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Preliminary studies on the bryoflora of the Narwiański National Park (NE Poland)

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Abstract: Preliminary studies on the bryoflora of the Narwiański National Park located in north-eastern Poland were carried out in July 2011. As a result, localities of 82 species (6 liverworts and 76 mosses) were discovered. The most interesting are *Aulacomnium androgynum* (Hedw.) Schwägr., *Hedwigia ciliata* (Hedw.) P.Beauv., *Leptodictyum humile* (P.Beauv.) Ochyra, *Plagiothecium latebricola* (Wils.) Schimp., *Syntrichia papillosa* (Jur.) Wilson and *S. virescens* (De Not.) Ochyra.

Key words: Bryophytes, liverworts, mosses, threatened species, protected species, distributional data, Narwiański National Park, Podlaskie Voivodeship, Poland.

Introduction

The Narwiański National Park is located in north-eastern Poland in the area of Podlaskie Voivodeship (Fig 1) and was established on 1 July 1996 on the area of 6810 ha. The main purpose was to protect a well preserved the Narew river valley which is the sole braided river in Europe. The park comprises the swampy area of the valley between the towns Suraż and Rzędziany, with a network of channels separated by small islands. The protective zone around the park covers the area of 15 408 ha (http://www.npn.pl/narwianski-park-narodowy).

Overwhelming majority of the Narew river valley is overgrown by various plant communities from the classes *Phragmitetea* and *Potamogetonetea* and this part is difficult to investigate (Fig 2). In the areas surrounding the valley meadows, arable fields, forests (mainly managed mixed and coniferous) and villages predominate (Fig 3).

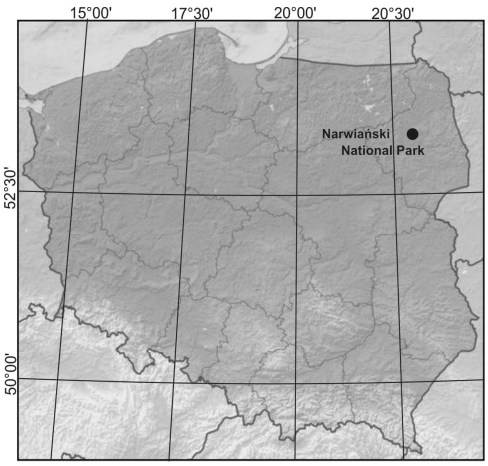


Fig 1: Map of Poland with marking of studing area (Narwiański National Park)

Material and methods

The field investigations were carried out in the July 2011. For each locality habitat and GPS coordinates were noted. The taxa are listed in an alphabetical order. Their nomenclature follows Ochyra et al. (2003). Protected species in Poland are given after 'Regulation of the Minister of the Environment' (Anonymus 2012), whereas threatened species after Żarnowiec et al. (2004).

List of localities

List of localities is set in alphabetical order. For each locality ATMOS grid square (Ochyra, Szmajda 1981), GPS coordinates and topography information are given.

Baciuty (Cf 29; 53°3'14.52"N, 22°58'26.38"E), western part.
Grobla pod Kurowem (Gf 18; 53°7'2.31"N, 22°47'48.38"E), projected nature reserve, near bridge on the Narew river.
Jeńki-Romanowo (Cf 28; 53°3'10.74"N, 22°51'42.33"E), forest east of the village.
Kolonia Kościuki (Cf 19; 53°7'7.28"N, 22°57'7.92"E), near road Kościuki-Choroszcz.
Kolonia Kurowo (Cf 18; 53°6'26.1"N, 22°46'48.28"E), meadows.
Kolonia Pajewo (Cf 18; 53°7'9.47"N, 22°46'28.92"E), near road to Jeżewo.
Kolonia Rogowo (Cf 19; 53°7'29.53"N, 22°54'49.29"E), near road to Rogowo.
Kościuki [I] (Cf 19; 53°6'10.21"N, 22°55'38.84"E), forest in southern part.
Kościuki [II] (Cf 19; 53°6'17.43"N, 22°56'8.47"E), south-western part of village.
Kościuki-Mogiłki (Cf 29; 53°5'59.6"N, 22°56'21.09"E), forest in southern part of village.
between Kościuki and Zaczerlany (Cf 19; 53°6'16.73"N, 22°57'16.57"E), forest.
Kurowo [I] (Cf 28; 53°6'18.82"N, 22°47'43.79"E), near palace.
Kurowo [II] (Cf 18; 53°6'37.3"N, 22°46'57.63"E), near mill.
Pobłocie (Biendziuga) (Cf 18; 53°7'0.94"N, 22°46'55.63"E), meadows, arable fields.
Rogowo (Cf 19; 53°8'10.46"N, 22°54'4.14"E), eastern part.
Ruszczany (Cf 19; 53°8'31.68"N, 22°56'29.33"E), forest in western part.
Topilec [I] (Cf 29; 53°4'26.37"N, 22°57'2.44"E), cemetery.
Topilec [II] (Cf 29; 53°4'31.4"N, 22°57'15.76"E), sand-pit near cemetery.
Topilec [III] (Cf 29; 53°4'38.71"N, 22°55'46.41"E), near stream in western part.
Uhowo (Cf 39; 52°59'43.7"N, 22°56'11.4"E), peat bog and its surroundings in southern part.
Waniewo (Cf 28; 53°4'36.44"N, 22°49'8.38"E), bank of the Narew river.

Results

As a result, localities of 82 species were noted (6 liverworts and 76 mosses). They are mainly common species in Poland. The most interesting are species protected (24) and threatened in Poland (2). It should be emphasized that all these data are new for this area, but till this time any bryological information has been known from here.

LIST OF SPECIES

Abbreviations: b. – between; **!** – species partly protected in Poland, **!!** – species strictly protected in Poland, ***** – species threatened in Poland.

LIVERWORTS (MARCHANTIOPHYTA)

Lophocolea heteropylla (Schrad.) Dumort. – Kościuki [I]; Kościuki-Mogiłki. Rotten wood.
Lophocolea bidentata (L.) Dumort. – Grobla pod Kurowem; Kościuki [I]. Grassy slopes.
Marchantia latifolia Gray – Pobłocie, wet stubble field.
! *Ptilidium ciliare* (L.) Hampe – Jeńki-Romanowo, young pine forest.
Ptilidium pulcherrimum (Weber) Vain. – Kościuki-Mogiłki; b. Kościuki and Zaczerlany, bark of deciduous trees and logs.
Radula complanata (L.) Dumort. – Grobla pod Kurowem, bark of wayside *Salix alba*.

MOSSES (BRYOPHYTA)

Abietinella abietina (Hedw.) M.Fleisch. – Grobla pod Kurowem; Kolonia Rogowo; Ruszczany; Topilec [I]; Topilec [II]; Topilec [III]. Grassy slopes, old walls.
Amblystegium serpens (Hedw.) Schimp. – Grobla pod Kurowem; Kolonia Kościuki; Kościuki [II]; Kurowo [II]; Ruszczany; Uhowo; Waniewo. Bark of trees, logs, walls.
Atrichum undulatum (Hedw.) P.Beauv. – Pobłocie, soil in shrubs.
Aulacomnium androgynum (Hedw.) Schwägr. – Kościuki-Mogiłki, humic soil in *Picea abies* forest; Topilec [III], humic soil in thicket.

! *Aulacomnium palustre* (Hedw.) Schwägr. – Jeńki-Romanowo; Kolonia Rogowo; b. Kościuki and Zaczerlany; Uhowo. Peat bogs, litter in pine forest.
Barbula unguiculata Hedw. – Topilec [II]; Grobla pod Kurowem; Jeńki-Romanowo. Waysides, concrete walls.
Brachytheciastrum velutinum (Hedw.) Ignatov & Huttunen – Kolonia Rogowo, bark of *Betula pendula*.
Brachythecium albicans (Hedw.) Schimp. – Jeńki-Romanowo; Kościuki [I]. Grasslands, waysides.
Brachythecium rutabulum (Hedw.) Schimp. – Grobla pod Kurowem; Kościuki [I]; Kurowo [I]; Topilec [III]. Logs, stumps, soil, bark of deciduous trees.
Brachythecium salebrosum (Web. & Mohr) Schimp. – Kolonia Rogowo, bark of *Betula pendula*.
Bryoerythrophyllum recurvirostrum (Hedw.) P.C.Chen – Grobla pod Kurowem, wall of bridge on the Narew river.
Bryum argenteum Hedw. – Grobla pod Kurowem; Kurowo [II]. Concrete walls, ruderal places.
Bryum caespiticium Hedw. – Jeńki-Romanowo, wayside.
Bryum pallescens Schwägr. – Grobla pod Kurowem, wall of old bridge on the Narew river.
! *Calliergonella cuspidata* (Hedw.) Loeske – Kurowo [I]; Kolonia Kurowo. Wet meadow.
Ceratodon purpureus (Hedw.) Brid. – Jeńki-Romanowo; Ruszczany. Concrete walls, ruderal places, bark of deciduous trees.
Cirriphyllum piliferum (Hedw.) Grout – Kościuki [I]; b. Kościuki and Zaczerlany. Grassy slopes.
! *Climacium dendroides* (Hedw.) F.Weber & D. Mohr – Kolonia Rogowo; Ruszczany; Topilec [I]; Uhowo. Wet meadow, peat bog, waysides.
Dicranella heteromalla (Hedw.) Schimp. – Topilec [III], on ground in shrubs.
! *Dicranum polysetum* Sw. *ex* anon. – Jeńki-Romanowo; b. Kościuki and Zaczerlany; Kościuki-Mogiłki; Ruszczany; Uhowo. On ground in pine forest.
! *Dicranum scoparium* Hedw. – Kolonia Rogowo; b. Kościuki and Zaczerlany; Kościuki-Mogiłki; Ruszczany; Uhowo. Bark of trees, rotten wood, soil in forest.
Didymodon fallax (Hedw.) R.H.Zander – Topilec [II], slope in sand-pit.
Drepanocladus polycapos (Voit) Warnst. – Grobla pod Kurowem, bank of the Narew river.
Dryptodon pulvinatus (Hedw.) Limpr. – Grobla pod Kurowem; Kurowo [II]; Topilec [III]. Old concrete walls.
Fissidens taxifolius Hedw. – Pobłocie, on ground in alder forest.
Funaria hygrometrica L. – Pobłocie, stubble field.
Hedwigia ciliata (Hedw.) P.Beauv. – Grobla pod Kurowem, wall of old bridge on the Narew river. Species rare in this area of Poland (Ochyra et al. 1988).
! *Hylocomium splendens* (Hedw.) Schimp. – Jeńki-Romanowo; Kolonia Rogowo; b. Kościuki and Zaczerlany; Kościuki-Mogiłki; Uhowo. On ground in coniferous forest.
Hypnum cupressiforme Hedw. – Jeńki-Romanowo; Kościuki [I]; Kolonia Pajewo; Kurowo [I]; Uhowo. Rotten wood, bark of trees, on ground in forest.
Hypnum lindbergii Mitt. – Jeńki-Romanowo, wayside near drainage ditch.
Hypnum pallescens (Hedw.) P.Beauv. – Kościuki [I]; Kościuki-Mogiłki; Uhowo. Bark of deciduouds trees.
!! *Leptodictyum humile* (P.Beauv.) Ochyra – Kurowo [II], stone in wet place in thicket.
Leskea polycarpa Hedw. – Grobla pod Kurowem, bark of wayside *Salix alba* and concrete wall.
! *Leucobryum glaucum* (Hedw.) Ångstr. – Jeńki-Romanowo, on ground in pine forest. Suboceanic species (Düll & Meinunger 1994), rare in the eastern part of Poland (Fig 4).
Mnium hornum Hedw. – Topilec [III], humic soil near stream. Suboceanic species (Düll 1994a), rare in the eastern part of Poland.
Niphotrichum canescens (Hedw.) Ochyra & Bednarek-Ochyra – Topilec [II]; Topilec [III]; Uhowo. Grasslands. Species rare in this area of Poland (Bednarek-Ochyra 1995).
Orthodicranum montanum (Hedw.) Loeske – Jeńki-Romanowo; Kościuki-Mogiłki. Rotten wood, bark of trees.
Orthotrichum affine Brid. – Baciuty; Kolonia Pajewo; Kolonia Rogowo; Kościuki [II]; Kurowo [I]; Kurowo [II]; Topilec [III]; Uhowo. Bark of deciduous trees.
Orthotrichum anomalum Hedw. – Grobla pod Kurowem; Rogowo; Kurowo [I]; Kurowo [II]; Topilec [III]. Old concrete walls and stones.
Orthotrichum diaphanum Brid. – Grobla pod Kurowem; Rogowo, stone wall; Uhowo; Waniewo. Bark of deciduous trees.
Orthotrichum obtusifolium Brid. – Kolonia Kościuki; Kościuki [II]; Kurowo [II]; Uhowo. Bark of deciduous trees.
Orthotrichum pumilum Sw. *ex* anon. – Grobla pod Kurowem; Rogowo; Waniewo. Bark of deciduous trees, on wayside stones.
Orthotrichum speciosum Nees – Baciuty; Projected Grobla pod Kurowem nature reserve; Kolonia Kościuki; Kolonia Pajewo; Kolonia Rogowo; Kościuki [II]; Kurowo [I]; Uhowo; Waniewo. Bark of deciduous trees.
Oxyrrhynchium hians (Hedw.) Loeske – Kolonia Kurowo; Pobłocie. Meadow, stubble field.
Plagiomnium affine (Funck) T.J.Kop. – Jeńki-Romanowo; Topilec [III]. On ground in forest.

Plagiomnium cuspidatum (Hedw.) T.J.Kop. – Kurowo [I], on lawn.
Plagiomnium undulatum (Hedw.) T.J.Kop. – Grobla pod Kurowem, wet place in forest.
Plagiothecium curvifolium Limpr. – Jeńki-Romanowo; Kościuki-Mogiłki; Uhowo. Rotten wood, on litter in coniferous forest.
Plagiothecium denticulatum (Hedw.) Schimp. – Topilec [III], on ground in thicket.
Plagiothecium latebricola (Wils.) Schimp. – Kościuki [I], rotten wood in mixed forest. Suboceanic species (Düll 1994b), rare in the eastern part of Poland.
Platygyrium repens (Brid.) Loeske – Grobla pod Kurowem; Waniewo. Bark of deciduous trees.
! *Pleurozium schreberi* (Brid.) Mitt. – Kościuki-Mogiłki; Uhowo. On ground in coniferous forest.
Pohlia nutans (Hedw.) Lindb. – Ruszczany; Uhowo. On ground in coniferous forest, bark of trees, rotten wood.
Polytrichastrum formosum (Hedw.) G.L.Sm. – Jeńki-Romanowo, wayside in pine forest.
Polytrichastrum longisetum Brid. – Topilec [III]; Uhowo. On ground in damp forest.
! *Polytrichum commune* Hedw. – Uhowo, peat bog.
Polytrichum juniperinum Hedw. – Jeńki-Romanowo; Kościuki-Mogiłki; Uhowo. Dry pine forest, grasslands, waysides.
Polytrichum piliferum Hedw. – Topilec [III]; Uhowo. Sandy soil.
! *Polytrichum strictum* Brid. – Uhowo, peat bog.
! *Pseudoscleropodium purum* (Hedw.) Broth. – Jeńki-Romanowo; Kolonia Rogowo; b. Kościuki and Zaczerlany; Kościuki-Mogiłki. On ground in forest, waysides.
! *Ptilium crista-castrensis* (Hedw.) De Not. – Jeńki-Romanowo; Kolonia Rogowo; b. Kościuki and Zaczerlany; Ruszczany; Uhowo. On ground in coniferous forest.
Pylaisia polyantha (Hedw.) Grout – Kolonia Kościuki; Kolonia Pajewo; Kolonia Rogowo; Kościuki [II]; Kurowo [I]; Kurowo [II]; Uhowo. Bark of solitary deciduous trees.
! *Rhytidiadelphus squarrosus* (Hedw.) Warnst. – Jeńki-Romanowo; Kościuki-Mogiłki. Grassy waysides.
Schistidium crassipilum H.H.Blom – Grobla pod Kurowem; Topilec [I]; Topilec [III]. Old concrete walls.
Sciuro-hypnum oedipodium (Mitt.) Ignatov & Huttunen – Jeńki-Romanowo; Kościuki-Mogiłki; Topilec [III]; Uhowo. Rotten wood and litter in coniferous forest.
!! *Sphagnum capillifolium* (Ehrh.) Hedw. – Jeńki-Romanowo, on ground in pine forest.
!! *Sphagnum flexuosum* Dozy & Molk. – Kolonia Rogowo, on ground in pine forest; Uhowo, peat bog.
!! *Sphagnum palustre* L. – Topilec [III], on ground in thicket; Uhowo, damp birch forest and peat bog.
! *Sphagnum squarrosum* Crome – Uhowo, damp birch forest.
!! *Sphagnum subsecundum* Nees – Uhowo, peat bog (Fig 5).
! *Sphagnum teres* (Ångstr.) Schimp. – Uhowo, peat bog.
!! *Syntrichia papillosa* (Wilson) Jur. – Kolonia Kościuki, bark of wayside *Salix fragilis*; Kolonia Pajewo, bark of wayside *Salix alba*; Waniewo, bark of *Salix fragilis* near the Narew river. In many regions of Poland recently the number of localities of this species increases.
Syntrichia ruralis (Hedw.) Web. & Mohr – Grobla pod Kurowem; Kurowo [I]; Kurowo [II]; Kolonia Pajewo; Ruszczany; Topilec [III]. Grasslands, waysides, old concrete walls, roofs.
!! *Syntrichia virescens* (De Not.) Ochyra – Kurowo [I], bark of *Fraxinus excelsior* and *Acer platanoides*. Like in case of *S. papillosa*, in many regions of Poland recently the number of localities of this species increases.
Teterphis pellucida Hedw. – Uhowo, rotten wood.
! *Thuidium assimile* L – Kolonia Rogowo, grassy slope; Topilec [I], stone wall.

Discussion

The state of knowledge of bryoflora of national parks in Poland is unsatisfactory, especially these located in the lowland part of the country. Till this time only few, for example Ojcowski (Stebel et al. 2008), Wigierski (Wierzcholska et al. 2010) and Borów Tucholskich (Stebel 2012) national parks have well recognized bryoflora. This paper is first which refers to the liverworts and mosses of Narwiański National Park. Its bryoflora seems to be not especially rich. The Narew river valley is overgrown mainly by plant communities from the class *Phragmitetea*. Such habitats are generally not appropriate for bryophytes. Vicinity of the valley is quite densely populated and managed by inhabitants. Moreover, this part of Poland is bryologically poorly known, so now it is difficult to state, which species are indeed rare in this area. The most valuable place is located in the southern part of the Uhowo



Fig 2: The Narew river valley. View from ‘Grobla pod Kurowem’ projected nature reserve (Photo by A. Stebel, 27 July 2011)



Fig 3: Pine forest near Jeńki-Romanowo (Photo by A. Stebel, 29 July 2011)



Fig 4: Large White-moss *Leucobryum glaucum* (Photo by V. Plášek)



Fig 5: Slender Cow-horn Bog-moss *Sphagnum subsecundum* (Photo by A. Stebel - on peat bog near Uhowo)

village and comprises peat bog and wet forest communities with such species, as *Polytrichastrum longisetum*, *Polytrichum strictum*, *Sphagnum subsecundum* and *S. teres*. Further bryologicall investigation is necessary in this area.

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