

THE IMPORTANCE OF FISHPONDS TO THE PRESERVATION OF AVIAN BIODIVERSITY IN AGRICULTURAL LANDSCAPE

Marek Nieoczym

Department of Zoology, University of Life Sciences in Lublin
Akademicka str. 13, 20-950 Lublin, mnieoczy@wp.pl.

Summary. The research was carried out on five fishpond complexes in the breeding season in 2008. The ponds are situated in an agricultural landscape of Lublin region. Overall, there are 137 reservoirs and their total area is 520 ha. There were 69 species of birds observed, among which 40 were breeding. The dominant species were Coot, Mallard, Pochard and Black-headed Gull. The largest fishpond complexes with numerous reservoirs and varied habitat cause that the diversity of avifauna in agricultural landscape increases.

Key words: birds, breeding season, fishponds, agricultural landscape, Lublin region

INTRODUCTION

The data presented in this paper concerning birds living in fishponds were collected within the framework of the annual action „Ornithological monitoring of ponds and lakes in Lublin region”, organised by the Lublin Ornithological Society. The aim of the action is to determine the significance of different types of water reservoirs for waterfowl in breeding season and monitoring avifauna on selected reservoirs in Lublin region. Most of the research was carried out on fishpond complexes. In comparison to different parts of Poland, Lublin region has a big share of ponds which play a significant role for birds in breeding season [Wesołowski and Winiecki 1988, Guziur *et al.* 2003]. Besides, when compared to other reservoirs, fishponds constitute the largest area in the Lublin region [Uziak and Turski 2008]. What is more, most of them are situated in agricultural landscape [Dobrowolski 1995]. The presence of different kinds of reservoirs considerably influences avian diversity in agricultural landscape of the Lublin region [Buczek *et al.* 1997, Kitowski *et al.* 2000, Stachyra *et al.* 2006, Stachyra and Marczakowski 2009].

MATERIALS AND METHODS

The birds were observed in the breeding season in 2008. 5 fishpond complexes were chosen in agricultural landscape (Fig. 1). They are located in the following villages: Samokłęski, Rawa, Garbów-Przybysławice, Czesławice, Piaski-Siedliszczki. Samokłęski and Rawa are located in Wysoczyzna Lubartów-

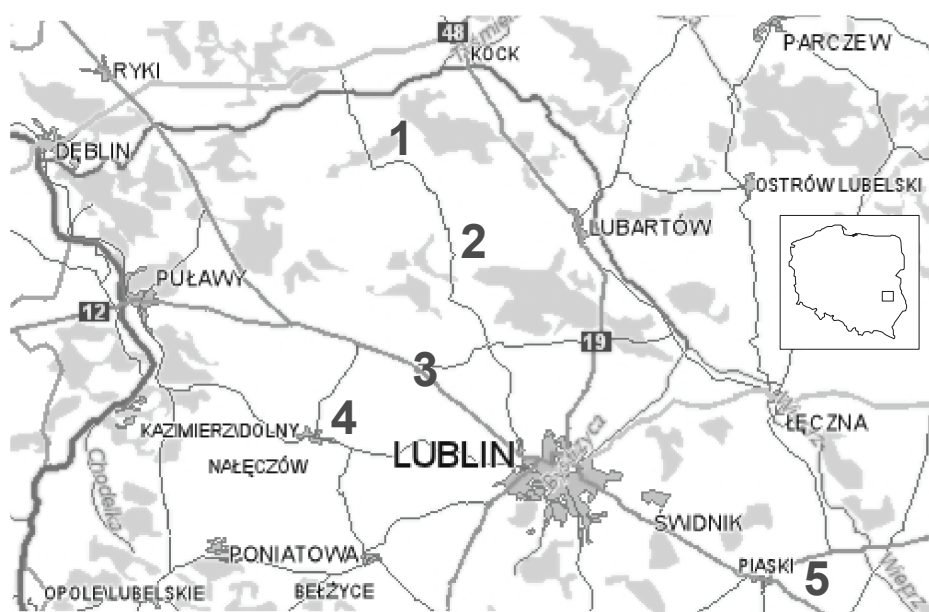


Figure. 1. Location of studied fishponds: 1. Rawa ponds, 2. Samokłęski ponds, 3. Garbów-Przybysławice ponds, 4. Czesławice ponds, 5. Piaski-Siedliszczki ponds

Table 1. Characterisation of the fishponds

Locality	Rawa	Samokłęski	Garbów	Czesławice	Piaski-Siedliszczki
Area, ha	119	185,5	110	22,5	83
Number of ponds	20	53	21	14	29
Rush, %	5–100	5–100	10–100	10–100	5–100
River	Minina	Minina	Kurówka	Bystra tributary	Gielczew

ska (Południowopodlaska Lowland), another two complexes are in Nałęczowski Plateau (Lublin Upland) and the last one in Świdnicki Plateau (Wyżyna Lubelska) [Kondracki 2002]. The total area of the ponds is 520 ha with 137 ponds in sum (Tab. 1). The research of birds was based on the instructions included in the

paper „Monitoring Bird Populations” [Koskimies and Väisänen 1991] which assume two surveys in breeding season. The first survey was in the period of 12th–17th May and the other one between 21th June and 2nd July. On the same day two pairs of complexes were controlled: Samokłęski and Rawa, Garbów and Czesławice. Observations were made at dawn and in the evening. Sound stimulation was used. The numbers of Little Grebe *Tachybaptus ruficollis* and of rallids: Water Rail *Rallus aquaticus*, Little Crake *Porzana parva* and Moorhen *Gallinula chloropus* were estimated using the playback method [Dombrowski *et al.* 1993].

RESULTS

In the researched places, 69 species were recorded, 54 of which belonged to the group of waterfowl (Tab. 2). There were from 21 to 46 species of birds on the particular complexes. 40 species were breeding and 29 of them belonged to waterfowl.

11 species of birds included in the Polish Red Data Book of Animals [Głowaciński 2001] were seen in this area. Among them 3 species were breeding: Little Bittern *Ixobrychus minutus* – observed on two complexes, density 0.03–0.1 males/10 ha; Bittern *Botaurus stellaris* – observed on all fishponds except for Czesławice, density 0.04–0.2 males/10 ha; Bearded Tit *Panurus biarmicus* – during the other survey in Samokłęski there were 10 individuals observed, 4 of which were juvenile birds. Moreover, there were White-tailed Eagles *Haliaeetus albicilla* observed, which were breeding in the vicinity of the fishponds in Rawa and Samokłęski (2 pairs in sum).

The most numerous waterfowl species were: Coot *Fulica atra*, Mute Swan *Cygnus olor*, Mallard *Anas platyrhynchos*, Pochard *Aythya ferina*, Tufted Duck *Aythya fuligula*, Great Crested Grebe *Podiceps cristatus*, Black-headed Gull *Larus ridibundus*, and among passerine birds *Passeriformes*: Reed Warbler *Acrocephalus scirpaceus*, Great Reed Warbler *Acrocephalus arundinaceus*, Reed Bunting *Emberiza schoeniclus*, Sedge Warbler *Acrocephalus schoenobaenus* (tab. 2).

There were 15 species not belonging to the group of water birds, mainly passerine birds. 3 of them, which were breeding within fishpond complexes, were dominant: Whitethroat *Sylvia communis*, Willow Warbler *Phylloscopus trochilus* and Thrush Nightingale *Luscinia luscinia*. The largest number of these species were seen in Garbów (respectively: 14, 5 and 6 singing males). They live in bushes growing in dikes and ponds. Besides, there were also other breeding species: Pheasant *Phasianus colchicus*, Woodpigeon *Columba palumbus*, Cuckoo *Cuculus canorus*, Fieldfare *Turdus pilaris*, Chiffchaff *Phylloscopus collybita*, Blackcap *Sylvia atricapilla*, Lesser Whitethroat *Sylvia curruca* and Magpie *Pica pica*. Passing and foraging species were also observed: Blue Tit *Cyanistes caeruleus*, Starling *Sturnus vulgaris*, Golden Oriole *Oriolus oriolus* and Raven *Corvus corax*.

Table 2. Characterisation of birds of the studied fishponds

Species	1	2	3	4
<i>Cygnus olor</i>	77	120	W	B
<i>Anser anser</i>	2	15	W	B
<i>Anas penelope</i>	0	1	—	P
<i>Anas strepera</i>	6	0	C	B
<i>Anas crecca</i>	0	1	W	P
<i>Anas platyrhynchos</i>	286	845	C	B
<i>Anas querquedula</i>	3	0	C	P
<i>Anas clypeata</i>	2	0	C	P
<i>Aythya ferina</i>	391	389	W	B
<i>Aythya fuligula</i>	218	156	W	B
<i>Mergus merganser</i>	2	0	—	P
<i>Phasianus colchicus</i>	2	2	B	B
<i>Gavia arctica</i>	0	1	—	P
<i>Tachybaptus ruficollis</i>	23	45	W	B
<i>Podiceps cristatus</i>	90	175	W	B
<i>Podiceps grisegena</i>	17	33	W	B
<i>Podiceps nigricollis</i>	5	0	W	B
<i>Phalacrocorax carbo</i>	1	0	—	P
<i>Botaurus stellaris</i>	10	0	W	B
<i>Ixobrychus minutus</i>	0	3	W	B
<i>Egretta alba</i>	0	5	—	P
<i>Ardea cinerea</i>	20	50	—	b
<i>Ciconia ciconia</i>	4	5	A	b
<i>Haliaeetus albicilla</i>	3	1	—	b
<i>Circus aeruginosus</i>	23	23	W	B
<i>Circus pygargus</i>	1	0	C	b
<i>Rallus aquaticus</i>	5	40	W	B
<i>Crex crex</i>	1	0	C	b
<i>Gallinula chloropus</i>	7	25	W	B
<i>Fulica atra</i>	428	1757	W	B
<i>Charadrius dubius</i>	4	0	U	B
<i>Vanellus vanellus</i>	26	2	C	B
<i>Philomachus pugnax</i>	19	0	C	P
<i>Limosa limosa</i>	4	0	C	P
<i>Tringa nebularia</i>	1	0	—	P
<i>Tringa ochropus</i>	1	0	—	P
<i>Tringa glareola</i>	4	0	—	P
<i>Actitis hypoleucos</i>	2	3	—	P
<i>Larus ridibundus</i>	263	431	W	B
<i>L. argentatus/L. cachinnas</i>	10	0	—	P
<i>Sterna hirundo</i>	6	16	W	P
<i>Sternula albifrons</i>	1	0	W	P
<i>Chlidonias hybrida</i>	3	0	—	P
<i>Chlidonias leucopterus</i>	1	1	—	P
<i>Alcedo atthis</i>	2	2	W	B
<i>Columba palumbus</i>	1	0	F	B
<i>Cuculus canorus</i>	1	0	F	B
<i>Luscinia luscinia</i>	8	0	F	B

<i>Turdus pilaris</i>	1	0	F	B
<i>Locustella naevia</i>	1	0	C	b
<i>Locustella luscinioides</i>	8	10	W	B
<i>Acrocephalus schoenobaenus</i>	108	9	W	B
<i>Acrocephalus palustris</i>	7	16	C	B
<i>Acrocephalus scirpaceus</i>	104	116	W	B
<i>Acrocephalus arundinaceus</i>	120	56	W	B
<i>Sylvia curruca</i>	3	0	F	B
<i>Sylvia communis</i>	20	2	F	B
<i>Sylvia atricapilla</i>	3	1	F	B
<i>Phylloscopus collybita</i>	1	1	F	B
<i>Phylloscopus trochilus</i>	6	3	F	B
<i>Panurus biarmicus</i>	0	10	W	B
<i>Cyanistes caeruleus</i>	1	0	F	b
<i>Remiz pendulinus</i>	20	8	F	B
<i>Oriolus oriolus</i>	3	0	F	b
<i>Pica pica</i>	1	0	F	B
<i>Corvus corax</i>	0	4	F	b
<i>Sturnus vulgaris</i>	3	0	F	b
<i>Carpodacus erythrinus</i>	8	4	F	B
<i>Emberiza schoeniclus</i>	80	60	W	B
Total	2482	4447		

1 – total number of individuals observed during the first survey, 2 – total number of individuals observed during the other survey, 3 – habitat of breeding species in agricultural landscape (A – hamlets, B – fields, C – meadows and grasslands, F – trees, W – reservoirs, U – fallows) (according to Tryjanowski *et al.* 2009), 4 – status of species (B – breeding on ponds, b – breeding in the vicinity of ponds, P – species of passage), bold font – waterfowl species

DISCUSSION

Despite carrying out only two surveys, a significant number of bird species was observed as the research was conducted on five different fishponds with total area of over 5 km². Only slightly more species were seen on fishponds in Dub and Swaryczów near Zamość – at least 68 species of waterfowl [Kitowski *et al.* 2000]. However, the area of these ponds is smaller than the described complexes by a factor of about four. Therefore, if studies in breeding season had been more accurate, more species would have been discovered. Furthermore, only 20–38 species of waterfowl were observed on the particular complexes, which is a lot fewer than in Dub and Swaryczów but similar to other ponds in the Lublin region, for example in Tarnawatka and Borki [Cios *et al.* 2004, Kitowski *et al.* 2000].

From the 54 species of waterfowl observed on the researched ponds, almost half of them (25 species) are breeding in agricultural landscape, however they are connected with freshwater habitat [Tryjanowski *et al.* 2009]. Moreover, some of the non-breeding species are seen during migration period. In spring the pools on meadows attract ducks of passage and wading birds: Wood Sandpiper

Tringa glareola, Spotted Redshank *Tringa erythropus*, Greenshank *Tringa nebularia*, Common Sandpiper *Actitis hypoleucos* [Tryjanowski *et al.* 2009]. These birds are also met on fishponds during migration [Nieoczym 2007, 2008]. Taking into account the number of water bird species observed it can be assumed that the lack of ponds or other wetlands in the fields would cause the reduction of avifauna by at least 39 species (72.2%). The rest of the 15 species of waterfowl (27.7%) which were observed on ponds are breeding in agricultural landscape despite the lack of reservoirs. In this case, these are mainly meadows, grasslands and sometimes hamlets (White Stork *Ciconia ciconia*), trees (Penduline Tit *Remiz pendulinus*, Scarlet Rosefinch *Carpodacus erythrinus*) and fallows (Little Ringed Plover *Charadrius dubius*) [Tryjanowski *et al.* 2009]. In the case of the birds which do not belong to waterfowl, most of them (14 species) are connected with trees and bushes in the agricultural landscape as well as with dikes and ponds in breeding season.

CONCLUSION

Fishpond complexes cause the rise of biodiversity among birds in agricultural landscape. This concerns mainly the largest complexes with many ponds and various habitats, like fishponds in Garbów, Samokłęski and Piaski.

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ZNACZENIE STAWÓW RYBNYCH DLA ZACHOWANIA RÓŻNORODNOŚCI AWIFAUNY W KRAJOBRAZIE ROLNICZYM

Streszczenie. Badania prowadzono w sezonie lęgowym 2008 r. na pięciu kompleksach stawów hodowlanych położonych w krajobrazie rolniczym na Lubelszczyźnie (137 zbiorników, 520 ha). Stwierdzono 69 gatunków ptaków, w tym 40 gatunków lęgowych. Gatunkami dominującymi były: łyśka, krzyżówka, głowienka i śmieszka. Zróżnicowane siedliskowo kompleksy stawów rybnych o dużej powierzchni i z licznymi zbiornikami przyczyniają się do wzrostu różnorodności awifauny w krajobrazie rolniczym.

Słowa kluczowe: ptaki, sezon lęgowy, stawy rybne, krajobraz rolniczy, Lubelszczyzna