THE WATERBIRDS OF THE OEȘTI, CERBURENI AND CURTEA DE ARGEȘ DAM BASINS (ARGEȘ COUNTY, ROMANIA) OBSERVED DURING 2023

MESTECĂNEANU Adrian

Abstract. The first published information about the avifauna of the Oești, Cerbureni and Curtea de Argeș Dam Basins, from the upper sector of the Argeș River, are shown in this paper. During 2023, 25 waterbird species were found here, 7 of them, 28% of all, *Ciconia nigra* (Linnaeus, 1758), *C. ciconia* (Linnaeus, 1758), *Ixobrychus minutus* (Linnaeus, 1766), *Nyctycorax nyctycorax* (Linnaeus, 1758), *Ardea purpurea* Linnaeus, 1766, *A. alba* Linnaeus, 1758, *Egretta garzetta* (Linnaeus, 1766) and *Mycrocarbo pygmaeus* Pallas, 1773, being listed in the Annex I of Directive 2009/147/EC. 6 species, 24% of all, *Cygnus olor* (Gmelin J. F., 1789), *Anas platyrhynchos* Linnaeus, 1758, *Gallinula chloropus* (Linnaeus, 1758), *Fulica atra* Linnaeus, 1758, *Ciconia ciconia* (Linnaeus, 1758) and *Larus michahellis* Naumann, 1840, were certain breeders in the area, and 2 species, 8% of all, *Tachybaptus ruficollis* (Pallas, 1764) and *Ardea cinerea* Linnaeus, 1758, probable breeders. While their avifauna is not as diverse as the one of the lower wetlands, the dam basins, though created by economic reasons, prove to be hotspots for the waterbirds, mainly in the period of passage and in winter, and, consequently, they need minimal avifaunistic protection: partially silted areas, covered with characteristic vegetation, not disturbed by people. Additional considerations about the distribution, phenology, dynamics and other factors that influenced the occurrence of the birds in the area were performed in the paper, too.

Keywords: waterbirds, breeding, migration, dam basins, protection.

Rezumat. Păsările de apă ale lacurilor de acumulare Oești, Cerbureni și Curtea de Argeș (județul Argeș, România) observate în anul 2023. În această lucrare sunt publicate, în premieră, informații despre avifauna lacurilor de acumulare Oești, Cerbureni și Curtea de Argeș din bazinul superior al râului Argeș. În anul 2023, 25 de specii de păsări de apă au fost identificate aici, 7 dintre acestea, 28% din total, *Ciconia nigra* (Linnaeus, 1758), *C. ciconia* (Linnaeus, 1758), *Ixobrychus minutus* (Linnaeus, 1766), *Nyctycorax nyctycorax* (Linnaeus, 1758), *Ardea purpurea* Linnaeus, 1766, *A. alba* Linnaeus, 1758, *Egretta garzetta* (Linnaeus, 1766) și *Mycrocarbo pygmaeus* Pallas, 1773, fiind menționate în Anexa I a Directivei 2009/147/CE. 6 specii, 24% din total, *Cygnus olor* (Gmelin J. F., 1789), *Anas platyrhynchos* Linnaeus, 1758, *Gallinula chloropus* (Linnaeus, 1758), *Fulica atra* Linnaeus, 1758, *Ciconia ciconia* (Linnaeus, 1758) și *Larus michahellis* Naumann, 1840, au fost sigur cuibăritoare în zonă, iar 2 specii, 8% din total, *Tachybaptus ruficollis* (Pallas, 1764) și *Ardea cinerea* Linnaeus, 1758, probabil cuibăritoare. Chiar dacă avifauna lor nu este diversă precum cea a zonelor umede mai joase, lacurile de acumulare, deși create în scop economic, se dovedesc a fi atractive pentru păsările de apă, mai ales în perioadele de pasaj și în timpul iernii, fapt pentru care merită o minimă protecție avifaunistică, prin menținerea unor locuri nederanjate de oameni și parțial colmatate, acoperite cu vegetație caracteristică. În lucrare, au fost făcute, de asemenea, aprecieri referitoare la distribuția, fenologia, dinamica și alți factori care influențează prezența păsărilor în zonă.

Cuvinte cheie: păsări de apă, cuibărire, migrație, lacuri de acumulare, protecție.

INTRODUCTION

The avifauna proper to the dam basins from the mountain and submountain course of the Argeș River was insufficiently studied until now, although those dam basins were built more than 50 years ago. The first papers related to them were published by Mircea Mătieș, who focused mainly on the waterbirds of the Vidraru Dam Basins and on the ones able to cross the Făgăraș Mountains (MĂTIEȘ, 1969, 1971, 1973, 1974b), but, certainly, some data remained unpublished, with the premature death of the author. Concomitantly, WEBER (1970) noticed the occurrence of the dotterel (*Eudromias morinellus* Brehm C. L., 1830) at the end of the Vidraru Dam Basin and, later, MUNTEANU & MĂTIEȘ (1983) analysed the situation of the avifauna from the entire sector between Vidraru and downstream of Pitești, but without particular mentions regarding the envisaged area. The researches were resumed at the beginning of the 21st century (PETRESCU, 2005), to be continued only in the recent years (MESTECĂNEANU & MESTECĂNEANU, 2022; MESTECĂNEANU, 2023a, b). The following authors wrote about other species observed in the area: RADU (1972), MĂTIEȘ (1974a), PAPADOPOL (1979), TĂLPEANU & PASPALEVA (1979), etc., while KLEMM & KOHL (1988) mentioned some of this information in their work of synthesis.

The aim of the paper, the first one about the Oești, Cerbureni and Curtea de Argeș Dam Basins avifauna, is to fill the gap regarding the knowledge on the waterbirds from the upper Argeș, especially on their distribution and migration. Also, we wanted to show the importance of the minimum protection of all dam basins, not only of the officially protected ones.

MATERIALS AND METHODS

Oești, Cerbureni and Curtea de Argeș are dam basins of relatively small size (Table 1), placed on the upper course of the Argeș River (Fig. 1). They are not protected areas from an avifaunistic point of view, but constitute the link between the Vidraru Dam Basin, 13 km upstream, 870 ha – the largest of all, and the series of dam basins from downstream, which forms the ROSPA0062 Lacurile de acumulare de pe Argeș, which starts from Zigoneni (4.5 km away) and extend up to Golești (41 km away) and which measure between 122 and 646 ha each (based on Atlasul Cadastrului

Apelor din România, 1992). The three dam basins cover a distance of nearly 11.5 km in straight line (in other words, 4.7 km between the Oești and Cerbureni dams and 5.9 km between the Cerbureni and Curtea de Argeș dams).

Table 1. Characteristics of the dam basins (based on Atlasul Cadastrului Apelor din România, 1992).

Dam Basin	Total volume (mil. m^3)	Normal volume (mil. m^3)	Normal area (ha)	Height of dam (m)*	Length of dam (m)*	Drainage basin area (km^2)**	Purpose	Year of commissioning*
Oești	1.77	1.77	46.30	20.5	31.0	441	energy	1967
Cerbureni	1.30	1.10	38.00	18.0	31.0	480	energy	1968
Curtea de Argeș	1.20	1.05	30.00	27.0	31.0	570	energy	1973

Legend: * – by CONSTANTIN (2018a, b); ** – by RĂDOANE & RĂDOANE (2005).

The dam basins are located in the sub-mountain region, corresponding to the Sub-Carpathians, at 502 m a.s.l. – the Oești Dam Basin, 456 m a.s.l. – the Cerbureni Dam Basin, and 413 m a.s.l. – the Curtea de Argeș Dam Basin (cf. Google Earth Database). The zone is characterised by a complex relief with aspect of depressions that starts from the south of the Frunți (1,533 m) and Ghițu (1,621 m) Mountains, pertaining to the Făgăraș Mountains, and continue to the Getic Piedmont. The Arefu Depression is located in the north and the Curtea de Argeș Depression in the south of the area. The high hills that meet them are named "muscels" by locals and Tămaș (1,104 m), toward west, and Chicera (1,218 m), toward east, are the highest of them (BARCO & NEDELCU, 1974).

Figure 1. The map of the zone, with the general placement on the Romanian map (by Maps - Bing, modified).

The vegetation of the area is mainly composed by forests of beech (*Fagus sylvatica* L.) and secondary pastures, some of them transformed in agricultural terrains covered with orchards and crops. The vegetation of the dam basins is rich, because of their very strong silting degree: 74% of the initial volume for Oești, 68% of the initial volume for Cerbureni, and 88% of the initial volume for Curtea de Argeș (RĂDOANE & RĂDOANE, 2005). It allowed for the installation of reed (*Phragmites australis* (Cav.) Trin. ex Steud.) and, chiefly, bulrush (*Typha* L. spp.), on the flooded banks, and of willow (*Salix* L. spp.) and, mostly, alder (*Alnus* Mill. spp.), on the drier and higher banks.

The ichthyofauna of the Argeș River is well represented in the sector. *Squalius cephalus* Linnaeus, 1758, *Phoxinus phoxinus* Linnaeus, 1758 and *Barbus petenyi* Heckel, 1847 were found in the area of Oești and Curtea de Argeș, and *Squalius cephalus* Linnaeus, 1758, *Phoxinus phoxinus* Linnaeus, 1758, *Gobio obtusirostris* Valenciennes, 1844, *Barbus petenyi* Heckel, 1847, *Orthrias barbatulus* Linnaeus, 1758, *Sabanejewia romanica* Băcescu, 1943, *Sabanejewia wallachica* Nalbant, 1957, in the area of Cerbureni (URECHE et al., 2007).

The human settlements from the vicinity are grouped in villages; placed near the dam basins, along the Transfăgărășan Road, they gave the names to the reservoirs. Curtea de Argeș Dam Basin is the exception, the homonym city, practically, surrounding it with buildings, although parcels with crops can be found in the immediate neighbourhood, on the west bank. Oești is almost entirely delimited by roads of low importance, partially provided with a cement slope, Cerbureni is bordered on a short distance by a road of local use that crosses the dam and Curtea de Argeș is also partially

flanked, toward the downstream, by a road provided with cement slope, that, over the dam, is relatively intensely circulated. A way of ground penetrates into a peninsula incompletely reinforced by artificial structures.

The climate of the area is temperate continental with sub-mountain features. The annual mean temperature of the air is about 6-8°C, with ca. -3°C the average temperature of January and ca. 18°C the average temperature of July. The daily temperature varies between -30°C and +38°C. In terms of precipitations, an average of nearly 800 mm/year is recorded, the richest month being July (ca. 155 mm/year) and the scarcest, February (ca. 40 mm/year). On average, the frost appears in the first days of October, while the last days of frost are seen at the end of April. 106 days with cloudy sky/year is the average of nebulosity in Curtea de Argeș (BARCO & NEDELCU, 1974). The increase in the temperatures from the last decades is expected to lead to more intense precipitations that previously, with more abundant precipitations in the higher regions than usual, and with a changed pattern (https://www.mmediu.ro/). During the researches, 16.33°C was the mean day temperature among the observations registered in the area at 12:00 (n=12, minimum 0°C, in February, maximum 28°C, in September). A snow cover of 10 cm depth occurred in February, when the Oești Dam Basin was 5% frozen.

As regard the method of work, the observations were performed in 2023, once a month (on January 15, February 5, March 5, April 14, May 7, June 4, July 15, August 14, September 14, October 1, November 10 and December 3), on every dam basin, from 11 points of observations with good visibility (4 each, placed on the banks of Oești and Curtea de Argeș, and 3, on Cerbureni). The access, particularly difficult on the Cerbureni Dam Basin, meant that nearly 95% of the waters depleted of vegetation of the Oești Dam Basin were visually covered, ca. 90%, in the case of Cerbureni, and ca. 99%, in the case of the Curtea de Argeș Dam Basin. The area was visited between 10:00 and 15:00, when all the observed birds were registered, while a particular attention was granted to the waterbirds. A 67X scope, binoculars and a photo camera were used.

The data were worked by GOMOIU & SKOLKA (2001), GACHE (2002) and ZAMFIRESCU & ZAMFIRESCU (2008). The species denomination and systematics were undertaken by Wetland International and BirdLife International.

RESULTS AND DISCUSSIONS

While dam basins generally affect the initial biodiversity of the rivers where they were built (MUNTEANU, 1978; MUNTEANU & MĂTIEȘ, 1983), 25 waterbird species, represented by 2,176 individuals (ones of them registered several times in different months; in average, 181.33 individuals/month, n=12), were observed on the considered dam basins during 2023. They pertain to 7 orders and 8 families, Anseriformes and Pelecaniformes being the most important orders as species and Anatidae and Ardeidae, the most important families (Table 2). 18 species were counted on the Oești Dam Basin, the uppermost among them, 14 species, on the Cerbureni Dam Basin, and 19 species, on the Curtea de Argeș Dam Basin, from the downstream, while, in terms of strength, Oești was the first (with 857 individuals), Curtea de Argeș, the second (with 684 individuals) and Cerbureni, the last (with 635 individuals). Because not the entire area of the dam basins was visually covered, in terms of linear proportion, a total of 952 individuals and 20 species for Oești, 641 individuals and 14 species for Cerbureni and 720 individuals and 20 species for Curtea de Argeș can be estimated. Relatively to the area of 100 ha, 154.23 for Oești, 139.25 for Cerbureni and 190.00 for Curtea de Argeș are the monthly means of the number of individuals, while 14.94 for Oești, 10.09 for Cerbureni and 19.72 for Curtea de Argeș are the monthly means of the number of species. By way of comparison, 14 waterbird species, belonging to 5 orders and 6 families, were recently found during a year of study on the larger mountain dam basin Vidraru (MESTECĂNEANU, 2023b), while much more, i.e. 54, were found on the dam basins from the downstream, between Vâlcele and Golești, during a year of study, in 2013 and 2014 (MESTECĂNEANU & GAVA, 2016), which show the general increase in the number of species with the decrease of the height, although other aspects are implied here, too.

A strong and positive correlation (0.75) was established between the number of individuals and the areas of the dam basins and a strong and negative correlation (-0.74) was established between the number of individuals and the position of the dam basins on the river course (in the direction of the flow). Instead, a strong and positive correlation (0.85) was established between the number of species and the degree of silting of the dam basin (although it was measured before 2005). To eliminate the effect of the size of the area of each dam basin on the position, the monthly mean number of individuals/100 ha, respectively the monthly mean number of species/100 ha were used, in which case the correlations become strong and positive (0.69) for the number of individuals and moderate and positive (0.50) for the number of species. Equally, it was done for the silting, when the correlations were, each time, very strong (1.00, respectively 0.97). These mean that the number of individuals, less the number of species, increased as the area of the dam basins increased, as well as the dam basins are placed at lower elevation, respectively the number of individuals and the number of species are higher, as the degree of silting is higher. Regarding the anthropogenic pressure, it is difficult to assess, but, if 1 point is granted for every person observed on the basins or on the banks (fishermen, kayakers, hunters), bizarre strong or very strong and positive correlations appear (0.94 with the number of individuals and 0.78 with the number of species). The explanation consists in the fact that the fishermen were relatively well tolerated by the waterbirds in the traditional places of fishing from the end of Oești and from the dam of Curtea de Argeș (like the passers-by on the streets from the banks of Cerbureni and Curtea de Argeș, less Oești, and the passing cars, which were not considered here), contrasting with the presence of the people in other places of the dam basins, which typically was repulsive. The estimated number of individuals or of species and the effective covered area of the dam basins can be introduced in the correlations, but without significant changes in results, while the other correlations were weak or very weak. It should be mentioned that, certainly, the results were influenced by other elements, too, like the types of habitats, the water depth, the food, etc.

Table 2. The strength, respectively the monthly mean of the strength of the species observed in the area and their phenology, breeding and status of protection.

Order/Family/Species	January (n=1)	February (n=1)	March (n=1)	April (n=1)	May (n=1)	June (n=1)	July (n=1)	August (n=1)	September (n=1)	October (n=1)	November (n=1)	December (n=1)	Hiemal (n=4)	Prevernal (n=2)	Vernal (n=1)	Aestival (n=1)	Serotinal (n=2)	Autumnal (n=2)	All year (n=12)	Phenology	Breeding	Bird Directive
Anseriformes																						
Anatidae																						
Cygnus olor (Gmelin J. F., 1789)[1,2,3]	2	7	2	4	2	5	5	5	10	10	6	5	20/ 5	6/ 3	2/ 2	5/ 5	10/ 5	20/ 10	63/ 5.3	R, P	CB	AII/B
Mergus merganser Linnaeus, 1758[1]	0	0	0	4	1	0	0	0	0	0	0	0	0/ 0	4/ 2	1/ 1	0/ 0	0/ 0	0/ 0	5/ 0.4	P	NB	AII/B
Netta rufina (Pallas, 1773)[3]	0	0	0	0	0	0	0	0	0	0	1	0	1/ 1	0/ 0	0/ 0	0/ 0	0/ 0	0/ 0	1/ 0.1	P	NB	AII/B
Spatula querquedula (Linnaeus, 1758)[2]	0	0	0	6	0	0	0	0	0	0	0	0	0/ 0	6/ 3	0/ 0	0/ 0	0/ 0	0/ 0	6/ 0.5	P	NB	AII/A
Anas platyrhynchos Linnaeus, 1758[1,2,3]	36	130	44	12	11	64	94	71	65	113	75	110	351/8 7.8	56/ 28	11/ 111	64/ 64	165/ 82.5	178/ 89	825/ 68.8	P, WV, R	CB	AII/A, AIII/A
Anas crecca Linnaeus, 1758[1,2,3]	65	97	32	27	0	0	18	12	35	53	102	148	412/ 103	59/ 29.5	0/ 0	0/ 0	30/ 15	88/ 44	589/ 49.1	P, WV	NB	AII/A, AIII/B
Podicipediformes																						
Podicipedidae																						
Tachybaptus ruficollis (Pallas, 1764)[1,2,3]	18	24	22	0	0	1	3	4	9	33	12	26	80/ 20	22/ 11	0/ 0	1/ 1	7/ 3.5	42/ 21	152/ 12.7	P, WV, SV, R?	PB	x
Gruiformes																						
Rallidae																						
Rallus aquaticus Linnaeus, 1758[2,3]	0	0	0	1	0	1	0	0	1	1	0	0	0/ 0	1/ 0.5	0/ 0	1/ 1	0/ 0	2/ 1	4/ 0.3	SV	NB	AII/B
Gallinula chloropus (Linnaeus, 1758)[1,2,3]	0	2	1	6	3	5	9	36	14	7	11	12	25/ 6.3	7/ 3.5	3/ 3	5/ 5	45/ 22.5	21/ 10.5	106/ 8.8	P, WV, SV, R?	CB	AII/B
Fulica atra Linnaeus, 1758[1,2,3]	0	0	3	5	3	4	2	7	30	1	11	5	16/ 4	8/ 4	3/ 3	4/ 4	9/ 4.5	31/ 15.5	71/ 5.9	P, WV, SV	CB	AII/A, AIII/B
Ciconiiformes																						
Ciconiidae																						
Ciconia nigra (Linnaeus, 1758)[3]	0	0	0	0	0	0	0	1	0	0	0	0	0/ 0	0/ 0	0/ 0	0/ 0	1/ 0.5	0/ 0	1/ 0.1	P	NB	AI
Ciconia ciconia (Linnaeus, 1758)[1,3]	0	0	0	11	3	1	1	1	0	0	0	0	0/ 0	11/ 5.5	3/ 3	1/ 1	2/ 1	0/ 0	17/ 1.4	P, SV	CB	AI
Pelecaniformes																						
Ardeidae																						
Ixobrychus minutus (Linnaeus, 1766)[1]	0	0	0	0	0	1	1	0	0	0	0	0	0/ 0	0/ 0	0/ 0	1/ 1	1/ 0.5	0/ 0	2/ 0.2	P, SV?	NB	AI
Nyctycorax nyctycorax (Linnaeus, 1758)[1,3]	0	0	0	0	0	4	17	2	0	0	0	0	0/ 0	0/ 0	0/ 0	4/ 4	19/ 9.5	0/ 0	23/ 1.9	P, SV?	NB	AI
Ardea cinerea Linnaeus, 1758[1,2,3]	7	2	2	6	4	2	10	6	4	24	7	1	17/ 4.3	8/ 4	4/ 4	2/ 2	16/ 8	28/ 14	75/ 6.3	P, WV, R	PB	x
Ardea purpurea Linnaeus, 1766[1]	0	0	0	0	0	1	0	0	0	0	0	0	0/ 0	0/ 0	0/ 0	1/ 1	0/ 0	0/ 0	1/ 0.1	P	NB	AI
Ardea alba Linnaeus, 1758[1,3]	5	0	0	2	0	5	0	0	1	0	0	0	5/ 1.3	2/ 1	0/ 0	5/ 5	0/ 0	1/ 0.5	13/ 1.1	P, WV, SV?	NB	AI
Egretta garzetta (Linnaeus, 1766)[3]	0	0	0	1	0	0	0	1	0	0	0	0	0/ 0	1/ 0.5	0/ 0	0/ 0	1/ 0.5	0/ 0	2/ 0.2	P	NB	AI
Suliformes																						
Phalacrocoracidae																						
Mycrocarbo pygmaeus Pallas, 1773[1]	0	0	0	0	0	0	2	0	2	0	2	0	2/ 0.5	0/ 0	0/ 0	0/ 0	2/ 1	2/ 1	6/ 0.5	P	NB	AI
Phalacrocorax carbo (Linnaeus, 1758)[1,2,3]	0	2	6	0	3	9	34	35	24	0	8	15	25/ 6.3	6/ 3	3/ 3	9/ 9	69/ 34.5	24/ 12	136/ 11.3	P, WV, SV?	NB	x
Charadriiformes																						
Scolopacidae																						
Gallinago gallinago (Linnaeus, 1758)[2,3]	0	8	0	0	0	0	0	0	0	0	1	1	10/ 2.5	0/ 0	0/ 0	0/ 0	0/ 0	0/ 0	10/ 0.8	P, WV	NB	AII/A, AIII/B

Actitis hypoleucos (Linnaeus, 1758)[1,2,3]	0	0	0	0	0	0	3	0	0	0	0	0	0/ 0	0/ 0	0/ 0	0/ 0	3/ 1.5	0/ 0	3/ 0.3	P	NB	x
Laridae																						
Larus ridibundus Linnaeus, 1766[2,3]	0	0	22	1	0	0	0	0	0	0	0	0	0/ 0	23/ 11.5	0/ 0	0/ 0	0/ 0	0/ 0	23/ 1.9	P	NB	AII/B
Larus michahellis Naumann, 1840[1,2,3]	1	2	2	15	6	5	1	3	3	0	2	1	6/ 1.5	17/ 8.5	6/ 6	5/ 5	4/ 2	3/ 1.5	41/ 3.4	P, R	CB	x
Larus cachinnans Pallas, 1811[1]	0	0	0	0	0	0	1	0	0	0	0	0	0/ 0	0/ 0	0/ 0	0/ 0	1/ 0.5	0/ 0	1/ 0.1	P	NB	AII/B

Legend: [1] – occurred on the Oești Dam Basin, [2] – occurred on the Cerbureni Dam Basin, [3] – occurred on the Curtea de Argeș Dam Basin; grey cells – predominantly or fully in passage individuals; R – resident species, SV – summer visitor, WV – winter visitor, P – species of passage, ? – uncertain situation; NB – non-breeding species, PB – probably breeding species, CB – certainly breeding species; A I – Annex I, A II/A – Annex II, Part A; A II/B – Annex II, Part B; A III/A – Annex III, Part A; A III/B – Annex III, Part B; x - species not mentioned in the annexes, but covered by the general protection regime provided by Article 1 of the Directive to all species of birds naturally occurring in the wild state in the European territory of the Member States to which the Treaty applies (cf. EUNIS).

The number of all individuals was maximum in December, although important strengths were also registered in February, October and November, while it was minimum, by far, in May. July, August and September were well represented, too. This was reflected in the seasonal distribution, in which the hiemal season dominated and where the vernal season had the least importance. As regard the number of species, July stands out as being the richest, while January was the poorest. October, February and May also were scarcely represented. In terms of seasons, the serotinal and prevernal registered the highest values, while the vernal had the lowest one. The monthly average number of the individuals places again the hiemal season on the first position and the vernal season on the last one, although the values generally differ. The monthly averages of the number of species brought in the foreground the aestival and serotinal seasons, while the vernal season was ranked, again, the last. The periods of migration and wintering (seen in the high numbers of species and individuals) stood out, while the general strength was relatively low in the breeding season, when some species in passage added to the breeding ones. We considered that species with individuals preponderantly in migrations occurred mainly in April, and November, while July, August and September were also, well represented. October was a particular case, because of the low number of species and of the high number of individuals, proving to be a month of break for many migratory species. As regard the ratio number of individuals/number of species, the highest value was registered in December, followed by February and October, while the lowest values (the minimum one, in May) were registered in April, May and June. In terms of seasons, the hiemal had the highest value and the vernal, the lowest one. The ratio average monthly number of individuals/average monthly number of species reveals the same hierarchy, although the values are different (Table 3). By comparison, the maximum number of individuals on the Vidraru Dam Basin was registered in November (280), respectively in hiemal (121.2), while the minimum one was registered in May, respectively aestival (18 individuals, each). The average number of species varied that case between 1.66, in July, and 6.66, in February, respectively between 2.20, in the serotinal, and 5.35, in the hiemal (MESTECĂNEANU, 2023b). On the dam basins between Vâlcele and Golești from the downstream, the maximum number of individuals was registered in February, more than 18,000, and the minimum, in May, less than 400 (MESTECĂNEANU & GAVA, 2016).

Concerning the variation of strengths of every species, some remarks have to be done: *Anas platyrhynchos*, present all year round, had the maximum numbers in February and the minimum ones, in May; *Anas crecca*, absent in May and June, had the highest strength in December; *Tachybaptus ruficollis*, absent in April and May, had the highest numbers in October; *Gallinula chloropus*, present all time, except January, was the most abundant in August; *Fulica atra*, absent in January and February, had the highest numbers in September; *Ardea cinerea*, occurred all year round, was the most abundant in October, while only 1 individual was observed in December; *Phalacrocorax carbo*, absent in January, April and October, had the highest strength in July and, mainly, August; and *Larus michahellis*, absent in October, had the highest strength in April. By seasons, generally, the highest strengths for every species were registered in the serotinal, while no species had the highest numbers in the vernal one. The dynamics reflect both the climatic or anthropogenic influences and the phenology and the breeding of the birds. Also, they are the results of the number of proves that varied from a season to another, and, consequently, the means of strength/month is more suitable. Thus, relatively equal maximum values from the serotinal to the hiemal season can be noticed for *Anas platyrhynchos*, while the maximum average monthly strength, registered in the hiemal season, was very high comparatively with the second one, registered in autumn, for *A. crecca*; also, relatively identical maximum values were found for *Tachybaptus ruficollis* in the hiemal and autumnal, etc. *Anas platyrhynchos* and *A. crecca* had the highest overall strengths (Table 2). By comparison, *Cygnus olor*, *Netta rufina*, *Spatula querquedula*, *Anas crecca*, *Rallus aquaticus*, *Gallinula chloropus*, *Fulica atra*, *Ciconia nigra*, *C. ciconia*, *Ixobrychus minutus*, *Nyctycorax nyctycorax*, *Ardea purpurea*, *A. alba*, *Egretta garzetta*, *Mycrocarbo pygmeus*, *Gallinago gallinago* and *Larus ridibundus* were not seen in 2022-2023 on the upper Vidraru Dam Basin (MESTECĂNEANU, 2023a, b), although *Spatula querquedula*, *Anas crecca*, *Gallinula chloropus*, *Fulica atra* (MĂTIEȘ, 1974b), *Ardea alba*, *Larus ridibundus* (PETRESCU, 2005) and *Nycticorax nycticorax* (MESTECĂNEANU, 2023b) were previously reported from here. *Megus merganser*, *Anas platyrhynchos*, *Tachybaptus ruficollis*, *Ardea cinerea*, *Phalacrocorax carbo*, *Actitis hypoleucos*, *Larus michahellis* and *L. cachinnans*, were common both sites, while *Anser albifrons* (Scopoli, 1769), *Tadorna tadorna* (Linnaeus, 1758), *Aythya ferina* (Linnaeus, 1758), *Spatula clypeata*

(Linnaeus, 1758), *Mareca penelope* (Linnaeus, 1758), *Podiceps cristatus* (Linnaeus, 1758) and *Tringa ochropus* Linnaeus, 1758, present on Vidraru, can appear on the Oești-Curtea de Argeș Dam Basins at other times. Also, on the Vidraru Dam Basin, *Mergus merganser*, present all year round as breeding species, had the maximum number of individuals in March, *Anas platyrhynchos*, one of the most abundant species at general level, by *Anser albifrons* and before *Mergus merganser*, absent from May to August, had the maximum number in January, *Tachybaptus ruficollis*, appearing from October to February, was the most abundant species in December, *Ardea cinerea*, absent only in May, had the maximum strengths in August, *Phalacrocorax carbo*, every month present, was best represented in September and October, *Actitis hypoleucos* was present in February and August, while *Larus michahellis* and *L. cachinnans*, taken together, were intermittently present, with the maximum strengths in May (MESTECĂNEANU, 2023b). This suggests spatial dynamics of the species in the upper basin of the Argeș River, although the climatic influences, different from a year to another, cannot be excluded.

Table 3. The monthly and seasonal variation of the number of species and of their strengths.

Period	January	February	March	April	May	June	July	August	September	October	November	December	Hiemal	Prevernal	Vernal	Aestival	Serotinal	Autumnal	All year
Number of individuals	134	274	136	101	36	108	201	184	198	242	238	324	970	237	36	108	385	440	2176
Number of species	7	9	10	14	9	14	15	13	12	8	12	10	13	16	9	14	17	12	25
Mainly in passage species	0	6	5	11	4	6	9	9	9	6	10	7	9	14	4	7	13	9	23
Individuals/species	19.1	30.4	13.6	7.2	4.0	7.7	13.4	14.2	16.5	30.3	19.8	32.4	74.6	14.8	4.0	7.7	22.6	36.7	87
Average number of individuals/month	134	274	136	101	36	108	201	184	198	242	238	324	242,5	118,5	36	108	192,5	220	181.3
Average number of species/month	7	9	10	14	9	14	15	13	12	8	12	10	9,5	12	9	14	14	10	11.1
Average number of individuals/average number of species	19.1	30.4	13.6	7.2	4.0	7.7	13.4	14.2	16.5	30.3	19.8	32.4	25,5	9,9	4,0	7,7	13,8	22,0	16.4

The correlation set between the monthly variation of the number of individuals and the temperature was very weak and negative (-0,13) while the correlation set between the seasonal variation of the number of individuals and the temperature was moderate and negative (-0.40). Instead, the correlation between the monthly variation of the number of species and the temperature was moderate and negative (0.45) while the correlation between the seasonal variation of the number of species and the temperature was very weak (practically, negligible) and positive (0.02). Regarding the correlations between the monthly strengths of each species and the temperature (Table 3), moderate and positive values were found for *Cygnus olor*, *Rallus aquaticus*, *Gallinula chloropus*, *Fulica atra*, *Ardea cinerea*, and *Phalacrocorax carbo*, which means that their strengths generally increased as the temperature increased and viceversa. For *Anas crecca* and *Gallinago gallinago*, the correlations were moderate and negative, which means that their strengths generally increased as the temperature decreased and viceversa. In terms of seasons, *Ciconia nigra*, *Nyctycorax nyctycorax*, *Actitis hypoleucos* and *Larus cachinnans* added to the species with moderate and positive correlations, while *Tachybaptus ruficollis* added to the species with moderate and negative correlations. *Netta rufina*, *Ardea alba* and *Gallinago gallinago* were the species with very strong and negative correlations, their strengths increasing as the temperature decreasing, and the other way around. Instead, the correlations of the strengths of *Cygnus olor*, *Gallinula chloropus* and *Fulica atra* with the temperature became null or positive and weak and that can be related to the fact that the appearance of their chicks or of the post-breeding individuals coincided with the increase of the temperature from the warm period of the year. Other parameters can influence the occurrence of the species, and the number of people present on the dam basins is one of them, as previously seen. Thus, in principle, a higher number of people on the reservoirs should lead to a decrease in the numbers of birds, and the other way around, but, actually, not all birds are sensitive to human presence. Additionally, because of their phenology, some individuals can leave or not arrive in response to this element, while chicks of the breeding species can appear on the dam basins although the human presence increases. Consequently, the correlations of the strengths with the number of people are not eloquent enough in this case (Table 4).

The density of individuals/100 ha similarly varied with the strengths, between 283.5, in December, and 31.5, in May, and between 212.2, in the hiemal, and 31.5, in the vernal season. As species, *Anas crecca* stands out with 129.5 individuals/100 ha, in December, and 90.1, in the hiemal season, and, also, *A. platyrhynchos*, with 113.7 individuals/100 ha, in February, and 77.9, in autumnal, while the other species had each below 35 individuals/100 ha, regardless of the considered period. 158.6 individuals/100 ha is the mean density of all species for the year, while *A. platyrhynchos* and *A. crecca*, the species with the highest annual strengths, reached 60.1, respectively 42.9 individuals/100 ha.

Table 4. The correlations between the strengths of every species and the mean of the temperature at 12:00, respectively the average number of people, registered at the moment of observations, by months and seasons (n=1 for January – December and vernal and aestival, n=2 for prevernal, serotinal and autumnal, n=4 for hiemal and n=12 for all the year).

Species	Monthly temperature	Seasonal temperature	Monthly number of people	Seasonal number of people
Cygnus olor	0,40	0,00	0,14	-0,02
Mergus merganser	0,09	-0,19	0,07	0,26
Netta rufina	-0,16	-0,73	-0,22	-0,35
Spatula querquedula	0,06	-0,20	-0,01	0,11
Anas platyrhynchos	-0,10	-0,32	-0,04	-0,36
Anas crecca	-0,52	-0,64	-0,14	-0,26
Tachybaptus ruficollis	-0,35	-0,45	0,43	-0,07
Rallus aquaticus	0,45	0,40	0,26	0,39
Gallinula chloropus	0,54	0,33	-0,28	-0,39
Fulica atra	0,48	0,35	-0,27	0,35
Ciconia nigra	0,32	0,46	-0,22	-0,42
Ciconia ciconia	0,14	-0,13	0,03	0,16
Ixobrychus minutus	0,17	0,20	-0,28	-0,71
Nyctycorax nyctycorax	0,31	0,43	-0,23	-0,53
Ardea cinerea	0,42	0,42	0,70	0,23
Ardea purpurea	-0,05	-0,20	-0,22	-0,48
Ardea alba	-0,27	-0,79	-0,25	-0,60
Egretta garzetta	0,28	0,20	-0,17	-0,24
Mycrocarbo pygmaeus	0,35	0,25	-0,33	-0,15
Phalacrocorax carbo	0,57	0,42	-0,44	-0,43
Gallinago gallinago	-0,64	-0,73	-0,26	-0,35
Actitis hypoleucos	0,28	0,46	-0,15	-0,42
Larus ridibundus	-0,16	-0,20	0,20	0,11
Larus michahellis	0,10	-0,38	-0,08	0,06
Larus cachinnans	0,28	0,46	-0,15	-0,42

As for the density of species/100 ha, it was the highest in July (13.1) and the lowest, in January (6.1). In terms of seasons, it varied between 12.2, in the estival and serotinal season, and 8.3, in the hiemal one, thus reaching 9.7 for the whole year (Table 5). The densities of individuals are a better term of comparison for the dam basins avifauna than the strengths. Thus, the maximum values of individuals/100 ha for the species from the Vidraru Dam Basin were: 3.37, in March, for *Mergus merganser*, 6.66, in January, for *Anas platyrhynchos*, 0.86, in December, for *Tachybaptus ruficollis*, 0.23, in August, for *Ardea cinerea*, 3.04 each, in September and October, for *Phalacrocorax carbo*, 0.05, in August, for *Actitis hypoleucos*, 0.63, in May, for *Larus cachinnans/L. michahellis*. As a whole, the density reached 32.1 individuals/100 ha in November or 10.75, in January, if *Anser albifrons*, viewed only in flight, is excluded (MESTECĂNEANU, 2023b). Much higher densities were attained on the series of dam basins from the upper and middle Argeș River: maximum 1,500 individuals/100 ha, ca. 50 years ago (MUNTEANU & MĂTIEȘ, 1983), 466.6, recently, on the dam basins between Vâlcele and Golești (MESTECĂNEANU & GAVA, 2021), or 508.62, on the same dam basins (maximum 2,850, on Pitești), on October 1, 2022, when *Anas platyrhynchos* reached 120.5 individuals/100 ha (maximum 226.93, on Golești), *A. crecca*, 39.06 (maximum 208.20, on Pitești) and *Fulica atra*, 75.27 (maximum 118.42, on Golești). Also, *Microcarbo pygmeus* reached 8.17 individuals/100 ha, maximum 24.48, and *Ardea alba*, 1.03 individuals/100 ha, maximum 4.20, both on Vâlcele (MESTECĂNEANU & GAVA, 2023).

In terms of phenology at the local level, the majority of the species (23 of them, 92%) were considered preponderantly of passage (11 species, 48% – exclusively of passage), while 1 species (4% each) was predominantly resident (*Cygnus olor*) or an exclusively summer visitor (*Rallus aquaticus*). Individuals from 14 species (56% of all) belonged to several phenological categories; thus, individuals of 6 species (24% of all) were considered residents, individuals of 9 species (36% of all), summer visitors, individuals of 9 species (36% of all), winter visitors and individuals of 24 species (96% of all), passage visitors. The high percent of non-resident species is obvious, and it shows, practically, that all found species had migratory individuals. No species was considered a predominantly or exclusively winter visitor, although it is difficult to clearly affirm, without adequate equipment for individual monitoring, to what extent a species pertains to these categories. Some individuals can be erratic in the area, too. 16 species were seen in the spring passage and 18 in the autumn passage, 10 of them (*Anas platyrhynchos*, *A. crecca*, *Tachybaptus ruficollis*, *Gallinula chloropus*, *Fulica atra*, *Ardea cinerea*, *A. alba*, *Egretta garzetta*, *Phalacrocorax carbo*, *Larus michahellis*) being common both migratory seasons (Table 2). By comparison, 8 species (*Anser albifrons*, *Tadorna tadorna*, *Aythya ferina*, *Spatula clypeata*, *Podiceps cristatus*, *Ardea cinerea*, *Actitis hypoleucos*, and *Tringa ochropus*) were considered principally species of passage on the Vidraru Dam Basin, 3 winter visitors (*Mareca penelope*, *Anas platyrhynchos*, *Tachybaptus ruficollis*),

3 summer visitors (*Phalacrocorax carbo*, *Larus cachinnans*, *L. michahellis*) and 1 resident (*Mergus merganser*) (MESTECĂNEANU, 2023b). Also, on the dam basins from the downstream, 35 species among the ones dependent on the wetlands, were considered mainly summer visitors, 12 mainly of passage, 9 mainly partial migrant, 7 mainly winter visitors, and 1 mainly resident (MESTECĂNEANU & GAVA, 2017). The preponderance of the species in the spring passage against the species in the autumn passage seen in the case of the Vidraru Dam Basin (MESTECĂNEANU, 2023b) was not found now. All these suggest that, in terms of mountain migration, many species prefer to avoid the barrier of the Făgăraș Mountains, which is confirmed by MĂTIEȘ (1971), although, on the other hand, most of the migratory species can cross the highest crests of the Carpathians (MĂTIEȘ, 1969). They are deviated to the low corridors from the east (Rucăr-Bran) and, probably, chiefly, from the west (Turnu Roșu-Cozia), which was previously stated (MĂTIEȘ, 1969, 1977, 1986; MESTECĂNEANU, 2023b). Additionally, other studies (RUDESCU, 1958; STEIN-SPIESS, 1956; MUNTEANU, 1969) validate the migration of some waterbirds through the Cozia Pass, too, while MĂTIEȘ (1977-1979) concluded that waterbirds almost completely avoid the corridor, which is travelled mainly by passeriforms.

Table 5. The mean monthly density of the species observed in the area (individuals/100 ha) (n=1 for January – December and vernal and aestival, n=2 for prevernal, serotinal and autumnal, n=4 for hiemal and n=12 for the entire year).

Species	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Hiemal**	**Prevernal**	**Vernal**	**Aestival**	**Serotinal**	**Autumnal**	**All year**
Cygnus olor	1.7	6.1	1.7	3.5	1.7	4.4	4.4	4.4	8.7	8.7	5.2	4.4	4.4	2.6	1.7	4.4	4.4	8.7	4.6
Mergus merganser	-	-	-	3.5	0.9	-	-	-	-	-	-	-	-	1.7	0.9	-	-	-	0.4
Netta rufina	-	-	-	-	-	-	-	-	-	-	0.9	-	0.2	-	-	-	-	-	0.1
Spatula querquedula	-	-	-	5.2	-	-	-	-	-	-	-	-	-	2.6	-	-	-	-	0.4
Anas platyrhynchos	31.5	113.7	38.5	10.5	9.6	56.0	82.2	62.1	56.9	98.9	65.6	96.2	76.8	24.5	9.6	56.0	72.2	77.9	60.1
Anas crecca	56.9	84.9	28.0	23.6	-	-	15.7	10.5	30.6	46.4	89.2	129.5	90.1	25.8	-	-	13.1	38.5	42.9
Tachybaptus ruficollis	15.7	21.0	19.2	-	-	0.9	2.6	3.5	7.9	28.9	10.5	22.7	17.5	9.6	-	0.9	3.1	18.4	11.1
Rallus aquaticus	-	-	-	0.9	-	0.9	-	-	0.9	0.9	-	-	-	0.4	-	0.9	-	0.9	0.3
Gallinula chloropus	-	1.7	0.9	5.2	2.6	4.4	7.9	31.5	12.2	6.1	9.6	10.5	5.5	3.1	2.6	4.4	19.7	9.2	7.7
Fulica atra	-	-	2.6	4.4	2.6	3.5	1.7	6.1	26.2	0.9	9.6	4.4	3.5	3.5	2.6	3.5	3.9	13.6	5.2
Ciconia nigra	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	0.4	-	0.1
Ciconia ciconia	-	-	-	9.6	2.6	0.9	0.9	0.9	-	-	-	-	-	4.8	2.6	0.9	0.9	-	1.2
Ixobrychus minutus	-	-	-	-	-	0.9	0.9	-	-	-	-	-	-	-	-	0.9	0.4	-	0.1
Nyctycorax nyctycorax	-	-	-	-	-	3.5	14.9	1.7	-	-	-	-	-	-	-	3.5	8.3	-	1.7
Ardea cinerea	6.1	1.7	1.7	5.2	3.5	1.7	8.7	5.2	3.5	21.0	6.1	0.9	3.7	3.5	3.5	1.7	7.0	12.2	5.5
Ardea purpurea	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-	0.9	-	-	0.1
Ardea alba	4.4	-	-	1.7	-	4.4	-	-	0.9	-	-	-	1.1	0.9	-	4.4	-	0.4	0.9
Egretta garzetta	-	-	-	0.9	-	-	-	0.9	-	-	-	-	-	0.4	-	-	0.4	-	0.1
Mycrocarbo pygmaeus	-	-	-	-	-	-	1.7	-	1.7	-	1.7	-	0.4	-	-	-	0.9	0.9	0.4
Phalacrocorax carbo	-	1.7	5.2	-	2.6	7.9	29.7	30.6	21.0	-	7.0	13.1	5.5	2.6	2.6	7.9	30.2	10.5	9.9
Gallinago gallinago	-	7.0	-	-	-	-	-	-	-	-	0.9	0.9	2.2	-	-	-	-	-	0.7
Actitis hypoleucos	-	-	-	-	-	-	2.6	-	-	-	-	-	-	-	-	-	1.3	-	0.2
Larus ridibundus	-	-	19.2	0.9	-	-	-	-	-	-	-	-	-	10.1	-	-	-	-	1.7
Larus michahellis	0.9	1.7	1.7	13.1	5.2	4.4	0.9	2.6	2.6	-	1.7	0.9	1.3	7.4	5.2	4.4	1.7	1.3	3.0
Larus cachinnans	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-	0.4	-	0.1
Mean number of individuals/100 ha	117.2	239.7	119.0	88.4	31.5	94.5	175.9	161.0	173.2	211.7	208.2	283.5	212.2	103.7	31.5	94.5	168.4	192.5	158.6
Mean number of species/100 ha	6.1	7.9	8.7	12.2	7.9	12.2	13.1	11.4	10.5	7.0	10.5	8.7	8.3	10.5	7.9	12.2	12.2	8.7	9.7

Legend: - – absence.

In terms of breeding, 6 species (24%, *Cygnus olor*, *Anas platyrhynchos*, *Gallinula chloropus*, *Fulica atra*, *Ciconia ciconia* and *Larus michahellis*) were certainly breeders, 2 species (8%, *Tachybaptus ruficollis* and *Ardea cinerea*) were probably breeders and 17 species (68%) were non-breeders in the area (Table 2). Some remarks must be done:

Cygnus olor bred on the Oești Dam Basin (1 pair, at least, Fig. 2), *Ciconia ciconia* bred at ca. 1.3 km of the Cerbureni Dam Basin and ca. 2.8 km of the Oesti Dam Basin, in the Albeștii de Argeș Village, and, also, in the Curtea de Argeș City, ca. 0.25 km away from the homonym dam basin, and *Larus michahellis* bred in the Curtea de Argeș City, too, on the building from the dam (Fig. 3). Instead, *Mergus merganser* was the only and certain breeding species on the Vidraru Dam Basin (MESTECĂNEANU, 2023b). Among the species dependent on wetlands from the downstream dam basins between Vâlcele and Golești, 6 were certainly breeding – *Podiceps cristatus*, *Nycticorax nycticorax*, *Anas platyrhynchos*, *Fulica atra*, *Chlydonias hybridus* (Pallas, 1811), *Sterna hirundo* Linnaeus, 1758, 3, probably breeding, 23, possible breeding, and 32, non-breeding (MESTECĂNEANU & GAVA, 2017). The same setting of the breeding species as regards the altitudinal distribution of all species can be seen in this case, too.

Figure 2. Female of *Cygnus olor* with chicks, the Oești Dam Basin, June 4, 2023 (original).

Figure 3. Young of *Larus michahellis* begging food, the Curtea de Argeș Dam Basin, August 14, 2023 (original).

7 species (28% of all, *Ciconia nigra*, *C. ciconia*, *Ixobrychus minutus*, *Nyctycorax nyctycorax*, *Ardea purpurea*, *A. alba*, *Egretta garzetta* and *Mycrocarbo pygmaeus*) are listed in the Annex I of the Directive 2009/147/EC (Bird Directive) and, accordingly, they shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution (Table 2). *Ciconia nigra* was observed on the Curtea de Argeș Dam Basin (1 individual, on August 14, in passage), *C. ciconia* was observed many times between April and August (no more than 11 individuals, in migration, on April 14, over the Curtea de Argeș Dam Basin), *Ixobrychus minutus* was spotted twice in the red bed from the Oești Dam Basin (on June 4 and July 15, rather in passage, than as summer visitor), *Nyctycorax nyctycorax* was observed on Oești and Curtea de Argeș, in June-August (maximum, 17 individuals, on July 15, at the end of Curtea de Argeș Dam Basin), all individuals probably being in passage, and *Ardea purpurea* was observed on the Oești Dam Basin (1 individual, on June 4, in passage). Further, *A. alba* was seldom observed on Oești and Curtea de Argeș (a peak of 5 individuals, on January 15, respectively June 4, 4 individuals of them, each time, on the Oești Dam Basin), probably mainly as species of passage, *Egretta garzetta* was observed on the Curtea de Argeș Dam Basin (1 individual, each, on April 14 and August 14, in passage), while *Mycrocarbo pygmaeus* was observed only on the Oești Dam Basin (2 individuals, each time, on July 15, September 14 and November 10, probably all in passage).

CONCLUSIONS

The waterbird avifauna observed during 2023 on the Oești, Cerbureni and Curtea de Argeș dam basins numbered 25 species and 2,176 individuals. It proved to be poorer comparatively with the one from the downstream dam basins, from the hilly and plain area of the Argeș River, but richer by comparison with the one of Vidraru, a mountain water reservoir from the vicinity. These can be understood as number of species, strengths, number of breeding species, as well as densities of individuals, which reached a peak of 129.5 individuals/100 ha, in December, for *Anas crecca*, and 113.7 individuals/100 ha, in February, for *A. platyrhynchos*.

The position on the river course of the dam basins, and also the clogging influenced the number of individuals and the number of species the lower the reservoirs and the higher the degree of silting, the higher these values. The size of the dam basins had effect mainly on the strengths of the species, too, the larger the reservoirs, the higher the strengths. Instead, the human presence had negative impact on the birds, mainly in the non-usual places, the hunters, followed by the athletes in boats, being the most disturbing.

The number of individuals and the number of species highlight the importance of the dam basins chiefly in the passage periods and in winter, as in the case of the other dam basins from the Argeș Valley, while the breeding period is significant for a lower number of species.

Differences were seen in the monthly dynamics of the species strengths, inclusively in the case of *Anas platyrhynchos* and *A. crecca*, the most abundant of them, which had the maximum numbers in February, respectively December. A spatial dynamic of the species strengths along the upper course of the Argeș River seems to be, too.

The correlations between the number of individuals and the temperature offer clues about the time when each species predominantly occurs in the area, although, to be accurate, the very weak and weak correlations have to be excluded. Thus, the monthly strengths of *Cygnus olor*, *Rallus aquaticus*, *Gallinula chloropus*, *Fulica atra*, *Ardea cinerea*, and *Phalacrocorax carbo* generally increased as the temperature increased and the other way around, while the monthly strengths of *Anas crecca* and *Gallinago gallinago* generally increased as the temperature decreased and the other way around.

Migratory species are the most numerous, whether they are preponderantly or exclusively of passage in the area or summer visitors. The results seem to show that, in a larger context, the species in passage along the Argeș Valley dilute once with the proximity on the dam basins to the mountains, decreasing in terms of number and strengths from the lowlands to the highlands. These suggest that, generally, they head to the lower passes from the west and the east of the Făgăraș Mountains.

Regarding the breeding, *Cygnus olor*, *Anas platyrhynchos*, *Gallinula chloropus*, *Fulica atra*, *Ciconia ciconia* and *Larus michahellis* were certain breeders in the area and *Tachybaptus ruficollis* and *Ardea cinerea* were probably breeders. The observation of a young individual of *Larus michahellis* on the Curtea de Argeș Dam Basin, flying poorly and in search for food, is of maximum interest, attesting the enlarging of the breeding territory of the species on the Argeș Valley, upstream of the Pitești Town, where it was previously known. The breeding of *Cygnus olor*, at 502 m a.s.l., and the absence as breeding species of *Mergus merganser*, identified as certain breeder on the Vidraru dam basin from vicinity, is worth to be mentioned, too.

Among the observed species, *Ciconia nigra*, *C. ciconia*, *Ixobrychus minutus*, *Nyctycorax nyctycorax*, *Ardea purpurea*, *A. alba*, *Egretta garzetta* and *Mycrocarbo pygmaeus* are listed in the Annex I of the Directive 2009/147/EC. Consequently, it means that, while the dam basins where the study was done are not classified as protected avifaunistic areas, a minimum conservation thereof is required. This can be achieved by keeping some areas not disturbed by people and partially silted, with swamp appearance, covered by characteristic vegetation, which will not generate important economic losses, but which will be beneficial for the nature, in general, and for the waterbirds, in particular.

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Mestecăneanu Adrian
The Argeș County Museum, Armand Călinescu, 44, 110047, Pitești, Argeș County, Romania.
E-mail: mestecaneanua@yahoo.com

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