

NOTES ON SOME NOTEWORTHY LICHENS AND ALLIED FUNGI FOUND IN THE BIAŁOWIEŻA PRIMEVAL FOREST IN POLAND**Poznámky k několika pozoruhodným lišejníkům a jim příbuzným houbám v Białowiežském pralese v Polsku**

Martin Kukwa¹, Ulf Schiefelbein², Paweł Czarnota³, Josef Halda⁴, Dariusz Kubiak⁵, Zdeněk Palice^{6,7} & Aleksandra Naczka¹

¹ Department of Plant Taxonomy and Nature Protection, Gdańsk University, Al. Legionów 9, PL-80-441 Gdańsk, Poland, e-mail: dokmak@univ.gda.pl; ² Schulstraße 21, D-17373 Ueckermünde, Germany, e-mail: Ulf.Schiefelbein@gmx.de; ³ Scientific Laboratory of the Gorce National Park, Poręba Wielka 590, PL-34-735 Niedźwiedź, Poland, e-mail: pawczarnota@poczta.onet.pl; ⁴ Muzeum a galerie Orlických hor, Jiráskova 2, CZ-516 01 Rychnov n. Kn., Czech Republic, e-mail: halda@jjh.cz; ⁵ Department of Mycology, Warmia and Mazury University in Olsztyn, Oczapowskiego 1A, PL-10-957 Olsztyn, Poland, e-mail: darkub@uwm.edu.pl; ⁶ Institute of Botany, Academy of Sciences of the Czech Republic, CZ-252 43 Průhonice, Czech Republic, e-mail: palice@ibot.cas.cz; ⁷ Department of Botany, Faculty of Natural Sciences, Charles University, Benátská 2, CZ-128 01 Praha 2, Czech Republic

Abstract: A list of 41 lichens and allied fungi new to Poland or otherwise of floristic interest is presented. It includes 30 lichens, nine lichenicolous fungi and two saprobic fungi. Three species, *Cheiromycina petri*, *Lobaria amplissima* and *Taeniolella delicata* (with *Loxospora elatina* as a new host) are reported for the first time from Poland. *Lobaria virens* should be excluded from the Polish lichen checklist as the record can be referred to *L. amplissima*. *Pertusaria ophthalmiza* should be added to the new edition of Polish checklist as old records were previously overlooked. Three species are reported as new to the Polish lowland, five as new to NE Poland and 18 as new to the Białowieża Primeval Forest. Chemotypes of *Chrysothrix candelaris* were investigated for the first time in Poland. Additionally, *Pertusaria ophthalmiza* is reported for the first time from the Polish Carpathians.

Key words: lichen diversity, saprobic and lichenicolous fungi, lichenized hyphomycetes, Białowieża Primeval Forest, NE Poland.

The Białowieża Primeval Forest is a unique forest complex in Poland. Geographically it belongs to the Nizina Północnopodlaska lowland and Równina Bielska plain. It covers a large, contiguous area, and several of its parts represent well preserved natural forest ecosystems (Cieśliński & Tobolewski 1988). Although the area has been the subject of biodiversity studies for more than a century (see Cieśliński & Tobolewski 1988), additional taxa have continued to be found and reported even up to the present (e.g. Czyżewska & al. 2001).

The aim of this paper is to present further data on rare and otherwise noteworthy species from the Białowieża Primeval Forest. The material on which this paper is based was collected mostly during a short excursion by the authors in 2006, although three of us (PC, DK and MK) had also collected some specimens during previous studies in the Białowieża Primeval Forest. The material is deposited in the following herbaria: GPN, OLTC, UGDA, PRA and the private herbaria of Josef Halda and Ulf Schiefelbein. In addition, some specimens from BSG and LBL have been included in this paper. The following abbreviations are used: BNP – Białowieża National Park, fs – forest section(s). The names of the collectors are abbreviated as follows: PC – Paweł Czarnota, JH – Josef Halda, DK – Dariusz Kubiak, MK – Martin Kukwa, ZP – Zdeněk Palice, US – Ulf Schiefelbein. Lichenicolous fungi are marked with asterisk (*) and saprobic fungi are marked with the plus sign (+). The nomenclature mostly follows Santesson & al. (2004) with the exception of *Biatora mendax* (Printzen 1995), *Cheiromycina petri* (Printzen 2007), *Hertelidea botryosa* (Printzen & Kantvilas 2004), *Micarea nowakii*, *M. tomentosa* (Czarnota 2007), *Piccolia ochrophora* (Hafellner 2004) and *Sarea resinae* (Hawksworth & Sherwood 1981). Short notes on the European

and world distributions are provided for each taxon, although it was not possible due to space limitations to cite the literature on each species in full.

The species

Anisomeridium polypori (Ellis & Everh.) M.E.Barr

- Specimens examined – ‘Żebra Żubra’ tourist trail, on *Sambucus nigra*, 13.05.2006, DK 3275 (OLTC). Białowieża village, Sportowa street, on *Salix* sp., 10.05.2006, US (herb. Schiefelbein).

This is a rather little-known lichen in Poland (Cieśliński & Zielińska 1994, Fałtynowicz 2003, Kukwa 2005a). It is apparently under-recorded elsewhere as well. In Białowieża Forest it was reported only once before (Cieśliński 2003). *A. polypori* is a nearly cosmopolitan species with a broad ecological amplitude (Aptroot 1999).

Arthonia didyma Körb.

- Specimen examined – NE of Topiło settlement, Hajnówka forest division, fs no. 599B, 52°38'36"N, 23°38'04"E, on *Carpinus betulus*, 12.05.2006, PC 5021 (GPN).

This species is rather rare in Poland, and most records are old (see Fałtynowicz 2003). In NE Poland it is known from only four recent records (Cieśliński 2003, Kubiak 2005). New to the Białowieża Primeval Forest. *A. didyma* occurs in Europe from the meridional to the boreal floristic zone. Most localities are found in the western and central parts of Europe.

Bacidia biatorina (Körb.) Vain.

- Specimen examined – Vicinity of Topiło settlement, SW of the ‘Michnówka’ nature reserve, 52°39.12'N, 23°38.30'E, on mossy bark of young *Quercus* sp., 12.05.2006, PC, JH, DK, MK, ZP 10362 & US (PRA).

So far this species has been reported only from NE Poland (see Cieśliński 2003, Fałtynowicz 2003). New to the Białowieża Primeval Forest. *B. biatorina* is known from western and central-eastern parts of Europe. The distribution centre seems to be in the subatlantic floristic province.

Bacidia circumspecta (Nyl. ex Vain.) Malme

- Specimen examined – Topiło settlement, the valley of Perebel brook, 52°38.61'N, 23°37.88'E, on *Carpinus betulus*, 12.V.2006, PC, JH, DK, MK, ZP 10219 & US (PRA).

Until now only one locality was known in the Polish lowland, although several further localities have been found in the southern, mountainous part of the country (see Czarnota 2000, Czarnota & Coppins 2007). New to NE Poland. *B. circumspecta* is probably a Holarctic circumpolar species. In Europe it has been recorded from the meridional to the arctic zone.

Bacidia fraxinea Lönnr.

- Specimen examined – BNP, fs no. 401B, on *Populus tremula*, 28.03.2001, MK 314a (UGDA).

So far reported from only a few localities in Poland and only one record was known from the Białowieża Primeval Forest (Czyżewska & al. 2001, Cieśliński 2003). Here we report the second locality from the Białowieża Primeval Forest. The known distribution of *B. fraxinea* ranges from the boreal to the meridional zone of Europe and adjacent Asia. It occurs in much of lowlands of northern and central Europe, while it is a montane species in the Mediterranean. It appears to prefer more continental regions than the similar *B. rubella*, though it was reported also from humid regions of the Euxine region (see Llop & al. 2007).

Bacidia hemipolia (Nyl.) Malme f. *pallida* Czarnota & Coppins

- Specimens examined – Ca. 1 km W of Białowieża Krzyże village, on *Quercus* sp., 29.03.2001, MK 380 (UGDA). Vicinity of Topiło village, the valley of Perebel brook, 52°38.58'N, 23°38.07'E and 52°38.67'N, 23°38.03'E, on *Carpinus betulus*, 12.05.2006, PC, JH, DK, MK, ZP 10082 & 10162, US (PRA). NE of Topiło village, fs no. 599, near Perebel stream, 52°38'36"N, 23°37'53"E, on *Carpinus betulus*, 12.05.2006, PC 5064 & DK 2124 (GPN, OLTC). BNP, fs no. 340A, on *Carpinus betulus*, 12.08.2002, PC 5113 (GPN). BNP, fs no. 401A, 52°43.38' N, 23°53.24' E, on *Quercus* sp., 10.05.2006, PC 5107 (GPN). BNP, fs no. 340C, 52°44.312' N, 23°49.865' E, on *Tilia cordata*, 11.05.2006, PC 5041 (GPN).

The species has been only recently reported from Poland (with one locality from Białowieża National Park), and all records have been referred to the newly described forma, f. *pallida*

(Czarnota & Coppins 2007). New localities presented here confirm that it is likely to be common within ancient woodlands. *B. hemipolia* f. *pallida* has so far been reported only from Central Europe (Czech Republic, Germany and Poland; Czarnota & Coppins 2007).

Bacidina egenula (Nyl.) Vězda

– Specimen examined – Białowieża village, Palace Park, on brick, 10.05.2006, DK 2125 (OLTC).

So far the species has been reported only from the southern part of the country (see Fałtynowicz 2003). New to the Polish lowland. This is a species often recorded on anthropogenic substrates. It is rarely recorded but apparently widely distributed, known mainly from Europe, but also from North America, East Asia and Australasia.

Biatora albohyalina (Nyl.) Bagl. & Carestia

– Specimens examined – Vicinity of Topiło village, by Perebel stream, fs no. 599, 52°38'36"N, 23°37'53"E, on *Carpinus betulus* and *Fraxinus excelsior*, 12.05.2006, PC 5066, DK 3268, 3269 & MK 5094 (GPN, OLTC, UGDA-L-14089, herb. Halda, herb. Schiefelbein). Ca. 1 km W of Białowieża village, 'Żebra Żubra' tourist trail, fs. no. 451B, on *Fraxinus excelsior*, 13.05.2006, DK 3270, MK 5114 & US (OLTC, herb. Schiefelbein, UGDA-L-14090, PRA). BNP, E of the point 'Mogilki', 52°43.38'N, 23°51.37'E, on *Carpinus betulus*, 10.06.2006, PC, JH, DK, ZP 10237 & US (PRA).

The species has been reported several times from Poland (Fałtynowicz 2003), but the only recent record comes from Toborowicz and Nowak (1983). New for the Białowieża Primeval Forest. *B. albohyalina* seems to be a boreal species with a distribution range from the temperate to the arctic floristic zone.

Biatora mendax Anzi

– Specimens examined (all on *Carpinus betulus*) – NE of Topiło settlement, fs no. 599B, 52°38'36"N, 23°38'04"E, 12.05.2006, PC 5021 (GPN). BNP, fs no. 399B, 52°43'22"N, 23°51'11"E, 10.05.2006, PC 5031 (GPN). BNP, near a cross of fs nos 314 and 340, 52°44'32"N, 23°49'57"E, 11.05.2006, PC 4788 (GPN).

So far known in Poland only from one recent locality (Printzen & Palice 1999, Fałtynowicz 2003). Three additional localities are reported here from Białowieża Primeval Forest. A distribution map of *B. mendax* is presented by Printzen (1995) and Printzen and Palice (1999). The Polish localities lie near the putative northern distribution limit of the species (see map in Printzen 1995 and Printzen and Palice 1999). This is a rare taxon confined to humid, continuously forested regions of continental Europe. So far it has not been reported from outside of Europe.

**Biatoropsis usnearum* Räsänen

– Specimen examined – Ca. 0.5 km N of Czerlonka village, fs no. 444, on *Usnea subfloridana* growing on *Quercus* sp., 29.03.2001, MK 414 (UGDA).

In Poland this fungus has been reported from only one locality in Gdańsk Pomerania (Kowalewska & Kukwa 2003). This is the first record in NE Poland. Diederich and Christiansen (1994) considered the range of *B. usnearum* to be cosmopolitan.

Calicium parvum Tibell

– Specimens examined – Vicinity of Topiło village, 'Michnówka' nature reserve, 52°39'07-12"N, 23°38'17-33"E, on *Pinus sylvestris*, 12.05.2006, PC 5018, JH 6838, DK, MK, ZP 10189 & US (GPN, OLTC, herb. Halda, PRA, herb. Schiefelbein).

The species was reported for the first time from Poland by Jando (2000). Additional records have been found in Gdańsk Pomerania (Fałtynowicz & Kukwa 2006). Here the species is reported as new to the NE part of the country. *C. parvum* is a circumboreal species. It occurs mainly in well-lit but humid pine forests (Tibell 1999).

Caloplaca flavocitrina (Nyl.) H.Olivier

– Specimen examined – Białowieża village, Palace Park, on bricks, 10.05.2006, DK 3267 (OLTC).

The first Polish record of the species was reported by Sparrius (2003). *C. flavocitrina* was subsequently reported by Kukwa (2005b) and Kubiak and Kukwa (2008). New to the Białowieża Primeval Forest. The species seems to be much more common than the few records to date would seem to indicate. However, until recently it was included in the variability of *C. citrina* (Hoffm.) Th.Fr. (Kukwa 2005b). For the differences between these and other related taxa, see Arup (2006).

**Chaenothecopsis pusiola* (Ach.) Vain.

- Specimens examined – 'Michnówka' nature reserve, on wood, 11.08.2002, PC 3000, 3008, 3010 (GPN), DK 3276 (OLTC). BNP, fs no. 225C, 52°46'34"N, 23°51'27"E, on *Chaenotheca brunneola* on wood, 11.05.2006, PC 5087 (GPN).

The species has been reported from several localities in Poland (Fałtynowicz 2003). In NE Poland it has been reported only by Kubiak (2002, 2005, 2008). New to the Białowieża Primeval Forest. *Ch. pusiola* is widely distributed in the boreal zone of the Northern Hemisphere and known also from New Zealand (Tibell 1999).

**Chaenothecopsis rubescens* Vain.

- Specimen examined – BNP, 52°44.35'N, 23°49.83'E, on thallus of *Arthonia byssacea* growing on *Acer platanoides*, 11.05.2006, PC, JH, DK, ZP 10152 & US (PRA).

So far the species has been reported only from S Poland (Fałtynowicz 2003). Here it is reported from lowland part of the country for the first time. *Ch. rubescens* is a species occurring in regions influenced by continental climate. It is not known in Western Europe. For the general distribution in the Holarctic see Titov (2006).

**Chaenothecopsis savonica* (Räsänen) Tibell

- Specimen examined – BNP, fs no. 373C, on *Chaenotheca trichialis* growing on *Quercus* sp., 28.03.2001, MK 343a (UGDA).

The first Polish report of the species from Białowieża Primeval Forest was presented by Sparrius (2003), but without detailing the locality. It is the second record of the species in the country. *Ch. savonica* is widespread in temperate to cool temperate areas of the Northern Hemisphere and occurs also in Australasia and South America (Tibell 1999).

Cheiromycina petri D.Hawksw. & Poelt

- Specimen examined – BNP, by Orłówka river, 52°44.319'N, 25°50.209'E, on *Ulmus* sp., 10.05.2006, DK (OLTC-L-3253, UGDA-L-14348).

New to Poland. It seems to be widely distributed, but only few records are known so far (Printzen 2007).

Chrysothrix candelaris (L.) J.R.Laundon

- Specimens examined – Chemotype I: BNP, fs no. 255, on *Fraxinus excelsior*, 30.03.2001, MK 457 (UGDA). BNP, fs no. 314C, horn beam-oak-lime forest, on *Quercus* sp. and *Acer platanoides*, 27.03.2001, MK 281 & 286 (UGDA). BNP, fs no. 318C, on *Acer platanoides*, 28.03.2001, MK 372 (UGDA). BNP, fs no. 371, on *Quercus* sp., 27.03.2001, MK 213 (UGDA). Chemotype II: BNP, fs no. 373C, on *Quercus* sp., 28.03.2001, MK 343 (UGDA).

The species is rather widespread in Poland, and common in Białowieża Primeval Forest (Cieśliński 2003, Fałtynowicz 2003 and literature cited therein), but its chemistry has been studied only in some countries (Laundon 1981, Tønsberg 1992). In central and east-central Europe the chemistry was studied only by Golubkov and Kukwa (2006). They reported chemotype I with pinastric acid, which according to Kalb (2001) may represent an as yet undescribed taxon. In the studied material we found chemotypes I and II, the latter containing calycin, and thus representing *Ch. candelaris* s.str. (Laundon 1981, Kalb 2001). *Ch. candelaris* is widespread in Europe. Litterski (1999) described the global distribution of this widespread species.

Cladonia norvegica Tønsberg & Holien

- Specimens examined – BNP, fs no. 284D, 52°46.55'N, 23°51.47'E, on wood of pine, 11.05.2006, PC, DK, ZP 10111 & US (PRA, herb. Schiefelbein).

The species is rarely reported from Poland (see Fałtynowicz 2003). In the NE part of the country it has been reported from only three localities (Cieśliński 2003, Czyżewska & al. 2005). New to the Białowieża Primeval Forest. *C. norvegica* seems to be a widely distributed species with most localities in the boreal zone of Northern Hemisphere, but recorded also from Madeira, Mexico and Chile (Stenroos & Ahti 1990, Ahti 2000). It is a cool-temperate to boreal-montane species in Europe.

Fellhaneropsis myrtillicola (Erichsen) Sérus. & Coppins

- Specimens examined – Vicinity of ‘Michnówka’ nature reserve, fs no. 571B, 52°39'07"N, 23°38'17"E, on twigs of young spruce, 12.05.2006, PC 5022 (GPN). BNP, fs no. 225C, 52°46'34"N, 23°51'27"E, on twigs of young spruce, 11.05.2006, PC 5088 (GPN).

This is a rare lichen in Poland. It was reported by Miądlukowska (1997), Kubiak (2002, 2005) and Kukwa (2005a). New to the Białowieża Primeval Forest. The distribution of this west-central European species is described by Schiefelbein (2007).

Fuscidea arboricola Coppins & Tønsberg

- Specimens examined – Białowieża village, Palace Park, on *Quercus rubra*, 10.05.2006, DK 3278 (OLTC). Vicinity of Topiło village, by Perebel stream, fs no. 599, 52°38'37"N, 23°37'46"E, on *Alnus glutinosa*, 12.05.2006, PC 5073, MK 5087 & DK 3279, 3280 (GPN, UGDA, OLTC). ‘Żebra Żubra’ tourist path, fs no. 451B, 52°42'15"N, 23°49'35"E, on *Alnus glutinosa*, 13.05.2006, MK 5115 (UGDA). ‘Kozłowe Borki’ nature reserve, fs no. 702, 52°37'10"N, 23°43'33"E, on *Alnus glutinosa* and *Carpinus betulus*, 13.05.2006, PC 5057 & 5059 (GPN). BNP, fs no. 314D, 52°44'18"N, 23°49'42"E, on *Alnus glutinosa*, 13.05.2006, MK 5125 (UGDA; c.ap.). BNP, fs no. 399B, 52°43'22"N, 23°51'11"E, on *Carpinus betulus* and *Tilia cordata*, 10.05.2006, PC 5035 & DK 3272 (GPN, OLTC). BNP, fs no. 401A, 52°43.38'N, 23°53.24'E, on *Carpinus betulus*, 10.05.2006, PC 5105 (GPN).

So far the species is known only from northern Poland (Cieśliński 2003, Fałtynowicz 2003, Kubiak 2005, Fałtynowicz & Kukwa 2006, Kubiak 2006, 2008, Kubiak & Kukwa 2008). In Białowieża Primeval Forest it was previously recorded only by Sparrius (2003), but he did not provide locality details. Here we report additional findings. *F. arboricola* is a boreal-montane lichen. It has only rarely been reported from the temperate zone, mainly from the mountain belts.

Fuscidea pusilla Tønsberg

- Specimens examined – Ca. 3.5 km WNW of Białowieża Krzyże village, fs no. 448, on twigs of spruce, 29.03.2001, MK 387 (UGDA). ‘Michnówka’ nature reserve, fs no. 572, on *Betula pendula*, 11.08.2002, PC 4977 (GPN).

F. pusilla has been reported recently from several localities in Poland (Fałtynowicz 2003). In Białowieża Primeval Forest it was reported only by Sparrius (2003), but without details of the locality. Here we present two additional records. *F. pusilla* is a boreal-montane taxon widespread in Europe.

Hertelidea botryosa (Fr.) Printzen & Kantvilas

- Specimens examined – ‘Michnówka’ nature reserve, 52°39'11"N, 23°38'32"E, on wood, 12.05.2006, PC, JH, DK, MK, ZP 10123 & US (PRA). BNP, 52°45.92'N, 23°51.59'E, on wood, 11.05.2006, PC 5083, JH 6835, DK 3268, ZP 10110 & US (herb. Halda, PRA, herb. Schiefelbein, GPN, OLTC, UGDA).

So far this species has been reported from only four localities in Poland (Cieśliński 2003, Fałtynowicz & Kukwa 2006) including one in the Białowieża Primeval Forest. *H. botryosa* is a boreal-montane to cool-temperate species. The range extends southwards into the montane belt of the Submediterranean (e.g., Nimis 2003) and northwards into the Arctic (Santesson & al. 2004).

**Illosporopsis christiansenii* (B.L.Brady & D.Hawksw.) D.Hawksw.

- Specimen examined – Topiło village, by the lake Basen, 52°38'12"N, 23°37'24"E, on *Physcia adscendens* growing on *Salix* sp., 12.05.2006, MK 5083a (UGDA).

This fungus has been reported several times from Poland (e.g. Kukwa 2004, 2005c, Kukwa & Czarnota 2006). New to the Białowieża Primeval Forest. An overview of its distribution is given by Kocourková (2000). *Illosporium christiansenii* is distributed from the meridional to the boreal floristic zone. Its easternmost localities lie in the Ukrainian Carpathians, Lithuania and Estonia.

Lecanora persimilis (Th.Fr.) Nyl.

- Specimen examined – Białowieża village, Palace Park, on fallen branches of oak, 10.05.2006, DK 3277 (OLTC).

The species has been overlooked for a long time in Poland, and was only recently rediscovered after ca. 40 years (Fałtynowicz 2003, Kubiak 2005, Łubek 2007). New to the Białowieża Primeval Forest. The species is known from Europe and North America. It is perhaps a boreal to mainly temperate element (Śliwa 2007).

Lecidea nylanderi (Anzi) Th.Fr.

- Specimens examined – ‘Michnówka’ nature reserve, fs no 571B, 52°39'07"N, 23°38'17"E, on *Betula pendula* and wood, 12.05.2006, MK 5104 & DK (UGDA, OLTC). *ibid.*, fs no. 572, on *Betula pendula* and *Pinus sylvestris*, 11.08.2002, PC 2980 & 3014 (GPN). *ibid.*, fs no. 572, on wood, 12.05.2002, DK 3271 (OLTC). ‘Kozłowe Borki’ nature reserve, fs no. 702, 52°37'10"N, 23°43'33"E, on *Alnus glutinosa*, 13.05.2006, PC 5056 (GPN). Białowieża forest division, fs no. 494C, on wood, 13.08.2002, PC 4975 (GPN). Czerlonka village, S of the railway, on *Pinus sylvestris* and *Populus tremula*, 29.03.2001, MK 407 & 408 (UGDA). BNP, fs no. 256, on *Pinus sylvestris*, 30.03.2001, MK 476 (UGDA). BNP, fs no. 370, on *Carpinus betulus*, 28.03.2001, MK 297 (UGDA). BNP, fs no. 371C, on *Pinus sylvestris* and *Tilia cordata*, 27.03.2001, MK 197 & 359 (UGDA). BNP, fs no. 372, on *Betula* sp., 27.03.2001, MK 225 (UGDA). BNP, fs no. 399A & B, on *Carpinus betulus* and *Picea abies*, 10.05.2006, PC 5033 & US (GPN, herb. Schiefelbein). Vicinity of Topiło village, by Perebel stream, fs no. 599, on *Alnus glutinosa*, 12.05.2006, DK 3273 (OLTC).

L. nylanderi has been long overlooked in Poland (see Fałtynowicz 2003). The species seems to be common in Poland, as indicated by several recently published (e.g. Kubiak 2008) as well as unpublished records. None of the above cited specimens contained apothecia. New to the Białowieża Primeval Forest. *L. nylanderi* is a circumboreal-montane taxon of the Northern Hemisphere.

Lecidella flavosorediata (Vězda) Hertel & Leuckert

- Specimens examined – Białowieża village, 52°42'N, 23°52'E, open area, on *Fraxinus excelsior*, 26.03.2001, MK 148 (UGDA, c.ap.). *ibid.*, 52°42'14"N, 23°52'58"E, on *Populus* sp., 10.05.2006, PC 5048 (GPN).

This is a common lichen growing on roadside trees in northern Poland (Kukwa, unpubl.), though still rarely reported (Cieśliński 2003, Fałtynowicz 2003, Kubiak 2005, Kubiak & Kukwa 2008). New to the Białowieża Primeval Forest. This taxon is distributed from the meridional to the southern boreal zone. It appears to have a preference for oceanic climate.

Lecidella subviridis Tønsberg

- Specimen examined – Vicinity of Topiło village, by Perebel stream, fs no. 599, 52°38'32"N, 23°37'30"E, on *Alnus glutinosa*, 12.05.2006, MK 5086 (UGDA).

This species recently reported from Poland for the first time and is known from only a few localities (Czarnota & Kukwa 2004, Fałtynowicz & Kukwa 2006, Kubiak 2006, Kubiak & Kukwa 2008). New to the Białowieża Primeval Forest. Little is known about the distribution of the species. It occurs in the temperate and boreal zone.

**Lichenochora obscuroides* (Linds.) Triebel & Rambold

- Specimens examined – Białowieża village, Sportowa street, 52°42'18"N, 23°51'13"E, on *Phaeophyscia orbicularis* growing on *Salix* sp., 10.05.2006, PC 5050, MK 5074 & US (GPN, UGDA, herb. Schiefelbein).

This species has been reported for Poland only by Kukwa (2005c). New to the NE part of Poland. Kocourková (2000) gives an overview of the world distribution of *Lichenochora obscuroides*.

**Lichenosticta alcicornaria* (Linds.) D.Hawksw.

- Specimen examined – BNP, fs no. 315D, on *Cladonia grayi* growing on *Alnus glutinosa*, 27.03.2001, MK 266a (UGDA).

This is a rather uncommon taxon in Poland (Kukwa & Kowalewska 2007). New to the Białowieża Primeval Forest. *L. alcicornaria* seems to be a widespread taxon occurring from the submeridional to northern boreal zones.

Lobaria amplissima (Scop.) Forssell

- Specimen examined – S of Budy village, fs no. 329B, on *Quercus* sp., s.dat., S. Cieśliński & Z. Tobolewski (BSG).

During the revision of some specimens deposited in the herbarium BSG, we realized that material identified and presented by Cieśliński and Tobolewski (1988) as *L. laetevirens* (Lightf.) Zahlbr. (= *L. virens* (With.) J.R.Laundon) in fact belongs to *L. amplissima*. As *L. virens* was known from only that one record, it must be excluded from the Polish lichen checklist. *L. amplissima* is reported for the first time from Poland. The Polish material of *L. amplissima* lacks the

characteristic cephalodia, is fertile and ascospores clearly match the species (see Purvis 1992). Degelius (1935) presented a map of the European distribution of *L. amplissima*.

Micarea nowakii Czarnota & Coppins

- Specimen examined – BNP, fs no. 255, by ‘Sierakowski Tryb’ forest road, 52°46'24"N, 23°51'33"E, on wood, 11.05.2006, PC 5044 (GPN).

This species was only recently described from Poland (Czarnota 2007). Here it is reported as new to the Polish lowland.

Micarea tomentosa Czarnota & Coppins

- Specimens examined – BNP, fs nos 399A & 399B, 52°43'N, 23°51'E, on soft wood, 10.05.2006, PC 5028 & 5097 (GPN). BNP, 52°44.50'N, 23°49.93'E, on wood of *Quercus* stump, 11.05.2006, PC, JH, DK, ZP 10083 & US (PRA).

The species has been only recently described from Poland and Slovakia. So far, four specimens of the species have been reported from the Polish lowland, including two from the Białowieża Primeval Forest (Czarnota 2007). It seems to be an indicator of ecological continuity of forest ecosystems and is common in large, ±ancient or ecologically stable woodlands of the Białowieża Forest.

**Muellerella lichenicola* (Sommerf.: Fr.) D.Hawksw.

- Specimen examined – BNP, fs no. 399B, 52°43'22"N, 23°51'11"E, on *Biatora* sp. on *Carpinus betulus*, 10.05.2006, PC 5029 (GPN).

So far known from only a handful of localities from central and southern Poland (Fałtynowicz 2003, Kukwa & Czarnota 2006). New to the Polish lowland. This probably cosmopolitan taxon is known from the Mediterranean to the arctic zone.

+*Mycocalicium subtile* (Pers.) Szatala

- Specimens examined – ‘Michnówka’ nature reserve, fs no. 572, on wood, 11.08.2002, PC 3005, 3010, 3018, 3024 (GPN). Białowieża forest division, fs no. 494C, on wood, 13.08.2002, PC 3039 (GPN). BNP, fs no. 255B, on wood, 11.05.2006, US (herb. Schiefelbein).

This species is common in Poland, but probably overlooked (Fałtynowicz 2003). New to the Białowieża Primeval Forest. The world distribution of *Mycocalicium subtile* was described by Litterski (1999). It is a widespread species in Europe occurring from the Mediterranean to the Arctic.

Peltigera polydactylon (Neck.) Hoffm.

- Specimen examined – BNP, fs no. 399, on mossy log, 27.03.2001, MK 192 (UGDA).

This lichen has been reported as common in Poland (Fałtynowicz 2003 and literature cited therein). New to the Białowieża Primeval Forest. *P. polydactylon* is one of the five most widespread species of the genus, displaying an almost cosmopolitan distribution pattern (Martínez & al. 2003).

Pertusaria ophthalmiza (Nyl.) Nyl.

- Specimens examined – Vicinity of Topiło village, by Perebel stream, fs no. 599, 52°38'40"N, 23°38'02"E, on *Carpinus betulus*, 12.05.2006, MK 5098, PC, JH, DK 3274, ZP 10404 & US (PRA, herb. Schiefelbein, OLTC, UGDA). BNP, E of the point ‘Mogiłki’, 52°43.38'N, 23°51.37'E, on *Carpinus betulus*, 10.05.2006, PC, JH, DK, ZP 10415 & US (PRA). BNP, fs no. 400, on *Tilia cordata*, 27.03.2001, MK 210 (UGDA). Additional specimen examined – Rów Podtatrzański, Łysa Polana settlement, by Biała Woda stream, on *Alnus incana*, 16.05.1965, J. Bystrek (LBL).

P. ophthalmiza was reported from Poland by Hanko (1983), who referred to Eitner's specimens from Silesia. However, the species was missing from the Polish checklist (see Fałtynowicz 2003). The name *P. multipuncta* auct. was often mistakenly applied to *P. ophthalmiza* by earlier authors (see Hanko 1983). Therefore, several Polish records of the Atlantic *P. multipuncta* may belong to the more continental *P. ophthalmiza*. More studies are needed with respect to Polish material.

During the revision of some *Ochrolechia* specimens from LBL, the first author found additional material from the Tatra Mountains. New to NE Poland and the Polish Carpathians. *P. ophthalmiza* has a circumboreal-montane distribution from the submeridional to the northern boreal zones.

Piccolia ochrophora (Nyl.) Hafellner

- Specimens examined – Białowieża village, Sportowa street, on *Salix* sp., 10.05.2006, US (herb. Schiefelbein). *ibid.*, 01.04.2001, MK 528 (UGDA). Białowieża village, vicinity of the former railway station, on *Populus nigra*, 31.03.2001, MK 506a (UGDA).

So far much overlooked (Kubiak & Kukwa 2008). New to the Białowieża Primeval Forest. *P. ochrophora* is a widespread species occurring from the meridional to the arctic zone of Europe. Known also from the tropics. In the recent past the species has turned up more frequently in floristic publications (Hafellner 2004), but records from eastern and SE Europe are still lacking.

Rinodina efflorescens Malme

- Specimens examined – ‘Żebra Żubra’ tourist trail, fs no. 451B, 52°42'15"N, 23°49'35"E, on *Populus tremula*, 13.05.2006, MK 5117 (UGDA). BNP, fs no. 399A, on *Carpinus betulus*, 10.05.2006, MK 5075 (UGDA).

Only recently reported from Poland, but overlooked (Kowalewska & Kukwa 2003, Kubiak & Kukwa 2008). New to the Białowieża Primeval Forest. *Rinodina efflorescens* is a widespread mild-temperate species occurring from the submeridional to the northern boreal zone.

+*Sarea resinae* (Fr.) Kuntze

- Specimens examined – ‘Michnówka’ nature reserve, fs no. 572, on pine resine, 11.08.2002, PC 2999 (GPN). BNP, fs no. 256, on pine resine, 11.05.2006, DK 3252 (OLTC). BNP, fs no. 314, on spruce resine, 27.03.2001, MK 268 (UGDA).

This saprobic fungus is rarely reported from Poland (see Fałtynowicz 2003, under *Pycnidiella resinae*). New to the Białowieża Primeval Forest. *Sarea resinae* is a boreal-montane, probably circumpolar fungus occurring from the submeridional to the boreal zone.

Scoliciosporum sarothamni (Vain.) Vězda

- Specimen examined – Białowieża village, by the entrance to Białowieża National Park, on twigs of *Salix* sp., 02.05.2004, MK (UGDA-L-11012).

Only recently found in Poland (Fałtynowicz 2003), but overlooked and common on twigs (Kubiak 2008, Kukwa, unpubl.). New to the Białowieża Primeval Forest. The species is widely distributed in Europe. It is also known from North America (Tønsberg 1995).

**Taeniolella delicata* M.S.Christ. & D.Hawksw.

- Specimen examined – BNP, fs no. 340B, 52°44'18"N, 23°49'42"E, on *Loxospora elatina* growing on *Tilia cordata*, 13.05.2006, MK 5121 (UGDA).

The species is new to Poland. *Loxospora elatina* is a new host for the fungus. Kocourková (2000) outlined the distribution of the species. *Taeniolella delicata* occurs from the submeridional to the temperate zone. The northernmost known locality lies at the northern shore of the Ladoga Lake in the boreal zone (Alstrup & al. 2005).

Souhrn

Celosvětově proslulý Bialowiežský prales patří díky své atraktivitě k jednomu z nejlépe prozkoumaných území z hlediska lišejníků v Polsku. I když zde prakticky chybí přirozené skalní substráty, území je natolik bohaté na epifyty a epixylické druhy, že se jedná bezesporu o nejbohatší území na lišejníky v severním Polsku. Každá důkladnější lichenologická návštěva musí zákonitě přinést nové a zajímavé nálezy. V předkládaném příspěvku je vybráno 41 druhů lichenizovaných, lichenikolních a lišejníků podobných saprofytických hub, které jsou v Polsku regionálně či celonárodně málo známé, často pro území zcela nové. Významná část sběrů (zejména sorediosní lišejníky a lichenikolní houby) pochází z dřívějších individuálních návštěv polského tria autorů článku (PC, DK a MK) v letech 2001, 2002 a 2004. Většina nálezů pak byla učiněna na začátku května 2006 během několikadenní společné exkurze v Bialowiežském pralesi. Údaje pocházejí nejen z vlastního národního parku Białowieża, ale také z okolních lesních porostů a rezervací, jakožto i mimolesních ploch, které formálně spadají do velkého územního celku Bialowiežského pralesa. Autoři zmiňují tři nové druhy pro Polsko, a to lichenizovaný a lichenikolní druh hyfomycetů (*Cheiromycina petri* a *Taeniolella delicata*). Dále pak nápadný a vzácný druh *Lobaria amplissima* jako výsledek revize jediného polského herbářového dokladu

Lobaria laetevirens (= *L. virens*) pocházejícího z Bialowiežského národního parku. *Pertusaria ophthalmiza* chybí v checklistu polských lišejníků, nicméně druh byl již dříve z Polska udáván a potřebná revize dokladů určených jako *P. multipuncta* může přinést podobné výsledky jako v některých jiných zemích Evropy, kde *P. multipuncta* auct. = *P. ophthalmiza*. Sterilní druh *Chrysothrix candelaris* byl analyzován chemicky a na území parku byly detekovány 2 chemotypy. Častější chemotyp I (s pinastrovou kyselinou) může dle literatury představovat nepopsaný druh. V seznamu figurují také dva nálezy z adventivních substrátů jako jsou cihly (*Bacidina egenula*, *Caloplaca flavocitrina*). Z celkového počtu 41 druhů, připadá 30 na lichenizované druhy včetně jednoho hyfolyšejníku, 9 na (fakultativně) lichenikolní houby a 2 taxony představují saprofyty, tradičně studované lichenology.

Acknowledgements

The authors warmly thank Toby Spribille for the helpful comments and improving the English as well as to an anonymous reviewer for the notes. This work was partly supported by a SYNTHESYS grant GB-TAF-1013 to MK. ZP acknowledges the Academy of Sciences of the Czech Republic (KJB600050635, AV0Z60050516) and the Ministry of Education, Youth and Sports of the Czech Republic (0021620282) for financial support.

References

- Ahti T. (2000): *Cladoniaceae*. – Flora Neotropica 78: 1–362.
- Alstrup V., Zavarzin A. A., Kocourková J., Kravchenko V., Fadeeva M. A. & Schiefelbein U. (2005): Lichens and lichenicolous fungi found in northern Ladoga area (Republic of Karelia) during the international fieldtrip in August 2004, prior the fifth congress of the International Lichenological Association. Preliminary report. – Biogeografia Karelii 7: 3–16. [in Russian]
- Aptroot A. (1999): Notes on taxonomy, distribution and ecology of *Anisomeridium polypori*. – Lichenologist 31(6): 641–642.
- Arup U. (2006): A new taxonomy of the *Caloplaca citrina* group in the Nordic countries, except Iceland. – Lichenologist 38(1): 1–20.
- Cieśliński S. (2003): Atlas rozmieszczenia porostów (Lichenes) w Polsce Północno-Wschodniej. – Phytocoenosis 15(N.S.), Supplementum Cartographiae Geobotanicae 15: 1–426.
- Cieśliński S. & Tobolewski Z. (1988): Porosty (Lichenes) Puszczy Białowieskiej i jej zachodniego przedpoła. – Phytocoenosis 1(N.S.), Supplementum Cartographiae Geobotanicae 1: 3–216.
- Cieśliński S. & Zielińska J. (eds) (1994): Materiały do flory porostów Puszczy Knyszyńskiej. – Fragmenta Floristica et Geobotanica, Series Polonica 1: 49–61.
- Czarnota P. (2000): Porosty Gorceńskiego Parku Narodowego. Część I. Wykaz i rozmieszczenie gatunków. – Parki Narodowe i Rezerваты Przyrody 19(1): 3–73.
- Czarnota P. (2007): The lichen genus *Micarea* (*Lecanorales*, *Ascomycota*) in Poland. – Polish Botanical Studies 23: 1–199.
- Czarnota P. & Coppins B. J. (2007): Contribution to the knowledge of rare *Bacidia* s.lat. (*Lecanorales*, lichenized *Ascomycetes*) from Central Europe including a new, pallid forma of *Bacidia hemipolia*. – Nova Hedwigia 85(3–4): 503–513.
- Czarnota P. & Kukwa M. (2004): Some sorediate lichens and lichenicolous fungi new to Poland. – Graphis Scripta 15: 24–32.
- Czyżewska K., Motiejūnaitė J. & Cieśliński S. (2001): Species of lichenized and allied fungi new to Białowieża Large Forest (NE Poland). – Acta Mycologica 36(1): 13–19.
- Czyżewska K., Motiejūnaitė J. & Cieśliński S. (2005): New and noteworthy species of lichens and allied fungi from North-Eastern Poland. – Acta Mycologica 40(2): 277–291.
- Degelius G. (1935): Das ozeanische Element der Strauch- und Laubflechtenflora von Skandinavien. – Acta Phytogeographica Suecica 7: 1–411.
- Diederich P. & Christiansen M. S. (1994): *Biatoropsis usnearum* Räsänen, and other heterobasidiomycetes on *Usnea*. – Lichenologist 26(1): 47–66.
- Fałtynowicz W. (2003): The lichens, lichenicolous and allied fungi of Poland. An annotated checklist. – In: Mirek Z. (ed.). Biodiversity of Poland 6: 1–435. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków.
- Fałtynowicz W. & Kukwa M. (2006): Lista porostów i grzybów naporostowych Pomorza Gdańskiego. – Acta Botanica Cassubica, Monographiae 2: 1–98.

- Golubkov V. V. & Kukwa M. (2006): A contribution to the lichen biota of Belarus. – *Acta Mycologica* 41(1): 155–164.
- Hafellner J. (2004): A revision of *Maronella laricina* and *Piccolia ochrophora*. – *Symbolae Botanicae Upsalienses* 34(1): 87–96.
- Hanko B. (1983): Die Chemotypen der Flechtengattung *Pertusaria* in Europa. – *Bibliotheca Lichenologica* 19: 1–297.
- Hawksworth D. L. & Sherwood M. A. (1981): A reassessment of three widespread resinicolous discomycetes. – *Canadian Journal of Botany* 59(3): 357–372.
- Jando K. (2000): *Calicium parvum* (Caliciaceae) new to Poland. – *Graphis Scripta* 11: 33–34.
- Kalb K. (2001): New or otherwise interesting lichens. I. – *Bibliotheca Lichenologica* 78: 141–167.
- Kocourková J. (2000): Lichenicolous fungi of the Czech Republic (The first commented checklist). – *Acta Musei Nationalis Pragae, Ser. B*, 55: 59–169.
- Kowalewska A. & Kukwa M. (2003): Addition to the Polish lichen flora. – *Graphis Scripta* 14: 11–17.
- Kubiak D. (2002): Nowe stanowiska rzadkich porostów (*Ascomycota* lichenisati) na Pojezierzu Mazurskim. – *Acta Botanica Warmiae et Masuriae* 2: 169–178.
- Kubiak D. (2005): Lichens and lichenicolous fungi of Olsztyn town (NE Poland). – *Acta Mycologica* 40(2): 293–332.
- Kubiak D. (2006): Lichens of red oak *Quercus rubra* in the forest environment in the Olsztyn Lake District (NE Poland). – *Acta Mycologica* 41(2): 319–328.
- Kubiak D. (2008): Lichens in peat bog reserves 'Mszar' and 'Redykajny' in Olsztyn Lake District. – *Parki Narodowe i Rezerваты Przyrody* 27(1): 3–14.
- Kubiak D. & Kukwa M. (2008): Nowe gatunki i nowe stanowiska porostów i grzybów naporostowych na obszarze miasta Olsztyna. – *Fragmenta Floristica et Geobotanica Polonica* (in press).
- Kukwa M. (2004): New or interesting records of lichenicolous fungi from Poland II. Species mainly from northern Poland. – *Herzogia* 17: 67–75.
- Kukwa M. (2005a): Nowe stanowiska rzadkich i interesujących porostów na Pomorzu Gdańskim. Część I. – *Acta Botanica Cassubica* 5: 95–111.
- Kukwa M. (2005b): Nowe stanowiska rzadkich i interesujących porostów na Pomorzu Gdańskim. Część II. Sorediowane i izydiowane porosty skorupiaste. – *Acta Botanica Cassubica* 5: 113–125.
- Kukwa M. (2005c): New or interesting records of lichenicolous fungi from Poland III. – *Herzogia* 18: 37–46.
- Kukwa M. & Czarnota P. (2006): New or interesting records of lichenicolous fungi from Poland IV. – *Herzogia* 19: 11–123.
- Kukwa M. & Kowalewska A. (2007): New or interesting records of lichenicolous fungi from Poland V. Species mainly on *Cladonia*. – *Herzogia* 20: 199–207.
- Kukwa M., Motiejūnaitė J., Rutkowski P. & Zalewska A. (2002): New or interesting records of lichenicolous fungi from Poland. Part I. – *Herzogia* 15: 129–139.
- Laundon J. R. (1981): The species of *Chrysothrix*. – *Lichenologist* 13: 101–121.
- Litterski B. (1999): Pflanzengeographische und ökologische Bewertung der Flechtenflora Mecklenburg-Vorpommerns. – *Dissertationes Botanicae* 307: 1–391.
- Llop E., Ekman S. & Hladun N. L. (2007): *Bacidia thyrronica* (*Ramalinaceae*, lichenized *Ascomycota*), a new species from the Mediterranean region, and a comparison of European members of the *Bacidia rubella* group. – *Nova Hedwigia* 85(3-4): 445–455.
- Łubek A. (2007): Antropogeniczne przemiany bioty porostów Świętokrzyskiego Parku Narodowego i otuliny. – *Fragmenta Floristica et Geobotanica Polonica, Supplementum* 10: 3–94.
- Martínez I., Burgaz A. R., Vitikainen O. & Escudero A. (2003): Distribution patterns in the genus *Peltigera* Willd. – *Lichenologist* 35(4): 301–323.
- Miądlikowska J. (1997): New and other lichen records from *Vaccinium myrtillus* in Poland. – *Graphis Scripta* 8: 1–3.
- Nimis P. L. (2003): Checklist of the Lichens of Italy 3.0. – University of Trieste, Trieste, IN3.0/2 (<http://dbiodbs.univ.trieste.it/>).
- Printzen C. (1995): Die Flechtengattung *Biatora* in Europa. – *Bibliotheca Lichenologica* 60: 1–275.
- Printzen C. (2007): New records of *Cheiromycina* species, a genus of lichenized hyphomycetes, with *C. reimeri* sp. nov. and a revised key to the species. – *Nova Hedwigia* 84: 261–267.
- Printzen C. & Kantvilas G. (2004): *Hertelidea*, genus novum Stereocaulacearum (*Ascomycetes* lichenisati). – *Bibliotheca Lichenologica* 88: 539–553.
- Printzen C. & Palice Z. (1999): The distribution, ecology and conservational status of the lichen genus *Biatora* in Central Europe. – *Lichenologist* 31(4): 319–335.

- Purvis W. O. (1992): *Lobaria* (Schreb.) Hoffm. (1796). – In: Purvis W. O., Coppins B. J., Hawksworth D. L., James P. W. & Moore D. M. (eds), The lichen flora of Great Britain and Ireland, p. 361–363, Natural History Museum Publications, London.
- Santesson R., Moberg R., Nordin A., Tønsberg T. & Vitikainen O. (2004): Lichen-forming and lichenicolous fungi of Fennoscandia. – Museum of Evolution, Uppsala University, Uppsala. [359 pp.]
- Schiefelbein U. (2007): Ökologie und Verbreitung von in Mecklenburg-Vorpommern neu- und wiedergefundenen lichenisierten und lichenicolen Pilzen. – *Herzogia* 20: 77–86.
- Sparrus L. B. (2003): Contribution to the lichen floras of the Białowieża Forest and the Biebrza Valley (Eastern Poland). – *Herzogia* 16: 155–160.
- Śliwa L. (2007): A revision of the *Lecanora dispersa* complex in North America. – *Polish Botanical Journal* 52(1): 1–70.
- Stenroos S. & Ahti T. (1990): The lichen family *Cladoniaceae* in Tierra del Fuego: problematic or otherwise noteworthy taxa. – *Annales Botanici Fennici* 27: 317–327.
- Tibell L. (1999): Calicioid lichens and fungi. – In: Ahti T., Jørgensen P. M., Kristinsson H., Moberg R., Sjøchting U. & Thor G. (eds.), *Nordic Lichen Flora. Volume 1. Introductory parts. Calicioid lichens and fungi*, p. 20–94, Nordic Lichen Society, Uddevalla.
- Titov A. N. (2006): Mikokalitsievye griby (poryadok *Mycocaliciales*) golarktiki. KMK Scientific Press, Moscow. [296 pp.]
- Toborowicz K. & Nowak S. (1983): Stan flory porostów w okolicach Grzybowa pod Staszowem. – *Studia Kieleckie* 2(38): 29–49.
- Tønsberg T. (1992): The sorediate and isidiate, corticolous, crustose lichens in Norway. – *Sommerfeltia* 14: 1–331.
- Tønsberg T. (1995): Additions to the lichen flora of North America IV. *Scoliciosporum sarothamni*. – *Evansia* 12(1): 27–30.