POPULATIONS OF BIRDS IN PADUREA VERDE, TIMISOARA, IN THE AUTUMNAL SEASON

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Abstract: *We chose Padurea Verde for research from the outskirts space of Timisoara, because it is a great green area, compared to the other green spaces within the city, with significant importance to the urban environment and also shelter for bird species that adapt more slowly to the anthropogenic ecosystem. One of urbanization's consequences is threatening to extinction some bird species. This paper aims at highlighting the adaptability of bird species that are in decline across Europe and the number of habitats important as barometer for preserving biodiversity in urban areas. Internationally, this kind of research is attempted to contribute at the composition of databases concerning the biodiversity in urban areas and finding strategies for its conservation. Some bird species constitute sensitive indicators for the quality of urban life, which makes the avifauna diversity to be a problem today. The investigation method applied is based on the path method (Ferry and Frochot, 1958), which is improved by processing a statistical method established by specialists from the Zoology Department of the Faculty of Chemistry, Biology and Geography of the Western University of Timisoara. From the taken observations, it results that there are present 31 bird species, characteristic for this season and for this type of ecosystem, and that also includes species that are in the autumn migration, water birds and antropofile species whose presence is due to the peculiarities of this forest. The degrees of dominance are distributed as follows: 6 absolutely dominant species: Parus major, Parus caeruleus, Passer montanus, Anas plathyrhynchos, Columba livia domestica, Fulica atra, 11 dominant species, 9 subdominant species, 5 auxiliary species. According to the Official Journal of the European Union, to Directive 79/409/EEC and to the Emergency Ordinance nr.57/20.07.2007, 70% of this species are of national and community interest. They are described in various specialty papers as being well adapted to the tumultuous life of the city and extremely inventive when environmental conditions change.*

Key words**:** *diversity, bird populations, Padurea Verde, Timisoara*

INTRODUCTION

Green Forest is located in the north-eastern side of Timisoara and its surface, measuring about 737 hectares, is divided into 78 plots more or less square shaped. It is crossed by Behelea river whose bed is sinuous, it is 1-3 m deep and 4-8 meters wide and has many meanders. At the northern limit of forest stands Dumbravita Lake, an artificial lake with recreational purposes, filled in by Beherlea river. The east side of the lake is not arranged, it shows and stands hygrophile marsh vegetation, being a favorable place for the water-dwelling species. As Padurea Verde vertical structure falls in the forest type floor, with some pockets of the stand-type distribution gardening. It is a typical forest of pedunculate oak whose stratification is observed even since the first line. The relevant species are *Quercus robur*, *Carpinus betulus* and *Fraxinus excelsior*, plus *Acer tataricum*, *Acer campestris*, *Quercus Cerris*, *Tyllia sp*., *Robinia pseudacacia* measuring 40 m height, the shrub layer includes *Crataegus monogyna*, *Prunus spinosa*, *Cornus mas*, *Ligustrum vulgare*, the herbaceous layer being composed of mosses and lichens and herbaceous plants. Woody plants are an existential condition for the populations of birds in any ecosystem.

MATERIAL AND METHODS

The investigation method applied is based on the routes method (FERRY and FROCHOT, 1958), improved by Prof. Univ. Phd. Biol. Dan STĂNESCU, by including in the calculation of threshold values of the dominant three indices, besides assessing the participation percentage. These indices are: kilometric abundance index (IKA), biomass, metabolic index, called consumption by KORODY (1958), reconsidered by STĂNESCU et al. (1999) as a metabolic index, which is actually the flies or body surface area calculated by the energy loss by Turcek in the tables that bear his name. According to him, STĂNESCU et al. (1999) speaks of the involvement of the user or consumer species in the ecosystem.

Dominance thresholds values are considered as follows:

→ absolute dominance threshold is given by all values placed above the average values plus standard deviation,

→ dominance threshold of all values that are above the average values

→ subdominance threshold of all values above the average value minus standard deviation

→ auxiliary threshold of all values less than the average values and standard deviation

→ the quality of accident (accident) of all values under 20% of the auxiliary value (STĂNESCU et al. 1999).

Margin of error is calculated by 0.05%.

All calculation is made by using a soft, made in the informatics laboratory of Zoology Department belonging to the Faculty of Biology, Geography and Chemistry (West University of Timişoara). Currently the program is in the custody of Prof. Dan Stănescu.

RESULTS AND DISCUSSIONS

Investigations have been made between 10/12/2008 to 10/30/2010. Results will be presented in the tables bellow.

Table 1

Table1. Avifauna from Padurea Verde in autumn season, 2008

Crt. Nr.	SPECIES	IKA	FREC (%)	BIOM	I_{CONS}	Σ_{LOG}	DOMINANCE
1	*Streptopelia decaocto*	1.79	2.62	**7.04**	**5.29**	16.74	AD
2	*Corvus frugilegus*	1.10	1.93	**7.31**	**5.24**	15.58	DOM
3	*Columba livia domestica*	1.39	1.93	6.98	5.12	15.42	DOM
4	*Sitta europaea*	**2.40**	**2.85**	5.58	4.52	15.34	DOM
5	*Garulus glandarius*	1.39	2.34	6.52	4.81	15.06	DOM
6	*Passer domesticus*	2.08	2.62	5.48	4.35	14.53	DOM
7	*Parus caeruleus*	2.08	2.62	4.64	3.79	13.14	SD
8	*Parus major*	1.79	2.62	4.69	3.72	12.82	SD
9	*Falco tinnunculus*	0.00	1.24	5.30	3.53	10.07	AUX
						SUM	128.70
						AVERAGE	14.30
						STANDARD DEVIATION	2.00

IKA - mileage index of abundance, FREC - frequency, BIOME - biomass, Icons - index of consumption, AD - absolutely dominant, DOM – dominant, SD - subdominant, AUX - auxiliary.

The investigations have been made during this year for a shorter period, that is why the number of species is smaller.

The degree of absolute dominance is that of an ubicvista species (*Streptopelia*

decaocto), invasive species in our fauna which led to the decline of native species *Streptopelia turtur*. This place is due to the biomass and to the high consumptive index, as the first dominant species *Corvus frugilegus* (antropofile species) is an important pawn in the power transfer in the ecosystem.

The highest frequency is that of a characteristic species for the forest ecosystem - *Sitta europea.*

Table 2

Avifauna from Padurea Verde in autumn season, 2009

Crt. Nr.	SPECIES	IKA	FREC (%)	BIOM	I_{CONS}	Σ_{LOG}	DOMINANCE
1	*Anas platyrhinchos*	1.92	8.30	**9.92**	**7.56**	21.70	AD
2	*Fulica atra*	1.39	2.17	**8.99**	**6.76**	19.30	AD
3	*Passer montanus*	**2.87**	1.83	7.00	5.93	17.63	AD
4	*Columba livia domestica*	1.48	1.61	8.00	6.13	17.22	AD
5	*Aytha nyroca*	0.69	1.32	8.16	5.98	16.15	DOM
6	*Ardea cinerea*	0.18	0.92	8.59	6.10	15.79	DOM
7	*Phasianus colchicus*	0.18	1.32	7.84	5.60	14.94	DOM
8	*Saxicola rubetra*	**1.86**	**2.30**	5.77	4.77	14.70	DOM
9	*Buteo buteo*	0.18	0.92	7.78	5.55	14.44	DOM
10	*Parus caeruleus*	**1.79**	**2.79**	5.27	4.42	14.27	DOM
11	*Parus major*	1.28	2.42	5.09	4.12	12.19	DOM
12	*Dendrocopos major*	0.18	0.92	5.48	4.02	10.60	SD
13	*Circus cyaneus*	-0.92	0.22	6.29	4.19	9.79	SD
14	*Lanius collurio*	0.18	1.32	4.50	3.37	9.37	SD
15	*Dendrocopos medius*	-0.22	0.92	4.79	3.42	8.90	SD
16	*Pica pica*	-0.92	0.22	5.60	3.60	8.50	SD
17	*Falco tinnunculus*	-0.92	0.22	5.30	3.53	8.14	SD
18	*Garrulus glandarius*	-0.92	0.22	5.14	3.42	7.87	AUX
19	*Sitta europaea*	- 0.22	0.92	3.87	2.81	7.38	AUX
20	*Erithacus rubecula*	-0.22	0.92	3.47	2.54	6.70	AUX
21	*Cinclus cinclus*	- 0.92	0.22	3.91	2.61	5.83	AUX
						SUMM	262.13
						AVERAGE	12.48
						STANDARD DEVIATION	4.56

Table 3

Avifauna from Padurea Verde, in autumn season, 2010

Crt. Nr.	SPECIES	IKA	FREC (%)	BIOM	I_{CONS}	Σ_{LOG}	DOMINANCE
1	*Parus caeruleus*	2.53	3.05	5.78	4.93	16.29	AD
2	*Aegithalos caudatus*	2.71	3.11	5.60	4.87	16.28	AD
3	*Parus major*	2.14	2.80	5.72	4.76	15.43	AD
4	*Garrulus glandarius*	0.92	1.55	6.75	5.03	14.24	DOM
5	*Dendrocopos major*	1.25	1.77	6.33	4.87	14.22	DOM
6	*Asio otus*	0.00	0.86	6.40	4.50	11.75	SD
7	*Sitta europaea*	1.10	1.77	4.97	3.91	11.75	SD
8	*Turdus merula*	0.41	1.26	5.70	4.17	11.54	SD
9	*Corvus corax*	- 0.69	0.16	7.13	4.75	11.35	SD
10	*Falco tinnunculus*	0.00	0.86	5.59	4.23	11.07	SD
11	*Anas plathyrhyncos*	- 0.69	0.10	6.10	5.03	11.05	SD
12	*Phylloscopus collybita*	1.61	1.26	4.38	3.69	10.94	SD
13	*Falco peregrinus*	-0.69	0.16	6.86	4.57	10.90	SD
14	*Buteo buteo*	-0.69	0.16	6.68	4.46	10.61	SD
15	*Fringilla coelebs*	0.69	1.26	4.61	3.53	10.09	AUX
16	*Erithacus rubecula*	0.69	1.55	4.16	3.23	9.64	AUX
						SUMM	186.10
						AVERAGE	12.41
						STANDARD DEVIATION	2.25

This year there were registered 21 species of which five species due to their proximity to Dumbravita Lake, one of the conditions of the existence of these species are marsh vegetation, and the proximity to the hygrophile body of water: *Anas plathyrhynchos, Aytha nyroca, Ardea cynerea, Fulica atra, Cinclus cinclus*, these, except the last species (species auxiliary), have absolute dominance and dominance cues due to the higher energy (biomass and consumptive index). Among the absolute dominant, most common bird is *Paser montanus*, a species characteristic of open spaces. As the dominant species characteristic for the forest ecosystems we meet *Parus major* and *P. caeruleus*.

There were registered 16 species characteristic for the forest ecosystems. During this year there was a lower share of water birds due to the works for the development of one part of Dumbravita Lake, to fishing and hunting organization. Three species have absolutely dominant value: *Parus major*, *Parus caeruleus* and *Aegithalus caudatus*, all excelling in frequency.

Table 4

Avifauna of Padurea Verde in the autumnal seasons, 2008-2010

Crt. Nr.	SPECIES	IKA	FREC (%)	BIOM	I_{CONS}	Σ_{LOG}	DOMINANCE
1	*Anas plathyrhynchos*	1.13	1.42	9.92	7.56	20.03	AD
2	*Fulica atra*	0.60	1.28	8.99	6.76	17.63	AD
3	*Parus caeruleus*	2.17	2.89	6.44	5.58	17.08	AD
4	*Columba livia domestica*	1.00	1.13	8.31	6.44	16.88	AD
5	*Parus major*	1.76	2.63	6.36	5.39	16.14	AD
6	*Passer montanus*	2.08	0.95	7.00	5.83	15.96	AD
7	*Garrulus glandarius*	0.60	1.42	7.44	5.73	15.18	DOM
8	*Aytha nyroca*	-0.10	0.44	8.16	5.98	14.48	DOM
9	*Aegithalos caudatus*	1.70	2.28	5.60	4.87	14.44	DOM
10	*Sitta europaea*	1.24	1.82	6.12	5.06	14.25	DOM
11	*Ardea cinerea*	-0.61	0.03	8.59	6.10	14.11	DOM
12	*Buteo buteo*	-0.32	0.44	8.07	5.84	14.03	DOM
13	*Dendrocopos major*	0.60	1.28	6.68	5.22	13.79	DOM
14	*Phasianus colchinus*	-0.61	0.44	7.84	5.60	13.27	DOM
15	*Streptopelia decaocto*	0.09	0.72	7.04	5.29	13.14	DOM
16	*Saxicola rubetra*	1.07	1.42	5.77	4.77	13.02	DOM
17	*Falco tinnunculus*	0.32	0.72	6.68	4.92	12.01	DOM
18	*Corvus frugilegus*	-0.61	0.03	7.31	5.24	11.98	SD
19	*Passer domesticus*	0.37	0.72	5.48	4.35	10.93	SD
20	*Asio otus*	-1.01	0.03	6.40	4.50	9.91	SD
21	*Turdus merula*	- 0.61	0.44	5.70	4.17	9.70	SD
22	*Corvus corax*	-1.70	-0.66	7.13	4.75	9.51	SD
23	*Eritachus rubecula*	0.09	1.13	4.56	3.64	9.42	SD
24	*Phylloscopus collybita*	0.60	0.44	4.38	3.69	9.10	SD
25	*Falco peregrinus*	-1.70	-0.66	6.86	4.57	9.06	SD
26	*Fringilla coelebs*	-0.32	0.44	4.61	3.53	8.25	SD
27	*Lanius collurio*	-0.61	0.44	4.50	3.37	7.70	AUX
28	*Dendrocopus medius*	-1.01	0.03	4.79	3.42	7.23	AUX
29	*Lanius excubitor*	-1.61	-0.91	4.17	2.78	4.44	AUX
30	*Carduelis chloris*	-1.61	-0.91	3.33	2.22	3.04	AUX
31	*Pica pica*	-1.70	-0.66	5.60	4.77	6.83	AUX
						SUMM	377.33
						AVERAGE	12.17
						STANDARD DEVIATION	3.74

Overall there were seen 31 bird species from which six species are absolut dominant, 11 dominant species, 9 subdominant species, 5 auxiliary species characteristic for steppe area and for this season. To this we add some water species and antropofil species due to the peculiarities of this forest.

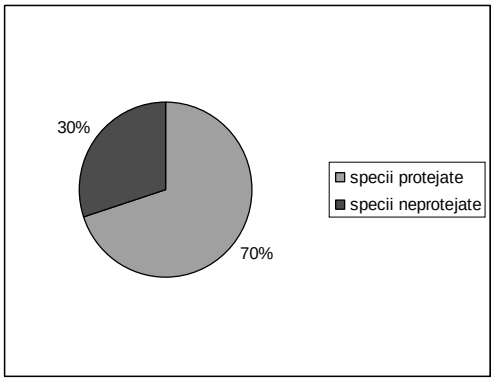

Figure 1: Percentage representation of the protected birds from Padurea Verde according to Directive 79/409/EEC and GEO nr.57/20.07.2007

CONCLUSIONS

Totally, during these seasons in three years of study, we registered 31 species.

There are 6 absolut dominant species, 11 dominant species, 9 subdominant species, 5 auxiliary species.

The largest share in terms of quality is owned by species characteristic for deciduous forests.

Bird species listed in the Directive 79/409/EEC: *Erithacus rubecula, Falco tinnunculus, Accipiter Gentiles, Accipiter nisus, Aegithalos caudatus, Alauda arvensis, Alcedo athis, Anas platyrhynchos, Aythya Keep away, Aythya nyroca, Chlidonias hybridus, Chlidonias niger, Cinclus cinclus, frugilegus Corvus, Corvus monedula, Dendrocopus medius, Dendrocopus syriacus, Falco peregrinus, Lanius collurio, Pica pica, Streptopelia decaocto, Turdus merula*.

70% species of national and European interest in accordance with Directive 79/409/EEC and OUG. 57/20.07.2007.

The neighborhood with recreational Dumbravita Lake increases avifauna diversity by adding some water species on the list.

Human activities such as hunting, picnics, the airport proximity, all this factors influence the forest diversity.

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