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PEAT PITS VEGETATION OF PEATLANDS IN THE POLESIE NATIONAL PARK AND ITS PROTECTED ZONE

Piotr Sugier

Department of Ecology, Institute of Biology, Maria Curie-Skłodowska University
Akademicka str. 19, 20-033 Lublin, Poland, e-mail: psugier@biotop.umcs.lublin.pl

Summary. The aim of the research was detailed identification of vegetation that overgrows peat pits located on trophically diverse peatlands in the Polesie National Park (PNP) and its protected zone. They are characterized by considerable floristic and phytocenotic diversity. Peat pits in PNP provide a habitat for many rare and endangered plant taxa. Communities that are present here represent classes *Lemnetea minoris*, *Charetea*, *Potametea*, *Utricularietea intermedio-minoris*, *Phragmitetea*, *Scheuchzerio-Caricetea nigrae*, *Oxycocco-Sphagnetea* and *Alnetea glutinosae*.

Key words: peat pits, peat bog, vegetation, diversity

INTRODUCTION

Peatlands represent an important component in the global carbon cycle [Gorham 1991]. They have often been drained for agriculture, forestry and for peat production [Borowiec 1990, Coulson *et al*. 1990]. In many countries peat is used as fuel and in horticulture. However, the obtaining of it often triggers irrevocable changes in habitat conditions not only of the places exploited but also of vast areas of peatlands. More and more often such areas undergo restoration in order to reestablish conditions favourable for peat forming plants [Beltman *et al*. 1996, Cooper 2000].

In shallow peat pits water plants started to grow and a large variety of plant communities developed [Succow 1988]. Apart from the emergent water plant communities, also terrestrialised stage developed with reed, sedges and bryophytes [Podbielkowski 1960, Beltman 1996, Podbielkowski and Tomaszewicz 1996]. There can also be observed dynamic processes of this vegetation, the stages of overgrowing of peat pits, as well as their terrestralisation [Podbielkowski 1960, Podbielkowski and Tomaszewicz 1996].

The aim of this research was a thorough investigation into vegetation (species, phytocenoses) taking part in overgrowing peat pits and a general characterisation of habitat conditions.

STUDY AREA, MATERIALS AND METHODS

The peat pits under study are located in the vicinity of lakes: Moszne, Karaśne, Długie, Łukie, Zagłębocze, and Płotycze on trophically diverse peatlands in Polesie National Park and its protected zone. Peat pits complexes, the excavation of which was finished before WWII, were identified on the basis of topographic maps and aerial photographs. The survey was conducted in 2001. In each of the studied phytocenoses phytosociological relévе was made and parameters representative for the whole complex of peat pits, as far as floristic composition, quantity and share of phytocenoses, and a stage of succession is concerned, were taken into account. The following nomenclature was employed: higher plants – Mirek *et al*. [1995]; bryophytes – Frey *et al*. [1995]; syntaxonomy – Matuszkiewicz [2001].

RESULTS

In the peat pits there were noted 76 taxa of vascular plants and 9 species of bryophytes. They are characteristic of the following classes: *Lemnetea minoris, Charetea, Potametea, Utricularietea intermedio-minoris, Phragmitetea, Scheuchzerio-Caricetea nigrae, Oxycocco-Sphagnetea* and *Alnetea glutinosae*. The studied phytocenoses were qualified as belonging to 22 syntaxa (Tab. 1).

Table 1. Associations of peat pits in the PNP and its protected zone
Tabela 1. Zespoły roślinne dołów potorfowych PPN i jego otuliny

Class – Klasa	Association – Zespół
Lemnetea minoris R. Tx. 1955	*Lemnetum trisulcae* (Kelhofer 1915) Knapp et Stoffers 1962
	Lemna minor community
*Charetea (*Fukarek 1961 n.n.) Krausch 1964	*Charetum vulgaris* Corill. 1957
Potametea R.Tx. et Prsg	*Potametum natantis* Soó 1927
	Hottonietum palustris R.Tx. 1937
	Nupharo-Nymphaeetum albae Tomasz. 1977
	Hydrocharitetum morsus-ranae Langendonck 1935
Utricularietea intermedio-minoris Den Hartog et Segal 1964 em. Pietsch 1965	*Sphagnum cuspidatum* community
Phragmitetea R.Tx. et Prsg 1942	*Typhetum latifoliae* Soó 1927
	Typhetum angustifoliae (Allorge 1922) Soó 1927
	Thelypteridi-Phragmitetum Kuiper 1957
	Sparganietum erecti Roll 1958
	Caricetum acutiformis Sauer 1937
	Caricetum elatae Koch 1926
	Caricetum rostratae Rübel 1912
	Equisetetum fluviatilis Steffen 1931
	Eleocharitetum palustris Šennikov 1919
Scheuchzerio-Caricetea nigrae (Nordh. 1937) R.Tx. 1937	*Rhynchosporetum albae* Koch 1926
	Caricetum lasiocarpae Koch 1926
	Sphagno-Caricetum rostratae Steff. 1931 em Dierssen 1982
Oxycocco-Sphagnetea Br.-Bl. Et R.Tx. 1943	*Eriophorum vaginatum-Sphagnum fallax* Huerck 1928 pro ass.
Alnetea glutinosae Br.-Bl. Et R.Tx. 1943	*Salicetum pentandro-cinereae* (Almq. 1929) Pass 1961

In peat pits situated on peatlands generated from fen peats, surrounded by mown meadows, willow shrubs, alder forests, and in which the depth of water reached 0.6 m, with bottom covered with hydrated sediments, there were recorded emmerse phytocenoses of *Lemnetea minoris* class – not abundant in species, composed mainly of *Lemna minor,*

L. trisulca and *Utricularia vulgaris*. Peat pits that were made shallow and were 0.3 m deep were dominated by helophytes. Phytocenoses *Phragmitetum australis, Typhetum latifoliae, Sparganietum erecti* occupied the largest area. Species from *Phragmitete*a class were accompanied also by taxons of aquatic vegetation: *Nymphaea candida, Hydrocharis morsus-ranae, Potamogeton natans* and *Chara vulgaris*. In places without vegetation from *Phragmitete*a class, the presence of aquatic communities, mainly *Hottonietum palustris* was recorded. Biomass of this community made the peat pits shallow and thereby prepared a habitat for invasion of helophytes. Bryophytes communities, with the dominance of *Drepanocladus aduncus* f. *pseudofluitans*, or *Fontinalis antipyretica* that appeared only in some fragments, constituted another significant part of the area.

In peat pits that were made shallow by bottom sediments most common were patches of association *Salicetum pentandro-cinereae* representing one of the final stages of overgrowing. Herb layer, the coverage of which as well as floristic composition and number of taxa were correlated with the density of shrubs, was composed mainly of the species from *Phragmitetea* and *Alnetea glutinosae* class. In the analysed phytocenoses of bryophytes the presence of *Calliergon cordifolium, Calliergonella cuspidata, Climacium dendroides* was recorded.

In peat pits situated on peatlands derived from transitional peats and raised bogs, most common was moss sod which formed a floating mats dominated by species from *Scheuchzerio-Caricetea nigrae* (*Eriophorum angustifolium*) and *Oxycocco-Sphagnetea* (*Eriophorum vaginatum, Oxycoccus palustris, Drosera rotundifolia*) class. In a highly developed bryophytes layer, formed mainly by species *Sphagnum* sp. genus, there were recorded *Sphagnum cuspidatum, S. magellanicum, S. fallax* and *Polytrichum strictum*. The phytocenoses were classified as, among others, belonging to *Sphagno-Caricetum rostratae* association. Final stage of overgrowing was represented by communities with predominant *Eriophorum vaginatum* and *Oxycoccus palustris* in herb layer and *Sphagnum cuspidatum* in the bryophytes one.

In the poorest and strongly acid habitats, *Sphagnum cuspidatum, S. fallax, Utricularia vulgaris, Comarum palustre, Drepanocladus fluitans* took part in the initial stage of overgrowing. In the habitats that were more fertile or had a prominent trophy gradient, phytocenoses *Potametum natantis*, *Hottonietum palustris* and *Caricetum rostratae* with a share of peat moss or sod with helophytes species were the precursors for communities of transitional stages dominated by the species from *Scheuchzerio-Caricetea nigrae* and *Oxycocco-Sphagnetea* classes.

The analysed sites, surrounded by bog forests, were characterised by a topographic depression (a narrow strip) stretching along a peat pit. It was covered with water and inside, in a swelled mat of vegetation, water reached the level of a dozen or so centimetres. In this land lows situated next to the escarpment there were usually recorded species (*Calla palustris, Juncus effusus* as well as species from *Phragmitetea* class) phytosociologically not belonging to those identified 2 or 3 meters from the border of the peat pit.

DISCUSSION

The spontaneous succession of vegetation was observed in vacuum-mined and harvested by hand peatlands [Jonsson-Ninniss and Middleton, 1991; Lavoie and Rochefort, 1996]. In the conditions of low moisture, the surface after the excavation of peat is overrun by *Epilobium angustifolium*, *Calluna vulgaris*, *Betula pendula* and *Molinia caerulea* among others – species

considered to be invasive on degenerated as well as on excavated peatlands [Jonsson-Ninniss and Middleton 1991, Jasnowska and Markowski 1995, Tomassen *et al*. 2004].

In peat pits located in PNP, on the Łęczyńsko-Włodawskie Lake District [Mosek and Miazga 1999] and in other parts of Poland [Podbielkowski 1960, Ilnicki 1992], for many years there has been observed a succession of peat forming vegetation. Floristic composition of studied phytocenoses is determined by the reaction and depth of water, as well as by the trophy of habitat. It is possible to identify stages and types of overgrowing described by Podbielkowski [1960]. In many cases the presence of phytocenoses representing terminal stage – *Salicetum pentandro-cinereae* on low peatlands and *Eriophorum vaginatum-Sphagnum fallax* on raised bog – was noted. Phytocenoses of many peat pits are characterized by a high coverage of *Betula pubescens* – a species considered to be very expansive on peatlands [Chmielewski 2001, Lorens and Sugier 2002, Tomassen *et al*. 2004].

Peat pits provide a habitat for numerous rare and endangered taxa, among others *Drosera rotundifolia*, *Nuphar lutea*, *Scheuchzeria palustris*, *Utricularia minor* and also for some charophytes, which was stressed in the past [Fijałkowski 1959, Karczmarz 1963, 1966]. They are precious also in terms of fauna, as well as because of the presence of glacial relict – *Phoxinus percnurus* [Danilkiewicz 1968], and a wide variety of insects, among which are protected species [Buczyński 1997].

CONCLUSIONS

1. Peat pits are characterized by a considerable floristic and phytocenotic diversity. Worth noticing is the presence of numerous rare and protected species representing flora and fauna.

2. Peat pits provide a classic example of succession of aquatic, rush and peatland vegetation. These specific places, in which the peat forming process takes place, differ in floristic and phytocenotic composition, as well as in terms of habitat conditions from the adjacent peatlands.

3. Due to the forest character of a majority of surrounding peatlands, the role of this type of vegetation in bio- and landscape diversity is relatively vital.

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ROŚLINNOŚĆ DOŁÓW POTORFOWYCH TORFOWISK POLESKIEGO PARKU NARODOWEGO I JEGO OTULINY

Streszczenie. Celem pracy było szczegółowe rozpoznanie roślinności biorącej udział w zarastaniu dołów potorfowych zlokalizowanych na zróżnicowanych troficznie torfowiskach Poleskiego Parku Narodowego i jego otuliny. Doły potorfowe cechują się stosunkowo dużą różnorodnością florystyczną i fitocenotyczną. Są siedliskiem wielu rzadkich i zagrożonych gatunków roślin. Występujące tu zbiorowiska roślinne reprezentują klasy: *Lemnetea minoris, Charetea, Potametea, Utricularietea intermedio-minoris, Phragmitetea*, *Scheuchzerio-Caricetea nigrae, Oxycocco-Sphagnetea* i *Alnetea glutinosae*.

Słowa kluczowe: torfowisko, roślinność, różnorodność