

DIVERSITY OF VERTEBRATE FAUNA OF HIGH AND TRANSITIONAL PEAT BOGS OF THE SOLSKA FOREST AND THE ROZTOCZE REGION AND SUGGESTIONS FOR THEIR PROTECTION

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Summary. The paper presents results of observation on vertebrates fauna in seven high and transitional peat bog complexes of the Solska Forest and Roztocze Region (southern part of Lublin Region). The observations were carried in 1996-2003. In the territory of high and transitional peat bogs 10 species of amphibians (e.g. *Triturus cristatus*, *Bombina bombina*, *Bufo calamita*), 6 species of reptiles (e.g. *Vipera berus*, *Coronella austriaca*), 93 species of birds (e.g. *Botaurus stellaris*, *Ciconia nigra*, *Circus gallicus*, *Tetrao tetrix*, *T. urogallus*, *Grus grus*, *Bubo bubo*) and rare species of mammals (*Alces alces*, *Canis lupus*, *Felis lynx*) were found. The paper presents threats to these biotopes. Suggestions for their protection are also given.

Key words: Solska Forest, Roztocze Region, amphibians, reptiles, birds, mammals.

INTRODUCTION

The Solska Forest and the Roztocze Region, due to their peculiar climatic, water and soil conditions as well as their surface features and plant cover, are distinguished by the presence of a significant number of high and transitional peat bogs – habitats which are extremely valuable from the point of view of natural science, but at the same time endangered [Borowiec 1990, Tomiałojć 1995, Dobrowolski and Lewandowski 1998, Chmiel and Urban 1999, Pawlaczyk *et al.* 2002].

There is very little information on the vertebrate fauna of this type of peat bogs in the Lublin Region and it is limited to general mentions of the occurrence of individual species or groups of species [Chobotow and Czarniawski 1999, Kucharczyk 2002].

The purpose of this paper is to present the faunal diversity of the most important high and transitional peat bogs in the Zamość Region based on the example of selected groups of vertebrates, and also to point out threats to these species as well as to give suggestions for legal and practical protection of these endangered ecosystems.

STUDY SITES AND METHODS

The research and observations were conducted from 1996 to 2003 in seven peat bog complexes of the Solska Forest and the Roztocze Region (Fig. 1) located in the Janów-Biłgoraj region [Borowiec 1990].

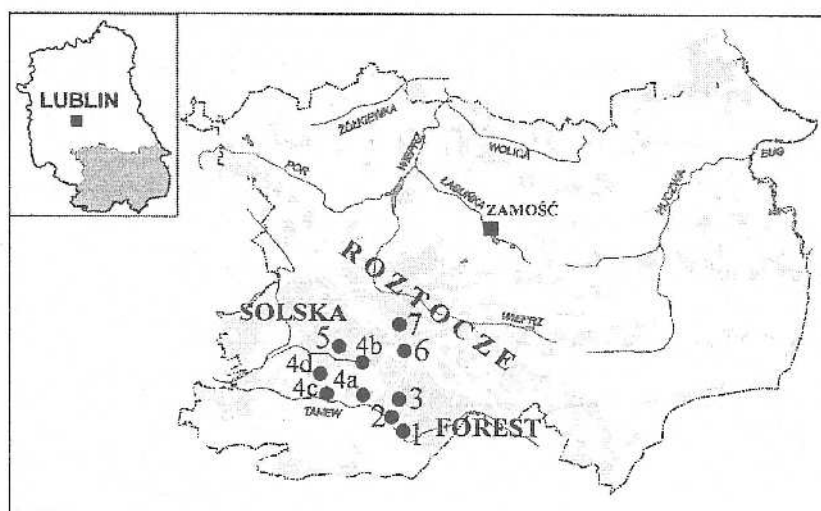


Fig. 1. Localization of peat bogs on the territory of the Solska Forest and the Roztocze Region. Solska Forest: 1 – Lysa Góra, 2 – Muraszków, 3 – Szerokie and Długie Bagno, 4 – peat bogs near village of Aleksandrów (4a – Bagno Brylskie, 4b – Sokoliska, 4c – Lipowiec, 4d – Margółka, Trzciny, Wielkie Bagno), 5 – Wielkie Bagno; Roztocze Region: 6 – Jęzior, 7 – Międzyrzeki

Rys. 1. Lokalizacja badanych torfowisk na obszarze Puszczy Solskiej i Roztocza. Puszcza Solska

This paper does not describe the above-mentioned peat bogs; a description of them is available in an extensive study by Józef Borowiec [1990] and their exact location can be found on topographical maps at a scale of 1:25 000. It should be mentioned, however, that in the characterization of fauna areas directly surrounding the peat bogs were taken into consideration as well – marshy and humid coniferous forests, and thus places of faunal interchange.

During the research all encountered species of the groups under discussion were noted along with the size of their populations. The criteria used in determining the status of amphibians and reptiles were subjective, but largely based on the study by Głowaciński and Rafiński [2003], with only adult specimens taken into consideration: a rare species: 1-2 specimens, an uncommon species – 3-10 specimens, a numerous species – more than 10 specimens. In the case of birds generally accepted methods of estimating populations were used as well [Czapulak *et al.* 1987]. All the mammal species mentioned were regarded as rare, which is a result of the rare status of these animals in the Zamość Region [Głowaciński *et al.* 1992, Głowaciński and Profus 1992, unpublished materials].

Table 1. Vertebrate fauna of some high and transitional peat bogs of the Solska Forest and the Roztocze Region

Tabela 1. Kręgowce wybranych torfowisk wysokich i przejściowych Puszczy Solskiej i Roztocza

Species (protection status) Gatunek (status ochronny)	Names of peat bogs – Nazwy torfowisk						
	1	2	3	4	5	6	7
Amphibians – Plazy							
<i>Triturus cristatus</i> (DS)				+			
<i>Bombina bombina</i> (DS)	++	++		++	++	++	
<i>Pelobates fuscus</i> (DS)		+	+			+	+
<i>Bufo bufo</i>	+	+++	-	+++	+++	+++	++
<i>Bufo viridis</i> (DS)						+	
<i>Bufo calamita</i> (DS)		++		++		+	
<i>Hyla arborea</i> (DS)	+	++	+	++	++	++	++
<i>Rana lessonae</i> (DS)	+	++		++		++	
<i>Rana temporaria</i> (DS)	+	++	+	++	++	+	++
<i>Rana arvalis</i> (DS)	+	++	+	++	+++	++	+++
number of species – 10	5	8	5	7	5	9	5
Reptiles – Gady							
<i>Lacerta agilis</i> (DS)	+	++	+	++	++	++	+
<i>Lacerta vivipara</i>	+	++	+	++	++	++	++
<i>Anguis fragilis</i>	+	+		++	++	+	++
<i>Natrix natrix</i>	++	++		++	++	++	+
<i>Vipera berus</i>	+	+		+	+	+	+
<i>Coronella austriaca</i> (PCKZ, DS)	+				+		
number of species – 6	6	5	2	5	6	5	4
Birds – the most important species – Ptaki – najważniejsze gatunki							
<i>Botaurus stellaris</i> (PCKZ, DP)						1 t	
<i>Ciconia nigra</i> (PCKZ, DP)			1 p		1 p	1 t	
<i>Circus gallicus</i> (PCKZ, DP)	1 t	1 t					
<i>Circus aeruginosus</i> (DP)			1 p	1-2 p		2 p	
<i>Aquila pomarina</i> (PCKZ, DP)	1 p			1 p	1 p		
<i>Tetrao tetrix</i> (PCKZ, DP)			1-2 m		3 m		
<i>Tetrao urogallus</i> (PCKZ, DP)			10 i		12-15 i		
<i>Porzana porzana</i> (DP)			1 t		+		
<i>Porzana parva</i> (PCKZ, DP)						1 t	
<i>Grus grus</i> (DP)		1 p	2-3 p	5-6 p	2-3 p	3-5 p	1 p
<i>Bubo bubo</i> (PCKZ, DP)		1 p					
<i>Caprimulgus europaeus</i> (DP)	2 t	+	+	+	+	2 t	+
<i>Picus canus</i> (DP)			1 t	1 t			
<i>Dryocopus martius</i> (DP)	1 t	1 t		3-4 t	2-3 t	2 t	1-2 t
<i>Lanius collurio</i> (DP)	1 p	2 p		+		+	
number of species – 15	5	6	8	7	8	8	3
Mammals – the most important species – Ssaki – najważniejsze gatunki							
<i>Alces alces</i>		+	+	+	+		+
<i>Canis lupus</i> (DS)	+	+	+	+	+	+	+
<i>Felis lynx</i> (DS)					+		+

Names of peat bogs: 1 – Łysa Góra, 2 – Muraszków, 3 – Szerokie and Długie Bagno, 4 – peat bogs near village of Aleksandrów, 5 – Wielkie Bagno, 6 – Jęzior, 7 – Międzyrzeki.

Protection status: PCKZ – species from Polish red data book of animals [Głowaciński 2001]; DP – species from I appendix of birds directive; DS – species from II and IV appendix of habitat directive [Głowaciński et al. 2003].

Amphibians and reptiles: + – rare species; ++ – not numerous species; +++ – numerous species.

Birds and mammals: p – pair (-s); t – territory (-ies); i – individuals; m – male (-s); + – present species.

Nazwy torfowisk: 1 – Łysa Góra, 2 – Muraszków, 3 – Szerokie i Długie Bagno, 4 – Torfowiska k. Aleksandrowa, 5 – Wielkie Bagno, 6 – Jęzior, 7 – Międzyrzeki.

Status ochronny: PCKZ – gatunki z polskiej czerwonej księgi zwierząt [Głowaciński 2001]; DP – gatunki z załącznika I unijnej dyrektywy ptasiej; DS – gatunki z załączników II i IV unijnej dyrektywy siedliskowej [Głowaciński et al. 2003].

Plazy i gady: + – gatunek rzadki; ++ – gatunek nieliczny; +++ – gatunek dość liczny.

Ptaki i ssaki: p – para (-y); t – terytorium (-a); i – osobnik; m – samiec; + – gatunek stwierdzony.

Another breeding and non-breeding birds (in systematic order): *Tachybaptus ruficollis*, *Egretta alba*, *Ardea cinerea*, *Anas crecca*, *A. platyrhynchos*, *A. querquedula*, *Buteo buteo*, *Falco subbuteo*, *F. vespertinus*, *F. columbarius*, *Bonasa bonasia*, *Rallus aquaticus*, *Gallinula chloropus*, *Fulica atra*, *Scolopax rusticola*, *Gallinago gallinago*, *Tringa ochropus*, *Columba palumbus*, *Columba oenas*, *Sireptopelia turtur*, *Cuculus canorus*, *Strix aluco*, *Asio otus*, *Picus viridis*, *Dendrocopos major*, *D. minor*, *Anthus trivialis*, *Troglodytes troglodytes*, *Prunella modularis*, *Erithacus rubecula*, *Phoenicurus phoenicurus*, *Turdus merula*, *T. pilaris*, *T. philomelos*, *T. iliacus*, *T. viscivorus*, *Locustella luscinioides*, *Acrocephalus schoenobaenus*, *A. palustris*, *A. scirpaceus*, *A. arundinaceus*, *Hippolais icterina*, *Sylvia curruca*, *S. communis*, *S. borin*, *S. atricapilla*, *Phylloscopus sibilatrix*, *Phylloscopus collybita*, *Phylloscopus trochilus*, *Regulus regulus*, *R. ignicapillus*, *Muscicapa striata*, *Ficedula hypoleuca*, *Aegithalos caudatus*, *Parus palustris*, *P. montanus*, *P. cristatus*, *P. ater*, *P. caeruleus*, *P. major*, *Sitta europea*, *Certhia familiaris*, *C. brachydactyla*, *Oriolus oriolus*, *Garrulus glandarius*, *Nucifraga caryocatactes*, *Corvus corax*, *Lanius excubitor*, *Sturnus vulgaris*, *Fringilla coelebs*, *F. montifringilla*, *Serinus serinus*, *Carduelis spinus*, *Loxia curvirostris*, *Pyrrhula pyrrhula*, *Coccothraustes coccothraustes*, *Emberiza schoeniclus*.

RESULTS

In the high and transitional peat bogs of the Solska Forest and Roztocze Region 10 species of amphibians (55% of Poland's amphibian fauna), 6 species of reptiles (66% of Poland's herpetofauna), 93 species of birds (c. 22% of Poland's avifauna) and rare species of mammals were noted (Tab. 1). A significant majority of the species within these groups are – according to international categories – endangered and vanishing [Liro and Dyduch-Falniowska 1999, Głowaciński 2001].

The greatest species abundance was found in the peat bog complex of Jęzior, Muraszków, Szerokie Bagno and Długie Bagno, while the most valuable species were in the Wielkie Bagno, Szerokie Bagno and Długie Bagno peat bogs. The least abundance was noted in the Międzyrzeki peat bogs, which underwent drainage years ago and are currently being renaturalized.

It is also worth adding that all of the peat bogs studied are very important amphibian and reptile refuges.

THREATS TO THE PEAT BOGS AND SUGGESTIONS FOR THEIR PROTECTION

The most serious threats to the peat bogs under discussion and the fauna occurring in them are drainage of forest land begun after WW II and intensified in recent years, which

involves digging deep ditches on or near the peat bogs and improvement of the infrastructure of forest roads by digging ditches around them; building reservoirs (mainly for fire-fighting) near peat bogs; cutting down old-growth forests; creating drainage furrows for the planting of trees in logged areas; and penetration of peat bogs by people.

High and transitional peat bogs of the Solska Forest and Roztocze Region should become legally protected as nature reserves as soon as possible. The above results confirm that such protection is justified. So far only two peat bog complexes in the Zamość Region have been placed under protection: Błoto Obary and Nowiny. Measures should be taken to re-naturalize the degraded complexes or parts of these peat bogs, including filling in or blocking drainage ditches. Peat bogs and the area around them should be excluded from intensive forest economy, allowing only minor work which does not disturb water conditions and the structure of tree stands. Penetration by man (e.g. for gathering fruit) should be limited to the late summer, so as not to create a threat to the animal species in these biotopes. Plans for building any reservoirs which could disturb the water conditions of the peat bogs should be made subject to consultation and scientific analysis in order to evaluate their effect on the environment. This in particular applies to reservoirs within forests.

CONCLUSIONS

High and transitional peat bogs, because of their rank and status in the context of the Natura 2000 European Ecological Network [Liro and Dyduch-Falniowska 1999], should be protected as nature reserves, independently of their status as habitat refuges. The fauna of these habitats, with more than a dozen characteristic species occurring in the Zamość Region almost exclusively in this type of peat bog (e.g. *Tetrao urogallus*, *T. tetrix*, *Circaetus gallicus*, *Grus grus*, *Bubo bubo*, *Canis lupus*, *Alces alces*), is another argument in favor of protecting peat bogs as reserves.

Peat bog ecosystems play a significant role in the natural environment, the landscape, the economy and the life of man. Their role consists mainly in maintaining natural wealth, accumulation of vast amounts of water and organic material, maintaining a rich source of food (for humans as well) and preservation of the landscape [Dobrowolski and Lewandowski 1998]. This is why their preservation and protection should be priorities for scientists and for environmental protection services in the area of nature conservation.

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RÓŻNORODNOŚĆ FAUNY KRĘGOWCÓW TORFOWISK WYSOKICH I PRZEJŚCIOWYCH PUSZCZY SOLSKIEJ I ROZTOCZA ORAZ PROPOZYCJE JEJ OCHRONY

Streszczenie: W pracy przedstawiono wyniki badań i obserwacji płazów, gadów, ptaków i ssaków przeprowadzonych w latach 1996-2003 na siedmiu kompleksach torfowisk wysokich i przejściowych Puszczy Solskiej i Roztocza. W omawianych biotopach stwierdzono 10 gatunków płazów (m.in. traszkę grzebieniastą, kumaka nizinny i ropuchę paskówkę), 6 gatunków gadów (m.in. żmiję zygzakowatą i gniewosza plamistego), 93 gatunki ptaków (np. bąka, bociana czarnego, gadożera, cietrzewia, głuszcza, żurawia, puchacza) oraz wilka, rysia i łosia. Wskazano również zagrożenia dla torfowisk wynikające z działalności gospodarczej człowieka oraz zaproponowano wskazówki dotyczące ich formalno-prawnej i praktycznej ochrony.

Słowa kluczowe: Puszcza Sol ska, Roztocze, płazy, gady, ptaki, ssaki