



FLORA, BRYOFLORA AND PLANT COMMUNITIES IN THE PEATLAND
“MSZAR KOŁO STAREJ DOBRZYCY” NATURE RESERVE
(WYSOCZYŻNA ŁOBESKA, NW POLAND)

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ABSTRACT. The paper presents a floristic and phytosociological description of the “Mszar koło Starej Dobrzycy” Nature Reserve situated in the Wysoczyzna Łobeska (NW Poland). Totally 96 plant species, including 39 bryophytes and 57 vascular plants, are mentioned. Five species, i.e. *Sphagnum fuscum*, *S. papillosum*, *Pohlia sphagnicola*, *Scheuchzeria palustris*, *Carex limosa*, belong to the group of endangered mosses and vascular plants in Poland. Two relict species *Hammarbya paludosa* and *Oxycoccus microcarpus* are not confirmed. Despite this fact the object is well preserved which proves the good conditions of peatbog vegetation (seven out of nine types of phytocoenoses, have the bog moss characters). As a consequence of the introduction of an active protection methods in the reserve, the development of *Phragmites australis* is limited. A constant monitoring of vegetation can determine the rate of succession and possible risks.

KEY WORDS: bryophytes and vascular plants, plant communities, peatland, West Pomerania

INTRODUCTION

“Mszar koło Starej Dobrzycy” Nature Reserve, was established in 1976 to preserve the raised peatbog with its typical moss vegetation units and positions of the protected species. In 2002, it became a subject to a 20-year protect plan, implemented by the management of The Resko Forest (DZIENNIK URZĘDOWY... 2002). Protection of the “Mszar koło Starej Dobrzycy” Nature Reserve is an important task, particularly in a municipality with not very high natural value (KONDRACKI 2002). Maintaining the natural character of the peatland, with its valuable vegetation will benefit biodiversity of Resko municipality and in microlocal scale it will improve preservation and proper retention of the area directly adjacent to the reserve.

Despite its significant natural values, the peatbog has not been an object of a frequent research (JASNOWSKI 1972 a, JASNOWSKA and JASNOWSKI 1983 a). This paper aims to present the current state of vegetation as well as the assessment of the nature value of peatbog. Basing both on field scientific research and on source data, present threats of nature reserve and conservation measures problems were also pointed out.

AREA OF STUDY

The “Mszar koło Starej Dobrzycy” with an area of 11.17 ha is located in the Resko municipality, in the Łobez district (the Province of Western Pomerania). The nature reserve is located in a basin without any outflow,

at an altitude of about 75 m above sea level, it is adjacent on the east to the municipal road (ca. 81 m a.s.l.), leading from Starogard to Stara Dobrzyca. The studied peatbog is surrounded by well-hydrated pine bog, only its eastern part is bordered by the upland covered by the oak forest. In its central part the reserve is bordered by the mineral island (about 77.6 m), with well-developed pine trees. North-eastern part of the studied object is an overgrown pond area of about 0.93 ha (Fig. 1). That is a natural water reservoir (JASNOWSKI 1972 a), which tract is overgrown by singular specimens of plants. Though, the biggest variety of peatbog plants of that nature reserve occurs around that water reservoir. The entire area of the reserve is administered by the State Forests, the Resko Forest Division, the Sosnowko Forestry (compartment 243b). The reserve is also a part of the proposed territory of Natura 2000 “Dorzecze Regi” PLH320049. According to the ATPOL the studied area is assigned to the BB40 square. According to the physico-geographical regionalization of Poland “Mszar koło Starej Dobrzycy” is located in the mezoregion of the Wysoczyzna Łobeska (KONDRACKI 2002). On the basis of the geobotanical division by MATUSZKIEWICZ (1993) the reserve is located in the Kraina Pojezierzy Środkowopomorskich in the Świdwiński District.

MATERIAL AND METHODS

Floristic and phytosociological studies were conducted in the summer of 2007 and 2010. Topographic

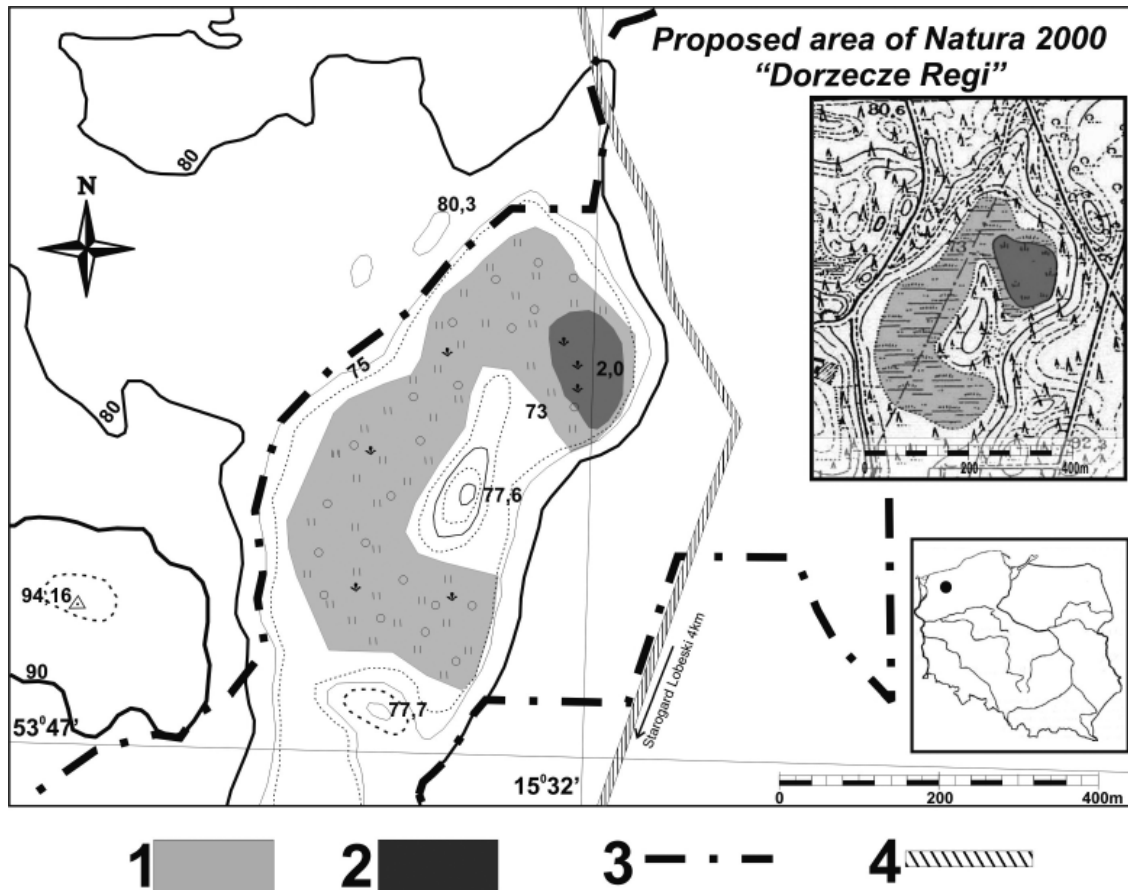


FIG. 1. Location of the “Mszar koło Starej Dobrzycy” Nature Reserve; on the right a historical map from 1891; 1 – area of the reserve, 2 – water reservoir in the reserve, 3 – borders of the proposed area of Natura 2000 Dorzecze Regi, 4 – roads

method was used to make floristic inventories, and phytosociological relevés by Braun-Blanquet method. The study presents three tables, prepared on the basis of 60 phytosociological relevés documenting communities of the classes: *Alnetea glutinosae*, *Scheuchzerio-Caricetea fuscae*, *Oxycocco-Sphagnetetea* and *Vaccinio-Piceetea*. Abundance of species was assessed from a 5-score scale (1 – singletons, 2 – rare species, several individuals, 3 – dispersal, a few tens of individuals, 4 – often, abundant in the area, 5 – common). Herbarium and photographic documentation was deposited in the Department of Plant Taxonomy and Phytogeography of University of Szczecin.

Nomenclature of vascular plants and systematic ordination follow those of MIREK et AL. (2002), mosses after OCHYRA et AL. (2003) and liverworts after SZWEJKOWSKI (2006). Phytosociological communities were delineated following JASNOWSKI et AL. (1968), and JASNOWSKA and JASNOWSKI (1983 b), MATUSZKIEWICZ (2005). Systems of geographical elements are presented according to the studies by ZAJĄC and ZAJĄC (2009). Categories of threats to individual species were determined following ŻUKOWSKI and JACKOWIAK (1995), ŻARNOWIEC et AL. (2004), ZARZYCKI and SZELĄG (2006). The protected species are listed according to the Annex to the Directive of the Minister of the Environment of 2 July 2004 (Item 1764), Dziennik Ustaw (Official Gazette) No. 168.

RESULTS

General characteristics of bryoflora and vascular plants

In “Mszar koło Starej Dobrzycy” Nature Reserve the research found 39 taxa of bryophytes belonging to 12 families and 20 genera. Most numerous group of bryophytes is the family of *Sphagnaceae*, with 14 species of the *Sphagnum* genus. Natural values of the peatbog are enriched by the three species endangered in Poland: from category V – *Sphagnum fuscum*, from category R – *Pohlia sphagnicola*, from category I – *Sphagnum papillosum*. Among the plants protected by the law, 13 taxa are under strict protection (*Cladopodiella fluitans*, *Sphagnum angustifolium*, *S. capillifolium*, *S. cuspidatum*, *S. fimbriatum*, *S. flexuosum*, *S. fuscum*, *S. magellanicum*, *S. palustre*, *S. papillosum*, *S. riparium*, *S. rubellum* and *S. teres*), and 11 are under partial protection (*Sphagnum fallax*, *S. squarrosum*, *Polytrichum commune*, *P. strictum*, *Dicranum polystyum*, *D. scoparium*, *Aulacomnium palustre*, *Hylocomnium splendens*, *Pleurozium schreberi*, *Rhytidiadelphus squarrosus*, *Calliergonella cuspidata*). Among all bryophytes, *Sphagnum fuscum* is definitely the least common, currently it does not create its own phytocenoses formings (cf. JASNOWSKI 1972 a). Bryoflora is also poorer in a rare species like *Sphagnum balticum*, *Dicranum undulatum*, which were not confirmed during the research.

Due to the cosmopolitan nature of the bryophytes, their geographical distribution is not given in the characteristics of individual species.

Vascular plants flora of the reserve consists of 57 taxa, belonging to 30 families. The most represented family is *Cyperaceae* which has 11 species, including eight of the *Carex* genus. Six endangered species in Western Pomerania and two – endangered species in Poland were reported during the research. Species directly endangered on the Polish territory (category E) include *Scheuchzeria palustris*, whereas *Carex limosa* from plants threatened in Poland from the group with category V. Four endangered species in West Pomerania from category V (*Andromeda polifolia*, *Carex limosa*, *Rhynchospora alba* and *Scheuchzeria palustris*), one from the category R (*Empetrum nigrum*) and one of category I (*Drosera rotundifolia*) were found in the reserve. Legally protected species are also located in the reserve, from which three taxa under strict protection (*Drosera rotundifolia*, *Ledum palustre* and *Scheuchzeria palustris*) and three species partially protected by the law (*Nymphaea alba*, *Fragula alnus* and *Menyanthes trifoliata*). The populations of *Scheuchzeria palustris*, *Carex limosa*, *Rhynchospora alba* and *Drosera rotundifolia*, are extremely rich and dynamic. *Andromeda polifolia* and *Ledum palustre* are frequent only in the southern part of the site, they are also observed in dispersion on quacking bog in its central part. *Empetrum nigrum* is sparse on the researched area, for the first time it was found during the current fieldwork in the southern part of the peatbog. Unfortunately the presence of some rare taxa, such as *Calamagrostis stricta*, *Dryopteris cristata*, *Oxycoccus microcarpus* and *Hammarbya paludosa*, noted by JASNOWSKI in 1972 a, were not confirmed by the research. Vascular plants in the Natural Reserve have a high degree of naturalness. Most of the species are habitat-related to peatbogs and wetland areas. Native species are on the attached floristic list, only *Picea abies* has the status of the anthropophyte in West Pomerania.

The studied area is dominated by species with Circum-Boreal (CB – 49.1%) and Euro-Siberian (ES – 21.1%) range. It is followed by: connective element (15.8%) and European-temperate and sub-element (CE – 10.5%), and cosmopolitan element (cosmop – 3.5%).

A systematics list of species

The following abbreviations were used: OŚ – strictly protected species, OCz – partially protected species, P – threat category in Poland (E – endangered species, V – vulnerable species, R – rare species), PZ – threat category in Western Pomerania (V – vulnerable species, R – rare, I – indeterminate), CB – Circum-Boreal sub-element (c-b-w – Circum-Boreal group proper, c-b-o – Circum-Boreal-Oceanic group), ES – Euro-Siberian sub-element, CE – European-temperate sub-element (sat – Sub-Atlantic distributional type, a-ne – Alpic-North-European distributional type), M – Mediterranean element, IR – Irano-Turanian element, cosmop – Cosmopolitan element, (m) – in a mountain regions, (w) – western, 1 – singletons, 2 – rare species, 3 – dispersal, 4 – often, 5 – common.

Bryophytes

Hepaticopsida: *Cladopodiella fluitans* (Nees) H. Buch – OŚ, 1, in the bog-pools filled with water of the dominance of *Carex limosa*; *Cephalozia bicuspidata* (L.) Dumort. – 2, on hummocks in carpets of bogs of the dominance of *Carex limosa*.

Sphagnaceae: *Sphagnum angustifolium* (C.E.O. Jensen ex Russow) C.E.O. Jensen – OŚ, 2, low hummocks forming carpets; *S. capillifolium* (Ehrh.) Hedw. – OŚ, 3, in well-hydrated, but never flooded phytocoenoses of bog moss, numerous in the bog woods surrounding the reserve; *S. cuspidatum* Ehrh. ex Hoffm. – OŚ, 4, in bog-pools in the communities of bog-moss, the main vegetation component the open area of the lake; *S. fallax* (H. Klinggr.) H. Klinggr. – OCz, 5, ingredient of all moss communities, woodlands, reeds and willow shrubberies; *S. fimbriatum* Wilson – OŚ, 3, often on hummocks in pine bog woods, under willow shrubbery and rarely on high hummocks of *Eriophorum vaginatum*; *S. flexuosum* Dozy & Molk. – OŚ, 2, forming quacking bog of *Eriophoro-Sphagnetum recurvi*; *S. fuscum* (Schimp.) H. Klinggr. – OŚ, PV, 1, small hummocks in phytocoenoses *Sphagnetum magellanicum*; *S. magellanicum* Brid. – OŚ, 4, numerous in patches of pine bog woods and as a basic component of carpet in open bogs; *S. palustre* L. – OŚ, 3, numerous in a willow shrubberies, in pine bog woods and dispersed on bog moss adjacent to the marginal part of the peatbog; *S. papillosum* Lindb. – OŚ, PLI, 1, in small hummocks on the quacking bog around the lake; *S. riparium* Ångstr. – OŚ, 2, occasionally on the marginal part of bog; *S. rubellum* Wilson – OŚ, 2, sometimes the main species forming carpets of *Sphagnetum magellanicum*; *S. squarrosum* Crome – OCz, 1, in the marginal part of the peatbog, in the eastern part of the reserve it creates a medium-sized mosaic hummocks interlaced with patches of *Sphagnum cuspidatum* and *S. riparium*; *S. teres* (Schimp.) Ångstr. – OŚ, 2, dispersed only in the northern part of the reserve.

Polytrichaceae: *Polytrichastrum longisetum* (Brid.) G.L. Sm. – 1, moist peat at the edge of willow shrubbery; *Polytrichum commune* Hedw. – OCz, 2, on the periphery of the peatbog; *P. strictum* Menzies ex Brid. – OCz, 3, building up dense hummocks on the carpets of *Sphagnetum magellanicum*, distracted in other bog-moss communities.

Dicranaceae: *Dicranum polystyum* Sw. ex anon. – OCz, 2, in pine bog woods; *D. scoparium* Hedw. – OCz, 2, occasionally in willow shrubbery and in pine bog woods; *Dicranella cerviculata* (Hedw.) Schimp. – 1, in willow shrubbery; *D. heteromalla* (Hedw.) Schimp. – 2, small numbers in pine bog woods.

Bryaceae: *Bryum pseudotriquetrum* (Hedw.) P. Gaertn., B. Mey & Scherb. – 2, occasionally in willow shrubbery; *Pohlia nutans* (Hedw.) Lindb. – 3, often in pine bog woods; *P. sphagnicola* (Bruch & Schimp.) Broth. – PR, 1, in the moss communities on the periphery of the willow shrubbery.

Aulacomniaceae: *Aulacomnium palustre* (Hedw.) Schwägr. – OCz, 3, numerous in pine bog woods, rarely in mesotrophic carpets.

Plagiomniaceae: *Plagiomnium medium* (Bruch & Schimp.) T.J. Kop. – 1, in willow shrubbery.

Mniaceae: *Mnium hornum* Hedw. – 3, common ingredient of willow shrubbery.

Hylocomniaceae: *Hylocomnium splendens* (Hedw.) Schimp. – OCz, 2, in pine bog woods; *Pleurozium schreberi* (Willd. ex Brid.) Mitt. – OCz, 3, larger hummocks in patches of pine bog woods; *Rhytidadelphus squarrosus* (Hedw.) Warnst. – OCz, 2, in undergrowth of willow shrubbery in the southern part in the reserve.

Brachytheciaceae: *Brachythecium rutabulum* (Hedw.) Schimp. – 3, base of a trunk of willows in the southern part in the reserve; *B. salebrosum* (Hoffm. ex F. Weber & D. Mohr) Schimp. – 2, base of willow trunks.

Amblystegiaceae: *Straminergon stramineum* (Dicks. ex Brid.) Hedenäs – 4, in all bog-moss communities; *Warnstorfia fluitans* (Hedw.) Loeske – 2, in wet hollows of the patches with *Scheuchzeria palustris* and in willow shrubbery.

Hypnaceae: *Calliergonella cuspidata* (Hedw.) Loeske – OCz, 2, in the lower, flooded area on the north western border of the mineral island; *Hypnum cupressiforme* Hedw. – 3, numerous of a trunk of pine in pine bog woods; *H. jutlandicum* Holmen & E. Warncke – 2, in bog woods in the vicinity of the clumps of *Pleurozium schreberi*.

Vascular plants

Equisetaceae: *Equisetum fluviatile* L. – CB, 3, dispersed in the northeastern part of the reserve, grows around the water, rarely in willow shrubbery.

Thelypteridaceae: *Thelypteris palustris* Schott – CB, 3, in willow shrubbery and by the water reservoir.

Driopteridaceae: *Dryopteris carthusiana* (Vill.) H.P. Fusch – CB(d), 2, occasionally on quacking bog and on the border of peatland.

Pinaceae: *Picea abies* (L.) H. Karst. – CE: a-ne, Ken, 2, few representatives scattered on the periphery of the reserve; *Pinus sylvestris* L. – ES, 5, common on the quacking bog and in the *Vaccinio uliginosi-Pinetum sylvestris* community.

Nymphaeaceae: *Nymphaea alba* L. – OCz, sa-CE-M(n), 1, in the water in the northeastern part of the site.

Fagaceae: *Quercus robur* L. – sa-CE-M(n), 1, single individuals (seedlings) on the quacking bog.

Betulaceae: *Alnus glutinosa* (L.) Gaertn – sa-ES (e)-M(n), 2, occasionally in the northern part of peatland; *Betula pubescens* Ehrh. subsp. *pubescens* – sa-ES, 5, common among *Vaccinio uliginosi-Pinetum* community and in the phytocoenoses of bog moss.

Urticaceae: *Urtica dioica* L. – ES-M-IR-Asia E, 2, occasionally in the community *Salicetum pentandro-cinereae* in the western part of the reserve.

Violaceae: *Viola palustris* L. – CB: c-b-o, 2, small numbers at the edge of the reserve in its southwestern part.

Salicaceae: *Salix aurita* L. – sa-CE, 2, near the water reservoir in north west part of the reserve, rarely a willow shrubbery in the western part; *Salix cinerea* L. – ES(w), 3, numerous at the marginal part of peatland and occasionally on the open mire, single plants in direct contact with the waterline; *Salix*

pentandra L. – ES, 2, occasionally in the community *Salicetum pentandro-cinereae* in the south-western part of the object.

Ericaceae: *Andromeda polifolia* L. – PZV, CB, 3, numerous only in the south part of the reserve and scattered at a quacking bog; *Calluna vulgaris* (L.) Hull – ES(w), 3, scattered in a *Vaccinio-Pinetum* community and at a quacking bog; *Ledum palustre* L. – OŚ, CB, 3, numerous in the southern part of the reserve, single specimens at a quacking bog in the center of the reserve; *Oxycoccus palustris* Pers. – CB(d), 5, commonly in the peatland; *Vaccinium myrtillus* L. – sa-ES, 2, rarely at the periphery at the western part of the facility; *Vaccinium uliginosum* L. – CB, 2, rare in community of *Vaccinio-Pinetum*.

Empetraceae: *Empetrum nigrum* L. – PZR, CB(d), 2, small numbers, only in the southern part of the reserve.

Primulaceae: *Lysimachia thyrsiflora* L. – CB: c-b-w, 2, distracted at the marginal part of peatland and in carpets around the lake; *Lysimachia vulgaris* L. – sa-ES-M(n)-IR(m), 2, small numbers at the edge of the reserve and in willow shrubbery; *Trientalis europaea* L. – ES, 1, single specimens in the central part of bog moss.

Rosaceae: *Comarum palustre* L. – CB, 4, often in marginal part of bog, occasionally on bog moss; *Potentilla erecta* (L.) Raeusch. – sa-ES(w)-M(n), 1, single specimens in the western part of the object.

Droseraceae: *Drosera rotundifolia* L. – PZI, OŚ, CB: c-b-w, 4, numerous on the quacking bog.

Hydrocotylaceae: *Hydrocotyle vulgaris* L. – CE: sat, 2, occasionally on the border of peatland.

Apiaceae: *Peucedanum palustre* (L.) Moench – ES(n, w), 2, small numbers on quacking bog around the water and in willow shrubbery.

Rhamnaceae: *Frangula alnus* Mill. – OCz, sa-ES(w), 1, single specimens on the edge of the object.

Meynanthaceae: *Menyanthes trifoliata* L. – OCz, CB, 3, scattered in the southern part of the reserve especially in the *Sphagnetum magellanici*.

Rubiaceae: *Galium palustre* L. – CB(d), 2, dispersed only in willow shrubbery.

Solanaceae: *Solanum dulcamara* L. – sa-ES-M-IR, 1, few in willow shrubbery.

Lamiaceae: *Lycopus europaeus* L. – sa-ES(w)-M(n)-IR, 2, small numbers in the willow shrubbery and in the wet rims; *Scutellaria galericulata* L. – CB, 1, single specimens at the edge of the peatland in its western part and in the willow shrubbery.

Hydrocharitaceae: *Hydrocharis morsus-ranae* L. – sa-ES(w), 2, rarely in the water in the northeastern part of the reserve.

Scheuchzeriaceae: *Scheuchzeria palustris* L. – PE, PZV, OŚ, CB(d), 4, often on the quacking bog especially in *Caricetum limosae* community.

Potamogetonaceae: *Potamogeton natans* L. – CB: c-b-w, 2, in the water, in the northeastern part of the reserve.

Juncaceae: *Juncus effusus* L. – cosmop, 3, dispersed on the border of peatland, nearness at the marginal part of peatland and in the vicinity of the mineral island.

Cyperaceae: *Carex canescens* L. – CB, 2, scattered around the water and in the willow shrubbery; *Carex echinata* Murray – CB(d), 2, rarely at the periphery of the peatland, near willow bushes in the northeastern part of the reserve; *Carex elata* All. – sa-CE, 2, rare, small clumps around the lake and at the marginal part of bog; *Carex lasiocarpa* Ehrh. – CB, 2, recorded only around the water; *Carex limosa* L. – OŚ, CB(n), 4, often on the quacking bog in *Caricetum limosae* community; *Carex nigra* Reichard – CB(d), 2, in small numbers at the edge of the peatland and in the willow shrubbery; *Carex pseudocyperus* L. – CB(d): c-b-w, 2, rarely in the marginal part of the peatland and around the lake; *Carex rostrata* Stokes – CB, 5, commonly on the quacking bog with cotton grass and in *Sphagno-Caricetum rostratae* community; *Eriophorum angustifolium* Honck – CB, 5, commonly in open bog mosses especially in community in the *Scheuchzeria caricetea-fuscae* class; *Eriophorum vaginatum* L. – CB, 4, often on the quacking bog in community in the *Oxycocco-Sphagnetum* class; *Rhynchospora alba* (L.) Vahl – PZV, CB: c-b-o, 4, often in open bog mosses.

Poaceae: *Agrostis canina* L. – sa-ES, 2, small numbers on the quacking bog; *Calamagrostis canescens* (L.) P. Beauv. – ES(w), 3, scattered on the peripheries of the reserve, particularly in its north part; *Glyceria fluitans* (L.) R. Br. – sa-CE-M(n), 2, few in the willow shrubbery in the western part of the reserve; *Molinia caerulea* (L.) Moench. – sa-CE, 3, abundant on the west bank of the lake, occasionally in open bog mosses; *Phragmites australis* (Cav.) Trin ex Steud. – cosmop, 3, numerous only in the western part of the reserve, occasionally in carpets.

Araceae: *Calla palustris* L. – CB: c-b-w, 3, often in the marginal part of the peatland, single specimens on the open bog mosses.

Typhaceae: *Typha latifolia* L. – CB, 2, rare, single patch (about 1 m²) on the western bank of the lake.

Plant communities

The nature reserve was found to support nine categories of phytocoenoses ranked as assemblages, two forms of the *Eriophoro angustifolii-Sphagnetum recurvi*, and four forms *Sphagnetum magellanici* ranked as a variety.

A systematics list of plant communities

ALNETEA GLUTINOSAE Br.-Bl. et R. Tx. 1943

Alnetalia glutinosae R. Tx. 1937

Alnion glutinosae (Malc. 1924) Meijer Dres 1936

1. *Salicetum pentandro-cinereae* (Almq. 1929) Pass. 1961

SCHEUCHZERIO-CARICETEA FUSCAE (Nordh. 1936) R. Tx. 1937

Scheuchzerietalia palustris Nordh. 1936

Rhynchosporion albae Koch 1926

2. *Caricetum limosae* Br.-Bl. 1921

3. *Rhynchosporium albae* Koch 1926

4. *Eriophoro angustifolii-Sphagnetum recurvi* Jasn. 1968

Caricion lasiocarpae Vanden Bergh. ap. Lebrun et al. 1949

5. *Caricetum lasiocarpae* Koch 1926

6. *Sphagno-Caricetum rostratae* Steff. 1931 em. Dierss. 1982

OXYCOCCO-SPHAGNETEA Br.-Bl. et R. Tx. 1943

Sphagnetalia magellanici (Pawl. 1928) Moore (1964)1968

Sphagnion magellanici Kästner et Flössner 1933 em. Dierss. 1975

7. *Sphagnetum magellanici* (Malc. 1929) Kästner et Flössner 1933

8. Association *Eriophorum vaginatum-Sphagnum fallax* Hueck 1928 pro ass.

VACCINIO-PICEETEA Br.-Bl. 1939

Cladonio-Vaccinietalia Kiell.-Lund 1967

Dicrano-Pinion Libb. 1933

Piceo-Vaccinienion uliginosi Seibert in Oberd. (ed.) 1992

9. *Vaccinio uliginosi-Pinetum* Kleist 1929

Characteristics of the specified community

Salicetum pentandro-cinereae

Table 1, rel. 1-5

Willow shrubberies are located on the flooded, marginal part of peatbog, particularly well developed on its southern parts. Larger patches of communities were also observed in the north-east, near the water reservoir. *Salix cinerea* is dominant in the shrub layer, but occasionally there are also: *Betula pubescens*, *Frangula alnus* and *Salix pentandra*. In the dense and occasionally flooded thickets, undergrowth is relatively poor, a greater number of species was reported in drying locations, mainly due to the penetration of the open bog moss communities. Thus, in the prepared relevés in addition to plants related to alder forests and reeds, there is a marked presence of the species from the *Scheuchzeria-Caricetea fuscae* class. The most numerous in the herbaceous layer are: *Thelypteris palustris*, *Calla palustris*, *Juncus effuses* and *Carex pseudocyperus*. The representatives of 16 species were found in the moss layer, with domination of *Sphagnum fallax*, *S. palustre*, *S. squarrosum* and *S. cuspidatum* bog mosses.

Caricetum limosae

Table 2, rel. 24-33

The community with a clear dystrophic character inhabiting the highly hydrated spaces between the ombrotrophic carpets, and forming the core of vegetation on the quacking bog near the lake. The most important species of the *Caricetum limosae* are typical hydrophytes – *Scheuchzeria palustris*, *Carex limosa*, *Sphagnum cuspidatum* and *Sphagnum fallax*. *Scheuchzeria palustris* is particularly abundant peat, sometimes as the only characteristic species on the observed patches. Very often, represented only by vegetative shoots. *Rhynchospora alba* and *Sphagnum fallax* are a constant element of the group. *Sphagnum cuspidatum* is rarer, seen mainly in highly hydrated quacking bog in the vicinity of the lake. Moss layer is completed by: *Cladopodiella fluitans*, *Straminergon stramineum*, *Warnstorfia fluitans*. Species reported by JASNOWSKI (1972 a) in the *Caricetum limosae* such as bog-moss *Sphagnum balticum* and orchid *Hammarbya paludosa* were not reported.

TABELA 1. Forest and shrub communities

Successive No.		1	2	3	4	5	6	7	8	9	10	11	12	13
	day	2	2	2	13	13	2	2	2	2	2	2	2	2
Date	month	9	9	9	6	6	9	9	9	9	9	9	9	9
	year	2007	2007	2007	2010	2010	2007	2007	2007	2007	2007	2007	2007	2007
Density of shrub tree	a (%)	-	-	-	-	-	60	20	30	30	30	40	25	30
Density of shrub layer	b (%)	50	50	70	50	65	-	5	5	min	10	5	min	5
Cover of herb layer	c (%)	40	45	30	30	30	100	100	90	90	90	95	90	85
Cover of moss layer	d (%)	60	60	55	65	40	90	85	85	80	80	65	70	60
Area of releve	(m ²)	10	10	10	10	10	40	30	30	30	30	30	30	30
Number of species		25	22	21	20	20	11	16	17	14	19	16	14	17
Association		A					B							
I. Ch. Ass.														
<i>Salix cinerea</i>	b	3.3	3.4	4.4	3.4	4.3	.	.	.	.	.	.	.	.
<i>Salix cinerea</i>	c	2.2	1.2	1.1	1.1	+	.	.	.	.	.	.	.	.
<i>Salix pentandra</i>	b	.	+	.	.	.	.	.	.	.	.	.	.	.
<i>Ledum palustre</i>		.	.	.	.	.	3.4	3.3	1.2	3.4	3.3	3.3	+	1.2
<i>Vaccinium uliginosum</i>		.	.	.	.	.	.	.	.	.	2.2	.	2.2	.
II. Ch. Alnetea glutinosae														
<i>Lycopus europaeus</i>		+	+	+	+	.	.	.	.	.	.	.	.	.
<i>Solanum dulcamara</i>		+	+	.	+	+	.	.	.	.	.	.	.	.
<i>Thelypteris palustris</i>		1.2	1.2	1.2	.	.	.	.	.	.	.	.	.	.
<i>Sphagnum squarrosum</i>		.	.	.	1.2	1.2	.	.	.	.	.	.	.	.
III. Ch. Phragmitetea														
<i>Peucedanum palustre</i>		+	+	+	+	+	.	.	.	.	.	.	.	.
<i>Galium palustre</i>		+	1.1	+	+	+	.	.	.	.	.	.	.	.
<i>Carex pseudocyperus</i>		1.1	.	1.2	.	+	.	.	.	.	.	.	.	.
<i>Scutellaria galericulata</i>		.	+	+	.	+	.	.	.	.	.	.	.	.
<i>Phragmites australis</i>		.	.	1.1	.	.	.	.	.	.	.	.	+	.
<i>Lysimachia thyrsoiflora</i>		.	.	.	+	+	.	.	.	.	.	.	.	.
IV. Ch. Scheuchzerio-Caricetea fuscae et Oxycocco-Sphagnetea*														
<i>*Aulacomnium palustre</i>		+	+	+	2.2	.	1.2	1.2	1.2	1.2	+	1.2	.	1.2
<i>*Sphagnum fallax</i>		3.3	3.3	3.3	1.2	3.3	.	3.3	.	2.2	2.2	+	3.3	2.2
<i>Carex rostrata</i>		.	+	+	+	+	.	.	+	.	+	+	.	1.1
<i>*Oxycoccus palustris</i>		.	.	.	.	.	.	2.2	3.3	1.2	.	2.2	3.3	3.3
<i>*Eriophorum vaginatum</i>		.	.	.	.	.	.	2.3	2.3	1.2	.	1.2	1.2	.
<i>Eriophorum angustifolium</i>		.	.	.	.	.	.	.	+	.	+	1.2	1.2	+
<i>*Polytrichum strictum</i>		1.2	.	+	.	.	.	.	1.2	.	.	1.2	.	.

TABELA 1 – cont.

Successive No.	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>*Sphagnum magellanicum</i>	.	.	.	.	.	.	.	+	.	1.2	3.3	2.2	.
<i>*Drosera rotundifolia</i>	.	.	.	.	.	.	.	+	.	.	+	.	+
<i>*Andromeda polifolia</i>	.	.	.	.	.	.	.	1.1	.	.	1.1	1.1	.
<i>Straminergon stramineum</i>	+	+	.	.	.	.	+	.	.	.	.	.	.
<i>Calla palustris</i>	.	2.2	+	2.2	.	.	.	.	.	.	.	.	.
<i>Menyanthes trifoliata</i>	1.1	+	.	.	+	.	.	.	.	.	.	.	.
<i>Comarum palustre</i>	.	+	+	.	.	.	.	.	.	.	.	.	.
<i>*Pohlia sphagnicola</i>	+	.	+	.	.	.	.	.	.	.	.	.	.
<i>Sphagnum cuspidatum</i>	.	.	+	2.2	.	.	.	.	.	.	.	.	.
<i>Carex canescens</i>	.	.	.	+	+	.	.	.	.	.	.	.	.
Sporadic species: <i>Carex echinata</i> 11(1.2), <i>Carex nigra</i> 10(+), <i>Sphagnum capillifolium</i> 4(3.3), <i>Warnstorfia fluitans</i> 3(+)													
V. Ch. Cladonio-Vaccinietalia et Vaccinio-Piceetea*													
<i>Sphagnum palustre</i>	1.2	1.2	1.2	.	.	3.5	.	2.2	1.2	2.3	.	1.2	1.2
<i>Molinia caerulea</i>	+	.	+	+	2.2	+	1.1	1.1	1.1	1.1	.	.	1.1
<i>*Pleurozium schreberi</i>	.	.	.	.	.	2.2	2.2	2.2	3.3	2.2	1.2	+	2.2
<i>Pinus sylvestris</i> a	.	.	.	.	.	2.1	1.1	2.1	2.1	2.1	3.2	2.1	2.1
<i>Pinus sylvestris</i> b	.	.	.	.	.	.	.	+	+	1.1	1.1	+	+
<i>Pinus sylvestris</i> c	.	.	.	.	.	.	.	+	.	+	.	+	.
<i>*Vaccinium myrtillus</i>	+	.	.	+	.	2.2	1.1	.	2.2	1.2	.	.	1.2
<i>*Picea abies</i> c	+	.	.	.	+	.	+	+	.	+	.	.	+
<i>Dicranum polystemum</i>	+	+	.	.	.	2.2	.	.	.	.	.	.	.
Sporadic species: <i>Dicranum scoparium</i> 8(+), <i>Empetrum nigrum</i> 5(1.2), <i>Frangula alnus</i> b 4(+), <i>Hylocomnium splendens</i> 5(+)													
VI. Others													
<i>Betula pubescens</i> a	.	.	.	.	.	.	1.1	1.1	+	1.1	.	.	1.1
<i>Betula pubescens</i> b	+	.	.	.	+	.	+	+	+	+	+	.	1.1
<i>Betula pubescens</i> c	.	.	.	.	.	.	.	+	.	.	+	+	+
<i>Calluna vulgaris</i>	.	.	.	.	.	2.2	1.2	.	.	+	+	.	1.1
<i>Hypnum cupressiforme</i>	+	+	.	.	+	+	+	.	.	+	.	.	.
<i>Juncus effusus</i>	1.2	+	+	1.1	+	.	.	.	.	.	.	.	+
<i>Dicranella cerviculata</i>	+	+	+	.	.	.	.	.	.	.	.	.	.
<i>Dicranella heteromala</i>	.	.	.	.	.	.	.	.	+	+	.	.	.
<i>Pohlia nutans</i>	+	+	.	1.1	.	.	.	.	.	.	.	.	.
<i>Mnium hornum</i>	.	.	.	2.2	1.2	.	.	.	.	.	.	.	.
<i>Urtica dioica</i>	.	+	1.1	.	.	.	.	.	.	.	.	.	.
Sporadic species: <i>Brachythecium salebrosum</i> 1(+), <i>Bryum pseudotriquetrum</i> 4(+), <i>Fagus sylvatica</i> 5(juv.), <i>Hypnum jutlandicum</i> 7(+), <i>Polytrichastrum longisetum</i> 4(+), <i>Sphagnum fimbriatum</i> 8(+), <i>Sphagnum flexuosum</i> 6(2.2)													

Explanations: A – *Salicetum pentandro-cinereae*, B – *Vaccinio uliginosi-Pinetum*.

TABLE 2. Communities of *Scheuchzerio-Caricetea fuscae* class

Successive No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
day		22	22	22	22	13	13	13	13	13	13	13	13	13	13	22
Date	month	7	7	7	7	6	6	6	6	6	6	6	6	6	6	7
	year	2007	2007	2007	2007	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2007
Cover of herb layer	c (%)	100	100	70	100	95	80	70	75	80	70	60	75	90	100	95
Cover of moss layer	d (%)	100	100	100	80	100	100	100	80	20	90	90	90	100	95	90
Area of releve	(m ²)	3	2	3	6	10	10	30	4	16	18	20	10	15	20	6
Number of species		7	8	7	11	9	7	13	8	7	12	13	8	6	6	13
Association		A					B		C					D		
I. Ch. Ass.																
<i>Sphagnum fallax</i>		5.5	4.4	2.2	4.5	5.5	5.4	5.4	4.4	.	5.4	5.4	5.4	5.5	5.4	4.4
<i>Carex rostrata</i>		.	.	.	+	1.1	2.1	1.1	+	.	1.2	.	.	4.3	5.4	4.4
<i>Eriophorum angustifolium</i>		4.3	3.3	2.2	4.4	4.2	3.2	+	+	.	.	1.1	.	1.1	.	1.2
<i>Rhynchospora alba</i>		1.1	+	1.1	+	.	.	.	1.2	.	.	.	.	.	.	+
<i>Scheuchzeria palustris</i>		.	.	.	.	+	.	.	.	.	.	.	.	.	+	.
<i>Carex limosa</i>		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Carex lasiocarpa</i>		.	.	.	.	.	.	.	3.3	3.2	3.3	3.2	4.3	.	.	.
<i>Sphagnum cuspidatum</i>		.	.	3.3	.	.	.	.	.	2.2	.	.	.	.	.	.
<i>Phragmites australis</i>		.	.	.	.	+	2.2	3.3	.	.	.	.	.	.	.	.
II. Ch. <i>Scheuchzerio-Caricetea nigrae</i>																
<i>Agrostis canina</i>		.	.	.	.	.	.	.	+	.	1.1	.	.	.	.	.
<i>Carex canescens</i>		.	.	.	.	.	1.1	1.1	.	.	1.1	+	+	.	.	.
<i>Straminergon stramineum</i>		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Comarum palustre</i>		.	.	.	.	.	.	+	2.1	.	.	.	.	.	.	.
Sporadic species: <i>Carex nigra</i> 4(+), <i>Menyanthes trifoliata</i> 7(1.1)																
III. Ch. <i>Oxycocco-Sphagnetum</i> et <i>Vaccinio-Piceetea</i>*																
<i>Drosera rotundifolia</i>		1.1	+	1.1	.	+	.	.	1.1	.	.	+	1.2	+	.	1.2
<i>Oxycoccus palustris</i>		2.3	2.3	2.2	2.2	3.2	.	+	.	.	.	+	.	2.1	1.2	1.2
* <i>Pinus sylvestris</i>	b	.	.	.	+	.	.	+	.	.	.	+	.	.	.	.
* <i>Pinus sylvestris</i>	c	.	+	.	.	.	.	.	.	.	+	+	.	.	.	+
<i>Sphagnum magellanicum</i>		1.2	2.4	.	1.2	.	.	.	.	.	.	.	.	.	.	.
<i>Polytrichum strictum</i>		.	.	3.3	.	.	.	.	.	.	.	.	.	.	.	1.2
<i>Eriophorum vaginatum</i>		.	.	.	1.2	.	.	.	.	.	+	.	+	.	.	+
<i>Andromeda polifolia</i>		2.2	3.2	.	+	1.1	.	.	.	.	.	.	.	.	.	.
<i>Aulacomium palustre</i>		.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.2
IV. Others																
<i>Molinia caerulea</i>		.	.	.	.	+	1.2	1.2	.	.	+	+	.	1.1	1.2	+
<i>Betula pubescens</i>	b	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
<i>Betula pubescens</i>	c	.	.	.	+	.	+	+	.	.	+	+	2.2	.	.	+
<i>Calla palustris</i>		.	.	.	.	.	.	.	.	2.1	.	1.2	.	.	.	.
<i>Lysimachia thyrsoflora</i>		.	.	.	.	.	.	.	2.1	2.1	+	+	+	.	.	.
<i>Peucedanum palustre</i>		.	.	.	.	.	.	.	.	.	+	+	+	.	.	.
<i>Sphagnum palustre</i>		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Carex elata</i>		.	.	.	.	.	.	+	2.3	.	.	.	.	.	.	.
<i>Juncus effusus</i>		.	.	.	.	.	.	.	1.2	.	1.1	+	.	.	.	.
<i>Quercus robur</i>	c	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.
Sporadic species: <i>Sphagnum flexuosum</i> 11(1.2), <i>Cladopodiella fluitans</i> 14 (r), <i>Cephalozia bicuspidata</i> 15 (+), <i>Sphagnum fimbriatum</i>																

Explanations: A – *Eriophoro-Sphagnetum recurvi* typicum, B – *Eriophoro-Sphagnetum recurvi* variant *Phragmites communis*,

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
22	22	13	13	13	13	13	13	22	22	22	22	22	2	2	2	2	2	22	22	22	22	
7	7	6	6	6	6	6	6	7	7	7	7	7	9	9	9	9	9	7	7	7	7	
2007	2007	2010	2010	2010	2010	2010	2010	2007	2007	2007	2007	2007	2007	2007	2007	2007	2007	2007	2007	2007	2007	
95	95	80	90	75	80	75	65	100	100	95	90	90	95	100	85	100	85	90	95	95	95	
100	100	95	100	100	95	100	100	75	100	100	100	100	100	95	85	95	95	100	90	90	90	
8	6	20	20	20	20	20	20	2	2	2	2	2	5	4	6	6	6	2	6	8	6	
13	12	11	10	10	9	9	6	10	10	10	6	8	6	11	10	11	9	6	8	9	8	
D								E								F						
5.5	5.5	4.4	4.4	5.5	5.4	5.5	5.4	4.4	5.5	4.5	4.5	5.5	.	5.5	4.5	5.5	4.4	.	4.4	4.5	4.5	
4.4	3.3	4.3	4.3	4.4	4.4	4.3	4.3	+	2.2	.	.	+	.	.	1.2	1.1	+	.	+	+	2.2	
+	2.2	+	+	+	+	+	+	.	.	.	.	.	.	.	+	+	.	1.1	1.2	1.2	.
+	+	.	.	.	+	.	.	4.4	3.4	+	1.2	.	2.3	2.2	2.2	1.2	.	4.4	4.4	4.4	3.3	
.	+	1.1	+	1.2	.	.	.	2.1	2.1	3.4	4.3	2.1	4.5	3.3	3.2	3.3	3.3	.	.	.	.
.	+	.	.	.	.	.	.	.	.	2.2	.	3.2	.	+	.	.	1.2	.	.	.	.
.	
.	.	.	.	.	.	.	.	.	.	.	.	.	5.5	.	.	.	.	5.5	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.1	.	.	.	.	.
+	+	+	
.	
.	+	.	.	.	+	+	+	
.	
1.2	+	1.2	2.2	.	+	+	2.2	2.2	2.2	1.1	+	1.1	1.1	1.2	1.2	1.2	+	1.1	2.2	+	1.2	
1.2	2.3	1.2	+	+	.	+	.	2.2	2.2	2.2	2.2	2.2	.	2.2	.	3.3	2.2	2.2	.	2.2	2.2	
.	+	+	.
+	+	.	.	.	.	.	+	1.1	1.1	.	.	.	.	.	+	+	.	.	+	+	+
.	.	.	1.2	.	.	.	.	.	.	2.3	3.4	.	.	.	.	1.2	.	.	2.2	1.2	1.2
+	+	1.2	.	.	.	.	1.2	+	+	+	.	.	.	.	+	.	.	.	.	.	.
+	.	+	.	+	+	.	.	.	.	.	.	1.2	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	1.1	+	.	.	.	+	.	.	+	.	.	.	.
1.2	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1.2	.	2.2	.	.	.	.
1.2	.	1.2	2.2	1.1	2.2	2.2	.	.	.	.	.	.	1.2	+	.	+	.	.	+	.	.
.	.	+	
+	+	.	.	.	+	+	.	1.1	.	.	.	.	.	.	.	.	+	+	.	.	.
.	+	+	+	
.	
.	.	.	1.2	.	.	.	.	.	.	.	.	.	.	.	1.1	+	.	.	.	.	.
.	.	.	.	+	
.	
.	
.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

20(+), *Sphagnum angustifolium* 20(+)

C – *Caricetum lasiocarpae*, D – *Sphagno-Caricetum rostratae*, E – *Caricetum limosae*, F – *Rhynchosporium albae*.

Rhynchosporium albae**Table 2, rel. 34-37**

Community with the dominant *Rhynchospora alba*, occupying habitats with lower ground water table than *Caricetum limosae* (MATUSZKIEWICZ 2005). It commonly occurs in the reserve, mosaic interspersed with ombrotrophic carpets. The core of communities are the taxa from the *Scheuchzeria-Caricetea fuscae* class. *Sphagnum fallax* dominates over the *Sphagnum cuspidatum* in the bog moss layer.

Eriophoro angustifolii-Sphagnetum recurvi**Table 2, rel. 1-5**

Quacking bog with a *Eriophorum angustifolium* and a *Sphagnum fallax* covers a small area of the peatbog. It is concentrated in the central and north edge of the water reservoir. Its physiognomy is shaped by the fields of *Eriophorum angustifolium*. The bog moss is diversified by the dispersed specimens of *Rhynchospora alba* and representatives of the *Oxycocco-Sphagnetetea* class (*Andromeda polifolia*, *Drosera rotundifolia*, *Oxycoccus palustris*). The compacted, well-hydrated moss layer is dominated by *Sphagnum fallax*. Ombrotrophic carpets with cotton grass borders *Sphagno-Caricetum rostratae* phytocenoses.

Caricetum lasiocarpae**Table 2, rel. 8-12**

Community with dominant filiform sedge was reported in the northern part of the site. *Carex lasiocarpa* instantly creates there difficult to access turfs in the close vicinity of the water. This indicator species is frequently, accompanied by: *Lysimachia thyrsiflora*, *Peucedanum palustre*, *Carex canescens*, *Drosera rotundifolia* and *Juncus effusus*. The bog moss layer is dominated by *Sphagnum fallax*, reaching up to 90% of the coverage. High percentage of *Sphagnum cuspidatum* was observed in places with stagnant water (rel. 9).

Sphagno-Caricetum rostratae**Table 2, rel. 13-23**

Quacking bog with *Carex rostrata* was found in the central and northern parts of the peatbog in the vicinity of the community of *Eriophoro angustifolii-Sphagnetum recurvi*. Phytocoenoses is distinguished (along with *Carex rostrata*) by a large number of species from *Oxycocco-Sphagnetetea* class, particularly *Drosera rotundifolia* and *Oxycoccus palustris*. Also moor grass occurs in this area with high constancy. Cotton grass was also recorded in some patches, this species occupied a small space in the relevés, usually up to 5%. Floristic composition of *Sphagno-Caricetum rostratae* refers to the floristic composition of *Eriophoro-Sphagnetum recurvi*. However, the physiognomy of both associations is clearly different. Quacking bog with rostrate sedge was distinguished mainly on bases of the dominance of *Carex rostrata* and low participation of *Eriophorum angustifolium*.

Sphagnetum magellanicum**Table 3, rel. 1-8**

Sphagnetum magellanicum is the most common and most widespread bog moss community in Europe

(JASNOWSKI et AL. 1968). On the researched facility it is recorded on much larger area than other phytocenosis. Its physiognomy is determined by characteristic arrangement of hummocks and hollows, built mainly by *Sphagnum magellanicum* and *Sphagnum rubellum*. The participation of these species depends on the degree of hydration of the tested patches, with the *Sphagnum rubellum* choosing places with higher water content. In addition, the components of carpet of sphagna are: *S. fallax*, *S. angustifolium*, *S. capillifolium*, *Polytrichum strictum* and *S. fuscum*. The latter species is very rare in the reserve, and fades, judging by the few and small separate clusters (in the past it made strong and dense carpets – cf. JASNOWSKI 1972 a). In the herbaceous layer continuously present are: *Eriophorum vaginatum*, *Oxycoccus palustris* and *Drosera rotundifolia*.

Four varieties of the organic community in the rank of variants were distinguished on the whole surface of the peatbog (cf. JASNOWSKI et AL. 1968):

1. *Sphagnetum magellanicum typicum*; typical form of bog moss inhabiting the central part of the reserve (cf. JASNOWSKI 1972 a). Differentiated from other phytocenoses by larger hummocks of *Sphagnum magellanicum*. Consequently, small pools are heavily waterlogged and mostly dominated by communities of the *Scheuchzeria-Caricetea* class.

2. *Sphagnetum magellanicum sphagnetosum recurvi*, a variant of *Eriophorum vaginatum*, common type of the community where *Eriophorum vaginatum* is dominant. The cotton grass forms clumps of medium size and concentration, and emphasizes the distinctive physiognomy of hummock-hollow phytocenoses. Bog moss occurs in the southern part of the reserve, where historical positions of *Oxycoccus microcarpus* were located (cf. JASNOWSKI 1972 a).

3. *Sphagnetum magellanicum pinetosum*; pine bog moss is characterised by a high proportion of low (approximately 2-3 m height) *Pinus sylvestris* and shrubs of the heath family such as *Ledum palustre* or *Andromeda polifolia*. This is an example of stagnation phase of the bog moss (JASNOWSKI et AL. 1968). It occurs throughout the whole peatbog, interspersing with open bog mosses; bigger concentration was observed in the northern and western parts of the site.

4. *Sphagnetum magellanicum*, variant from *Sphagnum rubellum*; ecological variety of the group, indicating a higher hydration of the area. *Sphagnum rubellum* (large carpets) clearly prevails over the *Sphagnum magellanicum* (small mounds). Therefore, the hummock-hollow structure of the bog moss deteriorates. *Rhynchospora alba* or *Carex rostrata* rarely appears in the shallow valleys. This phytocoenosis inhabits the northern and western part of the peatbog, including the vicinity of the lake.

Community of Eriophorum vaginatum-Sphagnetum fallax**Table 3, rel. 9-10**

Phytocoenoses has found optimal conditions for development in southern and south-eastern part of the reserve. It instantly creates very large patches, often neighbouring with bog woods. Indicators of communities – *Eriophorum vaginatum* and *Sphagnetum fallax* – are

TABLE 3. Communities of *Oxycocco-Sphagnetea* class

Successive No.		1	2	3	4	5	6	7	8	9	10
day		22	22	13	2	13	22	2	22	22	22
Date	month	7	7	6	9	6	7	9	7	7	7
	year	2007	2007	2010	2007	2010	2007	2007	2007	2007	2007
Density of shrub layer	b (%)	30	30	30	30	15	-	-	35	20	35
Cover of herb layer	c (%)	100	100	50	30	40	100	65	30	70	100
Cover of moss layer	d (%)	100	100	100	100	100	100	100	100	100	100
Area of releve	(m ²)	20	20	8	4	3	2	2	1	3	1
Number of species		15	14	9	11	8	9	12	10	9	10
Association		A		B			C	D		E	
I. Ch. Ass.											
		3.4	4.5	3.3	.	4.4	1.2	5.4	5.4	.	.
		4.5	3.4	4.4	2.4	3.3	.	.	.	5.5	4.4
		3.4	2.3	2.2	1.2	.	.	1.2	.	3.4	2.2
		.	1.2	2.3	.	.	4.4	2.3	2.3	.	.
	b	2.1	2.2	1.1	1.1	1.1	.	.	+	1.1	2.2
	c	.	.	2.1	.	.	.	+	.	.	.
II. Ch. Oxycocco-Sphagnetea											
		2.3	1.2	1.2	1.2	2.1	3.3	2.3	2.2	2.2	2.2
		1.1	.	.	1.2	1.1	1.1	1.1	1.1	1.1	+
		2.2	1.2	2.3	3.3	.	1.2	+	.	1.2	3.3
		+	.	.	.	1.1	.	2.2	.	.	.
		+	.	.	.	.	.	.	.	.	2.2
III. Ch. Vaccinio-Piceetea											
		2.3	2.3	.	.	.	.	.	.	.	.
Sporadic species: <i>Picea abies</i> 1(+), <i>Vaccinium myrtillus</i> 1(+), <i>Vaccinium uliginosum</i> 2(+), <i>Frangula alnus</i> 4(juv.), <i>Sphagnum palustre</i> 4(3.3), <i>Sphagnum capillifolium</i> 6(3.4)											
IV. Ch. Scheuchzerio-Caricetea fuscae											
		.	.	+	+	.	.	1.1	.	+	1.1
		+	+	.	.	1.1	.	.	+	.	.
		.	.	.	.	2.2	2.2	2.2	1.1	.	.
		.	.	.	1.2	.	1.2	+	1.2	.	.
		.	+	+	.	.
V. Others											
	b	1.2	2.2	.	1.2	.	.	.	.	1.1	.
	c	.	.	.	.	.	.	1.2	+	.	.
		+	1.2	.	.	.	.	.	.	.	.
		+	+
Sporadic species: <i>Quercus robur</i> 2 (+), <i>Cladonia macilenta</i> 10 (+), <i>Sphagnum angustifolium</i> 6(1.2)											

Explanations: A – *Sphagnetum magellanicum sphagnetosum recurvi* variant *Eriophorum vaginatum*, B – *Sphagnetum magellanicum pinetosum*, C – *Sphagnetum magellanicum* variant *Sphagnum rubellum*, D – *Sphagnetum magellanicum typicum*, E – *Eriophorum vaginatum-Sphagnum fallax*.

responsible for its structure with no clumps (MATUSZKIEWICZ 2005). Occasionally it is interrupted by clumps of *Polytrichum strictum*, emphasizing the next stage of development of covering bog moss. Dwarf pine growing in a small concentration also appears in the community and its number is steadily increasing towards the bog woods.

Vaccinio uliginosi-Pinetum

Table 1, rel. 6-13

Bog woods patches are concentrated along the southern border of the reserve. Tree stands are built by *Pinus sylvestris* and *Betula pubescens*, also found in the shrub layer and herbaceous layer. From the characteristic species of the community *Ledum palustre* reaches a higher number than *Vaccinium uliginosum*. The studied bog woods are in good hydrological condition. It is seen in well-developed moss layer, consisting of: *Sphagnum magellanicum*, *S. fallax*, *S. capillifolium*, *Aulacomnium palustre*. *Molinia caerulea* occurs on the moss carpet with a high constancy. *Oxycocco-Sphagnetes* class is well expressed in the phytocoenoses of woods. Species representing it, occupy both, moist and slightly drier niches (*Eriophorum vaginatum*, *Oxycoccus palustris*). Drier woods patches are characterised by a large proportion of *Pleurozium schreberi*, *Vaccinium myrtillus*, *Calluna vulgaris*, mostly bordering with pads built by *Sphagnum palustre*.

CONCLUDING REMARKS

“Mszar koło Starej Dobrzycy” has high natural values and preservation of that peatbog is one of the best in Western Pomerania (cf. PAWLACZYK et AL. 2005, WILHELM 2009). Its distinguishing values are seen in:

- well developed communities of peat (seven out of nine types phytocoenoses, has a bog moss character) indicating the stability of the hydrological conditions and the natural character of the reserve,

- the presence of 30 species under legal protection (including 16 under strict protection), nine species are considered to be at risk in the area either of Poland or Western Pomerania (including *Carex limosa* and *Scheuchzeria palustris* threatened in Poland and Western Pomerania),

- rich brio flora (39 species to 57 species of vascular plants) represented by taxa of the threatened status of (*Sphagnum fuscum*), rare (*Pohlia sphagnicola*) and of a vague threat (*S. papillosum*) on the area of Poland,

- big acreage and the dynamic growth of the population of *Carex limosa*, *Scheuchzeria palustris*, *Drosera rotundifolia*, *Rhynchospora alba*.

In comparison with the material contained in the earlier researches on the studied peatbog (JASNOWSKI 1972 a, JASNOWSKA and JASNOWSKI 1983 a) this study presents disappearance of two relict species *Hammarbya paludosa* and *Oxycoccus microcarpus*. In addition the presence of taxa, such as *Sphagnum balticum*, *Dicranum undulatum*, *Calamagrostis stricta*, *Dryopteris cristata* was not confirmed. Transformations of the object which have occurred over the past 30-40 years are the result of a autogenic and allogenic succession. The current trend of climate (AABY 1976) and overall

water conditions change affect a regional scale of the pace of succession (JASNOWSKI 1972 b, HERBICHOWA 1999, RYDIN and JEGLUM 2009). As the result of deterioration of light conditions (BRÓŻ et AL. 2001), changes in trophic conditions and the emergence of new series of successions, the above species had disappeared, and the populations of others such as *Sphagnum fuscum*, *S. rubellum* reduced their numbers. The existence of *S. fallax* in phytocoenoses found in the nature reserve might be a consequence of transformation trophic conditions (LIMPENS and BERENDSE 2003, HÁJKOVÁ and HÁJEK 2004, TOMASSEN et AL. 2004).

A similar process of regression of rare wetland plants was observed by PISAREK and POLAKOWSKI (2001) on the “Zielony Mechacz” peatbog. Bog moss phytocoenoses are also directly threatened by the invasion of cane (E and W part of the peatbog) and willow thickets (NE and S part of the peatbog). It should be emphasised also that, the transformations of the vegetation in the reserve “Mszar koło Starej Dobrzycy” are not the result of anthropogenic influences of a local importance.

Active conservation treatments aimed at stopping the spread of common cane, currently used in the reserve, are effective. Every year, the development of cane is systematically weakened by mowing it twice a year (in June and August). Biomass derived from the mowing is transported beyond the peatbog. As a result, cane create more loosely closed patches, and its shoots are characterised by weak growth. New threat to the tested object may be the expansion of *Salicetum pentandro-cinereae* patches. Today they form a natural, narrow protective belt on the north east and south of the peatbog, protecting the reserve against unauthorized persons entering the reserve. Places of their occurrence should be continuously monitored and their expansion in the moss phytocoenosis should be treated accordingly. In addition, the establishment of buffer zones in the areas adjacent to the border of the peatbog should be considered.

Because of its natural values and the role it plays in preserving biodiversity “Mszar koło Starej Dobrzycy” (PAWLACZYK et AL. 2001), should continue to be the subject of the care and conservation. The experience gained during the protection of the peatbog can be used to protect other objects of this type.

REFERENCES

- AABY B. (1976): Cyclic climatic variations in climate over the past 5,500 yr reflected in raised bogs. *Nature* 263: 281-284.
- BRÓŻ E., BERNACKI L., PRZEMYSKI A. (2001): *Hammarbya paludosa*. In: Polska czerwona księga roślin. Paprotniki i rośliny kwiatowe. Eds R. Kaźmierczakowa, K. Zarzycki. Instytut Botaniki im. W. Szafera, PAN, Instytut Ochrony Przyrody, Kraków: 578-580.
- DZIENNIK URZĘDOWY Województwa Zachodniopomorskiego nr 39 z dnia 10 czerwca 2002 r. Poz. 839, rozp. 8/2002, Szczecin.
- HÁJKOVÁ P., HÁJEK M. (2004): Bryophyte and vascular plant responses to base-richness and water level gradients in Western Carpathian *Sphagnum*-rich mires. *Folia Geobot.* 39: 335-351.

- HERBICHOWA M. (1999): Antropogeniczny aspekt kierunków i tempa sukcesji roślinności na torfowiskach wysokich właściwych. In: Mechanizmy antropogenicznych przekształceń szaty roślinnej. Konferencja Naukowa, Poznań, grudzień 1999. Zakład Taksonomii Roślin UAM Poznań: 13.
- JASNOWSKA J., JASNOWSKI M. (1983 a): Pojezierze Zachodniopomorskie. Wiedza Powszechna, Warszawa.
- JASNOWSKA J., JASNOWSKI M. (1983 b): Szata roślinna torfowisk mszarnych na Pojezierzu Bytowskim. Part 4. Zbiorowiska roślinne ze związku *Rhynchosporion albae* Koch 1926. Zesz. Nauk. AR Szczec. Przyr. 99: 58-67.
- JASNOWSKI M. (1972 a): Rezerwat torfowiskowy „Mszar koło Starej Dobrzycy” – dokumentacja przyrodnicza. Typescript. Wojewódzka Rada Narodowa, Szczecin.
- JASNOWSKI M. (1972 b): Rozmiary i kierunki przekształceń szaty roślinnej torfowisk. Phytocoenosis 1, 3: 193-208.
- JASNOWSKI M., JASNOWSKA J., MARKOWSKI S. (1968): Ginące torfowiska wysokie i przejściowe w pasie nadbałtyckim Polski. Ochr. Przyr. 33: 69-124.
- KONDRACKI J. (2002): Geografia regionalna Polski. Wyd. Nauk. PWN, Warszawa.
- LIMPENS J., BERENDSE F. (2003): How litter quality affects mass loss and N loss from decomposing 5 Sphagnum. Oikos 103: 537-547.
- MATUSZKIEWICZ J.M. (1993): Krajobrazy roślinne i regiony geobotaniczne Polski. Pr. Geogr. Inst. Geogr. Przestrz. Zagosp. PAN 158.
- MATUSZKIEWICZ W. (2005): Przewodnik do oznaczania zbiorowisk roślinnych Polski. Wyd. Nauk. PWN, Warszawa.
- MIREK Z., PIĘKOŚ-MIRKOWA H., ZAJĄC A., ZAJĄC M. (2002): Flowering plants and pteridophytes of Poland. A checklist. Biodiversity of Poland. Vol. 1. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków.
- OCHYRA R., ŻARNOWIEC J., BEDNAREK-OCHYRA H. (2003): Census catalogue of Polish mosses. Biodiversity of Poland. Vol. 3. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków.
- PAWLACZYK P., HERBICHOWA M., STAŃKO R. (2005): Ochrona torfowisk bałtyckich. Przewodnik dla praktyków, teoretyków i urzędników. Wyd. Klubu Przyrodników, Świebodzin.
- PAWLACZYK P., WOŁEJKO L., JERMACZEK A., STAŃKO R. (2001): Poradnik ochrony mokradeł. Wyd. LKP, Świebodzin.
- PISAREK W., POLAKOWSKI B. (2001): Szata roślinna rezerwatu „Zielony Mechacz” i problemy związane z jego ochroną. Acta Bot. Warmiae et Masuriae 1: 71-101.
- RYDIN H., JEGLUM J. (2009): The biology of peatlands. Oxford University Press, Oxford.
- SZWEYKOWSKI J. (2006): An annotated checklist of Polish liverworts and hornworts. Biodiversity of Poland. Vol. 4. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków.
- TOMASSEN H.B.M., SMOLDERS A.J.P., LIMPENS J., LAMERS L.P.M., ROELOFS J.G.M. (2004): Expansion of invasive species on ombrotrophic bogs: desiccation or high N deposition? J. Appl. Ecol. 41: 139-150.
- WILHELM M. (2009): Spontaniczne procesy rozwoju roślinności na obszarach poeksploatacyjnych torfowisk wysokich typu bałtyckiego. PhD thesis. Typescript. Uniwersytet Szczeciński, Szczecin.
- ZAJĄC M., ZAJĄC A. (2009): Elementy geograficzne rodzimej flory Polski. Pracownia Chorologii Komputerowej Instytutu Botaniki Uniwersytetu Jagiellońskiego, Kraków.
- ZARZYCKI K., SZELĄG Z. (2006): Red list of the vascular plants in Poland. In: Red list of plants and fungi in Poland. Eds Z. Mirek, K. Zarzycki, W. Wojewoda, Z. Szeląg. Instytut Botaniki im. W. Szafera, PAN, Kraków: 9-20.
- ŻARNOWIEC J., STEBEL A., OCHYRA R. (2004): Threatened moss species in the Polish Carpathians in the light of a new red-list of mosses in Poland. In: Bryological studies in the Western Carpathians. Eds A. Stebel, R. Ochryra. Sorus, Poznań: 9-28.
- ŻUKOWSKI W., JACKOWIAK B. (1995): Lista roślin naczyniowych ginących i zagrożonych na Pomorzu Zachodnim i w Wielkopolsce. In: Ginące i zagrożone rośliny naczyniowe Pomorza Zachodniego i Wielkopolski. Eds W. Żukowski, B. Jackowiak. Pr. Zakł. Takson. Rośl. UAM 3. Bogucki Wyd. Nauk., Poznań: 9-96.

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