

ADDITIONS TO THE BIOTA OF LICHENS AND LICHENICOLOUS FUNGI OF POLAND, WITH A NOTE ON *LECANIA PRASINOIDES* IN EASTERN AND CENTRAL EUROPE

JURGA MOTIEJŪNAITĖ & KRYSZYNA CZYZEWSKA

Abstract. Data on twelve lichens and lichenicolous fungi rare or poorly known in Poland are presented. *Sclerophora coniophaea* is reported for the first time for the Polish lowlands and the second time for the country. The lichenicolous fungus *Niesslia cladoniicola* is reported here for the first time for Poland. The distribution of *Lecania prasinoides* in Eastern and Central Europe is discussed, and the species is reported here for the first time for Ukraine.

Key words: lichenized Ascomycota, cladoniicolous and peltigericolous fungi, new records, Poland, Lithuania, Ukraine

Jurga Motiejūnaitė, Laboratory of Mycology, Institute of Botany, Žaliųjų ežerų 49, LT-08406 Vilnius, Lithuania; e-mail: jurga.motiejunaite@botanika.lt

Krystyna Czyżewska, Department of Mycology, Laboratory of Lichenology, University of Łódź, Banacha 12/16, PL-90-237 Łódź, Poland; e-mail: czyzew@biol.uni.lodz.pl

INTRODUCTION

In 1999–2005, the diversity and distribution of lichenized, lichenicolous and allied fungi were studied in European Nature Heritage areas in NE Poland. The results of the investigations were included in papers by Czyżewska *et al.* (2001, 2002, 2005) and Motiejūnaitė *et al.* (2004). However, several interesting records remained unpublished, and some determinations have been revised. Additional material was collected by the first author in the Puszcza Białowieska forest during excursions of the 4th Nordic Saproxylic Network Workshop in 2007. The data are presented in this paper, along with an extended note on *Lecania prasinoides*.

MATERIAL AND METHODS

The presented data are based on specimens housed in the herbaria of Łódź University (LOD) and the Institute of Botany, Vilnius (BILAS). The species were identified by routine lichenological methods. Nomenclature follows Santesson *et al.* (2004), for *Micarea* and *Lecania* the most recent monographs by Czarnota (2007) and Reese Næsberg (2008).

In the list, full citations of the specimens examined are provided, including their geographical location in Poland

in the modified ATPOL grid square system (Cieśliński & Fałtynowicz 1993), given in square brackets. Species distribution is briefly discussed and in some cases data on species ecology, morphology or anatomy are given. Lichenicolous fungi are asterisked (*).

RESULTS AND DISCUSSION

Data on eight species of lichens and four species of lichenicolous fungi are presented here. *Lecania prasinoides* is reported for the first time for Ukraine. *Niesslia cladoniicola* is reported for the first time for Poland. *Sclerophora coniophaea* is reported for the first time for Polish lowlands and for the second time for the whole country. All other taxa are rare or poorly known in the country.

Cladonia caespiticia (Pers.) Flörke

Only a few localities of this red-listed species (category E in whole Poland) are known in NE Poland (Czyżewska *et al.* 2005), but apparently it is somewhat overlooked in old forests, especially in the Puszcza Białowieska forest.

SPECIMEN EXAMINED. POLAND. NIZINA PÓLNOČNO-PODLASKA LOWLAND, Puszcza Białowieska forest, Sacharewo forestry division, forest section 465, on trunk of *Fraxinus excelsior* in ash-alder forest [ATPOL grid square Cg 64], 3 Sept. 2007, leg. J. Motiejūnaitė (BILAS 7749).

Fellhanera gyrophorica Sérus., Coppins, Diederich & Scheideg.

The species was previously known only from the northeastern part of the country (see comments in Czyżewska *et al.* 2005; see also Pišút *et al.* 2007). The locality in the Spała Reserve is the second one for central Poland (see Cieśliński 2007).

SPECIMEN EXAMINED. POLAND. WZNIESIENIA POŁUDNIOWOMAZOWIECKIE HEIGHTS, Łasy Spalskie forests, Spała Reserve, forest section 286, [Ee 00], on bark of old *Carpinus betulus* in oak-linden-hornbeam forest near Pilica River, 2 Sept. 1969, leg. K. Czyżewska (LOD 14508).

Lecania prasinoides Elenkin

Corticolous lichens of the *Lecania cyrtella* group have been a source of many misinterpretations and taxonomic confusion for quite a long time. Poelt (1969) first suggested reducing *L. sambucina* to a synonym of *L. cyrtella*. Later, *L. cyrtellina* was also suggested to be conspecific with *L. cyrtella* (Santesson 1993). Recently the long-forgotten and neglected species *L. prasinoides* was synonymized with *L. cyrtella* as well (van den Boom & Khodosovtsev 2004). However, recent combined molecular and morphological studies have shown all these species to be clearly separate taxonomic entities (Reese Næsberg 2008).

Lecania sambucina (Körb.) Arnold is characterized by one-septate ascospores, 10–16-spored asci and a preference for rough bark. *Lecania cyrtellina* (Nyl.) Sandst. is characterized by generally nonseptate and narrow (2.0–2.5 μm) ascospores, a very low (34–39 μm) hymenium and a preference for basic bark in more or less dry conditions. *Lecania prasinoides* Elenkin is characterized by one-septate ascospores (8.0–14.5 \times 3–4 μm), a hyaline to pale brown epihymenium and a preference for very humid habitats. *Lecania cyrtella* (Ach.) Th. Fr. is characterized by one-sep-

tate ascospores (9–16 \times 3–4.5 μm), an intensively pigmented epihymenium and a preference for nutrient-enriched bark (according to Reese Næsberg 2008). Our specimens of the two latter species showed slightly wider variation of ascospore size: 8–14 \times 2.5–4.0 μm in *L. prasinoides* and 9–17 \times 3–5 μm in *L. cyrtella*.

In light of the recent new approach to the group, many previous reports of *L. cyrtella* and *L. cyrtellina* should be revised, and the distribution of particular species reconsidered. Here we try to trace the distribution of *L. prasinoides* in continental Eastern and Central Europe. It was originally described from Eastern Europe (Moscow region, Russia) by Elenkin (1907). Several specimens of this lichen from the Czech Republic, Poland, Lithuania and Russia (Tatarstan) were included in the monograph by Reese Næsberg (2008).

Our investigations indicate that *L. prasinoides* has generally been cited as *L. cyrtellina*. All specimens cited under the latter name in Czyżewska *et al.* (2001), Motiejūnaitė (1996, 1999a, b, 2002, 2003, 2007a; for specimen details see our list below and Reese Næsberg 2008) and Kukwa (2005a) belong to *L. prasinoides*. The specimen mentioned by Toborowicz (1985) may also belong to that species. The specimens cited in Alstrup and Olech (1992), Sagin (1993) and Zalewska & Rutkowski (2001) apparently belong to either *L. cyrtella* or *L. cyrtellina* s.str., as the ecology described in these papers suggests.

Very few data on the *L. cyrtella* group can be found in recent literature pertaining to Estonia, Latvia, Russia, Ukraine or Belarus. Published lists of lichens generally contain little or no ecological information, so it is difficult to assess the actual delimitation and distribution of particular species in the countries. In addition, synonymization with *L. cyrtella* is often encountered. In two cases, however, *L. prasinoides* is mentioned from Russia: Muchnik (2005) reports it for the Central Chernozem region (citing Elenkin 1906–1911) and Kovaleva (2004) reports it for the Tomsk region (Asian part of Russia). There is also an uncertain report of this species for the Novgorod region (Savich 1925). There are no recent records of the *L. cyrtella* group from Belarus; the latest are from

the 1980s (Golubkov 1987). *Lecania prasinoides* is reported by Golubkov (1987), who cites Savich (1925) as well as his own findings, but the reports apparently do not really refer to this species. The specimen description by Savich (1925) is doubtful. The collection could belong to *L. cyrtella* as well: it is described as growing on twigs of shrubs in a bog; no details of apothecia or ascospores are provided. Moreover, at least two specimens collected by Golubkov for which details of ecology are given (timber fence and trunk of a willow in a village) do not fit *L. prasinoides*.

Only *L. cyrtella* is reported from Latvia and Estonia (Piterâns 2002; Randle et al. 2006). *Lecania cyrtella*, *L. cyrtellina* and *L. sambucina* are united into one entity in Estonia (Randle & Saag 2004) and provided with ecological details ('...mainly on nutrient-rich bark of deciduous trees, rarely on wood') which do not apply to *L. prasinoides*. In Latvia, the reports pertain to *L. cyrtella* s.str. (see, e.g., Piterâns 1982; Sundin & Thor 1990). In Ukraine, *L. cyrtellina* was reported for the first time relatively recently (Coppins et al. 1998; Kondratyuk et al. 1998), and neither reference provided any ecological details. A paper by van den Boom and Khodosovtsev (2004) synonymizes *L. prasinoides* with *L. cyrtella* and cites several specimens from Ukraine, but, judging by their ecology (twigs of *Thymus* and *Ephedra* in dry steppe) they all belong to *L. cyrtella* s.str. However, a specimen in BILAS deposited under *L. cyrtellina* appeared to be *L. prasinoides*; here this well-documented species is reported for the first time from Ukraine. The present known distribution of the species in Europe is presented in Figure 1.

SPECIMENS EXAMINED. POLAND. KOTLINA BIEBRZAŃSKA BASIN, Puszcza Augustowska forest, Kozi Rynek Reserve, forest section 169, 53°48'N/23°13'E [Bg 40], on roots of decaying *Picea abies* in moist fertile oak-linden-hornbeam forest, 12 Aug. 2005, leg. J. Motiejūnaitė (LOD 14024, dupl. in BILAS). UKRAINE. EASTERN CARPATHIANS, Zakarpatskaya oblast, Kostrino, on seasonally submerged roots of alder along Uzh River, 25 May 1998, leg. J. Motiejūnaitė (BILAS 3086). LITHUANIA.: TRAKAI DISTRICT, environs of Varnikai castle-mound, on tree base of *Alnus* sp. on shore of Galvė Lake, 11 Oct. 1993, leg. J. Motiejūnaitė (BILAS 5972); ŠVENČIONYS DISTRICT, former Pabradė

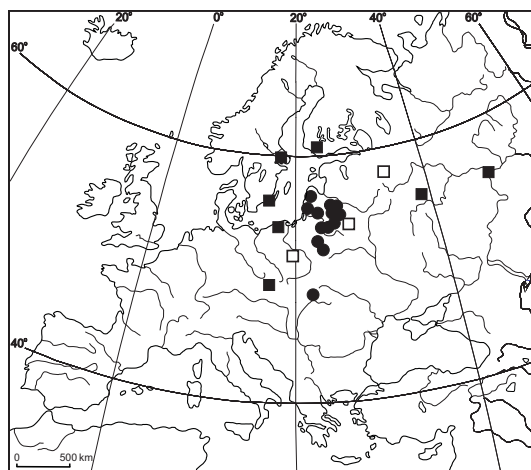


Fig. 1. Known distribution of *Lecania prasinoides* Elenkin in Europe. ■ – literature records (Kukwa 2005a; Pykälä 2008; Reese Næsberg 2008), ● – data from BILAS and LOD, □ – uncertain literature data (Savich 1925; Toborowicz 1985).

military forestry division, forest section 169, on submerged roots and trunk bases of *Alnus glutinosa* along Žeimena River, 27 Sept. 1994, leg. J. Motiejūnaitė (BILAS 5969); UTENA DISTRICT, Aukštaitija National Park, Vaišnoriskė, on submerged roots and tree bases of *Alnus glutinosa* along Buka stream, 28 June 1995 and 27 June 1995, leg. J. Motiejūnaitė (BILAS 5390, 6007, 6017); IGNALINA DISTRICT, Aukštaitija National Park, ca 1 km NW of Vaišniūnai, on tree base of *Alnus* sp. on shore of Dringis Lake, 27 June 1995, leg. J. Motiejūnaitė (BILAS 6008); on base of *Alnus glutinosa* tree on shore of Ūkojas Lake, 28 June 1995, leg. J. Motiejūnaitė (BILAS 5957); Ginučiai, on submerged roots of *Alnus glutinosa* along Alnaja stream, 28 June 1995, leg. J. Motiejūnaitė (BILAS 6011); S of Pakretuonė, on submerged roots of *Alnus glutinosa* on shore of Žeimena Lake, 28 June 1995, leg. J. Motiejūnaitė (BILAS 6016); on submerged roots of *Alnus glutinosa* along Švogina stream, 14 May 2001, leg. J. Motiejūnaitė (BILAS 5707); KLAIPĖDA DISTRICT, former Kairiai military forestry division, forest section 93, on base of trunk of *Fraxinus excelsior* along Mimija canal, 6 July 1995, leg. J. Motiejūnaitė (BILAS 6010); VARĖNA DISTRICT, Dzūkija National Park, Puvočiai, on submerged roots of *Alnus glutinosa* along Grūda stream, 14 July 1996, 20 July 1998, leg. J. Motiejūnaitė (BILAS 2979, 6018). TAURAGĖ DISTRICT, Pagramantis Regional Park, on submerged roots of *Alnus glutinosa* along Lylava stream, 13 May 1999, leg. J. Motiejūnaitė (BILAS 6009); MARIJAMPOLĖ DISTRICT, Barkai, on

submerged roots of *Fraxinus excelsior* along Šarkyčia stream and on shore of Šarkyčia Lake, 2 May 2000, leg. J. Motiejūnaitė (BILAS 5186, 5190); PLUNGĖ DISTRICT, Žemaitija National Park, Plateliai, on bases of *Berberis vulgaris* branches in shaded situation in a mansion park, 14 Sept. 2001, leg. J. Motiejūnaitė (BILAS 5493); VILNIUS DISTRICT, Neris Regional Park, Saidžiai, on submerged roots of *Alnus glutinosa* along Saidė stream, 21 April 2004, leg. J. Motiejūnaitė (BILAS 6341); TRAKAI DISTRICT, Neris Regional Park, Kragžliai, Vievis forestry division, forest section 66, on submerged roots of *Alnus glutinosa* along Bražuolė stream, 10 Dec. 2004, leg. D. Stončius (BILAS 7018); ZARASAI DISTRICT, Gražutė Regional Park, Lūžai forest, Dusetos forestry division, forest section 59, on submerged roots of *Fraxinus excelsior* along Šavaša stream, 9 Sept. 2007, leg. D. Stončius (BILAS 7956).

****Libertiella malmedyensis* Speg. & Roum**

This peltigericolous fungus is known from a number of European countries (Martinez & Hafellner 1998). In Poland it was recorded from five localities in lowland (Zielińska 1963 as *L. peltigerae* (Lib.) Keissl.; Hawksworth & Miądlkowska 1997; Czyżewska *et al.* 2002; Czyżewska 2003a, b). Species new to Biebrza National Park.

SPECIMEN EXAMINED. POLAND. KOTLINA BIEBRZAŃSKA BASIN, Biebrza National Park, forest section 136, 53°36'N/22°52'E [Bf 68], on thallus of *Peltigera didactyla* growing on soil on earth bank along forest road in open situation, 10 Aug. 2005, leg. K. Czyżewska (LOD 14618).

****Lichenocodium pyxidatae* (Oudem.) Petr. & Syd.**

This lichenicolous fungus confined to hosts of the genus *Cladonia* is known from several European countries as well as from North America, from various climatic zones (Diederich 2004; Zhurbenko & Alstrup 2004). In Poland it is rather common but clearly overlooked (Jando *et al.* 2000; Czyżewska *et al.* 2002; Kukwa *et al.* 2002; Łubek 2002; Czyżewska 2003a, b; Jando & Kukwa 2003; Kukwa & Czarnota 2006; Kukwa & Kowalewska 2007). *Lichenocodium pyxidatae* is new to Biebrza National Park.

SPECIMEN EXAMINED. POLAND. KOTLINA BIEBRZAŃSKA BASIN, Biebrza National Park, forest section 136, [Bf 68], road by the animal rehabilitation center,

on podetia of *Cladonia fimbriata* growing in grassland with *Cladonia cariosa* and *Diploschistes bryophilus*, and young *Betula pendula* and *Quercus robur*, 10 Aug. 2005, leg. K. Czyżewska (LOD 14620).

***Micarea nigella* Coppins**

Though recorded mostly in the southern part of the country, this lichen has also been reported from several localities in the northern part (Czarnota 2007). New to the Puszcza Augustowska forest.

SPECIMEN EXAMINED. POLAND. RÓWNINA AUGUSTOWSKA PLAIN, Puszcza Augustowska forest, 53°52'N/23°21'E [Bg 31], Starozyn Reserve, forest section 196, on wood of decaying stump in old *Pinus-Picea* forest; 17 Aug. 2005, leg. K. Czyżewska (LOD 14028).

***Micarea tomentosa* Czarnota & Coppins**

In his monograph, Czarnota (2007) cited specimens of this lichen from several localities in north-eastern and central Poland. *Micarea tomentosa* is new to the Puszcza Knyszyńska forest.

SPECIMENS EXAMINED. POLAND. NIZINA PÓŁNOCNOPODLASKA LOWLAND, Puszcza Knyszyńska forest, Supraśl forest division, Budzisk Reserve, forest section 109d, 53°16'N/23°22'E [Bg 92] on wood of decaying stumps (with pycnidia); 11 June 1999, leg. K. Czyżewska (LOD 10885) as *Micarea hedlundii* (Czyżewska *et al.* 2002), and forest section 124c, 12 June 1999, leg. K. Czyżewska (LOD 11876); WYŻYNA PRZEDBORSKA UPLAND, Silniczka forest division, uroczysko Dębowiec range, forest section 165, 50°55'N/19°44'E [Ed 68], on wood on decaying stump (with apothecia), 24 Sept. 1970, leg. K. Czyżewska (LOD 1031), as *Catillaria prasina* f. *laeta* (Czyżewska 1981); WZNIESIENIA POŁUDNIOWOMAZOWIECKIE HEIGHTS, Lasy Spalskie forests, Spała Reserve, forest section 285, [Ee 00], on decaying bark of standing trunk of *Abies alba* (with pycnidia), 4 Nov. 1993, leg. K. Czyżewska (LOD 11864).

****Niesslia cladoniicola* D. Hawksw. & W. Gams**

Our specimen of *Niesslia cladoniicola* is characterized by 1-septate, 4.5–7.5 × 1.5 μm ascospores and filiform paraphyses, disappearing in mature ascomata. Ascomata 0.10–0.15 mm in diam., superficial and with stiff dark hair. All characteristics well fit the description given in the protologue (Hawksworth 1975).

This infrequently recorded cladoniicolous fungus is known from a few European countries (Great Britain, Italy, Germany, Sweden, Finland) and from Northern Asia, Greenland and the Canary Islands (Clauzade *et al.* 1989; Hafellner 1996; Alstrup 2004; Santesson *et al.* 2004; Zhurbenko & Alstrup 2004). *Niesslia cladoniicola* is reported here for the first time from Poland.

SPECIMEN EXAMINED. POLAND. RÓWNINA AUGUSTOWSKA PLAIN, Puszcza Augustowska forest, Starożyn Reserve, forest section 194, 53°32'N/23°21'E [Bg 31], on squamules and podetia of *Cladonia ochrochlora* growing on decaying stump; 8 Aug. 2005, *leg.* K. Czyżewska (LOD 14553).

****Pronectria robergei* (Mont. & Desm.) Lowen**

Pronectria robergei differs from *P. erythrinella* by having larger ascospores with a more prominent constriction at the septum and slightly paler ascomata (Hawksworth 1978). *Pronectria robergei* is a cosmopolitan peltigericolous fungus recorded from a number of European countries, North and South America as well as from Australasia (Kocourková 2000). In Poland it is known from the northern and central parts of the country (Zielińska 1963; Kukwa 2004, 2005b).

SPECIMENS EXAMINED. POLAND. WYSOCZYNA BIAŁOSTOCKA PLATEAU, Puszcza Knyszyńska forest, Supraśl forest division, Budzisk Reserve, forest section 61, [Cg 02], on thallus of *Peltigera didactyla* growing on soil in gravel pit, 12 June 1999, *leg.* K. Czyżewska & J. Motiejūnaitė (LOD 10722) as *Pronectria erythrinella* (Nyl.) Lowen (Czyżewska *et al.* 2002).

***Reichlingia leopoldii* Diederich & Scheideg.**

This lichenized hyphomycete remains very much under-recorded. In Poland it is known so far from several localities in northern and northeastern parts of the country (Kukwa 2004; Czyżewska *et al.* 2005; Szymczyk 2007). The locality in the Konewka Reserve is the first one for central Poland.

SPECIMENS EXAMINED. POLAND. NIZINA PÓLNOCNOPODLASKA LOWLAND, Równina Bielska plain, Białowieża National Park, forest section 256, [Cg 55], on trunk of old *Carpinus betulus* in oak-linden-hornbeam forest, 16 Sept. 1987, *leg.* K. Czyżewska (LOD 14556); forest section 399, ca 700 m from main entrance, along

tourist trail, [Cg 55], on trunk of *Quercus robur*; 3 Sept. 2007, *leg.* J. Motiejūnaitė (field record, not collected); WZNIESIENIA POŁUDNIOWOMAZOWIECKIE HEIGHTS, Lasy Spalskie forests, Konewka Reserve, forest section 180b, [De 91], on trunk of very old *Quercus robur* in thin oak forest, 25 Sept. 1995, *leg.* K. Czyżewska (LOD 11837).

***Sclerophora coniophaea* (Norman) J. Mattsson & Middelb.**

The species is scattered and rather rare in Northern Europe: Nordic countries (Tibell 1999), Estonia (Randlane & Saag 2004) and Lithuania (Motiejūnaitė 2007b). In Central Europe the lichen is a genuine rarity, with most records referring to the Carpathian Mts (Liška *et al.* 2006). In Poland it was previously recorded from the southern part of the country. Tobolewski (1966) reported the species as *Coniocybe obscuripes* Nyl. from the Bieszczady Mts (Pszczeliny, S of Stuposiany village, 650 m a.s.l., on bark of *Picea abies* in mixed forest). Our record is the first one for Polish lowland and the northeastern part of the country, and the second for Poland. In Northern Europe and mountain forests it most often prefers trunks and stumps of *Betula*, *Picea*, *Salix*, *Alnus* and *Abies*; in the mixed forest zone it is found mainly on *Quercus* (Tibell 1999).

Sclerophora coniophaea is red-listed in many European countries: Lithuania (Motiejūnaitė 2007b), Slovakia (Pišút *et al.* 2001), Finland (Rassi *et al.* 2001), Estonia (Randlane & Saag 2004), Sweden (Thor & Arvidsson 1999) and Russia, Republic of Karelia (Moutchnik & Zavarzin 2005). In Poland the lichen is not red-listed, but its rarity and apparent confinement to biologically rich forests should qualify it for red-listing here.

SPECIMEN EXAMINED. POLAND. RÓWNINA AUGUSTOWSKA PLAIN, Puszcza Augustowska forest, Starożyn Reserve, 53°32'N/23°21'E [Bg 31], on trunk of old *Carpinus betulus* in hardwood forest (together with *Cliostomum* sp.), 7 Aug. 2005, *leg.* J. Motiejūnaitė (BILAS 7692).

***Trapeliopsis glaucolepidea* (Nyl.) G. Schneider**

All specimens cited below represent a diminished lignicolous form earlier referred to as *Trapeli-*

opsis percrenata(Nyl.) Gotth. Schneid. (following Palice *et al.* 2006). Our field experience suggests that the lichen is found almost exclusively in this form in lowland forests of Eastern Europe and eastern Central Europe, often overgrowing *Placynthiella icmalea* (Ach.) Coppins & P. James.

In Poland this species has been recorded from the Tatra Mts (S Poland), Bory Tucholskie forests and Olsztyn (N Poland) (Czarnota & Kukwa 2004; Kubiak 2005; Kukwa 2005c).

SPECIMENS EXAMINED. POLAND. WYSOCZYŻNA BIAŁOSTOCKA PLATEAU, Puszcza Knyszyńska forest, Budzisk Reserve, forest section 109, [Cg 02], on decaying deciduous tree stump, 11 June 1999, *leg. J. Motiejūnaitė* (BILAS 5924). The specimen was cited as 'Motiejūnaitė unpubl. data' by Fałtynowicz (2003); NIZINA PÓLNOCNOPODLASKA LOWLAND, Białowieża National Park, forest section 399, [Cg 55], ca 200 m from main entrance, along tourist trail, on decaying log, 3 Sept. 2007, *leg. J. Motiejūnaitė* (field record, not collected).

ACKNOWLEDGEMENTS. We are indebted to the anonymous reviewers for useful suggestions on the manuscript. The study was supported in part by the Polish Ministry of Science and Higher Education, grant No. 2 PO4G 069 30.

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Received 27 March 2008