Epiphytic lichen mycota of the virgin forest reserve Rajhenavski Rog (Slovenia)

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Abstract: Bilovitz, P. O., Batič, F. & Mayrhofer, H. 2011. Epiphytic lichen mycota of the virgin forest reserve Rajhenavski Rog (Slovenia). – Herzogia **24**: 315–324.

A list of 128 taxa (127 species) of lichens, 6 species of lichenicolous fungi and 2 non-lichenized fungi traditionally included in lichenological literature from the virgin forest Rajhenavski Rog and its surroundings in the southeastern part of Slovenia is presented. The lichen *Gyalecta derivata*, the lichenicolous fungus *Homostegia piggotii*, and the non-lichenized fungus *Mycomicrothelia pachnea* are new to Slovenia. The lichenized fungi *Chaenotheca trichialis*, *C. xyloxena*, *Lecanactis abietina*, *Lecanora thysanophora*, *Pertusaria ophthalmiza*, the lichenicolous fungi *Monodictys epilepraria*, *Tremella hypogymniae*, *Taeniolella friesii*, and the non-lichenized fungus *Chaenothecopsis pusilla* are new to the Dinaric phytogeographical region of Slovenia.

Zusammenfassung: Bilovitz, P. O., Batič, F. & Mayrhofer, H. 2011. Epiphytische Flechten des Urwaldschutzgebietes Rajhenavski Rog (Slowenien). – Herzogia **24**: 315–324.

Für den Urwald Rajhenavski Rog und seine Umgebung, gelegen im südöstlichen Teil Sloweniens, wird eine Liste von 128 Taxa von Flechten (127 Arten), von 6 Arten lichenicoler Pilze und 2 nicht-lichenisierten Schlauchpilzen, die traditionell in der Flechtenliteratur eingeschlossen werden, vorgelegt. Die Flechte *Gyalecta derivata*, der lichenicole Pilz *Homostegia piggotii*, und der nicht-lichenisierte Pilz *Mycomicrothelia pachnea* werden erstmals in Slowenien nachgewiesen. Die lichenisierten Pilze *Chaenotheca trichialis*, *C. xyloxena*, *Lecanactis abietina*, *Lecanora thysanophora*, *Pertusaria ophthalmiza*, die lichenicolen Pilze *Monodictys epilepraria*, *Tremella hypogymniae*, *Taeniolella friesii* und der nicht-lichenisierte Pilz *Chaenothecopsis pusilla* sind Erstnachweise für die Dinarische phytogeographische Region Sloweniens.

Key words: Ascomycetes, Balkan Peninsula, Dinarides, biodiversity, virgin forests.

Introduction

Since the publication of the catalogue of the lichenized and lichenicolous fungi of Slovenia (Suppan et al. 2000) and its additions and corrections (Mayrhofer 2006), several papers deal with or include lichenized and/or lichenicolous fungi from Slovenia (e.g. Obermayer 2006, Bilovitz et al. 2007, Mayrhofer & Sheard 2007, Obermayer 2007, Obermayer & Mayrhofer 2007, Breuss 2008a, 2008b, Hafellner 2008, Kukwa 2008, Muggia et al. 2008, Arup & Åkelius 2009, Navarro-Rosinés et al. 2009, Tretiach et al. 2009, Bilovitz et al. 2010, Breuss & Berger 2010, Hafellner 2010, Dakskobler et al. 2011, Hafellner 2011, Spribille et al. 2011, Šoun et al. 2011). Apart from the contribution of Hočevar et al. (1995), who give an incomplete list of the lichenized fungi of the virgin forest reserve Rajhenavski Rog, there are only few records mentioned in Mayrhofer et al. (2006) and Obermayer & Mayrhofer (2007).

Parviainen (2005) lists the fir-beech forest Rajhenavski Rog as an example of a non-fragmented virgin forest community in Central Europe. According to Bončina (1999), there are

Fig. 1: Location of the investigated area.

approximately 200 forest reserves in Slovenia, including some virgin forest reserves, most of which are situated in the Kočevje region: Krokar, Rajhenavski Rog, Prelesnik's sinkhole, and Strmec. In 1894 the virgin forest 'Rajhenavski gozd' was first mentioned in the forest management plan. Since then it has not been managed any more, but treated as a forest reserve (Hartman 1987). First official protection dates from 1976 when the forest reserve was protected by the community of Kočevje. Today Rajhenavski Rog is protected as all Slovenian forest reserves by the special regulation act (Anonymous 2005). The virgin forest reserve Rajhenavski Rog (51 hectares) is situated in the northern part of the Dinaric Alps in SE Slovenia (Fig. 1) in the middle of Kočevski Rog on a high karst plateau, with several karst depressions called 'vrtača', at an altitude from 852 to 917 m. According to Hartman (1999) most of the virgin forest reserves in Slovenia have been conserved on high karst plateaus where silver fir (*Abies alba*) and European beech (*Fagus sylvatica*) grow. The climate of the region is moderately humid with an annual precipitation of up to 1600 mm and a mean annual air temperature of 8.4 °C (Vilhar et al. 2010). The bedrock is cretaceous limestone, the soil is brown post-carboniferous, varying from shallow on ridges to deep at the bottom of sinkholes (Hartman 1999). The main vegetation type is the Omphalodo-Fagetum association, dominated by silver fir (*Abies alba*) and European beech (*Fagus sylvatica*). The proportion of these two species in the total growing stock is 99.5 %. Since 1967 the proportion of silver fir has steadily decreased (Bončina 1999). Norway spruce (*Picea abies*), sycamore maple (*Acer pseudoplatanus*), wych elm (*Ulmus glabra*) and large-leaved lime (*Tilia platyphyllos*) are modestly represented. The shrub layer is well developed only in regeneration nests, represented mainly by *Fagus sylvatica* (Hočevar et al. 1995, Pisek 2010). In 1995, 12 % of the forest were in a juvenile stage, 52 % in an optimal stage and 36 % in a terminal stage (Bončina 1999). The importance of dead

wood is also reflected by the species richness of other cryptogams inhabiting dead wood of beech: Ódor & van Dort (2002) report 96 bryophytes and Piltaver et al. (2002) 206 macrofungi, both including several threatened species.

Material and methods

The list presented in this paper is mainly based on collections made by the first author, who visited Rajhenavski Rog and its surroundings in autumn 2008 and 2010 for a half day excursion each. The specimens have been identified mainly with the aid of Wirth (1995) and Ihlen & Wedin (2008), using routine light microscopy techniques. Some of the identifications required verification by using standardized thin-layer chromatography (TLC) following the protocols of White & James (1985) and Orange et al. (2001). The specimens are preserved in the herbarium of the Institute of Plant Sciences, Karl-Franzens-University Graz (GZU). The nomenclature follows Nimis & Martellos (2003), Santesson et al. (2004), or other modern treatments. New records for the Dinaric phytogeographical region of Slovenia are marked with an asterisk (*).

List of sampling locations

Slovenia, Central Dinarides, SE of Ljubljana, Kočevski Rog, ...

01: Virgin forest Rajhenavski Rog, 45°39'36"N/15°00'31"E, c. 875 m, mixed woodland with *Fagus sylvatica* and *Abies alba*, 05.XI.2008 & 25.XI.2010, P. Bilovitz.
02: Road to the virgin forest Rajhenavski Rog, 45°40'31"N/15°00'17"E, c. 840 m, isolated deciduous trees in a meadow, 25.XI.2010, P. Bilovitz.
03: Road to the virgin forest Rajhenavski Rog, 45°41'32"–43"N/15°00'31"–46"E, c. 690–745 m, *Acer pseudoplatanus* trees along and near the road, 05.XI.2008, F. Batič et P. Bilovitz.
04: Road to the virgin forest Rajhenavski Rog, 45°41'54"N/15°00'40"E, c. 655 m, mixed woodland near the road, 25.XI.2010, P. Bilovitz.

List of substrata and their abbreviations:

Abies alba	Abi alb
Acer pseudoplatanus	Ace pse
Fagus sylvatica	Fag syl
Prunus avium	Pru avi
Salix caprea	Sal cap
Sambucus nigra	Sam nig
on branches	bra(-)
on bark of trunks (corticolous)	cor-
on calcareous rocks	cal
on dead wood, stumps ... (lignicolous)	lig(-)
on mossy bark	mus-
on mossy calcareous rocks	mus-cal

Results

Lichenized taxa

Acrocordia gemmata (Ach.) A.Massal.: 03 (cor Ace pse)
Arthonia leucopellaea (Ach.) Almq.: 01 (cor Abi alb)
Arthonia vinosa Leight.: 01 (cor Abi alb)
Bacidia rubella (Hoffm.) A.Massal.: 01 (cor Fag syl), 03 (cor/mus Ace pse)
Biatoridium monasteriense J.Lahm ex Körb.: 01 (mus Ace pse)

Bryoria implexa (Hoffm.) Brodo & D.Hawksw.: 02 (cor/bra Sal cap)
Bryoria nadvornikiana (Gyeln.) Brodo & D.Hawksw.: Hočevar et al. (1995: 22 as *Alectoria n*., *Alectoria n*. var. *spinulosa*) Abi alb
Buellia griseovirens (Turner & Borrer ex Sm.): 01 (cor Abi alb, cor Fag syl), 02 (cor Ace pse, cor Pru avi), 03 (cor Ace pse)
Calicium glaucellum Ach.: 01 (cor Abi alb)
Calicium salicinum Pers.: 01 (cor Abi alb, lig)
Caloplaca cerinelloides (Erichsen) Poelt: 02 (bra Sal cap)
Caloplaca herbidella (Hue) H.Magn.: 01 (cor Ace pse)
Candelariella reflexa (Nyl.) Lettau: 02 (cor Pru avi)
Catillaria nigroclavata (Nyl.) Schuler: 02 (bra Sal cap)
Cetrelia cetrarioides (Delise ex Duby) W.L.Culb. & C.F.Culb.: 03 (cor Ace pse)
Cetrelia monachorum (Zahlbr.) W.L.Culb. & C.F.Culb.: 01 (cor/mus Ace pse, cor/mus Fag syl); Obermayer & Mayrhofer (2007: 268) Fag syl
Cetrelia olivetorum (Nyl.) W.L.Culb. & C.F.Culb.: 01 (cor Fag syl), 03 (cor Ace pse); Hočevar et al. (1995: 21) Fag syl
Chaenotheca chrysocephala (Turner ex Ach.) Th.Fr.: 01 (cor Abi alb)
Chaenotheca ferruginea (Turner ex Sm.) Mig.: 01 (cor Abi alb)
**Chaenotheca trichialis* (Ach.) Th.Fr.: 01 (cor Abi alb)
**Chaenotheca xyloxena* Nádv.: 01 (lig, lig Abi alb)
Chrysothrix candelaris (L.) J.R.Laundon: 01 (cor Abi alb)
Cladonia chlorophaea (Flörke ex Sommerf.) Spreng.: Hočevar et al. (1995: 21) Fag syl
Note: In Suppan et al. (2000) the cited record is listed under *C. pyxidata* subsp. *chlorophaea*.
Cladonia coniocraea (Flörke) Spreng.: 01 (cor/mus Fag syl)
Cladonia digitata (L.) Hoffm.: 01 (lig); Hočevar et al. (1995: 22, 23) Abi alb, lig
Cladonia furcata (Huds.) Schrad.: 01 (mus-cal)
Cladonia macilenta Hoffm.: Hočevar et al. (1995: 22, 23) Abi alb, lig
Cladonia pyxidata (L.) Hoffm.: 01 (mus-cal), 04 (mus Ace pse, mus-cal)
Cladonia squamosa Hoffm. var. *squamosa*: Hočevar et al. (1995: 23) lig
Cladonia squamosa var. *subsquamosa* (Nyl. ex Leight.) Vain.: Mayrhofer et al. (2006: 169)
Collema auriforme (With.) Coppins & J.R.Laundon: 01 (mus-cal)
Collema nigrescens (Huds.) DC.: 03 (cor Ace pse)
Dimerella pineti (Ach.) Vězda: 01 (cor Abi alb, lig)
Diploschistes muscorum (Scop.) R.Sant.: 01 (on *Cladonia* spec.)
Evernia prunastri (L.) Ach.: 01 (cor Abi alb, cor Ace pse), 02 (cor Ace pse, bra Pru avi, bra Sal cap); Hočevar et al. (1995: 22) Abi alb
Flavoparmelia caperata (L.) Hale: 01 (cor Fag syl), 03 (cor Ace pse)
Graphis scripta (L.) Ach.: 01 (cor Ace pse, cor Fag syl), 03 (cor Ace pse), 04 (cor Abi alb); Hočevar et al. (1995: 21, 22) Abi alb, Ace pse, Fag syl
Gyalecta derivata (Nyl.) H.Olivier: 03 (cor Ace pse)
Note: New to Slovenia.
Hypogymnia physodes (L.) Nyl.: 01 (bra, bra/cor Abi alb), 02 (bra/cor Pru avi); Hočevar et al. (1995: 21, 22) Abi alb, Fag syl
Hypogymnia tubulosa (Schaer.) Hav.: 01 (bra Abi alb), 02 (bra Pru avi, bra Sal cap); Hočevar et al. (1995: 22) Abi alb
**Lecanactis abietina* (Ach.) Körb.: 01 (cor Abi alb)
Lecania cyrtella (Ach.) Th.Fr.: 02 (bra Sal cap)
Lecania naegelii (Hepp) Diederich & van den Boom: 02 (bra Sal cap)
Lecanora albella (Pers.) Ach.: Hočevar et al. (1995: 21) Fag syl
Lecanora carpinea (L.) Vain.: 02 (bra Pru avi)
Lecanora chlarotera Nyl.: 01 (cor Ace pse, cor Fag syl), 03 (cor Ace pse), 04 (cor Ace pse)
Lecanora hagenii (Ach.) Ach.: 02 (bra Sal cap)
Lecanora horiza (Ach.) Linds.: 01 (cor Fag syl)

Lecanora intumescens (Rebent.) Rabenh.: 01 (cor Fag syl); Hočevar et al. (1995: 21, 22) Ace pse, Fag syl
Lecanora persimilis (Th.Fr.) Nyl.: 02 (bra Pru avi, bra Sal cap)
Lecanora pulicaris (Pers.) Ach.: 02 (bra Pru avi)
Lecanora subcarpinea Szatala: 02 (bra Pru avi, bra Sal cap)
Lecanora subrugosa Nyl.: Hočevar et al. (1995: 21) Fag syl
Note: In Suppan et al. (2000) the cited record is listed under *L. argentata*.
**Lecanora thysanophora* R.C.Harris: 01 (cor Ace pse), 04 (cor Ace pse)
Note: Previously only known from the Julian Alps (Mrak et al. 2004) and from the Slovenian part of the Koralpe (Hafellner 2008).
Lecidella achristotera (Nyl.) Hertel & Leuckert: 01 (cor Ace pse), 02 (bra Sal cap), 03 (cor Ace pse); Hočevar et al. (1995: 22 as *Lecidea a.*) Ace pse
Note: In Suppan et al. (2000) the cited record is listed under *L. elaeochroma*.
Lecidella euphorea (Flörke) Hertel: Hočevar et al. (1995: 21 as *Lecidea e.*, 22 as *Lecidea e.*) Abi alb, Ace pse, Fag syl
Note: In Suppan et al. (2000) the cited record is listed under *L. elaeochroma*.
Lecidella flavosorediata (Vězda) Hertel & Leuckert: 01 (cor Ace pse, cor Fag syl), 03 (cor Ace pse)
Lepraria eburnea J.R.Laundon: 01 (cor Fag syl)
Lepraria incana (L.) Ach.: 01 (cor Abi alb)
Lepraria lobificans Nyl.: 01 (mus Ace pse), 03 (cor Ace pse)
Lepraria rigidula (de Lesd.) Tønsberg: 01 (cor Abi alb), 02 (cor Pru avi), 03 (cor/mus Ace pse)
Lepraria vouauxii (Hue) R.C.Harris: 01 (mus Fag syl)
Leptogium lichenoides (L.) Zahlbr.: 01 (mus-cal), 03 (mus Ace pse)
Lobaria pulmonaria (L.) Hoffm.: 01 (cor/mus Ace pse), 03 (cor Ace pse), 04 (cor/mus Ace pse); Hočevar et al. (1995: 21 as *L. p.* var. *meridionalis*) Fag syl
Loxospora elatina (Ach.) A.Massal.: 01 (cor Abi alb), 04 (cor Abi alb); Hočevar et al. (1995: 22 as *Pertusaria chloropolia*) Abi alb
Megalaria laureri (Hepp ex Th.Fr.) Hafellner: 01 (cor Ace pse, cor Fag syl), 03 (cor Ace pse)
Megalaria pulverea (Borrer) Hafellner & E.Schreiner: 01 (cor Abi alb, cor Ace pse, cor Fag syl); Hočevar et al. (1995: 22 as *Pertusaria miniescens*) Abi alb
Melanelixia fuliginosa (Fr. ex Duby) O.Blanco et al.: 01 (cor Ace pse, cor Fag syl), 03 (cor Ace pse)
Melanelixia glabratula (Lamy) Sandler & Arup: Hočevar et al. (1995: 21 as *Parmelia g.*, 22 as *Parmelia g.*) Abi alb, Ace pse, Fag syl
Melanelixia subaurifera (Nyl.) O.Blanco et al.: 01 (cor Ace pse), 02 (cor Ace pse, bra Pru avi, bra Sal cap)
Melanohalea elegantula (Zahlbr.) O.Blanco et al.: 01 (cor Fag syl), 03 (cor Ace pse)
Melanohalea exasperata (De Not.) O.Blanco et al.: Hočevar et al. (1995: 21 as *Parmelia e.*) Fag syl
Melanohalea exasperatula (Nyl.) O.Blanco et al.: 02 (bra Pru avi, bra Sal cap)
Melanohalea laciniatula (Flagey ex H.Olivier) O.Blanco et al.: Hočevar et al. (1995: 21 as *Parmelia l.*) Fag syl
Menegazzia terebrata (Hoffm.) A.Massal.: 01 (cor Fag syl); Hočevar et al. (1995: 21, 22) Abi alb, Fag syl
Micarea adnata Coppins: 01 (cor Abi alb)
Micarea prasina Fr.: 01 (lig)
Mycobilimbia pilularis (Körb.) Hafellner & Türk: 03 (cor Ace pse), 04 (mus Ace pse)
Mycobilimbia sanguineoatra auct.: 01 (cor Abi alb)
Mycoblastus fucatus (Stirt.) Zahlbr.: 01 (lig)
Normandina pulchella (Borrer) Nyl.: 01 (mus Ace pse), 03 (cor/mus Ace pse)
Ochrolechia androgyna (Hoffm.) Arnold: 03 (cor Ace pse)
Opegrapha vulgata (Ach.) Ach.: 01 (cor Abi alb, cor Ace pse, cor Fag syl), 03 (cor Ace pse), 04 (cor Abi alb)
Parmelia saxatilis (L.) Ach.: 01 (cor Abi alb, cor Fag syl), 02 (cor Ace pse, cor Pru avi), 03 (cor Ace pse); Hočevar et al. (1995: 21, 22) Abi alb, Fag syl
Parmelia submontana Nádv. ex Hale: 02 (cor Pru avi); Hočevar et al. (1995: 22 as *P. contorta*) Abi alb
Parmelia sulcata Taylor: 01 (cor Fag syl), 02 (cor Ace pse, bra/cor Pru avi, bra Sal cap), 03 (cor Ace pse); Hočevar et al. (1995: 21, 22) Abi alb, Fag syl
Parmelina carporrhizans (Taylor) Poelt & Vězda: Hočevar et al. (1995: 21 as *Parmelia c.*) Fag syl

Parmelina pastillifera (Harm.) Hale: Hočevar et al. (1995: 21 as *Parmelia scortea* var. *pastillifera*) Fag syl
Parmeliopsis ambigua (Wulfen) Nyl.: 01 (cor Abi alb), 04 (cor Abi alb); Hočevar et al. (1995: 22) Abi alb
Parmeliopsis hyperopta (Ach.) Arnold: 01 (cor Abi alb), 04 (cor Abi alb); Hočevar et al. (1995: 22) Abi alb
Parmotrema crinitum (Ach.) M.Choisy: 01 (cor Fag syl)
Peltigera collina (Ach.) Schrad.: 03 (mus Ace pse)
Peltigera degenii Gyeln.: Hočevar et al. (1995: 23) lig
Peltigera horizontalis (Huds.) Baumg.: 01 (mus-cal)
Peltigera praetextata (Flörke ex Sommerf.) Zopf: 01 (cor/mus Fag syl, mus-cal), 02 (cor Sal cap, mus Sam nig), 03 (mus Ace pse)
Pertusaria albescens (Huds.) M.Choisy & Werner: 01 (cor Ace pse, cor Fag syl), 03 (cor/mus Ace pse); Hočevar et al. (1995: 21 as *P. a.* var. *globulifera*, 22) Abi alb, Fag syl
Pertusaria amara (Ach.) Nyl.: 02 (cor Ace pse, cor Pru avi), 03 (cor Ace pse); Hočevar et al. (1995: 21, 22) Abi alb, Fag syl
Pertusaria coccodes (Ach.) Nyl.: 01 (cor Abi alb, cor Ace pse)
Pertusaria coronata (Ach.) Th.Fr.: 01 (cor Ace pse), 03 (cor Ace pse); Hočevar et al. (1995: 22) Abi alb
Pertusaria flavida (DC.) J.R.Laundon: 03 (cor Ace pse)
Pertusaria hemisphaerica (Flörke) Erichsen: 01 (cor Abi alb, cor Fag syl)
Pertusaria hymenea (Ach.) Schaer.: 01 (cor Ace pse, cor Fag syl); Hočevar et al. (1995: 21, 22) Ace pse, Fag syl
[*]*Pertusaria ophthalmiza* (Nyl.) Nyl.: 01 (cor Fag syl)
Note: Previously only known from the Pohorje (Mayrhofer et al. 1996).
Pertusaria pertusa (Weigel) Tuck.: 01 (cor Ace pse, cor Fag syl), 03 (cor Ace pse); Hočevar et al. (1995: 21, 22) Abi alb, Ace pse, Fag syl
Pertusaria pustulata (Ach.) Duby: 01 (cor Ace pse)
Phaeographis dendritica (Ach.) Müll.Arg.: Hočevar et al. (1995: 21) Fag syl
Note: The occurrence of this taxon is questionable.
Phaeophyscia chloantha (Ach.) Moberg: 01 (cor Fag syl)
Phaeophyscia orbicularis (Neck.) Moberg: 02 (cor Ace pse, bra Sal cap)
Phlyctis argena (Spreng.) Flot.: 01 (cor/mus Ace pse, cor Fag syl), 02 (cor Ace pse, cor Pru avi, cor Sal cap), 03 (cor Ace pse), 04 (cor Ace pse)
Physcia adscendens H.Olivier: 02 (bra Sal cap)
Physcia stellaris (L.) Nyl.: 02 (bra Pru avi, bra Sal cap)
Physcia tenella (Scop.) DC.: 02 (bra Pru avi, bra Sal cap)
Platismatia glauca (L.) W.L.Culb. & C.F.Culb.: 02 (cor Pru avi, cor Sal cap); Hočevar et al. (1995: 22) Abi alb
Protoblastenia rupestris (Scop.) J.Steiner: 01 (cal)
Pseudevernia furfuracea (L.) Zopf: 01 (bra, bra Abi alb), 02 (bra Pru avi, bra Sal cap); Hočevar et al. (1995: 21, 22) Abi alb, Fag syl
Pyrenula nitida (Weigel) Ach.: 01 (cor Fag syl); Hočevar et al. (1995: 21) Fag syl
Pyrenula nitidella (Flörke ex Schaer.) Müll.Arg.: 01 (cor Ace pse, cor Fag syl); Hočevar et al. (1995: 21) Fag syl
Ramalina farinacea (L.) Ach.: 01 (cor Ace pse), 02 (cor Ace pse, bra Sal cap)
Ramalina fastigiata (Pers.) Ach.: 02 (cor Ace pse, bra Sal cap)
Ramalina pollinaria (Westr.) Ach.: Hočevar et al. (1995: 22) Abi alb
Ramalina roesleri (Hochst. ex Schaer.) Hue: Hočevar et al. (1995: 22) Ace pse
Ropalospora viridis (Tønsberg) Tønsberg: 04 (cor Abi alb)
Strigula stigmatella (Ach.) R.C.Harris: 01 (mus Fag syl)
Thelotrema lepadinum (Ach.) Ach.: 01 (cor Abi alb, cor Ace pse, cor Fag syl); Hočevar et al. (1995: 21, 22) Abi alb, Fag syl
Usnea intermedia (A.Massal.) Jatta: Hočevar et al. (1995: 22 as *U. carpatica*) Abi alb
Note: In Suppan et al. (2000) the cited record is listed under *U. carpatica*.
Usnea subfloridana Stirt.: Hočevar et al. (1995: 22) Abi alb

Xanthoria candelaria (L.) Th.Fr.: 02 (bra Pru avi)
Xanthoria parietina (L.) Th.Fr.: 02 (bra Sal cap)

Lichenicolous taxa

Abrothallus bertianus De Not.: 01 (on *Melanelixia subaurifera*), 02 (on *Melanelixia subaurifera*)
Homostegia piggotii (Berk. & Broome) P.Karst.: 01 (on *Parmelia saxatilis*)
Note: New to Slovenia.
Lichenodiplis lecanorae (Vouaux) Dyko & D.Hawksw.: 02 (on *Lecanora hagenii*, *L. persimilis*)
**Monodictys epilepraria* Kukwa & Diederich: 01 (on *Lepraria* spec., *L. lobificans*)
Note: Previously only known from the Pohorje (Kukwa 2008).
**Tremella hypogymniae* Diederich & M.S.Christ.: 01 (on *Hypogymnia physodes*)
Note: Previously only known from the Slovenian part of the Koralpe (Hafellner 2008).
**Taeniolella friesii* (Hepp) Hafellner: 01 (on *Strigula stigmatella*)
Note: Previously only known from the Julian Alps (Hafellner 1998).

Fungi traditionally included in lichenological literature

**Chaenothecopsis pusilla* (Ach.) A.F.W.Schmidt: 01 (lig, lig Abi alb)
Note: Previously only known from the Kamniško-Savinjske Alps (Bilovitz et al. 2010).
Mycomicrothelia pachnea (Körb.) D.Hawksw.: 01 (cor Abi alb)
Note: New to Slovenia.

Doubtful taxa and records

Cladonia cariosa (Ach.) Spreng.: Hočevar et al. (1995: 21) Fag syl
Note: According to Wirth (1995) this species grows on calcareous soil.
Cladonia symphycarpia (Flörke) Fr.: Hočevar et al. (1995: 21, 22, 23) Abi alb, Fag syl, lig
Note: According to Wirth (1995) this species grows on calcareous soil in dry grasslands.
Lecanora subfusca s.l.: Hočevar et al. (1995: 21, 22) Ace pse, Fag syl
Note: The cited records could refer to *L. allophana* or *L. argentata*.
Leptogium intermedium (Arnold) Arnold: Hočevar et al. (1995: 23 as *L. minutissimum*) lig
Note: In Suppan et al. (2000) the cited record is listed under *L. intermedium*. However, Hočevar et al. (1995) did not include taxonomic authorities in their species lists, and therefore it remains quite unclear what they meant by the name *L. minutissimum*, which might also turn out as *L. subtile* (Jørgensen 1994).
Peltigera canina (L.) Willd.: Hočevar et al. (1995: 23) lig
Note: The cited records maybe refer to the common lichen *P. praetextata*, which does not appear in the lists of lichens of Rajhenavski Rog in Hočevar et al. (1995).

Discussion

Our investigation of the lichen mycota of the virgin forest reserve Rajhenavski Rog and its surroundings yielded 128 lichen taxa (127 species), 6 lichenicolous fungi and 2 non-lichenized fungi traditionally included in lichenological literature. 100 lichen taxa (99 species), 5 lichenicolous fungi and 2 non-lichenized fungi occur in the virgin forest itself. Saxicolous lichen species play a minor role and were so far neglected, with the exception of *Protoblastenia rupestris*. *Fagus sylvatica*, *Abies alba* and *Acer pseudoplatanus* are the most important phorophytes for lichens with 47, 45 and 30 species, respectively. Despite the presence of considerable quantities of dead wood in the investigated area, the number of species occurring on dead wood in different stages of decay is small (9). This is mainly due to the fact that many dead trees still have their bark or are covered with mosses.

The dominance of species with crustose thalli in the virgin forest is noticeable (56%); the genus *Pertusaria* for example occurs with 9, the genus *Lepraria* with 5 species. On the other hand, fruticose lichens are represented with only 15 species (15%). Grube et al. (1998) report on the absence of pendulous species (only one sample of *Bryoria taborensis* is recorded) in the area of Goteniški Snežnik, which is close to the investigated area. Apparently Rajhenavski Rog and its surroundings show similar environmental conditions, as both number and abundance of *Bryoria*- and *Usnea*-species are negligible. Grube et al. (1998) point out several possible factors for this phenomenon: occasional extremely heavy rainfall, low frequency of fog, relatively long periods of low air humidity and rather frequent occurrence of heavy ice formation in winter.

The ratio of growth forms in Rajhenavski Rog is similar to that mentioned in Hafellner & Komposch (2007), who investigated the epiphytic lichens in a small primeval beech-fir-spruce-forest in southwestern Lower Austria (Austria). They investigated an area of 1 hectare and detected 126 lichen taxa, 20 lichenicolous fungi and 5 non-lichenized ascomycetes. Also the small number of species and the low abundance of macrolichens of the Lobarion community agree well with our results from Rajhenavski Rog. However, Hafellner & Komposch (2007) indicate that they found only a single middle-aged individual of *Acer pseudoplatanus* in their sampling site, the most important phorophyte for this lichen community in the Eastern Alps, where sycamore bark is an important substratum for *Nephroma* species and other lichens with similar ecological requirements (see also Bilovitz & Mayrhofer 2001, Bilovitz 2007). The virgin forest Rajhenavski Rog harbours several sycamore individuals, but none of them showed a typically developed species-rich Lobarion, and *Lobaria pulmonaria* could be found only on one sycamore individual with just a few specimens. Hočevar et al. (1995) report *Lobaria pulmonaria* from *Fagus sylvatica*. By contrast, *Lobaria pulmonaria* was rather frequent on *Acer pseudoplatanus* outside Rajhenavski Rog, near and along the road to the virgin forest, where we also detected *Collema nigrescens* and *Peltigera collina*, two other species not found in the virgin forest so far.

Although the lichen floras of the investigated areas in Goteniški Snežnik (Grube et al. 1998) and Rajhenavski Rog agree in the absence of pendulous species, it must be pointed out that Goteniški Snežnik is largely covered by undisturbed conatural forests. These host a high percentage of lichen species typical of such forest types, classified as rare and endangered in Central Europe, e.g. *Degelia plumbea*, *Lobaria amplissima*, *Nephroma laevigatum*, *N. resupinatum*, and *Parmeliella triptophylla*. However, it must be pointed out that frequent occurrence of these species was only noted in the best preserved areas (Grube et al. 1998). Ozimec et al. (2010) investigated the lichen mycota of the Risnjak National Park in Croatia, which is also close to the investigated area. They also emphasize the occurrence of endangered and rare species like *Degelia plumbea*, *Lobaria amplissima*, *L. pulmonaria*, *Lobarina scrobiculata*, and *Pannaria conoplea*. Except for *Lobaria pulmonaria*, none of these species could be detected in Rajhenavski Rog and its surroundings, probably due to the significantly lower mean annual precipitation of Rajhenavski Rog (c. 1600 mm) in comparison with the precipitation in Risnjak National Park (3770 mm).

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