

BIRDS OF FIELD KARST LAKES ON THE OUTSKIRTS OF THE BUG VALLEY NEAR ZOSIN VILLAGE IN THE ZAMOŚĆ REGION AND SUGGESTIONS FOR THEIR PROTECTION

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Summary. The paper concentrates on the ornithological value of three small karst lakes located near the village of Zosin on the outskirts of the Bug valley in the Zamość region. The lakes are 1.5 to 11.3 ha in area and their surface is mostly covered with rushes. The biggest one (Kacapka Lake) is protected as an ecological site. There have been registered 76 different bird species in the area, such as: red-necked grebe, bittern, little bittern, montagu's harrier, little crane, bluethroat, lesser-spotted eagle and red kite. Environmental dangers for the lakes are synthetically discussed and methods of protection suggested.

Key words: avifauna, karst lakes, Zamość region

INTRODUCTION

The Zamość Region (former Zamość voivodship) is one of the poorest regions in Poland as far as surface water is concerned [Michalczyk and Wilgat 1998]. Therefore, any water basins or flows are crucial in enriching the environment of the region. For that reason, man-made water bodies such as fish ponds or scarce natural water basins like old river beds and small karst lakes deserve special attention.

The national literature on the karst lake avifauna near Zosin is very skimpy and it is mainly concerned with the biggest lake – Kacapka [Głowaciński 1992, Profus *et al.* 1992, Reszel 1992]. Two nameless lakes, seldom mentioned, are without any natural characteristics whatsoever [Malec *et al.* 1995]. The present study aims at summing up the current knowledge of karst lake avifauna as well as at defining threats and proposing methods of lake protection. Since the bird population of the discussed lakes depends on nesting conditions and on the influence of abiotical factors on the environment of the lakes, the main threats were identified. That brought about some protective methods which should theoretically guard the lakes to a considerable degree against the decline of ecological conditions and the regression of some bird species.

STUDY AREA

Karst hollows are mainly located in the east of the Zamość region. Most of them are small, shallow and swampy depressions covered with rushes. The biggest number of the hollows occurs between the localities of Strzyżów and Horodło (Grzęda Horodelska subregion); three of the hollows can be characterized as small lakes (Fig. 1). They are spread along an east-west line near Zosin. The biggest lake, Kacapka, covers an area of 11.3 ha. The major flora consists of several species such as: *Phragmitetum communis*, *Typhetum angustifoliae* and *Typhetum latifoliae*. The surface of the lake water (about 70%) is covered with patches of *Stratoites aloides*. In close vicinity there are numerous lowland bogs and wet, marshy hay meadows which stretch up to nearby farmlands. The edges of the meadows are speckled with stunted willows and lanes of willows and poplars.

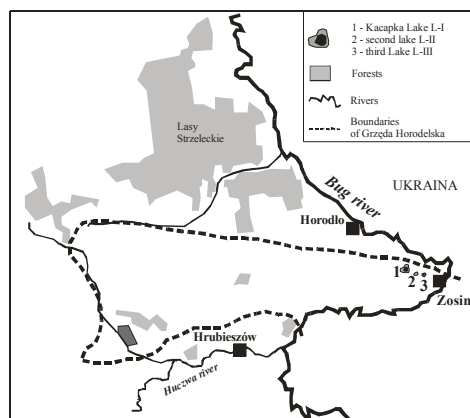


Fig. 1. Location of the karst lakes in the Grzęda Horodelska subregion
Rys. 1. Lokalizacja jezior krasowych w makroregionie Grzędy Horodelskiej

The second, nameless, lake (L-II) lies 600 meters of Kacapka and its area is about 1.5 ha. Rushes (grass, sedge) cover about 90% of its surface area. A belt of hay meadows and grazing lands surrounds the lake up to the cultivated area.

The third, also nameless, lake (L-III) lies about 1 km east of Kacapka. Its area is about 1.5 ha, of which about 20% is uncovered. The predominant flora here consists of *Phragmitetum communis* with a small percentage of *Typhetum latifoliae* and *Glycerietum maximeae*.

Kacapka Lake is protected as an ecological site and at the same time it is a proposed nature reserve [Reszel, 1992]. Whereas all the lakes are part of two bigger protected areas: the Near Bug Area of Protected Landscape, and the international bird refuge Nature 2000 „The Middle Bug River Valley” [Malec *et al.* 1995, Sidło *et al.* 2004].

MATERIALS AND METHODS

The data presented in the paper come from 1986 through 2006 and were collected in three periods. There were two surveys in 1986 and 1988 on Kacapka Lake [Głowaciński 1992, Profus *et al.* 1992]. In the 90's more thorough inspections, 14 in total, on all the lakes

were conducted [Stachyra and Tchórzewski 1999], according to methodological guidelines outlined in the works of Czapulak *et al.* [1987] and Dombrowski *et al.* [1993]. In 2000-2006 changes in the quantity of rare bird species were registered on Kacapka Lake. Altogether, 22 area inspections took place – 21 between April and June, and 1 in the winter. Kacapka Lake was inspected 22 times, and the two nameless lakes L-II and L-III – 3 and 5 times, respectively. During the inspections, all located bird species were recorded. The applied methods to estimate birds density lead to general characteristics of the local avifauna such as survival, which provides data for a long-term change logbook.

RESULTS OF THE REASERCH

76 bird species, including 66 breeding and probably breeding, were located on all three lakes and in the neighbourhood in 1986-2006. 55 breeding or probably breeding species out of the total of 69 bird species were recorded on Kacapka Lake and in its vicinity. Observations in 1986 and 1988 located 35 species, and in the 90's – 63 species. The disproportion was caused by a different number of surveys in the two periods. Still, populations of main species are comparable and the collected data suggest population decrease. 19 and 24 bird species, including 18 and 19 breeding and probably breeding species, were observed on the nameless lakes L-II and L-III, respectively.

The main nesting species in the area are: *Podiceps grisegena*, *Botaurus stellaris*, *Ixobrychus minutus*, *Aythya nyroca*, *Circus aeruginosus*, *Porzana parva*, *Chlidonias niger*, *Chlidonias leucopterus* and *Luscinia svecica*. One ephemeral site of *Circus pygargus* was also discovered. Three of the mentioned species emigrated: (*Aythya nyroca*, *Ch. niger*, *Ch. leucopterus*). Two species (*Circus pygargus* and *Luscinia svecica*) were located in the 90's, but in the case of *C. pygargus* it was only one year. *Milvus milvus* and *Aquila pomarina* should be mentioned among migrating and passing birds.

Table 1 presents rare species and their populations on each of the lakes, and the changes which took place in the last two decades in the avifauna of Kacapka Lake were synthetically discussed.

DISCUSSION

Altogether, 76 bird species were located on all the lakes and in the neighbourhood with a total area of about 15 ha (0.15 square km), which constitutes about 25% of all birds species in the Zamość Region (8500 square km). The density of the main species: *Podiceps grisegena*, *Botaurus stellaris*, *Ixobrychus minutus*, *Circus aeruginosus*, *Porzana parva* and *Luscinia svecica* is comparable (regardless of a huge difference in the surface area of the analysed water basins) to the density of the species occupying other three fish pond sets and two natural water basins (Boćków pond and Wieprzowe Lake) [Stachyra *et al.* 2002, unpublished data]. The degree of birds preservation on the described lakes is comparable to the one on the natural pond near Zakrzew which is 250 ha (2.5 square km) in area. The avifauna of fish ponds is undoubtedly richer [e.g. Profus *et al.* 1992, Kitowski *et al.* 2000, Stachyra 2000], but then much bigger areas of ponds sets must be taken into account, at least 100 ha (1 square km) as far as the Zamość region is concerned. Moreover, fish ponds are situated

within river valleys, and the described lakes are located 1 km away from the Bug river valley, which also influences the quality of avifauna.

Table 1. Selected breeding birds of karst lakes near Zosin and their protection status
Tabela 1. Wybrane lęgowe gatunki ptaków jezior krasowych koło Zosina i ich status ochronny

Species Gatunek	Number of species on lakes I-III (pairs/territories) Liczebność gatunków na jeziorach I-III (par/terytoriów)					Protection status Status ochronny	
	Kacpka Lake		Lake II		Lake III	DP	PCKZ
	1986-1988	1991-1999	2000-2006	1996-1997	1996-1998		
<i>Tachybaptus ruficollis</i>	1	1	+	–	3-4		
<i>Podiceps cristatus</i>	1	1	–	–	–		
<i>Podiceps grisegena</i>	1	2-3	1-2	1	–		
<i>Botaurus stellaris</i>	1	1	1-2	–	1	+	
<i>Ixobrychus minutus</i>	1	–	–	–	–	+	
<i>Cygnus olor</i>	1	1	–	–	–		
<i>Anas crecca</i>	–	1	+	1	–		
<i>Anas querquedula</i>	1	2-3	+	1-2	–		
<i>Anas clypeata</i>	1	–	+	–	–		
<i>Aythya nyroca</i>	2	–	–	–	–	+	+
<i>Circus aeruginosus</i>	+	2-3	2	–	1-2	+	
<i>Circus pygargus</i>	–	1	–	–	–	+	
<i>Rallus aquaticus</i>	–	8-9	+	1	4		
<i>Porzana parva</i>	–	1	+	1	2	+	+
<i>Crex crex</i>	–	1	+	–	–	+	
<i>Gallinula chloropus</i>	2	5	+	1	7		
<i>Gallinago gallinago</i>	–	1	–	–	–		
<i>Larus ridibundus</i>	2-3	–	–	–	–		
<i>Chlidonias niger</i>	+	0-15	–	–	–	+	
<i>Chlidonias leucopterus</i>	20-30	0-30	–	–	–	+	+
<i>Luscinia svecica</i>	–	1	–	–	–	+	+
<i>Locustella fluviatilis</i>	–	2	+	–	–		
<i>Locustella luscinioides</i>	3-4	4	+	–	1		

Protection status: DP – birds from annex I of Birds Directive Nature 2000 Network [Sidło *et al.* 2004]; PCKZ – birds from Polish Red Data Book of Animals [Głowaciński 2001]

Status ochronny: DP – ptaki umieszczone w zał. I Dyrektywy Ptasiej sieci Natura 2000 [Sidło *et al.* 2004]; PCKZ – ptaki wpisane do Polskiej czerwonej księgi zwierząt [Głowaciński 2001]

Comparing the data from the 90's with the data from the 80's [Głowaciński 1992, Profus *et al.* 1992], the main changes present were those in the avifauna quality. It is highly probable that *Aythya nyroca*, whose population decrease in the Zamość region was particularly noticeable at the end of the 80's and in the beginning of the 90's, emigrated irrevocably [author's data].

The recorded changes indicate a regression of rare breeding species: the above mentioned *A. nyroca* and two tern species *Ch. leucopterus* i *Ch. niger*. Other water and bog sites of the avifauna of the Zamość region are experiencing only minor population fluctuations, while no significant decrease was recorded [Stachyra 2000, Stachyra *et al.* 2002, author's data]. This proves that the negative issues outlined in the upcoming part of the work are serious.

RECAPITULATION AND CONCLUSIONS

An analysis focused on the outcome of changes which took place in the last two decades identified three species which emigrated from the lakes: *Aythya nyroca*, *Chli-*

donias niger, *Ch. leucopterus*. The emigration of the first species can be ascribed to its general regression in the whole area [Tomiałojć and Stawarczyk 2003], while the emigration of terns is probably rooted in the adverse alterations of their immediate environment, associated with the intensive development of agriculture [author's data]. The conclusion is supported by the fact that most of the birds are insectivorous [Snow and Perrins 1998]. Slight fluctuations in the population of other breeding species can originate from natural (zoogeographic) or anthropogenic causes (e.g. those discussed in the work). The presence of a significant number of protected species on the national and international scale should also be emphasized. There have been located 8 species placed in the Polish Red Data Book of Animals [Głowaciński 2001], and 16 species mentioned in annex I of Birds Directive [Sidło *et al.* 2004].

Quantitative and qualitative make-up of the avifauna of the lakes is not impressive. However, considering the strictly agricultural character of the land and the far reaching transformations of the Grzęda Horodelska landscape, the lakes' decisive part in enriching the subregion cannot be questioned. The part of the Bug valley where Grzęda Horodelska stretches is destroyed to a great degree, which is manifest in dried up lowland bogs and the conversion of the bogs into grasslands or farmlands [Marczakowski and Stachyra 1999]. Therefore, the presented karst lakes are the main avifaunistic refuge in the area, more important than the Bug river valley itself [Marczakowski and Stachyra 1999]. While assessing the role of the lakes in preserving the Grzęda Horodelska birds, it should be emphasized that the lakes gather (in a sense of quality measure) about 70% of the subregion avifauna.

Data analyses lead to a conclusion that the small surface of the lakes, the location of the lakes among fields and the tiny population of the recorded bird species endanger the stability of water and bog avifauna, and strengthen the tendency of bird population to decrease.

The location of the lakes among farmlands and near farm buildings carries considerable threats:

- 1) eutrophication generated by the flow of fertilizers from nearby farmlands, the drift of dust from surrounding fields and the disposal of wastes;
- 2) chemization of the agrocenoses around the lakes, which leads to fauna (mainly invertebrates) and flora impoverishment;
- 3) deforestation (Kacapka Lake) which greatly impoverishes the environment and deprives animals (especially birds) of suitable breeding sites;
- 4) scorching of plants alongside water basins, resulting in a considerable loss in animal population and destroying bird clutches, making the lakes less attractive to migrating birds;
- 5) hunting policy and poaching, mainly fishing and bird hunting.

Since the lakes play an important role in maintaining the environmental diversity (especially the ornithological diversity) of the Horodelska bar, and because of several threats that this area faces, the lakes should be brought under protection, both legal and practical. Therefore it is recommended that the following changes be implemented:

- 1) the Kacapka Lake should be transformed into a nature reserve,
- 2) the lakes L-II and L-III should be protected as ecological sites,
- 3) the belt of grassland surrounding the lakes should be broadened (up to a couple dozen meters) to keep most fertilizers and pesticides from getting into water,
- 4) the disposal of wastes and washing of agricultural machines near the lakes after fertilizing and spraying should be categorically brought to cessation,

- 5) the ban on plant scorching should be exercised and any changes in aquatic flora should be prohibited unless it is necessary for so called active protection,
- 6) the introduction of new species, which could destroy the natural biological rhythm in the lakes, should be avoided,
- 7) the area of the lakes should be completely excluded from hunting grounds and poaching must be eliminated,
- 8) animals and plants should be under close surveillance, especially the dynamics of flora assemblages and the population of fish, amphibians and birds.

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AWIFAUNA ŚRÓDPOLNYCH JEZIOR KRASOWYCH
NA PRZEDPOLU DOLINY BUGU KOŁO ZOSINA NA ZAMOJSZCZYŹNIE
ORAZ PROPOZYCJE ICH OCHRONY

Streszczenie. W pracy przedstawiono walory ornitologiczne trzech niewielkich jezior krasowych, zlokalizowanych k. miejscowości Zosin w pobliżu doliny Bugu na Zamojszczyźnie. Jeziora te mają powierzchnię od 1,5 do 11,3 ha i w przeważającej mierze porośnięte są roślinnością szuwarową. Największe z nich – jez. Kacapka objęte jest ochroną jako użytek ekologiczny. Na omawianym terenie zanotowano 76 gatunków ptaków, w tym m.in.: perkoza rdzawoszyjnego, bąka, bączka, błotniaka łąkowego, zielonkę i podróżniczkę oraz orlika krzykliwego i kanię rudą. Syntetycznie omówiono zagrożenia dla środowiska przyrodniczego tych jezior oraz wskazano propozycje ich ochrony.

Słowa kluczowe: awifauna, jeziora krasowe, Zamojszczyzna