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New and noteworthy species of lichens and allied fungi from North-Eastern Poland

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54 new species of lichenized, lichenicolous and saprobic fungi were found in the nature reserves of Augustowska Forest – Starożyn, Mały Borek and Kozi Rynek, and in Biebrzański National Park. The following species are: new to Poland – *Multiclavula mucida* and *Polycoccum pulvinatum*; reported for the first time from the Polish lowlands – *Biatora chrysantha*, *Normandina pulchella* and *Microcalicium ahlneri*; new to N Poland – *Leptorhaphis epidermidis*; new to NE Poland – *Arthrorhaphis aeruginosa*, *Epicladonia sandstedei*, *E. stenospora*, *Lichenomphalia umbellifera*, *Reichlingia leopoldii* and *Verrucaria bryoctona*.

Key words: lichens, lichenicolous and saprobic fungi, new species, old-growth forests, distribution

INTRODUCTION

Present paper aims in reporting the results of investigations on lichens and allied fungi in the Polish part of Augustowska Forest and Biebrzański National Park. The investigation was carried out in August 2005 as a part of study on model lichen biota of lowland old-growth forests in Poland, Lithuania and Belarus, especially on the diversity of species connected with natural forests.

Best preserved biocoenoses of deciduous and coniferous forests – part of the nature reserves Mały Borek, Starożyn and Kozi Rynek in Augustowska Forest as well as fragments of old forests in the Biebrzański National Park were selected as objects of the present investigations. The forests under the study occupy large areas and represent woodland types characteristic of North-Eastern Poland and neighbouring countries.

Ca. 365 taxa of lichens had been known before from the Augustowska Forest (including the Wigierski National Park) (Zielińska 1969; Cieśliński 2003 and literature cited therein) and ca. 185 taxa had been known from the Biebrzański National Park (Cieśliński 2003; Sparrius 2003). There are no previous data on lichenicolous fungi and saprobes, traditionally included into the lichen lists in these areas.

Our investigations add to the knowledge on the diversity of forest lichen species as well as lichenicolous and allied saprobic fungi in the heritage areas of European nature.

MATERIAL AND METHODS

Lichens, lichenicolous and saprobic fungi were collected in six sites of the Augustowska Forest and Biebrzański National Park (Fig. 1):

1. Augustów Plain mesoregion, the Augustowska Forest (Puszcza Augustowska), Starożyn nature reserve, 53°52'N/23°21'E, ATLICHEN grid squere Bg31, forest section Nos 191-211, typical and moist fertile oak-linden-hornbeam forest *Tilio-Carpinetum* with old *Quercus robur*, *Carpinus betulus*, *Tilia cordata*, *Picea abies*, streamside alder-ash forest *Circaeo-Alnetum* and black alder bog forest *Ribo nigri-Alnetum* with *Alnus glutinosa*, *Fraxinus excelsior*, pine-spruce forest *Peucedano-Pinetum* with *Pinus sylvestris*, *Picea abies*, *Populus tremula*, etc. 7-8 August 2005.

2. Augustowska Forest mesoregion, Mały Borek nature reserve, 53°52'N/23°18'E, Bg31, old pine-spruce forest. 7 August 2005.

3. Biebrza Basin mesoregion, the Augustowska Forest, Kozi Rynek nature reserve, 53° 48'N/23°13'E, Bg40; forest section No. 169, typical and moist fertile oak-linden-hornbeam forest, streamside alder-ash forest, moist oak-spruce forest; forest section No. 113, border of the reserve, pine-spruce forest. 12 August 2005.

4. Biebrza Basin mesoregion, the Biebrzański National Park [NP] (Biebrzański Park Narodowy), 53°36'N/22°52'E, Bf 68, alt. 111m, between the Grzędy forestry and animal rehabilitation center, forest section No. 136, scarp of forest road along the rehabilitation center, thermophilic grassland with young *Betula pendula* and *Quercus robur*. 10 August 2005.

5. The Biebrzański National Park, Bf68, Grzędy Forest, forest section Nos 148, 147, 146, pine-spruce forest on dunes, black alder bog and streamside alder-ash forest, oak-linden-hornbeam forest; forest section No. 144, educational track "Czerwone Bagno", pine bog forest *Vaccinio uliginosi-Pinetum*. 11 August 2005.

6. The Biebrzański National Park, Osowiec-Twierdza, Fort II Zarzeczny, 53°31'N/22°39'E, Bf 77, alt. 125 m, concrete ruins of fortifications of the World War I. 11 August 2005.

Collected specimens were determined according to routine lichenological methods. The collections are deposited in the following herbaria: LOD (the University of Łódź), BILAS (the Institute of Botany inVilnius) and KTC (the Świętokrzyska Academy in Kielce). In the list every species is provided with following information: name (nomenclature follows Santesson et al. (2004) and Index Fungorum (2005), substrate, herbarium in which specimen(s) is/are deposited, in some cases also notes on distribution in Poland and other European countries.

Abbreviations: * - lichenicolous fungus; + - saprobic fungus.

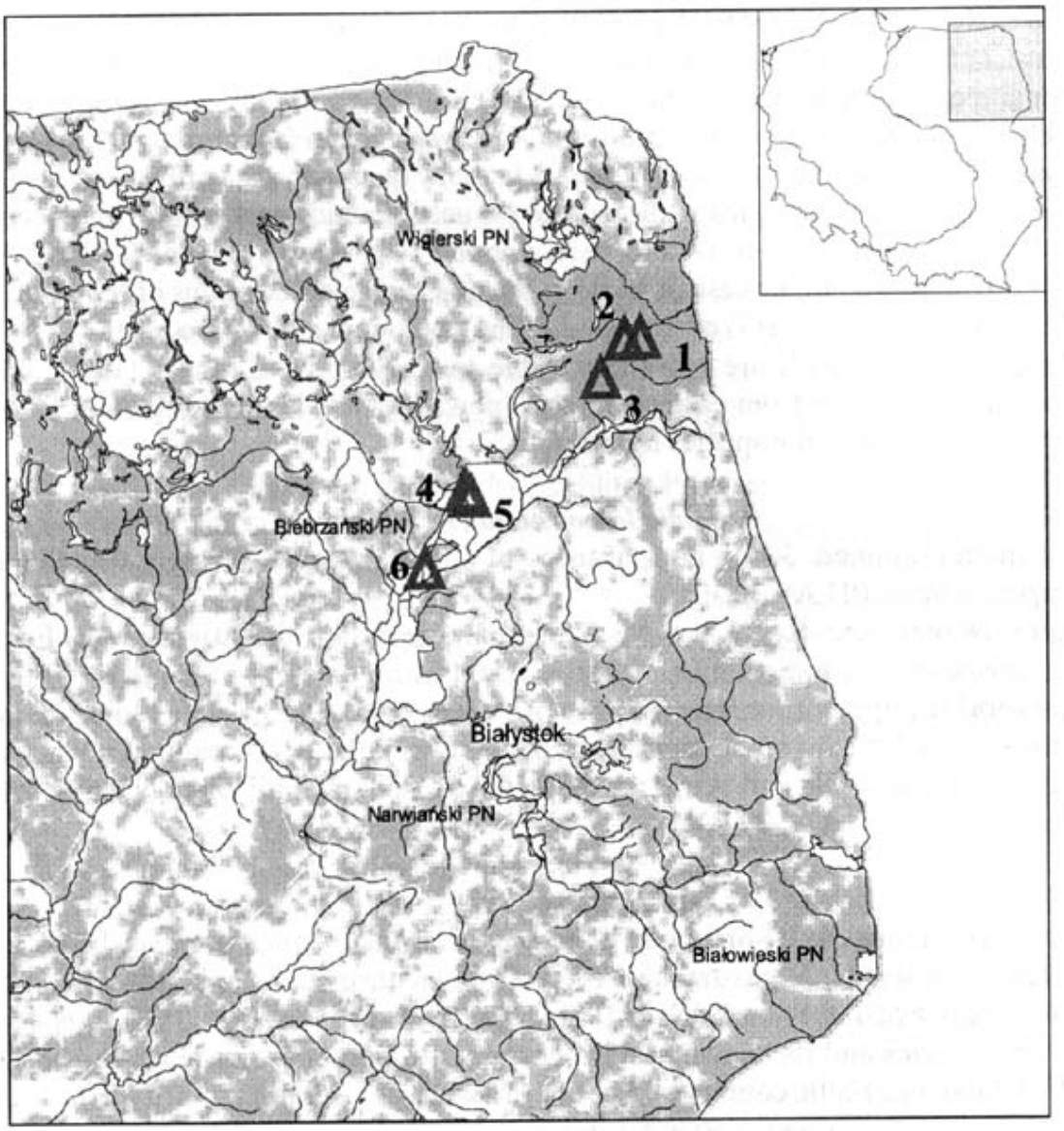

Fig. 1. Location of investigated sites (1-6) in the Augustowska Forest and Biebrzański National Park.

LIST OF SPECIES

Absconditella lignicola Vězda & Pišút

Specimen examined: 1 – on decaying stump in pine forest. LOD.

Notes: New to the Augustowska Forest.This inconspicuous lichen is known from many countries in Europe (montane and lowland cool temperate areas) and also from Asia (Siberia) and North America, though it is still rarely reported. In NE Poland it is known now from 4 localities (Cieśliński 2003), but its occurrence is highly probable in all less disturbed forest areas with mixed deciduous-coniferous and spruce stands.

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

Specimen examined: 1 – on trunk of *Fraxinus excelsior*. BILAS, LOD.

Notes: New to the Augustowska Forest. This lichen is rarely recorded in Eastern and East-Central Europe (e.g. only 3 localities in NE Poland, acc. to Cieśliński 2003) though common throughout the western part of the continent. This situation probably arises due to taxonomic confusion: *A. polypori* is rarely recorded in the region, meanwhile *A. biforme* commonly appears in many inventory lists of Eastern Europe. However, the latter species is thought to be oceanic and most of previous records in Central Europe have proved to be *A. polypori* (e.g. see Poelt and Türk 1994). This might be true in the case of Eastern Europe, as the descriptions of *A. biforme* in older references, such as Golubkova (1966), Nowak and Tobolewski (1975), Makarevich (1977) are more applicable to *A. polypori*. Lettau (1912), when reporting *A. biforme* from eastern Prussia (nowadays Kaliningrad region of Russia) expresses doubts of the species identity.

Arthonia leucopellaea (Ach.) Almq.

Specimen examined: 3 – on bark of trunk of *Tilia cordata* and overgrowing thalli of *Graphis scripta*. BILAS, LOD.

Notes: New to Kozi Rynek reserve. The second record in the Augustowska Forest. The species is rare in Eastern and East-Central European lowlands and is red-listed in several European countries (Motiejūnaitė 2005). It is assumed to be an indicator species for old and biologically rich forests in Poland, Lithuania, Latvia, Estonia and Sweden (Ek and Auziņš 1998; Andersson et al. 2000; Nitare 2000; Motiejūnaitė et al. 2004).

Arthonia muscigena Th. Fr.

Specimen examined: 3 – on epiphytic mosses on trunk of *Quercus robur*. BILAS.

Notes: New to the Augustowska Forest. This inconspicuous lichen was recorded before only twice in Poland (Cieśliński 2003; Fałtynowicz 2003). It is a suboceanic species and its known easternmost distribution does not reach further that NE Poland and Baltic countries (Motiejūnaitė et al. 2005).

****Arthrorhaphis aeruginosa*** R. Sant. & Tønsberg

Hosts: *Cladonia ochrochlora* Flörke and *Cladonia* spp. (squamules).

Specimens examined: 1 – on trunk of an old *Betula* sp., 3 – on decaying tree stump in swampy mixed forest. BILAS, LOD.

Notes: New to NE Poland. This lichenicolous fungus, causing specific discoloration of the host tissues (Fahselt et al. 2000) is known now from an increasing number of European countries, it is also reported from North America. In Poland it is known from montane part of the country and from northern part of the country (Fałtynowicz 2003).

Bacidia bagliettoana (A. Massal. & De Not.) Jatta

Specimen examined: 4 – on soil on earth bank along forest road in more or less open situation. BILAS.

Notes: New to the Biebrzański NP. This rather common terricolous and muscicolous lichen is quite common in NE Poland, especially in its eastern part (Cieśliński 2003) and is still probably overlooked due to insufficient study of suitable habitats.

Bacidia subincompta (Nyl.) Arnold

Specimen examined: 1 – on trunk of *Populus tremula*. KTC.

Notes: The second record in the Augustowska Forest. This epiphytic lichen is mainly confined to natural or close to natural deciduous and mixed forests. It is not very commonly recorded in NE Poland (Cieśliński 2003), meanwhile in neighbouring Lithuania it is known from 25 localities (Motiejūnaitė, unpubl. data).

Bacidia vermifera (Nyl.) Th. Fr.

Specimen examined: 1 – on trunk of *Quercus robur*. KTC.

Notes: New to Starożyn reserve; the second record of the species in NE Poland (Cieśliński 2003); rare in whole Poland (Fałtynowicz 2003).

Biatora chrysantha (Zahlbr.) Printzen

Specimen examined: 1– on epiphytic mosses on trunk of *Quercus robur*. BILAS.

Notes: New to the Polish lowlands. The lichen has been reported only from Western and Eastern Carpathians (Fałtynowicz 2003). *B. chrysantha* is generally rarely reported in Central Europe and reason for this is mainly that the lichen is sorediate and mostly sterile (Printzen and Palice 1999). Another reason for its rarity is that the lichen requires high humidity which is characteristic only for little disturbed forests.

Chaenotheca chlorella (Ach.) Müll. Arg.

Specimen examined: 3 – on trunk of *Quercus robur*. LOD.

Notes: The second record in the Augustowska Forest. A lichen of high ecological requirements, assumed to be an indicator species for old and biologically rich forests in Poland, Lithuania, Latvia, Estonia and Sweden (Ek and Auziņš 1998; Andersson et al. 2000; Nitare 2000; Czyżewska and Cieśliński 2003; Motiejūnaitė et al. 2004).

****Chaenothecopsis pusilla*** (Ach.) A.F.W. Schmidt

Host: *Hypocenomyce scalaris* (Ach.) M. Choisy (thallus).

Specimen examined: 3 – on trunk of old *Pinus sylvestris*. LOD.

Notes: New to Kozi Rynek reserve. Generally rather rarely recorded species, but probably overlooked.

Cladonia caespiticia (Pers.) Flörke

Specimen examined: 3 – on decaying tree stump in swampy mixed forest. BILAS, LOD.

Notes: New to the Augustowska Forest. The third record in NE Poland (Cieśliński 2003). This lichen is confined to old forests and is rare to very rare also in adjacent countries – Lithuania and Belarus (Golubkov 1987; Motiejūnaitė 2002).

Cladonia norvegica Tønsberg & Holien

Specimens examined: 1 – on trunk of an old *Betula pendula*, 3 – on decaying log and stump. BILAS, LOD.

Notes: New to the Augustowska Forest. From the Polish lowlands, this species has been reported only twice before – from the Knyszyńska Forest in NE Poland

(Cieśliński 2003) and Lasy Janowskie Landscape Park (H. Wójciak, pers. comm.). In Eastern and East-Central European lowlands, the lichen is known from the region of the Baltic sea (Motiejūnaitė 2005) and is still rarely reported.

Cladonia ramulosa (With.) J.R. Laundon

Specimen examined: 1 – on fallen trunk of *Quercus robur*. BILAS.

Notes: New to Starożyn reserve; the second record in Augustowska Forest. This suboceanic species is rarely reported from eastern part of Europe. Besides, due to specific ecological requirements it is often subject of confusion: outside oceanic parts of the continent this lichen prefers moisture-retaining substrate and therefore most often is found on decaying wood. On this substrate *C. ramulosa* becomes morphologically very similar to *C. parasitica* and in some cases can be distinguished only by chemical reactions. The latter species also is ecologically more demanding, preferring old, little disturbed forests.

Cladonia turgida Hoffm.

Specimen examined: 5 – soil on earth bank along forest road. BILAS, LOD.

Notes: New to the Biebrzański NP. In the last several decades this species shows tendencies towards decline in the region. The same is also observed in neighbouring Lithuania (Motiejūnaitė 2002).

****Clypeococcum hypocenomycis*** D. Hawksw.

Host: *Hypocenomyce scalaris* (Ach.) M. Choisy (thallus).

Specimens examined: 1, 2, 3, 5 – on trunks of *Pinus sylvestris*. BILAS, LOD.

Notes: New to the Augustowska Forest and Biebrzański NP. Known from a number of European countries and from North America. Probably one of the commonest lichenicolous fungi in the region, known from numerous localities in Poland (Kukwa et al. 2002; Czyżewska 2003; Kukwa 2004, 2005, etc.).

****Epicladonia sandstedei*** (Zopf) D. Hawksw.

Host: *Cladonia coniocraea* (Flörke) Spreng. (squamules).

Specimen examined: 3 – on decaying tree stump in swampy mixed forest. BILAS, LOD.

Notes: New to NE Poland. The species has wide circumpolar distribution, it is reported from many European countries, Asia and North America. In Poland it was so far known only from the northern part of the country [Ac43, Bc52] (Kukwa et al. 2002; Kukwa 2004).

****Epicladonia stenospora*** (Harm.) D. Hawksw.

Host: *Cladonia coniocraea* (Flörke) Spreng. (squamules).

Specimen examined: 1 – on fallen trunk of *Quercus robur*. BILAS.

Notes: New to NE Poland. *E. stenospora* is more rarely reported than *E. sandstedei*: it is known from scattered finds mainly in Western and Central Europe also from South America. This is the second recent record of the species in Poland (see Kukwa 2004 – Ac98).

Fellhanera gyrophorica Sérus., Coppins, Diederich & Scheideg.
Specimen examined: 5 – on trunk of *Quercus robur*. BILAS.
Notes: New to the Biebrzański NP. This recently described species with subcontinental distribution is found in increasingly more localities in Eastern and East-Central Europe during the last years (Motiejūnaitė and Prigodina-Lukošienė 2002; Motiejūnaitė et al. 2003). In NE Poland it was so far known from the Borecka, Knyszyńska and Białowieska Forests (Cieśliński 2003).

Fellhanera subtilis (Vězda) Diederich & Sérus.
Specimen examined: 5 – on twigs of *Picea abies*. BILAS, LOD.
Notes: New to the Biebrzański NP. *F. subtilis* was recorded for the first time in Poland as late as 1997 (Miądlikowska 1997) and since then this species has been reported from a number of localities, mainly in Southern and Northern Poland (Fałtynowicz 2003).

Fellhaneropsis vezdae (Coppins & P. James) Sérus. & Coppins
Specimen examined: 1 – on trunk of *Alnus glutinosa*. BILAS.
Notes: New to the Augustowska Forest. This lichen is included into the list of old-growth forest indicator species of the Polish lowlands and Lithuania (Czyżewska and Cieśliński 2003; Motiejūnaitė et al. 2004), known from two localities in NE Poland before (Cieśliński 2003) and from 7 localities in Central Poland (Czyżewska, unpubl. data; Łubek 2003 and Hachułka 2005), probably overlooked.

Hypocenomyce anthracophila (Nyl.) P. James & Gotth. Schneid.
Specimen examined: 3 – on trunk of *Pinus sylvestris*, edge of the reserve in pine-spruce forest. BILAS, LOD.
Notes: New to Kozi Rynek reserve. A species mainly connected with fire-related disturbances in coniferous forests. In boreal zone it is considered to be an indicator of biological values connected with forest fire-related disturbances (Nitare 2000).

* ***Illosporium carneum*** Fr.
Host: *Peltigera didactyla* (With.) J.R. Laundon (thallus).
Specimen examined: 4 – soil on earth bank along forest road more or less open situation. BILAS.
Notes: New to the Biebrzański NP. A common peltigericolous fungus with circumpolar distribution, known from many localities in various parts of Poland (Czyżewska 2003; Fałtynowicz 2003; Kukwa 2004, 2005).

Lecanactis abietina (Ach.) Körb.
Specimen examined: 3 – on trunks of *Quercus* robur, *Picea abies*, *Alnus glutinosa* and *Populus tremula*. BILAS, LOD.
Notes: New to the Augustowska Forest. Very rare in the Polish lowlands (Fałtynowicz 2003), assumed to be an indicator species for old and biologically rich forests in Poland, Lithuania, Latvia, Estonia and Sweden (Ek and Auziņš 1998; Andersson et al. 2000; Nitare 2000; Motiejūnaitė et al. 2004).

Lecanora thysanophora R.C. Harris

Specimens examined: 1 – on trunk of *Alnus glutinosa*, 3 – on trunk of *Quercus robur*. LOD, 5 – on trunk of *Carpinus betulus*. 24 September 1987, *leg. S. Cieśliński, det. M. Kukwa*. KTC.

Notes: New to the Augustowska Forest, it was, however, probably recorded from the area before under the name of *Haematomma ochroleucum* (see e.g. Kowalewska and Kukwa 2003).

+***Leptorhaphis epidermidis*** (Ach.) Th. Fr.

Specimens examined: 1, 3, 4 – on trunks of *Betula pendula*. BILAS, LOD.

Notes: New to N Poland. Very rare in Poland (Fałtynowicz 2003, as *L. epidermis*), probably very often overlooked.

****Lichenoconium erodens*** M.S. Christ. & D. Hawksw.

Hosts: *Hypogymnia physodes* (L.) Nyl. and *Cladonia coniocraea* (Flörke) Spreng. (thalli).

Specimens examined: 1 – on trunk of an old *Betula* sp., 2, 5 – on trunk of *Picea abies*. BILAS, LOD.

Notes: New to the Augustowska Forest and Biebrzański NP. One of the commonest lichenicolous fungi, known from numerous localities in Poland from various hosts (Fałtynowicz 2003).

****Lichenoconium lecanorae*** (Jaap) D. Hawksw.

Host: *Lecanora chlarotera* Nyl. (apothecia).

Specimen examined: 5 – on trunk of *Acer platanoides*. BILAS.

Notes: New to the Biebrzański NP. A common lichenicolous fungus, known from various localities in Poland (Fałtynowicz 2003).

Lichenomphalia umbellifera (L.: Fr.) Redhead et al.

Specimens examined: 1, 2, 3 – on moist lignum of a decaying stumps, 5 – on decaying wood and plant remnants on humus rich-soil (together with *Placynthiella icmalea* (Ach.) Coppins & P. James). BILAS, LOD.

Notes: New to NE Poland. In the Polish lowlands known from Słowiński National Park (Bujakiewicz and Lisiewska 1983), Gdańskie Pomerania (Kukwa and Zwolicki 2004); recently recorded also on the Babia Góra massif (Bielczyk 2004; Węgrzyn 2004).

****Marchandiomyces aurantiacus*** (Lasch) Diederich

Host: *Physcia caesia* (Hoffm.) Fürnr. (thallus).

Specimen examined: 6 – on old concrete. BILAS, LOD.

Notes: This species is now known from four localities in Poland (Kukwa 2004).

Melaspilea gibberulosa (Ach.) Zwackh

Specimen examined: 1 – on trunk of *Alnus glutinosa*. BILAS.

Notes: New to Starożyn reserve. The third record in the Augustowska Forest (Cieśliński 2003), a species with high ecological requirements, connected with old deciduous forests.

Micarea hedlundii Coppins

Specimen examined: 3 – on decaying tree stump in swampy mixed forest. BILAS, LOD.

Notes: New to the Augustowska Forest. The species is still little known in Eastern and East-Central Europe (Motiejūnaitė 2005) and is probably connected here with natural forests. In Sweden it is considered to be a species of indicatory value for biologically rich forests (Hallingbäck 1995).

+***Microcalicium ahlneri*** Tibell

Specimens examined: 3 – on soft, decayed lignum of *Quercus robur*. BILAS, 5 – on decayed lignum of *Quercus robur* in humid situation. BILAS, LOD.

Notes: New to the Polish lowlands. So far it was reported only from Tatry Mountains (Alstrup and Olech 1990; Lisická 2005), probably overlooked.

+***Microcalicium disseminatum*** (Ach.) Vain.

Specimen examined: 5 – on trunk of *Quercus robur*. LOD.

Notes: New to the Biebrzański NP. Assumed to be an indicator species for old-growth forests in Poland and in Lithuania (Motiejūnaitė et al. 2004).

Multiclavula mucida (Pers.) R.H. Petersen

Specimen examined: 1 – on fallen, decayed tree trunk. BILAS, LOD.

Notes: New to Poland. This basidiolichen is known from a number of cool temperate and montane areas in several European countries (see Lisická 2005) as well as in North America. Probably more common in natural humid forests, but difficult to distinguish when sterile.

+***Mycocalium subtile*** (Pers.) Szatala

Specimen examined: 1 – on the decaying wood. 17 September 1986, *leg. S. Cieśliński, rev. A. Titov*. KTC.

Notes: New to the Augustowska Forest. This species has been reported from Budzisk reserve in the Knyszyńska Forest [Cg02] (Czyżewska et al. 2002) only. A very common species of dry wood in early decay stages, but very often overlooked.

Normandina pulchella (Borrer) Nyl.

Specimen examined: 1 – on epiphytic mosses growing on cut trunk of an old *Quercus robur* with bark. BILAS, LOD, KTC.

Notes: New to the Polish lowlands. This species is known only from the Carpathians and Sudety Mountains (Fałtynowicz 1999, 2003; see also Lisická 2005). A very unusual record of this suboceanic-montane lichen, probably the farthest locality eastwards in the European lowlands.

Ochrolechia alboflavescens (Wulfen) Zahlbr.

Specimen examined: 1 – on trunk of *Fraxinus excelsior*. KTC.

Notes: New to the Augustowska Forest. The third record in NE Poland (Cieśliński 2003).

Peltigera canina (L.) Willd.
Specimen examined: 2 – on a grassy bank along a forest road. LOD.
Notes: New to Mały Borek reserve. A rather common lichen species, the record novelty indicating gaps in lichen diversity inventory.

Pertusaria hemisphaerica (Flörke) Erichsen
Specimen examined: 3 – on trunk of *Quercus robur*. BILAS.
Notes: New to Kozi Rynek reserve. Suboceanic species, assumed to be an indicator species for old and biologically rich forests in Poland, Lithuania, Latvia and Estonia (Ek and Auziņš 1998; Andersson et al. 2000; Motiejūnaitė et al. 2004). Probably not extending further eastwards than Baltic countries and Eastern Poland, part of the records corresponding to *Ochrolechia androgyna*.

****Phaeopyxis punctum*** (A. Massal.) Rambold, Triebel & Coppins
Host: *Cladonia coniocraea* (Flörke) Spreng. (squamules).
Specimen examined: 1 – on trunk of an old *Betula pendula*. LOD.
Notes: New to the Augustowska Forest. This species is known from the Białowieski National Park, forest section No 256 [Cg55] (Czyżewska et al. 2001; Kukwa et al. 2002; see also Kukwa 2005) and the Knyszyńska Forest [Cg02] (Czyżewska et al. 2002).

****Phoma*** sp.
Host: *Protoparmeliopsis muralis* (Schreb.) M. Choisy (apothecia).
Specimen examined: 6 – on old concrete. BILAS.
Notes: The specimen, undetermined at species level, is characterised by ellipsoid conidia 3-5 x 1.5-2 μm, conidiogenous cells 4-5 μm diam. and conidiomata 50-65 μm diam. The species is very similar to *Phoma lecanorina* Diederich (Diederich 1986), differing in slightly wider, virtually globose conidiogenous cells, wider conidia and the host (*Lecanora expallens* in *Ph. lecanorina*).

****Polycoccum pulvinatum*** (Eitner.) R. Sant.
Host: *Physcia caesia* (Hoffm.) Fürnr. (thallus).
Specimen examined: 6 – on old concrete. BILAS.
Notes: New to Poland. This is a widely distributed lichenicolous fungus, known from both hemispheres and recorded from numerous European countries.

Pycnora sorophora (Vain.) Hafellner
Specimen examined: 3 – on trunk of *Pinus sylvestris*, edge of the reserve. BILAS, LOD.
Notes: New to Kozi Rynek reserve. Until recently in was considered to be a rare species in the country, but the latest data shows it to be a common component of pine forest lichen biota (Kubiak et al. 2003).

Reichlingia leopoldii Diederich & Scheideg.
Specimens examined: 1, 3, 5 – on trunks of *Quercus robur*. BILAS, LOD.
Notes: New to NE Poland. The first and only record of *R. leopoldii* is from Jar rzeki Raduni reserve [Ac98] (Kukwa 2004). The species was described as lichenicolous

fungus growing on unknown sterile lichen with *Trentepohlia* as a photobiont (Diederich and Scheidegger 1996). In the protologue, the possibility of various hosts is discussed and finally it is decided that the host could represent an undescribed species. Numerous observations of growth peculiarities of this species in Lithuania (38 localities are known at present, in part of them it is abundant) and Northern and Central Poland (6 localities – Czyżewska, unpubl. data and M. Kukwa, pers. comm.) suggest that *R. leopoldii* could be a hyphomycetous anamorph of the lichen itself and not a lichenicolous fungus.

+***Sarea difformis*** (Fr.) Fr.

Specimen examined: 1 – on resin of *Picea abies*. BILAS, LOD.

Notes: New to the Augustowska Forest. Very rarely recorded in whole country (Fałtynowicz 2003).

+***Sarea resinae*** (Fr. ex Fr.) Kuntze (together with an anamorph ***Pycnidiella resinae*** (Fr. ex Fr.) Höhnel)

Specimens examined: 1, 2 – on resin of *Picea abies*. BILAS, LOD.

Notes: New to the Augustowska Forest. Known from several localities in NE Poland, though only in an anamorph stage (Fałtynowicz 2003).

Sclerophora pallida (Pers.) Y. Jao & Spooner

Specimen examined: 1 – on trunk of *Alnus glutinosa*. BILAS, LOD.

Notes: New to the Augustowska Forest. Rare species in whole country (Fałtynowicz 2003), assumed to be an indicator species for old and biologically rich forests in Poland, Lithuania, Latvia, Estonia and Sweden (Ek and Auziņš 1998; Andersson et al. 2000; Nitare 2000; Motiejūnaitė et al. 2004).

*+***Taeniolella punctata*** M.S. Christ & D. Hawksw.

Host: *Graphis scripta* (L.) Ach. (thallus).

Specimen examined: 3 – on trunk of hornbeam. LOD.

Notes: New to the Augustowska Forest. Recently reported from Poland (Jando and Kukwa 2003; Kukwa 2005).

Thelocarpon lichenicola (Fuckel) Poelt & Hafellner

Specimen examined: 1 – on moist lignum of a decaying stumps. BILAS, LOD.

Notes: New to the Augustowska Forest. The second record in NE Poland (Cieśliński 2003).

Thelotrema lepadinum (Ach.) Ach.

Specimens examined: 3 – on trunk of *Populus tremula* and *Quercus robur*. BILAS, LOD, 5 – on trunk of old *Carpinus betulus*. LOD.

Notes: New to Kozi Rynek reserve and the Biebrzański NP. Indicator species for old and biologically rich forests in Poland, Lithuania, Latvia, Estonia and Sweden (Ek and Auziņš 1998; Andersson et al. 2000; Nitare 2000; Czyżewska and Cieśliński 2003; Motiejūnaitė et al. 2004).

Verrucaria bryoctona (Th. Fr.) Orange

Specimen examined: 4 – soil on earth bank along forest road in more or less open situation. BILAS.

Notes: New to NE Poland. Probably more common, but suitable habitats insufficiently searched.

**Vouauxiomyces santessonii* D. Hawksw.

Host: *Platismatia glauca* (L.) W.L. Culb. & C.F. Culb. (thallus).

Specimens examined: 1, 2 – branches of *Picea abies* and *Quercus robur*. BILAS, LOD.

Notes: New to the Augustowska Forest. Widely distributed in montane and cool temperate parts of Europe and North Africa (Canary Islands), in Poland is so far known only from the Borecka Forest [Bf13] (Kukwa et al. 2002).

**Xanthoriicola physciae* (Kalchbr.) D. Hawksw.

Host: *Xanthoria parietina* (L.) Th. Fr. (apothecia)

Specimen examined: 5 – on trunk of *Populus tremula*. LOD.

Notes: New to the Biebrzański NP. A very common lichenicolous fungus, known from numerous European countries and North Africa (Canary Islands), known also from a number of localities in NE Poland.

CONCLUSIONS

• 33 species of lichens, 15 species of lichenicolous and 6 species of saprobic fungi were collected. In total this makes 54 taxa previously not recorded in the reserves Starożyn, Mały Borek and Kozi Rynek in Augustowska Forest and in Biebrzański National Park. Two species – *Multiclavula mucida* and *Polycoccum pulvinatum* are new to Poland; three species are reported for the first time from the Polish lowlands – *Biatora chrysantha*, *Normandina pulchella* and *Microcalicium ahlneri*, six species are new to NE Poland – *Lichenomphalia umbellifera*, *Reichlingia leopoldii*, *Verrucaria bryoctona*, *Arthrorhaphis aeruginosa*, *Epicladonia sandstedei* and *E. stenospora*, and *Leptorhaphis epidermidis* is new to N Poland.

• The present research add 17 taxa to the lichen biota of the Augustowska Forest known so far, as well as 8 lichenicolous and 5 saprobic fungi. 7 new lichen taxa as well as 7 species of lichenicolous and 3 of saprobic fungi are added to biota of the Biebrzański National Park.

• The Augustowska Forest was established as a biocenter for lichen diversity and is an important locality for old-growth forest indicators in NE Poland and Lithuania (Motiejūnaitė et al. 2004). After present investigation the number of indicator species in the forest has increased from 34 to 44. The following species were added to the list: *Arthonia leucopellaea*, *Calicium adspersum*, *Chaenotheca chlorella*, *Cladonia norvegica*, *Fellhaneropsis vezdae*, *Hypotrachyna revoluta*, *Lecanactis abietina*, *Micarea hedlundii*, *Schismatomma pericleum* and *Sclerophora pallida*.

• Starożyn nature reserve is an important refuge for lichen diversity within the Augustowska Forest complex – 29 indicators of old-growth forests were found in the reserve earlier (Czyżewska and Cieśliński 2003 – as old-growth forest indicators of the Polish lowlands). The present study added three more indicator species: *Cladonia nor-*

vegica, *Fellhaneropsis vezdae* and *Sclerophora pallida*. Thus the present list of indicator species comprises 32 species.

• Although the list of indicator species increased, reverse process was noted as well: several important old-growth forest indicators were not recorded during present investigations, i.e. *Lobaria pulmonaria* and *Thelotrema lepadinum*, which were reported to be common in the Starożyn nature reserve in the 1960s (Zielińska 1969). This is probably due to cutting of the oldest trees, especially oaks and disturbance of water regime connected with drainage of surrounding agricultural areas (see Zielińska l.c.).

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Nowe oraz interesujące gatunki porostów i innych grzybów znalezione w Polsce Północno-Wschodniej

Streszczenie

W pracy przedstawiono 54 gatunki porostów, grzybów naporostowych (*) i saprobiontów (+) dotychczas nie wykazywanych w rezerwatach Starożyn, Mały Borek i Kozi Rynek w Puszczy Augustowskiej oraz w Biebrzańskim Parku Narodowym, biocentrach gatunków starych lasów. Dwa z tych taksonów, *Multiclavula mucida* (zlichenizowane Basidiomycota) i **Polycoccum pulvinatum*, są nowe dla bioty Polski, trzy – nowe dla Polski Niżowej: *Biatora chrysantha*, *Normandina pulchella* i +*Microcalicium ahlneri*, jeden – nowy dla Polski Północnej: +*Leptorhaphis epidermidis* oraz sześć – nowych dla Polski Północno-Wschodniej: **Arthrorhaphis aeruginosa*, **Epicladonia sandstedei*, **E. stenospora*, *Lichenomphalia umbellata* (zlichenizowane Basidiomycota), *Reichlingia leopoldii* (zlichenizowane Hyphomycetes) i *Verrucaria bryoctona*. Materiały zebrano w sierpniu 2005 r. w ramach badań nad lichenologicznym modelem niżowych starych lasów Polski, Litwy i Białorusi.