



LICHENS OF NAREW AND ITS SURROUNDINGS (PODLASIE, NORTH-EASTERN POLAND)

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ABSTRACT. The paper presents a list of lichen species collected in Narew (North-Eastern Poland). In total 97 species, have been recorded 15 of which belong to the group of threatened lichens in Poland (e.g. *Bryoria crispa*, *Pleurosticta acetabulum*, *Ramalina fastigiata*, *R. fraxinea*, *R. subargentifera*, *Usnea filipendula*). Predominate epixyloous lichens (50 species). Other ecological groups are represented by smaller number of species – epiphytic (38), epilithic (36) and epigeic (19).

KEY WORDS: lichens, distribution, Narew, North-Eastern Poland

INTRODUCTION

For many years city lichens have been the subject of numerous studies. So far data from 54 cities of Poland have been published (MATWIEJUK and KOROBKIEWICZ 2012). The cities under study are located in different regions of Poland, e.g. in the region of the Baltic (ŚPIEWAKOWSKI and IZYDOREK 1981, LIPNICKI 1984, FAŁTYNOWICZ et AL. 1991, IZYDOREK 2005), Warmia (KUBIAK 2005), Podlasie (RYDZAK 1957, MATWIEJUK 2007, 2008, 2009 a, b, 2011, MATWIEJUK and KOLANKO 2007), Lubelszczyzna (RYDZAK 1953, WÓJCIAK and KORONA 2008), Kielecczyzna (TOBOROWICZ 1976), Mazowsze (CIEŚLIŃSKI 1974, ZIMNY and KUCIŃSKA 1974) and southern Poland. Nevertheless (RYDZAK 1956 a, b, 1959, JAGIEŁŁO 1983, PUSTELNIAK 1991, KISZKA 1999), it cannot be assumed that the inventory stage of lichen research in cities has been closed. Further studies are needed in urbanised areas – both in those yet untested and those previously assessed lichenologically. The need results from the following conditions:

1. Biota of lichens from cities provides a significant figure in the general composition of Polish biota. Lichens from urbanised areas constitute 27% of lichenbiota of Poland. Without the current knowledge of city lichens the knowledge of Polish biota would be incomplete.

2. Lichenbiota of cities are the hallmarks of a clear specificity and rapid volatility in time. Studies conducted repeatedly in cities show lines of anthropogenic change: the emergence and spread of new species and the extinction of other species, including the most vulnerable.

3. Cities are often points of spread of synanthropic lichens on agricultural sites, woodland, etc.

The lichenbiota of Narew which is situated on the river Narew in the province of Podlasie has not been developed so far.

The aim of the undertaken studies was to investigate the lichenbiota of Narew and adjacent areas with regard to the habitat conditions of species.

STUDY AREA

Narew is a town situated in Podlasie. Its beginnings – the former royal town date back to Middle Ages. The city was founded in 1514 by village headman Olbracht Gasztold on the orders of king Zygmunt Stary.

Nowadays Narew has 1500 inhabitants. It is the seat of the municipality. Because of its borderland location Narew keeps some traditions of the Republic of Two Nations highlighting the wealth of traditions, customs and rituals. It is the seat of a leading producer of agricultural machines in Poland and the world – PRONAR Sp. z o.o.

The town is situated on the edge of the Białystok Plain, on the river Narew, in the Valley of the Upper Narew.

The town is the seat of the Narew municipality, located in the county of Hajnówka, in Podlasie Province (Fig. 1). The town is located about 20 km north of Hajnówka, on the left bank of the river Narew, on the provincial road No 685. Climatic conditions of the Narew municipality comply with the conditions prevailing on the Białystok Plateau, Bielsk Plain and the Białowieża Forest.

The spatial layout of the center of Narew, which existed in the 19th and early 20th century has been preserved to this day, and it is entered into the register of monuments of the Podlasie Province. Single-family and small-town housing dominates in Narew. The preserved historic buildings are wooden. To the east and south of the main square of Narew the housing is more concentrated, estates are smaller and possess small gardens. To the east and north of the church the Narew area has characteristics of an open countryside with riverside meadows.

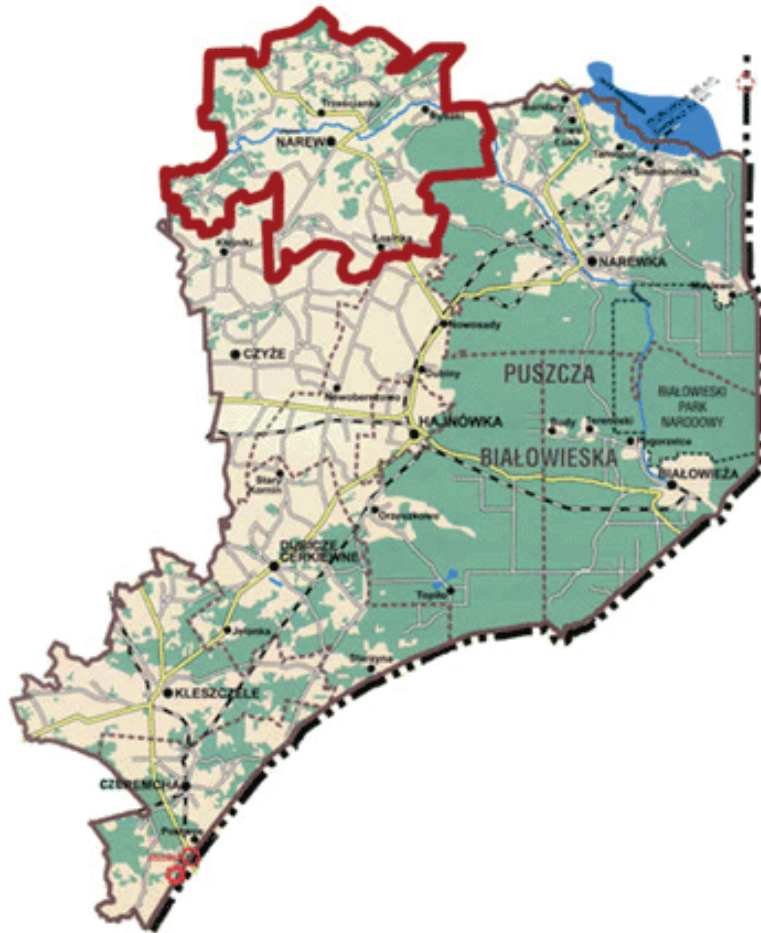


FIG. 1. Position of the Municipalities Narew in the County Hajnówka, in the Province Podlaskie

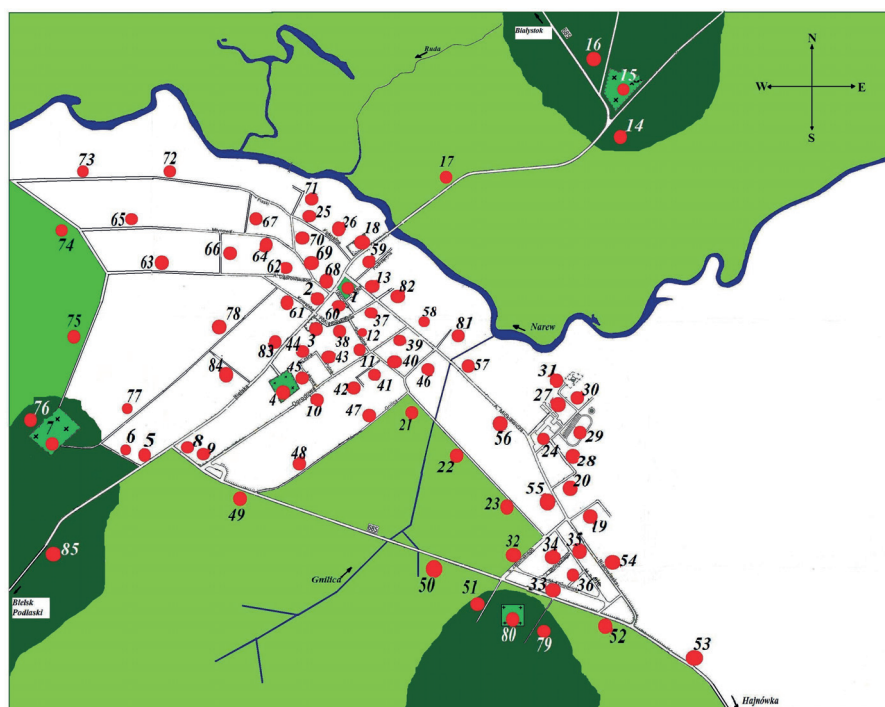


FIG. 2. Distribution of stands in Narew and its surroundings

MATERIAL AND METHODS

The investigations in the area of Narew and its surroundings were carried out in 2010-2011, on 85 research stands (Fig. 2). The alphabetical list of lichen species has been compiled. For each taxon we have specified the type of substratum it can be found on, and the numbers of stands. The species have been named according to FAŁTYNOWICZ (2003), and genus *Bryoria* to BYSTREK (1986, 1994), *Melanohalea exasperatula* to BLANCO et AL. (2004 a), *Xanthoparmelia loxodes* to BLANCO et AL. (2004 b), *Melanelixia fuliginosa* to ARUP and SANDLER BERLIN (2011), *Caloplaca flavocitrina* to ARUP (2006), *C. oasis* to ARUP (2009), *C. pusilla* to GAYA (2009), *Lecanora semipallida* to ŚLIWA (2009), *Cladonia coniocrea* to PINO-BODAS et AL. (2011).

The lichen material has been deposited at the Herbarium of the Institute of Biology, University of Białystok.

Index of stands

Distribution of stands in Narew and its surroundings is presented Figure 2.

RESULTS AND CONCLUSION

On the territory of Narew 97 lichen species of 42 genera have been recorded. The most abundant numbers of species represented here are those of genera *Cladonia* (21), *Lecanora* (12), *Caloplaca* (4) and *Ramalina* (4).

Lichens occur on all substrata likely to be colonized – on the bark of deciduous and coniferous trees and shrubs, wooden constructions, soil, stones, concrete, mortar, plaster and unusual substrate (metal, eternit, papa, rubber, plate bitumine).

Epixyloous lichens

The largest group of the habitats lichens are epixyloous, represented by 50 species (which represents 52% of the total biota). It stems (originates) from the fact that in the town in focus and others in the area of Podlasie old wooden huts have been kept. On the territory of Narew lichens of dead and rotting wood favour mainly man-made timber constructions (fences, poles, crosses and farm outbuildings). The exclusive species are *Cladonia coccifera*, *C. glauca*, *C. squamosa*, *Lecanora symmicta*, *L. varia*, *Micarea denigrata*, *Placynthiella uliginosa*, *Platismatia glauca* and *Trapeliopsis flexuosa*.

Epiphytes

The bark of trees (38 species) constitutes a substratum for numerous lichens. Out of 97 lichen species recorded in the area under study, 46 grew on tree bark including 14 obligatory epiphytes. Roadside trees dominate in Narew, free-standing trees prevail in agricultural landscape. The richest lichenbiota has been recorded on the bark of deciduous trees – *Fraxinus excelsior* (28 species), *Tilia cordata*, *Betula pendula* and *Acer platanoides* (such as 22). The epiphytic biota of the ash is of greater interest. The vulnerable and protected taxa have been identified on its bark, such as *Anaptychia ciliaris*, *Evernia prunastri*, *Hypogymnia tubulosa*, *Parmelina tiliacea*,

Pleurosticta acetabulum, *Ramalina farinacea*, *R. fastigiata* and *R. pollinaria*.

The largest amount of stands and the highest coverage coefficients are attained by species which colonize not only tree bark but other types of substrata as well. These species also comprise the most frequently encountered group in the lichenbiota of Narew: *Phaeophyscia orbicularis*, *Physcia adscendens* and *Xanthoria parietina*.

The rare species worth mentioning here include *Bryoria crispa* (stand 8), *Melanelixia subargentifera* (stand 27), *Pleurosticta acetabulum* (stand 18), *Ramalina fastigiata* (stand 18), *R. pollinaria* (stands 3, 18), *Usnea filipendula* (stands 7, 15, 24, 25), *U. hirta* (stands 7, 14, 15, 25).

Epilythes

The third largest habitat group – 36 species, comprises rock lichens, of which 12 are exclusive epilythes. They colonize both natural and anthropogenic substrata. Stones can be found in the open area, agricultural landscape, as well as within the town and built-up areas (walls, underpinnings and gravestones). Obligatory species include, among others *Acarospora fuscata*, *Candelariella coralliza*, *Rhizocarpon distinctum*, *Scoliciosporum umbrinum* and *Xanthoparmelia loxodes*. Rich lichenbiota occurs also on artificial substrata with properties resembling those of rocks, such as concrete, mortar and bricks. These become colonized by calciphilous species and also by species tolerant towards the presence of calcium carbonate, such as *Caloplaca flavocitrina*, *C. decipiens*, *C. pusilla*, *Lecanora albescens*, *L. dispersa*, *L. semipallida* and *Xanthoria parietina*. They are accompanied by numerous nitrophilous species of family *Physciaceae* (*Phaeophyscia orbicularis*, *P. nigricans*, *Physcia adscendens*, *P. caesia*, *P. dubia*, *P. tenella*).

Lichens atypical substrates

Lichens colonized atypical substrates, such as metal, rubber, papa, eternit, plate bitumine, are represented by 20 species. These are the species growing in other substrates, mainly on the concrete and the bark of trees. Most lichens were located on the metal (18 species), including, e.g. *Candelaria concolor*, *Phaeophyscia orbicularis*, *Physcia tenella*, *Xanthoria elegans*. Particular attention should also be paid to rubber (old abandoned tyres). These become colonized by many species, such as *Candelariella aurella*, *Lecanora albescens*, *L. dispersa*, *Phaeophyscia orbicularis*, *Physcia caesia*, *P. dubia*, *Xanthoria parietina*.

Epigeits

Soil is colonized by 19 lichen species of three genera (*Cetraria*, *Cladonia*, *Placynthiella*). The dominant one are terricolous cup-mosses (*Cladonia* – 17 species).

Terricolous lichens in the investigated area can be encountered outside urban settlements. The richest lichenbiota has been identified on stands 7, 15 and 18.

Participation of vulnerable and protected lichens

Of the 97 lichen species identified in Narew and its environs, 15 species have been put on the Red list of extinct and vulnerable lichens of Poland (CIEŚLIŃSKI et AL.

2006), including the five species in the endangered category – EN (*Anaptychia ciliaris*, *Bryoria crispa*, *Pleurosticta acetabulum*, *Ramalina fastigiata*, *R. fraxinea*), seven species in the vulnerable category – VU (*Cetraria chlorophylla*, *C. islandica*, *Parmelina tiliacea*, *Ramalina farinacea*, *R. pollinaria*, *Usnea filipendula*, *U. hirta*), three species in the category of near threatened – NT (*Evernia prunastri*, *Hypogymnia tubulosa*, *Melanelixia subargentifera*).

The most threatened ecological group in Narew are epiphytes.

Of all the 97 lichen species of Narew, 24 have been put under legal protection, 19 of which are totally and five of which are partially protected.

Species index

1. *Acarospora fuscata* (Nyl.) Arnold – stone; stand: 15.
2. *Amandinea punctata* (Hoffm.) Coppins & Scheid. – bark of *Fraxinus excelsior*, wood; stands: 3, 8, 15.
3. *Anaptychia ciliaris* (L.) Körb. – bark of *Fraxinus excelsior*; stand: 18.
4. *Aspicilia cinerea* (L.) Körb. – stone; stand: 15, 18.
5. *Bryoria crispa* (Motyka) Bystrek – bark of *Betula pendula*; stand: 8.
6. *Caloplaca decipiens* (Arnold) Blomb. & Forss. – concrete, stone ankle, stone; stands: 2, 4, 10-13, 15, 18-22, 24-26, 28-30, 32, 33, 37, 39, 40, 43-46, 48, 52, 56, 58, 60, 62, 63, 65, 68, 69, 72, 73, 75, 83, 85.
7. *Caloplaca flavocitrina* (Nyl.) H. Olivier – concrete, brick, stone ankle; stands: 2, 3, 7, 12, 13, 15, 18, 20, 22, 31.
8. *Caloplaca oasis* (A. Massal.) Szat. – stone, concrete, wood; stands: 2, 4, 7, 10, 12, 14, 15, 21, 24-26, 29, 31, 35, 37-39, 43, 46, 54-56, 58, 59, 64, 72, 77, 83.
9. *Caloplaca pusilla* (A. Massal.) Zahlbr. – concrete, stone, eternit; stands: 2, 7, 13, 15, 18, 21, 26-30, 32-41, 43-47, 51, 52, 54-58, 61-65, 67-72, 75, 78, 83, 84.
10. *Candelaria concolor* (Dicks.) Stein. – bark of *Prunus* sp., *Sorbus aucuparia*, *Tilia cordata*, concrete, metal; stands: 20, 27.
11. *Candelariella aurella* (Hoffm.) Zahlbr. – bark of *Betula pendula*, *Pyrus* sp., *Tilia cordata*, *Sorbus aucuparia*, concrete, wood, gum, stone, metal, papa, plate bitumine; stands: 2, 3, 4, 7, 10, 12, 15, 18, 20, 24-26, 29, 32-38, 43-45, 47, 48, 51, 52, 55-58, 60-66, 68, 70, 72, 74, 78, 80, 82-85.
12. *Candelariella coralliza* (Nyl.) H. Magn. – stone; stands: 3, 4, 15, 56.
13. *Candelariella vitellina* (Hoffm.) Müll. Arg. – concrete, stone, wood, metal; stands: 1-3, 12, 15, 18, 27, 29, 34, 36-39, 54, 61, 62, 65, 68, 69, 72, 73, 77, 78, 81, 82.
14. *Candelariella xanthostigma* (Ach.) Lettau – bark of *Acer platanoides*, *Betula pendula*, *Fraxinus excelsior*, *Populus tremula*, *Prunus* sp., *Robinia pseudoacacia*, *Salix alba*, *Tilia cordata*, wood; stands: 1, 3, 5, 7, 17, 18, 25, 27, 68.
15. *Cetraria chlorophylla* (Willd.) Vain. – bark of *Betula pendula*, stone, wood; stands: 7, 15.
16. *Cetraria islandica* (L.) Ach. – soil; stands: 7, 14, 16, 76.
17. *Cladonia arbuscula* (Wallr.) Flot. em. Ruoss subsp. *mitis* (Sandst.) Ruoss. – soil; stands: 7, 14, 16, 51, 76, 80, 85.
18. *Cladonia cariosa* (Ach.) Spreng. – soil; stand: 14.
19. *Cladonia chlorophaea* s. l. – soil, wood; stands: 7, 10, 14, 16.
20. *Cladonia coccifera* (L.) Willd. – wood; stand: 14.
21. *Cladonia coniocrea* (Flörke) Spreng. – bark of *Betula pendula*, wood, soil; stands: 7, 10, 14, 16, 38, 43, 55, 60, 63.
22. *Cladonia cornuta* (L.) Hoffm. – soil, wood; stands: 7, 80.
23. *Cladonia fimbriata* (L.) Fr. – bark of *Fraxinus excelsior*, *Salix alba*, wood, soil; stands: 5, 7, 12, 15, 16, 18, 38, 43, 47, 57, 63, 80, 85.
24. *Cladonia furcata* (Huds.) Schrad. – soil; stands: 4, 7, 14, 16.
25. *Cladonia glauca* Flörke – wood; stand: 16.
26. *Cladonia gracilis* (L.) Willd. – soil; stand: 14.
27. *Cladonia macilenta* Hoffm. subsp. *floerkeana* (Fr.) V. Wirth – wood; stands: 14, 38.
28. *Cladonia phyllophora* Hoffm. – soil; stands: 7, 14, 16, 76.
29. *Cladonia portentosa* (Dufour) Coem. – soil; stand: 14.
30. *Cladonia pyxidata* s. l. – soil; stand: 16.
31. *Cladonia ramulosa* (With.) J.R. Laundon – soil; stand: 14.
32. *Cladonia rangiferina* (L.) Weber – soil; stands: 7, 51.
33. *Cladonia rangiformis* Hoffm. – soil; stand: 14.
34. *Cladonia rei* Schaer. – soil; stands: 16, 85.
35. *Cladonia squamosa* (Scop.) Hoffm. – wood; stand: 14.
36. *Cladonia subulata* (L.) Weber in F.H. Wigg. – soil; stand: 4.
37. *Cladonia uncialis* (L.) F.H. Wigg. – soil; stand: 7.
38. *Evernia prunastri* (L.) Ach. – bark of *Acer platanoides*, *A. pseudoplatanus*, *A. saccharinum*, *Aesculus hippocastanum*, *Betula pendula*, *Cerasus* sp., *Crataegus laevigata*, *Fraxinus excelsior*, *Larix decidua*, *Populus nigra*, *P. tremula*, *Prunus* sp., *Pyrus* sp., *Quercus robur*, *Rhus typhina*, *Robinia pseudoacacia*, *Salix caprea*, *Sorbus aucuparia*, *Tilia cordata*, stone, wood; stands: 3, 5, 7, 8, 10, 14, 15-20, 24, 25, 27, 31, 32, 41, 48, 49, 56, 58, 61, 63, 64, 65, 66, 71, 72, 74, 75, 77, 82, 85.
39. *Hypocenomyce scalaris* (Ach.) M. Choisy – bark of *Betula pendula*, *Pinus sylvestris*, *Tilia cordata*, *Thuja occidentalis*, wood; stands: 5, 7, 12, 15, 16, 19, 20, 22, 24, 26, 33, 44, 48, 56, 63-67, 71, 75, 83, 84.
40. *Hypogymnia physodes* (L.) Nyl. – bark of *Acer platanoides*, *A. pseudoplatanus*, *A. saccharinum*, *Aesculus hippocastanum*, *Betula pendula*, *Catalpa bignonioides*, *Cerasus* sp., *Cornus alba*, *Crataegus laevigata*, *Fraxinus excelsior*, *Juniperus communis*, *Larix decidua*, *Picea abies*, *P. pungens*, *Pinus sylvestris*, *Populus nigra*, *P. tremula*, *Prunus* sp., *Pyrus* sp., *Quercus robur*, *Rhus typhina*, *Robinia pseudoacacia*, *Salix alba*, *S. caprea*, *Sorbus aucuparia*, *Tilia cordata*, wood, stone, metal, concrete; stands: 1, 5, 7-10, 12, 14-27, 29, 31-38, 40-67, 69, 71-85.
41. *Hypogymnia tubulosa* (Schaer.) Hav. – bark of *Acer platanoides*, *A. pseudoplatanus*, *Betula pendula*, *Fraxinus excelsior*, *Larix decidua*, *Pinus sylvestris*, *Prunus* sp., *Salix alba*, *Tilia cordata*, wood; stands: 15, 18, 20, 24, 27, 29, 31, 34, 43, 45, 48, 49, 74, 76, 79.

42. *Lecanora albescens* (Hoffm.) Flörke – concrete, brick, stone ankle, stone, papa, plate eternite, gum, metal; stands: 2-5, 7, 10, 12, 13, 15, 18-24, 26-41, 43, 46, 48, 51, 54-66, 68-73, 75, 77, 78, 82, 84, 85.
43. *Lecanora allophana* (Ach.) Nyl. – bark of *Acer saccharinum*, wood; stands: 8, 13.
44. *Lecanora argentata* (Ach.) Malme – wood; stand: 38.
45. *Lecanora carpinea* (L.) Vain. – bark of *Acer platanoides*, *A. saccharinum*, *Fraxinus excelsior*, *Sorbus aucuparia*, *Tilia cordata*, wood; stands: 1, 8, 14, 15, 17, 23, 24.
46. *Lecanora conizaeoides* Nyl. – bark of *Acer platanoides*, *Betula pendula*, *Pinus sylvestris*, *Tilia cordata*; stands: 1, 15, 16, 24, 27.
47. *Lecanora dispersa* (Pers.) Sommerf. – concrete, stone, gum; stands: 3-7, 15, 21, 26, 28, 32, 34, 35, 43, 44, 47, 54, 60, 63, 78, 82, 83.
48. *Lecanora hageni* (Ach.) Ach. – bark of *Acer pseudoplatanus*, wood; stands: 8, 14.
49. *Lecanora polytropa* (Ehrh. ex Hoffm.) Rabenh. – stone; stand: 3.
50. *Lecanora pulicaris* (Pers.) Ach. – bark of *Acer platanoides*, *A. pseudoplatanus*, *A. saccharinum*, *Populus nigra*, wood, stands: 4, 8, 14, 20, 24, 58.
51. *Lecanora semipallida* H. Magn. – concrete, stands: 2, 10, 12, 13, 30, 40, 55, 60.
52. *Lecanora symmicta* (Ach.) Ach. – wood; stand: 4.
53. *Lecanora varia* (Hoffm.) Ach. – wood; stand: 3, 4, 10, 12, 15, 37.
54. *Lecidella stigmathea* (Ach.) Hertel & Leuckert – concrete, stone; stands: 6, 13, 21, 70.
55. *Lepraria* spp. – bark of *Acer platanoides*, *A. pseudoplatanus*, *Aesculus hippocastanum*, *Betula pendula*, *Fraxinus excelsior*, *Juniperus communis*, *Larix decidua*, *Picea pungens*, *Pinus sylvestris*, *Robinia pseudoacacia*, *Tilia cordata*, wood, concrete; stands: 3, 7, 15-18, 22, 32, 43, 44, 47-51, 58, 61, 62, 64-67, 71-73, 79, 80, 85.
56. *Melanelixia fuliginosa* (Fr. ex Duby) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch – bark of *Fraxinus excelsior*, *Quercus robur*, *Robinia pseudoacacia*, *Tilia cordata*, stone, wood, metal; stands: 1, 3, 7, 15, 18, 57, 71.
57. *Melanelixia subargentifera* (Nyl.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch – bark of *Tilia cordata*; stand: 27.
58. *Melanohalea exasperatula* (Nyl.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch – bark of *Betula pendula*, *Fraxinus excelsior*, *Tilia cordata*, wood; stands: 18, 55, 63, 85.
59. *Micarea denigrata* (Fr.) Hedl. – wood; stand: 10.
60. *Parmelia sulcata* Taylor – bark of *Acer platanoides*, *A. pseudoplatanus*, *A. saccharinum*, *Aesculus hippocastanum*, *Betula pendula*, *Catalpa bignonioides*, *Cerasus* sp., *Cornus alba*, *Crataegus laevigata*, *Fraxinus excelsior*, *Juniperus communis*, *Larix decidua*, *Malus* sp., *Picea abies*, *Pinus sylvestris*, *Populus nigra*, *P. tremula*, *Prunus* sp., *Pyrus* sp., *Rhus typhina*, *Robinia pseudoacacia*, *Salix alba*, *S. caprea*, *Sorbus aucuparia*, *Tilia cordata*, *Ulmus laevis*, stone, concrete, wood, metal; stands: 1, 3-9, 15-29, 31-36, 38, 42, 43, 46-52, 54-67, 69, 71-78, 81, 84, 85.
61. *Parmelina tiliacea* (Hoffm.) Hale – bark of *Fraxinus excelsior*; stand: 18.
62. *Parmeliopsis ambigua* (Wulfen) Nyl. – bark of *Tilia cordata*; stand: 15.
63. *Peltigera rufescens* (Weiss) Humb. – soil; stand: 7, 14, 85.
64. *Pertusaria albescens* (Huds.) M. Choisy & Werner – bark of *Fraxinus excelsior*; stand: 18.
65. *Phaeophyscia nigricans* (Flörke) Moberg – concrete; stands: 5, 13.
66. *Phaeophyscia orbicularis* (Neck.) Moberg – bark of *Acer platanoides*, *A. pseudoplatanus*, *Betula pendula*, *Cerasus* sp., *Fraxinus excelsior*, *Juglans regia*, *Larix decidua*, *Malus* sp., *Pinus sylvestris*, *Populus tremula*, *Prunus* sp., *Pyrus* sp., *Robinia pseudoacacia*, *Salix alba*, *Sorbus aucuparia*, *Tilia cordata*, wood, stone, concrete, plate eternite, metal, papa, gum, plate bitumine; stands: 1-8, 10-13, 15-26, 28-33, 37, 38, 40, 43-46, 48, 49, 52, 54-75, 77, 78, 80-82, 84, 85.
67. *Phlyctis argena* (Ach.) Flot. – bark of *Acer negundo*, *A. platanoides*, *A. pseudoplatanus*, *Fraxinus excelsior*, *Picea abies*, *Populus tremula*, *Prunus* sp., *Pyrus* sp., *Robinia pseudoacacia*, *Salix alba*, *Sorbus aucuparia*, *Syringa vulgaris*, *Tilia cordata*, *Ulmus laevis*, wood; stands: 1, 3, 7, 12, 15, 18, 21, 27, 35, 48, 49, 50, 52-54, 56, 57, 59, 63, 65, 67, 73, 75, 76, 80, 85.
68. *Physcia adscendens* (Fr.) H. Olivier – bark of *Acer negundo*, *A. platanoides*, *A. pseudoplatanus*, *A. saccharinum*, *Aesculus hippocastanum*, *Betula pendula*, *Caragana arborescens*, *Catalpa bignonioides*, *Cerasus* sp., *Cornus alba*, *Crataegus laevigata*, *Fraxinus excelsior*, *Juniperus communis*, *Larix decidua*, *Malus* sp., *Pinus sylvestris*, *Picea abies*, *Populus tremula*, *Prunus* sp., *Pyrus* sp., *Rhus typhina*, *Robinia pseudoacacia*, *Salix alba*, *S. caprea*, *Sorbus aucuparia*, *Syringa vulgaris*, *Tilia cordata*, *Ulmus laevis*, concrete, stone, metal, wood; stands: 1, 3, 5-8, 10, 15, 16, 19-22, 24-28, 31, 33, 37, 39-40, 42-44, 46-50, 52, 54, 55-75, 78, 80-82, 85.
69. *Physcia caesia* (Hoffm.) Fűrnrrohr – bark of *Crataegus laevigata*, *Sorbus aucuparia*, *Tilia cordata*, concrete, stone, wood, metal, papa, gum; stands: 6, 12, 15, 18, 20, 23-27, 32, 34, 38, 40, 43-45, 48, 55, 58, 60, 61, 63, 64, 71-73, 84.
70. *Physcia dubia* (Hoffm.) Lettau – bark of *Acer negundo*, *A. platanoides*, *A. pseudoplatanus*, *A. saccharinum*, *Aesculus hippocastanum*, *Betula pendula*, *Caragana arborescens*, *Catalpa bignonioides*, *Cerasus* sp., *Cornus alba*, *Crataegus laevigata*, *Fraxinus excelsior*, *Juglans regia*, *Juniperus communis*, *Ginkgo biloba*, *Larix decidua*, *Malus* sp., *Picea abies*, *Pinus sylvestris*, *Populus nigra*, *P. tremula*, *Prunus* sp., *Pyrus* sp., *Rhus typhina*, *Salix alba*, *Sorbus aucuparia*, *Syringa vulgaris*, *Tilia cordata*, *Ulmus laevis*, stone, concrete, wood, metal, gum, plate bitumine; stands: 1, 3-5, 7, 11, 15, 18-29, 31-37, 41, 43-50, 52-57, 61, 63-65, 68, 71-74, 76, 79, 81, 84, 85.
71. *Physcia stellaris* (L.) Nyl. subsp. *stellaris* – bark of *Acer negundo*, *A. platanoides*, *A. pseudoplatanus*, *Betula pendula*, *Picea abies*, wood, metal; stands: 7, 8, 10, 14, 20, 24, 27, 44.
72. *Physcia tenella* (Scop.) DC. – bark of *Acer platanoides*, *A. pseudoplatanus*, *Aesculus hippocastanum*,

- Betula pendula*, *Cerasus* sp., *Fraxinus excelsior*, *Malus* sp., *Populus nigra*, *P. tremula*, *Prunus* sp., *Pyrus* sp., *Rhus typhina*, *Salix alba*, *Sorbus aucuparia*, *Syringa vulgaris*, *Tilia cordata*, concrete, stone, wood, metal; stands: 1, 5, 7, 8, 15, 18-20, 22-27, 31, 34, 44, 46-49, 52, 54, 55, 57, 61-63, 67, 71-73, 85.
73. *Physconia enteroxantha* (Nyl.) Poelt – bark of *Salix alba*, *Tilia cordata*; stands: 1, 5, 15.
74. *Physconia grisea* (Lam.) Poelt – bark of *Acer platanoides*, *Fraxinus excelsior*, wood; stands: 3, 15, 18.
75. *Placynthiella uliginosa* (Schrad.) Coppins & P. James – wood; stand: 3.
76. *Platismatia glauca* (L.) W.L. Culb. & C.F. Culb. – wood; stand: 7.
77. *Pleurosticta acetabulum* (Neck.) Elix & Lumbsch – bark of *Fraxinus excelsior*; stand: 18.
78. *Porpidia crustulata* (Ach.) Hertel & Knoph – stone; stands: 12, 58.
79. *Protoparmeliopsis muralis* (Schreb.) Choisy – stone, brick, concrete, wood, plate eternite, metal; stands: 1-4, 6, 7, 10-13, 15, 18, 19, 22, 24, 26, 27, 29-35, 37, 39, 44, 46, 51, 56-70, 73, 74, 78, 80, 82-84.
80. *Pseudevernia furfuracea* (L.) Zopf – bark of *Acer platanoides*, *Betula pendula*, *Larix decidua*, *Fraxinus excelsior*, *Quercus robur*, *Pinus sylvestris*, wood; stands: 7, 15, 18, 24, 34, 48, 51, 56, 85.
81. *Ramalina farinacea* (L.) Ach. – bark of *Acer platanoides*, *Fraxinus excelsior*, *Populus tremula*, *Salix caprea*; stands: 3, 7, 18, 74, 85.
82. *Ramalina fastigiata* (Pers.) Ach. – bark of *Fraxinus excelsior*; stand: 18.
83. *Ramalina fraxinea* (L.) Ach. – bark of *Acer platanoides*, *A. pseudoplatanus*, *Fraxinus excelsior*, *Populus nigra*, *Salix alba*, wood; stands: 3, 5, 7, 8, 17, 18, 20, 56, 57, 71.
84. *Ramalina pollinaria* (Westr.) Ach. – bark of *Acer platanoides*, *Fraxinus excelsior*; stands: 3, 18.
85. *Rhizocarpon distinctum* Th. Fr. – stone; stand: 4.
86. *Scoliciosporum chlorococcum* (Graeve ex Stenh.) Vězda – bark of *Betula pendula*, wood; stands: 9, 15.
87. *Scoliciosporum umbrinum* (Ach.) Arnold – stone; stands: 3, 12.
88. *Trapeliopsis flexuosa* (Fr.) Coppins & P. James – wood; stand: 10.
89. *Trapeliopsis granulosa* (Hoffm.) Lumbsch – wood; stand: 10.
90. *Usnea filipendula* Stirt. – bark of *Betula pendula*, *Tilia cordata*, wood; stands: 7, 15, 24, 25.
91. *Usnea hirta* (L.) Weber ex F.H. Wigg. – bark of *Betula pendula*, *Populus tremula*, *Pinus sylvestris*, *Tilia cordata*, wood; stands: 7, 14, 15, 25.
92. *Verrucaria muralis* Ach. – brick, stone, concrete; stands: 2, 4.
93. *Verrucaria nigrescens* Pers. – concrete, plate eternite, stone, metal; stands: 7, 21, 27-33, 36-39, 41, 43-46, 48, 51, 52, 54-58, 60-63, 68, 69, 73, 75, 78, 80, 82-84.
94. *Xanthoparmelia loxodes* (Nyl.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch – stone; stand: 4.
95. *Xanthoria elegans* (Link.) Th. Fr. – concrete, metal; stands: 2, 10, 13, 18, 19, 24, 26, 37, 43, 52, 58, 59, 85.
96. *Xanthoria parietina* (L.) Th. Fr. – bark of *Acer negundo*, *A. platanoides*, *A. pseudoplatanus*, *A. saccharinum*, *Aesculus hippocastanum*, *Betula pendula*, *Caragana arborescens*, *Catalpa bignonioides*, *Cerasus* sp., *Cornus alba*, *Crataegus laevigata*, *Fraxinus excelsior*, *Ginkgo biloba*, *Juglans regia*, *Juniperus communis*, *Larix decidua*, *Malus* sp., *Picea abies*, *Pinus sylvestris*, *Populus nigra*, *P. tremula*, *Prunus* sp., *Pyrus* sp., *Rhus typhina*, *Robinia pseudoacacia*, *Salix alba*, *Sorbus aucuparia*, *Symphoricarpos albus*, *Syringa vulgaris*, *Thuja occidentalis*, *Tilia cordata*, *Ulmus laevis*, tile, wood, stone, concrete, metal, plate eternite, gum, plate bitumine; stands: 1-3, 5-11, 14-29, 31-61, 63-67, 69-75, 77-85.
97. *Xanthoria polycarpa* (Hoffm.) Rieber – bark of *Acer platanoides*, *A. saccharinum*, *Fraxinus excelsior*, *Ginkgo biloba*, *Larix decidua*, *Prunus* sp., *Populus nigra*, *P. tremula*, *Salix alba*, *S. caprea*, *Sorbus aucuparia*, *Tilia cordata*, wood, metal, concrete, stone; stands: 3, 5, 7, 15, 17, 19-25, 27, 28, 30, 32, 36, 37, 44, 46, 48, 52, 57, 60-63, 64, 68, 74, 77, 82.

On the territory of Narew there have been recorded 97 lichen species. The lichen biota of other towns with a similar number of inhabitants as Narew documented in literature (RYDZAK 1956 a, b, 1957, 1959, JAGIEŁŁO 1983, IZYDOREK 2005, MATWIEJUK 2008, WÓJCIĄK and KORONA 2008, MATWIEJUK 2009 b, 2011), is characterized by a poorer species composition of lichens. The analysed towns differ due to a significant number of species growing on the bark of trees and shrubs (Białowieża – 94 species, Boćki – 57, Limanowa – 57, Ciechanowiec – 55, Świnoujście – 47, Mielnik – 47, Narew – 46, Drohiczyn – 43, Drezdenko – 39, Władysławowo – 37, Świdnik – 33, Hel – 31). Their rich species variety and abundant occurrence highlights the maintenance of biocenotic structures deformed to an insignificant extent by anthropopressure. Among the lichens colonizing secondary rock substrata the most frequently represented habitat group are calcilophilous lichens bound up with concrete. This species are spread, especially in city zone. The most common-place species are *Lecanora albescens*, *L. dispersa*, *Caloplaca decipiens*, *C. pusilla*, *Candelariella aurella*, *Phaeophyscia orbicularis*, *Xanthoria parietina*. They frequently cover large surfaces, especially on old plaster of houses, on walls and poles. Lichens of Narew is characterised by a large share of the species growing on wood. Lichens of dead and rotting wood favour mainly man-made timber constructions (fences, poles, crosses and farm outbuildings). Terricolous lichens have been found outside urban settlements, primarily in forest fragments, grass, on sandy wasteland situated in the vicinity of administrative city boundaries and on the outskirts. In all of the towns, a group of species can be differentiated, the ones which have found here optimal living conditions. These are common nitrophilous lichens, coniofilous lichens of order *Buelliales* and of family *Lecanoraceae*, frequently growing in large populations.

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REFERENCES

- ARUP U. (2006): A new taxonomy of the *Caloplaca citrina* group in the Nordic countries, except Iceland. *Lichenologist* 38, 1: 1-20.
- ARUP U. (2009): The *Caloplaca holocarpa* group in the Nordic countries, except Iceland. *Lichenologist* 41, 2: 111-130.
- ARUP U., SANDLER BERLIN E. (2011): A taxonomic study of *Melanelixia fuliginosa* in Europe. *Lichenologist* 43: 89-97.
- BLANCO O., CRESPO A., DIVAKAR P.K., ESSLINGER T.L., HAWKSWORTH D.L., LUMBSCH H.T. (2004 a): *Melanelixia* and *Melanohalea*, two new genera segregated from *Melanelia* (*Parmeliaceae*) based on molecular and morphological data. *Mycol. Res.* 108, 8: 873-884.
- BLANCO O., CRESPO A., ELIX J.A., HAWKSWORTH D.L., LUMBSCH H.T. (2004 b): A molecular phylogeny and a new classification of parmelioid lichens containing *Xanthoparmelia* – type lichenan (Ascomycota: Lecanorales). *Taxon* 53, 4: 959-975.
- BYSTREK J. (1986): Species of the genus *Bryoria* Brodo et Hawksw. (Lichenes, Usneaceae) in Europe. *Bull. Pol. Acad. Sci.* 34, Ser. Biol. 10-12: 293-300.
- BYSTREK J. (1994): Studien über die Flechtengattungen *Usnea* in Europa. Wyd. Uniwersytetu Marii Curie-Skłodowskiej, Lublin.
- CIEŚLIŃSKI S. (1974): Flora epifityczna porostów miasta Radom. *Biul. Kwart. Radom. Tow. Nauk.* 11, 3/4: 169-189.
- CIEŚLIŃSKI S., CZYŻEWSKA K., FABISZEWSKI J. (2006): Red list of the Lichenes in Poland In: Red list of plants and fungi in Poland. Czerwona lista roślin i grzybów Polski. Eds Z. Mirek, K. Zarzycki, W. Wojewoda, Z. Szeląg. W. Szafer Institute of Biology, Polish Academy of Sciences, Kraków: 71-90.
- FALTYNOWICZ W. (2003): The lichens, lichenicolous and allied fungi of Poland. An annotated checklist. Krytyczna lista porostów i grzybów naporostowych Polski. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków.
- FALTYNOWICZ W., IZYDOREK I., BUDZBON E. (1991): The lichen flora as bioindicator of air pollution of Gdańsk, Sopot and Gdynia. *Monogr. Bot.* 73: 1-52.
- GAYA E. (2009): Taxonomical revision of the *Caloplaca saxicola* group (Teloschistaceae, lichen-forming Ascomycota). *Bibl. Lichenol.* 101. J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, Berlin-Stuttgart.
- GÓRNIAK A. (2000): Klimat województwa podlaskiego. Instytut Meteorologii i Gospodarki Wodnej, Białystok.
- IZYDOREK I. (2005): Porosty wybranych miast na polskim wybrzeżu Bałtyku. [The lichens of selected towns in a Polish coastline of the Baltic Sea]. *Acta Bot. Cassub.* 5: 173-178.
- JAGIEŁŁO M. (1983): Porosty epifityczne Limanowej. *Zesz. Nauk. Uniw. Jagiell. Pr. Bot.* 11: 191-218.
- KISZKA J. (1977): Wpływ emisji miejskich i przemysłowych na florę porostów (*Lichenes*) Krakowa i Puszczy Niepołomickiej. Wyd. Naukowe WSP w Krakowie, Pr. Monogr. 19: 5-137.
- KISZKA J. (1999): Porosty (*Lichenes*) oraz warunki biologiczne Przemysła. *Arbor. Bolestr.* 6.
- KONDRACKI J. (1994): Geografia Polski. Mezoregiony fizyczno-geograficzne. Wyd. Nauk. PWN, Warszawa.
- KUBIAK D. (2005): Lichens and lichenicolous fungi of Olsztyn town (NE) Poland. *Acta Mycol.* 40, 2: 293-332.
- LIPNICKI L. (1984): Porosty miasta Drezdenka i najbliższej okolicy. *Fragm. Florist. Geobot.* 28, 2: 221-239.
- MATWIEJUK A. (2007): Porosty Białegostoku. Analiza florystyczno-ekologiczna. Vol. 1. Wyd. „Ekonomia i Środowisko”, Białystok.
- MATWIEJUK A. (2008): Lichens of Mielnik on river Bug (Podlasie, Eastern Poland). *Opole Scientific Society. Nat. J.* 41: 5-18.
- MATWIEJUK A. (2009 a): Lichens of the Boćki and its surroundings in Podlasie (NE Poland), *Opole Scientific Society. Nat. J.* 42: 49-61.
- MATWIEJUK A. (2009 b): Lichens of Drohiczyń on the Bug river (Podlasie, Eastern Poland). *Rocz. AR Pozn.* 390, Bot. Sec. 12: 57-62.
- MATWIEJUK A. (2011): Anthropogenic changes of lichen biota of the Białowieża (Podlasie, Eastern Poland). *Rocz. AR Pozn.* 390, Bot. Sec. 15: 51-60.
- MATWIEJUK A., KOLANKO K. (2007): Lichenes of Ciechanowiec and its environs (Eastern Poland). *Rocz. AR Pozn.* 390, Bot. Sec. 11: 85-93.
- MATWIEJUK A., KOROBKIEWICZ K. (2012): Stan bioty porostów w miastach Polski. *Ochr. Środ. Zasob. Nat.* 51: 85-105.
- MICHAŁUK D. (1996): Z dziejów Narwi i okolic. W 480. rocznicę nadania prawa chełmińskiego 1514-1994. Białostockie Towarzystwo Naukowe, Białystok: 5-49.
- PINO-BODAS R., BURGAS A.R., MARTIN M.P., LUMBSCH H.T. (2011): Phenotypical plasticity and homoplasies complicate species delimitation in the *Cladonia gracilis* group (*Cladoniaceae*, Ascomycota). *Organ. Div. Evol.* 11, 5: 245-355.
- PUSTELNIAK L. (1991): Epiphytic lichens of the city Rzeszów (South – Eastern Poland). *Zesz. Nauk. Uniw. Jagiell. Pr. Bot.* 22: 171-191.
- ROZPORZĄDZENIE Ministra Środowiska z dnia 9 lipca 2004 roku w sprawie gatunków dziko występujących grzybów objętych ochroną. (2004). *Dz.U.* nr 168, poz. 1765.
- RYDZAK J. (1953): Rozmieszczenie i ekologia porostów miasta Lublina. *Ann. Univ. Mariae Curie-Skłodowska Sect. C* 8, 9: 233-356.
- RYDZAK J. (1956 a): Wpływ małych miast na florę porostów. Part 1. Dolny Śląsk – Kluczbork, Wołczyn, Opole, Cieszyn. *Ann. Univ. Mariae Curie-Skłodowska Sect. C* 10, 1: 1-32.
- RYDZAK J. (1956 b): Wpływ małych miast na florę porostów. Part 2. Beskidy Zachodnie. Wisła-Ustroń-Muszyna-Iwonicz-Rymanów-Lesko. *Ann. Univ. Mariae Curie-Skłodowska Sect. C* 10, 2: 33-66.
- RYDZAK J. (1957): Wpływ małych miast na florę porostów. Part 4. Lubelszczyzna-Kieleckie-Podlaskie-Puławy-Busko-Siedlce-Białowieża. *Ann. Univ. Mariae Curie-Skłodowska Sect. C* 10, 14: 321-398.
- RYDZAK J. (1959): Wpływ małych miast na florę porostów. Part 5. Kotlina Kłodzka – Kłodzko, Kudowa Zdrój, Duszniki Zdrój, Polanica Zdrój, Łądek Zdrój, Stronie Śląskie. *Ann. Univ. Mariae Curie-Skłodowska Sect. C* 11, 2: 25-50.

ŚLIWA L. (2009): *Lecanora semipallida* (lichenized Ascomycota) in Poland. Pol. Bot. J. 54, 1: 31-36.

ŚPIEWAKOWSKI E.R., IZYDOREK I. (1981): Porosty Słupska na tle warunków ekologicznych miasta. WSP, Słupsk.

TOBOROWICZ K. (1976): Porosty miasta Kielc i najbliższej okolicy. Fragm. Florist. Geobot. 22, 4: 574-603.

WÓJCIAK H., KORONA K. (2008): The condition of the biota of Lichen in Świdnik. Teka Kom. Ochr. Kształt. Środ. Przyr. – OL PAN, 5: 199-207.

ZIMNY H., KUCIŃSKA K. (1974): Porosty Warszawy jako biowskaźniki zaburzeń środowiska miejskiego. Przegł. Inf. – Ziel. Miej. 10/1, Instytut Gospodarki Komunalnej, Warszawa: 13-22.

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