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SPECIFICITY OF MACROPHYTE VEGETATION OF THE WIELKOPOLSKI AND POLESKI NATIONAL PARKS- STATE OF PRESERVATION AND PROBLEMS OF PROTECTION

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A b s t r a c t. The aim of the present paper was a comparative analysis of syntaxonomical composition of the lakes macrophyte vegetation in two protected areas differentiated due to the origin, geographical location and forms of present anthropogenic influences and protection (the Wielkopolski and Poleski National Parks). As a result a few, differences only referring to the present state of vegetation of both Parks were found but there exist some aspects which differ entiate both areas: the origin and directions of changes of vegetation in a long-time scale.

K e y w o r d s: macrophyte vegetation, plant associations, lakes, bogs, protection

OUTLINE OF THE SUBJECT

The aim of the present paper was to compare syntaxonomical composition of lake vegetation in two protected areas differentiated by their geographical location and forms of present anthropogenic influences. Two National Parks, the Wielkopolski and the Poleski, localized in the western and eastern regions of Poland were chosen. As far as the origin of lakes and bogs basins adjacent to them are considered, the basic difference becomes clear: lakeland landscape of the Wielkopolski National Park, which is part of the Poznań Lake District (and the larger Wielkopolska Lake District), was shaped during the last glaciation so the that the above mentioned structural and functional landscape features reveal distinct postglacial character and are located in the gullies rutting moraines [13], whereas in the area of the Poleski National Park (and the larger Łęczyńsko-Włodawskie Lakeland) lakes constitute a group of Polish lakes located outside the extent of the

last glaciation [19]. The origin of this group of lakes and bogs, which according to some authors relating to [1] took place about 12,500 years ago, is considered a complex problem hydrogeological conditions of the region resulting from a geological and geomorphological evolution understood as shallow, thermo-karst [5,20]. Therefore, lacustrine basins are flat, mostly shallow, dominated by macrophytes and covered by bed sediments of a significant thickness exceeding several times water depth. In the case of the Lake Moszne, deposit thickness reaches 10.5 m [1]. By contrast, ribbon lakes of the Wielkopolski National Park located within the Park boundaries and in its protective zone forms 4 channels [18] with specific features such as floral poverty of helophytes in the group of typical ribbon-like, deep and stratified reservoirs, on one hand, and, shallowness and progressing overgrowing by macrophytes in the group of in stratified lakes on the other. There is only one lake, Lake Skrzynka – with an ecotone zone formed as peat-bog of transitional character and mossy floating mats.

Lakes of the Wielkopolski National Park are mostly eutrophic but one of them, i.e., the above-mentioned Lake Skrzynka – is said to be dystrophic. According to nutrient loading (from different sources – basically anthropogenic) two general groups: highly loaded lakes and lakes less loaded with N and P are to be distinguished [18]. Despite different forms of protection including strict reservation, in almost all lakes, negative changes of vegetation affecting vegetation landscape of this area, are observed [12].

Lakes of the Poleski National Park have been subjected to limited anthropopressure and the Lakes Moszne and Długie are protected as strict nature reserves. They are said to be examples of the most natural ecosystems.

In the present paper, 16 lakes of the Wielkopolski National Park and its protective zone and 4 lakes of the Poleski National Park were examined. In the case of the Wielkopolski National Park, papers by Pełechaty and Nagengast [11,12], Nagengast and Pełechaty [10] were considered. Macrophyte vegetation of the Poleski National Park was characterized further to papers by Sugier and Popiołek [16,17], Lorens and Sugier [8,9] and Sugier and Lorens [15]. These papers provide not only an actual state of vegetation but also a tendency for changes observed on the basis of comparison with literature data and a noted own observations.

COMPARATIVE CHARACTERISTICS OF THE VEGETATION PRESENT IN LAKES OF THE WIELKOPOLSKI AND POLESKI NATIONAL PARKS

Further to authors cited above, in all lakes of the Wielkopolski National Park 39 associations belonging to the following 6 classes: *Lemnetea, Charetea, Fontinaletea, Potamogetonetea, Phragmitetea* and *Artemisietea* are represented by phytocoenoses in the phytolittoral zone (Table 1) but only in 2 lakes typical zonation of phytolittoral is fully developed. Additionally, in the transition zone surrounding the Lake Skrzynka communities representing *Scheuchzerio-Caricetea fuscae* class were found. As it could be seen from Table 1, in the lakes of the Poleski National Park, there occur 19 communities from 4 classes: *Lemnetea, Charetea, Potamogetonetea* and *Phragmitetea*. Around 2 lakes, the Karaśne and the Moszne, there appear large areas of peat-bogs adjacent to the lakes and covering as floating mats riparian parts of the water surface. In general, the larger the lake the higher its observed qualitative phytocoenotic diversity. In the lakes of the Wielkopolski National Park, the highest number of associations represented the classes of: *Phragmitetea* (18) and *Potamogetonetea* (11). Such tendency is typical for the Poleski National Park too.

The above presented comparison does not reveal many significant qualitative differences in the macrophyte vegetation between both Parks, beside the number of associations higher in the Wielkopolski National Park which probably results from the number and area of lakes in this Park. In accordance with the azonal character of species forming such vegetation, there exist no differences which might be expected as resulting from the transitional character in the east-west direction of the Polish climate. The elements that differ in both Parks is an abundant occurrence of the *Nymphaeetum candidae* phytocoenoses, boreal elements in the vegetation in lakes of the Poleski National Park. In the lakes of the Wielkopolski National Park phytocoenoses representing associations expressing human impact on the aquatic ecosystems such as *Phalaridetum arundinaceae* or *Glycerietum maximae* are found[3]. Patches of a xenospontaneous community – *Acoretum calami* are also found in the lakes of the Wielkopolski National Park.

From all that, there emerge only a few differences relating to the present state of vegetation of both Parks studied. One of them is also the area of peatlands adjacent to the lakes, much larger in the Poleski National Park. That might affect the character of vegetation, on one hand, and function as a kind of buffer for the lakes, on the other.

Table 1. Macrophyte associations and communities present in lakes of the Wielkopolski and Poleski National Parks based on Pełechaty and Nagengast [11,12], Nagengast and Pełechaty [10], Sugier and Popiołek [16,17], Lorens and Sugier [8,9] and Sugier and Lorens [15]

Communities	Wielkopolski National Park	Poleski National Park
Cl. Lemnetea		
Lemno-Spirodeletum	+	.
Lemnetum minoris	+	.
L. trisulcae	+	.
Lemno-Utricularietum vulgaris	+	.
Lemno-Hydrocharitetum morsus-ranae	+	.
Stratiotetum aloidis	.	+
Cl. Charetea		
Nitellopsidetum obtusae	+	.
Charetum tomentosae	+	.
Ch. Hispidae	+	+
Ch. vulgaris	.	+
Community with *Ch. delicatula*	.	+
Cl. Fontinaletea		
Fontinaletum antipyreticeae	+	.
Cl. Potamogetonetea		
Potamogetonetum perfoliati	+	.
P. pectinati	+	.
P. filiformis	+	.
P. natantis	+	+
Community with P. pusillus	.	+
Elodeetum canadensis	.	+
Najadetum marinae	+	.
Polygonetum natantis	+	.
Myriophylletum spicati	+	+
M. verticillati	+	.
Ceratophylletum demersi	+	+
Ranunculetum circinati	+	.
Nupharo-Nymphaeetum albae	+	+
Nymphaeetum candidae	.	+
Cl. Phragmitetea		
Phragmitetum	+	+
Typhetum angustifoliae	+	+
T. latifoliae	+	+
Scirpetum lacustris	+	+
Acoretum calami	+	.
Thelypteridi-Phragmitetum	+	.
Glycerietum maximae	+	.
Sparganietum erecti	+	+
Phalaridetum arundinaceae	+	.
Rorippo-Oenanthetum aquaticeae	+	.
Equisetetum limosi	.	+

Table 1. Continued

Communities	Wielkopolski National Park	Poleski National Park
Eleocharitetum palustris	+	.
Iretum pseudoacori	+	.
Caricetum acutiformis	+	+
C. ripariae	+	+
Cicuto-Caricetum pseudocyperi	+	.
Caricetum elatae	+	+
C. paniculate	+	.
C. rostratae	+	+
Cl. Artemisietea		
Eupatorietum cannabinii	+	.

However, there are some aspects which clearly differentiate both areas from each other. Those aspects concern the origin and directions of changes in vegetation in a long-time scale. In the Wielkopolski National Park, the most significant changes took place in the Lake Łódzko-Dymaczewskie, considered as one of the mostly changed by anthropopressure [2] where 13 communities have disappeared during the last decade [12]. From amongst 7 communities considered as rare for the Wielkopolska region and present in the past in the lakes of the Wielkopolski National Park, the following 3 are found any more: *Potamogetonetum graminei, Scirpetum maritimi* and *Cladietum marisci.* The area of the remaining 4 communities (*Potamogetonetum filiformis, Myriophylletum verticillati, Ranunculetum circinati* and *Parvopotamo-Zannichellietum*) became considerably smaller [10,12].

Based on the previous literature data [4,7], a sharp syntaxonomical impoverishing could be observed in the lakes of the Wielkopolski National Park, especially in the group of communities of the submerged vegetation (apart from the above mentioned, phytocoenoses of 7 associations that disappeared). This fact indicates worse light conditions in the water as a result of an anthropogenic impact.

Another tendency observed in the lakes of the Wielkopolski National Park, is dominance of the *Phragmitetea* class communities, especially those of wide ecological amplitude, preferably occupying eutrophic or anthropogenically changed habitats and an increase of trophy of the littoral habitats [12] which implies strong needs for modern water and land use management beside the present forms of protection [18].

In the lakes of the Poleski National Park, an overgrowing by macrophyte vegetation and ongoing shallowness relating to the deposition of plant debris and other forms of organic matter is observed from year to year (especially in the Lake

Karaśne). The leading role in the processes of overgrowing is played by the phytocoenoses of some very expansive associations such as *Stratiotetum aloidis, Myriophylletum spicati, Scirpetum lacustris* and *Phragmitetum communis*.

Significant changes in the macrophyte vegetation took place in the Lake Karaśne [16]. Patches of *Stratiotes aloides* showed up along the shoreline and in the mid-lake as well. Contrary to that, phytocoenoses of *Charetum hispidae* and *Charetum vulgaris*, which used to cover almost the whole lake basin, have disappeared for the last few years. The surface area of the lake decreased from 7 ha in 1953 [19] to 2.7 in 1994 [16].

Overgrowing by *Stratiotetum aloidis* was also observed in the Lake Łukie where patches of this association replaced phytocoenoses of *Ceratophylletum demersi*.

Disappearance of hydrophytes (including charophytes) observed in the lakes of the Poleski National Park was explained by a strong ice cover and freezing of the surface layers of sediments [14]. This phenomenon is considered in the context of a naturally conditioned short-time fluctuations of the ecosystems [6].

CONCLUSION

Taking all that above under consideration, it might be stated that the basic difference between the Wielkopolski and Poleski National Parks is a consequence of the origin of both areas which influenced the character of vegetation and directions of its changes in time, strongly modified by anthropopressure, especially in case of the Wielkopolski National Park.

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SPECYFIKA ROŚLINNOŚCI MAKROFITOWEJ WIELKOPOLSKIEGO PARKU NARODOWEGO I POLESKIEGO PARKU NARODOWEGO – STAN ZACHOWANIA I PROBLEMY OCHRONY

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S t r e s z c z e n i e. Celem pracy była analiza porównawcza składu syntaksonomicznego roślinności jezior położonych w różnych regionach Polski, różniących się od siebie nie tylko geograficznym położeniem, ale także genezą i aktualnymi formami antropopresji oraz ochrony. Wybrano dwa parki narodowe: Wielkopolski i Poleski. Stwierdzono, iż istnieją pewne różnice w aktualnym składzie roślinności, niezwiązane jednak wyraźnie z typową dla Polski przejściowością w charakterze szaty roślinnej w kierunku wschód-zachód. Zdecydowanie wyraźniejsze są różnice w typie i kierunku przemian roślinności w czasie, niewątpliwie uwarunkowane genezą obu obszarów i intensywnie modyfikowane przez czynnik antropogeniczny pomimo różnych form ochrony, co szczególnie widoczne jest na terenie Wielkopolskiego Parku Narodowego, gdzie obserwuje się zubożenie syntaksonomiczne roślinności głównie w grupie zbiorowisk rzadkich i zanurzonych oraz rozprzestrzenianie zbiorowisk świadczące o eutrofizacji siedlisk. W jeziorach Poleskiego Parku Narodowego obserwuje się procesy wypłycania i zarastania ekspansywnymi zbiorowiskami oraz zanikanie zbiorowisk, które zdaje się wynikać z czynników naturalnych i stanowić etap fluktuacji ekosystemowych.

S ł o w a k l u c z o w e: zbiorowiska makrofitów, zespoły roślinne, jeziora, torfowiska, ochrona