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Lichens and lichenicolous fungi of Olsztyn town (NE Poland)

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A list of 279 taxa of lichenized, lichenicolous and saprobic fungi recorded within the town of Olsztyn is given. The findings comprise the results of field studies conducted between 1999 and 2003 and published in earlier sources. The distribution of individual taxa, currently occuring in the city, is show on a grid of 500 m x 500 m squares.

Key words: lichens (lichenized fungi), lichenicolous and saprobic fungi, Olsztyn, NE Poland

INTRODUCTION

Lichenological studies are often conducted in cities and towns in Poland (Zurzycki 1950; Rydzak 1953, 1958; Rydzak and Krysiak 1967; Kozik 1970; Toborowicz 1976; Kiszka 1977, 1999; Kuziel and Halicz 1979; Śpiewakowski and Izydorek 1981; Lipnicki 1982; Wilkoń-Michalska, Glazik and Kalińska 1988; Fałtynowicz, Izydorek and Budzbon 1991). A visible difference in the distribution of the urban centres examined across Poland, however, is noteworthy. No comprehensive studies on lichens have been carried out in north-east Poland except for Białowieża (Rydzak 1957) and Białystok (Matwiejuk 2000, 2001, 2003; Matwiejuk and Kolanko 2001). This area, which constitutes over 11% of Poland, is in many ways greatly differentiated from other parts of Poland. Its idiosyncratic geological structure, features of the climate and the plant cover, as well as the history, enthographic background and economic relations of the region determine its separate nature (Kondracki 1972). This inspired lichenological investigations in Olsztyn, the second largest urban centre in north-east Poland after Białystok. Only few studies that report findings on the occurrence of lichens within Olsztyn had been published before 1999, including works by Lettau (1919, 1955), Motyka (1960), Hutorowicz (1964), Tobolewski and Kupczyk (1976), Sulma and Fałtynowicz (1987), Juśkiewicz and Endler (1997), Juśkiewicz (1999).

The aim of this project was to examine the taxonomic differentiation of the current biota of lichens and lichenicolous fungi in Olsztyn and to document the spatial distribution of taxa representing it. The findings allow for future moniotoring of changes resulting form progressing urbanisation and industralisation of this dynamically developing city, whose population increased 7 times in the 20th century and which had been transformed from a provincial town into a medium-sized urban centre, the capital of the region and the voivodeship.

STUDY AREA

Field studies were conducted in the area delineated by the administrative borders of Olsztyn (87.9km^2). The city borders are determined by the following geographical coordinates: 53°43'20"N, 53°49'50"N, 20°22'00"E and 20°34'10"E. The area covers squares Be42, Be43, Be52 and Be53 on the cartographic grid (Cieśliński and Fałtynowicz 1993) (Fig. 1). The population is 174 000.

Olsztyn is situated in the central part of the Olsztyn Lake District. Rolling and hilly plateaux, altitude difference over 60 m, dominate in the area. The highest point is situated at 150.8 m above sea level, the lowest point at 88.5 m above sea level.

Hydrographically, the town is situated in the basin of the Łyna river. The river flows for 13 km in the city taking in run-off surface waters. Olsztyn is characteristically rich in lakes. As many as 10 lakes whose total surface area exceeds 700 ha, that is 8% of its area, are situated within the town. Lakes cover 40% of the area in the western part of the city and only 8% in its eastern part.

More than 21% of the city area is taken by the municipal forest. More than a half of that area is taken by the Las Miejski forest complex (1055ha). That isolated and clearly separated forest complex has functioned as the municipal forest of Olsztyn since mid 14th c., i.e. since establishment of the city. Despite many centuries of use and a drastic decrease in forests density in Warmia and Mazury during the early 19th c. (Jutrzenka-Trzebiatowski 1993) that complex has survived almost intact in its area preserving rich resources of timber. After termination of logging at the turn of the 19th and 20th c., it has fulfilled mainly recreational and tourist functions (Śrutkowski 2002).

According to the Las Miejski forest development plan for the years 1988-1997, its standing timber consists mainly of *Pinus sylvestris* (71,5%) and *Picea abies* (16,1%), although the area is dominated by broadleaved forest habitats. The percentage share of broadleaved species is very small: *Quercus robur* and *Q. rubra* – 4,2%, *Betula* spp. – 4%, *Fagus sylvatica* and other – slightly over 4%. Significant delays in implementation of recommendations contained in the earlier development plans resulted in development of unfavorable age structure. Trees representing class VIII and older age classes (mainly coniferous ones) represent more than 35% of the standing timber.

Two strict nature reserves, "Mszar" and "Redykajny", that protect mid-forest peat bogs and forest associations surrounding them, are situated in the Las Miejski forest (Dąbrowski, Polakowski and Wołos 1999).

The communities of the Las Miejski forest have been presented in few phytosociological studies. Polakowski (1962) presents four relevés of spruce bog forest *Sphagno girgensohnii-Piceetum* from "Redykajny" nature reserve. Jutrzenka-

-Trzebiatowski (1995), in the study devoted to slope maple-linden forests *Aceri-Tilietum*, presents relevés of such forest from the Wadąg River valley.

Despite one of the higher forest density ratios in the country, the city suffers from a significant shortage of park areas. Municipal greenery arranged in the form of parks, greens and three over 100-year old cemeteries occupies the total of 560 ha representing only 6.5% of the city area (Stypiński 1995).

MATERIAL AND METHODS

Research material comes from own field studies conducted between 1999 and 2003 and from published sources referred to in the introduction.

The cartographic method based on a grid of regular squares was used in field studies (Faliński 1990). A field cartogram consisting of regular basic units (basic research fields), that is 500 m x 500 m squares into which the study area was divided, served as a system of reference. Two topographic maps in the scale 1:25 000 were used as the basis of the cartogram. The study area comprises 363 squares. As a consequence of limited access to some areas (military, industrial or private grounds, etc.) the information on lichens was collected from 345 squares only (Fig.1).

The keys by Nowak and Tobolewski (1975), Purvis et al. (1992), Wirth (1995) and other studies and monographs were used to determine the fungi. After the material collected had been identified, especially species belonging to the genus *Cladonia* and lichens with sterile crustose thalli, the thin layer chromatography method (TLC) was used, according to the procedures given in Orange, James and White (2001), to supplement the results of morphological and anatomic analyses.

Names of lichens and lichenicolous fungi are given after Fałtynowicz (2003), except a few taxa not comprised in this study for which the nomenclature was given after Aptroot and van Herk (1999) – *Bacidia neosquamulosa* as well as Sparrius and Aptroot (2003) – *Bacidia adastra*; or those different taxonomically – *Micarea micrococca* (Coppins 2004). The taxa are given in alphabetical order. The type of the colonised substrate, square number according to ATPOL grid (Cieśliński and Fałtynowicz 1993), number of the basic research fields with the side length of 500 m and the total number of basic research fields (in parentheses) are given after the name of each taxon.

The collected herbarium material comprising ca. 4 000 herbarium lichen packet is deposited in the Herbarium of the Department of Mycology, University of Warmia and Mazury in Olsztyn (OLTC-L-).

Abbreviations: c. ap. – cum apotheciae, * – lichenicolous fungus, (*) – facultative lichenicolous fungus, + –saprobic fungi, ? – probable locatities within the town

LIST OF SPECIES

Absconditella lignicola Vězda et Pišút

On wood (lying logs, rotting stumps, ant-hill fencing).
Specimens examined: **Be42** – C7, D7, 8, 16, 19, F20, G12, 14, 15, I6, J6; **Be43** – D21; **Be52** – K7, L8, 9, P8, 11; **Be53** – P21; (18 sites)

Acarospora fuscata (Nyl.) Arnold

On erratic boulders and stones.
Specimens examined: **Be42** – A16, C10, D11, E11, F7, J25; **Be52** – K1, M6, 8, 11, N6, P13; **Be53** – K26; (13)

Acarospora heppii (Naeg. ex Hepp) Naeg. ex Körb.

On small stones in a gravel pit and on breakstone in a railway track.
Specimens examined: **Be42** – H13; **Be52** – L9, Q10; (3)

Acarospora veronensis A. Massal.

On erratic boulder.
Specimen examined: **Be52** – M6; (1)

Acrocordia gemmata (Ach.) A. Massal.

On bark of *Acer platanoides*.
Specimen examined: **Be52** – P13; (1)

Amandinea punctata (Hoffm.) Coppins et Scheid. var. ***punctata***

On bark of *Acer*, *Alnus*, *Betula*, *Corylus*, *Fraxinus*, *Malus*, *Parthenocissus*, *Populus*, *Quercus*, *Rosa*, *Salix*, *Sorbus* and *Tilia* as well as on wood.
Specimens examined: **Be42** – B9, 16, C10, D10, E5, 6, F6, 8, 9, 13, G5, 7-9, 11, 16, H7, I7, 13, 14, 16, J3, 4, 6, 9, 12-16, 20; **Be43** – D21, 22, E21, 22, G25, H24, 25, I25, J21, 27; **Be52** – K2, 5, 9, 10-15, L10, 12-14, 17, 20, M10-13, 18, 19, N8-11, 14, O9, 11, P8, 9, 13, Q8, 11, 13, 15-18, 20, R13, 17, 20, S12, 13, 16, 17, T16, 17, U16-20, W16-18, X15; **Be53** – K22, N22, 24, 25, O22, P21, 22, Q22, R21-24; (111)

Amandinea punctata (Hoffm.) Coppins et Scheid. var. ***stigmatea*** (Schaer.) Erichsen

On erratic boulders and on breakstone in a railway track.
Specimens examined: **Be42** – A10, D10; **Be52** – M8, Q10; **Be53** – K26; (5)

Anaptychia ciliaris (L.) Körb.

On bark of *Acer*, *Fraxinus* and *Populus tremula*.
Specimens examined: **Be42** – H12; **Be43** – G25, I25; **Be52** – W17, 18 (5); (cf. Kubiak 2002)

Anisomeridium polypori (M.B. Ellis et Everh.) M.E. Barr.

On bark of *Acer, Fraxinus, Malus, Salix* and *Sambucus* as well as on wood.
Specimens examined: **Be42** – C16, D15, 18, E18, H7, I13, J6, 15; **Be43** – I25; **Be52** – K4, 5, 8-10, Q12; **Be53** – P21; (17) (cf. Kubiak 2002 – as *A. nyssaegenum* (Ellis et Everh.) R.C.Harris)

Arthonia didyma Körb.

On bark of *Acer platanoides*.
Specimen examined: **Be42** – D16; (1)

****Arthonia galactinaria*** Leight.

On apothecia of *Lecanora dispersa* growing on concrete.
Specimen examined: **Be43** – G24; (1)

Arthonia mediella Nyl.

On bark of *Acer, Fraxinus* and *Salix*.
Specimens examined: **Be42** – C8, 18, D18, G11; **Be52** – P8, 13; (6)

Arthonia radiata (Pers.) Ach.

On bark of *Carpinus, Corylus, Quercus* and *Sorbus*.
Specimens examined: **Be42** – C15, 17, D13, 14, F14, G13, 14, H13; **Be52** – K8; (9)

Arthonia spadicea Leight.

On bark of *Alnus, Corylus* and *Quercus* as well as on wood.
Specimens examined: **Be42** – C17, 19, G14, H13, I15; (5)

Arthothelium ruanum (A. Massal.) Körb.

On bark of *Acer, Carpinus, Fraxinus* and *Quercus*.
Specimens examined: **Be42** – C16-19, D18, F13, 16, G13, 14; **Be52** – O11, P11, Q11; (12)

Aspicilia caesiocinerea (Nyl. ex Malbr.) Arnold

On erratic boulder.
Specimen examined: **Be42** – B16; (1)

Aspicilia calcarea (L.) Mudd

On concrete.
Specimens examined: **Be42** – B16, C16, G16; **Be52** – O18, R19; (5)

Aspicilia contorta (Hoffm.) Kremp.

On concrete.
Specimen examined: **Be52** – R14; (1)

Aspicilia moenium (Vain.) G. Thor et Timdal

On concrete.
Specimens examined: **Be42** – B16, D13; **Be52** – N19, P20, Q20, R14; **Be53** – K21; (7)

Aspicilia simoënsis Räs.

On erratic boulder.
Specimen examined: **Be42** – B16; (1)

****Athelia arachnoidea*** (Berk.) Jülich

On thalli of *Lecanora conizaeoides* and *Scoliciosporum chlorococcum* growing on bark of *Acer, Alnus, Fagus, Fraxinus, Populus* and *Prunus*.
Specimens examined: **Be42** – E18, F17, H15; **Be52** – K9, 13, N13, S20; **Be53** – P21; (8)

Bacidia adastra Sparrius et Aptroot

On bark of *Euonymus* and *Sambucus*.
Specimens examined: **Be42** – J6; **Be52** – Q12, S20; (3) (cf. Kubiak and Sparrius 2004)

Bacidia beckhausii Körb.

On bark of *Acer platanoides*.
Specimen examined: **Be42** – C16; (1)

Bacidia brandii Coppins et van den Boom

On bark of dying *Carpinus betulus*.
Specimen examined: **Be52** – K5; (1) (cf. Kubiak and Sparrius 2004)

Bacidia neosquamulosa Aptroot et van Herk

On bark of *Sambucus* and *Thuja*.
Specimens examined: **Be52** – J6, M13; (2) (cf. Kubiak and Sparrius 2004)

Bacidia rubella (Hoffm.) A. Massal.

On bark of *Acer, Fraxinus* and *Populus tremula*.
Specimens examined: **Be42** – C17, H12; **Be52** – K8, 9, O13, P9, 13; (7) (cf. Kubiak 2002)

Bacidia subincompta (Nyl.) Arnold

On bark of *Acer platanoides* and *Populus tremula*.
Specimens examined: **Be42** – J16; **Be52** – P7; (2)

Bacidina arnoldiana Körb.

On bark of *Acer, Alnus, Corylus, Crataegus, Frangula, Fraxinus, Malus, Padus, Populus, Quercus, Rhamnus, Salix, Sambucus* and *Tilia* as well as on wood.
Specimens examined: **Be42** – B11, C15, D13, 17, 18, E13, 16, 17, F20, H15, I15, J6, 15; **Be43** – I24; **Be52** – K5, 7, 8, L10, P11, 13, Q11, 12; **Be53** – P21, 22, Q21, 22; (26)

Bacidina assulata (Körb.) Vězda

On bark of *Fraxinus* and *Populus*.
Specimens examined: **Be42** – C7, D18, F13, H12; **Be52** – O11, Q11; (6)

Bacidina chloroticula (Nyl.) Vězda et Poelt

On bark of *Frangula, Larix* and *Sambucus* as well as on erratic boulder.
Specimens examined: **Be42** – B11, D11, J6; **Be52** – K9; **Be53** – P21; (5)

Bacidina delicata (Larbal. ex Leight.) V. Wirth et Vězda

On bark of *Betula, Picea, Quercus, Rhamnus, Sambucus* as well as on concrete.
Specimens examined: **Be42** – C17, E9, 15, 16, F17, 20, J6; (7) (cf. Kubiak 2002 – as *Bacidia delicata* (Larbal. ex Leight.) Coppins)

Bacidina phacodes (Körb.) Vězda

On bark of *Quercus rubra* and bryophytes growing over eroding concrete.
Specimens examined: **Be42** – F14, D17; **Be53** – Q21; (3)

Baeomyces rufus (Huds.) Rebent.

On soil.
Specimens examined: **Be42** – C8, 19, G19, I12; **Be53** – Q21, T21; (6)

Biatora efflorescens (Hedl.) Erichsen

On bark of *Acer, Alnus* and *Quercus*.
Specimens examined: **Be42** – E17, F15, G12, H12; **Be43** – F21; (5)

Bryoria fuscescens (Gyeln.) Brodo et D. Hawksw.

On bark *Acer, Betula, Fagus, Pinus, Populus* and *Quercus* as well as on the wood of a fencing.
Specimens examined: **Be42** – E9, 20, G5, 14, H15, 16, I13, J3, 13; **Be52** – K3, 8; (10)

Buellia aethalea (Ach.) Th. Fr.

On erratic boulders.
Specimens examined: **Be42** – E11, F13; **Be52** – M6, P13; **Be53** – K26; (5)

Buellia griseovirens (Turner et Borrer ex Sm.) Almb.

On bark of *Acer, Alnus, Carpinus, Corylus, Fagus, Malus, Populus, Quercus, Rhamnus, Salix* and *Tilia* as well as on wood.
Specimens examined: **Be42** – C15-19, D14, 16, 17, E13, 14, 16-18, F13, 14, 16, 18, G13, 14, 16, H12-15, I12, 14, 15, J6; **Be43** – D21, F21, I25; **Be52** – K3, 4, K7-9, L14, M11, O7, 11, P11, 15, Q10, 11; **Be53** – P22, Q21, S20; (49)

Buellia schaerii De Not.

On bark of Salix.
Specimen examined: **Be42** – E10; (1)

Calicium trabinellum (Ach.) Ach.

On wood.
Specimen examined: **Be42** – I14; (1)

Calicium viride Pers.

On bark of *Acer* and *Quercus*.
Specimens examined: **Be42** – F13, G16; (2) (cf. Kubiak 2002)

Caloplaca chlorina (Flot.) Sandst.

On bark of *Fraxinus excelsior*.
Specimen examined: **Be43** – H21; (1)

Caloplaca citrina (Hoffm.) Th. Fr.

On anthropogenic rock substrates (concrete, plaster, mortar, bricks).
Specimens examined: **Be42** – B18, C20, D13, 20, E4, 6, 9, 11, 13, 20, F4, 6, 11, G6-10, 13, 15-18, 20, H7, 10, 13, 14, 16, 18, I5, 10-20, J2, 3, 11, 13-15, 17, 18; **Be43** – D21, H23, 24, F23, I21, 24, J24; **Be52** – K13-19, L9, 15-19, M10, 11, 13, 14, 16-20, N9, 10, 14, 16-18, O9, 10, 14, 16, 19, 20, P10, 13, 14, P18-20, Q13, 15, 17, 19, 20, R11, 13, 14, 19, 20, S12, 13, 15, T17, 18; **Be53** – K21-23, N24, O21, Q23, R21; (119)

Caloplaca decipiens (Arnold) Blomb. et Forss.

On anthropogenic rock substrates (concrete, plaster, mortar).

Specimens examined: **Be42** – B18, F4, H10, 18, I3, 21, J3, 13; **Be43** – E23; **Be52** – K14-16, L9, 16-19, M9, 12, 13, 17, N8, 9, 11, 14, 16, O10, 14, 17, 19, P13, 14, 19, Q13, 15, R11, 19, S12; **Be53** – K21, 23, N24, P22; (42)

Caloplaca flavorubescens (Huds.) J.R. Laundon

On bark of *Acer negundo* and *Populus tremula*.

Specimens examined: **Be52** – Q9; **Be53** – R24; (2)

Caloplaca holocarpa (Hoffm.) A.E. Wade

On natural and artificial rock substrates as well as on wood and bark of *Populus*.

Specimens examined: **Be42** – A10, C19, D6, 11, E6, 13, F11, 19, G5, 16, 19, H13, 16, I20, J4, 12, 13; **Be43** – F23, H24, I23, J25; **Be52** – K14, 15, L8-10, 12, 17-20, M8, N9, 19, O13, P11, 13, 18, 20, Q20, R11, 12, 19, 20, S12, 14, 15, W18; **Be53** – K21, 24, L22, Q23; (53)

Caloplaca saxicola (Hoffm.) Nordin

On anthropogenic rock substrates (concrete, plaster, mortar).

Specimens examined: **Be42** – A10, B16, C20, D11, E6, F6, 11, G5-7, H6, 10, 16, I4, 5, 10, 11, 20, J2, 11-13, 19; **Be43** – E23, F22, 23, G24, H21, 24, I24, J23, 25; **Be52** – K2, 3, 13, L9, 12, 17-20, M8, 9, 12, 14, 15, 17-19, N9, 14, 15, 18-20, O8, 9, 13, 14, 18-20, P13, 14, 18-20, Q13, 18, 19, R13, 15, 18-20, S12, 13, 15, 17, 19, T17, 20, U20; **Be53** – K22-25, P21, Q23, R21; (92)

Candelaria concolor (Dicks.) Stein

On bark of *Acer, Alnus, Betula, Fraxinus, Populus, Salix* and *Tilia*.

Specimens examined: **Be42** – E4, 6, F6, J2; **Be43** – E22, H21, 24; **Be52** – K13, L12, M11-13, N8, 20, Q15, T16, U16, 19, W16, X15; **Be53** – N22, 24, 25, R22, 24; (25)

Candelariella aurella (Hoffm.) Zahlbr.

On anthropogenic rock substrates (concrete, plaster, mortar), rarely on erratic boulders and on bark of *Populus*.

Specimens examined: **Be42** – B16, C10, 20, D6, 11, 13, E6-8, 11, 13, F4, 6, 7, 11, 16, 20, G5-8, 10, 15-19, H6, 10, 16-18, I3, 5, 10, 11, 17, 19, 20, J2, 3, 11-13, 15-20; **Be43** – E23, F22, 23, G24, H21-24, I21, 24, J21-24; **Be52** – K2, 3, 12-19, L9, 12, 16-19, M8, 9, 12, 13, 15-20, N8-10, 12, 14-20, O8-10, 13, 14, 16-20, P10, 13, 14, 18-20, Q13, 15, 18-20, R11-15, 17-20, S12-17, 20, T14, 17, 18, 20, U18, 20, X15; **Be53** – K21-25, L21, 22, 24, O21, 22, P21, Q21, 23, R23, 24, T21; (160)

Candelariella reflexa (Nyl.) Lettau

On bark of *Acer, Fraxinus, Populus* and *Salix*.

Specimens examined: **Be42** – C17, J4; **Be52** – K10, N11, O7, 13, P7, 13, 16, R13; (10)

Candelariella vitellina (Hoffm.) Müll. Arg.

On erratic boulders, concrete, wood and bark of *Tilia*.

Specimens examined: **Be42** – D11, F13, G5; **Be43** – I25; **Be52** – K20, L12, 14, M6, 11, N18, O10, P13, Q10, 16; **Be53** – K26, P21; (16)

Candelariella xanthostigma (Ach.) Lettau

On bark of *Acer, Betula, Fraxinus, Lonicera, Malus, Populus, Salix, Sorbus, Thuja* and *Tilia* as well as on wood.

Specimens examined: **Be42** – A16, B9, 16, 17, C10, E4-6, 16, F4, 6, 12, G7-11, 16, H7, 10, 16, I2, 4, 7, 11, 13, 16, J3, 5, 12-14; **Be43** – D21, 22, G24-26, H21, 24, 25, I25, J21; **Be52** – K2, 3, 8, 10-14, 18, 19, N8, 9, 11, 14, O9, 13, 14, 17, 18, P8, 9, 13, 14, 18, Q8, 9, 13, 15-17, 20, R13, 17, 20, S12, 13, 15, 17, T16, 17, U16-19, W16, X15; **Be53** – N22, O22, P21, Q22, R22, 23; (100)

Catillaria nigroclavata (Nyl.) Schuler

On bark of *Acer, Sambucus* and *Populus tremula*.

Specimens examined: **Be42** – C16, 19, E13, F14; **Be52** – N20, P11, Q9, Q11; (8)

Catinaria atropurpurea (Schaer.) Vězda et Poelt

On bark of *Salix*.

Specimen examined: **Be52** – K11; (1)

Catinaria neuschildii (Körb.) P. James

On bark of *Fraxinus excelsior*.

Specimen examined: **Be42** – D19; (1)

Cetraria aculeata (Schreb.) Ach.

On soil.

Specimens examined: **Be42** – C19, **Be52** – M6; (2) (cf. Juśkiewicz and Endler 1997 – as *Coleocaulon aculeatum*, Juśkiewicz 1999)

Cetraria chlorophylla (Willd.) Vain.

On bark of *Acer, Alnus, Betula, Fraxinus, Padus, Pinus, Populus, Quercus, Salix* and *Tilia* as well as on wood.

Specimens examined: **Be42** – D10, 16, E17-20, F10, 19, G5, 12, I3, 6, 12, 13, J2, 3, 5; **Be43** – D21, E21, 22, I25; **Be52** – K5, 7, 8, 13, L6, 8, 9, 19, M11, N9, 10, O13, 14, P11, 13, Q8, 10, 11, R13, 20, S15, W17; **Be53** – P22, R21; (45)

Cetraria islandica (L.) Ach.

On soil and on rotting wood.

Specimens examined: **Be42** – C18, 19, E19, F20; **Be43** – E21; **Be52** – K8, L8; (7) (cf. Lettau 1919 – c. ap.)

Cetraria muricata (Ach.) Eckfeldt

Juśkiewicz (1999).

Cetraria sepincola (Ehrh.) Ach.

On bark of *Betula* and *Populus* as well as on wood of a fencing.

Specimens examined: **Be42** – E9, H6, I14, J6; **Be52** – L6; (5) (Tobolewski and Kupczyk 1976)

?***Cetrelia olivetorum*** (Nyl.) W.L. Culb. et C.F. Culb

Lettau (1919), as *Parmelia cetrarioides* Del.

Chaenotheca chrysocephala (Ach.) Th. Fr.

On bark of *Acer, Alnus, Betula, Fraxinus, Picea, Pinus, Quercus, Salix* and on wood.
Specimens examined: **Be42** – C16, 17, D14, 16-19, E15, 17, F6, 13, G13, 14, I7, J6; **Be52** – K5, L9, N11, Q10; **Be53** – R21; (20) (cf. Kubiak 2002)

Chaenotheca ferruginea (Turner ex Sm.) Mig.

On bark of *Alnus, Betula, Picea, Pinus, Populus, Quercus, Salix, Tilia* and on wood.
Specimens examined: **Be42** – A10, B11, C8, 15, 16, 18, 19, D8, 13-19, E13, 15-20, F13-19, G11-16, 18, 20, H12-16, I12-15, J6; **Be43** – G21, 22, H21; **Be52** – K5-9, L8, P8, 11, 13, Q10, 11, 15, R11; **Be53** – P22; (64)

Chaenotheca furfuracea (L.) Tibell

On bark of *Acer, Alnus, Carpinus* and *Quercus* as well as on rotting wood and on soil covered with a layer of humus.
Specimens examined: **Be42** – C15, E15, 16, F13, G14, H12, 15; **Be52** – O11, Q11; (9) (cf. Kubiak 2002)

Chaenotheca phaeocephala (Turner) Th. Fr.

On bark of *Salix*.
Specimen examined: **Be42** – D10; (1) (cf. Kubiak 2002)

Chaenotheca stemonea (Ach.) Müll. Arg.

On rotting wood as well as on bark of *Betula pendula* and *Picea* abies.
Specimens examined: **Be42** – C18, D19, E18, F13, G12, 14, 16, H12, I14, 15; **Be52** – K8 (11); (cf. Kubiak 2002)

Chaenotheca trichialis (Ach.) Th. Fr.

On wood and bark of *Acer, Betula, Fraxinus, Quercus* and *Salix*.
Specimens examined: **Be42** – C19, D10, 18, E10, G14, H13, I14, J6; **Be43** – D21, 22; **Be52** – K6-8, 10, P13; **Be53** – R22; (16) (cf. Kubiak 2002)

Chaenotheca xyloxena Nádv.

On wood of conifers.
Specimens examined: **Be42** – E17, G12, H12; **Be52** – L8, 9, P11, Q11; (7)

(*)***Chaenothecopsis pusilla*** (Flörke) A. Schmidt.

On wood of conifers as well as on thallus of *Hypocenomyce scalaris* growing on bark of *Picea* and *Pinus*.
Specimens examined: **Be42** – C16, D13, 17, E17, G14; **Be52** – K7, 8, L8, 9; (9)

(*)***Chaenothecopsis pusiola*** (Ach.) Vain.

On wood of conifers and (probably) on thallus of *Chaenotheca xyloxena*.
Specimens examined: **Be42** – E9; **Be52** – L9; (2) (cf. Kubiak 2002)

Chrysothrix candelaris (L.) J.R. Laundon

On bark of *Salix*.
Specimen examined: **Be42** – E10; (1)

Cladonia arbuscula (Wallr.) Flot. em. Ruoss subsp. ***mitis*** (Sandst.) Ruoss

On soil and on rotting wood.

Specimens examined: **Be42** – A16, B17, C8, F17, 20, J9, 10; **Be52** – L6, 8, M6, 9; (11) (cf. Lettau 1955 – as Cl. mitis Sandst., Juśkiewicz and Endler 1997 – as *Cladina mitis*, Juśkiewicz 1999 – as *Cladina mitis*)

C. a. subsp. ***squarrosa*** (Wallr.) Ruoss.

On soil and on rotting wood.

Specimens examined: **Be42** – A16, C18, 19, E9, 19, I14; **Be43** – E21; (7)

Cladonia cariosa (Ach.) Spreng.

On soil.

Specimens examined: **Be42** – C8; **Be52** – M6, 8, 9; (4) (cf. Kubiak 2002)

Cladonia cenotea (Ach.) Schaer.

On wood and on bark of Acer, Betula and Pinus.

Specimens examined: **Be42** – C18, D15, 17, E15, 19, F15, 17, 18, 20, G15, H12, I14; **Be52** – K6, 7; (15) (cf. Lettau 1919, 1955)

Cladonia cervicornis (Ach.) Flot. subsp. ***verticillata*** (Hoffm.) Ahti

On soil.

Specimens examined: **Be42** – I14; **Be43** – E21; **Be52** – Q10; (3) (cf. Lettau 1919 – as *Cladonia verticillata* Hoffm. Flk., Juśkiewicz 1999)

Cladonia chlorophaea (Flörke ex Sommerf.) Spreng.

On soil, wood and bark of *Picea* and *Tilia*.

Specimens examined: **Be42** – B17, C16, 18, D16, E13, 19, G12, H15; (8)

Cladonia ciliata Stirton

On soil.

Specimens examined: **Be42** – B17, C19; (2) (cf. Lettau 1919 – as *Cladonia tenuis* Flk.)

Cladonia coccifera (L.) Willd

Lettau (1919).

Cladonia coniocraea auct.

On bark of *Acer, Alnus, Betula, Carpinus, Corylus, Fagus, Fraxinus, Malus, Padus, Picea, Pinus, Populus, Quercus, Rhamnus, Salix, Sorbus, Thuja, Tilia*, on soil and on wood.

Specimens examined: **Be42** – A10, 16, 17, B11, 16, C8, 15-19, D7-10, 13-15, 17-20, E8-11, 13-20, F10, 11, 13-20, G11-16, 18, 20, H12-15, I3, 5, 6, 12-15, J2, 6, 9, 10, 14, 15; **Be43** – D21, E21, F21, 22, G21, 22, H21-24, I23, 25, 27; **Be52** – K1, 4-8, 11, L6-10, M8-11, 13, O11, P10, 11, Q8-11, R11, 14, 20, S12, 20; **Be53** – P22, Q22, 23, R21, S21; (118) (cf. Lettau 1919, 1955)

Cladonia cornuta (L.) Hoffm.

On soil.
Specimens examined: **Be42** – A16, 17, B16, C8, 19, D10, 13, E9, F7, G20, J14; **Be43** – E21, F22, H23; **Be52** – K2, M6, 8, 9, O11; **Be53** – R21; (20) (cf. Lettau 1919, 1955; Juśkiewicz and Endler 1997; Juśkiewicz 1999)

Cladonia deformis (L.) Hoffm.

On bark of *Betula* and on wood.
Specimens examined: **Be42** – C19, I6; (2) (cf. Juśkiewicz and Endler 1997)

Cladonia digitata (L.) Hoffm.

On bark of *Alnus, Betula, Picea, Pinus, Populus, Quercus* and *Sorbus* as well as on soil and wood.
Specimens examined: **Be42** – A10, 16, 17, B11, C15, 16, 18, 19, D8, 10, 13-20, E15-20, F9, 10, 15-20, G12-16, 20, H12-15, I12-15, J6; **Be43** – F21, G21, 22; **Be52** – K5-8, L-8, M6, 10, O7, Q10, 11, R11; (63)

Cladonia fimbriata (L.) Fr.

On bark of *Acer, Alnus, Betula, Fraxinus, Malus, Padus, Picea, Pinus, Populus, Quercus, Rhamnus, Salix, Sorbus* and *Tilia* as well as on wood, soil and a layer of humus on erratic boulders and weathered concrete.
Specimens examined: **Be42** – A10, 16, B16, 17, C8, 10, 15-20, D7, 8, 10, 11, 13-18, 20, E5, 9-11, 13, 15-19, F5, 7, 10, 11, 13, 14, 16-20, G12-16, 19, 20, H12-14, I3, 4, 6, 12-15, J2, 4-6, 9, 11, 14, 15; **Be43** – D21, 22, E21, 22, F21, 22, G22, 25, H23, 24, I23, J25-27; **Be52** – K1-5, 8, L6-10, 14, M6, 8, 10, 13, N7, 11, O9, 11, P11, 13, Q8, 10-12, R14, 20, S12, 14, 20, W18; **Be53** – P22 Q21, 22, R21, S21, T21; (121) (cf. Lettau 1955 – as *Cl. maior* (Hag.) Zopf., Juśkiewicz and Endler 1997, Juśkiewicz 1999)

Cladonia furcata (Huds.) Schrad.

On soil and rotting wood.
Specimens examined: **Be42** – A16, 17, B16, 17, C8, 10, 18-20, D10, 13, 18, E9, 20, F18-20, G15, I4, 12, 14, J9, 14; **Be43** – E21, H23; **Be52** – K1, 2, L6, 8, 9, M6, 8, 9, O9, 11, Q10, S12; **Be53** – S21, T21; (39) (cf. Juśkiewicz and Endler 1997, Juśkiewicz 1999 – as *Cl. furcata* var. *palamaea*)

Cladonia glauca Flörke

On bak of *Alnus, Betula, Picea, Pinus, Populus* and *Quercus* as well as on wood and soil.
Specimens examined: **Be42** – B17, C8, 17, 19, 20, D17, 20, E15, F17, 18, 20, G20, H12, I14, J2; **Be52** – K5, 8, M10, Q10, R14; **Be53** – P22; (21) (cf. Lettau 1919)

Cladonia gracilis (L.) Willd.

On soil and wood.
Specimens examined: **Be42** – A16, C19, I14, J10; **Be43** – E21; **Be52** - L8, M6; (7) (cf. Lettau 1919, Juśkiewicz 1999)

Cladonia grayi Merill ex Sandst.

On wood.
Specimens examined: **Be42** – D18, F18, G12; (3)

Cladonia macilenta Hoffm. subsp. ***florkeana*** (Fr.)

On bark of *Alnus* and *Betula* as well as on wood and soil.
Specimens examined: **Be42** – C8, D16, E9, 17, 19, I14; **Be43** – E21; **Be52** – L8, Q12; (9)

C. m. subsp. ***macilenta***

On bark of *Betula, Picea* and *Pinus* as well as on wood and soil.
Specimens examined: **Be42** – A16, B17, C7, 8, 15, 18, D14-20, E9, 16-19, F16-19, G12-14, 16, 20, H12, 13, I6, 13-15, J15; **Be43** – F21, G21; **Be52** – K1, 5-8, L6-8, O7; (45) (cf. Lettau 1919)

Cladonia merochlorophaea Asahina

On soil and bark of *Betula*.
Specimens examined: **Be42** – C19, D13; **Be52** – L8, M9; (4)

Cladonia ochrochlora Flörke

On bark of *Alnus, Betula, Fraxinus, Picea, Pinus, Populus* and *Quercus* as well as on wood and soil.
Specimens examined: **Be42** – B17, C8, 15, 16, 18-20, D8, 9, 14, 16-20, E10, 13, 15-19, F13, 15-20, G13-16, 20, H12-15, I14-16; **Be43** – D21, G22, H23; **Be52** – K6, 7, L7, 8, O9, P7, Q10, 11, R11; **Be53** – R21; (53) (cf. Lettau 1919)

Cladonia phyllophora Hoffm.

On soil.
Specimens examined: **Be42** – B17, C8, E19, I14; **Be52** – K1, M9; (6) (cf. Lettau 1919 – as *Cladonia degenerans* (Flk.) Spreng., Juśkiewicz 1999)

Cladonia pleurota (Flörke) Schaer.

On soil.
Specimen examined: **Be42** – C8; (1) (cf. Lettau 1919, 1955)

Cladonia portentosa (Dufour) Coem.

Lettau (1955), as *C. impexa* Harm.

Cladonia ramulosa (With.) J.R. Laundon

On bark of *Alnus* and *Betula*.
Specimens examined: **Be42** – I6; **Be52** – O11, Q8; (3)

Cladonia rangiferina (L.) Weber

On soil.
Specimens examined: **Be42** – C19, G12; (2)

Cladonia rangiformis Hoffm.

On soil.
Specimens examined: **Be43** – E21; **Be52** – M8; (2)

Cladonia rei Schaer.

On soil.
Specimens examined: **Be42** – E19, I14; **Be52** – K2; (3)

Cladonia scabriuscula (Delise) Nyl.

On soil, bark of *Betula* and wood.
Specimens examined: **Be42** – B17, C8, 19, D11, E8, 19, F16, J10; **Be52** – L6, 8, R20; (11)

Cladonia subulata (L.) Weber

On soil, bark of *Picea* and wood.
Specimens examined: **Be42** – B16, C8, 19, D16, E11, 19, F13, 20, G15, I14; **Be43** – D22, H23; **Be52** – K1, 2, L9, M8, O9, Q10; (18) (cf. Lettau 1955 – as *Cl. cornutoradiata* Coëm., Juśkiewicz and Endler 1997, Juśkiewicz 1999)

Cladonia sulphurina (Michx.) Fr.

On wood.
Specimen examined: **Be42** – F17; (1)

Cladonia uncialis (L.) F.H. Wigg.

Juśkiewicz and Endler (1997), Juśkiewicz (1999).

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

On thallus of *Hypocenomyce scalaris* growing on bark of *Picea abies* and *Pinus sylvestris* as well as on wood.
Specimens examined: **Be42** – D14, E17, I12, L8; (4)

Collema limosum (Ach.) Ach.

On bryophytes growing over concrete.
Specimen examined: **Be42** – H14; (1) (cf. Kubiak 2002)

Dimerella pineti (Schrad. ex Ach.) Vězda

On bark of *Acer, Alnus, Betula, Carpinus, Corylus, Crataegus, Fraxinus, Malus, Padus, Picea, Pinus, Populus, Quercus, Rhamnus, Salix, Sorbus, Tilia* and on wood.
Specimens examined: **Be42** – A9, 10, C15-20, D7, 8, 11, 16-19, E9, 13-19, F14-19, G7, 11-16, H12, 14, 15, I12, 15, J6, 14-16; **Be43** – E21, G22, H22; **Be52** – K5, 7-9, L9, N7, 11, O11, P7, 11, 13, Q8, 11; **Be53** – P21, 22, Q21, 22; (66)

Evernia prunastri (L.) Ach.

On bark of *Acer, Alnus, Betula, Fraxinus, Populus, Quercus, Rhamnus, Salix, Sambucus, Sorbus, Tilia* and on wood.
Specimens examined: **Be42** – A10, 17, B9, 16, 17, C8, 10, 15-19, D8, 16-19, E6, 9, 13-18, F4, 6, 8, 12, 14, 15, G5, 8, 9, 11, 13-16, H5, 10, 12-15, I3, 4, 12, 14, 15, J2-6, 9, 12, 14; **Be43** – D21, E21-23, G22, 24, 26, I23, 25-27; **Be52** – K4, 5, 7-9, 11-15, L6-10, 19, 20, M10, 11, 13, 15, N9, 10, 13-15, O9, 11, 13, 14, 20, P8, 9, 11, 13-15, 18, Q8, 10, 11, 13, 15, 16, R13, 14, S13-15, T16, 17, U16-19, W16-18, X15; **Be53** – K24, N22, 24, 25, O22, P21-23, Q22, R21, 22, 24, S21; (147)

Fellhanera subtilis (Vězda) Diederich et Sérus.

On twigs of Picea abies and *Vaccinium myrtillus*.
Specimens examined: **Be42** – A10, E17, 20; (3) (cf. Kubiak 2002)

Fellhaneropsis myrtillicola (Erichsen) Sérus. et Coppins

On twigs of *Picea abies* and bark of *Tilia*.
Specimens examined: **Be42** – C16-19; (4) (cf. Kubiak 2002 – as *Fellhanera myrtillicola* (Erichsen) Haf.)

Fellhaneropsis vezdae (Coppins et P. James) Sérus. et Coppins

On bark of *Quercus*.
Specimen examined: **Be42** – E15; (1)

Fuscidea arboricola Coppins et Tønsberg

On bark of *Alnus, Fraxinus* and *Quercus*.
Specimens examined: **Be42** – C18, D18, G13; (3)

Fuscidea pusilla Tønsberg

On bark of *Alnus, Betula, Corylus, Quercus, Rhamnus* and *Sorbus*.
Specimens examined: **Be42** – D17, E18, G12, J6; **Be43** – D21; **Be52** – K8, **Be53** – P21; (7)

Graphis scripta (L.) Ach.

On bark of *Acer, Carpinus, Corylus, Fraxinus, Quercus, Sorbus* and *Tilia*.
Specimens examined: **Be42** – C15-18, D14, 17, 18, F13, 14, G12-15, H15, **Be52** – O11, P11, Q11; (17) (cf. Hutorowicz 1964)

Hypocenomyce anthracophila (Nyl.) P. James et Gotth. Schneid.

On bark of *Pinus sylvestris*.
Specimens examined: **Be42** – C20, F20, G16, I14, **Be52** – Q10; (5)

Hypocenomyce caradocensis (Leight. ex Nyl.) P. James et Gotth. Schneid.

On bark of *Pinus sylvestris* and *Picea abies*.
Specimens examined: **Be42** – C16, E16, F19, G12, 14, 18, H12, I15; **Be43** – F21; (9)

Hypocenomyce scalaris (Ach.) Choisy

On bark of *Acer, Alnus, Betula, Fraxinus, Padus, Picea, Pinus, Populus, Quercus, Salix, Sorbus* and *Tilia* as well as on wood.
Specimens examined: **Be42** – A10, 16, 17, B11, 16, C7, 8, 10, 15, 16, 18-20, D8-11, 13-20, E4, 6-11, 13-20, F6, 8-20, G5-20, H6, 7, 11-16, 18, I3, 6, 7, 10-15, 19, 20, J2, 3, 5, 6, 10-16; **Be43** – D21, E21, 22, 24, F21, 22, G21-23, 25, 26, H21-24, I25, 26, J25-27; **Be52** – K1-11, 13-17, L6, 8-10, 12-17, M6, 9-14, 16, 18, N6-11, 14, 17, O7, 8, 11, 13, 14, 18, 20, P7-11, 13, 14, Q8-11, 13, 15, 16, 20, R11-15, 20, S12-15, 17, T16, 17, U17-20, W16-18, X15; **Be53** – K22, N22, 24, 25, O22, P22, 23, Q21-23, R21, 22, 24, S21, U21; (222)

Hypogymnia physodes (L.) Nyl.

On bark of *Acer, Alnus, Berberis, Betula, Carpinus, Corylus, Crataegus, Fagus, Forsythia, Frangula, Fraxinus, Malus, Padus, Picea, Pinus, Populus, Prunus, Quercus, Rhus, Rosa, Salix, Sambucus, Sorbus* and *Tilia* as well as on wood, soil and erratic boulders.
Specimens examined: **Be42** – A9, 10, 16, 17, B9, 11, 16, 17, C7, 8, 10, 15-20, D7-11, 13-20, E4-6, 8-11, 13-20, F4-6, 8-20, G5-11, 12 (c. ap.), 13-18, 20, H5-7, 9, 11-15, 17-19, I3-7, 10-17, 19, 20, J2-6, 9-18, 20; **Be43** – D21, E21-24, F21-23, G21-24, 26, H21-24, I23-26, J25-27; **Be52** – K1-20,

L6-10, L12-20, M6, 8-11, 13-18, 20, N6-11, 14, 15, 18, 20, O7, 9-11, 13, 14, 16, 18-20, P7, 8, 11, 13, 14, 18-20, Q8, 10-13, 15-17, 19, 20, R11-15, 18, 20, S13-15, 20, T16, 17, 19, 20, U16-20, W16-18, X15; **Be53** – K22, 25, N22, 24, 25, O22, P21-23, Q21-23, R21-24, S21-23, T21, U21; (271) (cf. Hutorowicz 1964 – as *Parmelia physodes*)

Hypogymnia tubulosa (Schaer.) Hav.

On bark of *Acer, Alnus, Betula, Crataegus, Fagus, Fraxinus, Padus, Populus, Quercus, Rhamnus, Salix* and *Tilia* as well as on wood.

Specimens examined: **Be42** – A17, E9, 13, F9, 12, G17, H15, I4, J2, 4, 5, 9; **Be43** – D21, H23, I25; **Be52** – K2, 8, 11, 13, L9, 14, 19, 20, M9, 11, 13, N15, 20, O18, P11, 14, 19, Q9, 11-13, S15, T19, U17, 20, W18, X15; **Be53** – N24, P21, S21; (45)

Imshaugia aleurites (Ach.) S.L.F. Meyer

On bark of *Pinus sylvestris* as well as on wood.

Specimens examined: **Be42** – D10, 13-15, E19, F18, 20, G12, 13, H12; **Be52** – K5, L9, Q10; (13)

Lecania cyrtella (Ach.) Th. Fr.

On bark of *Acer, Alnus, Betula, Fraxinus, Populus, Salix, Sambucus* and *Sorbus*.

Specimens examined: **Be42** – A10, 17, C18-20, D13, E9, 13, F13, G16, H12, I4, J6; **Be43** – E21, 23, G22; **Be52** – K12, L6, 7, 9, 10, 18, M10, 13, O7, 18, P11, Q10-12, R14, 20, S20; **Be53** – Q22, 23, R21, 24; (37)

Lecania globulosa (Flörke) van den Boom et Sérus.

On bark of *Acer, Fraxinus, Malus, Populus, Quercus* and *Salix*.

Specimens examined: **Be42** – B17, C16-18, D10, 16, 18, 19, E17, J6; **Be43** – F21; **Be52** – K9, Q11; (13)

Lecania naegelii (Hepp) Diederich et P. Boom

On bark of *Acer, Fraxinus, Populus* and *Salix*.

Specimens examined: **Be42** – A17, C10, 17-19, D13, E9, 13, F14, G16, I3, J6; **Be43** – E23, J23; **Be52** – L8, 10, M8, P8, 13, Q10, S12, 20; **Be53** – T21; (23) (cf. Kubiak 2002 – as *Bacidia naegelii* (Hepp.) Zahlbr.)

Lecania sylvestris (Arnold) Arnold

On concrete.

Specimens examined: **Be42** – E13, F18, G13, I12, J2; **Be43** – F21; (6)

Lecanora albella (Pers.) Ach.

On bark of *Quercus rubra*.

Specimen examined: **Be42** – F14; (1)

Lecanora albescens (Hoffm.) Flörke

On anthropogenic rock substrate (concrete, plaster).

Specimens examined: **Be42** – A10, C7, 10, 20, D6, 11, 13, 20, E4-7, 11, 13, 20, F4, 7, 11, 13, 20, G5-8, 13, 16, 18, 19, H5-7, 10, 13, 16-18, I3-5, 10, 11, 14, 17, 20, J2, 11, 12, 18-20; **Be43** – E23, F22, 23, G24, H21, 23, 24, I21, 24, J22, 23, 25; **Be52** – K2, 3, 12-17, L9, 12, 14, 18-20, M8, 9, 12-20, N8-10, 12, 14, 15, 17-20, O8-10, 13, 16, 17, 19, 20, P13, 14, 18-20, Q13, 15, 16, 18, 19, R11, 12, 15, 17-20, S12-15, 17, 20, T14, 17, 18, 20, U17, 18, 20, X15; **Be53** – K22-25, L21, O21, 22, Q23, S21; (145)

Lecanora allophana (Ach.) Nyl.

On bark of *Populus tremula*.
Specimen examined: **Be52** – K8; (1)

Lecanora argentata (Ach.) Malme

On bark of *Acer, Alnus, Betula, Carpinus, Fraxinus, Populus, Quercus, Salix* and *Tilia*.
Specimens examined: **Be42** – D16, 17, E16-18, F13, 14, G11, 16, H15, J5, 6, 15; **Be52** – K7, 9, 11, L8, 9, O7, 11, Q8, 16, T17, X15; **Be53** – P21; (25)

Lecanora carpinea (L.) Vain.

On bark of *Acer, Alnus, Carpinus, Corylus, Fraxinus, Populus, Quercus, Salix, Sambucus, Sorbus* and *Tilia*.
Specimens examined: **Be42** – A17, B9, C7, 10, 15-19, D13, 17, E13, 14, F5, 13, G11, 13, 14, H12, I7, 12, 13, J4; **Be43** – E21, I24, 25, J21, 24; **Be52** – K2, 5, 8, L7, 8, 12, M8, 10-12, N7, O7, 13, P7, 11, 17, Q9, 11, 13, 17, R11, 13, 17, S15, 20, T17, 20, U16, W18, X15; **Be53** – O22, P22, Q22, 23, R21, 24, S22, U21; (66)

Lecanora chlarotera Nyl.

On bark of *Acer, Alnus, Fraxinus, Lonicera, Populus, Quercus, Salix, Sorbus* and *Tilia*.
Specimens examined: **Be42** – C7, 10, 15, 16, 18, 19, D9, 13, E17, F4, 6, 13, G12, 14, H10, 12, I7, 13, J3, 9, 12; **Be43** – G26, H21; **Be52** – K2, 8, 10, 12, L9, 10, M13, O13, P8, 13, Q9, 11, 13, 18, 19, R12, 13, S12, 13, 15, S20, T17, 18, U17, W16, X15; **Be53** – N21, 25, P21, Q22, R22-24, S21, 22; (58)

Lecanora conizaeoides Nyl. ex Crombie

On bark of *Acer, Alnus, Berberis, Betula, Carpinus, Corylus, Fagus, Frangula, Fraxinus, Malus, Padus, Picea, Pinus, Populus, Prunus, Quercus, Rhamnus, Rosa, Salix, Sambucus, Sorbus* and *Tilia*, on twigs of *Vaccinium* as well as on wood.
Specimens examined: **Be42** – A9, 10, 16, 17, B9, 16, 17, C7, 8, 10, 15-20, D7, 8, 10, 11, 13-20, E4, 7-11, 13-20, F5, 6, 9, 10-20, G5-8, 10-20, H5-7, 9, H10-18, I3-7, 10-20, J3-6, 9-19; **Be43** – D21, 22, E21-23, F21-24, G21-24, 26, H21-25, I21-23, 25, J21, 24-27; **Be52** – K1-17, 19, 20, L6, 8-10, 12-20, M6, 8-20, N6-9, 11, 14-18, O7-11, 13-15, 17-20, P7-11, 13-15, 17-20, Q8-13, 15, 16, 18-20, R11, 12, 13-15, 17, 18, 20, S13-17, 20, T16-20, U16, 18-20, W16, 18, X15; **Be53** – K21, 22, N21, 24, 25, O21, 22, P21-23, Q21-23, R21-24, S21, T21, U21; (280)

Lecanora dispersa (Pers.) Sommerf.

On anthropogenic rock substrate (concrete, plaster, mortar, bricks), on bark of *Acer, Betula, Fraxinus, Populus, Rhus* and *Tilia* as well as on wood and erratic boulders.
Specimens examined: **Be42** – A10, B16, 17, C7, 10, 16, 20, D6, 10, 13, 20, E4-8, 11, 13, 20, F4, 6, 7, 11, 13, 16, 17, 19, 20, G5-8, 10, 13, 15-20, H5-7, 10, 13, 14, 16-18, I3-5, 10-15, 17-20, J2, 3, 11-13, 16, 18, 20; **Be43** – D21, F22, 23, G24, 26, H21-24, I21, 24, J21-25; **Be52** – K2-4, 12-19, L9, 12, 14, 17-20, M8-20, N8-12, 14-20, O8-10, 13, 14, 16-20, P7, 10, 13, 14, 17-20, Q13, 15-20, R11-15, 17-20, S12-17, 20, T14, 17, 18, 20, U17, 18, 20, X15; **Be53** – K21-25, L21, 22, N24, O21, 22, P21, 22, Q23, R23, S21, T21; (194)

Lecanora expallens Ach.

On bark of *Acer, Alnus, Betula, Carpinus, Corylus, Fagus, Fraxinus, Malus, Populus, Quercus, Salix, Sambucus, Sorbus* and *Tilia* as well as on wood.

Specimens examined: **Be42** – A9, 10, 16, 17, B9, 16, 17, C8, 10, 15-20, D10, 15-20, E5, 6, 10, 13, 16-18, 20, F4, 13-15, 20, G5, 8, 9, 11-16, H7, 10, 12, 13, 15, I7, 11-15, J2-4, 6, 9, 12-16; **Be43** – D22, E21, F21, G25, 26, H21, 24, I24, 25, J25, 27; **Be52** – K3-5, 7-9, 13-15, L10, 12, 13, M10-13, N7, 9, 11, O11, 13, P8, 9, 11, 13, 15, 20, Q8, 10, 11, 13, 15, R11, 12, 14, 17, 20, S12-15, 17, T16, 17, U17, 19, 20, W16-18, X15; **Be53** – N22, 24, P21, 22, Q21, 22, R21, 22, 24; (138)

Lecanora glabrata (Ach.) Malme

On bark of *Carpinus betulus*.
Specimen examined: **Be42** – G14; (1)

Lecanora hagenii (Ach.) Ach.

On bark of *Acer, Betula, Carpinus, Faxinus, Malus, Populus, Salix, Sambucus* and *Tilia* as well as on wood and concrete.
Specimens examined: **Be42** – B16, C10, D13, E9, 13, G16, H4, J5; **Be43** – E21, 23, F22, 23, J21, 23; **Be52** – K11, 14, L10, N8, 15, 18, O9, O18, 19, P8, Q9, R13, 19, T19, W16, X15; **Be53** – K24, 25, L22, O21, R24; (35)

Lecanora leptyrodes (Nyl.) Degel.

On bark of *Populus*.
Specimens examined: **Be42** – H4; **Be53** – S22; (2)

Lecanora persimilis (Th. Fr.) Nyl.

On bark of *Acer, Alnus, Betula, Fraxinus, Malus, Populus, Prunus, Salix* and *Tilia* as well as on erratic boulder.
Specimens examined: **Be42** – E6, F9, G16, 20, H4, J5; **Be43** – G25, H23; **Be52** – K9, L10, 14, M12, 18, N20, O16, 19, P8, R13, 19, X15; **Be53** – L22, S22; (22)

Lecanora piniperda Körb.

On bark of *Betula, Fraxinus* and *Salix* as well as on wood.
Specimens examined: **Be42** – D19, F16, J15; **Be43** – E21, H23; **Be53** – S21; (6)

Lecanora polytropa (Ehrh. ex Hoffm.) Rabenh.

On erratic boulders.
Specimens examined: **Be42** – A16, B17, D11; **Be52** – K1, 2, M6, N6, Q10; **Be53** – K26, P21; (10)

Lecanora cfr. ***populicola*** (DC.) Duby

On bark of *Populus tremula*.
Specimen examined: **Be42** – E9; (1)

Lecanora pulicaris (Pers.) Ach.

On bark of *Acer, Alnus, Betula, Carpinus, Corylus, Fagus, Fraxinus, Populus, Quercus, Salix, Sorbus* and *Tilia* as well as on wood.
Specimens examined: **Be42** – A10, 17, B9, 18, C15-17, 19, 20, D14, 15, 17-19, E5, 13, 14, 16, 17, F13, 14, 17, 19, G6, 12-14, H7, 12-15, I7, 13-15, J3, 6, 9; **Be43** – D21, G21, 22, I25, J25; **Be52** – K2, 5, 7-9, L6, 7, 9, 13, M20, O7, 15, P15, Q8, 9, 11, 13, 18, 19, S20, T17, 19, 20, U18, W18; **Be53** – K24, N21, P21, 22, Q21-23, R22, T21; (78)

Lecanora rugosella Zahlbr.

On bark of *Acer, Populus* and *Salix*.
Specimens examined: **Be42** – A17, C19, D13, E9, F13, I3, J9; **Be43** – G22; **Be52** – K8, L8, 10, M8, N20, P8, 11, R13, S20; **Be53** – N24, R21, T21; (20)

Lecanora saligna (Schrad.) Zahlbr.

On bark of *Acer, Betula, Fraxinus, Populus* and *Salix* as well as on wood.
Specimens examined: **Be42** – B9, 16, 17, C10, D10, E10, 13, G16, H7, I7, J5, 14; **Be43** – I25, J27; **Be52** – K5, 9, 10, 14, L9, 10, 12, 14, 19, M13, O9, P8, Q8, R13, 14, S12, 13, 15, T16, 17, U20; **Be53** – R22, 24; (37)

Lecanora sambuci (Pers.) Nyl.

On bark of *Populus tremula*.
Specimen examined: **Be52** – M8; (1)

Lecanora symmicta (Ach.) Ach.

On bark of *Fraxinus, Populus, Quercus* and *Salix*, on twigs of *Picea abies* and wood.
Specimens examined: **Be42** – A17, C7, 20, E9, 13, F5, 18; **Be43** – E21, G22, J25; **Be52** – K2, 9, 10, L6, 8, M9, P8, 14, Q8, 11, S20; (21)

Lecanora varia (Hoffm.) Ach.

On bark of *Acer, Alnus* and *Betula* as well as on wood.
Specimens examined: **Be42** – C8, E6, 11, F8, J5; **Be52** – K13, Q11, 15; **Be53** – N24; (9)

Lecidea fuscoatra (L.) Ach.

On erratic boulder.
Specimens examined: **Be42** – D10; **Be52** – N6; (2)

Lecidella elaeochroma (Ach.) Choisy

On bark of *Acer, Carpinus, Corylus, Fraxinus, Lonicera, Populus, Quercus, Salix, Sambucus* and *Thuja*.
Specimens examined: **Be42** – A17, C7, 10, 15-19, D13, 16, E4, 9, 13, F6, 13, G13, 16, H4, 5, 7, 12, 14, 15, I3, J6, 9, 10, 14; **Be43** – D21, E21, 23, G22, 25, J23; **Be52** – K3, 8, 9, 11, L7-10, 12, 13, M10, 11, N19, 20, O7, P8, 11, 13, 14, 20, Q9, 11, 15, R11, 17, S15, T14, 16, 17, U19, W16; **Be53** – K22, 24, Q21, 22, R21, 24, S21, 22, T21; (79)

Lecidella flavosorediata (Vězda) Hertel et Leuckert

On bark of *Malus, Populus, Quercus, Salix* and *Tilia*.
Specimens examined: **Be42** – B17, E9, 17, J4, 14; **Be43** – I25; **Be52** – M8, Q9, 12; **Be53** – R23; (10)

Lecidella stigmatea (Ach.) Hertel et Leuckert

On concrete and wall plaster.
Specimens examined: **Be42** – A10, C16, 20, D6, E4, 20, F4, 6, 16, G5-7, 15, 16, H13, I13, 14, J2, 12; **Be43** – D21, F23, H23, 24, I24; **Be52** – K13-16, L9, 15, 17-19, M9, 10, 17, 18, N9, 18, O9, 13, 20, Q20, R12, T14; **Be53** – K24, N24; (50)

Lepraria spp.

On bark of trees and shrubs, wood, natural and anthropogenic rock substrate as well as on soil.

Specimens examined: **Be42** – A9, 10, 16, 17, B9, 11, 16, 17, C7, 8, 15-20, D7-11, 13-20, E4, 8-11, 13-20, F4-6, 9-20, G5-7, 11-20, H5, 7, 10-17, 20, I3-7, 10-17, 19, 20, J2-6, 9-11, 13-17; **Be43** – D21, 22, E21-24, F21, 23, G21-23, 25, 26, H21-25, I21, 24-26, J25-27; **Be52** – K1, 2, 4-11, 13-16, L6-10, 12, 14, 15, 17, 20, M6, 8-13, 15, 17, 18, N6-11, 13, 14, 16, 17, 7, 10, 11, 13, 14, 18, 20, P7-9, 11, 13-15, 18, Q8-13, 15, 16, R11-14, 17, 20, S12-15, 17, 20, T16, 17, 19, U16, 17, 19, 20, W16-18, X15; **Be53** – K22, 26, N22, 24, 25, O22, P21-23, Q21-23, R21-23, T21, U21; (241)

+***Leptorhaphis atomaria*** (Ach.) H. Magn.

On bark of *Populus*.

Specimens examined: **Be52** – L9, M8, Q9, R20; **Be53** – S21, 22; (6) (cf. Kubiak 2002)

(*)***Licea parasitica*** (Zukal) Martin

On thallus of undetermined crustose, sorediate lichen growing on bark of *Rhamnus catharticus*.

Specimen examined: **Be52** – J6; (1)

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

On thallus and apothecia of Lecanora carpinea growing on bark of *Fraxinus excelsior* as well as on thalli of *Hypogymnia physodes* and *Lecanora conizaeoides* growing on bark of *Alnus glutinosa*.

Specimens examined: **Be42** – C18; **Be52** – K5; (2)

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

On apothecia of *Lecanora conizaeoides* growing on bark of *Alnus* and *Pinus sylvestris*.

Specimens examined: **Be52** – K9, M8; (2)

****Lichenodiplis lecanorae*** (Vouaux) Dyko et D. Hawksw.

On apothecia of *Lecanora saligna* growing on bark of *Populus*.

Specimen examined: **Be52** – K14; (1)

?***Lobaria pulmonaria*** (L.) Hoffm.

Lettau (1919).

Loxospora elatina (Ach.) A. Massal

On bark of *Tilia*.

Specimen examined: **Be42** – C15; (1)

Macentina abscondita Vězda

On bark of *Rhamnus* and *Sambucus*.

Specimens examined: **Be42** – C20, I15, J6; **Be52** – K5, 8, L16, O11, Q11, 12, R11; **Be53** – Q22; (11) (cf. Kubiak 2003)

Melanelia elegantula (Zahlbr.) Essl.

On bark of *Alnus* and *Fraxinus*.

Specimens examined: **Be53** – P22, Q22; (2)

Melanelia exasperatula (Nyl.) Essl.

On bark of *Acer, Berberis, Betula, Carpinus, Corylus, Fagus, Fraxinus, Malus, Padus, Populus, Quercus, Salix, Sorbus* and *Tilia* as well as on wood and erratic boulders.
Specimens examined: **Be42** – C19, E9, 11, F6, 8, G16, H16, 18, I16, 17, J3-5; **Be43** – D22, E22, F23, H25, I25, J25-27; **Be52** – K10, 13, 19, 20, L12, 14, 18, 20, M8, 11, 13, N10, 11, 20, O10, O3, 18, P10, 13, 14, 18, Q8, 12, 13, R13, 15, 20, S15, T18, 19, U16, 19, 20, W17, X15; **Be53** – K25, N24, R22-24, S22; (64)

Melanelia fuliginosa (Fr. ex Duby) Essl.

On bark of *Acer, Alnus, Betula, Carpinus, Corylus, Fagus, Fraxinus, Malus, Padus, Populus, Quercus, Rhamnus, Salix, Sambucus, Sorbus* and *Tilia* as well as on wood.
Specimens examined: **Be42** – A17, B16, 17, C15, 16, 17 (c. ap.), 18-20, D7, 13, 16-19, E13, 14, 17, 20, F13, 14, 16, 20, G12-14, 16, H12, 14-16, I3, 7, 12-14, 16, J6, 15, 16; **Be43** – D21, H22, J27; **Be52** – K5, 7-10, 13-15, L8-10, 14, M11, O11, 13, P7, 11, 13, Q8, 9, 11, 13, 15, S20, T16, X15; **Be53** – P22, Q22, R21, S21; (73)

Melanelia subargentifera (Nyl.) Essl.

On bark of *Acer*.
Specimens examined: **Be52** – N9, Q8, 13, 16; (4)

?***Menegazia terebrata*** (Hoffm.) Körb.

Motyka (1960), as *Parmelia pertusa* (Schrank) Schaer.

Micarea botryoides (Nyl.) Coppins

On bark of *Betula, Carpinus, Pinus* as well as on wood and a small stone.
Specimens examined: **Be42** – E15, G13, 15; **Be52** – M8, P11; **Be53** – P21; (6) (cf. Kubiak 2002)

Micarea denigrata (Fr.) Hedl.

On wood and bark *Pinus sylvestris*.
Specimens examined: **Be42** – C18-20, D13, 14, 16, 19, 20, E8, 10, 16, 19, F6, 11, 17-19, G13, 14, 20, I13-15, J5; **Be43** – E21, 24, F22; **Be52** – K1, 3, 4, L8, 9, Q10, U16, U17; **Be53** – O22, P22, Q23; (38)

Micarea melaena (Nyl.) Hedl.

On bark of *Betula* and on wood.
Specimens examined: **Be42** – E15, I14, **Be52** – K7; (3) (cf. Czarnota 2002)

Micarea micrococca (Körb.) Gams et Coppins

On wood and bark of *Pinus sylvestris*.
Specimens examined: **Be42** – D16, H14; **Be52** – L9, P7; (4)

Micarea misella (Nyl.) Hedl.

On wood.
Specimens examined: **Be42** – A16, C8, D8, 9, 16, 18, E8, 9, 16, 18, F16, 18, G14, H15, I5, 14; **Be43** – D21, F21, G21; **Be52** – K6, L9, P7; **Be53** – P21, S21; (24)

Micarea nigella Coppins

On wood.
Specimens examined: **Be42** – C8, 15, D18, E10, F15, 18; **Be52** – P7, Q10; (8)

Micarea nitschkeana (J. Lahm. ex Rabenh.) Harm.

On twigs of *Picea abies* as well as on bark of *Betula, Pinus* and on wood.
Specimens examined: **Be42** – C16, 18, 19, D15, E19, F16, G12, 15, H12, J2; **Be52** – K8; (11)

Micarea prasina Fr.

On bark of *Acer, Alnus, Betula, Carpinus, Coryllus, Crataegus, Fraxinus, Picea, Pinus, Populus, Quercus, Rhamnus, Salix, Sambucus, Sorbus, Tilia* and on wood.
Specimens examined: **Be42** – A10, 16, B11, 17, C8, 15, 17-20, D9-11, 14-20, E9, 10, 13-20, F9, 14-20, G11-16, 19, 20, H12-15, I6, 12-15, J6, 15; **Be43** – D21, E21, F21, G21, 22, H22, 23, J26; **Be52** – K5-10, L6, 8, 9, M10, 11, P7, 8, 11, Q8, Q10, 11, R20, S20; **Be53** – K26, P21, Q21-23, S21, T21; (91)

Micarea viridileprosa Coppins et v. d. Boom

On rotting wood.
Specimen examined: **Be42** – C15; (1)

Mycobilimbia tetramera (De Not.) Vitik., Ahti, Kuusinen, Lomi et Ulvinen

On small concrete post.
Specimen examined: **Be53** – P22; (1)

Mycoblastus fucatus (Stirt.) Zahlbr.

On bark of *Acer, Alnus, Betula, Carpinus, Corylus, Fagus, Fraxinus, Padus, Pinus, Populus, Quercus, Sorbus* and *Tilia* as well as on wood.
Specimens examined: **Be42** – A10, B11, C15-19, D13-18, E14-18, F13, 14, 16, 17, G11-16, H12, 14, 15, I14, 15; **Be52** – K7, 8, P11, 13, Q10, 11, S20; **Be53** – P21; (41)

Myxobilimbia sabuletorum (Schreb.) Hafellner

On concrete and bryophytes growing over it and on thallus of *Peltigera*.
Specimens examined: **Be42** – B16, G15, H15; (3)

Neofuscelia loxodes (Nyl.) Essl.

On erratic boulder.
Specimen examined: **Be42** – D11; (1)

Ochrolechia androgyna (Hoffm.) Arnold

On bark of *Alnus, Betula, Carpinus, Fraxinus, Quercus* and on wood.
Specimens examined: **Be42** – C16, D18, E17, F14, G13, H12, 14, 15, I15; **Be52** – K8; (10) (cf. Kubiak 2002)

Ochrolechia microstictoides Räs.

On bark of *Acer* and *Alnus*.
Specimens examined: **Be42** – D16, E18, H12 (3)

Opegrapha rufescens Pers.

On bark of *Populus*.
Specimen examined: **Be52** – Q11; (1)

Opegrapha varia Pers.

On bark of *Acer* and *Malus*.
Specimens examined: **Be42** – B17, D16; (2)

Opegrapha viridis (Pers. ex Ach.) Behlen et Desberger

On bark of *Acer* and *Carpinus*.
Specimen examined: **Be42** – C15; (1)

Opegrapha vulgata Ach. var. ***subsiderella*** Nyl.

On bark of *Acer, Carpinus, Corylus, Quercus* and *Salix*.
Specimens examined: **Be42** – C15, C16, D14, E15, F13, 15, H7; (7)

O. v. var. ***vulgata***

On bark of *Acer platanoides*.
Specimen examined: **Be52** – P9; (1)

Pachyphiale fagicola (Hepp ex Arnold) Zwackh

On bark of *Acer platanoides*.
Specimen examined: **Be42** – I7; (1)

Parmelia saxatilis (L.) Ach.

On bark of *Carpinus, Fraxinus* and *Quercus*.
Specimens examined: **Be42** – C19, D17, H13, 15; (4)

Parmelia submontana Nádv. ex Hale

On bark of *Acer* and *Quercus*.
Specimens examined: **Be42** – D16, G12; (2) (cf. Kubiak and Fiedorowicz 2000)

Parmelia sulcata Taylor

On bark of *Acer, Alnus, Betula, Carpinus, Corylus, Crataegus, Fagus, Fraxinus, Malus, Padus, Picea, Pinus, Populus, Prunus, Quercus, Rhamnus, Salix, Sambucus, Sorbus* and *Tilia* as well as on wood and erratic boulders.
Specimens examined: **Be42** – A9, 10, 17, B9, 16-18, C7, 10, 15-20, D7-10, 13, 15-20, E4, 6, 9-11, 13-20, F4-6, 8, 9, 12-14, 16, 17, 19, 20, G5, 7, 9, 11-14, 16-18, 20, H5, 7, 10, 12-14, 16-18, I3-5, 7, 10-17, 19, J2-6, 9, 10, 12-15, 20; **Be43** – D21, 22, E21-23, F21, 23, G22, 24-26, H21-24, I21, 23-26, J23, 26, 27; **Be52** – K2-5, 7-20, L6-10, 12, 13, 15-20, M8, 10-13, 15-20, N7-11, 13-16, 18-20, O7, 9-11, 13, 14, 18, 19, P7-9, 11, 13, 14, 17-20, Q8-13, 15-20, R12-15, 18, 20, S12-15, S20, T16, 17, 19, 20, U16-20, W16-18, X15; **Be53** – K25, N22, 24, 25, O22, P21-23, Q21, 22, R21-24, S21, 22, T21, U21; (256) (cf. Hutorowicz 1964)

Parmeliopsis ambigua (Wulfen ex Jacq.) Nyl.

On bark *Alnus, Betula, Carpinus, Corylus, Fagus, Fraxinus, Malus, Picea, Pinus, Populus, Quercus, Rhamnus, Sorbus* and *Tilia* as well as on wood.

Specimens examined: **Be42** – B16, C15, 18-20, D14-20, E9, 10, 14, 17-20, F14, 17, 18, 20, G12-15, H9, 12, 14, 15, I3, 12, 13; **Be43** – E24; **Be52** – K11, L7, P11, Q10, 11, R11, W16; **Be53** – P22, R21; (43)

Peltigera canina (L.) Willd.

On soil.
Specimens examined: **Be42** – A16, F12, G17, J4; **Be52** – L9; **Be53** – S21; (6)

Peltigera didactyla (With.) J.R. Laundon var. ***didactyla***

On soil and wood.
Specimens examined: **Be42** – F8, 13, 16, G14; **Be52** – P11, Q20; (6)

P. d. var. ***extenuata*** (Nyl. ex Vain.) Goffinet et Hastings

On soil.
Specimen examined: **Be52** – R11; (1)

Peltigera hymenina (Huds.) Baumg.

On soil and boulders in retaining wall.
Specimens examined: **Be42** – G15, I14; **Be52** – L8; (3)

Peltigera membranacea (Ach.) Nyl.

On soil.
Specimen examined: **Be42** – B18; (1)

Peltigera neckeri Hepp ex Müll. Arg.

On soil.
Specimens examined: **Be42** – I14; **Be52** – N16; (2)

Peltigera ponojensis Gyeln.

On soil.
Specimen examined: **Be42** – F13; (1)

Peltigera praetextata (Flörke) Zopf

On rotting wood.
Specimen examined: **Be42** – F16; (1)

Peltigera rufescens (Weiss) Humb.

On soil and weathered concrete.
Specimens examined: **Be42** – B16, 17, D9, 13, G15, I12, 14, J4; **Be43** – F22; **Be52** – K1, L9, 10, M6, 9, P11, Q10; (16) (cf. Juśkiewicz and Endler 1997, Juśkiewicz 1999)

Pertusaria albescens (Huds.) Choisy et Werner

On bark of *Acer, Carpinus, Corylus, Fraxinus, Populus* and *Tilia*.
Specimens examined: **Be42** – C17, E13, 16, F8, G5, 8, 9, I7, J12, 15, 16; **Be43** – I25; **Be52** – M11-13, P11, Q15-17, R13, U16, 17, W16; (23)

Pertusaria amara (Ach.) Nyl.

On bark of *Acer, Alnus, Carpinus, Corylus, Fagus, Fraxinus, Malus, Populus, Quercus, Sorbus* and *Tilia*.

Specimens examined: **Be42** – C15, 17, 18, D16-19, E13-18, F13, 14, G7, 12-14, H12-15, I15; **Be43** – D21, E21, F21, I24, 25; **Be52** – K13, L8, N8, P7, 11, Q10, 11; **Be53** – R21; (37)

Pertusaria coccodes (Ach.) Nyl.

On bark of *Acer, Alnus, Carpinus, Fraxinus, Populus* and *Quercus*.

Specimens examined: **Be42** – C16, D17, 18, E16, 17, G5, 9, 12, 13, H12-15; **Be52** – O8, P8, Q8, 15; **Be53** – Q22; (18)

Pertusaria leioplaca DC. ex Lam. et DC.

On bark of *Acer, Carpinus* and *Corylus*.

Specimens examined: **Be42** – C15, D14, E13, F13, G13, 14; (6)

+***Phaeocalicium populneum*** (Brond. ex Duby) A. Schmidt

On twigs of *Populus*.

Specimens examined: **Be42** – G16; **Be52** – Q11; (2)

Phaeophyscia nigricans (Flörke) Moberg

On concrete as well as bark of *Acer, Betula, Carpinus, Fraxinus, Malus, Populus* and *Salix*.

Specimens examined: **Be42** – A10, C7, 20, D6, E6, 8, 11, 20, F4, 11, G10, H17, I13, 16, J3, 11, 13, 17; **Be43** – F23, J23, 24; **Be52** – L18, 19, M16-20, N14, 18, 19, 08, 9, 19, P13, 14, 18, Q18, 19, R12, 13, 15, 18-20, S12, 15, 16, T19; **Be53** – K24, 25; (51)

Phaeophyscia orbicularis (Neck.) Moberg var. ***hueana*** (Harm.) Erichsen

On bark of *Populus*.

Specimen examined: **Be52** – K8; (1)

Ph. o. var. ***orbicularis***

On natural and anthropogenic rock substrate, on bark of *Acer, Betula, Fagus, Fraxinus, Malus, Padus, Populus, Quercus, Salix, Sambucus, Sorbus, Thuja* and *Tilia* as well as on wood.

Specimens examined: **Be42** – A10, B16, 18, C10, 20, D6, 13, E4-8, 11, 13, F4, 6, 8, 10, 13, 20, G5, 7-10, 13, 16-18, H4, 5, 7, 13, 16-18, I3-5, 7, 12-18, 20, J2, 3, 9, 10, 12-16, 18-20; **Be43** – D21, 22, E21, 23, F22, G24, H21, 23, 24, I24, J21-23, 25; **Be52** – K2, 12-20, L9, 12-14, 16-20, M8, 9, 11, 13-20, N8, 9, 13-16, 18-20, O9, 10, 13, 14, 17-20, P8, 9, 13, 14, 18-20, Q8, 13, 15-19, R11-15, 17-19, S12, 13, 15, 16, 20, T16, 17, 19, U16-20, W16-18; **Be53** – K21, 24, 25, L21, 22, N21, 25, O21, P21, 22, Q21, 22, R21-24, T21; (178)

Phlyctis argena (Ach.) Flot.

On bark of *Acer, Alnus, Carpinus, Fagus, Fraxinus, Lonicera, Malus, Padus, Populus, Quercus, Rhamnus, Salix, Sambucus, Sorbus, Thuja* and *Tilia* as well as on wood and erratic boulders.

Specimens examined: **Be42** – A10, 16, 17, B9, 16, 17, C7, 15-19, D9, 10, 13-19, E6, 10, 13-17, 20, F4, 6, 8, 10, 13-15, 19, G5, 7-9, 11, 13, 14, 16, H7, 12, 14-16, I3, 4, 7, 10, 12, 13, 17, J2-4, 6, 11, 12, 15, 16; **Be43** – D21, 22, E21-23, F21, G22, 25, 26, H21, 22, 24, 25, I24, 25, J27; **Be52**

– K2, 4, 5, 7-9, 11, 13-15, L6, 8, 10, 12-14, 17, 18, M10, 11-13, N7-11, 17, O7, 11, 13, 14, 18, P7-9, 11, 13-15, 18, Q8, 9, 11-13, 15, 16, R12, 13, 17, 20, S12-14, 17, T16, 17, U16-19, W16-18, X15; **Be53** – K26, N22, 25, P21, 22, Q21, 22, R21, 22, 24, U21; (158)

Physcia adscendens (Fr.) H. Olivier

On bark of *Acer, Betula, Crataegus, Fraxinus, Lonicera, Malus, Parthenocissus, Populus, Prunus, Quercus, Salix, Sambucus, Sorbus, Thuja* and *Tilia* as well as on wood, concrete and erratic boulders.

Specimens examined: **Be42** – B16, C7, 10, 17, 18, 20, D13, E4, 6, 9, 11, F4, 11, 20, G5, 8, 9, 11, 16, 17, H5, 7, 16-18, I3-5, 7, J2-5, 9, 10, 12, 14; **Be43** – E21, 23, F23, G22, 25, 25, H23, 24, I25, J23, 24; **Be52** – K5, 10, 13, 18, L8-10, 12, 14, 17-20, M11, 13, 16, 18-20, N8, 9, 11, 14, 15, 18-20, O9, 13, 14, 16, 18, 19, P7, 8, 13, 14, 17, 18, Q8, 12, 13, 15, 18, 19, R12, 13, 15, 17, 19, 20, S12, 13, 15, 17, 19, U16-20, W16-18, X15; **Be53** – K22, 24, N21, 25, R24, S21, T21; (121)

Physcia aipolia (Ehrh.) Hampe subsp. ***aipolia***

On bark of *Populus*.

Specimen examined: **Be42** – I3; (1)

Physcia caesia (Hoffm.) Fürnrohr

On concrete, erratic boulders and wood.

Specimens examined: **Be42** – A10, B16, 18, D13, F20, I3, J3; **Be43** – F22, H23, I24; **Be52** – L8, M9, 17, 18, O13, Q15, R13, 14, S15, T17; (20)

Physcia dubia (Hoffm.) Lettau

On bark of *Acer, Betula, Fraxinus Populus* and on boulders and concrete.

Specimens examined: **Be42** – C10, G10, H10; **Be43** – J25; **Be52** – L14, 17, 18, M18, O19, Q15, 16, W18; **Be53** – Q22, 23; (14)

Physcia stellaris (L.) Nyl. subsp. ***stellaris***

On bark of *Acer, Betula, Forsythia, Fraxinus, Lonicera, Populus, Prunus, Rhus, Rosa, Salix, Sorbus* and *Tilia* as well as on boulders.

Specimens examined: **Be42** – A17, B18, C10, D13, E9, 13, F13, G5, 8, 9, 16, H4, 12, 15, J4, 5, 19, 20; **Be43** – E23, G24, J23, 24; **Be52** – K2, 13, 18-20, L7, 9, 12, 16-18, M8, 10, 13, 15, 17-20, N13, 15, 18-20, O15, 17-19, P7, 11, 13, 14, 17, 19, 20, Q9, 11, 12, 17-19, R11, 12, 17-19, S15, 17, 20, T17-20, U20, W18, X15; **Be53** – K21, 22, 24, 25, L22, N21, P21, R24, S21, 22, T21, U21; (90) (cf. Hutorowicz 1964)

Physcia tenella (Scop.) DC.

On bark of *Acer, Alnus, Berberis, Betula, Corylus, Fagus, Forsythia, Fraxinus, Lonicera, Malus, Padus, Parthenocissus, Populus, Prunus, Quercus, Rhamnus, Rhus, Salix, Sambucus, Sorbus, Thuja* and *Tilia* as well as on wood and boulders.

Specimens examined: **Be42** – A17, B9, 16, 18, C7, 8, 10, 15, 18, 19, D7, 9, 10, 13, 17, E4, 6, 8, 9-11, 13, 16, F4, 8-10, 12, G9-12, 14, 16, H4, 7, 10, 12, 13, 16, 17, I3, 7, 10, 12, 13, 16-18, 20, J2-6, 9-11, 13, 14, 16, 18-20; **Be43** – D21, 22, E21, 22, F23, G22, 25, 26, H21, 24, 25, I21, 25, J23-27; **Be52** – K2, 4, 5, 8-14, 16-20, L6, 8, 9, L1, 12-14, 16-20, M8, 11-20, N8-10, 14-17, O9, 10, 13-16, 18-20, P7, 8, 11, 14, 20, Q9-13, 15, 17-20, R11-13, 15, 17, 20, S13, 15-17, 20, T16-20, U16-20, W16-18, X15; **Be53** – K22, 24-26, M22, N24, 25, O22, P21, 22, Q22, R21-24, S22; (200)

Physconia distorta (With.) J.R. Laundon

On bark of *Acer* and *Populus*.
Specimens examined: **Be42** – A16, H12; (2)

Physconia enteroxantha (Nyl.) Poelt

On bark of *Acer, Betula, Fraxinus, Lonicera, Populus, Quercus, Salix* and *Tilia*.
Specimens examined: **Be42** – A16, 17, B9, C8, 10, D10, E16, F6, G9, H16, I3, 4, 7, 13, 16, J12; **Be43** – D22, E21-23, G25, H24, 25; **Be52** – K2, 9, 13, L10, 14, M11, 18, N8, 9, 11, O9, 13, 14, 17-19, P8, 9, 13, 14, Q8, 13, 15-17, 20, R13, 17, 20, S12, 13, 16, T16, 17, U16, 17, 19, 20, W16, 17, X15; **Be53** – P21, R22, 24; (70)

Physconia grisea (Lam.) Poelt

On bark of *Acer, Crataegus, Populus, Salix, Tilia* and on weathered concrete.
Specimens examined: **Be42** – B16, 17, C8, 10, E6, 16, G7-9, H7, 10, J2, 3, 12, 16; **Be43** – D21, I25; **Be52** – K13, L12-14, 18, M13, N8, 14, O13, 14, 17, P18, Q13, 15, 16, 20, R13, U16, 17, 19, 20, W16-18, X15; **Be53** – N22, 24, 25, P22, Q22, R22, 24; (49) (cf. Hutorowicz 1964)

Physconia perisidiosa (Erichsen) Moberg

On bark of *Acer, Fraxinus* and *Populus*.
Specimens examined: **Be42** – C17, G16, H12, J15; **Be43** – I25, N24; **Be52** – P13, Q8, S13, U17, W18; **Be53** – Q22; (22)

Placynthiella dasaea (Stirt.) Tønsberg

On bark of *Alnus, Betula, Coryllus, Fraxinus, Picea, Rhamnus*, on wood and on soil.
Specimens examined: **Be42** – C15-17, D7, 19, E9, 16, 17, F17, H7, 12-15; **Be52** – K7, L9, 12, P7, 8, Q10; **Be53** – P21, 22; (22)

Placynthiella icmalea (Ach.) Coppins et P.James

On bark of *Acer, Alnus, Betula, Coryllus, Crataegus, Malus, Padus, Picea, Pinus, Populus, Quercus, Rhamnus, Salix, Sorbus*, on wood and on soil.
Specimens examined: **Be42** – A10, 16, 17, B11, 17, C7, 8, 15, 18-20, D7, 9, 13-20, E8, 9, 13-19, F15-20, G12, 14, 15, 19, 20, H11, 12, 14-16, I4, 5, 12-15, J4, 6, 9, 10; **Be43** – E21, F21, G21, 22, H23, J25, 27; **Be52** – K1, 4-9, L6, L7, 8, M8, 10, 13, P7, 8, 11, Q10, 20, R14, 20, S12; **Be53** – P21, 22, R21, S21, T21; (89)

Placynthiella oligotropha (Vain.) Coppins et P. James

On soil.
Specimens examined: **Be42** – C18, E13, 19, F18; **Be43** – H23; **Be52** – K1, M8; (7)

Placynthiella uliginosa (Schrad.) Coppins & P. James

On wood, bark of *Alnus, Betula, Pinus, Populus, Rhamnus* and on soil.
Specimens examined: **Be42** – C7, 8, 16, 19, 20, D8, 10, 13, 14, 17, 20, E10, 14, 19, 20, F6, 10, 17, 18, G12, 15, H12, I5, 13, 14, J6; **Be43** – D21, E21, G21, 22, J25; **Be52** – K2, 4-6, 10, L6, 8, 9, M10, Q10, S20, U16; **Be53** – P23; (44)

Platismatia glauca (L.) W.L. Culb. et C.F. Culb.

On bark of *Acer, Alnus, Betula, Carpinus, Coryllus, Fagus, Fraxinus, Malus, Padus, Picea, Pinus, Populus, Quercus, Rhamnus, Salix, Tilia* and on wood.

Specimens examined: **Be42** – A10, C15-17, 19, D9, 15-19, E9, 15, 17, 18, F10, 13, 14, 16, 17, 19, 20, G12-15, H12-15, I6, 12, 14, 15, J2, 4, 6, 9; **Be43** – E21, G22, H22; **Be52** – K5-8, L6-10, M11, P7, 11, 16, Q10, 11; **Be53** – P22, Q21; (58)

Pleurosticta acetabulum (Neck.) Elix et Lumbsch

On bark of *Acer, Fraxinus, Populus, Quercus, Salix* and *Tilia*.
Specimens examined: **Be42** – B16, F6, G8, 9, J3; **Be43** – G26; **Be52** – L8, 12, 14, 17, M11, 18, N11, O13, P13, 16, U17, W17, 18, X15; **Be53** – N22, R22, 24; (23) (cf. Kubiak 2002)

Polysporina lapponica (Schaer.) Degel.

On stone and thallus of *Acarospora fuscata*.
Specimens examined: **Be42** – A16; **Be52** – M6; (2)

Porpidia crustulata (Ach.) Hertel et Knoph

On erratic boulders.
Specimens examined: **Be52** – K1, M8; (2)

Porpidia soredizodes (Lamy ex Nyl.) J.R. Laundon

On erratic boulders.
Specimens examined: **Be42** – D11, E20, F17, G16; **Be52** – Q10; (5)

Protoparmelia hypotremella van Herk, Spier et V. Wirth

On bark of *Acer* and *Fraxinus*.
Specimens examined: **Be52** – P13, R17; (2)

Protoparmeliopsis muralis (Schreb.) Choisy

On anthropogenic rock substrate (concrete, plaster) as well as on erratic boulders and bark of *Tilia*.
Specimens examined: **Be42** – C16, 20, D11, 13, E6, F6, 16, 20, G6, 17, H5, 10, 16, 18, I3, 17, J17; **Be43** – D21, E23, F22, H23, I24, J25; **Be52** – K2, 13-15, 17, L9, 14-17, M9, 10, 12-14, 16-19, N6, 14, 16, 17, O9, 10, 17, 19, P13, Q10, 15, 16, R14, 18, 19, S15, T14, 17; **Be53** – K24, 26, N24, Q21; (64)

Pseudevernia furfuracea (L.) Zopf

On bark of *Acer, Alnus, Betula, Coryllus, Fraxinus, Picea, Pinus, Populus, Quercus, Salix, Sorbus, Tilia* and on wood.
Specimens examined: **Be42** – B11, C10, 15, 19, D8, 10, 16-18, E6, 13, 17, 20, F6, 8-10, 18, G5, 10-13, 15, H12, 14, 16, 17, I6, 14, J2, 3, 11, P11, 13, 14; **Be43** – D21, E21, G22; **Be52** – K5, 8, 13, L6, 7, 9, M6, 11, 13, N10, O11, 13, Q8-13, R13-15, R24, S15, U17, 19, U20, W16-18; **Be53** – N24, 25, O22, P23; (75) (Sulma, Fałtynowicz 1987)

Pseudosagedia aenea (Wallr.) Hafellner et Kalb

On bark of *Acer, Carpinus, Coryllus, Fagus, Fraxinus, Padus, Rhamnus, Sorbus, Tilia* and on wood.
Specimens examined: **Be42** – C15, 16, 18, 19, D14, 16-19, E14, F13, 14, G13-15, H13-15, I15, J6, 15; **Be43** – E21; **Be52** – K4, 7-9, P11, 15, Q11; (29)

Psilolechia lucida (Ach.) Choisy

On wood.
Specimen examined: **Be42** – G16; (1)

Pycnora sorophora (Vain.) Hafellner

On wood (stumps, lying logs, forest cultivation fencing).
Specimens examined: **Be42** – F18, 19, H12, I14; (4) (cf. Kubiak et al. 2003)

Pyrenula nitida (Weigel) Ach.

On bark of *Carpinus betulus*.
Specimen examined: **Be42** – G14; (1)

Ramalina farinacea (L.) Ach.

On bark of *Acer, Alnus, Carpinus, Fraxinus, Populus, Quercus, Salix* and *Tilia*.
Specimens examined: **Be42** – A17, B17, C10, 15, 17, 18, D16, 18, E15-17, F8, G11, 13, 14, 16, H5, 12, 14, 15, I4, 7, 12, 14, J4, 6; **Be43** – E22, G25; **Be52** – K5, 7-9, 13, L7, 8, 10, 12, M8, 11, N9, O7, 13, 14, P7, 13, Q8, 9, R13, U17, W16-18; **Be53** – N25, R21, 22, 24; (56)

Ramalina fastigiata (Pers.) Ach.

On bark of *Acer, Betula, Fraxinus, Populus, Salix* and *Tilia*.
Specimens examined: **Be42** – C8, 17, E6, F4, 6, 8, G5, H14, I4, J3, 4, 12; **Be43** – D21, G25, 26, H25, I25; **Be52** – K7, 8, 13, L7, 8, 12, 14, M11, 13, N8, 9, O13, P13, Q8, 9, R13, S13, T16, 17, U16, 17, 19, W16-18, X15; **Be53** – P21, Q22, R22-24; (49)

Ramalina fraxinea (L.) Ach.

On bark of *Acer, Fraxinus, Populus, Salix, Sorbus* and *Tilia*.
Specimens examined: **Be42** – B9, 16, C10, E6, F6, 8, G5, 8, 16, H10, I7, J3, 4, 12, 14; **Be43** – D21, E22, H25, I25; **Be52** – K8, 14, L8, 12, M11, N9, O13, P9, 11, 13, Q8, 12, R13, S13, T16, 17, U16, 17, 19, 20, W16-18; **Be53** – N22, 25, O22, P21, R22, 24; (48)

Ramalina pollinaria (Westr.) Ach.

On bark of *Acer, Fraxinus, Populus, Quercus, Salix* and *Tilia*.
Specimens examined: **Be42** – E6, F4, 6, G5, 8, 9, 16, J3, 12, 14; **Be43** – D21, E22, G26, I25; **Be52** – K7, 8, 13, L12, 14, M11, 13, 15, N8, 11, O13, P11, 13, Q13, 15, R13, S13, U17, W17, 18, X15; **Be53** – N22, 24, 25, P21, R22, 23, S21; (42) (cf. Lettau 1919 – c. ap.)

Rhizocarpon distinctum Th. Fr.

On erratic boulders.
Specimens examined: **Be42** – D11; **Be52** – N6; (2)

Rhizocarpon geographicum (L.) DC.

On erratic boulders.
Specimens examined: **Be52** – N6, Q10; (2)

Rhizocarpon polycarpum (Hepp) Th. Fr.

On erratic boulders.
Specimens examined: **Be52** – M11; **Be53** – P21; (2)

Rinodina colobina (Ach.) Th. Fr.

On bark of *Populus*.
Specimen examined: **Be52** – P14; (1)

Rinodina efflorescens Malme

On bark of *Fraxinus* and *Quercus*.
Specimens examined: **Be42** – C18; **Be52** – Q12; (2)

Rinodina gennarii Bagl.

On concrete.
Specimen examined: **Be43** – G24; (1)

Ropalospora viridis (Tønsberg) Tønsberg

On bark of *Alnus, Betula, Carpinus, Coryllus, Fagus, Fraxinus, Populus, Quercu* and *Sorbus*.
Specimens examined: **Be42** – C15, 16, 18, D16, 17, 19, E14, 15, 18, F13, 14, G12, 13, H12-15; **Be52** – K8, P7, Q11, S20; (21)

Sarcogyne regularis Körb.

On concrete.
Specimens examined: **Be52** – Q20, R14, T14, U18; **Be53** – R21, 24; (6)

Sarcopyrenia gibba (Nyl.) Nyl.

On concrete.
Specimen examined: **Be42** – E13; (1)

Scoliciosporum chlorococcum (Graeve ex Stenh.) Vězda

On bark of *Acer, Alnus, Betula, Carpinus, Coryllus, Crataegus, Fagus, Fraxinus, Padus, Picea, Pinus, Populus, Quercus, Rhamnus, Salix, Sorbus, Tilia* and on wood.
Specimens examined: **Be42** – A17, B11, 18, C17-19, D7, 8, 15, 16, 18, 20, E9, 13, 15-20, F8, 13-20, G11-14, 16, 20, H7, 10, 12, 15, I13-15, J3, 4, 6; **Be43** – D21, E21, G22, 24, 26, H23, I23, J25; **Be52** – K2-4, 8, 9, L8, 9, M8-13, N8, P11, Q8, 11, R13, 14, 20, S13, 20; **Be53** – N24, O22, P21, 22, Q23, R21, 22, S22, T21; (85)

Scoliciosporum sarothamni (Vain.) Vězda

On twigs of *Coryllus, Crataegus, Fraxinus, Populus, Quercus, Sambucus* and *Sorbus*.
Specimens examined: **Be42** – C18, D15, 18, E16, F19, H12; **Be52** – L8, 9, Q12; (9)

Scoliciosporum umbrinum (Ach.) Arnold

On erratic boulders and larger stones.
Specimens examined: **Be42** – D11, E20, F7, **Be52** – N6, P13, W18; **Be53** – K26, P21; (8)

+***Stenocybe pullatula*** (Ach.) Stein

On twigs of *Alnus glutinosa* and bark of *Populus tremula*.
Specimens examined: **Be42** – C19, D17, G12, H12; (4)

Strangospora moriformis (Ach.) Stein

On wood and bark of *Pinus sylvestris*.
Specimens examined: **Be42** – F6, H9; **Be43** – F22, G26; **Be52** – K2, L9; (6) (cf. Kubiak 2002)

Strangospora ochrophora (Nyl.) R.A. Anderson

On bark of *Acer, Populus, Sambucus* and *Salix*.
Specimens examined: **Be42** – G16, H16; **Be52** – K5, 9, 13, P8, S12; **Be53** – Q22; (8)

Strangospora pinicola (A. Massal.) Körb.

On bark of *Acer, Fraxinus, Populus* and *Tilia* as well as on wood.
Specimens examined: **Be42** – B16, D10, F5, 6, 11, G5, J14; **Be43** – D21, E21, H21; **Be52** – K10, 13, 14, M13, 15, Q13, R17, S13, W16, 18, X15; **Be53** – K22, O22; (23) (cf. Kubiak 2002)

Thelidium cfr. ***pyrenophorum*** (Ach.) Mudd

On concrete.
Specimen examined: **Be52** – M9; (1)

Thelidium zwackhii (Hepp) A.Massal.

On concrete.
Specimens examined: **Be42** – B17, H13; (2)

Thelocarpon laureri (Flot.) Nyl.

On wooden post.
Specimen examined: **Be52** – Q20; (1)

Thelomma ocellatum (Körb.) Tibell

On wood (fencing post, boards – barn wall).
Specimens examined: **Be42** – C10, D10, F5, 6, H6; **Be43** – F22, G26; **Be52** – Q15, **Be53** – O22; (9)

Trapelia involuta (Taylor) Hertel

On small stones.
Specimen examined: **Be52** – M8; (1)

Trapelia placodioides Coppins et P. James

On erratic boulders and larger stones.
Specimens examined: **Be42** – D17, F13, 20, G14; **Be53** – K2; (5)

Trapeliopsis flexuosa (Fr.) Coppins et P. James

On bark of *Alnus, Betula, Picea, Pinus, Populus, Quercus, Salix* on wood and on erratic boulders.
Specimens examined: **Be42** – A10, B11, 17, C16, 20, D7-11, 13-20, E8, 10, 14-19, F9, 11-13, 15-19, G11-15, 20, H12, I13-15, J3; **Be43** – D21, E21, F22, G23, J27; **Be52** – K4-6, 8, L8, 9, M10, 11, P9, 11, Q10, 20, R20; **Be53** – P21, 22, R21, S21; (69)

Trapeliopsis glaucolepidea (Nyl.) Goth. Schneid.

On wood (lying log).
Specimen examined: **Be52** – P7; (1)

Trapeliopsis granulosa (Hoffm.) Lumbsch

On bark of *Betula, Picea, Pinus* as well as on wood and soil.
Specimens examined: **Be42** – A16, 17, C8, 10, 15, 18-20, D7, 10, 13, 14, 16-20, E10, 16, 19, F13, 14, 16-20, G12, 14-16, 20, H12, 14, 15, I5, 6, 14, 15, J2, 6; **Be43** – G22, H22, 23; **Be52** – K1, 6, 7, L6, 8, P7, Q10, R14; (52)

Trapeliopsis pseudogranulosa Coppins et P. James

On soil.
Specimen examined: **Be42** – C15; (1)

****Tremella lichenicola*** Diederich

On thallus of *Mycoblastus fucatus* growing on bark of *Fraxinus excelsior*.
Specimens examined: **Be42** – C19; (1)

****Tremella phaeophysciae*** Diederich et M.S. Christ.

On thallus of *Phaeophyscia orbicularis* growing on bark of *Acer* and *Populus*.
Specimens examined: **Be42** – E6; **Be52** – N8; (2)

"Usnea florida (L.) Hoff. var. ***sorediifera*** Arn."

Lettau (1919) – c. ap.; the original name of the taxon was preserved; it is difficult to assess its correct taxonomic position due to the lack of herbarium specimens.

Usnea hirta (L.) Weber

On bark of *Alnus, Betula, Fagus, Pinus, Populus, Quercus, Salix* and on wood.
Specimens examined: **Be42** – C15, D17, F10, G11, 12, H15, J5; **Be43** – E21, **Be52** – K5, L12, M11, S15; **Be53** – N25, R21; (14)

Usnea subfloridana Stirt.

On bark of *Alnus, Betula, Populus, Quercus* and *Salix*.
Specimens examined: **Be42** – C17, D17, 18, F13, G13, H12, I14, J2, 6; **Be43** – E22; **Be52** – K8; (11)

Verrucaria aethiobola Wahlenb.

On concrete.
Specimens examined: **Be42** – E4, 13, H15; **Be53** – K21, Q21; (5)

Verrucaria bryoctona (Th. Fr.) A. Orange

On soil.
Specimen examined: **Be53** – Q21; (1)

Verrucaria dolosa Hepp

On concrete and small stones.
Specimens examined: **Be42** – A16, B16, C15, 18, 20, D18, E13, F15, 18, 19, G15, H15; I15; **Be43** – D21, F21, G21, 22, H21; **Be52** – K2, Q11; **Be53** – Q21; (21)

Verrucaria muralis Ach.

On anthropogenic rock substrate (concrete, plaster, bricks).

Specimens examined: **Be42** – A16, B16, C20, E4, 19, G13, 15, 16, 18, H15, I12, 14; **Be43** – D21, E21, F22, I24; **Be52** – L9, R14; **Be53** – Q21; (19)

Verrucaria nigrescens Pers.

On concrete.
Specimens examined: **Be42** – B16, G18, H15; **Be43** – D21; **Be52** – M9, 10, O7, Q20, R14; **Be53** – R21; (10)

Verrucaria cfr. ***obnigrescens*** Nyl.

On small stone post.
Specimen examined: **Be42** – F17; (1)

Verrucaria cfr. ***procopii*** Servit.

On concrete.
Specimen examined: **Be43** – I24; (1)

Vulpicidia pinastri (Scop.) J.-E. Mattsson et M.J. Lai

On bark of *Betula, Picea, Populus, Quercus, Salix, Sorbus* and on wood.
Specimens examined: **Be42** – A17, C18, 20, D15, 17, E14, 17, 18, F19, I3, 14; **Be43** – E21; **Be52** – K13, P7; **Be53** – R21; (15)

Xanthoparmelia conspersa (Ach.) Hale

On erratic boulders.
Specimens examined: **Be42** – D11, **Be52** – N6; (2)

Xanthoria candelaria (L.) Th. Fr.

On bark of *Acer, Betula, Carpinus, Crataegus, Fagus, Fraxinus, Picea, Pinus, Populus, Prunus, Quercus, Salix, Sorbus* and *Tilia* as well as on wood.
Specimens examined: **Be42** – C8, 10, D10, E6, F4, 6, 8, G8, 9, 17, 18, H6, 10, I6, 10, 16, 17, 20, J3, 10, 12, 16, 20; **Be43** – D21, 22, F23, G25, H21, 23-25, J25, 26; **Be52** – K2, 13, L9, 12, 14, 17, 19, M11-14, N8-10, 14, O9, 13, 18, 20, P13, 18, 20, Q10, 13, 16, R12, S12, 13, 15, T16, 17, U16-20, W16-18, X15; **Be53** – N25, O22, R21-24, U21; (80)

Xanthoria elegans (Link.) Th. Fr.

On anthropogenic rock substrate (concrete, plaster).
Specimens examined: **Be42** – C20, D13, F4, J2; **Be43** – E23, H24; **Be52** – M8, 9, O9, 13, S15, 16, T18; (13)

Xanthoria parietina (L.) Th. Fr.

On bark of *Acer, Alnus, Berberis, Betula, Carpinus, Fagus, Forsythia, Fraxinus, Lonicera, Malus, Parthenocissus, Populus, Prunus, Quercus, Rhus, Salix, Sambucus, Sorbus* and *Tilia*, on wood as well as on natural and anthropogenic rock substarte.
Specimens examined: **Be42** – A10, 17, B9, 16, 18, C7, 8, 10, 19, 20, D6, 8, 9, 11, 13, E4-11, F4, 6, 8-13, G5-9, 11, 13, 14, 16-18, H4-7, 10, 12-14, 16-18, I3-7, 11-16, 18, 20, J3-5, 9-12, 14, 16, 18-20; **Be43** – D21, 22, E21, 23, F22, 23, G22, 24-26, H21, 23-25, I24, 25, J21, 23-26; **Be52** – K2, 3, 5, 8, 9, 11-20, L6-10, 12-20, 22, M8-13, 15-20, N8-20, O8-10, 13-20, P7-9, 11, 13, 14, 17-20, Q8-19, R11-15, 17-20, S12, 13, 15-17, 20, T14, 16-20, U16-20, W16, 18, X15; **Be53** – K21-25, N21, 22, 24, 25, O21, 22, P21, 22, Q21-23, R21-23, S21, 22, T21, U21; (238) (cf. Hutorowicz 1964)

Xanthoria polycarpa (Hoffm.) Rieber

On bark of *Acer, Alnus, Berberis, Betula, Carpinus, Crataegus, Forsythia, Fraxinus, Malus, Pinus, Populus, Prunus, Quercus, Rhus, Rosa, Salix, Sorbus, Tilia*, on wood and on erratic boulders.

Specimens examined: **Be42** – B9, 16, 18, C10, D10, 13, E13, F9, 12, 19, G9, 12, 18, H10, I7, 13, 16, J2-5, 16, 18-20; **Be43** – D21, E21, 22, F23, G24, H23, 25, I25, J21, 23, 27; **Be52** – K2-4, 9, 13, 18-20, L8-10, 14, 18-20, M11, 13, 15, 17, 18-20, N13-17, N18-20, O8-10, 14-19, P7, 8, 13, 17, 19, 20, Q13, 17-19, R11, 12, 13, 15, 17-20, S15, 17, 20, T16-20, U16-20, W16-18, X15; **Be53** – K21, 22, 24-26, L22, N21, O21, 22, P21, 22, Q23, R21, 23, 24, S21, 22, T21, U21; (130)

DESCRIPTION OF LICHEN BIOTA

The occurrence of 279 taxa, including 265 lichenized fungi, 8 – lichenicolous fungi, 3 – facultative lichenicolous fungi and 3 – saprobic fungi was documented in Olsztyn.

The following genera are most numerously represented in the lichen biota of the city: *Cladonia* – 32 taxa (currently 29), *Lecanora* – 22, *Micarea* – 9, *Peltigera* – 9, *Chaenotheca* – 7, *Verrucaria* – 7, *Bacidia* – 6, *Caloplaca* – 6, *Physcia* – 6, *Aspicilia* – 5, *Bacidina* – 5 and *Opegrapha* – 5. Localities of four species represent their first recordings in the area of the country: *Bacidia adastra*, *B. brandii*, *B. neosquamulosa* and *Macentina abscondita* (Kubiak 2003; Kubiak and Sparrius 2004). Additionally, 14 taxa of lichenized and saprobic fungi new for the region of north-east Poland were recorded (Cieśliński 2003a): (*)*Chaenothecopsis pusiola*, *Cladonia merochlorophaea*, *Fellhaneropsis myrtillicola*, *Micarea nigella*, +*Phaeocalicium populneum*, *Phaeophyscia orbicularis* var. *hueana*, *Protoparmelia hypotremella*, *Rinodina efflorescens*, *Sarcopyrenia gibba*, *Scoliciosporum sarothamnii*, *Thelidium* cf. *pyrenophorum*, *Trapeliopsis glaucolepidea*, *Verrucaria aethiobola* and *Verrucaria bryoctona*.

Lichens were recorded in every one of the basic fields available during field studies. In a single field from 5 to 61 species of lichens were recorded. In the studied area, areas with relatively poor diversity of lichen biota (11-30 taxa) dominated – in total 62% of the city area. The areas with rich lichen biota (41-61 taxa) represented only 9% of the analyzed area. Those are forest areas situated in the northern (Las Miejski forest) and western parts of Olsztyn (Fig. 2).

Epiphytic lichens were the dominating ecological group. On the bark of trees and shrubs 175 taxa of lichens were recorded (during field studies species from the genus *Lepraria* were treated jointly and recorded as *Lepraria* spp., see Lõhmus, Saag and Lõhmus 2003). The less numerous ecological groups were: epixylic lichens – 99 taxa, epilitic lichens – 74 and epigeic lichens – 45. Analyzing the spatial diversity of lichen species from individual ecological groups, the evident correlation between the group of epiphytic lichens and the overall number of taxa is observed (Fig. 3). That indicates high representativeness of that group in relation to the entire biota of lichens.

The number of lichen taxa recorded in Olsztyn is the highest among those recorded so far in urban areas of Poland. Despite evident differences between individual cities expressed, among others, by their size, population and level of industrialization, the number of species recorded in the areas covered by studies so far has not exceeded 200 (cf. Fałtynowicz et al. 1991; Kepel 1999; Kiszka 1999). It should be

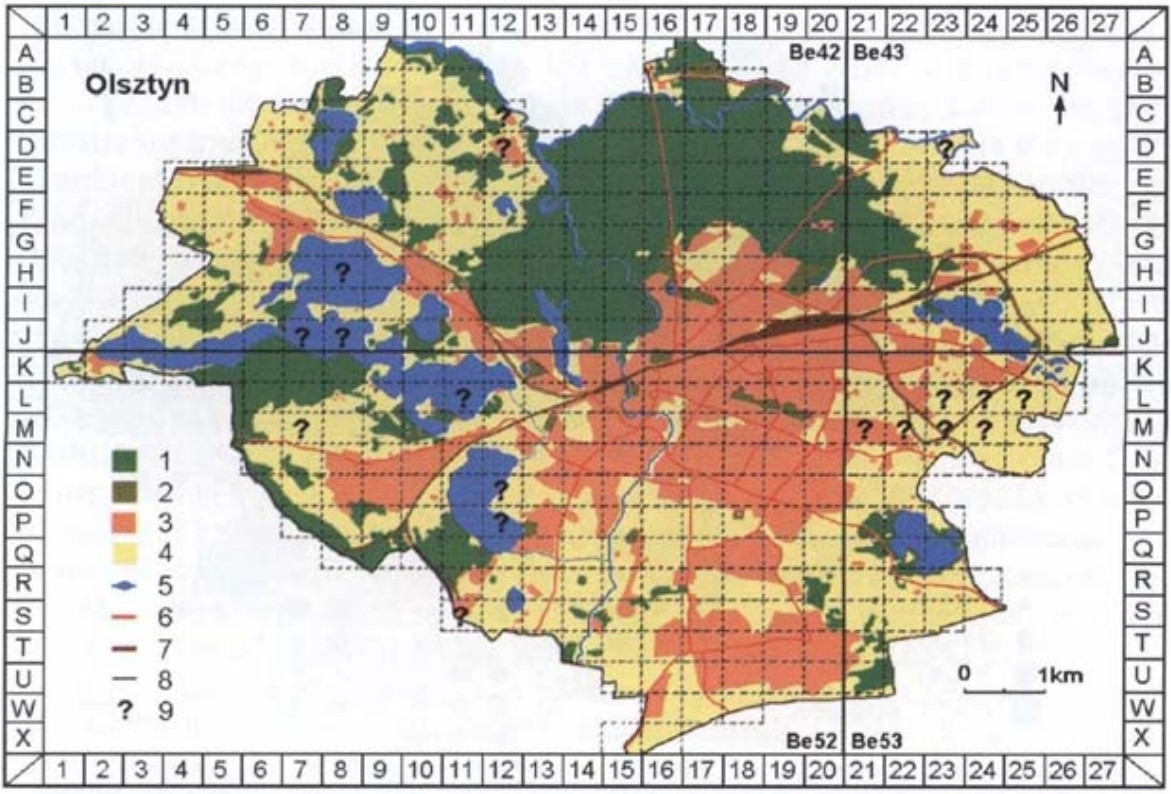

Fig. 1. Area of study against the background of the local grid of basic research fields (500 x 500m) and ATPOL squares (10 x 10km): 1 – forests, 2 – parks and cemeteries, 3 – built up areas, 4 – open areas, 5 – rivers and lakes, 6 – main transit roads, 7 – railway lines, 8 – city borders, 9 – squares from which data was not obtained.

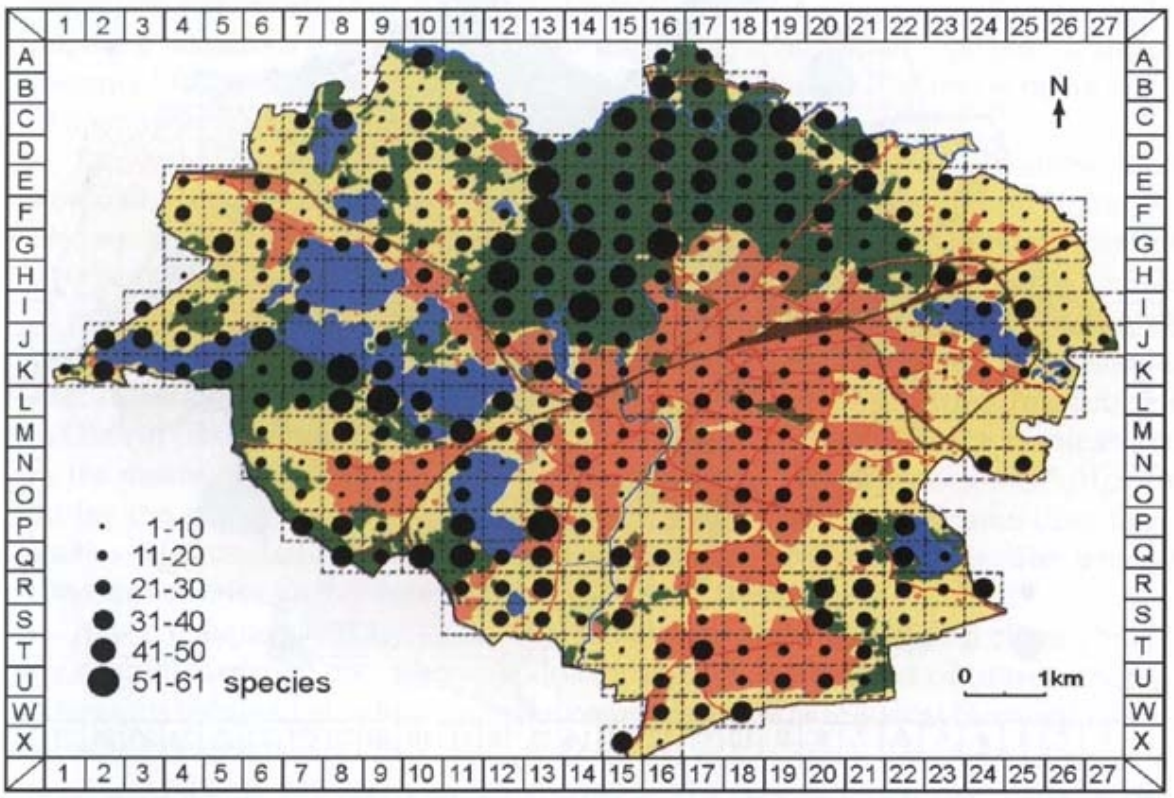

Fig. 2. Number of lichen taxa in individual basic research fields.

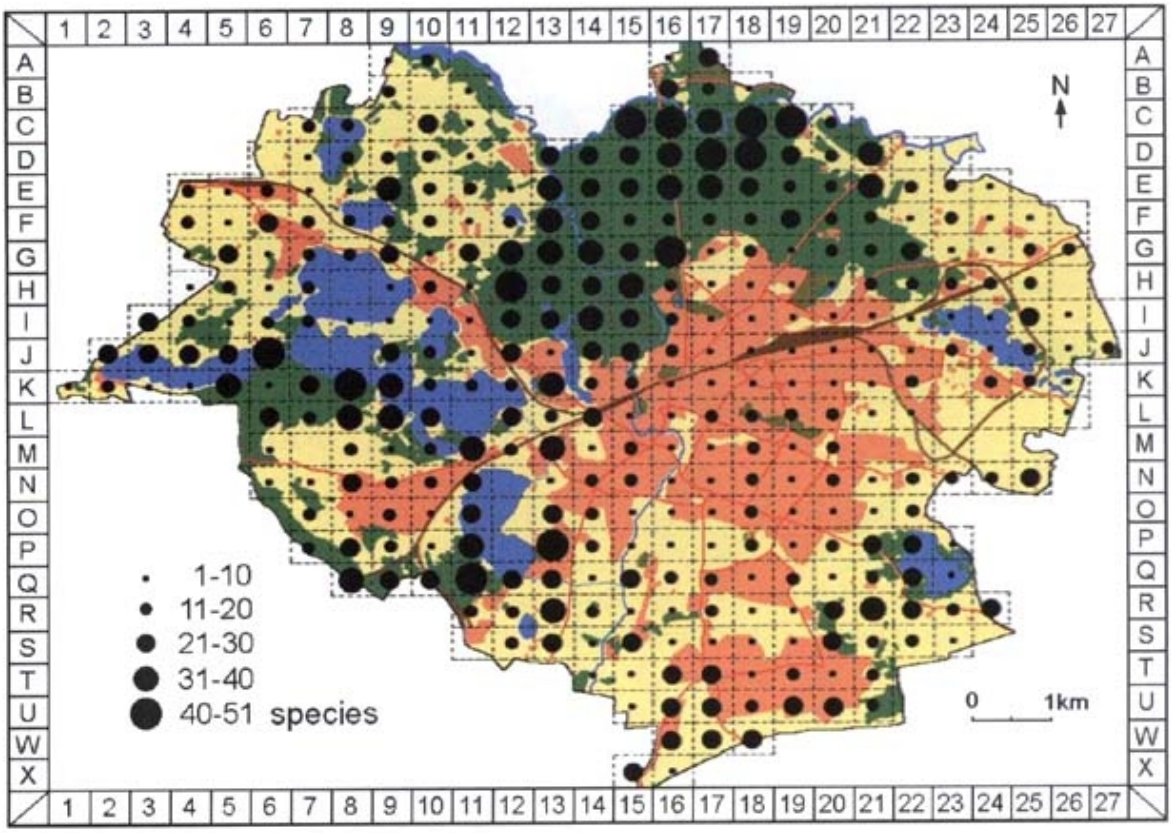

Fig. 3. Number of epiphytic lichen taxa in individual basic research fields.

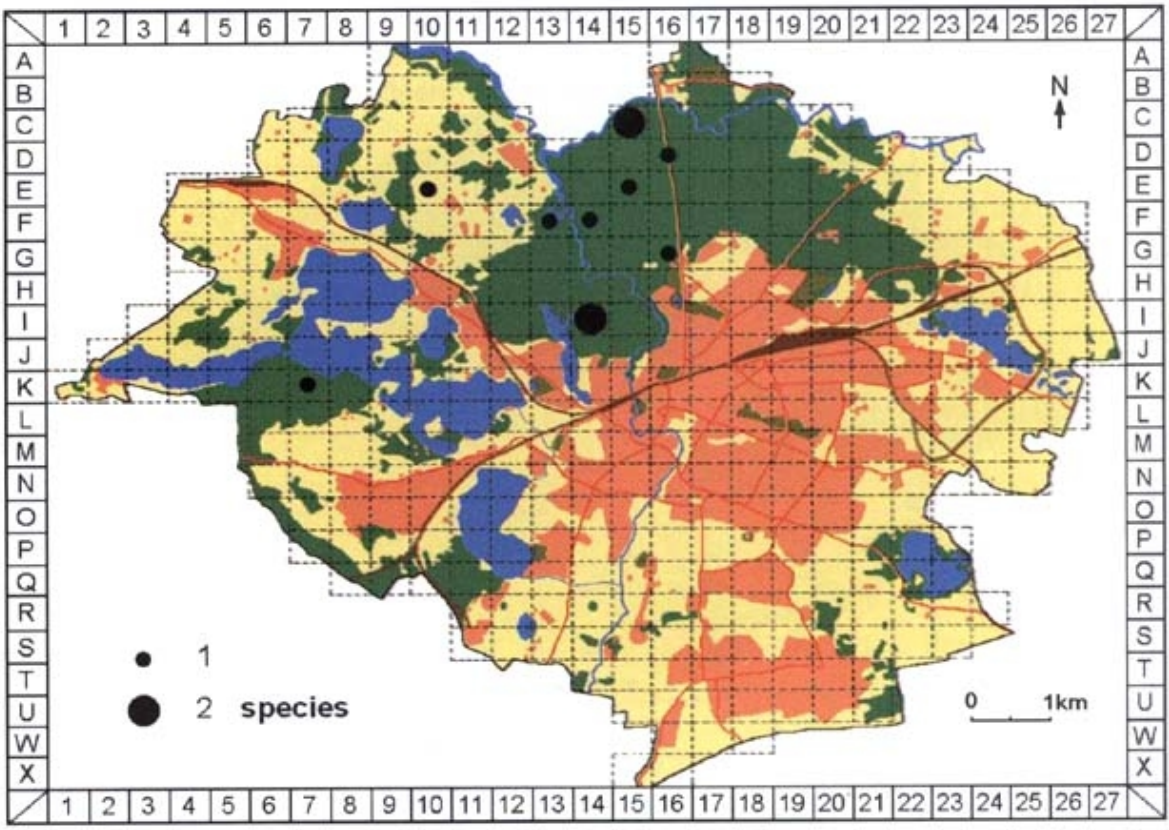

Fig. 4. Number of the taxa of lichens – indicators of old-growth forests in individual basic research fields.

highlighted that in some cities, such as Krakow the studies were repeated a number of times (Zurzycki 1950; Kiszka 1977; Kiszka and Kościelniak 1996).

The high diversity of lichen biota in Olsztyn is influenced by a relatively good, comparing to other regions of the country, condition of preservation in the region of north-east Poland (Cieśliński 2003a). Not without significance is also the presence of large, compact forest areas, lakes and extensive agriculture areas within the city as well as the character of the city, which started gaining the character of an industrial town only during the 1960s (Wakar 1997).

A significant number and density of species typical for forest areas of primeval character (old-growth forest) is a clear feature of the lichen biota in north-east Poland (Cieśliński 2003a). That group, to a limited extent, is one of the most characteristic elements of the local biota differentiating Olsztyn from among other Polish cities. Among lichens – indicators of lowland old-growth forests (Czyżewska and Cieśliński 2003) the following were recorded in the city area: *Arthonia didyma, Calicium trabinellum, C. viride, Chrysotrix candelaris, Lecanora albella, Loxospora elatina, Micarea melaena* and *Opegrapha viridis* (Fig. 4). Together with lichens – indicators of natural forests and regenerating managed forest (see Cieśliński 2003a) – *Acrocordia gemmata, Arthonia mediella, A. radiata, A. spadicea, Arthotelim ruanum, Bacidia beckhausii, B. subincompta, Bacidina arnoldiana, B. assulata, Chaenotheca chrysocephala, Ch. furfuracea, Ch. phaeocephala, Ch. trichialis, Ch. xyloxena, Chaenothecopsis pusilla, Graphis scripta, Hypocenomyce anthracophila, Ochrolechia androgyna, Opegrapha rufescens, O. varia, O. vulgata* var. *subsiderella, Pertusaria leioplaca* and *Usnea subfloridana*, they had a major influence on the diversity of that group of organisms in the city area. Their survival was possible thanks to retaining ecological continuity, mainly in associations of the Las Miejski forest, despite ages of use and transformation. Such conditions were established, paradoxically, by the municipal character of that complex imposing numerous limitations on forest users. The level of anthropogenic transformation of forest habitats in that complex is also indicated by a relatively minor share of apophytic lichens, frequently limited to peripheral areas.

Survival of some lichen species, particularly those with foliose or fruticose thalli would not be possible under conditions of strong atmospheric pollution characteristic for larger urban areas. Few local sources of pollution emissions and location of Olsztyn away from large industrial centers and regions forming potential sources of pollution emissions causes that the level of atmosphere pollution with sulfur dioxide, most harmful for lichens, is relatively low compared to other cities of similar size. According to the data of the Provincial Environment Protection Inspectorate in Olsztyn (Różański 2002), the average concentration of SO_2 in the air measured by the passive method in 41 points scattered over the entire city area was 5,01μg/m^3 during the period from January through December 2000. At the same time those studies documented relatively high concentrations of NO_2 in the air. The average concentration for all 41 measurement points was 21,04μg/m^3.

As a consequence of the status of research coverage in individual cities, character of studies carried out, the methodology applied and method of presentation of the results obtained, it is hard to make comparisons between local biotas of lichens recorded in their areas. The work by Matwiejuk (2001), devoted to lichens of Białystok (90km^2, 285 000 population) covered by species protection provides precious information from the area of north-east Poland. That type of protection in Po-

land covers mainly all lichens with large foliose or fruticose thalli, on one hand easy for recording during field studies, and on the other, most sensitive to anthropogenous transformations of the natural environment. As a consequence, that group is a particularly good comparative material. The list of protected lichens in Białystok contains 30 taxa, so it is evidently shorter than the equivalent list developed for Olsztyn – 38 taxa currently present. The applied systematic approach and the latest legal changes adjusting the list of protected lichens have minor influence on that situation. Almost all taxa identified in Białystok are characterized by a much smaller number of localities where they appear than is the case for the same taxa in the area of Olsztyn, even though the data for Olsztyn does not cover specific localities but individual basic fields within the area of which the given lichen was found, frequently a number of times. Only one taxon recorded in Białystok – *Parmelina tiliacea,* was not recorded in Olsztyn. In north-east Poland that lichen is quite frequent (Cieśliński 2003a). It is also found in the area of Olsztyn Lake District, even in the closest vicinity of the city (Kubiak 2002). That taxon was most frequently found on the bark of roadside trees in sunny locations. It is included in the group of antropophytes (see Fałtynowicz 1992, 1994). In the area of Olsztyn, on habitats typical for that lichen, more hygrophilous taxa, such as *Pleurosticta acetabulum* or *Ramalina* spp., very rare in the area of Białystok, were found. Most probably microclimatic factors are the cause of those differences. A much deeper degradation of the natural environment expressed by the diversity of protected lichen taxa was recorded in Przemyśl – 16 taxa (Kiszka 1998) and Poznań – 20 taxa (Kepel 1999).

In the area of Olsztyn 70 species that are endangered or reported extinct in the country (Cieśliński, Czyżewska and Fabiszewski 2003), including 1 reported extinct (RE – *Catinaria neushildii*), 1 critically endangered (CR), 20 endangered (EN), 26 vulnerable (VU), 3 least concern (LC), 15 near threatened (NT) and 4 taxa that are data deficient (DD) were recorded. The biota of lichens in the city included 40 species endangered in the region of north-east Poland (Cieśliński 2003b), including 1 reported extinct (RE – *Lecanora sambuci*), 4 critically endangered (CR), 5 endangered (EN), 13 vulnerable (VU), 2 least concern (LC), 1 near threatened (NT) and 14 taxa that are data deficient (DD).

A significant share of taxa that are locally rare or very rare, including those recorded in a single locality, is a common feature of urban areas. In Poznań Kepel (1999) recorded 50 taxa of lichens present simultaneously at just one locality in the city, which represented 28% of the biota he recorded. In Przemyśl, such taxa represented 27,5% of the biota (Kiszka 1999) while in Olsztyn – 19,4%.

In Olsztyn the zone without lichens (lichen desert) that was usually recorded in the earlier studies carried out in other cities, is not present. Nevertheless, spatial diversity of species most sensitive to pollution, particularly those with fruticose thalli, was recorded. Fruticose lichens rarely appeared in the city center area as well as in the eastern and southern residential neighborhoods. Species such as *Evernia prunastri, Pseudevernia furfuracea* or *Ramalina farinacea* possess highly similar presence in the city area. According to Fałtynowicz et al. (1991) those lichens can be considered indicators marking the border between the zones of normal and decreased development of lichens. The area determined by those taxa covers, beside the urbanized and industrialized (warehousing-industrial sector) areas also the southeastern part of the Las Miejski forest. That zone is characterized by the highest values of

SO_2 and NO_2 recorded in the city. The identified area possesses no larger areas of greenery. The city, despite a significant share of forests in its overall area, suffers from evident shortage of park areas, particularly in the zone of its central neighborhoods. The Kusociński Memorial park (L18-19, M19-20 – Fig. 1), where, e.g. *Cetraria chlorophylla, Evernia prunastri, Hypogymnia tubulosa, Melanelia exasperatula, Phlyctis argena* and *Physconia grisea* possess their isolated localities, is the only oasis of greenery in that zone. That indicates the role of ecological factor in development of lichens biota in the city.

The studies did not confirm occurence of 8 species mentioned by earlier researchers in the area of the city. Those lichens can be divided into two categories. The first one comprises lichens associted with natural forest communities, rare in the country, threatened (Cieśliński et al. 2003; Cieśliński 2003a), particularly sensitive to anthropogenous transformations of the environment, especially air pollution: *Cetrelia olivetorum*, *Lobaria pulmonaria*, *Menegazzia terebrata* and „*Usnea florida* var. *soredifera*". The second group comprises lichens-elements of communities of xerothermic and arenicolous grassland: *Cetraria muricata*, *Cladonia coccifera*, *C. uncialis*. Grass communities, mainly of anthropogenous origin, are subject to succession on one hand and on the other they are subjected to strong anthropogenous pressure leading to their degradation or decrease in area (Juśkiewicz and Endler 1995; Juśkiewicz 1999), which is particularly visible in urbanized areas. *Cladonia portentosa* is a frequent lichen in northern Poland (Fałtynowicz 1992), the number of its localities, however, decreases eastwards (subatlantic species). In north-east Poland it is very rare lichen, near threatened (NT) (Cieśliński 2003b). All previously listed taxa that were not found between the years 1999 and 2003 were recognised as extinct in the area studied.

CONCLUSIONS

1. The results obtained showed that the choice of the study area was right because of the specific and unique character of its lichen biota and, particularly, presence of taxa new for the country and the region.

2. The city of Olsztyn area is characterized, as compared to other Polish cities, by a much higher overall number of lichens taxa, higher number of rare, protected and threatened species as well as a lower number of locally rare taxa (recorded in single localities).

3. The numerous group of lichens characteristic for forest areas, including those indicative for old-growth (primeval) forests is a peculiarity of the biota of lichens in Olsztyn.

4. In the area of Olsztyn, we can identify a zone of weakened development of lichens that covers the central, southern, eastern and northeastern areas of the city. No zone of lichen desert characteristic for many other cities was recorded.

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Botanic Garden, Edinburgh – *Bacidina*, *Micarea*), dr. Paweł Czarnota (Scientific Laboratory of the Gorce National Park – *Micarea*) and dr. Martin Kukwa (Gdańsk University – group *Cladonia chlorophaea*, *Peltigera*, crustose sterile sorediated lichens and lichenicolous fungi). I would also like to thank the anonymous Reviewer for recommendations and comments to the manuscript of the paper.

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Porosty i grzyby naporostowe Olsztyna

Streszczenie

Praca zawiera listę 279 taksonów porostów (grzybów zlichenizowanych) oraz grzybów naporostowych i saprotroficznych odnotowanych na obszarze miasta Olsztyna (NE Polska). Materiały badawcze pochodzą z własnych badań terenowych przeprowadzonych w latach 1999-2003 oraz z literatury publikowanej (pierwsze dane historyczne dotyczące porostów tego terenu pochodzą z pierwszej połowy XX w.). Przeprowadzone na obszarze miasta badania wykazały występowanie czterech gatunków nowych dla bioty porostów kraju (*Bacidia adastra*, *B. brandii*, *B. neosquamulosa* i *Macentina abscondita*) oraz 14 nowych dla regionu Polski Północno-Wschodniej (**Chaenothecopsis pusiola*, *Cladonia merochlorophaea*, *Fellhaneropsis myrtillicola*, *Micarea nigella*, +*Phaeocalicium populneum*, *Phaeophyscia orbicularis* var. *hueana*, *Protoparmelia hypotremella*, *Rinodina efflorescens*, *Sarcopyrenia gibba*, *Scoliciosporum sarothamnii*, *Thelidium* cfr. *pyrenophorum*, *Trapeliopsis glaucolepidea*, *Verrucaria aethiobola* i *Verrucaria bryoctona*). Badania nie potwierdziły występowania na obszarze miasta ośmiu gatunków porostów, podawanych we wcześniejszych publikacjach, które uznano za wymarłe na tym terenie (*Cetraria muricata*, *Cetrelia olivetorum*, *Cladonia coccifera*, *C. uncialis*, *C. portentosa*, *Lobaria pulmonaria*, *Menegazzia terebrata* i „*Usnea florida* var. *sorediferа*").