* (JM/1947, 2063, *2823, 3000; ZP/13079, 13080, 13337, 13926, *14408*)
**Vulpicida pinastri** (NT) – 1, 2, 6, 36; on bark of *Fagus* and *Picea*, on stump and worked timber (JM/3134)  
**Xanthoria candelaria** (LC) – 2, 21, 25, 31, 41; on various deciduous trees  
**Xanthoria fulva** (VU) – 2, on bark of *Ulmus glabra*  
**Xanthoria parietina** (LC) – 2, 21, 25; on *Acer pseudoplatanus*, *Fraxinus* and *Fagus*  
**Xylographa parallela** (VU) – 1, 7, 30; rare on slowly decaying dead wood (JM/2974, 3144; ZP/14674)  
**#Xylopezia inclusa** (Pers.) Sherw. – 1; a lichen-allied fungus; on dry wood of *Abies* snag (ZP/12784)

**Comments on selected species**

**Agonimia flabelliformis**  
A recently described taxon allied to *Agonimia allobata* (Guzow-Krzemińska et al. 2012) characterized mainly by a distinctly developed coralloid thallus. An extraordinarily well developed specimen (ZP/12763) collected in the reserve was designated as holotype for this newly distinguished taxon (Guzow-Krzemińska et al. 2012). Like other species of *Agonimia* it shows a wide ecological amplitude, and may grow on various organic substrates including a raw humus.

**Additional records:** S Bohemia, Šumava Mts., Volary, Černý Kříž: Mt. Jelení vrch (c. 3 km SSW of Černý Kříž), 48°50′00″–05″N/13°51′20″E, remnants of beech forest on E slope, on dry wood of hollow *Fagus*, alt. 860 –900 m, 4.V.2002, Z. Palice 8058; S Bohemia, distr. Písek, nature reserve Krkavčina c. 1.8 km W of Oslov, a small waterless valley with a mixed forest on W-facing slope above Vltava river, 49°24′02″N/14°11′10″E, on bark at base of dead *Sambucus* stem, alt. 380 m, 15.V.2010, Z. Palice 13572; S Moravia, distr. Jihlava, Trešť: close-to-primeval forest (*Fagus sylvatica*, *Abies alba*, *Picea abies*, *Acer pseudoplatanus*) on WSW-facing slopes of Mt. Velký Špičák [734], 0.6 – 0.7 km SSE of the top, 2.4 km NE of Trešť, 49°18′21″N/15°30′51″E, on bark of old *Fagus*-snag, alt. 700 m, 10.IX.2010, I. Černajová, J. Malíček & Z. Palice 13974; N Bohemia, Ještědsko-kozákovský hřbet Mts, Liberec, Karlov pod Ještědem: Karlovské bučiny National Nature Reserve, E part of reserve, 50°46′26″N/14°58′28″E, on base of *Acer platanoides*, 17.X.2012, J. Malíček 4777 & J. Vondrák; Slovakia: W Carpathians, distr. Revúca, Muráň: a brookless valley just N of village, beech forest, 48°44′47″N/20°02′44.5″E, on humus among roots of *Fagus*, alt. 473 m, 3.V.2010, J. Halda & Z. Palice 13439.

**Alectoria sarmentosa**  
Historical sources mention this species from bark of old conifers in several mountain regions in the Czech Republic (Černohorský et al. 1956). Recently it was recorded mainly in mountain spruce forests (*Fraxinus excelsior*) in the Šumava Mts (Liška & Pišút 1995, Liška et al. 1998) and a stunted specimen was collected also in a boggy boreal forest in W Bohemia (see below).

**Additional record:** W Bohemia, Slavkovský les: Kladské rašeliniště peatbog, „Tajga“ near village Kladská, on dry branch of *Picea abies*, alt. 820 m, 26.IV.1997, Z. Palice s.n.

**Arthonia excipienda**  
This species can be easily overlooked or mistaken for e. g. *A. punctiformis* and *A. radiata*. However *A. excipienda* has a well-developed exciple-like margin and 1-septate ascospores (Coppins & Aptroot 2009a). Another similar species is *A. dispersa* which differs in smaller apothecia, larger ascospores and colour of epihymenium (Wirth 1995, Dolnik 2004). *A. excipienda* is an oceanic species in Europe, which is very rare in Central Europe. It has been recently reported from Germany (Dolnik 2004) and Austria (Berger et al. 2009). According to Dolnik (2004) *A. excipienda* may expand to the east.

**Bacidia circumspecta**  
The species resembles *B. subincompta* and *B. vermifera* in the field. It is quite a rare taxon in Central Europe and it is listed among potential old-growth forest indicator species by Printzen et al. (2002). On the other hand in oceanic Norwegian spruce forests, it may tolerate small-scale forest management (Holien 1998). Recent records in the Czech Republic are sparse, it has been reported from the Brdy Mts (Malíček 2013a) and a single locality in the Šumava Mts (Palice 1998) but more unpublished records from the territory exist.

**Bacidia incompta**  
A rare *Bacidia* which has been recently reported three times from the Czech Republic: from the Šumava Mts (Vezda 1995), “Soutok” in South Moravia (Gruna 2000), and the Žofín Virgin Forest (Peška et al. 2004). It is a rather specialized and hence very local epiphytic species demanding higher
pH of substrate, often growing on overmature trees and/or trees infected by wood-inhabiting fungi, beneath so called rot-holes (FRITZ & HEILMANN-CLAUSEN 2010).

**Additional records:** W Bohemia, Šumava Mts, Zdůří: valley of Pěnivý potok brook, nearby the settlement Bílý Potok, 49°06.4′N/13°34.08′E, on weathered bark of *Ulmus laevia*, alt. 750 m, 28.IX.2005, Z. Palice 9386 & J. Palicová; S Bohemia, distr. České Budějovice, Hluboká nad Vltavou, nature monument Baba, scree forest on E-facing slope above Vltava river, 49°04′30″N/14°27′10″E, on bark at base of *Fagus*, alt. 390 m, 31.XII.2012, Z. Palice 16020.

**Bacidia laurocerasi**

While this is a frequent species in the British Isles (COPPINS & APTROOT 2009b), it has quite rarely been recorded in continental Europe during recent decades and apparently has been declining in Central Europe (WIRTH 1995, BERGER et al. 2010). It is also an endangered species in all Fennoscandian countries (JÄÄSKELÄINEN et al. 2010, TIMDAL et al. 2010, THOR et al. 2010). In Germany it is regarded as extinct (WIRTH et al. 2011) as well as in the Czech Republic (LIŠKA & PALICE 2010). In the past, it was known from only few localities (cf. VEZDA & LIŠKA 1999). The species was growing in shaded habitats on more or less smooth bark of not to old *Fagus* trees both in managed and primeval forests. We anticipate the species may tolerate small scale forestry practices but as for stable humidity and air quality it is a sensitive species surviving only in more or less continuous woodland areas.

**Bacidia vermifera**

In the Czech Republic it is clearly a species of a long forest continuity. Only three recently published records from the Šumava Mts (VEZDA 1997, as *B. hegetschweileri*) and the Brdy Mts (MALÍČEK 2013a) exist.

**Additional records:** S Bohemia, Šumava Mts, Volary: Mt Jelení vrch, remnants of old-growth deciduous forest, on moribund bark of old *Fagus*, alt. 850–900 m, 29.XII.1994, 25.IX.1996, Z. Palice 12662, 12663, 12665; S Bohemia, Šumava Mts, Volary: Mt Stožec – NNW slope, on *Fagus* near forest-road, alt. 880 m, 9.III.1996, Z. Palice 12664; S Bohemia, Šumava Mts, Horní Planá, Želnava: Bulov Mt. 2 km NE of village, 48°49′26″N/13°59′08″E, alt. 930 m, on bark of *Fagus sylvatica*, 23.V.2010, J. Malíček 2780 & Z. Palice; S Moravia, Podyji, Vranov nad Dyji, Bitov, below ruin of Cornštejn, 48°56′02.5″N/15°42′52.1″E, on bark of *Quercus*, alt. 370 m, 2.IV.2011, J. Vondrák 8449.

**Biatora albohyalina**

This is a new record for the Czech Republic. It has been mentioned in several old papers from Moravia (cf. VEZDA & LIŠKA 1999) but preserved voucher specimens studied (OLM, PRA-Vězda) belong to *Biatora helvola* and *Cliostomum corrugatum*, respectively. The species does not belong to *Biatora* s. str. (PRINTZEN 1995) and according to combined phylogeny of mtSSU and ITS data sequences in SPRIBILLE et al. (2009: 123–124) the species comes close to *Lecania cyrtella*. From other epiphytic species currently belonging to *Biatora* and *Lecidea* s. l. the species is easily identifiable due to its pale apothecia and relatively large immersed pycnidia with long septate filiform conidia. It seems to be a pioneer taxon. The apothecia appear to be fairly fast-growing often occupying smooth bark of young deciduous trees. Younger apothecia often bear freely protruding excipular hyphae making the impression the apothecia are villose. This feature was not emphasized in previous publications.

**Additional records:** S Bohemia, Šumava Mts, České Žleby: Mt. Spáleníště – SE slope, a relatively young managed stand with *Picea*, *Fagus* and *Fraxinus* predominant, 48°52′40″N/13°48′50″E, on shaded trunk of middle-aged *Fraxinus*, alt. 900–920 m, 9.VIII.1998, Z. Palice 839; S Bohemia, Šumava Mts, Vírperk, Zátoň: virgin forest Boubínský prales, 200–250 m NW–WNW of Boubínské jezírko pond, old-growth mixed forest, 48°58′29.4″N/13°48′58.7″E, on bark of *Fagus*, alt. 950 m, 16.XI.2012, E. Jungwirthová & Z. Palice 15855; Slovakia: W Carpathians, Muránska planina plateau: Javorníková dolina valley (48°44′10″N/20°00′03″–20°01′20″E), on *Corylus avellana*, alt. 460 m, 8.V.2001, A. Guttová, J. Halda & Z. Palice 5343.

**Biatora ligni-mollis**

The species may form quite large and distinctive sessile pycnidia somewhat reminiscent to those of *Fellhanera gyrophorica*, but they are unevenly distributed forming groups and in parts only red-brown glossy biatoroid apothecia are formed on the thalli. The ascospores are strikingly narrowly bacilliform, mainly one to two-celled and unlike other *Biatora* species *Micarea*-type of asci are produced. In British Columbia (Canada), *Biatora ligni-mollis* grows on soft, punky wood of conifer snags in humid old-growth forests (SPRIBILLE et al. 2009). It is also reported from old woodlands in Western and Central Europe, where it is a rare lichen growing on old bark or lignum of deciduous or coniferous trees (SÉRUSIAUX et al. 2010). Bohemian specimens are richly fertile and TLC of the richest collection
(ZP/14609) confirmed the presence of lobaric acid reported from B. C. material. Unlike the western European samples (SéRUSiaux et al. 2010) the studied Bohemian specimen does not contain roccellic acid in addition to lobaric acid.

**Biotara mendax**

*B. mendax* is a very rare lichen in Central Europe. According to Printzen (1995) the species follows more or less the distribution area of *Abies alba*. It prefers the bark of young trees in humid localities. In the Czech Republic, it has been recorded at a single locality in the Šumava Mts (Printzen & Palice 1999).


**Buellia erubescens**

*B. erubescens* may resemble *Lecidella elaeochroma* superficially in the field. From other forest species of *Buellia* with large ascospores (*B. disciformis, B. arnoldii, B. sanguinolenta*) it is distinguished by the absence of oil droplets in the hymenium. Norstictic acid is not always detectable in thalli (Coppins et al. 2009). It has been recorded only twice in the Czech Republic before – in the Průhonice Park near Prague on bark of *Aesculus hippocastanum* in 1955 by M. Svrček (Liška & Vezda 1990) and in the Šumava Mts (Detinsky 1997).

**Candelariella xanthostigmoides**

Initially we determined sorediate *Candelariella* specimens in the area as *C. reflexa*, the taxon which is characterized by eight-spored asci, squamulose, rosette-like thalli and soredia initiated in centres of squamules (Lendemer & Westberg 2010). This taxon is apparently not so common as formerly believed and it often has been misidentified by earlier authors (cf. Lendemer & Westberg 2010, Westberg & Clerc 2012). We follow the concept outlined in the mentioned works in treating sterile sorediate *Candelariella* specimens as *C. efflorescens* s. str. Members of this group form soredia on margins of areoles/squamules that early dissolve into soralia and the two currently accepted taxa are identifiable only when fertile on account of number of ascospores. The only fertile specimen contained eight-spored asci and hence it is referable to *C. xanthostigmoides* as well as several other specimens cited below. *C. efflorescens* s. str. was recently reported by Šteinová et al. (2013). The whole group is not taxonomically resolved yet and in need of revision (M. Westberg, in litt.).

Additional records: S Bohemia, distr. Český Krumlov, Kaplice, Natural Park ‘Poluška’, margin of meadow, c. 0.3 km N of Výnežda settlement, 5 km W of Kaplice, 48°44'28"N/14°25'37"E, on dead stem of *Corylus avellana*, alt. 785 m, 11.VIII.2012, Z. Palice 15696 & K. Palicová, det. M. Westberg; S Bohemia, Šumava Mts, Volary, Černý Klíž: confluence of Studená Vltava and Hučina streams, 48°51'44.7"N/13°52'02.7"E, on bark of *Aesculus hippocastanum*, alt. 785 m, 11.VIII.2012, Z. Palice 15696 & K. Palicová, det. M. Westberg; S Bohemia, Šumava Mts, V olary, Černý kopec: confluence of Studená Vltava and Hučina streams, 48°51'44.7"N/13°52'02.7"E, on bark of *Aesculus hippocastanum*, alt. 785 m, 11.VIII.2012, Z. Palice 15696 & K. Palicová, det. M. Westberg; S Bohemia, Šumava Mts, V olary, Černý kopec” hill, 49°22'49.9"N/13°05'38.0"E, on bark of

**Chaothenocephus spherocephalus**

In the Czech Republic this is a very rare lichen previously published from high altitudes between 1100–1300 m in the area of Plechý Mt. in the Šumava Mts (Palice 1999). Since that time it is recorded several times also in other parts of this range as well as in W Sudetes (see below). It is an inhabitant of humid woodlands with indigenous *Picea abies*, where it grows mostly on very shaded bases of trees, overgrowing also detritus and bryophytes, and more rarely occurring on siliceous boulder underhangs (Palice 1999, Tibell 1999).

Additional records: E Bohemia, W Sudetes, Krkonoše Mts, Mt. Sněžka: Koulovy potok brook valley below Růžohorské sedlo saddle, a climatic spruce forest, 50°43'40"N/15°45'5"E, complete base of old *Picea*, + *Chaothenocephus viridireagens*, alt. 1200 m, 30.VIII.2000, Š. Bayerová, J. Liška & Z. Palice 5151; W Bohemia, Šumava Mts, the Vydra valley: well-lit relic pine forest on a boulder scree above the trail leading from Turnerova
In the field a quite easily recognized species due to its bluish sorediate thallus, pinkish pycnidia, *Fellhanera bouteillei*. In the Czech Republic, the species grew in mountain regions on acidic bark of spruce in the past but it is known from several localities in the Šumava Mts and the Krkonoše Mts. *Dictyocatenulata alba* is a lichenized synnematous hyphomycete reported from Europe a few years ago. In the Czech Republic, it is known from several localities in the Šumava Mts and the Krkonoše Mts. *Dictyocatenulata alba* grows mainly on smooth bark on the basis of deciduous trees in humid broad-leaved and mixed forests (Diederich et al. 2008). It is evidently not an old-growth forest species, but preferably growing at humid places at the very bases of beeches.

*Evernia divaricata*  
In the Czech Republic, the species grew in mountain regions on acidic bark of spruce in the past but started to disappear with increasing atmospheric pollution. In the 1990s it was known only from twelve localities in the Šumava Mts (Liška et al. 1996). The abundance of populations in this region has been probably still decreasing. Nowadays the species spreads together with other epiphytic lichens that were considered rare in the Czech Republic (for example *Evernia mesomorpha*, *Usnea* spp.) into untypical habitats – shrubby areas dominated by *Prunus spinosa* and *Crataegus* sp. or on branches of *Larix decidua* (Halda et al. 2011, Steinová et al. 2013). *Evernia divaricata* is reported here for the first time from the Novohradské hory Mts.

*Fellhanera bouteillei*  
In the field a quite easily recognized species due to its bluish sorediate thallus, pinkish pycnidia, eventually also apothecia and distinctive ecology. In the Czech Republic, *F. bouteillei* was recorded sporadically in the first half of 20th century in the lower elevations with no recent records (cf. Vežda & Liška 1999). For c. 10 years until 2006 when the species was recorded in a humid gorge in Central Bohemia (Peksa et al. 2007), the lichen was targetedly searched by the second author in habitats with developed foliicolous lichen assemblages but without any success. During last 5 years records of the species have been increasingly growing. Therefore we conclude it is very likely a rapidly spreading lichen that tends to be ± pyriform. The yellowish apothecia are developed very rarely (found once in the reserve). *C. leprosum* contains atranorin and caperatic acid, and (when fertile) usnic acid in apothecia. Apparently, it is an indicator of old coniferous forests, where it grows on spruces (Tønsberg 1992). Recently, it was collected also in the Šumava Mts on bark and wood of *Picea*. All collected specimens contain characteristic pycnidia. New to Central Europe.

**Additional records:** S Bohemia, Šumava Mts, Volary, Nové Údolí, N-slope of Mt Trojmezná, on spruce bark, alt. 1280–1350 m, 14.V.2011, Z. Palice, V. Pouska & J. Vondrík 8951; Ibid.: on wood and bark of *Picea*, alt. 1250 m, 15.XI.2012, Z. Palice 15712, 15730, V. Pouska & J. Vondrík; S Bohemia, Šumava Ms, Vimperk, Zátoň: virgin forest Boubínský prales, 50°48′28′′N/13°49′05.5′′E, on bark at foot of old *Picea*, alt. 1060–1070 m, 21.IX.2007, Z. Palice 11560.

*Fellhanera bouteillei* not far from the forestry-road, alt. 1135 m, 26.X.2005, F. Bouda, Z. Palice 9635, O. Peksa & J. Steinová; S Bohemia, Šumava Mts, Nová Pec: margin of bouldery field/glacial lake moraine with *Pinus mugo*, *Picea abies* and *Betula* SE of the Plešné jezero lake, 48°46′33″N/13°52′23″E, on tufts of bryophytes on overhanging shaded face of granite boulder, alt. 1060–1070 m, 21.IX.2007, Z. Palice 11560.

Malíček & Palice: Lichens of the virgin forest reserve Žofínský prales (Czech Republic)
A non-lichenized saprophytic corticolous species which has not been recorded by us during the current survey, but two (sub)recent collections exist in herbaria and hence the species is very likely still surviving in the virgin forest. The record on Picea published by PEKSA et al. (2004) was revised by JM in 2011 (PRC). An unpublished specimen from the virgin forest was revealed by ZP among his older collections from 1994.

**Fellhanera gyrophorica**

F. gyrophorica often lacks apothecia but usually forms conspicuous sessile pycnidia whose outer walls produce gyrophoric acid. It is known from many European countries including Central Europe (Austria, Poland, Slovakia, and Switzerland). It seems to be a typical inhabitant of well-preserved, rather shaded and humid, broad-leaved forests at lower elevations (SÉRUSIAUX et al. 2001).

**Fuscidea pusilla**

It is a sterile lichen morphologically very similar to *Ropalospora viridis*. However, the latter species is usually much larger and often more intensively green. Chemically *R. viridis* is distinct from *Fuscidea pusilla* in containing perlatolic acid as its major substance instead of divaricatic acid (TÖNSBERG 1992).

We have analysed most of our collections from the Žofín area putatively assigned to *Ropalospora viridis* and only one specimen from bark of spruce proved to contain divaricatic acid. *Fuscidea pusilla* seems to be a toxitolerant species (TÖNSBERG 1992). The species was not reported from the Czech Republic before and additional specimens were confirmed by TLC. They are listed below.

**Additional records:** N Bohemia, Krásná Lípa: National Park České Švýcarsko, the Kamenice valley near the junction with Soorgrund, c. 5.2 km WNW of Jetřichovice, c. 50°51'45″N/13°9'15″E, on bark of dead *Picea*, alt. 165m, 15.VIII.2001, Š. Bayerová, Z. Palice 5880, O. Peksa & L. Voříšková; W Bohemia, Šumava Mts, Prášily, mixed forest 700 m SE of “Laka” lake, 49°06'24″N/13°20'08″E, on bark of *Fagus sylvatica*, alt. 1160 m, 13.X.2009, J. Malíček 2153; S Bohemia, Novohradské hory Mts, Pohoří na Šumavě: Pohořské rašeliniště peat-bog, on branch of *Pinus × pseudopumilio*, alt. 895 m, 4.VI.2001, Z. Palice 5952; S Bohemia, Šumava Mts, Volary: boggy, taiga-like forest with *Pinus* dominating near the Hučina creek, c. 0.6 km ESE from the railway-stop Černý Kříž, 48°51'30″N/13°52'11″E, on dry twigs of young *Picea*, alt. 740 m, 4.IV.2010, J. Halda & Z. Palice 13351; S Bohemia, Šumava Mts, Volary, Černý Kříž: Hučina valley, 48°51'17″N/13°51'15″E, on twigs and needles of *Picea*, alt. 740 m, 21.V.2010, J. Maliček 2721 & Z. Palice 13702; C Bohemia, distr. Benešov, Roudný: margin of young *Picea* forest near the sanatorium complex at a former gold-mining area, 49°36'54.4″N/14°48'34.9″E, on needles and twigs of young *Picea*, alt. 480 m, 16.V.2010, Z. Palice 13595; S Bohemia, PLA Třeboňsko, nature reserve Soví les, boggy pine forest with *Picea* and *Betula* c. 3.5 km SE of Třeboň town, 48°58'56″N/14°49'04″E, on twigs (and needles) of young *Picea*, alt. 435 m, 2.III.2012, Z. Palice 15096; S Bohemia, PLA Třeboňsko, Suchdol nad Lužnicí, Červené blato National Nature Reserve, S part of reserve, on stems of *Vaccinium myrtillus*, alt. 470 m, 27.VIII.2011, J. Maliček 3713; E Bohemia, Orlické hory Mts, Bartošovice v Orlických horách, valley of Bartošovický potok, loc. ‘Údoličko’, 50°11'05.7″N/14°19'10″E, on bark of dead *Pinus*, alt. 1160 m, 15.VIII.2010, Z. Palice 13350.

**Hypogymnia vittata**

This *Hypogymnia* has not been recorded by us during the current survey, but two (sub)recent collections exist in herbaria and hence the species is very likely still surviving in the virgin forest. The record on *Picea* published by PEKSA et al. (2004) was revised by JM in 2011 (PRC). An unpublished specimen from the virgin forest was revealed by ZP among his older collections from 1994.

**Kirschsteiniothelia recessa**

A non-lichenized saprophytic corticolous species which has not been previously reported from Europe. Bohemian material somewhat deviates from North American specimens by slightly larger, usually distinctly sole-shaped ascospores with a finely verruculose surface (1000× magnif.) and a greenish pigment in inner wall of perithecia (cf. HAWKSWORTH 1985b, APTROOT 2002a). Clearly sole-shaped and distinctly papillate ascospores are indicative of *Mycomicrothelia pachnea* (Körb.) D.Hawksw. (HAWKSWORTH 1985a), a species described from *Abies* and hence easily misidentified for this species. However the perithecial wall of large, prolonged angular cells arranged in one direction in pallaides clearly place all Bohemian specimens to the genus *Kirschsteiniothelia* (HAWKSWORTH 1985b). The status of European material needs further studies.

**Additional record:** S Bohemia, Šumava Mts, Vimperk, Zátoň: virgin forest Boubínský prales, valley of Kaplický potok creek, 200–250 m WNW of Boubínské jezírko pond, old-growth mixed forest, 48°58'32.8″N/13°48'56.4″E, on bark at foot of 150 years old *Abies*, alt. 958 m, 15.VIII.2012, E. Jungwirthová, det. Z. Palice 16167.
Fig. 4: Fertile specimen of *Cliostomum leprosum* with typical black pycnidia (scale = 1 mm).

Fig. 5: *Fellhanera bouteillei* on spruce needles, with a bluish sorediate thallus (scale = 1 mm).
Lecania croatica
This sorediate epiphytic species resembles a Biatora species. Recently it was dealt with and described in detail by Harris & Lendemer (2010). According to the phylogenetic study by Reese Næsborg et al. (2007) the closest currently accepted genus is Bilimbia. The voucher specimens are sterile with pale green to brownish delimited soralia and TLC revealed no secondary lichen metabolites. It was compared to fertile specimens from Slovakia housed in PRA. In Germany it was collected in Rheinland-Pfalz and Baden-Württemberg in recent decades (Cezanne et al. 2008). It is an apparently not so rare, locally occurring species of humid forests that however is very likely overlooked in suitable habitats. Illustrative photo of the sterile lichen specimen is provided by Eichler et al. (2010).

Lecanora thysanophora
This sorediate species is distinctive mainly by its arachnoid prothallus and chemistry. In the field it may resemble Haematomma ochroleucum, Lecanora expallens, Loxospora elatina or Phlyctis argena. L. thysanophora can be easily separated by TLC. It produces atranorin, usnic acid, zeorin and specific terpenoids called “thysanophora-unknowns” (Harris et al. 2000, Kukwa 2005). In the Czech Republic it seems to be quite rare confined to humid mountain forests.

Additional records: W Bohemia, Šumava Mts, Modrava, Javoří Pila: Mt. Medvěd, NE slope, a spruce plantation with dispersed old maple soliters, 49°00′51″N/13°25′24″E, on bark of Acer pseudoplatanus, alt. 1125 m, 27.X.2005, F. Bouda, Z. Palice 9345, O. Peksa & J. Steinová; W Bohemia, Šumava Mts, Modrava: well-lit mixed forest in a saddle area between the points 1132.6 and <1120, 0.5 km WSW–SW of former bridge over Raklansky potok brook, 49°00′96″N/13°26′61″E, on bark of solitary old Acer pseudoplatanus, alt. 1120 m, 28.VI.2006, E. Loskotová, Z. Palice 10924 & O. Peksa; W Bohemia, Šumava Mts, Modrava: remnants of old-growth deciduous forest W of Rokytěcká slať bog just along the borderline, c. 6.5 km W of Modrava, 49°01′1″N/13°24′1″E, on bark of old Fagus, alt. 1085–1090 m, 27.VI.2006, E. Loskotová, Z. Palice 10956, 10975 & O. Peksa; S Bohemia, Šumava Mts, Nová Pec: Mt. Hraničník, NNW slope, remnants of mountain mixed forest, 49°45′11.9″N/14°20′29.1″E, on bark of old Fagus, alt. 1170 m, 9.VII.2007, Z. Palice 11333; Ibid.: 22.IX.2007, J. Malíček 1113.

Lecidea ahlesii
This Lecidea was only recently reported as new to the Czech Republic (Halda et al. 2011). Specific blue-violet (K+ green) granules often occurring in hymenium and hypothecium were not observed in our collections.

Lecidea huxariensis
One of the smallest and most inconspicuous lichens of all. However, it is very distinctive due to its anatomy and ecology. L. huxariensis is known usually as a pioneer species of hard exposed worked timber rarely associated with other lichens or just intermingled with juvenile thalli of e.g. Micarea denigrata, Lecanora saligna agg., and Trapeliopsis flexuosa. Recent collections from the Czech Republic originate mainly from exposed surfaces of elaborated conifer wood (e.g. fences). In the area we collected this species on a vertical surface of a stump of Picea abies in a glade, which is a kind of native habitat of the species apparently. There exist only two recent records from the Czech Republic (Farkas 2011, Steinová et al. 2013), the other recent collections from the Czech Republic are listed below.

Additional records: W Bohemia, Krušně hory Mts, Boží Dar, meadows 700 m NNW of village, 50°25′06″N/12°54′57″E, fence, on worked timber, alt. 1000 m, 14.X.2011, J. Malíček 3910; W Bohemia, Šumava Mts, Železná Ruda: abandoned village Nová Hůrka, at park-place near the bus stop, 49°08′45.6″N/13°19′37.0″E, on worked timber, alt. 885 m, 29.IX.2011, Z. Palice 15025; W Bohemia, Šumava Mts, Horská Kvilda: abandoned village Zhůří, pastures on N slope of the point Břemeno, 49°04′42.2″N/13°33′25.2″E, on wooden fence around a well, alt. 1145 m, 8.X.2007, Z. Palice 11631, J. Palicová & Jul. Palicová; S Bohemia, Šumava Mts, Borová Lada, on meadow near Haběcká Lada settlement, 49°00′16.5″N/13°40′05.6″E, on worked timber, alt. 910 m, 21.12.2011, J. Malíček 3354, I. Černajová & L. Syrovátková; C Bohemia, distr. Příbram, Prostřední Lhota, by road-side in direction to Chotilsko village, 49°45′11.9″N/14°20′29.1″E, on elaborated wood, alt. 405 m, 18.V.2012, Z. Palice 15242, Jul. Palicová & K. Palicová.

Lecidea sanguineoatra
L. sanguineoatra resembles L. hypnorum, but differs in reddish to dark brown apothecia, narrower simple spores and ecology. Both species are characterized by the presence of blue-green crystals in hyme-
nium and hypothecium (Aptroot et al. 2009). These crystals have not been found in our collections. *L. sanguineoatra* grows mainly on bryophytes over acidic bark, rarely on rocks (Wirth 1995, Aptroot et al. 2009). It is likely a very rare lichen restricted to continuous woodland areas. Recently not published from the Czech Republic but known also from three collections in the Šumava Mts.

**Additional records:** W Bohemia, Šumava Mts, Železná Ruda: Debrník (= Ferdinandovo údolí), the lower part of old avenue, 49°06'56''N/13°14'18''E, over mosses on bark of old *Tilia*, alt. 725 m, 7.VIII.1994, Z. Palice 4119 (conf. C. Printzen); W-Bohemia, Šumava Mts, Modrava: managed beech forest between bogs Rokytecká slať and Hochschachten Filze (Vorderer Sulz) near the Bohemian/Bavarian borderline, 49°01.37'N/13°24.42'E, on bark of dead younger/middle-aged *Fagus*, alt. 1130 –1140 m, 27.VI.2006, E. Loskotová, Z. Palice 10961 & O. Peksa; S Bohemia, Šumava Mts, Nová Pec, old-growth spruce-beech forest above road 1.5 km NNE of top of Smrčina Mt., 48°45'01''N/13°55'41''E, on mosses on base of *Fagus sylvatica*, alt. 1170 m, 27.IX.2012, J. Malíček 4704, F. Bouda & L. Syrovátková.

**Lecidea turgidula**

The species is included in the list with some hesitation. We list a specimen growing side by side with sorediate thalli of *L. leprarioides*. TLC of non-sorediate thalli revealed both placodiolic acid (characteristic for *Lecidea turgidula*) as well as pseudoplacodiolic acid (diagnostic substance of *Lecidea leprarioides*). An alternative explanation is that whole the sample belongs to *L. leprarioides* which in parts forms endoxylic thalli and produces both substances. We, however, follow Tønsberg (1992) who admits endoxylic forms of *Lecidea leprarioides* may exist and discriminate these two taxa chiefly on chemical background, placodiolic acid is not reported from numerous specimens of *Lecidea leprarioides* tested by him.

**Lecidella subviridis**

Interestingly, we collected this taxon exclusively in managed beech forests outside the reserve. This mostly sterile sorediate lichen may resemble *Lecanora expallens*. Tønsberg (1992) distinguishes two morphological forms – the first one with more or less punctiform soralia and the second one with mostly leprose thallus. Our specimens belong to the second morphotype which predominates also in Switzerland (Dietrich 2007). In one collection (JM/2977) a few apothecia were found. *Lecidella subviridis* is a chemically distinctive species. It contains atranorin, thiophanic acid, *expallens*-unknown and ± arthothelin. It prefers acidic-barked trees (Tønsberg 1992, Dietrich 2007).

**Additional record:** Slovakia: W Carpathians, distr. Revúca, Muráň: a brookless valley just N of village, beech forest, 48°44'49''N/20°02'46.5''E, on bark of dry *Fagus*, alt. 490 m, 3.V.2010, J. Halda & Z. Palice 13522.

**Leptogium teretiusculum**

There exist only few published records from the Czech Republic. Previously it was collected in S Moravia and the Šumava Mts (Vězda 1972, Palice 1999). The latter case refers to a historic collection by A. Hilitzer in 1925. The occurrence of *Leptogium teretiusculum* on both sites has not been recently confirmed (cf. Vězda 1998, Palice 1999). It is an easily overlooked species growing preferably on bark of older trees, but may also rarely switch to rock or soil (Jørgensen 2007). Several records from such habitats were recently published from Central Bohemia (Malíček 2013b).

**Micarea adnata**

In the Czech Republic, this rare lichen has been known previously only from two old-growth forest localities in the Šumava Mts (Palice 1999). According to Coppins (1983) its distribution coincides with an annual rainfall of over 1000 mm per a year, which is not the case of Bohemian localities however. In the Žofínský prales reserve and its surrounding it was recorded at approximately 10 microlocalities. Sometimes only characteristic sporodochia were developed and it was once recorded also at base on a young tree in a managed spruce forest. We therefore conclude that favourable meso-microclimatic conditions may play an important role. It is perhaps rather more a humid woodland species than an indicator of old-growth forest.

**Micarea cinerea**

A mostly epiphytic or epixylic member of the genus *Micarea*, which is very similar to the common *M. peliocarpa*. However that species is characterized by 3-septate spores while *M. cinerea* has mostly 5–7-septate ascospores. Additionally *M. cinerea* produces characteristic, straight, long macroco-
Fig. 6: Fertile specimen of *Jamesiella anastomosans*, a relatively common lichen in humid areas of the Czech Republic, but apothecia are very rarely present (scale = 1 mm).

Fig. 7: Rare species *Micarea cinerea* strongly resembles *M. peliocarpa*, but it differs in more septate spores (scale = 1 mm).
nidia. In Central Europe it is most frequently collected in the Alps and Carpathians (Coppins 1983, Czarnota 2007) but occasionally recorded elsewhere (Wirth 1995, Berger et al. 2010). *M. cinerea* is a rare species occurring in humid mountain areas with continuous woodlands. It has not been published from the Czech Republic recently.

**Micarea myriocarpa**

Two pigment apothecial/pycnidial forms (with or without green pigment in hymenium or wall of pycnidium) occur side by side in the collected specimen but forming discrete colonies. Czarnota (2007) suggests the variability in pigmentation might reflect environmental factors, i. e. light regime; however the two forms seem to be sharply delimited in our specimens as well as in other samples collected by the second author in the Šumava Mts. We anticipate a genetic background must exist, similarly like expected for albinomorphs of some other lichen species (Gilbert 1996). We recorded the lichen only once but it is an overlooked species of specific dry habitats.

**Micarea parva**

A poorly known inconspicuous epilithic lichen which has been reported from several collections in Western Europe so far (Coppins 2009). The species is a characteristic pioneer lichen, one of the first lichen colonizers of low siliceous shaded rocks. In the reserve it occupied recently exposed stones below a wind-blown tree together with *Absconditella delutula* and *Micarea lithinella*.

**Micarea prasina** s. l.

Most records refer to *M. micrococca* and *M. prasina* s. str. and perhaps partly to *M. byssacea*.* M. viridileprosa* seems to be much rarer and has not been recorded with certainty in the old-growth forest. Several finely sorediate specimens with delimited soralia (when young) containing micareic acid may represent a distinct undescribed taxon. These specimens are not listed under *Micarea prasina* s. str.

**Micarea synotheoides**

A rare *Micarea* easily confused with several common species, e.g. *M. prasina* or *M. denigrata*. It is restricted mainly to strongly oceanic European regions. Collections from Central Europe probably belong to an undescribed species (Czarnota 2007, Coppins 2009). In contrast to west European specimens well developed pycnidia bearing mesoconidia resembling those produced by *M. denigrata* are present. *M. synotheoides* has been known from the only one locality in the Czech Republic, from a climatic spruce forest in the Šumava Mts (Czarnota 2007).

**Mycobilimbia pilularis**

This is a lichen with finely granular thallus resembling some *Biatora* species. In Central Europe it seems to be rare, restricted to humid old-growth forests, where it grows on bark of deciduous trees. We have not recorded the related *Mycobilimbia carneovalbida* which occurs in similar habitats in the Šumava Mts. For the ecology see also Wirth (1995).

**Nephromopsis laureri**

In the past, it was regarded as a rare lichen in the Czech Republic known only from two areas: Šumava Foothills and Rakovník Region in W Bohemia (Černohorský et al. 1956). As late as in 90ies of 20th century the presence of the species in the Czech Republic was confirmed based on a record in E Bohemia (Liška & Pišút 1995). Recently the species has been discovered at 7 additional localities in the Czech Republic, especially in its W part. Since most of the new findings origin in open non-relictual habitats it is very likely a spreading species in the Czech Republic (Steinová et al. 2013, see the distribution map therein).

**Opegrapha trochodes**

This recently described corticolous species is characterized by rounded to shortly elongated gyrose apothecia, inconspicuous thallus and 3-septate ascospores (Coppins et al. 2008). On the first view this lichen resembles a non-lichenized fungus with hysterioid apothecia. *Opegrapha trochodes* is a widely distributed species growing on shaded bark of deciduous trees. In the British Isles it is confined to ancient woodlands (Coppins et al. 2008). It is quite frequent on rough bark of old beeches in the Žofínský prales. Probably it is an overlooked but local *Opegrapha* species in the Czech Republic growing in shaded and microclimatically suitable habitats of river valleys and old-growth forests.
Additional records: N Bohemia, Hřensko: National Park České Švýcarsko, the valley of Kamenice – Tichá soutěška, c. 2 km E of Hřensko, 50°52.3′N/14°15.6′E, on bark of Ulmus glabra, alt. 120–125 m, 29.V.2008, Z. Palice 12281; N Bohemia, Jetřichovice: National Park České Švýcarsko, valley of Křínice brook upstream of abandoned village Zadní Jetřichovice, N of Jankův kopek [348 m], 50°53.89′N/14°22.8′E, on shaded bark of Acer pseudoplatanus, alt. 255 m, 28.VII.2009, J. Maliček & Z. Palice 12759; S Bohemia, střední Povltaví, Hluboká nad Vltavou, Zámostí, on left bank of Vltava River, c. 3 km NEN of village, 49°05′29″N/14°28′01″E, on mossy bark of Tilia in humid forest, alt. c. 400 m, 24.IV.2010, J. Vondrák 7764 (CBFS); S Bohemia, Šumava Mts, Vimperk, Zátroň: virgin forest Bobínský prales, 200–250 m WNW of Bobínské jezírko pond, old-growth mixed forest, 48°58′28.5″N/13°48′56″E, on weathering bark of Fagus, alt. 960 m, 16.XI.2012, E. Jungwirthová & Z. Palice 15839.

Peridiothelia fuliguncta
This is a non-lichenized saprophytic corticolous species. According to Hawksworth (1985a) it is confined to Tilia but in fact it has a much broader range of host trees (see e.g. Aptroot 2002b). Upper spore-length limit slightly exceeds the measurements given by Hawksworth (1985a) and Aptroot (2002b).

Pertusaria constricta
It strongly resembles several other Pertusaria species, e.g. P. leioplaca and P. pertusa. It differs in 8-spored ascii and more-elevated (rarely ± constricted) warts containing 3–6 apothecia (Éríchsen 1935). Wirth (1995) regards P. constricta as a mountain lichen with an oceanic bias of distribution preferring bark of beech trees. It has been reported only once from the Czech Republic from the Krkonoše Mts (Kuták 1952).

Pyrenula laevigata
Nowadays it is considered to be extinct in the Czech Republic (Liška & Palice 2010). Despite an exhaustive search for this species it has been found on one single tree.

Rhaphidicyrtis trichosporella
This inconspicuous lichen could by distinguished by a white to grey thallus containing Trentepohlia as a photobiont, small perithecia, I+ deep blue hymenial gel, and filiform ascospores (Aguirre-Hudson 2009). The amyloidity character may be misleading since our specimens exhibit I+ red reaction of the hymenial gel, blue only after pretreatment with K. It resembles fertile specimens of Anisomeridium polypori. Rhaphidicyrtis grows in similar habitats to the latter taxon but produces perithecia only. Endophloedal Trentepohlia filaments were quite scanty but always present in our specimens. This species was recently reported from bark of apple trees from a land-used area of Germany (Cezanne et al. 2008). Some authors regard the species as a saprophytic fungus (Lindblad et al. 2011) and this is perhaps also the reason why the taxon is not included among Fennoscandian lichenized fungi (Santesson et al. 2004) although it was described from Finland. Quite recently this taxon was reported from Sweden (Ekman et al. 2013). The authors observed a clearly lichenized thallus in four of five studied samples except one older herbarium specimen. The seeming absence of algae is interpreted as a possible artefact due to storage of the material. Ekman et al. (2013) regard the lichen as an indicator species of long forest continuity which is in accordance with our observations.

Additional record: S Bohemia, Šumava Mts, Vimperk, Zátroň: virgin forest Bobínský prales, c. 450 m WNW of Bobínské jezírko pond, old-growth mixed forest, 48°58′32.5″N/13°48′50.5″E, on bark of Fagus, alt. 995 m, 16.XI.2012, E. Jungwirthová & Z. Palice 16108.

Rinodina degeliana
This is usually a sterile taxon intermingled among other lichens on smooth bark of broad-leaved trees. The species forms characteristic, rather firmly attached, greyish-white dispersed areoles or squamules with marginal to lip-shaped soralia that may later become confluent (Tønsberg 1992). Most specimens from the virgin forest were analysed by TLC and atranorin and zeorin were detected as characteristic for the species (Mayrhofer & Möberg 2002). The specimens from the Žofín settlement collected on Acer platanoides (JV/10108, ZP/15636) were fertile. Apothecia were unknown in Central European material up to now. Well developed apothecia are characterized by the distinct presence of both dark true and grey thalline exciple. R. degeliana seems to be partly an overlooked species in the Czech Republic, at least in woodlands of West and South Bohemia. It grows both in continuous forests as well as avenues (see the localities below). Illustrative pictures of the lichen are provided by Kubiak (2010).

Additional records: W Bohemia, distr. Plzeň-jih, Blovice: nature reserve Chejlova, deciduous forest, 49°32′04″N/13°33′21″E, on bark of Acer pseudoplatanus, alt. 630 m, 16.VI.2009, Z. Palice 12541; W Bohemia, distr.
Rinodina excrescens

*R. excrescens* is characterized by its discrete, coarse, bullate to subquamous areoles that often bear soredia or blastidia, and contain pannarin (Pd + orange). Apothecia tend to be pruinose (epipsamma present) containing *Physcia*-type ascospores (Giralt et al. 1994, Galánina et al. 2011). The Bohemian material was collected on old solitary trees in an avenue, where it covered large flanks of trunks accompanied by rather nitrophilous lichen assemblages (not Xanthorion community). Our material is richly fertile, devoid of blastidia or soralia, while the other European and Asian specimens form apothecia very rarely (Giralt et al. 1994, Galánina et al. 2011). *R. excrescens* seems to be a quite widespread in E Asia and East-north America (see Galánina et al. 2011 and references therein), while in Europe it is one of the rarest *Rinodina* species known only from single dispersed localities. It has been reported from Austria, Croatia (Giralt et al. 1994), Spain (Aragón et al. 2004) and Crete (Spribille et al. 2006). Just recently a sterile population has been found in the Brdy Mts (Central Bohemia) – on bark of *Quercus* at border of a scree (Malíček 2013a).

Rinodina freyi

The specimen refers to *Rinodina glauca* Ropin (Ropin & Mayrhofer 1993) which has been treated together with *Rinodina freyi* as the synonyms of *Rinodina septentrionalis* by Giralt & Mayrhofer (1995). Sheard (2010) has distinguished *Rinodina freyi* and *R. septentrionalis* and he has placed *R. glauca* in the synonymy of *R. freyi*. Two previous records of *R. septentrionalis* from the Czech Republic (Palice 1999, Vondrák et al. 2006) refer very likely to this taxon as well and therefore the name *R. septentrionalis* should be deleted from upcoming checklist of lichens of the Czech Republic.

Thelopsis rubella

From the Czech Republic this species is reported only from the Bílé Karpaty Mts (Suza 1916), the Brdy Mts (Vežda 1957), and recently from the Boubin Virgin Forest in the Šumava Mts (Svoboda & Bouda 2009). *Thelopsis rubella* is a rare lichen growing mainly on weathered bark of old beeches accompanied by bryophytes (Vežda 1957). In Central Europe it prefers humid beech woodlands.

Additional record: S Bohemia, distr. České Budějovice, Hluboká nad Vltavou, nature monument Baba, E-facing slope above Vltava river, 49°04'30"N/14°27'09"E, on bark at *Quercus petraea* near a rock view-point, alt. 420 m, 31.XII.2012, Z. Palice 15988.
In total, 312 lichens (20.5% of the lichen flora of the Czech Republic), and 25 lichenicolous and lichen allied-fungi have been recorded in the study area. 267 lichenized, lichen-allied and lichenicolous fungi are known from the virgin forest reserve Žofín, of that 247 lichenized, 11 lichen-allied and 10 lichenicolous fungi species. 89% of lichens in the old-growth forest (n=220) were growing as epiphytes or epixylic/epibryophytic species on trunks (accidental occurrences of primarily saxicolous species like Micarea sylvicola and Trapelia glebulaosa were not considered in the number). The saprophytic lichen-like pyrenocarpous fungus Kirschsteiniothelia recessa is reported for the first time from Europe. Fifteen lichenized fungi (Arthonia excipienda, Biatora ligni-mollis, Candelariella xanthostigmoides, Clostomum leprosum, Fellhanera gyrophorica, Fuscidea pusilla, Lecania croatica, Lecanora thyssanophora, Lecidella subviridis, Micarea parva, Mycobilimbia pilularis, Opegrapha trochoides, Raphidicyrtis trichosporella, Rinodina degeliana, R. ex crescens) and two lichen-allied fungi often associated with algae (Kirschsteiniothelia aethiops, Peridiothelia fuliguncta) are published for the first time from the Czech Republic. Three species considered to be extinct in the Czech Republic (Liška et al. 2008, Liška & Palice 2010) have been refound (Bacidia laurocerasi, Micarea cinerea, Pyrenula laevigata). Many other very rare and critically endangered lichens have been recorded, e.g. Bacidia circumspecta, B. vermifera, Biatora mendax, Buellia erubescens, Chaenotheca sphaerocephala, Micarea adnata, M. synotheoides, Pertusaria stricta, Sclerophora pallida, and Thelopsis rubella. Previously recorded specimens of Cetrelia olivetorum, Lecanora chlarotera and Punctelia subrudecta from the Žofín Virgin Forest (Peška et al. 2004) were revised and found to belong to Cetrelia cetrarioides, Lecanora argentata and Punctelia jeckeri, respectively. During our research, we did not confirm several rare macrolichens mentioned by Peška et al. (2004) and Jansová & Soldán (2006), namely Hypogymnia farinacea, H. vittata and Usnea florida. These species might have been overlooked by us as they are supposedly rare and very local in the reserve. Among microlichens mentioned by Peška et al. (2004) in the reserve we did not confirm Arthonia mediella, a species that was very likely overlooked by us.

The character of a forest stand that is dominated by beeches is very dark. Undergrowth is dominated by fairly fast-growing young beeches and other tree species are rarely encountered. Young silver-fir trees are almost absent. The overall darkness is apparently the main reason why macrolichens are quite sparsely developed, dominated by few common species (e.g. Hypogymnia physodes, Parmelia saxatilis, Platismatia glauca). Rare macrolichens are very local present mainly in well-lit spots of forest spring areas. Most of them have been found as a single or a few thalli on several trees (e.g. Alectoria sarmentosa, Cetrelia cetrarioides, C. monachorum, Evernia divaricata, Lobaria pulmonaria, Menegazzia terebrata, Nephromopsis laureri, Usnea glabrescens). It is a difference comparing the Žofín virgin forest to the old-growth forests in the Šumava Mts or especially more oceanic European regions, where macrolichens are usually richly represented, like e.g. species of the genera Collema, Heterodermita, Hypotrachyna, Nephroma, Pannaria, Sphaerophorus, Sticta etc. However, well developed microlichen communities predominate in the Žofín protected area. The Žofín Virgin Forest National Nature Reserve definitely belongs to the areas with the highest species richness of epiphytic and epixylic lichens in the Czech Republic. Several species with suboceanic distribution are reported from this locality, e.g. Arthonia excipienda, Lecidea ahlesii, Micarea cinerea, and M. synotheoides.
The substantial part of rare as well as common lichens in the virgin forest has been found on bark of *Fagus*. Among characteristic and distinctive species preferably occurring on bark of *Fagus* that are distributed more or less all over the reserve we may list *Pyrenula nitida*, *Thelotrema lepadinum*, *Lopadium disciforme*, *Graphis scripta* s. l., *Melanelixia glabrata* and *Lecanora argentata*. Less distinctive but also frequent species, preferably growing on smooth bark of younger stems of beeches, include mainly *Porina aenea*, *Biatora efflorescens*, *Ropalspora viridis*, and *Fellanheropis vezdae*. Frequent species at very bases of trunks are *Agonimia repleta* and *Antisomeridium polyport*. Beeches with a rough, more nutrient rich bark host several rare species like *Gyalecta flotowii*, *Bacidina phacodes*, *Mycobilimbia pilularis*, *Bacidia incompta* etc. Other distinctive species occurring preferably on *Fagus* are unevenly distributed in the reserve and sometimes were recorded only at one or several trees. We may list e.g. *Menegazzia terebrata*, *Buella erubescens*, *Biatora ocelliformis*, *B. mendax*, *Pertusaria constricta*, *P. hymenea*, *Bacidia circumspecta*, *B. laurocerasi*, *Pyrenula laevigata*, *Micarea synnotheoides* etc. A similar lichen flora is developed on *Acer pseudoplatanus*, which however hosts a less diverse spectrum of species, nevertheless several taxa were recorded only on this tree species in the reserve: *Arthonia ruana*, *Cetrelia cetrarioides*, and *Lobaria pulmonaria*.

Very important phorophytes are also conifers like *Picea abies* and *Abies alba*, although distinctly less diversified than on *Fagus* and other deciduous trees. Characteristic species on spruces and silver-fir trees include mainly skiphilous taxa like e. g. *Arthonia leucopellaea*, *Biatora veteranorum*, *Lecanactis abietina*, and *Micarea adnata*. Specific habitats are occupied by *Fellanhera bouteillei* (twigs and needles) and *Chaenotheca sphaerocephala* (very shaded bases of old trees). On illuminated sites (forest gaps like swamps and spring-areas) preferably beard lichens occur, especially on branches of dead trees: *Alectoria sarmentosa* (rarely), *Bryoria capitellaris*, *B. implexa*, *Nephromopsis laureri* (rarely), and *Usnea* sp. div., but these species are quite local. The most interesting records on conifers were done in a swampy area in W part of the reserve where the two rare species *Cliostomum leprosum* and *Biatora ligni-mollis* were recorded on several trees and snags.

It is worth noting that more than 35 lichen species were recorded only once on one single tree in the reserve. Except rare or easily overlooked epiphytic species we should emphasize rare occurrences of several nitrophytic species. The rarity of the ubiquitous epiphytes *Amandinea punctata* and *Lecidella elaeochroma* is astonishing and we explain this by an overall darkness of the old-growth stand and the unavailability of suitable substrates. Interestingly all three *Caloplaca* species were recorded each at one single tree. Clearly these species require specific niches and are restricted to microhabitats that are very exceptional and stochastically dispersed in the area, e.g. occurrence of *Caloplaca chrysodeta* (common species of calcareous areas) may depend on affinity to overmature trunks and snags with higher bark pH, that is caused by wood-inhabiting fungi resulting in ‘rot-holes’, see Fritz & Heilmann-Clausen 2010). Remarkably several lichen taxa (*Arthonia excipienda*, *Bacidia roSELLa*, *Caloplaca lucifuga*, *Psoroglaena stigonemoides*, *Sclerophora pallida*, *Schismatomma pericleum*) were recorded exclusively on elms or Norway maples, trees with relatively high bark pH. Moreover both tree species are very rare in the reserve.

A large amount of decaying wood is distributed all over the reserve. Dead standing trunks and snags of beeches are often occupied by calicioid lichens like e.g. *Chaenotheca brachypoda* and *C. chlorella* or hysterioid *Opegrapha varia*. Among pioneer species on decaying wood we may mention very common *Absconditella lignicola* and *Thelocarpon* species. On more decomposed wood of shaded habitats we have noted frequently *Micarea nigella*, *M. prasina*
s. str., *Multiclavula mucida*, *Peltigera* sp. div., and *Trapeliopsis viridescens*. On the other hand *Icmadophila ericetorum* and *Micarea hedlundii* were rarely seen. Only several lichen species have been found on shaded granite stones and rocky outcrops in forest: *Enterographa zonata*, *Lepraria* sp. div., *Micarea lutulata*, *M. sylvicola*, *Porina chlorotica*, and *Psilolechia lucida*. A few inconspicuous pioneer microlichens were recorded on small stones – *Absconditella delutula*, *Micarea lithinella*, and *M. parva*. A little bit richer lichen assemblages are growing on occasionally inundated stones in the Tisový brook, e.g. *Bacidina inundata*, *Baeomyces rufus*, *Lecidea ahlesii*, *L. lithophila*, *Porpidia macrocarpa*, *P. soredizodes*, *Trapelia coarctata*, *T. placodioides*, *Verrucaria dolosa*, *V. funckii*, and *V. hydrela*.

**Discussion**

At the first sight, many uncommon lichens are restricted to the virgin forest only. However, the reserve serves as an important source of diaspores for surrounding woodlands. Especially in old-growth beech forests bordered with the virgin forest, rare lichens are significantly represented in epiphytic communities. As an example of ‘old-growth forest’ species growing within managed forests outside the reserve the following lichens may be listed: *Bacidia circumspecta*, *B. laurocerasi*, *Biatora fallax*, *Buellia erubescens*, *Cetrelia cetrarioides*, *Lecanactis abietina*, *Lecanora albella*, *Lopadium disciforme*, *Micarea adnata*, *Pertusaria constricta*, *P. pertusa*, *Thelotrema lepadinum*, *Trapelia corticola* and *Varicellaria hemisphaerica*. Most of them are restricted to the bark of beech, rarely other trees. Another type of epiphytic community occurs in the Žofín settlement which is dominated by various solitary trees on more illuminated sites and often with subneutral bark. Macrolichens from the family *Parmeliaceae* are well represented, but microlichens *Candelariella subdeflexa*, *Gyalecta truncigena*, and *Rinodina excrescens* are the most valuable records from this habitat.

Surprisingly several sorediate epiphytic microlichens were found exclusively in managed forests (including avenues) only: *Fuscidea arboricola*, *F. pusilla*, *Halecania viridescens*, *Lecidea pullata*, *Lecidella flavosorediata*, and *L. subviridis*. The reason of seeming absence within the reserve surely differs among species as they have different ecological preferences both for the nutrients and light regime. We anticipate most of mentioned taxa do occur also in the reserve and were overlooked by us within extensive lichen mosaics. In managed forest they may form larger colonies due to the less competition from other crustose species. Some of the mentioned species may preferentially occur in crowns of trees because of prevalence of shaded habitats within the reserve. The crowns of trees were not studied by us and only accidently we screened fallen branches or crowns of recently broken trees. It is also of interest that in spite of focused intensive searching for specific ‘old-growth forest’ microlichen taxa which are regularly encountered in the neighbouring Šumava Mts we failed to record these species in the Žofín area and the Novohradské hory Mts at all. Examples are *Cyphelium inquinans*, *Gyalecta ulmi*, *Mycobilimbia carneolbida*, *Mycoblastus sanguinarius*, and *Strigula stigmatella*. The reason remains unknown to us.

For comparison, 209 vascular plants (Lepší et al. 2007), 195 bryophytes (Kučera 2009), and more than 600 species of macromycetes (Albrecht et al. 2003) have been reported from the virgin forest Žofín. Especially within the last twenty years, a number of floristic studies on old-growth and virgin forest has been published all over Europe.

Undoubtedly, with 247 recorded lichenized species (220 epiphytes) the Žofinský prales belongs to the lichen richest old-growth forest reserves in Central Europe. However, it is quite difficult to compare species richness of the Žofín with other virgin forests because other studied European forest reserves with dominating *Fagus* markedly differ in their size (usually
several times larger) and geomorphology (usually more craggy relief). What is more, the surveys of most of them were not studied in much detail and are rather based on results of several short visits; hence the real diversity must be several times higher. From other European old-growth beech forest reserves usually more macrolichen and less sorediate microlichen taxa are reported. As examples of comparable areas, two similarly sized virgin forests in Slovenia could be mentioned with dominating beech, silver fir and spruce: Rajhenavski Rog (51 ha) with 100 taxa of lichens (Bilovitz et al. 2011) and Ždrocle Forest Reserve (184 ha) with 88 taxa (Prügger et al. 2001). Similarly, lichen survey of Stužica virgin forest (659 ha) in Slovenian Eastern Carpathians with dominating beech and silver-fir (but absent spruce) yielded 116 lichen species including earlier subrecent (?)extinct, non confirmed records (Pišút & Lackovičová 1992). In Ukrainian Eastern Carpathians a small fragment of the largest European virgin-forest reserve – the Uholsko-Shyrokoluhanskyj primeval beech forest was intensively studied recently (Dymytrova et al. 2013). The authors recorded 203 epiphytic taxa of lichenized and lichen-allied fungi from 352 sampling plots. This vast area (hundred times larger than the Žofín reserve) however displays a rugged relief and includes a number of various biotopes that were not studied. In the Austrian Alps a detailed survey was done in nature reserve Rotwild on limestone bedrock (Türk & Breuss 1994), with additions (Bilovitz 2007) giving a sum of 194 epiphytic lichens for the area of c. 3 km². Interesting data are provided by Hafellner & Komposch (2007) from another Austrian old-growth forest “Urwaldrest Neuwald”. They carried out a detailed survey of epiphytic and epixylic lichen flora within two one hectare plots—the first one in beech-silver fir-spruce old-growth forest (128 species) and the second one in managed forest (58 species). The first number indicates relatively high diversity of local lichen flora, expectedly higher than in case of Žofínský prales area. Partly it may be explained by the geology (calcareous underground) and the generally richer lichen flora in the Alps than in the Hercynian region.

The biota of the Žofínský prales is exceptional although still incompletely known. We hope that this lichenological survey will stimulate the study of other endangered and vanishing central European old-growth forests.

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