

QUALITATIVE AND QUANTITATIVE ANALYSIS OF THE AVIFAUNA WITHIN THE AREA OF INTERNATIONAL AIRPORT CRAIOVA, ROMANIA

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Abstract. The study renders the results of the ornithological research achieved in 2014-2015 within the perimeter and the proximity of International Airport Craiova (I. A. C.) on a range of 3 km, thus covering all the ecological aspects of the year. The list resulted after the research includes 58 bird species belonging to 13 systematic orders. Forest and shrub species are predominant (37). From the phenological point of view, 25 species are sedentary, 7 species are partially migratory, 22 species are summer guests, 3 species are winter guests and 1 species is a passage species. Within the perimeter of I. A. C., we identified 21 species that flew over the airport at different heights or were stationary in various places. Of the total number of identified species, 29 species may trigger certain risks for the safety of airplanes and, implicitly, for air traffic, either due to their large size and high flight or their gregarious behaviour. Among these, the most frequently met are: *Columba livia domestica*, *Streptopelia decaocto*, *Corvus monedula*, *C. frugilegus*, *Pica pica*, *Passer montanus*, followed by *Falco tinnunculus*, *Phasianus colchicus*, *Perdix perdix*, *Columba palumbus*, *Hirundo rustica*, *Sturnus vulgaris*, *Passer domesticus*, *Emberiza calandra*. Other potentially dangerous species were rarely (*Ardea cinerea*, *Anas platyrhynchos*, *Buteo buteo*, *Larus ridibundus*, etc.) or very rarely/accidentally observed (*Egretta garzetta*, *Ciconia ciconia*, *Vanellus vanellus*, *Larus cachinnans*, *Turdus pilaris*, *Fringilla* sp., *Carduelis* sp.). The most numerous number of individuals was registered for the species *Corvus* sp., *Sturnus vulgaris*, *Columba* sp., *Passer* sp. Most of the birds present maximum activity and dynamism during the first part of the day (7 a.m. to 12 p.m.) and towards the evening (2 to 5 p.m.), in the interval February – March and September – October (RIDICHE, 2016).

Keywords: ornithological analysis, International Airport Craiova (I. A. C.).

Rezumat. Analiza calitativă și cantitativă a avifaunei din zona Aeroportului Internațional Craiova, România. Studiul prezintă rezultatele cercetărilor ornitologice realizate pe parcursul anilor 2014-2015 în perimetrul și împrejurimile Aeroportului Internațional din Craiova pe o rază de 3 km, în toate aspectele ecologice ale anului. Lista rezultată în urma inventarierii cuprinde 58 de specii de păsări, încadrate la 13 ordine sistematice. Preponderente sunt speciile de pădure și tufărișuri (37). Din punct de vedere fenologic, 25 de specii sunt sedentare, 7 specii sunt parțial migratoare, 22 de specii sunt oaspeți de vară, 3 specii sunt oaspeți de iarnă și 1 specie este de pasaj. Din totalul speciilor consemnate, 29 de specii pot genera anumite riscuri pentru siguranța aeronavelor și implicit pentru traficul aerian, fie datorită taliei mari și zborului la înălțime, fie datorită comportamentelor gregare pe care le manifestă. Dintre acestea, cele mai frecvente sunt: *Columba livia domestica*, *Streptopelia decaocto*, *Corvus monedula*, *C. frugilegus*, *Pica pica*, *Passer montanus* urmate de *Falco tinnunculus*, *Phasianus colchicus*, *Perdix perdix*, *Columba palumbus*, *Hirundo rustica*, *Sturnus vulgaris*, *Passer domesticus*, *Emberiza calandra*. Alte păsări generatoare de potențiale pericole au fost rar semnalate (*Ardea cinerea*, *Anas platyrhynchos*, *Buteo buteo*, *Larus ridibundus*, etc.) sau foarte rar/accidental (*Egretta garzetta*, *Ciconia ciconia*, *Vanellus vanellus*, *Larus cachinnans*, *Turdus pilaris*, *Fringilla* sp., *Carduelis* sp.). Efectivele cele mai mari le-am înregistrat la speciile: *Corvus* sp., *Sturnus vulgaris*, *Columba* sp., *Passer* sp. Marea majoritate a păsărilor au un maxim de activitate și dinamism în prima parte a zilei (orele 7.00-12.00) și spre seară (14.00-17.00), în lunile februarie-martie și septembrie-octombrie (RIDICHE, 2016).

Cuvinte cheie: analiza ornitologică, Aeroportul Internațional Craiova.

INTRODUCTION

Craiova Municipality represents the largest and the most important urban settlement in southwestern Romania; it is located on the left bank of the Jiu River, at a distance of 68 km from the Danube River and 227 km from the capital of the country, Bucharest (<http://ro.wikipedia.org/wiki/Craiova#cite>).

International Airport Craiova is located east of Craiova, about 7 km from the city centre; from the geomorphological point of view, it is located in Oltenia Plain (subunit of the Romanian Plain) (BADEA et al., 2011). The climate of the city and, implicitly, of the airport, is temperate continental with slight sub-Mediterranean influences (CETĂȚEANU et al., 1981).

The area adjacent to I. A. C. (on a range of 3 km) is part of the Teslui hydrographical basin in the north-east and east and of the Jiu basin in the west and south-west.

The ecosystems present within the perimeter of the I. A. C. and its adjacent area are generally subject to anthropization as they are developed in open fields with grass vegetation (meadows) or cultivated vegetation (agroecosystem) or on surfaces covered by trees and shrubs belonging to spontaneous or ornamental flora. The meadows are xerophilous and/or xeromezophilous with shrubs of *Rosa canina*, *Prunus spinosa*, *Rubus caesius*, etc. and they cover the largest part of I. A. C.; at the same time, they also predominate within the neighbouring area, together with cultivated plots. The surfaces covered by tree vegetation are located in the immediate proximity of the airport track and the recreation area Hanul Doctorului (The Doctor's Inn). The vegetal associations present here (shrubs: *Rosa canina*, *Crataegus monogyna*, *Ligustrum vulgare*, *Thuja orientalis*, etc.; trees: *Robinia pseudoacacia*, *Populus* sp., *Malus domestica*, *Fraxinus excelsior*, *Pinus* sp.; unmown grass) developed and extended and, thus, attract a quite varied specific avifauna. Aquatic ecosystems are insignificant in terms of extension and stability and they have only a

temporary (streams, swampy or liable to floods fields) or permanent character (Ghercești Pool supplied by the springs located north-west of I. A. C.).

Birds are an important component of the ecosystems developed within I. A. C. and their study became a necessity as there may occur collisions with aircraft that land or take off, thus, endangering the safety of air traffic. The factors that attract birds in the area of the airport, the distribution of bird species within the biotopes located on a range of 3 km, as well as the risk degree birds may represent for air traffic are some of the goals of the studies previously achieved by RIDICHE et al., 2015; RIDICHE & MUNTEANU, 2015.

MATERIAL AND METHODS

The present study is the result of the ornithological research achieved in 2014 and the first half of 2015 within the perimeter and the proximity of International Airport Craiova (I. A. C.) on a range of 3 km, thus covering all the ecological aspects of the year. As part of our field activities (identification and monitoring of bird species) we made trips to all biotopes (meadows and agricultural fields, forests or tree clumps, pools, settlements) located within the studied area. Observations were made from fixed points or in motion, with naked eye or by means of binoculars (Zeiss Jena 10x50, Bushnell 12x40), using different acoustic devices (CD-player, recorder) to record and play the singing of the males of small songbirds; for capturing some aspects of nature and certain bird species, we used a Sony 15 x camera. The most frequent observations were made in the months with the greatest dynamism of birds, respectively February-March and September-October, which are characterized by ample seasonal movements or movements determined by food search.

The scientific data processing (systematic, ecological, phenological category) was based on the specialized literature (SZABÓ-SZELEY & BACZÓ, 2006; CĂTUNEANU et al., 1978; MUNTEANU, 2012). The frequency of bird species was calculated according to the formula $F\% = p \times 100/P$, where p = number of observations when the bird species was noticed and P = total number of observations (GOMOIU & SKOLKA, 2001).

The data referring to the flying speeds are mostly based on the specialized literature (CIOCHIA, 1984), while those regarding the size/length and weight of the species were taken from the register of the bird collection.

RESULTS AND DISCUSSIONS

According to the investigations made within the biotopes located within the perimeter of I. A. C. and its neighbouring area (0-3 km), we identified 58 species, belonging to 13 systematic orders. 21 species were observed in various points of I. A. C., either stationary for rest and food or flying above the airport at different heights. For all the species recorded during the study we noted the typical biotope (biotope suitable for breeding), the phenological status and the potential risk for air traffic (Table 1).

Table 1. Systematic list of bird species observed within the perimeter of I. A. C. and its proximity (0-3 km).

No.	Species	Records		Typical biotope	Phenological status	Risk for air traffic
		Perimeter of I. A. C.	Proximity of I. A. C.			
ORD. CICONIIFORMES						
1	<i>Ardea cinerea</i>	√	√	We	SV, P	●
2	<i>Egretta garzetta</i>	-	√	We	SV, P	●
3	<i>Ciconia ciconia</i>	-	√	We	SV, P	●
ORD. ANSERIFORMES-						
4	<i>Anas platyrhynchos</i>	-	√	We	PM, WV	●
ORD. ACCIPITRIFORMES						
5	<i>Accipiter nisus</i>	-	√	Wo	WV, P	-
6	<i>Buteo buteo</i>	√	√	Wo	R, P, WV	●
7	<i>Falco tinnunculus</i>	√	√	Wo	PM, P, WV	●
ORD. GALLIFORMES						
8	<i>Perdix perdix</i>	√	√	AG	R	●
9	<i>Coturnix coturnix</i>	-	√	AG	SV, P, RI	-
10	<i>Phasianus colchicus</i>	√	√	Wo	R	●
ORD. GRUIFORMES						
11	<i>Fulica atra</i>	-	√	We	PM, P, WV	-
ORD. CHARADRIIFORMES						
12	<i>Vanellus vanellus</i>	-	√	We	SV, P	●
13	<i>Chidonias hybrida</i>	-	√	We	SV, P	-
14	<i>Larus ridibundus</i>	-	√	We	PM, P, WV	●
15	<i>Larus cachinnans</i>	-	√	We	R	●
ORD. COLUMBIFORMES						
16	<i>Columba livia domestica</i>	√	√	Hs	R	●
17	<i>Columba palumbus</i>	-	√	Wo	PM	●
18	<i>Streptopelia decaocto</i>	√	√	Hs	R	●
ORD. CUCULIFORMES						
19	<i>Cuculus canorus</i>	-	√	Wo	SV, P	-

ORD. STRIGIFORMES						
20	<i>Athene noctua</i>	-	√	Wo	R	-
ORD. CORACIIFORMES						
21	<i>Coracias garrulus</i>	-	√	Wo	SV, P	-
22	<i>Upupa epops</i>	√	√	Wo	SV, P	-
ORD. PICIFORMES						
23	<i>Dendrocopos major</i>	-	√	Wo	R	-
24	<i>Dendrocopos syriacus</i>	-	√	Wo	R	-
ORD. PASSERIFORMES						
25	<i>Galerida cristata</i>	-	√	AG	R	-
26	<i>Alauda arvensis</i>	-	√	AG	PM	-
27	<i>Hirundo rustica</i>	√	√	Hs	SV	●
28	<i>Delichon urbicum</i>	√	√	Hs	SV	●
29	<i>Anthus campestris</i>	√	√	AG	SV	-
30	<i>Motacilla flava</i>	-	√	AG	SV	-
31	<i>Motacilla alba</i>	-	√	Eur.	SV	-
32	<i>Troglodytes troglodytes</i>	-	√	Wo	R / PM, WV	-
33	<i>Luscinia luscinia</i>	-	√	Wo	SV	-
34	<i>Turdus merula</i>	-	√	Wo	PM	-
35	<i>Turdus pilaris</i>	-	√	Wo	WV	●
36	<i>Hippolais icterina</i>	-	√	Wo	SV	-
37	<i>Sylvia communis</i>	-	√	Wo	SV	-
38	<i>Phylloscopus collybita</i>	-	√	Wo	SV	-
39	<i>Phylloscopus trochilus</i>	-	√	Wo	P, SV	-
40	<i>Parus caeruleus</i>	-	√	Wo	R	-
41	<i>Parus major</i>	√	√	Wo	R	-
42	<i>Oriolus oriolus</i>	-	√	Wo	SV	-
43	<i>Lanius collurio</i>	√	√	Wo	SV	-
44	<i>Lanius minor</i>	√	√	Wo	SV	-
45	<i>Garrulus glandarius</i>	-	√	Wo	R	-
46	<i>Pica pica</i>	√	√	Wo	R	●
47	<i>Corvus monedula</i>	√	√	Wo	R	●
48	<i>Corvus frugilegus</i>	√	√	Wo	R	●
49	<i>Corvus cornix</i>	-	√	Wo	R	●
50	<i>Sturnus vulgaris</i>	√	√	Wo	PM	●
51	<i>Passer domesticus</i>	√	√	Wo	R	●
52	<i>Passer montanus</i>	√	√	Wo	R	●
54	<i>Fringilla montifringilla</i>	-	√	Wo	WV	●
55	<i>Fringilla coelebs</i>	-	√	Wo	R, SV	●
56	<i>Carduelis chloris</i>	-	√	Wo	R	●
57	<i>Carduelis carduelis</i>	-	√	Wo	R	●
58	<i>Emberiza calandra</i>	√	√	AG	R	●

Legend:

Records: √ – stationary and/or in transit (in flight).

Phenological type: R – resident; PM – partially migratory; SV – summer visitors; WV – winter visitors; P – passage visitors.

Typical biotope: AG – agroecosystems and grasslands; Wo – woodlands (forests and shrubs); We – wetlands; Hs – human settlements.

Risk for air traffic: ● – birds that may trigger risks.

According to the typical biotope, forest and shrub species (37) predominate both within the airport and its adjacent area, on a range of 3 km. Aquatic species (9) were mainly observed in the proximity of the airport. There was only one exception, the grey heron (*Ardea cinerea*) that was observed near the track, in the north-eastern part, attracted here by the marshes resulted from rains and grassy meadows that favour the presence of food sources (batrachians, small mammals, etc.). The species characteristic to meadows and agroecosystems (7), as well as the anthropophilic species (4) are frequent both within the perimeter of the airport and its adjacent area (0-3 km). One species is eurytopic (*Motacilla alba*) and it was noticed just outside the perimeter of I. A. C.

According to the phenological type, there was registered the following situation: 25 species are sedentary, 8 species are partially migratory, 21 species are summer visitors, 3 species are winter visitors and 1 species is only in transit.

Many of the identified bird species present a high degree of adaptability to the environmental conditions greatly influenced by human activity (phonic pollution, vehicles, people activity, etc.). By analysing the temporary or longer relationship birds have with the frequented habitat, we found out that there are several natural and anthropogenic factors (e.g. high tree vegetation, shrubs, tall grasses, crops, bodies of water, different constructions, waste) that attract them in the area and facilitate their living within I. A. C. (RIDICHE et al., 2015).

Among the 58 identified species, 29 species may trigger certain risks for the safety of airplanes because of possible collisions with airplanes. This is the case of the species that fly actively during the day, in numerous groups, near the area airplanes take off or land (*Columba livia domestica*, *Streptopelia decaocto*, *Corvus monedula*, *C. frugilegus*, *Passer* sp.), the species that fly together in flocks during migration periods (e.g. *Sturnus vulgaris*), as well as the large size species that reach great height taking advantage of the air currents above I. A. C. (e.g. *Buteo buteo*).

Birds that may trigger risks for air traffic do not have the same degree of presence within I. A. C., some species having a constant relationship with this specific biotope, while other species are just in passage or occasionally stationary within the perimeter of I. A. C. and its proximity. Taking into account the values resulting from the calculation of frequency (F) of each species, we can talk about four categories of birds generating potential risks, numerically distributed as follows (Table 2): 6 euconstant species / very common (frequency between 75.1% and 100% of the total number of observations); 8 constant species (frequency between 50.1% and 75% of total observations); 6 rare species (frequency between 25.1% and 50% of all observations); 9 accidental species (frequency between 1% and 25% of the total number of observations). Their percentage distribution is rendered in Fig. 1.

Table 2. Categories of bird species that may trigger potential risks compared to the frequency of their observation in the area of Craiova Airport (0-3 km).

Euconstant species (very frequent)	Constant species	Rare species	Accidental species
<i>Columba livia domestica</i> <i>Streptopelia decaocto</i> <i>Pica pica</i> <i>Corvus monedula</i> <i>Corvus frugilegus</i> <i>Passer montanus</i>	<i>Falco tinnunculus</i> <i>Phasianus colchicus</i> <i>Perdix perdix</i> <i>Columba palumbus</i> <i>Hirundo rustica</i> <i>Sturnus vulgaris</i> <i>Passer domesticus</i> <i>Emberiza calandra</i>	<i>Ardea cinerea</i> <i>Anas platyrhynchos</i> <i>Buteo buteo</i> <i>Larus ridibundus</i> <i>Delichon urbicum</i> <i>Corvus cornix</i>	<i>Egretta garzetta</i> <i>Ciconia ciconia</i> <i>Vanellus vanellus</i> <i>Larus cachinnans</i> <i>Turdus pilaris</i> <i>Fringilla montifringilla</i> <i>Fringilla coelebs</i> <i>Carduelis chloris</i> <i>Carduelis carduelis</i>

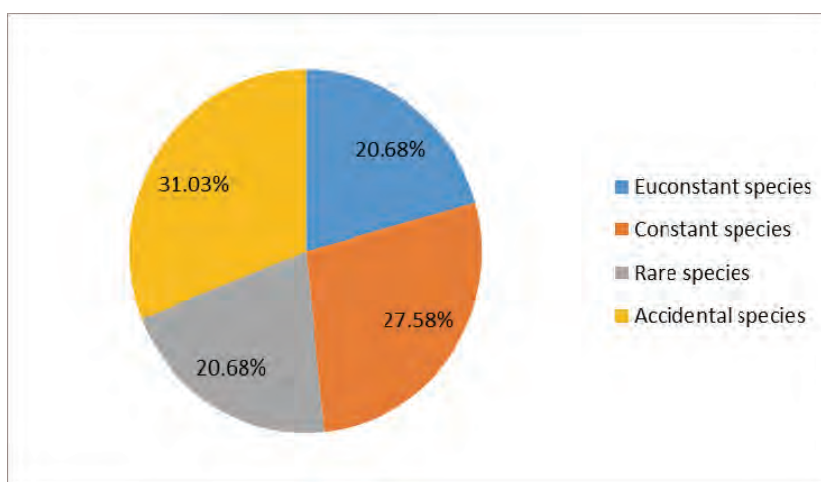


Figure 1. Percentage distribution of frequency groups of the bird species that trigger potential risks in the area of I. A. C.

The intense frequency of different species of birds within the perimeter of the airport or in its immediate proximity increases the risk of collisions with aircraft. The risks of accidents and their severity also depend on other parameters such as abundance, bird size, their flying speeds, their behaviour during the flight on different distances, etc. In Table 3, there are rendered the weight, size and flying speeds of the species generating potential risks to aircraft / air traffic.

The species that cause the most serious accidents by colliding with airplanes are the birds flying in large flocks or solitary at great height (*Anas platyrhynchos*, *Ciconia ciconia*, *Buteo buteo*, etc.), followed by crows and western jackdaw (*Corvus* sp.), black-headed gull (*Larus ridibundus*), pigeons (especially *Columba livia domestica*) and, finally, by flocks of small birds (the most frequent *Sturnus vulgaris*).

Table 3. Weight, size and flying speeds of the bird species susceptible to collisions with aircraft.

No.	SPECIES	Weight (g)	Size (cm)	Flying speed (Km/h)	Risk for traffic
Euconstant species					
1.	<i>Columba livia domestica</i>	250-300	32-35	60-75	X, XX
2.	<i>Streptopelia decaocto</i>	150-250	31-33	62-72	X, XX
3.	<i>Pica pica</i>	200-230	45	45-55	X, XX
4.	<i>Corvus monedula</i>	200-280	33	40-60	X, XX
5.	<i>Corvus frugilegus</i>	400-600	46	46-67	XXX
6.	<i>Passer montanus</i>	18-29	14	40-60	XX
Constant species					
7.	<i>Falco tinnunculus</i>	180-210	31-37	38-42	X
8.	<i>Phasianus colchicus</i>	1000-1200	65-85	40	X
9.	<i>Perdix perdix</i>	430-500	30	40	XX
10.	<i>Columba palumbus</i>	370-600	40-43	86	X, XX
11.	<i>Hirundo rustica</i>	15-20	17-19	50-77	X X

12.	<i>Sturnus vulgaris</i>	50-100	21	40-82	XX
13.	<i>Passer domesticus</i>	23-40	14,5-15	38-56	XX
14.	<i>Emberiza calandra</i>	40-65	15-1	38-55	XX
Rare species					
15.	<i>Ardea cinerea</i>	1000-1900	84 - 102	38-40	X, XXX
16.	<i>Anas platyrhynchos</i>	760-1400	50-60	74-96	XXX
17.	<i>Buteo buteo</i>	750-1400	48-58	42-47	X
18.	<i>Larus ridibundus</i>	200-400	35-38	60-80	XXX
19.	<i>Delichon urbicum</i>	12-16	12-14	47-50	XX
20.	<i>Corvus cornix</i>	445-520	41-46	30-50	X
Accidental species					
21.	<i>Egretta garzetta</i>	350-600	55 - 65	35-40	X, XXX
22.	<i>Ciconia ciconia</i>	3500-4000	110	50-60	X, XXX
23.	<i>Vanellus vanellus</i>	200-320	28-31	60	XX
24.	<i>Larus cachinnans</i>	600-1300	56-78	60-80	XXX
25.	<i>Turdus pilaris</i>	70-140	25	28-50	XX
26.	<i>Fringilla montifringilla</i>	20-30	15	35-55	XX
27.	<i>Fringilla coelebs</i>	20-40	15	33-56	XX
28.	<i>Carduelis chloris</i>	20-30	14,5-15	35-50	XX
29.	<i>Carduelis carduelis</i>	15-20	14	40-45	XX

Legend:

Risk for traffic: X – large size and/or medium size birds that fly solitary or in small groups (1 – 10 individuals); XX – small or medium size birds that fly in flocks (tens / hundreds of individuals); XXX – medium or large size birds that fly in flocks.

The flying speeds rendered in Table 3 are relative as they were evaluated on short distances thus, certain errors being possible (CIOCHIA, 1984). In certain situations (alerts of danger or prey attack), the flying speed may increase. In case of frontal collision, the collision between bird / birds and aircraft may have a force that increases with speed increase of both parts involved.

The most abundant and active species identified within I. A. C. belong to the euconstant and constant categories. They have a daily diurnal program, most of the time carefully looking for food within the specific biotopes, usually in mixed groups (Table 4).

Table 4. Bird species frequent within the airport and their activity hours during a spring or autumn day.

Bird species	Activity hours of the birds within I. A. C.											
	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 a.m.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.
<i>Falco tinnunculus</i>												
<i>Columba livia domestica</i>												
<i>Streptopelia decaocto</i>												
<i>Pica pica</i>												
<i>Corvus monedula</i>												
<i>Corvus frugilegus</i>												
<i>Sturnus vulgaris</i>												
<i>Passer sp.</i>												

	rest period for birds
	large or medium size birds flying in small numbers on the track
	large or medium size birds flying in large numbers on / over the track – tens of individuals
	great number of birds - a few hundred individuals
	small size birds flying in small or large groups on/over the track

The data rendered in Table 4 are the result of the observations achieved between the 28th of September 2014 and the 28th of October, between 7 a.m. and 6 p.m., in the days when air temperature at noon was between 15 and 20°C and there were not rainfalls or strong winds.

The common starling (*Sturnus vulgaris*), the rook (*Corvus frugilegus*) and the western jackdaw (*C. monedula*) are the most numerous and dynamic species from the perimeter of I. A. C. During spring and autumn days they feed together in the fields around the airport, mainly those located in the northern part (more than 500 individuals). Often, they were seen on the meadows near the track, also in mixed populations (more than 100-200 individuals). During the seasonal migrations (spring and autumn), before dusk, there can be observed numerous flocks of starlings (hundreds / thousands of individuals) transiting the track and the surroundings of I. A. C. In summer, the area is dominated by corvids, which placed their colonies in the trees located in the western vicinity of I. A. C. or along the national-European road located at the southern edge of I. A. C., and species of *Pica pica*, *Passer sp.*, *Columba livia domestica*, *Streptopelia decaocto* that fly above the airport area countless times, in more or less numerous groups, so that they seem to be present at all times.

The peak of activity in the vast majority of birds occurs early in the morning (7 a.m.-10 a.m.), gradually decreasing at noon, when birds rest; then, they resume their activity gradually, reaching another peak between 4 p.m. and 6 p.m.

Falco tinnunculus begins hunting later, after 8 a.m., and continues until 4-5 p.m., taking advantage of higher temperatures and currents of warm air for its flight.

CONCLUSIONS

During the research achieved in 2014-2015 upon the avifauna within the perimeter of International Airport Craiova and its adjacent area on a range of 3 km, we identified 58 bird species belonging to 13 systematic orders. From the point of view of the typical biotope, forest and shrub species (37) predominate both within the airport and its adjacent area, on a range of 3 km; aquatic species (9) were mainly observed in the proximity of the airport (an exception represented by the species *Ardea cinerea* that was observed stationing near the track); the species characteristic to meadows and agroecosystems (7), as well as the anthropophilic species (4) are frequent both within the perimeter of the airport and its adjacent area (0-3 km). One species is eurytopic (*Motacilla alba*) and it was noticed just outside the perimeter of I. A. C.

According to the phenological type of the bird species, it results the following situation: 25 species are sedentary, 8 species are partially migratory, 21 species are summer visitors, 3 species are winter visitors and 1 species is only in transit.

Half of the identified species (namely 29) may trigger risks for air traffic either due to their large size and high flight or their gregarious behaviour.

The birds that may represent a risk for the safety of air traffic are distributed according to the frequency (F) values calculated for each species as follows: 9 accidental species; 6 rare species; 8 constant species; 6 euconstant species / very frequent.

The most abundant and active bird species are those belonging to euconstant category (*Columba livia domestica*, *Streptopelia decaocto*, *Pica pica*, *Corvus monedula*, *C. frugilegus*, *Passer montanus*) and constant category (*Falco tinnunculus*, *Phasianus colchicus*, *Perdix perdix*, *Columba palumbus*, *Hirundo rustica*, *Sturnus vulgaris*, *Passer domesticus*). Other potentially dangerous species were noticed more rarely (*Ardea cinerea*, *Anas platyrhynchos*, *Buteo buteo*, *Larus ridibundus*, *Delichon urbicum*, *Corvus cornix*) or very rarely/accidentally (*Egretta garzetta*, *Ciconia ciconia*, *Vanellus vanellus*, *Larus cachinnans*, *Turdus pilaris*, *Fringilla* sp. *Carduelis* sp.).

The greatest dynamism of birds is registered in February-March and September-October when migration takes place or they are in search for food and the peak activity in most species occur early in the morning (7 to 10 a.m.) and between 4 and 6 p.m.

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