

**THE DIVERSITY AND DYNAMICS OF THE ORNITHOFAUNA  
IN CRAIOVA MUNICIPALITY**

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**ABSTRACT**

*The paper presents new information on the birds of Craiova. These were monitored in the period 2016-2020 in different anthropogenic habitats: green spaces (parks and gardens, squares, etc.) and wetlands (lakes and ponds, streams, marshes, etc.). The large number of highlighted bird species (125 species) demonstrates their diversity in the city. Particularly, we have noticed the species that are listed in different Annexes to international legislation (Birds Directive EC / 2009 – Annex 1) as they require special conservation measures: *Aythya nyroca*, *Mergellus albellus*, *Microcarbo pygmaeus*, *Himantopus himantopus*, *Recurvirostra avosetta*, *Calidris (Philomachus) pugnax*, *Chlidonias hybrida*, *C. niger*, *Ciconia ciconia*, *Ixobrychus minutus*, *Ardea purpurea*, *A. alba*, *Egretta garzetta*, *Nycticorax nycticorax*, *Ardeola ralloides*, *Pernis apivorus*, *Circus aeruginosus*, *Accipiter brevipes*, *Alcedo atthis*, *Coracias garrulus*, *Dendrocopos syriacus*, *Dendrocopos (Dendrocopos) medius*, *Lanius collurio*, *L. minor*, *Ficedula parva*, *F. albicollis*.*

**INTRODUCTION**

Birds have a significant share in the anthropogenic ecosystems, as they find here favorable resting, feeding and breeding sites. Over time, birds have adapted very well to the existing anthropogenic conditions, being important components of the urban ecosystem. In our country, the interest for urban birds is materialized through numerous papers, covering various aspects of diversity and annual phenological succession, as well as biological, ecological and behavioral aspects (Coroiu & Radulovici 2002; Gache 2004, 2007, 2015; Giurgincă 1997; Glăvan & Toader 2001; Ion & Valenciu 1982; Ion & Gache 1997; Ion & Ion 1998; Laiu & Pașol 2001; Munteanu 1998, Papadopol & Petrescu 1990; Ridiche & Munteanu 2015; Stănescu 1971; Toncean 1997, etc.).

Craiova Municipality is located in the southwest of Romania (Fig. 1) having the following geographical coordinates: 44°20'N and 23°49'E. It is located on the left bank of the Jiu River, at an altitude between 75 and 116 m. Craiova is a plain town, located in Oltenia Plain (part of the Romanian Plain). The coordinates of the city includes it in the area of temperate continental climate with sub-Mediterranean influences.

Bird monitoring took place in different anthropogenic habitats: green spaces (parks and gardens, squares, etc.) and wetlands (lakes, ponds, streams, marshes,

etc.), different neighborhoods of the city (Rovine, Brazda lui Novac, Romanești, Craiovița, Mofleni, etc.).

The present study aimed at updating the ornithological database, particularly the one referring to the ornithofauna in the urban area of Craiova (initiated in 2000), by including new observations resulting from the research conducted between 2016 and 2020. We also added the observations regarding the dynamics of the species during all the ecological seasons of an annual biological cycle.

## MATERIAL AND METHODS

In the inventory of species, classical specialized methods were taken into consideration. Observations from fixed points or from movement along some routes were made with optical devices (binoculars, photo and video cameras). The trips were made monthly, covering all ecological seasons (hiemal, prevernal, vernal, aestival, serotinal, autumnal). The exception is the year 2020, when observations were made quarterly. This was because of the restrictions imposed by the authorities due to the emergence of Sars-CoV-2 virus and the pandemic caused by it.



Figure 1. A. Map of Craiova Municipality with the main studied areas. (<https://www.google.com/maps/search/harta+craiovei/@44.3202439,23.7388883,12z/data=!3m1!4b1>). B. Location of the city within the country. (processed map)

Most trips were made in the morning (between 8 a.m. and 2 p.m. in summer, between 10 a.m. and 1 p.m. in winter) and less often in the afternoon (5-8 p.m.). The main observation points were: Romanescu Park, the Youth Park, the Botanical Garden, Craiovița Lake, Tanchiștilor Lake, Doctor's Inn Park (Ciobotea et al. 1999), Șerca Marsh, Mofleni Marsh, the Jiu Meadow – Craiova area (Fig. 1). There were also taken into account several neighborhoods of Craiova, with blocks of flats and green spaces between them, certain private houses and gardens, the railway station

area, vacant lots, squares, etc. The periurban area was less researched (Banu Mărăcine area, the Fetii Valley, etc.). Bird identification and field data processing were supplemented with laboratory studies, using literature in the field (Croitoru 2009; Delin & Svensson 2016; Ferenc et al. 2017; Munteanu 2005, 2012; Radu 1984; Sârbu et al. 2014; Stănescu & Pârvulescu 2008; Tâlpeanu 1969; \*\*\*, 2015; etc.). The systematic list of birds was drawn up in accordance with Avibase (<https://avibase.bsc-eoc.org/checklist.jsp?region=RO>), taking into account the new changes. In addition to the systematic list, we also present the phenology of the species identified in the city, the period when they were observed, the area where they nested.

## RESULTS AND DISCUSSIONS

Between 2016 and 2020, there were monitored 125 bird species belonging to 18 orders and 44 families (Table 1). With regard to dynamics, we specify that a relatively constant number of species are present in the vernal and aestival seasons; in these phenological seasons, nesting species predominate. The number of species in Craiova increases significantly in the prevernal (93 sp.), serotinal (87 sp.) and autumnal (89 sp.) seasons, which overlap the two periods of migration in the annual biological cycle of birds. This confirms that the city is located on the migratory route of birds moving along the Jiu corridor (Popescu 1974; Munteanu & Mătieș 2011, Ridiche & Sándor 2016). The fewest species were recorded in the hiemal season (60 sp.).

From a phenological point of view, the group of migratory birds predominates in the city (summer visitors – 47 sp., winter visitors – 21 sp., passage visitors – 28 sp.), compared to the group of sedentary and partially migratory birds (29 sp.). In many species we have highlighted a double status in terms of phenology: both as summer or winter and passage visitors. In some years, some species that were passage or winter visitors first, later became summer visitors, remaining to nest in their favorable habitats (the great crested grebe, the song thrush, the common chaffinch, etc.). Other species were constantly seen in all seasons of the year, without nesting in the city: *Phalacrocorax carbo* (in greater numbers in passage and during the cold seasons), *Ardea cinerea*, *Buteo buteo*, etc. The varied phenological status (and/or double status) shows that the birds are in a continuous dynamic, depending on the quality of the habitats and the climatic factors. Rare species (*Mergellus albellus*, *Recurvirostra avosetta*, *Merops apiaster*, *Anthus spinoletta* etc) have also been observed.

In the existing habitats of the city, a number of 68 species found favorable conditions for nesting. We mention other 4 probably nesting species (Table 1). With the exception of the sedentary and partially migratory species, during the five years of monitoring, the constantly nesting summer visitors are: *Aythya nyroca*, *Tachybaptus ruficollis*, *Ciconia ciconia*, *Ixobrychus minutus*, *Egretta garzetta*, *Nycticorax nycticorax*, *Vanellus vanellus*, *Chlidonias hybrida*, *Cuculus canorus*, *Apus apus*, *Coracias garrulus*, *Falco tinnunculus*, *Lanius collurio*, *Hirundo rustica*, *Delichon urbicum*, *Acrocephalus arundinaceus*, *A.scirpaceus*, *Sylvia atricapilla*, *Curruca communis*, *Muscicapa striata*, *Luscinia megarhynchos*, *Motacilla alba*, *M. flava*. The nesting place of the species (Bălescu 2013, 2016; Bălescu & Ștefănescu 2017) is chosen so as to ensure the survival of the chicks.

Table 1

## Systematic list of bird species from Craiova during 2016-2020

No.	Taxonomy	Observation periods (Months of the year)	Phenology Craiova	Place of the Breeding (estimated number of nesting pairs in aquatic species)
	<b>1.Order Anseriformes</b> <b>1.Family Anatidae</b>			
1.	<i>Cygnus olor</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	PM	Șerca Marshes, Botanical Garden, Tanchiștilor Lake (in each location a pair)
2.	<i>Spatula querquedula</i>	IV	P	
3.	<i>Spatula clypeata</i>	III, IV, V	P	
4.	<i>Anas platyrhynchos</i>	I – XII	S	Craiovița Lake, Botanical Garden, Romanescu Park, Youth Park, Mofleni & Șerca Marshes (2-16p)
5.	<i>Anas crecca</i>	XI, XII, I, II, III	WV	
6.	<i>Aythya ferina</i>	III, IV, V, VI, VII, VIII, IX, X, XI,	SV, P	Craiovița Lake, Șerca & Mofleni Marshes (2-3p)
7.	<i>Aythya nyroca</i>	II – XI	SV	Craiovița Lake, Șerca & Mofleni Marshes (2-5p)
8.	<i>Mergellus albellus</i>	I	WV	
	<b>2.Order Galliformes</b> <b>2.Family Phasianidae</b>			
9.	<i>Phasianus colchicus</i>	I – XII	S	Periurban area
	<b>3.Order Podicipediformes</b> <b>3.Family Podicipedidae</b>			
10.	<i>Tachybaptus ruficollis</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	SV, WV	Craiovița Lake, Șerca & Mofleni Marshes (2-9p)
11.	<i>Podiceps cristatus</i>	IV, V, V, VII, VII, IX, X	P, SV	Mofleni Marsh, Craiovița Lake; 2017, 2018 (in each location a pair)
12.	<i>Podiceps nigricollis</i>	I, II	WV	
	<b>4.Order Columbiformes</b> <b>4.Family Columbidae</b>			
13.	<i>Columba livia domestica</i>	I – XII	S	Neighborhoods, parks
14.	<i>Columba palumbus</i>	I – XII	S	Romanescu Park, Youth Park, Doctor's Inn Park, Tanchiștilor Lake, Botanical Garden
15.	<i>Streptopelia decaocto</i>	I – XII	S	Neighborhoods, parks
	<b>5.Order Cuculiformes</b>			

	<b>5.Family Cuculidae</b>			
16.	<i>Cuculus canorus</i>	IV – VIII	SV	Craiovița Lake, Mofleni & Șerca Marshes
	<b>6.Order Apodiformes</b> <b>6.Family Apodidae</b>			
17.	<i>Apus apus</i>	V – VIII	SV	Rovine neighborhood –Military unit
	<b>7.Order Gruiformes</b> <b>7.Family Rallidae</b>			
18.	<i>Gallinula chloropus</i>	I – XII	S	Craiovița Lake, Șerca & Mofleni Marshes, Youth Park, Romanescu Park, Botanical Garden (2-12p)
19.	<i>Fulica atra</i>	I – XII	S	Craiovița Lake, Șerca & Mofleni Marshes, Youth Park, Romanescu Park, Tanchiștilor Lake, Doctor's Inn Park (1-15p)
	<b>8.Order Charadriiformes</b> <b>8.Family Recurvirostridae</b>			
20.	<i>Himantopus himantopus</i>	IV – IX	SV	Craiovița Lake, Șerca Marshes (1-2p)
21.	<i>Recurvirostra avosetta</i>	V	P	
	<b>9.Family Charadriidae</b>			
22.	<i>Vanellus vanellus</i>	IV – IX	SV	The land in the Șerca marshes area (6-10p)
23.	<i>Charadrius dubius</i>	VIII	P	
	<b>10.Family Scolopacidae</b>			
24.	<i>Calidris minuta</i>	VII, VIII	P	
25.	<i>Calidris (Philomachus) pugnax</i>	V	P	
26.	<i>Tringa ochropus</i>	IX, X, XII, I, II, III	WV, P	
	<b>11.Family Laridae</b>			
27.	<i>Chroicocephalus ridibundus</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	SV, WV	B? The Jiu area (2019)
28.	<i>Larus cachinnans</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	SV, WV	The Jiu area (2020)
29.	<i>Larus fuscus</i>	XII, I, II	WV, P	
30.	<i>Chlidonias niger</i>	V	P	
31.	<i>Chlidonias leucopterus</i>	VII, VIII	P	
32.	<i>Chlidonias hybrida</i>	IV – IX	SV	Craiovița Lake, Mofleni & Șerca (2-15p)

	<b>9.Order Ciconiiformes 12.Family Ciconiidae</b>			
33.	<i>Ciconia ciconia</i>	III – VIII	SV	Mofleni Neighborhood (2p)
	<b>10.Order Suliformes 13.Family Phalacrocoracidae</b>			
34.	<i>Microcarbo pygmaeus</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII		Craiovița Lake; The Jiu Meadow (10-25p)
35.	<i>Phalacrocorax carbo</i>	I, II, III, IV, V, VII, VIII, IX, X, XI, XII	SV, WR	
	<b>11.Order Pelecaniformes 14.Family Ardeidae</b>			
36.	<i>Ixobrychus minutus</i>	V, VI, VII, VIII, IX	SV	Șerca & Mofleni Marshes, Craiovița Lake (2-9p)
37.	<i>Ardea cinerea</i>	I, II, III, IV, V, VII, VIII, IX, X, XI, XII	SV, WV	
38.	<i>Ardea purpurea</i>	VIII, IX	P	
39.	<i>Ardea alba</i>	X – II	WV	
40.	<i>Egretta garzetta</i>	IV – X	SV	Craiovița Lake, Șerca & Mofleni Marshes, The Jiu Meadow (3-12p)
41.	<i>Ardeola ralloides</i>	V – IX	SV	Șerca Marshes (1-3p)
42.	<i>Nycticorax nycticorax</i>	IV – X	SV	Craiovița Lake, Șerca & Mofleni Marshes, The Jiu Meadow (4-20p)
	<b>12.Order Accipitriformes 15.Family Accipitridae</b>			
43.	<i>Pernis apivorus</i>	VII, VIII	P	
44.	<i>Circus aeruginosus</i>	III, IV, V, VI, VII, VIII, IX, X	SV	B? Șerca Marshes (2017)
45.	<i>Accipiter brevipes</i>	IV, V, VI, VII, VIII, IX	SV	Romanescu Park
46.	<i>Accipiter gentilis</i>	XI, X, XI, II, III	WR, P	
47.	<i>Buteo buteo</i>	II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	SV, WV	
	<b>13.Order Strigiformes 16.Family Strigidae</b>			
48.	<i>Athene noctua</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XII, XII	S	Romanescu Park, Youth Park, different cemeteries: Ungureni, Sineasca; different neighborhoods

	<b>14.Order Bucerotiformes 17.Family Upupidae</b>			
49.	<i>Upupa epops</i>	IV, V, VI, VII, VIII	P, SV	Periurban area (2019, 2020)
	<b>15.Order Coraciiformes 18.Family Alcedinidae</b>			
50.	<i>Alcedo atthis</i>	X, XI, XII, I, II	WV	
	<b>19.Family Meropidae</b>			
51.	<i>Merops apiaster</i>	V (2020)	P	
	<b>20.Family Coraciidae</b>			
52.	<i>Coracias garrulus</i>	V – VIII	SV	Romanescu Park, Youth Park
	<b>16.Order Piciformes 21.Family Picidae</b>			
53.	<i>Dendrocytes medius</i> ( <i>Dendrocopos medius</i> )	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	S	Romanescu Park, Youth Park
54.	<i>Dendrocopos major</i>	I – XII	S	different neighborhoods, city parks,
55.	<i>Dendrocopos syriacus</i>	I – XII	S	city parks, different neighborhoods
56.	<i>Dryobates minor</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	S	Youth Park, Doctor's Inn Park,
57.	<i>Picus viridis</i>	I – XII	S	city parks, different neighborhoods
	<b>17.Order Falconiformes 22.Family Falconidae</b>			
58.	<i>Falco tinnunculus</i>	III, IV, V, VI, VII, VIII, IX, XI	SV	Romanescu Park, Tanchiștilor Lake, Brazda lui Novac neighborhood
59.	<i>Falco subbuteo</i>	IV, V, VI, VII, VIII, IX	SV	Tanchiștilor Lake, Youth Park, Romanescu Park
	<b>18.Order Passeriformes 23.Family Oriolidae</b>			
60.	<i>Oriolus oriolus</i>	V, VI, VII, VIII, IX	P, SV	Tanchiștilor area
	<b>24.Family Laniidae</b>			
61.	<i>Lanius collurio</i>	V – X	SV	shrubs in the area of Șerca & Mofleni Marshes Romanescu Park, periurban area
62.	<i>Lanius minor</i>	IV, V	P	

	<b>25. Family Corvidae</b>			
63.	<i>Pica pica</i>	I – XII	S	different neighborhoods, city parks
64.	<i>Garrulus glandarius</i>	I – XII	S	Romanescu Park, Youth Park
65.	<i>Corvus monedula</i>	I – XII	S	city parks, different neighborhoods
66.	<i>Corvus frugilegus</i>	I – XII	S	city parks, different neighborhoods
67.	<i>Corvus cornix</i>	I – XII	S	city parks, different neighborhoods
	<b>26. Family Paridae</b>			
68.	<i>Poecile palustris</i>	IX, X	P	
69.	<i>Cyanistes caeruleus</i>	I – XII	S	Romanescu Park, Youth Park
70.	<i>Parus major</i>	I – XII	S	city parks, different neighborhoods
	<b>27. Family Alaudidae</b>			
71.	<i>Galerida cristata</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	S	periurban area
	<b>28. Family Acrocephalidae</b>			
72.	<i>Iduna pallida</i>	IV, VIII, IX	P	
73.	<i>Hippolais icterina</i>	VIII, IX	P	
74.	<i>Acrocephalus schoenobaenus</i>	IV, V, VI, VII, VIII, IX, X	SV, P	Șerca & Mofleni Marshes
75.	<i>Acrocephalus palustris</i>	IV, V, VI, VII, VIII, IX	SV, P	Șerca Marsh
76.	<i>Acrocephalus scirpaceus</i>	IV, V, VI, VII, VIII, IX	SV	Craiovița Lake, Tanchiștilor Lake, Șerca & Mofleni Marshes
77.	<i>Acrocephalus arundinaceus</i>	IV, V, VI, VII, VIII, IX, X	SV	Craiovița Lake, Youth Park, Șerca & Mofleni Marshes, Tanchiștilor Lake
	<b>29. Family Locustellidae</b>			
78.	<i>Locustella luscinioides</i>	IV, V, VI, VII, VIII, IX	SV, P	B? Mofleni Marsh
	<b>30. Family Hirundinidae</b>			
79.	<i>Hirundo rustica</i>	IV – IX	SV	different neighborhoods
80.	<i>Delichon urbicum</i>	IV – IX	SV	different neighborhoods
	<b>31. Family Phylloscopidae</b>			
81.	<i>Phylloscopus sibilatrix</i>	IV, VIII, IX	P	
82.	<i>Phylloscopus trochilus</i>	IV, VIII, IX, X	P	
83.	<i>Phylloscopus collybita</i>	III, IV, V, VII, VIII, IX, X	P, SV	



	<b>32.Family Aegithalidae</b>			
84.	<i>Aegithalos caudatus</i>	X, XI	P	
	<b>33.Family Sylviidae</b>			
85.	<i>Sylvia atricapilla</i>	IV, V, VI, VII, VIII	SV	Romanescu Park, Youth Park, Doctor's Inn Park, Botanical Garden
86.	<i>Sylvia borin</i>	IV, V, VII, VIII, IX	P, SV	B? The Jiu area
87.	<i>Curruca curruca</i>	III, IV, V, VI, VII, VIII, IX	SV	Romanescu Park, the Jiu Meadow
88.	<i>Curruca communis</i>	III, IV, V, VI, VII, VIII, IX, X	SV	Romanescu Park, the Jiu Meadow, Șerca & Mofleni area
	<b>34.Family Regulidae</b>			
89	<i>Regulus regulus</i>	II, III	P	
	<b>35.Family Sittidae</b>			
90.	<i>Sitta europaea</i>	I – XII	S	Romanescu Park, Youth Park
	<b>36.Family Certhiidae</b>			
91.	<i>Certhia familiaris</i>	I, II, XII	WV, P	
	<b>37.Family Troglodytidae</b>			
92.	<i>Troglodytes troglodytes</i>	X – III	WV	
	<b>38.Family Sturnidae</b>			
93.	<i>Sturnus vulgaris</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	PM	city parks, different neighborhoods
	<b>39.Family Turdidae</b>			
94.	<i>Turdus merula</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	PM	Botanical Garden, Doctor's Inn Park, the Jiu Meadow, periurban area
95.	<i>Turdus viscivorus</i>	I, II, III, X, XI	WV, P	
96.	<i>Turdus philomelos</i>	III, IV, V, VII, VIII, IX	P, SV	Doctor's Inn Park (2017), Shrubby area near the Șerca Brook (2019)
97.	<i>Turdus iliacus</i>	XII, I, II, III	WV, P	
98.	<i>Turdus pilaris</i>	XII, I, II	WV	
	<b>40.Family Muscicapidae</b>			
99.	<i>Muscicapa striata</i>	IV – X	SV	Romanescu Park, Botanical Garden, Doctor's Inn Park
100.	<i>Erithacus rubecula</i>	X – IV	WV	
101.	<i>Luscinia megarhynchos</i>	IV – VIII	SV	Romanescu Park, Botanical Garden, the Jiu Meadow
102.	<i>Ficedula parva</i>	VIII, IX	P	
103.	<i>Ficedula hypoleuca</i>	IV, V, VIII, IX	P	
104.	<i>Ficedula albicollis</i>	IV, V, VIII, IX	P	
105.	<i>Phoenicurus phoenicurus</i>	IX, X	P	

106.	<i>Phoenicurus ochruros</i>	II, III, IV, V, VI, VII, VIII, IX, X, XI	SV	different neighborhoods, in the area of abandoned construction
107.	<i>Saxicola rubetra</i>	IX, X	P	
108.	<i>Saxicola torquatus</i>	IX, X	P	
	<b>41.Family Passeridae</b>			
109.	<i>Passer domesticus</i>	I – XII	S	neighborhoods, parks
110.	<i>Passer montanus</i>	I – XII	S	neighborhoods, parks
	<b>42.Family Motacillidae</b>			
111.	<i>Motacilla cinerea</i>	X, XI, XII, I, II, III	WV	
112.	<i>Motacilla flava</i>	IV – X	SV	Șerca and Mofleni Marshes
113.	<i>Motacilla alba</i>	III – X	SV	Romanescu Park, Youth Park, Doctor's Inn Park
114.	<i>Anthus trivialis</i>	VIII, IX	P	
115.	<i>Anthus spinoletta</i>	X	P	
	<b>43.Family Fringillidae</b>			
116.	<i>Fringilla coelebs</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	SV, WV	Youth Park, Doctor's Inn Park
117.	<i>Fringilla montifringilla</i>	XII, I, II, III	WV, P	
118.	<i>Coccothraustes coccothraustes</i>	X, XI, XII, I, II, III, IV	WV, P	
119.	<i>Pyrrhula pyrrhula</i>	XII, I, II, III	WV	
120.	<i>Chloris chloris</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	S	Romanescu Park, different neighborhood: Craiovița, Brazdă
121.	<i>Carduelis carduelis</i>	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII	S	periurban area
122.	<i>Spinus spinus</i>	I, II	WV, P	
	<b>44.Family Emberizidae</b>			
123.	<i>Emberiza calandra</i>	II, III, IV, V, VII, VIII, IX, X, XI	SV, P	
124.	<i>Emberiza citrinella</i>	XII, I, II, III	WV, P	
125.	<i>Emberiza schoeniclus</i>	XII – III	WV	

#### Legend

Months of the year: I – January, II – February, III – March, IV – April, V – May, VI – June, VII – July, VIII – August, IX – September, X – October, XI – November, XII – December; Phenological type: S – sedentary species; PM – partially migratory species, P – passage visitors; SV – summer visitors, WV – winter visitors. Place of the Breeding: p – nesting pairs; in aquatic species (without reed species); B? – possible breeding.

In all monitored locations, there were annual changes in the number of species and individuals, in the number of nesting pairs (Bălescu 2000-2008, 2013, 2016, 2017), changes determined by the living conditions.

Thus, if in 2016 and 2017, the monitoring of the pairs of common house martin (*Delichon urbicum*) nesting in the railway station area allowed the identification of 52 - 55 pairs that occupied arranged nests in the perimeter of the platforms, starting with 2018, there was a reduction in the number of nesting pairs, and in 2020, we counted only 31 pairs. These findings were also reported in the case of other species such as: the crested lark, the Eurasian nuthatch, etc. (Bălescu et Ștefănescu, 2017), the common swift - nesting at the Military Unit from the Rovine neighborhood, etc. Until 2019, on the territory of Craiova, there was only one stork nest (*Ciconia ciconia*); later, I noticed two other nests in the same neighborhood, Mofleni (in the proximity of the city landfill), away from the first nest. According to our observations, one nest was not occupied (it may have been abandoned during construction), but for the second nest we recorded 2 chicks in 2019, respectively 3 chicks in 2020. Since 2018, we have confirmed the nesting of *Fringilla coelebs* in the city parks. *Turdus philomelos* nested in 2017 in the Doctor's Inn Park and, in 2019, in the bush area near the Șerca Brook, etc. Since 2017, along with *Egretta garzetta* and *Nycticorax nycticorax*, we also observed pygmy cormorant chicks in the nests placed in the willows near the big lake - Craiovița Lake area, as well as within the Jiu Meadow. From a numerical point of view, this mixed colony of birds from Lake Craiovița had a positive evolution until 2019, when we identified about 12 nests of *Egretta garzetta*, about 20 nests of *Nycticorax nycticorax* and about 25 nests of *Microcarbo pygmaeus*. In the autumn of 2020, Lake Craiovița underwent a process of radical transformation. The large lake, which was a wetland, became an area for real estate development and this had negative consequences for the nesting of bird species, especially aquatic ones. Lake Craiovița was an excellent refuge for their reproduction.

The greatest specific diversity was highlighted in Romanescu Park (84 species), followed by the Youth Park (82 species) and Craiovița Lake with its surroundings (78 species). The fewest species were highlighted in the area of buildings with related green spaces, houses and gardens of locals (34 species) (Fig. 2). We consider that the presence of birds in an area of the city is influenced both by the size of the studied perimeter, but especially by the diversity of habitats and ecological niches offered by it.

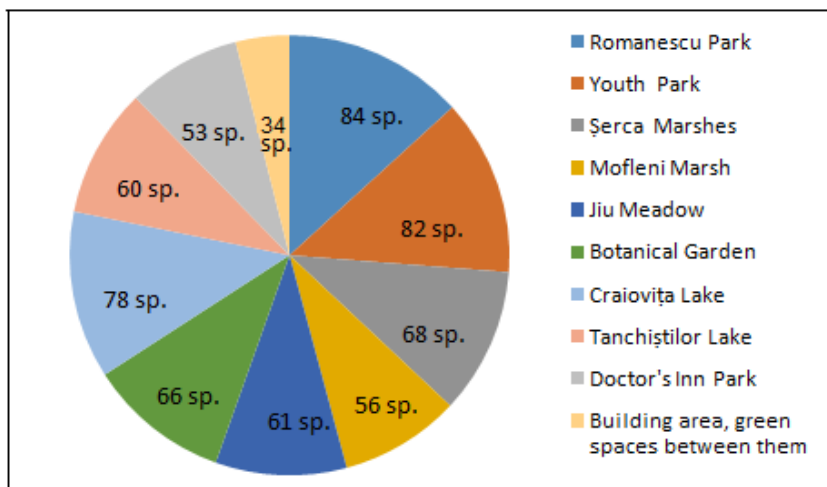


Figure 2. Distribution of species in the analysed areas

We mention the constant presence and nesting of some aquatic species such as: the mallard (*Anas platyrhynchos*), the Eurasian coot (*Fulica atra*), the common moorhen (*Gallinula chloropus*) and the mute swan (*Cygnus olor*) in the main parks of the city. They have adapted very well to the existing conditions. We notice the multiplication of the common wood pigeon (*Columba palumbus*), an aspect underlined by other authors (Gache, 2020) who emphasize the increase of its nesting population to the detriment of Eurasian collared dove (*Streptopelia decaocto*).

As birds got accustomed with anthropogenic factors, they adopted certain atypical behaviors, such as searching for food and consuming household waste, unhindered behavior near people (nesting in public areas), change of the intensity of the song according to the noise level of the area, etc., aspects mentioned by other authors in studies conducted in green urban and periurban perimeters (Croitoru 2009).

Regarding the presence of birds in the study areas, I noticed the following aspect. Some species appear in large numbers and nest in several locations in some years, while other species were present in smaller numbers. In the following years, we registered a reversed representation situation of these species on the territory of Craiova.

The anthropogenic impact on birds takes on different aspects depending on the type of human activity, which can favor or disturb the development of the annual biological cycle of birds.

On the territory of Craiova, there were identified 13 species with conservative value that need protection at national level, being included in the Red Book of Vertebrates from Romania (Munteanu, 2005). Nine species are vulnerable: *Aythya nyroca*, *Microcarbo pygmaeus*, *Nycticorax nycticorax*, *Ardeola ralloides*, *Ciconia ciconia*, *Accipiter brevipes*, *Upupa epops* (they are summer visitors and nesting species), *Mergellus albellus* (winter visitor species), *Recurvirostra avosetta* (passage species). Four species are endangered: *Himantopus himantopus* and *Egretta garzetta*– summer visitors and nesting species, *Ardea alba*– winter visitor species, all three considered *Natural Monuments*, *Ardea purpurea*– passage species.

## CONCLUSIONS

The variety of anthropogenic habitats, the existing trophic resource, and the climatic variations are the factors that influence the diversity and dynamics of the bird species.

The most representative phenological group of birds is represented by the group of summer visitors. The significant increase of bird species during migration periods (spring and autumn) confirms that the city is located on the migration route of birds moving along the Jiu corridor.

We notice the presence of some species whose nesting is less common in the urban perimeter of Craiova, such as *Ciconia ciconia* or *Cygnus olor*. We also mention the decrease of the breeding populations of some species such as the common house martin (*Delichon urbicum*), the common swift (*Apus apus*), respectively, the positive evolution of some species, namely the common wood pigeon (*Columba palumbus*). The mixed colony formed by *Egretta garzetta*, *Nycticorax nycticorax*, *Microcarbo pygmaeus*, species of great faunal value, was characteristic for Craiovița Lake.

The adaptation of birds in the urban space have begun a long time ago and continues, bringing unpredictable changes in their behavior.

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