ACTA MYCOLOGICA
Vol. 45 (2): 219–230
2010

Dedicated to Professor Barbara Gumińska on the occasion of her eighty-fifth birthday

Contribution to the lichen biota of the Pogórze Wiśnickie foothills (Carpathians)

LUCYNA ŚLIWA

Laboratory of Lichenology, W. Szafer Institute of Botany, Polish Academy of Sciences
Lubicz 46, PL-31-512 Kraków, l.sliwa@botany.pl

Śliwa L.: *Contribution to the lichen biota of the Pogórze Wiśnickie foothills (Carpathians).* Acta Mycol. 45(2): 219–230, 2010.

The Pogórze Wiśnickie foothills are situated in close vicinity to the Kraków agglomeration and is highly influenced by human activity. Lichen studies in the area revealed 163 species so far. A current checklist of the lichen biota of the territory is provided with numerous new regional records, e.g., *Bacidina sulphurella, Evernia prunastri, Fuscidea pusilla, Lecanora albellula, Lepraria ecorticata, Mycobilimbia epixanthoides, Ramalina farinacea, R. fastigiata, Ropalospora viridis, Verrucaria praetermissa* and *V. tectorum*.

Key words: lichens, biodiversity, lichenized fungi, new records, Poland

INTRODUCTION

The Carpathians are among the best known areas in Poland concerning the lichen biota (Bielczyk 2006), with respective literature comprising ca 300 references (Bielczyk 2003). The Carpathian foothills, however, though being close to the centres of lichenological investigations of southern Poland, remain poorly explored both historically and geographically. Among the foothills the most thoroughly explored areas are: Pogórze Rożnowskie and Ciężkowicke (Kozik 1970, 1976, 1977; Czwórnóg, Śliwa 1995), Pogórze Spisko-Gubałowskie (Kiszka 1985), Pogórze Przemyskie (Kiszka, Piórecki 1991; Kiszka 2002a, b). Fragmentary data originate from Pogórze Bukowskie (Rydzak 1955), Pogórze Wielickie (Kiszka 1996a), Pogórze Dynowskie (Krzewicka, Śliwa 2000), and Pogórze Śląskie (Leśniański 2001) foothills. The latter regions as well as others (e.g., Pogórze Strzyżowskie, Rzeszowskie and Jasielskie foothills) are in urgent need of complex investigations especially with rapid changes of environmental conditions caused by human activity and the influence of changing climate. Due to these same reasons some of the early investigations require re-examination.

In the years 1998-2000 a lichen survey was carried out aimed at a more comprehensive exploration of the Pogórze Wiśnickie foothills with special emphasis on protected areas. The project included lichenological training for students of the Jagiellonian University and resulted in some joint publications (Śliwa et al. 2001; Śliwa, Krzewicka 2004). Part of the results were also published by Stolarczyk (2003). This paper presents a part of a summary of the research as a contribution to the knowledge of the lichen biota of this interesting area highly influenced by human activity.

STUDY AREA

The Carpathian Foothills form a transitional area that is located between the Beskid in the south and the sub-Carpathian basins in the north, and the landscape is affected by three main subsystems: abiotic, biotic and anthropogenic (Drużkowski 1998). The Pogórze Wiśnickie foothills constitute the easternmost edge of the Pogórze Zachodniobeskidzkie foothills of the Western Carpathians (Kondracki 1989, 2001). Neighbouring areas are the Pogórze Wielickie foothills to the west and the Pogórze Rożnowskie foothills to the east. The territory includes several protected areas (e.g., the Bukowiec Nature Reserve, Kamień Grzyb and Kamienie Brodzińskiego protected sandstone tors) as well as areas of special concern (Wiśnicko-Lipnicki Landscape Park). In general it is rich in natural values represented by forested hills and unique landscape formations such as sandstone tors. Forest communities occupying the area were characterised by Stachurska (1998a, b).

On the other hand the Pogórze Wiśnickie foothills is under the visible impact of human activity; some parts of the area are strongly urbanized and influenced by industrial and transportation emissions of Krakow and surrounding towns. Details of the environmental transformation of the whole area of the Carpathians Foothills due to natural and anthropogenic factors is presented by Drużkowski (1998), who evaluated the transformation as moderate at present.

MATERIAL AND METHODS

Lichens were collected in the years 1998-2000 at 32 sites located in the Fe ATPOL gird square system (acc. to Cieśliński, Fałtynowicz 1993). Each 100×100 km (Fe) plot was divided into 10×10 km units numbered from 00 to 99, and then into 2×2 km subunits also numbered from 00 to 99 – the numbers follow one the other in the list of collecting sites. All habitats and substrates were explored. Lichens were identified using routine microscopic and laboratory techniques. When necessary the TLC analyses was performed in solvent system A or/and C (methods followed Orange et al. 2001).

Voucher specimens are available at KRA and/or KRAM herbaria. Nomenclature basically follows Santesson et al. (2004) and Diederich et al. (2010).

Lichen collecting sites in the Pogórze Wiśnickie foothills: **1** – Cichawka village, S slope of a hill along the road, Fe 8233; forest with *Pinus sylvestris* and *Quercus robur*, and road side trees, 8 May 1998, *L. Śliwa* collection numbers *539-561*; **2** – Cichawka village, near the church, Fe 8233; stream valley with *Alnus glutinosa*, rocks and stones, 8 May 1998, *L. Śliwa 562-592*; **3** – Wieruszycka village, along Stradomka stream, Fe 8232, shrubs with *Alnus glutinosa*, 19 May 1998, *L. Śliwa 593-614*; **4** – Cichawka stream headwaters, Fe 8234, mixed forest with *Fagus sylvatica, Carpinus betulus, Pinus sylvestris* and *Abies alba*, 19 May 1998, *L. Śliwa 615-662*; **5** – Królówka-Skotnica village, along stream, Fe 8331, mixed forest and concrete constructions; 2 June 1998, *L. Śliwa 663-728*; **6** – Królówka-Uzbornia village, Fe 8321, trees along road side and stream, 2 June 1998, *L. Śliwa 663-728*; **7** – E part of Łapanów village, road to Muchówka, Fe 8231, road side trees of *Fraxinus excelsior*, 3 June 1998, *L. Śliwa 662-796*; **8** – Łapanów-Rogatka village, Fe 8232, trees along stream and road side trees of *Populus* spp., 3 June 1998, *L. Śliwa 797-837*; **9** – Wola Wieruszycka village, Fe 8222, *Salix* spp. trees along stream and fruit trees, 17 June 1998, *L. Śliwa 838-873*; **10** – Chrostowa Góra Mt., Fe 8212, mixed forest with *Quercus robur, Fagus silvatica* and *Pinus sylvestris*, 17 June 1998, *L. Śliwa 874-880*; **11** – Chrostowa village, Fe 8212, road side trees, 17 June 1998, *L. Śliwa 881-898*; **12** – Dąbrowica village, park by the school, Fe 8211, 17 June 1998, *L. Śliwa 899-910*; **13** – Forest between Dołuszyce and Pogwizdów and Kobylany villages, S slope, Fe 7341, mixed forest with *Fagus sylvatica, Quercus robur, Carpinus betulus, Betula pendula*, and *Pinus sylvestris*, 21 April 1999, *L. Śliwa 975-992*; **14** – Road from Dołuszyce to Pogwizdów village, along a stream, Fe 7340, young forest with *Alnus glutinosa, Fraxinus excelsior* and *Quercus robur*, 21 April 1999, *L. Śliwa 993-1016*; **15** – Bukowiec Nature Reserve, alt. 430-460 m, Fe 8442, mixed forest and shaded streams, 21 May 1999 and 22 Sept. 1999, *L. Śliwa 1017-1075*; **16** – Tymowa Górna village, Fe 9342, road side trees, 22 Sept. 1999, *L. Śliwa 1076-1082*; **17** – Lipnica Murowana village, road to Nowy Wiśnicz town, Fe 8334, *Salix* spp., 1 March 2000, *L. Śliwa 1083*; **18** – Stary Wiśnicz town, road junction, Fe 8303, concrete post, 24 March 2000, *L. Śliwa 1084*; **19** – Lipnica Górna village, road to Rajbrot, Fe 8344, *Betula pendula*, 24 March 2000, *L. Śliwa 1085*; **20** – E part of Kobyle village, road side trees, Fe 8400, *Populus* spp., 24 March 2000, *L. Śliwa 1086-1087*; **21** – Krasa Góra village, road side, Fe 8420, 24 March 2000, *L. Śliwa 1088*; **22** – Muchówka village, road to Żegocina, Fe 8342, 24 March 2000, *L. Śliwa 1089-1093*; **23** – NW slope of the hill "409 m a.s.l" near Mt. Paprotna Góra, Fe 8342, mixed forest with rocks, 7 May 2000, *L. Śliwa 1094-1104*; **24** – Hill by road to Rajbrot village, near Mt. Paprotna Górna, Fe 8342**;** mixed forest with *Pinus sylvestris* and *Betula pendula*, 7 Maj 2000, *L. Śliwa 1105-1114*; **25** – "Kamień Grzyb" stone in Bigorzówka village near Raciechowice, Fe 9102, sandstone, 7 May 2000, *L. Śliwa 1115-1126*; **26** – "Diabelski Kamień" stone in Smykan village near Szczyrzyce, Fe 9122, sandstone, 7 May 2000, *L. Śliwa 1127-1159*; **27** – Forest S of Sobolów village, Fe 8215, mixed forest with *Quercus robur, Fagus sylvatica* and *Picea abies*, 5 June 2000, *L. Śliwa 1160-1182*; **28** – Mt. Góra Łysa between Zonia and Nieprzaśna villages, near quarry, Fe 8214, forest with *Fagus sylvatica* and *Pinus sylvestris*, 5 June 2000, *L. Śliwa 1183-1190*; **29** – Wichraź village near Zagrody, stream valley, Fe 8224, forest ridge, 20 June 2000, *L. Śliwa 1191-1212*; **30** – Sieradzka village, stream valley, Fe 8223, forest with *Fraxinus excelsior, Alnus glutinosa* and *Carpinus betulus*, 20 June 2000, *L. Śliwa 1213-1234*; **31** – Dziekanowice village, along Raba River, Fe 8014,

sandstone outcrops, 29 June 2000, *L. Śliwa 1235-1257*; **32** – Leszczyna village, W of junction with the road to Rozstajnie village, Fe 8234, road side trees, mainly *Salix* spp., 30 June 2000, *L. Śliwa 1258-1267*.

RESULTS AND DISCUSSION

The checklist of taxa presented below (Tab. 1) summarizes all known data concerning the lichen biota of the Pogórze Wiśnickie foothills.

Table 1
Lichenized fungi recorded in the Pogórze Wiśnickie foothills until the present

Source of information: 1 – Śliwa et al. (2001); 2 – Stolarczyk (2003); 3 – Śliwa & Krzewicka (2004); 4 – herbarium material, leg. Śliwa (*coll. no.*). Bark of trees: Ab – *Abies alba*, Ap – *Acer platanoides*, Ae – *Aesculus hippocastanum,* Al – *Alnus glutinosa*, B – *Betula pendula*, Cb – *Carpinus betulus,* Fs – *Fagus sylvatica,* Fr – *Fraxinus excelsior*, Jr – *Juglans regia,* Ma – *Malus domestica*, Lar – *Larix decidua*, Ps – *Pinus sylvestris,* Po – *Populus* spp., Pr – *Prunus* spp., Qr – *Quercus robur*, Sa – *Salix* spp., Tc – *Tilia cordata*.

Name of species	Substrate	Source of information
Acarospora fuscata (Schrad.) Th.Fr.	sandstone rocks, concrete	1; 2
Acrocordia gemmata (Ach.) A. Massal.	Po	2; 4 (*609, 1260*)
Amandinea punctata (Hoffm.) Coppins & Scheid.	Po, Tc, Fr, Sa, Qr, B, Ma, Jr	2; 4 (*540b, 547, 605, 597, 720, 735, 751, 772, 826a, 832a, 838, 847, 883, 884, 900*)
Anisomeridium polypori (Ellis & Everh.) M.E. Barr	Po	2; 4 (*857, 996, 1216b, 1086*)
Arthonia radiata (Pers.) Ach.	Fs, Al, Cb	4 (*564, 659, 703, 705, 998, 1005b, 1216a, 1221b, 1223, 1228*)
Arthonia spadicea Leight.	Cb	4 (*563*)
Aspicilia calcarea (L.) Mudd	calcareous stones, concrete, tile	2
Bacidia trachona (Ach.) Lettau	sandstone rocks	1
Bacidina sulphurella (Samp.) comb. ined.	Fs, Cb	4 (*598, 612, 1060, 1061*)
Baeomyces rufus (Huds.) Rebent.	soil, sandstone rocks	1; 2; 3; 4 (*621, 977, 1112*)
Bilimbia sabuletorum (Schreb.) Arnold	sandstone, concrete, bryophytes	2
Buellia griseovirens (Sm.) Almb.	Po, Ma	2; 4 (*726, 754, 849b, 1003*)
Caloplaca citrina (Hoffm.) Th.Fr.	concrete, sandstone rocks, asbestos tile	2; 4 (*671, 795, 1093*)
Caloplaca vitellinula auct.	concrete	2 (needs rev.)
Caloplaca decipiens (Arnold) Blomb. & Forssell	concrete, asbestos tile, tile	2; 4 (*683, 714, 1192*)
Caloplaca holocarpa (Ach.) A.E. Wade	concrete, sandstone rocks, tile	2; 4 (*712*)
Caloplaca velana (A. Massal.) Du Rietz	concrete	4 (*674, 863b, 866*)
Caloplaca saxicola (Hoffm.) Nordin	concrete	2
Candelaria concolor (Dicks.) Stein	Po	2; 4 (*665a*)
Candelariella aurella (Hoffm.) Zahlbr.	concrete, sandstone rocks, tile	2
Candelariella coralliza (Nyl.) H. Magn.	sandstone rocks	2
Candelariella reflexa (Nyl.) Lettau	Ma, Po, Sa, Fr, Tc, Ae	2; 4 (*599, 665a, 740, 818, 1007, 1077*)
Candelariella vitellina (Hoffm.) Müll. Arg.	sandstone rocks, tile	2; 4 (*713, 724*)
Candelariella xanthostigma (Ach.) Lettau	Po, Sa, Tc, Fr, Ma, Jr	2; 4 (*1078*)

Table 1 — cont.

Chaenotheca chrysocephala (Ach.) Th.Fr.	Sa	4 (*684, 848*)
Chaenotheca ferruginea (Turner & Borrer) Mig.	Al, Fs, Ps	2; 3; 4 (*677, 1008, 1010*)
Chaenotheca furfuracea (L.) Tibell	soil, roots of trees	4 (*575, 1198*)
Chaenotheca xyloxena Nádv.	wood	3
Cladonia caespiticia (Pers.) Flörke	soil	1; 2; 4 (*551, 556, 1161, 1172*)
Cladonia chlorophaea (Sommerf.) Spreng.	soil, sandstones, Ps, B, Sa, Fr, Ma	1; 2; 4 (*988*)
Cladonia coniocraea (Flörke) Spreng.	soil, wood, bark of trees	1; 2; 3; 4 (*585, 641, 855, 992*)
Cladonia digitata (L.) Hoffm.	Ps	1; 2
Cladonia fimbriata (L.) Fr.	soil	2; 4 (*733, 831, 985, 1181, 1231*)
Cladonia macilenta Hoffm.	B, Ps; wood, soil	1; 2; 3; 4 (*890*)
Cladonia ochrochlora Flörke	Ps; wood	1; 2; 3
Cladonia pleurota (Flörke) Schaer.	sandstone rocks	1
Cladonia parasitica (Hoffm.) Hoffm.	soil	2; 3 (needs rev.)
Cladonia pyxidata (L.) Hoffm.	soil	2
Cladonia rei Schaer.	soil	2 (needs rev.)
Cladonia squamosa Hoffm.	Ps	2
Cladonia subulata (L.) F.H. Wigg.	soil	2
Coenogonium pineti (Ach.) Lücking & Lumbsch	B, Qr	2; 3 (sub *Dimerella diluta*); 4 (*557b, 994b, 1109, 1191*)
Collema tenax (Sw.) Ach.	soil	4 (*1089*)
Dibaeis baeomyces (L.f.) Rambold & Hertel	soil	2; 4 (*560, 572*)
Diploschistes scruposus (Schreb.) Norman	sandstone rocks	1
Evernia prunastri (L.) Ach.	Po	4 (*545, 781, 1267*)
Fuscidea pusilla Tønsberg	Al	4 (*704, 1220a, 1221d*)
Graphis scripta (L.) Ach.	Fs, Cb	1; 3; 4 (*567, 649, 650, 661b, 696, 697, 702, 1005a, 1225a, 1230b*)
Hypocenomyce caradocensis (Nyl.) P. James & Gotth. Schneid.	Ps	2; 3
Hypocenomyce scalaris (Ach.) M. Choisy	B, Fs, Fr, Ma, Ps; wood	2; 3; 4 (*552, 648, 727, 776, 825, 854, 876, 909b, 975, 1013, 1098, 1168*)
Hypogymnia physodes (L.) Nyl.	Ps, Po, Fr, Qr, Ma, Sa, Pr; tile	2; 3; 4 (*576, 602, 634, 687, 743, 817, 851c, 1227*)
Hypogymnia tubulosa (Schaer.) Hav.	Ma	2; 4 (*1217*)
Imshaugia aleurites (Ach.) S.L.F. Meyer	B	4 (*1104*)
Lecania cyrtella (Ach.) Th.Fr.	Al, Sa, B	4 (*755, 816, 821a*)
Lecanora albellula Nyl.	Po, Sa, Fs, Qr, Ma	4 (*601, 610, 678, 746, 757, 1173a*)
Lecanora albescens (Hoffm.) Flörke	concrete	2; 4 (*1202*)
Lecanora carpinea (L.) Vain.	Fr, Sa	4 (*681, 815*)
Lecanora chlarotera Nyl.	Po	4 (*736*)
Lecanora conizaeoides Crombie	Ps, B, Sa, Qr, Po, Fs, Al, Ap, Lar, Cb, Ma, Pr; wood	1; 2; 3; 4 (*553, 565, 614, 625, 652, 676, 688a, 773, 819, 862, 888, 904, 909a, 986*)
Lecanora dispersa (Pers.) Sommerf.	concrete, sandstone rocks, bark of trees, asbestos tile, tile	2 (incl. *L. semipallida*); 4 (*760, 796, 867, 1091, 1201*)
Lecanora expallens Ach.	Po, Sa, Ap, Fr, Tc, Qr, Ma; asbestos tile	2 (needs rev.)
Lecanora hagenii (Ach.) Ach.	wood, concrete	4 (*794, 1164a, 1200*)
Lecanora muralis (Schreb.) Rabenh.	sandstone rocks	2; 4 (*692*)
Lecanora polytropa (Hoffm.) Rabenh.	sandstone rocks	1
Lecanora pulicaris (Pers.) Ach.	Sa, Al, Qr, Ma; wood	2; 3; 4 (*655, 680*)
Lecanora saligna (Schrad.) Zahlbr.	Po, Sa, Fs, Qr, Ma; wood	2; 4 (*624, 672, 834, 1014, 1195, 1257, 1264*)

Table 1 — cont.

Lecanora semipallida H. Magn.	concrete	4 (*701, 711, 729a, 1084, 1090, 1164*)
Lecanora symmicta (Ach.) Ach.	wood	4 (*851a*)
Lecanora varia (Hoffm.) Ach.	wood	2; 4 (*695*)
Lecidea fuscoatra (L.) Ach.	sandstone rocks	1
Lecidella elaeochroma (Ach.) M. Choisy	Sa, B	2
Lecidella stigmatea (Ach.) Hertel & Leuckert	concrete, tile	2; 4 (*653, 710, 797, 832b, 833a, 845, 1092*)
Lepraria borealis Lothander & Tønsberg	sandtone rocks, bryophytes	4 (*1119a*)
Lepraria caesioalba (de Lesd.) J.R. Laundon	sandtone rocks, soil, bryophytes	1; 4 (*1119b*)
Lepraria eburnea J.R. Laundon	Sa	4 (*774a, 1222, 1262*)
Lepraria ecorticata (J.R. Laundon) Kukwa	sandstone rock	4 (*1132*)
Lepraria elobata Tønsberg	Al, Sa, Ma, B, Fs; soil, rocks	3; 4 (*557a, 586, 643, 669, 774b, 813, 982, 1096, 1110, 1113, 1162, 1188, 1204, 1252*)
Lepraria incana (L.) Ach.	Po, Fr, Sa, Fs, B, Tc; sandstone rocks	1; 3; 4 (*676, 689, 899, 987, 1082, 1133, 1144, 1207, 1263*)
Lepraria jackii Tønsberg	bryophytes	4 (*1169, 1171*)
Lepraria lobificans Nyl.	Sa, Tc, Al, Fs, Ps; wood, sandstone rocks	1; 3; 4 (*581, 608, 734, 774c, 839, 978, 995, 1094, 1105, 1114, 1205, 1225b, 1230a, 1256*)
Lepraria membranacea (Dicks.) Vain.	sandstone rocks	1; 2; 4 (*1136, 1147b, 1238*)
Lepraria neglecta (Nyl.) Lettau	sandstone rocks	1; 4 (*1119c, 1147a*)
Lepraria vouauxii (Hue) R.C. Harris	Sa, Po, Ma	4 (*546, 632, 764, 836, 887, 893*)
Melanelixia fuliginosa (Duby) O. Blanco et al.	Po, Ap, Ae, Ma	2; 4 (*647, 678, 715*)
Melanelixia subargentifera (Nyl.) O. Blanco et al.	Sa	4 (*778, 1258*)
Melanelixia subaurifera (Nyl.) O. Blanco et al.	Qr, Ae	2; 4 (*567*)
Melanohalea elegantula (Zahlbr.) O. Blanco et al.	Sa	2 (sub *Melanelia incolorata*)
Melanohalea exasperatula (Nyl.) O. Blanco et al.	Tc, Sa, Fr, Ma; tile	2; 4 (*593, 890*)
Micarea botryoides (Nyl.) Coppins	bryophytes, wood	3 (cf. Czarnota 2007); 4 (*592, 699*)
Micarea denigrata (Fr.) Hedl.	sandstone, wood	2; 3; 4 (*729b, 1097*)
Micarea lignaria (Ach.) Hedl.	B; soil	4 (*577, 1102*)
Micarea micrococca (Körb) Coppins	Cb, Ps	4 (*639c, 1232*)
Micarea misella (Nyl.) Hedl.	rotting wood	3; 4 (*1182, 1197b*)
Micarea peliocarpa (Anzi) Coppins & R. Sant.	sandstone rock	1
Micarea prasina Fr.	rotting wood	3; 4 (*615b, 627b, 679, 1108a*)
Micarea viridileprosa Coppins & v.d. Boom	wood	3 (cf. Czarnota 2007); 4 (*1108b*)
Mycobilimbia epixanthoides (Nyl.) Hafellner & Türk	Sa	4 (*623, 666, 840, 850, 1081, 1083, 1173b*)
Mycoblastus fucatus (Stirtan) Zahlbr.	B, Qr	2; 4 (*656*)
Parmelia omphalodes (L.) Ach.	sandstone rocks	1
Parmelia saxatilis (L.) Ach.	sandstone rocks, Ma	1; 2; 3; 4 (*584, 1009, 1012, 1103*)
Parmelia sulcata Taylor	Po, Sa, Fr, Al, Tc, Qr, Ma; tile	2; 4 (*571, 594, 628, 717, 752, 770, 837a, 849a, 859, 1004*)
Parmelina tiliacea (Hoffm.) Hale	Tc, Po	2; 4 (*768, 802*)
Parmeliopsis ambigua (Wulfen) Nyl.	Ma, Al	2
Pertusaria albescens (Huds.) M. Choisy & Werner	Ap, Sa	2

Table 1 — cont.

Phaeophyscia nigricans (Flörke) Moberg	Po; concrete, tile	2; 4 (*741*)
Phaeophyscia orbicularis (Neck.) Moberg	Po, Sa, Tc, Ae, Fr, Cb, Jr, Ma; concrete, asbestos tile	2; 4 (*603, 747, 767, 780a, 873, 892, 898, 905, 1183*)
Phaeophyscia sciastra (Ach.) Moberg	concrete	4 (693)
Phlyctis argena (Spreng.) Flot.	Tc, Fr, Ma	1; 2; 4 (*542, 635, 790, 812, 851b, 901*)
Physcia adscendens (Fr.) H. Olivier	Po, Fr, Sa, Ma, Cb, Jr, Ae, Tc, Al; concrete	2; 4 (*539, 640, 706, 730, 748, 749, 771, 807, 895, 1015, 1079*)
Physcia caesia (Hoffm.) Fürnr.	concrete, tile	2; 4 (*758, 786*)
Physcia dubia (Hoffm.) Lettau	concrete	2; 4 (*737*)
Physcia stellaris (L.) Nyl.	Po	2; 4 (*792*)
Physcia tenella (Scop.) DC.	Po, Tc, Fr, Sa, Ma, Jr	2; 4 (*595, 596, 620, 691, 719, 777, 1226*)
Physconia detersa (Nyl.) Poelt	Po	4 (*779a*)
Physconia distorta (With.) J.R. Laundon	Po	4 (*763, 783*)
Physconia enteroxantha (Nyl.) Poelt	Po, Sa	2; 4 (*742, 779b*)
Physconia grisea (Lam.) Poelt	Po, Sa, Fr	2; 4 (*780b*)
Physconia perisidiosa (Erichsen) Moberg	Po, Sa	2; 4 (*1011*)
Placynthiella dasaea (Stirt.) Tønsberg	wood, Ps; sandstone rocks	2; 3; 4 (*1170, 1178*)
Placynthiella icmalea (Ach.) Coppins & P. James	Sa, Al, B; wood	1; 2; 3; 4 (*1006, 1166*)
Placynthiella uliginosa (Schrad.) Coppins & P. James	Ma, Po, Fr; wood	2; 3; 4 (*980*)
Placynthium nigrum (Huds.) Gray	sandstone rocks	2; 4 (*664*)
Platismatia glauca W.L. Culb. & C.F. Culb.	wood	4 (*894*)
Porina aenea (Wallr.) Zahlbr.	Fs	2; 3; 4 (*639a, 661a, 993, 1221c, 1224*)
Porpidia tuberculosa (Sm.) Hertel & Knoph	sandstone rocks	2
Protoblastenia rupestris (Scop.) J. Steiner	concrete, asbestos tile	2
Protoparmelia hypotremella Herk, Spier & V.Wirth	B, Fr	2; 4 (*789*)
Pseudevernia furfuracea (L.) Zopf	Ma; sandstone rocks, tile	1; 2; 4 (*573b, 756, 897, 1218*)
Punctelia subrudecta (Nyl.) Krog	Sa	2; 4 (*630, 787, 902*)
Pyrenula nitida (Weigel) Ach.	Fs	4 (*1177a*)
Ramalina farinacea (L.) Ach.	Fr	4 (*791*)
Ramalina fastigiata (Pers.) Ach.	Po	4 (*803*)
Ramalina pollinaria (Westr.) Ach.	sandstone rocks	2
Ropalospora viridis (Tønsberg) Tønsberg	Cb	4 (*619, 1221e*)
Sarcogyne regularis Körb.	concrete	2; 4 (*694, 1206*)
Scoliciosporum chlorococcum (Stenh.) Vězda	Po, Sa, Ma, Fs, Lar, Fr, Ap, B, Ps, Qr, Ab, Cb, Pr	1; 2; 3; 4 (*561, 638, 725, 739, 759, 766, 853, 877a, 981*)
Scoliciosporum umbrinum (Ach.) Arnold	sandstone	2
Trapelia coarctata (Sm.) M. Choisy	sandstone rocks, pebbles	2; 3; 4 (*644, 654, 660, 744, 991, 1180, 1184*)
Trapelia involuta (Taylor) Hertel	sandstone rocks	1; 3
Trapelia obtegens (Th.Fr.) Hertel	sandstone rocks	1; 2
Trapelia placodioides Coppins & P. James	sandstone rocks, tile	1; 2
Trapeliopsis flexuosa (Fr.) Coppins & P. James	Qr, Ma, B; wood	2; 3; 4 (*1163*)
Trapeliopsis gelatinosa (Flörke) Coppins & P. James	soil	1
Trapeliopsis granulosa (Hoffm.) Lumbsch	soil, wood	3
Trapeliopsis pseudogranulosa Coppins & P. James	wood, soil, bryophytes	2; 3; 4 (*1001*)
Trapeliopsis viridescens (Schrad.) Coppins & P. James	rotting wood	2; 3 (needs rev.)

Table 1 — cont.

Umbilicaria deusta (L.) Baumg.	sandstone rocks	1; 2
Umbilicaria hirsuta (Westr.) Hoffm.	sandstone rocks	1; 2
Verrucaria caerulea DC.	sandstone rocks	2 (sub *V. glaucina*, needs rev.)
Verrucaria muralis Ach.	concrete, pebbles	4 (*732, 784*)
Verrucaria nigrescens Pers.	tile, concrete, pebbles	2 (needs rev.); 4 (*728*)
Verrucaria praetermissa (Trevis.) Anzi	stone in stream beds	4 (*1043*)
Verrucaria tectorum (A. Massal.) Körb.	sandstone rock	4 (*868*)
Verrucaria velana (A. Massal.) Zahlbr.	concrete, stones	2
Xanthoparmelia conspersa (Ach.) Hale	sandstone rocks	1; 2
Xanthoparmelia loxodes (Nyl.) O. Blanco et al.	sandstone rocks	1; 2
Xanthoparmelia stenophylla (Ach.) Ahti & D. Hawksw.	sandstone rocks	1; 2 (sub *X. somolënsis,* needs rev.)
Xanthoria candelaria (L.) Th.Fr.	Po, Fr	2; 4 (*788*)
Xanthoria elegans (Link.) Th.Fr.	concrete	2; 4 (*1255*)
Xanthoria fallax (Hepp) Arnold	Po; asbestos tile	2; (*793*)
Xanthoria parietina (L.) Th.Fr.	Po, Ma, Fr, Tc; concrete	2; 4 (*611, 738, 769, 810, 871, 889*)
Xanthoria polycarpa (Hoffm.) Rieber	Po, Sa, Fr	2

The list of taxa presented summarizes all reported data (163 species so far) but most of all provides many new regional records. The newly recorded species represent various groups of lichens both in terms of taxonomy and ecology: members of large crustose genera that have been recently revised using modern approaches – *Bacidia* s.l., *Caloplaca*, *Lecanora*, *Lepraria*, *Micarea*, *Verrucaria*; widespread sterile species reported as frequent or common elsewhere, such *Fuscidea pusilla, Mycobilimbia epixanthoides, Ropalospora viridis*; and endengered species included in the Red List of extinct and threatened lichens in Poland (Cieśliński et al. 2003) – *Evernia prunastri, Ramalina farinacea, R. fastigiata*.

Several of the species deserve special attention. *Bacidina sulphurella* was reported only from a few sites in Poland until now: Góry Sowie Mts, on *Acer pseudoplatanus* and Puszcza Knyszyńska Forest, vicinity of Czarna Białostocka, on *Carpinus betulus* (Brand et al. 2009), and Warszawa city, "Las Bielański" Nature Reserve, on wood (Kubiak et al. 2010). However, it is considered a widespread species in the country (Kubiak et al. 2010). The species represents the *B. arnoldiana* group, which is distingushed by a finely granular thallus entirely covered by goniocysts, rather large and flat apothecia, with a greyish-brown disc with a slight violet hue, and paler orange-brown and raised margins, and a typically dark brown to red-brown hypothecium reacting K+ dark brown. Revision of the material referred to as *B. arnoldiana* in Western Europe and Macaronesia by Brand et al. (2009) demonstrated that two species can be recognized on the basis of the size of pycnidia and more particularly on the shape of the conidia: *B. arnoldiana* (Körb.) V. Wirth & Vězda characterised by filiform, arched or curved (rarely almost straight) conidia, and *B. sulphurella* characterised by filiform conidia, curved or not, but always with at least one end strongly hooked and slightly enlargered. Moreover, the authors discovered that in addition to morphology the species differ in ecology; the former one is saxicolous and the latter corticolous.

Lecanora albellula [syn. *L. piniperda* Körb.] was being reported during the last decade with increasing frequency as a result of a broader concept of the species

presented by Printzen (2001). The species belongs to the *L. saligna*-related taxa that are characterised by the presence of usnic and/or isousnic acids and corticate amphithecium (traditionally named the *L. varia* group). Additionally it is distinguished by apothecia rounded to flexuose, usually densely crowded, more rarely single or in small groups, sessile, 0.4−0.6(−0.9) mm diam.; disc light ochre to reddish-brown, matt, finely whitish pruinose, flat to modertely convex; margin weakly prominent when young, persistent or level with disc or often excluded in old apothecia. The most diagnostic character of the species is the apothecial granules that are abundant in the epithecium and densely obscure the whole area of amphithecial cortex. The granules are bright in polarized light and dissolve rapidly in KOH. *Lecanora albellula* can be mistaken for *L. subintricata* (Nyl.) Th. Fr. and specimens with dark apothecial discs can also be confused with *L. saligna* (Printzen 2001). Moreover, the study of the Polish collections of the *L. varia* group indicated the taxon *L. saligna* var. *sarcopis* (Ach.) Hillm. at least pro parte in fact represents *L. albellula*. The status of the taxa are in urgent need of further investigations.

Lepraria ecorticata has been recently reported for the first time from continental Europe by Kukwa (2006). The author presented records of the species from Poland and the Czech Republic. In Poland *Lepraria ecorticata* was noted from Równina Bielska Plain, Kaszuby Landlake and Warmia in the north, and from Pogórze Karkonoskie foothills, Góry Sowie Mts, Beskid Wyspowy Mts and Gorce Mts in the south. The species is characterized by a thick, not stratified thallus with most modullary hyphae and soredia well separated from one another. *L. ecorticata* is very similar in appearance to *L. elobata* but produces usnic acid in addition to zeorin. It resembles also sorediate species of *Lecanora* that contain usnic acid as well, e.g., *L. expallens*, *L. compallens* Herk & Aptroot and *L. leuckertiana* (cf. Kukwa 2006).

Verrucaria praetermissa is an amphibious species occurring exclusively in humid habitats and characterized by a pale green thallus with pinkish white prothallus. The species occupies large siliceous stones emerging above the water surface in streams but occasionally inundated. It is relatively frequently recorded both in lowland and mountainous areas of the country (e.g., Kiszka 1996b; Czarnota 2000; Zalewska 2000; Czyżewska et al. 2001, 2002; Bielczyk 2003; Cieśliński 2003; Krzewicka 2006, 2009).

Verrucaria tectorum is a member of the *V. nigrescens* complex. It is a saxicolous species occupying calcareous rocks and human-made calcium-containing substrata. The species was rarely reported from Poland (Rehman 1879; Kiszka, Kościelniak 1996; Sparrius 2003) but a recent revision of the genus in Poland demonstrated this poorly known species was often mistakenly reported as *V. nigrescens* Pers. (Krzewicka, unpubl.). The quoted treatment yielded numerous new records of the species from the area of the whole country.

CONCLUSION

Preliminary inventory of the lichens of the Pogórze Wiśnickie foothills indicates considerable diversity in spite of the high influence of human activity on the landscape and nature of the Carpathians Foothills. Additionally such a large representation of newly reported species belonging to various lichen groups, both in terms of taxonomy and ecology, indicate that further herbarium and field investigations will yield more interesting discoveries. Finally species that urgently require special attention are the lichenicolous fungi. So far only three of the most common species have been reported from the area: *Athelia arachnoidea* (Stolarczyk 2003), *Lichenoconium erodens* and *L. lecanorae* (Stolarczyk 2003; Śliwa, Krzewicka 2004).

Acknowledgements. It is a great pleasure and honour to dedicate this paper to Professor Barbara Gumińska with sincere thanks for her kindness and warm support during my student and academic career at the Institute of Botany of the Jagiellonian University in the years 1986-2003. I am grateful to Beata Krzewicka for friendly and most valuable support during the course of the study. Martin Kukwa (Gdańsk), Paweł Czarnota (Niedźwiedź), Beata Krzewicka and Karina Wilk (Kraków) are thanked for the determination or revising of some critical taxa, Dariusz Kubiak for sharing his ideas and personal comments on taxonomy of *Bacidia arnoldiana* group, and the following students for accompany me on some field trips: Aneta Sosin, Karina Palka (now Karina Wilk), Barbara Haduch, Michał Węgrzyn, Jerzy Smykla and Piotr Stolarczyk (Kraków). Sincere thanks are due to Krystyna Czyżewska (Łódź) for valuable comments on a paper proposal and to the anonymous reviewer for suggestions on the manuscript. The study was partly supported by the Ministry of Science and Higher Education, grant no. NN 304 170539.

REFERENCES

Bielczyk U. (ed.). 2003. The lichens and allied fungi of the Polish Western Carpathians. The lichens and allied fungi of the Polish Carpathians – an annotated checklist. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków.

Bielczyk U. 2006. The lichen biota of the Polish Carpathians – General Characteristic. Polish Bot. J. 51 (1): 1–24.

Brand M., Coppins B., van den Boom P.P.G., Sérusiaux E. 2009. Further data on the lichen genus *Bacidia* s.l. in the Canary Islands and Western Europe, with descriptions of two new species. Biblioth. Lichenol. 99: 81–92.

Cieśliński S., Fałtynowicz W. (eds). 1993. Atlas of the geographical distribution of lichens in Poland. 1: 1–67. W. Szafer Institute of Botany Polish Academy of Sciences, Kraków.

Cieśliński S., Czyżewska K., Fabiszewski J. 2003. Czerwona lista porostów wymarłych i zagrożonych w Polsce. (In:) K. Czyżewska (ed.), Zagrożenie porostów w Polsce. Monogr. Bot. 91: 13–49.

Cieśliński S. 2003. Atlas rozmieszczenia porostów (Lichenes) w Polsce Północno-Wschodniej. Phytocenosis, 15 (N.S.), Suppl. Cartogr. Geobot. 15: 1–426.

Czarnota P. 2000. Porosty Gorczańskiego Parku Narodowego. Część I. Wykaz i rozmieszczenie gatunków. Parki nar. Rez. Przyr. 19 (1): 3–73.

Czarnota P. 2007. The lichen genus *Micarea* (Lecanorales, Ascomycota) in Poland. Polish Bot. Stud. 23: 1–199.

Czwórnóg A., Śliwa L. 1995. Flora porostów rezerwatu "Skamieniałe Miasto" koło Ciężkowic (Pogórze Karpackie). Ochr. Przyr. 52: 185–193.

Czyżewska K. Cieśliński S. Motiejūnaitė J., Kolanko K. 2002. The Budzisk nature reserve as a biocentre of lichen dversity in the Knyszyńska Large Forest (NE Poland). Acta Mycol. 37 (1/2): 77–92.

Czyżewska K. Motiejūnaitė J., Cieśliński S. 2001. Species of lichenised and allied fungi new to Białowieża Large Forest (NE Poland). Acta Mycol. 36 (1): 13–19.

Diederich P., Ertz D., Stapper N., Sérusiaux E., Van Den Broeck D., Van Den Boom P., Ries C. 2010. The lichens and lichenicolous fungi of Belgium, Luxembourg and northern France. Available at http://www.lichenology.info [date of exploration 15 Nov. 2010).

Drużkowski M. 1998. Współczesna dynamika, funkcjonowanie i przemiany krajobrazu Pogórza Karpackiego, p. 1-285. Instytut Botaniki Uniwersytetu Jagiellońskiego, Kraków.
Kiszka J. 1985. Porosty Pogórza Spiskiego. Studia Ośr. Dokum. Fizjogr. PAN Oddz. Kraków 12: 213–243.
Kiszka J. 1996a. Porosty – wskaźniki gatunkowe skażenia środowiska. (In:) K. Grodzińska, L. Laskowski (eds). Ocena stanu środowiska i procesów zachodzących w lasach zlewni potoku Ratanica (Pogórze Wielickie, Polska Południowa). Państwowa Inspekcja Ochrony Środowiska, Biblioteka Monitoringu Środowiska, Warszawa: 100–104.
Kiszka J. 1996b. Nowe i rzadkie gatunki porostów (Lichenes) w Bieszczadzkim Parku Narodowym. Część I. Roczniki Bieszczadzkie 5: 43–48.
Kiszka J. 2002a. Porosty (Lichenes) oraz warunki bioekologiczne w Arboretum Cisowa (Pogórze Przemyskie). Arboretum Bolestraszyce 9: 47–67.
Kiszka J. 2002b. Notatki o porostach (Lichenes) w Arboretum Bolestraszyce. Część 2. Arboretum Bolestraszyce 9: 41–46.
Kiszka J., Kościelniak R. 1996. Dynamika zmian we florze porostów w obrębie i otoczeniu zbiorników retencyjnych w dolinie Dunajca w Pieninach. (In:) Ogólnopolskie sympozjum na temat: Dynamika zmian środowiska geograficznego pod wpływem antropopresji 'Atmosfera, Hydrosfera-Litosfera–Człowiek', 26-27 września 1996: 55–56, Kraków.
Kiszka J., Piórecki J. 1991. Porosty (Lichenes) Pogórza Przemyskiego. Uniwa, Warszawa.
Kondracki J. 1989. Karpaty. Ed. 2. Wydawnictwa Szkolne i Pedagogiczne, Warszawa.
Kondracki J. 2001. Geografia regionalna Polski. Ed. 2. Wydawnictwo Naukowe PWN, Warszawa.
Kozik R. 1970. Interesujące porosty (Lichenes) Pogórza Rożnowsko-Ciężkowickiego. Rocznik Naukowo-Dydaktyczny WSP w Krakowie 39, Prace bot. 2: 169–173.
Kozik R. 1976. Lichenoflora dorzecza Białej Dunajcowej. Studia Ośr. Dokum. Fizjogr. PAN Oddz. Kraków 5: 169–196.
Kozik R. 1977. Porosty (Lichenes) Pogórza Rożnowsko-Ciężkowickiego. Fragm. Flor. Geobot. 23 (2): 215–252.
Krzewicka B. 2006. Wodne gatunki porostów z rodzaju *Verrucaria* w potoku Chochołowskim w Tatrach. (In:) Z. Mirek, B. Godzik (eds). Tatrzański Park Narodowy na tle innych górskich terenów chronionych. Nauki biologiczne, Zakopane: 51–56.
Krzewicka B. 2009. Some new records of *Verrucaria* from Beskid Niski Mts. Acta Mycol. 44 (2): 265–273.
Krzewicka B., Śliwa L. 2000. Porosty rezerwatu „Prządki" koło Krosna (Pogórze Dynowskie) Ochr. Przyr. 57: 51–58.
Kubiak D., Wrzosek M., Zaniewski P. 2010. Materiały do bioty porostów i grzybów naporostowych rezerwatu „Las Bielański" w Warszawie. Parki nar. Rez. Przyr. 29 (3): 3–15.
Kukwa M. 2006. Notes on taxonomy and distribution of the lichen species *Lepraria ecorticata* comb. nov. Mycotaxon 97: 63–66.
Leśniański G. 2001. Zagrożone i chronione prawem gatunki porostów na Pogórzu Śląskim. (In:) Botanika w dobie biologii molekularnej. Materiały sesji i sympozjów 52. Zjazdu Polskiego Towarzystwa Botanicznego, p. 176. Wydawnictwo Poznańskie, Poznań.
Orange A., James P. W., White F. J. 2001. Microchemical methods for the identification of lichens. British Lichen Society, London.
Printzen C. 2001. Corticolous and lignicolous species of *Lecanora* (Lecanoraceae, Lecanorales) with usnic and isousnic acid in the Sonoran Desert region. Bryologist 104: 382–409.
Rehman A. 1879. Systematyczny przegląd porostów znalezionych dotąd w Galicyi zachodniej opracowany na podstawie własnych i cudzych spostrzeżeń Spraw. Kom. Fizyogr. Akad. Umiejętn. 13 (2): 1–66.
Rydzak J. 1955. Wpływ małych miast na florę porostów. Cz. II. Beskidy Zachodnie. Wisła, Ustroń, Muszyna, Iwonicz, Rymanów, Lesko. Ann. Univ. Mariae Curie-Skłodowska, Sect. C, Biol. 10 (2): 33–66.
Santesson R., Moberg R., Nordin A., Tønsberg T. Vitikainen O. 2004. Lichen-forming and lichenicolous fungi of Fennoscandia, Uppsala.
Sparrius L. 2003. Contribution to the lichen flora of the Białowieża Forest and Biebrza valley (Eastern Poland). Herzogia 15: 155–160.
Stachurska A. 1998a. Zbiorowiska leśne północno-wschodniej części Pogórza Wielickiego (Zachodnie Karpaty). Zesz. Nauk. Uniw. Jagiell., Prace Bot. 30: 1–78.

Stachurska A. 1998b. Forest communities and their transformations in the benchland area of the Carpathian foreland. Prace Geogr. Inst. Geogr. UJ 103: 179–188.
Stolarczyk P. 2003. Porosty Wiśnicko-Lipnickiego Parku Krajobrazowego na Pogórzu Wiśnickim. Fragm. Flor. Geobot. Polonica 10: 241–252.
Śliwa L., Krzewicka B. 2004. Lichens of the Bukowiec Nature Reserve (Pogórze Wiśnickie Foothills). Fragm. Flor. Geobot. Polonica 11: 171–175.
Śliwa L., Krzewicka B., Sosin A., Stolarczyk P. 2001. Lichens of the protected sandstone tors in Pogórze Wiśnickie (Wiśnickie Foothills, Carpathians). Chrońmy Przyr. Ojczystą 57 (3): 32–42.
Zalewska A. 2000. Ekologia porostów Puszczy Boreckiej i jej obrzeży. PhD thesis, Olsztyn.

Materiały do bioty porostów Pogórza Wiśnickiego (Karpaty)

Streszczenie

W latach 1998-2000 przeprowadzono badania lichenologiczne na obszarze Pogórza Wiśnickiego (Karpaty Zachodnie) ze szczególnym uwzględnieniem obszarów chronionych. Praca ta jest pierwszą z planowanych prac podsumowujących wyniki tych badań. Warto podkreślić, że Pogórze Karpackie to bardzo interesujący obiekt do badań, który pozostając pod znacznym wpływem działalności człowieka zachował wiele cennych składników przyrodniczych.

Obecna lista porostów Pogórza Wiśnickiego liczy 163 gatunki, wiele z nich podano z tego terenu po raz pierwszy. Gatunki nowe reprezentują różne grupy porostów, interesujące z taksonomicznego i ekologicznego punktu widzenia. Są to przedstawiciele licznych w gatunki rodzajów skorupiastych, które doczekały się w ostatnim czasie nowoczesnych rewizji – *Bacidia* s.l., *Caloplaca*, *Lecanora*, *Lepraria*, *Micarea*, *Verrucaria*; rozpowszechnione gatunki porostów występujących w stanie płonnym – *Fuscidea pusilla, Mycobilimbia epixanthoides* i *Ropalospora viridis* oraz gatunki, które znalazły się na liście porostów zagrożonych w Polsce (Cieśliński et al. 2003) – *Evernia prunastri, Ramalina farinacea, R. fastigiata*. Na szczególną uwagę zasługują *Bacidina sulphurella, Lecanora albellula, Lepraria ecorticata, Verrucaria praetermissa* i *V. tectorum*.