

NEW DATA REGARDING THE AQUATIC AVIFAUNA ON THE TERRITORY OF CRAIOVA CITY, DOLJ COUNTY

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Abstract. The present paper brings to light new data about the aquatic birds from Craiova city after 2002 as a result of the bird monitoring action that took place here. The bird monitoring activity is part of a larger project concerning the biodiversity of the city fauna. The aquatic avifauna is well represented here because of the city geographical location on the left side of the Jiu river and because of the great variety of the habitats found here. The number of observed aquatic species rises up to 46, systematically classified into 9 orders and 16 families. In this paper there are also mentioned the species that live and breed in the reed-beds (reed warblers, reed buntings) or near waters (wagtails, largely spread species from the Passeriformes order). The number of species and of individuals has fluctuated according to the climatic factors and the availability of food, both seasonally and annually. In the city were found 16 species with varying degrees of threat (vulnerable, endangered, declining) both at European and national level.

Keywords: aquatic birds, anthropogenic habitat, protection of birds.

Rezumat. Noi date referitoare la avifauna acvatică de pe teritoriul municipiului Craiova (județul Dolj). Lucrarea aduce noi date despre păsările acvatice din municipiul Craiova, după anul 2002, în urma monitorizării speciilor de păsări din oraș. Monitorizarea se înscrie într-un proiect mai amplu referitor la biodiversitatea faunei orașului. Avifauna acvatică este bine reprezentată, fiind favorizată de localizarea geografică a orașului pe malul stâng al râului Jiu și de varietatea habitatelor. Numărul speciilor acvatice observate se ridică la 46, distribuite în 9 ordine și 16 familii. În lucrare sunt menționate și speciile ce trăiesc și cuibăresc în stufăriș (lăcari, presuri de stuf) sau pe lângă ape (codobaturi, specii euritope ce aparțin ordinului Passeriformes). Numărul speciilor și al indivizilor a fluctuat în funcție de factorii climatici și de hrană, atât sezonier, cât și anual. Pe teritoriul orașului au fost evidențiate 16 specii cu diferite grade de amenințare (vulnerabile, periclitare, în declin) atât pe plan european cât și național.

Cuvinte cheie: păsări acvatice, habitat antropic, ocrotire a păsărilor.

INTRODUCTION

The cities are not complete without the presence of birds, which are important parts of the biocoenosis, of the biological diversity and which contribute to the ecological balance in nature.

The refuge and adaptation of birds to town lead to a more profound study of synanthropic birds by researchers. Thus, during the last decades, there was a blast of information regarding the bird urbanization problem in Romania, the relations established between bird and human communities and also regarding the problems related to their protection (BÉRES, 1980; CROITORU, 2009; GACHE, 2004; GIURGINCĂ 1997; GLĂVAN & TOADER, 2001; ION, 1992; ION & GACHE, 1997; MUNTEANU, 1998; PAPADOPOUL & PETRESCU, 1991, etc.).

Craiova city, an important urban location in the Oltenia region and the county seat of Dolj county, is situated in the South of Romania, on the left bank of the Jiu river, with an altitude between 75 and 116 m. It is situated in a plain, having a very irregular shape on the North and South sides, while the Central part is compact. It has an approximate surface of 6676 ha.

In Craiova there are 14 parks, many of them being marshes in the past that have been transformed into more modern habitats. The study of aquatic birds was made at Craiovița Lake and Park, Romanescu Park, Botanical Garden, Tineretului Park and along the Jiu river and the moors on the outskirts of Mofleni neighbourhood (Fig. 1).

Craiovița Lake is situated in the N-W region of Craiova. It is an artificial lake created on the course of the Cornițoiu river in 1966 - 1977. Over the years, the lake has suffered modifications being divided by an isthmus into two unequal lakes. The lake, with small isles, surrounded by reed, rush, willows has gained in time the characteristics of an alluvial plain. The park near the lake, has alleys and a mosaic of trees and bushes, and thus represents an attraction for numerous birds. In 1985 the whole establishment, the lake and the park, occupied a surface of approx. 85 ha, and the water surface was of about 32 ha (CIOBOTEA et al., 1999). There was a time when the lake had an embankment area, boats, swimming areas, etc. being a perfect relaxing place for the weekends. After the year 1990, Craiovița Lake and Park have undergone some modifications, being disputed by the ex-owners and the city authorities. The modifications made by reducing the habitat space in favour of new constructions (the Flormang hotel/pension in the north, the Real hypermarket in the east) led to changes in the initial habitat. This is why nowadays we do not possess official data regarding the surface of the place. Still, estimations are made at about 55 ha. From an administrative point of view, the lake is assigned to a private person, who has not valued the habitat properly, leaving it deserted.

“Alexandru Buia” Botanical Garden is located in the SW part of Craiova. It extends over a surface of approx. 17 ha and it is divided in separate sectors, which comprise approx. 6000 taxa. It is crossed from east to west by a small river that comes from Iancu Jianu fountain. On the river course, there have been created 3 lakes with a surface of approximately 0.3 ha. The lakes contain aquatic plants with numerous water lilies. The lake found in the sector called “The floristic provinces of the world” is surrounded by a specific type of vegetation (reed, rush, willows) adequate for aquatic birds.

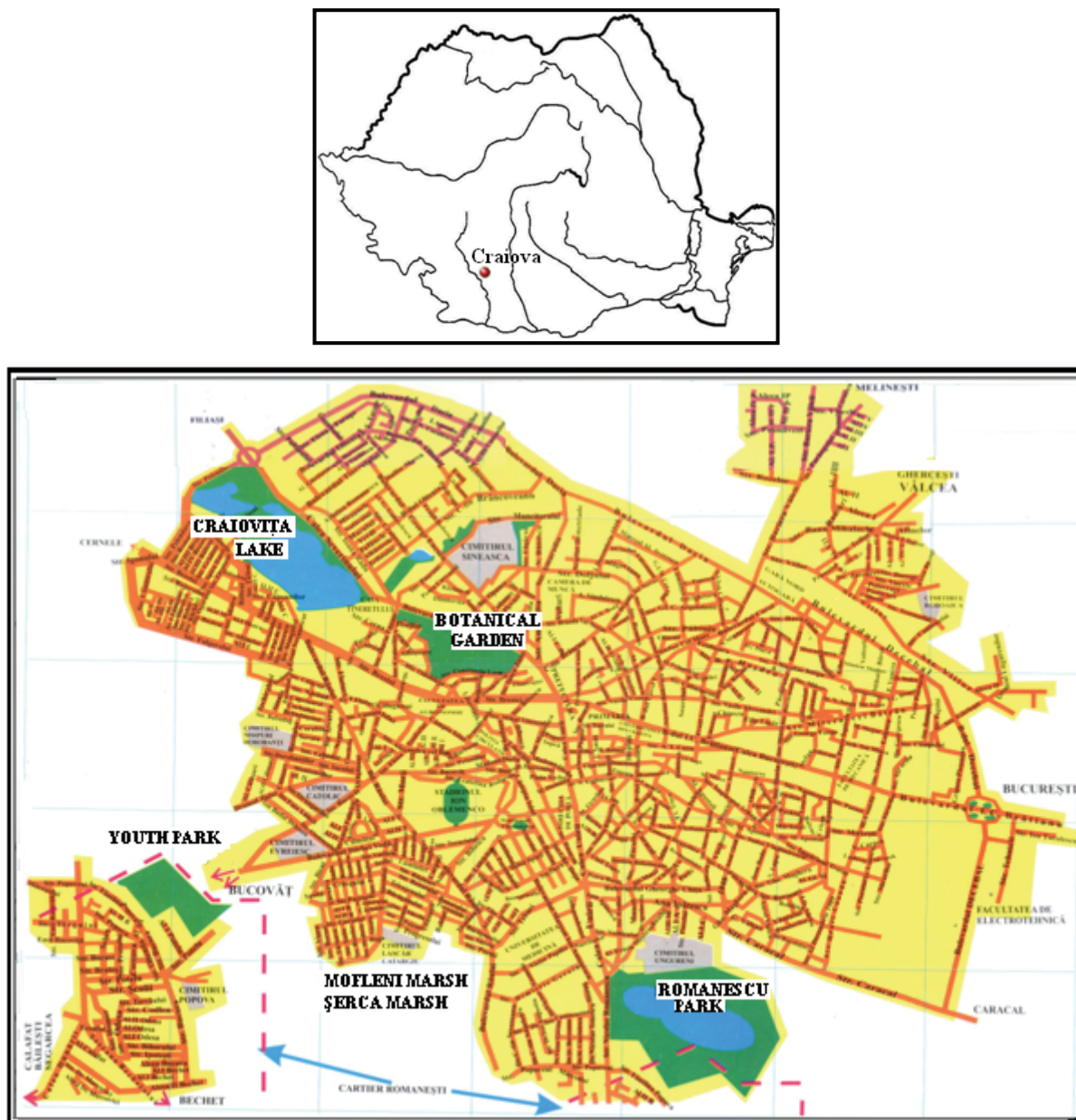


Figure 1. The map of Craiova city and of the studied habitats (from CIOBOTEA et al., 1999).

Tineretului Park, also known as Lunca Jiului Park till recently, is located in the western part of the city, on the left bank of the Jiu river. It first appeared as a result of a development program of a large sylvan area, having an initial surface of about 51 ha. It was modernized in the years 2008-2010. It contains a rich and diverse vegetation. Șerca creek, which crosses the park and the old swimming area that was abandoned due to lack of funds have attracted semi-aquatic and limicolous birds.

At the outskirts of Mofleni neighbourhood, area which contains the park, there is Mofleni Moor, permanently supplied by underground waters, with a surface of about 4 ha, and also Șerca Moor, a temporary moor which dries during the very droughty summers.

Nicolae Romanescu Park, located in the southern part of the city, is one of the most picturesque and one of the largest parks in our country (about 96 ha). Due to its unique view, the park is one of a kind in Romania and it is a special touristic attraction. It comprises forest and ornamental plantations with more than 250 tree and shrub species, numerous roads, alleys and footpaths. It also has greenhouses, race tracks and a zoo. The water surface is over 4 ha and it consists of the main lake in the central area of the park and of an artificial creek which crosses the park. On its course there is a line of lakes, all of them being supplied by underground waters.

The present paper is a continuation of a larger study regarding the city avifauna monitoring action, which began in the year 2000 (BĂLESCU 2000, 2002-2008; BĂLESCU & RIDICHE, 2001). Until now, a number of about 125 bird species has been observed in the habitats in Craiova. We will get back on this subject with more information.

The purpose of this paper is to do a brief analysis of the aquatic bird species of Craiova city from several points of view: the phenological status, the seasonal frequency and the recorded numbers. In order to fulfill this purpose the following objectives have been stated:

- the identification and the assessment of the aquatic bird species;
- the updating of the list of aquatic bird species that have been observed so far;
- the classification of the categories of birds found in Craiova;
- the diversity of the aquatic bird community in various seasons;
- the elaboration of a classification list containing the protected status of the aquatic bird species that have been identified.

MATERIAL AND METHODS

The used methods and materials were the classic ones, according to the existing guidelines. We also used data collected in the field.

The field studies have been performed monthly and twice a month in all phenological seasons. The observations have been realised from stationary locations, both with a binocular (Norconia 10x50) and without any optical equipment. For the identification of the birds I used bird guides (BRUUN et al., 1999; PETERSON et al., 1989). I also used FujiFilm FinePix S5700 and Canon SX40 HS photo cameras for taking photos and video equipment for recording the birds in various aspects of their lives and behaviour. The field observations were recorded on work sheets and analysed from a systematic, biological and ecological perspective. I also studied law statements with regard to the conservative aspect of bird species.

The information in this paper with regard to the aquatic birds from the city has been processed according to the observations recorded between 2003 and 2012. There were approached the reed species and also species which are connected to the water habitat, eurytopic species of wagtail birds which nesting on the banks of the rivers and lakes.

RESULTS AND DISCUSSIONS

In the city parks and surrounding areas, 46 aquatic species classified in 9 orders and 16 families were identified (Table 1).

Table 1. Classification of the observed number of bird species according to superior taxonomical units (families, orders).

No.	Order	Family	Number of species
1.	Podicipediformes	Podicipedidae	3
2.	Pelecaniformes	Phalacrocoracidae	2
3.	Ciconiiforme	Ardeidae	7
		Ciconiidae	1
4.	Anseriformes	Anatidae	8
5.	Accipitriformes	Accipitridae	1
6.	Gruiformes	Rallidae	2
7.	Charadriiformes	Recurvirostridae	2
		Charadriidae	2
		Scolopacidae	2
		Laridae	3
8.	Coraciiformes	Sternidae	3
		Alcedinidae	1
9.	Passeriformes	Motacillidae	3
		Sylviidae	5
		Emberizidae	1

The aquatic avifauna known seasonal changes. Weather conditions, food availability, human activities in certain situations, all of these have influenced the presence or absence of the aquatic birds in certain periods of time, as well as the number variation inside of the same species (Table 2).

During the winter season (November - February) there have been monitored the species belonging to all the above-mentioned orders (with one exception - Accipitriformes) - not all of them, and not in all the years.

Tachybaptus ruficollis – in certain years, it stayed until the end of November. In other years, it stayed over the winter, but in a small number, in the Botanical Garden, Tineretului Park, Mofleni Moors, in the winter of 2004, 2005, 2006, 2008, 2010.

Podiceps nigricollis (Black Necked Grebe) – it remained over the winter in December 2007 – February 2008 at Romanescu Park and the Botanical Garden.

Among the cormorants – *Phalacrocorax pygmaeus* stayed here during mild winters – the first time it was observed being in February 2002. On February the 5th 2010 we observed 30 specimens in Romanescu Park trees.

Phalacrocorax carbo was observed during winter time in Romanescu Park in February 2008, 2010 and in March 2011. Its presence in this habitat is not constant.

Starting with the winter of 2007, *Tringa ochropus* appeared in Romanescu Park. It was systematically observed in this season. In the winter of 2010 it was also seen at Mofleni Moors.

In January 2008 there were made observations regarding the presence of *Mergus albellus* on the Jiu river. Some species have been constantly observed during winter time: *ralidae* (*Fulica atra* and *Gallinula chloropus*), *anatidae* (*Anas platyrhynchos* and *A. crecca*) and *laridae* (*Larus ridibundus* and *L. cachinnans*).

Regarding the number of specimens, the coots have dominated the moor hen. Frequently, the most mature specimens used to stay. A small moor hen population remained permanently in the Botanical Garden.

Starting with the winter of 2009, the sea-gulls have been recorded in big numbers on the Jiu river, in the proximity of the landfill, which served as an important source of food in this season. The number of specimens ranged between 20 – 100/150 specimens. From here, they made short distance flights to the parks of Craiova, being rarely observed and in a small number of specimens. Starting with the winter of the year 2010, *Anas platyrhynchos* has been constantly observed on the lake from Romanescu Park. This happened because it remained close to the already acclimated species: *Cygnus olor*, *Ciconia alba*.

Cygnus olor was identified in February 2006 at Craiovița Lake, on the Jiu river in 2010, 2011; in January 2012 there were identified 14 specimens, both adults and juveniles.

Ardea cinerea, *Egretta alba* have been observed during extremely cold winters, either as isolated specimens, or in small groups of up to 4 specimens.

Alcedo atthis at Romanescu Park and the Botanical Garden – maximum 1-2 specimens in the winters of 2005, 2007, 2008, 2009, 2011.

Emberiza schoeniclus is an uncommon species, hidden in the reed. I noticed it in the winter of 2008, 2009, 2011 at Craiovița Lake, in small groups of up to 6 specimens.

The presence of an important number of aquatic birds in the researched habitats proves the fact that over time, the birds have adapted to the synanthropic conditions. Unlike the open areas, inside cities, birds manage to face the cold winters and to find food as well. They have adapted to a type of food that is not what they usually eat – that is the garbage that people throw in the parks.

In the spring time (March, April, May) some of the aquatic bird species that come out of the place where they have spent their winter remain in the area for the nesting period (Ferruginous Duck, Little Bittern – Fig. 2a, Night Heron, Northern Lapwing, Whiskered Tern, different species of Warbler, White Wagtail and Yellow Wagtail etc.)

Other species are just passing through on their way between their nesting places and the place where they are about to stay for the winter (Purple Heron, Shoveler, Garganey, Little Ringed Plover, Black Tern etc.). For example: *Ardea purpurea* was observed in flight over the Jiu river on the 29th of April 2009, but also at Craiovița Lake in May 2011, September 2011 and 2012.

During this season, the winter visitors, which were common during the winter time, get ready to leave, in turns, depending on the weather conditions, either in February, or in March, in order to find new places for their nests (Mute Swan, Grey Wagtail, Kingfisher, Reed Bunting etc.)

The spring migration can extend till the second half of May. During this period of time, from the second half of March – till the first half of May there could be made observations of many of the above-mentioned species.

During summer (June - August) most of the species are active around their nesting spot and around their new-borns. Many species make short flights in order to find food after the nesting period is over. There can be observed how adults and juveniles fly from the nesting places to the eating ones. That is why, during this period of time, in this habitat there have been seen other species that nest in the surrounding areas and come looking for food: *Ardea cinerea*, *Egretta garzetta*, *E. alba*, *Chlidonias niger*, *Recurvirostra avosetta* etc.

At the end of the summer (when the fall migration begins) at Șerca and Mofleni Moors found at the outskirts of Mofleni neighbourhood I observed an increase in the number of gulls, herons (little egret, night heron, grey heron), ducks, etc. In some years we could even observe purple heron, cormorants, etc. Some of the specimens of cormorants are found on Craiovița Lake as well. Also, in this time frame, we have observed in the area different species of the genera *Tringa*, *Calidris*, *Charadrius*.

Autumn (September, October) is the season of actual migration. The autumn migration extends over a longer period of time. The summer guests leave the area making room for the winter guests.

The weather conditions are the ones which rule a quicker or a slower rhythm in which the aquatic bird species leave the habitats of Craiova. Thus, some species have left the earliest in September, most of them in October (Night Heron, Little Egret, Warblers etc.), others in November (Little Grebe, Grey Heron). During this period, aquatic birds could be observed both solitary and in groups of tens, even hundreds of specimens (*anatidae*, *laridae*).

As a result of the field studies made in 2003, I have not observed the following species anymore: *Cygnus cygnus*, *Rallus aquaticus* (BĂLESCU, 2002; 2003; 2004).

The aquatic habitats (lakes, moors, rivers) and semi-aquatic habitats (reed, with or without willows, wetlands, swamps, sandy shores, etc.) from the parks or at the outskirts of the city have the necessary conditions to allow the birds to cross them or even to find shelter or to build nests. A great fact in favour of this situation is the lack of specific

habitat predators. The frequency in a certain area, over a longer or a shorter period of time is also influenced by the weather conditions.

Between 2003 and 2012 the majority of the aquatic bird species have been seen in the habitats of the city. Cormorants, grebes, great egret, kingfisher have chosen as a place to stay over the winter, the parks in the city (the Botanical Garden and Romanescu Park). Although the main lakes usually freeze during harsh winters, there are still a few unfrozen areas. Thus, the group of lakes from Romanescu Park and the first lake in the Botanical Garden do not usually freeze, offering food for these birds. During summer, the ardeidae, the anatidae, the charadriidae have preferred the lakes and moors at the outskirts of the city (Craiovița Lake, Mofleni moors, Șerca, Șerca creek, Jiu river).

Over the years I have recorded changes in the aquatic bird dynamics. Thus, during the first years of observation, some species were present in almost all habitats. In the last 5 years, the frequency and the number of certain species decreased due to weather conditions, urban factors and the competition for food and nesting. Although at Craiovița lake all aquatic bird species can be found (with few exceptions), these do not stay there for the nesting period. Some of them have been observed in great numbers (anatidae), others in small numbers and rarely observed (great crested grebe, pygmy cormorant). For example, *Tachybaptus ruficollis*, nests at Craiovița lake in certain years. Starting with the year 2010 I have recorded its presence in a very small number and often just in flight. It was replaced by other species that remained here for the nesting period, such as *Chlidonias hybrida*, *Nycticorax nycticorax*, etc. There is a permanent change and variability of species.

Data regarding the nesting/non-nesting aquatic birds show that there are more non-nesting species.

Most of the aquatic and semi-aquatic species have nested at Craiovița Lake, Mofleni Moor and Șerca creek, in small numbers and not in all the years. Out of the summer guests I consider a number of 15 species to be nesting or possibly nesting.

Most aquatic species nesting in the aquatic type of vegetation (in the reed): *Tachybaptus ruficollis*, *Ixobrychus minutus*, *Anas platyrhynchos*, *Aythya nyroca*, *A. ferina*, *Gallinula chloropus*, *Fulica atra*, *Locustella luscinioides*, species of *Acrocephalus* sp. *Vanellus vanellus* nesting on a grassy field near Șerca and Mofleni moors. The wagtails nest on the ground (in reed piles, in banks holes, etc.). Regarding the Yellow Wagtail, there is a preponderance of *Motacilla flava feldegg*. There have been reported *M. flava thunbergi*, *M. f. flava* și *M. f. flavissima* as well.

Nycticorax nycticorax nesting at the Craiovița Lake. In the year 2012, 3 pairs of herons bred in the willows from the little isle on the great lake. The adults carried sticks and willow branches in their beak (Fig. 2c). At the beginning of August I observed juveniles hidden in the rush-bed near the willows.

It is important to notice that in 2010 a pair of storks started to build a nest at the outskirts of Mofleni neighbourhood, near the bridge on the Jiu (Fig. 2b). The nest was built on a telegraph pole. After a long period of time, of about 10 years of observations, the White Stork found the proper conditions to nest at the outskirts of the city. In the year 2011, the pair of storks had 2 juveniles. In 2012 it reached the nest on the 30th of March and it had 3 juveniles. This year, in 2013, it arrived on the 29th of March. We keep monitoring this pair of storks in order to better record the biological and ecological aspects of this species.

In certain years, at Craiovița Lake and Mofleni Moor we have observed breeding activities of the black winged stilt: spectacular flights over the reed, loud sounds at the sight of unwanted guests, etc. However, we did not find the nest. Still, I consider that it is very likely for this bird to have bred there. Because of the fact that in the past years this species has been continuously observed in the aquatic habitats of the city it is necessary to continue monitoring it in order to find the exact nesting spot, to study the materials used for building it and to count the eggs. This should also be done for other bird species that have been constantly observed in all the seasons.

Data regarding the breeding of the aquatic species will be the subject of a future paper.

The changes in the lives of the birds are caused by two major factors: the climatic factors and the anthropogenic factors.

The influence of the anthropogenic factors on the studied habitats had the following negative consequences: the limitation of the park areas-consequence of the urbanistic management which intended to change the natural ecosystems (which had a poor economic potential) into anthropogenic ones (with a higher economic-potential); the noise of the daily activities, of the cars that pass near the studied ecosystems, the loud music, the recreational activities, the fishing – all elements that can cause changes in the biorhythm of these birds; the cutting of the reed in inappropriate periods (in some years this was done exactly in the nesting period); the fact that the reed caught fire from a cigarette thrown there; the domestic animals left by the locals to eat on the fields near the moors that destroy the nests built on the ground, etc.

In spite of all these we have observed that the birds have chosen to cohabit in the company of people. In time, the birds have managed to transform the anthropogenic disadvantages in advantages, thus managing to survive and adapt to the new life conditions. The abandonment of the rehabilitation plans of Craiovița Lake and Park had a beneficial consequence on the plant and animal species found here leading to an increase in their number. The bio-ecological conditions offered by the aquatic and semi-aquatic habitats in Craiova led to the cohabitations and nesting of many aquatic species in the same habitat. Most of them are found on Craiovița Lake, Mofleni and Șerca Moors, during spring, summer and autumn.

At national level, the aquatic birds are protected by numerous laws and ordinances, these being on the same direction with the ones given by the European Union. We mention only a few of them: Law no. 13/1993, Law no. 13/1998, Law no. 407/2006 and 197/2007, The Bird Directive 2009/47/EC.

11 of the aquatic species recorded in Craiova can be found in the Red Book of Vertebrates in Romania (MUNTEANU, 2005), as endangered species: 7 bird species are vulnerable (*Phalacrocorax pygmaeus*, *Nycticorax nycticorax*, *Ardeola ralloides*, *Ciconia ciconia*, *Aythya nyroca*, *Mergus albellus*, *Recurvirostra avosetta*) and 4 species are endangered (*Egretta garzetta*, *E. alba*, *Ardea purpurea*, *Himantopus himantopus*).

The majority of the aquatic bird species recorded in Craiova (35 species) have a favourable status of conservation, being secure (Spec 4 and Non Spec category) (Table 3). Out of these, 6 species can become vulnerable or endangered at any time, having a temporary status. Taking into consideration the European status of conservation (HAGEMEIJER et al., 1997), we have recorded the presence of 13 aquatic species in the city, species that have the following conservation status: 8 species are vulnerable: *Phalacrocorax pygmaeus*, *Ixobrychus minutus*, *Ardeola ralloides*, *Ardea purpurea*, *Ciconia ciconia*, *Anas querquedula*, *Aythya nyroca*, *Mergus albellus*; 4 species are in decline: *Nycticorax nycticorax*, *Chlidonias hybrida*, *C. niger*, *Alcedo atthis* and one species has a broad area of distribution: *Recurvirostra avosetta*.

Table 3. The threat and the protection status of the aquatic avifauna of Craiova.

No.	Species	Category Spec	Threat status		Protection status			
			Europe	Romania	Birds Directive	Law 13/ 1993	Law 13/ 1998	Law 407/2006
1.	<i>Tachybaptus ruficollis</i>	Non Spec	S	-		Annex II	-	Annex 2
2.	<i>Podiceps cristatus</i>	Non Spec	S	-		Annex III	-	A2
3.	<i>Podiceps nigricollis</i>	Non Spec	S	-		AII	-	A2
4.	<i>Phalacrocorax carbo</i>	Non Spec	S	-		AIII		Annex 1
5.	<i>Phalacrocorax pygmaeus</i>	Spec 2	V	V	Annex I	A II	AII	A2
6.	<i>Ixobrychus minutus</i>	Spec 3	(V)	-	A I	AII	AII	A2
7.	<i>Nycticorax nycticorax</i>	Spec 3	D	V	A I	AII	-	A2
8.	<i>Ardeola ralloides</i>	Spec 3	V	V	A I	AII	-	A2
9.	<i>Egretta garzetta</i>	Non Spec	S	V	A I	AII	-	A2
10.	<i>Egretta alba</i>	Non Spec	S	E	A I	AII	AII	A2
11.	<i>Ardea cinerea</i>	Non Spec	S	-		AIII	-	A2
12.	<i>Ardea purpurea</i>	Spec 3	V	E	A I	AII	AII	A2
13.	<i>Ciconia ciconia</i>	Spec 2	V	V	A I	AII	AII	A2
14.	<i>Cygnus olor</i>	Non Spec	S	-		AIII	AII	A2
15.	<i>Anas crecca</i>	Non Spec	S	-		AIII	AII	A1
16.	<i>Anas platyrhynchos</i>	Non Spec	S	-		AIII	AII	A1
17.	<i>Anas querquedula</i>	Spec 3	V	-		AIII	AII	A1
18.	<i>Anas clypeata</i>	Non Spec	S	-		AIII	AII	A1
19.	<i>Aythya ferina</i>	Spec 4	S	-		AIII	AII	A1
20.	<i>Aythya nyroca</i>	Non Spec	V	V	A I	AIII	AII	A2
21.	<i>Mergus albellus</i>	Non Spec	V	V	A I	AII	AII	A2
22.	<i>Circus aeruginosus</i>	Non Spec	S	-	A I	AII	AII	A2
23.	<i>Gallinula chloropus</i>	Non Spec	S	-		AIII	-	A1
24.	<i>Fulica atra</i>	Non Spec	S	-		AIII	-	A1
25.	<i>Himantopus himantopus</i>	Non Spec	S	E	A I	AII	AII	A2
26.	<i>Recurvirostra avosetta</i>	Non Spec	L*	V	A I	AII	AII	A2
27.	<i>Charadrius dubius</i>	Non Spec	(S)	-	-	AII	AII	A2
28.	<i>Vanellus vanellus</i>	Non Spec	(S)	-	-	AIII	AII	A2
29.	<i>Calidris minuta</i>	Non Spec	(S)	-	-	AII	AII	A2
30.	<i>Tringa ochropus</i>	Non Spec	(S)	-	-	AII	AII	A2
31.	<i>Larus ridibundus</i>	Non Spec	S	-	-	AIII	-	A2
32.	<i>Larus fuscus</i>	Spec 4	S	-	-	-	-	A2
33.	<i>Larus cachinnans</i>	Non Spec	S	-	-	-	-	A2
34.	<i>Chlidonias hybrida</i>	Spec 3	D	-	AI	AII	-	A2
35.	<i>Chlidonias niger</i>	Spec 3	D	-	AI	AII	AII	A2
36.	<i>Chlidonias leucopterus</i>	Spec 3	S	-		AII	AII	A2
37.	<i>Alcedo atthis</i>	Spec 3	D	-	AI	AII	-	A2
38.	<i>Motacilla flava</i>	Non Spec	S	-	-	AII	-	A2
39.	<i>Motacilla cinerea</i>	Non Spec	S	-	-	AII	-	A2
40.	<i>Motacilla alba</i>	Non Spec	S	-	-	AII	-	A2
41.	<i>Locustella luscinioides</i>	Spec 4	(S)	-	-	AII	-	A2
42.	<i>Acrocephalus schoenobaenus</i>	Spec 4	(S)	-	-	AII	-	A2
43.	<i>Acrocephalus palustris</i>	Non Spec	S	-	-	AIII	-	A2
44.	<i>Acrocephalus scirpaceus</i>	Spec 4	S	-	-	AII	-	A2
45.	<i>Acrocephalus arundinaceus</i>	Non Spec	S	-	-	AII	-	A2
46.	<i>Emberiza schoeniclus</i>	Non Spec	S	-	-	AII	-	A2

Legend: SPEC category: SPEC 1 – species of global conservation concern; SPEC 2 – unfavourable conservation status concentrated in Europa, SPEC 3 – unfavourable conservation status not concentrated in Europa, SPEC 4 – favourable conservation status concentrated in Europa, Non-SPEC – favourable conservation not concentrated in Europe. Threat status: S – secure, V – vulnerable, D – declining, E – endangered, L – localized, () – provisional status; Protection status: Birds Directive: AI/Annex I = species for which measures of habitat conservation must be taken in order to ensure the survival and reproduction in the area of distribution; Law 13/ 1993: AII/Annex II – species that are strictly protected; AIII/Annex III – protected species; AII/Annex II – migratory species with unfavorable conservation status, which need of protection; Law 407/ 2006: AI/Annex 1 – wild species that can be hunted; AII/Annex 2 – wild species that cannot be hunted.

As for maintaining and increasing the aquatic species diversity there is a strong need of actual measures and local implementation. For example: maintaining and protecting already existing parks, rehabilitation of Craiovița Lake and Mofleni moor, arranging an artificial moor with proper vegetation in Tineretului Park, resolving the problem of street dogs that destroy the nests on the ground, implementing measures of public ecological education regarding the protection of the birds in the city, etc.

CONCLUSIONS

The placement of the city on the left bank of the Jiu river and its generous anthropogenic habitat creates the most favourable life conditions for the aquatic birds, mostly in case of those with a high adapting potential. It offers food resources, shelter and nesting places for numerous aquatic birds. The area is situated on the migration route of some birds (ducks, storks, herons, caradriiforms).

The number of the species and of the individuals has fluctuated according to weather and food conditions, both seasonally and annually. The largest bird groups and number variations have been observed during the prevernal, serotinal and autumnal seasons. The majority of the identified species are migratory (41 sp.), most of them not being strictly enclosed in a certain phenological category.

We have identified some scarce species in the aquatic habitats: *Podiceps nigricollis*, *Ardea purpurea*, *Recurvirostra avosetta*, *Mergus albellus*.

Out of the summer visitors species with a constant presence we mention: *Tachybaptus ruficollis*, *Ixobrychus minutus*, *Nycticorax nycticorax*, *Egretta garzetta*, *Ardea cinerea*, *Aythya ferina*, *A. nyroca*, *Circus aeruginosus*, *Vanellus vanellus*, *Chlidonias hybridus*, *Motacilla alba*, *M. flava*, *Acrocephalus schoenobaenus*, *A. scirpaceus*, *A. arundinaceus*.

With only a few exceptions, the majority of the aquatic and semi-aquatic species recorded in Craiova are protected by the Romanian laws. Looking at the threat categories on the national level, we have identified 3 endangered species (*Egretta alba*, *Ardea purpurea*, *Himantopus himantopus*) and 8 vulnerable species (*Egretta garzetta*, *Phalacrocorax pygmaeus*, *Nycticorax nycticorax*, *Ardeola ralloides*, *Ciconia ciconia*, *Aythya nyroca*, *Mergus albellus*, *Recurvirostra avosetta*), of which three are declared Monuments of Nature: *Egretta alba*, *E. garzetta*, *Himantopus himantopus*.

In order to maintain the avifaunistic component in the area and to protect the birds, a firm implication of the authorities is required to elaborate a complex and clear set of measures, all with the purpose of minimizing the negative impact of people on the birds in the parks. Only by informing the public opinion and by showing how importance is the anthropogenic ecosystems we can fulfill our purpose, that of conserving biological diversity and life in big cities.

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Table 2. The spatial distribution, the phenology and some observations regarding the aquatic avifauna of the city of Craiova.

No.	Species	Studied habitats				Phenological category	Observations
		Craiovița Lake	Tineretului Park	Botanical Garden	Romanescu Park		
1.	<i>Tachybaptus ruficollis</i>	*	*	*	*	SV, RWR, N	in the past years - rare
2.	<i>Podiceps cristatus</i>	*	*	*	*	P, SV, PN	not constantly observed
3.	<i>Podiceps nigricollis</i>					WV	rare
4.	<i>Phalacrocorax carbo</i>					P, WR	rare
5.	<i>Phalacrocorax pygmaeus</i>	*	*	*	*	P, WR	not constantly observed
6.	<i>Ixobrychus minutus</i>	*	*	*	*	SV, N	constant
7.	<i>Nycticorax nycticorax</i>	*	*	*	*	SV, N	constant
8.	<i>Ardeola ralloides</i>	*	*	*	*	P	rare
9.	<i>Egretta garzetta</i>	*	*	*	*	SV, PN	constant
10.	<i>Egretta alba</i>	*	*	*	*	P, WR	2,4-14 ex
11.	<i>Ardea cinerea</i>	*	*	*	*	SV, WR	frequent, with a small number of specimens
12.	<i>Ardea purpurea</i>	*	*	*	*	P	very scarce, observed in 2009, 2011, 2012
13.	<i>Ciconia ciconia</i>	*	*	*	*	P	nesting the third consecutive year
14.	<i>Cygnus olor</i>	*	*	*	*	P, SV, N	5-14 specimens
15.	<i>Anas crecca</i>	*	*	*	*	P, WR	frequent
16.	<i>Anas platyrhynchos</i>	*	*	*	*	WV, P	common
17.	<i>Anas querquedula</i>	*	*	*	*	MP, N	not constantly observed
18.	<i>Anas clypeata</i>	*	*	*	*	P	not constantly observed
19.	<i>Aythya ferina</i>	*	*	*	*	SV, P, N	not constantly observed
20.	<i>Aythya nyroca</i>	*	*	*	*	SV, N	frequent
21.	<i>Mergus albellus</i>	*	*	*	*	WV	rare
22.	<i>Circus aeruginosus</i>	*	*	*	*	SV, PN	frequent
23.	<i>Gallinula chloropus</i>	*	*	*	*	MP, N	common
24.	<i>Fulica atra</i>	*	*	*	*	MP, N	common
25.	<i>Himantopus himantopus</i>	*	*	*	*	SV, PN	frequent
26.	<i>Recurvirostra avosetta</i>	*	*	*	*	P, OV-P	rare
27.	<i>Charadrius dubius</i>	*	*	*	*	P	not constantly observed
28.	<i>Vanellus vanellus</i>	*	*	*	*	SV, N	frequent
29.	<i>Calidris minuta</i>	*	*	*	*	P	infrequent appearances
30.	<i>Tringa ochropus</i>	*	*	*	*	P, WR	constant appearance in the last five years
31.	<i>Larus ridibundus</i>	*	*	*	*	R	constantly observed
32.	<i>Larus fuscus</i>	*	*	*	*	P-WV	rare
33.	<i>Larus cachinnans</i>	*	*	*	*	R	constantly observed
34.	<i>Chlidonias hybrida</i>	*	*	*	*	SV, N	frequent
35.	<i>Chlidonias niger</i>	*	*	*	*	P	rare
36.	<i>Chlidonias leucopterus</i>	*	*	*	*	P	rare
37.	<i>Alcedo atthis</i>	*	*	*	*	WV	only in cold winters
38.	<i>Motacilla flava</i>	*	*	*	*	SV, N	common
39.	<i>Motacilla cinerea</i>	*	*	*	*	WV	frequent
40.	<i>Motacilla alba</i>	*	*	*	*	SV, N	common
41.	<i>Locustella luscinioides</i>	*	*	*	*	SV, PC	regularly appears
42.	<i>Acrocephalus schoenobaenus</i>	*	*	*	*	SV, N	frequent

43.	<i>Acrocephalus palustris</i>	*	*			V, VI, VII, VIII, IX	SV, PC	regularly appears
44.	<i>Acrocephalus scirpaceus</i>	*	*			IV-X	SV, N	frequent
45.	<i>Acrocephalus arundinaceus</i>	*	*	*		IV - X	SV, N	common
46.	<i>Emberiza schoeniclus</i>	*	*			XII, I, II	WV	rare

Legend: I.....XII – the months of the year; Phenological type: R – resident; MP – migratory partly; SV– summer visitor; WV– winter visitor; RWV – rarely winter visitors; N – nesting; PN – possible nesting.



a.



b.



c.

Figure 2. The aquatic species nesting in Craiova: a. *Ixobrychus minutus* – Botanical Garden, The 18th of July 2011; b. *Ciconia ciconia* – Mofleni District, The 29th of March 2012; c. *Nycticorax nycticorax* – Craiovița Lake, The 31st of May 2012. (Original photographs).