



ORNITHOLOGICAL STUDY IN THE SUCEAVA RIVER'S MIDDLE BASIN

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SYNOPSIS

We present the results of an ornithological research done in the middle part of the Suceava River basin during the period 2006 – 2008. The avifauna list includes 125 bird species (12 species included in the Romanian Red Book of Vertebrates), the passerines being dominants with 68 species (54.40% from whole recorded avifauna). During the year, the greatest bird species' diversity (107 species) was recorded during the spring migration (March - April) while during the winter, we identified just 64 bird species. The breeding avifauna includes 86 bird species (69% from the recorded avifauna), 13 from them being new breeding species in the area. The human pressure has a high level – the deforestation and the garbage deposits represent the most important threatening factors for birds.

INTRODUCTION

The Suceava River has its springs in the northern part of Romania, on Suceava County's territory, from the eastern Carpathians Mountains (Izvoarele Sucevei village). It is affluent of Siret River, with a length about 172 km, forming a basin about 2616 km² surface; the confluence point is situate near the Liteni village.

The Middle Basin of the Suceava River, sprawling in the Rădăuți Swale area, consists mainly of the Suceava River itself and four rivulets: Voitineli, Boișa, Horodnic and Pozen. The Pozen rivulet collects water from Toplita and Sucevita brook, having a area about 148 km² and a length of 28 km. The Sucevita's branches are the brooks of Rusca, Bercheza, Voievodeasa, Soarecul, Volovat and Temnic. From the north side, the river of Suceava receives water from Bilca and Paraul Rusului brooks.

The climate of the area is temperate–continental, with cold winters and warm summers. The average yearly temperature is about 8.2 °C, below the country's average temperature. The winds are blowing predominantly from the north and north – west during the winter and autumn time, while during the spring, from south and south – east directions. The annual average of precipitation is of 627.7 mm and the relative humidity average is above 80%, which makes of Rădăuți City (situated in our study area, at the altitude of 374 m) a true humidity pole in Romania.

The vegetation represents the vector that marks the habitats of birds, playing an important role in the birds' distribution and life. In the Middle Basin of Suceava River, the principal ecosystems are:

- a) the agricultural fields, where the predominant species are the cultivated ones;
- b) the mixed forest lands, situated, especially, in the western and southern side of the study area; on the eastern side of Obcina Mare Mountain, the coniferous woods descent until the altitudes of about 400 m, being mixed with numerous species of deciduous tree species;
- c) the river meadows and riversides cover large surfaces along the Suceava River and near villages, the meadow areas are getting narrow. The Sucevița River present, also, some well developed areas of river meadows.

METHODS AND PERIOD OF STUDY

Our ornithological research was done in the middle part of the Suceava River basin during the period 2006' spring – 2008's June, but the first fieldworks began in 2003, in Sucevita riverside and surrounding forest. The main used method was the visual transect survey, but we also used the visual point survey method. The meteorologically parameters were estimated in field, but we have used data from the Radauți Meteorologically Station, too. For the crepuscular and night active birds like the owls, *Crex crex* and *Caprimulgus europaeus*, the observations were made during the night, using their sonic emissions to identify the species and to count the effectives.

RESULTS AND DISCUSSIONS

The avifauna list includes 125 bird species (table 1), that are belong to 15 orders and 42 families, the passerines being dominants with 68 species (54.40% from whole recorded avifauna). The situation is valid only for the study period, because there are situations when a species uncharacteristically for the area, was observed only one time, therefore the possibility that some species could be omitted. We consider that those accidental apparitions cannot modify significantly the birds' systematic list of the study area.

Table 1 - The bird species' phenology status in the Suceava River middle basin (2003 - 2008)

No.	Species	N	D	J	F	M	A	M	J	J	A	S	O
1	<i>Tachybaptus ruficollis</i>	-	-	+	+	+	-	-	-	-	-	+	-
2	<i>Casmerodius albus</i>	-	-	-	-	-	+	-	-	-	-	-	-
3	<i>Ardea cinerea</i>	-	-	+	+	+	+	+	+	+	+	+	-
4	<i>Nycticorax nycticorax</i>	-	-	-	-	-	+	-	-	-	-	-	-
5	<i>Ciconia ciconia</i>	-	-	-	-	+	+	+	+	+	+	+	-
6	<i>Ciconia nigra</i>	-	-	-	-	-	+	+	+	+	+	+	-
7	<i>Cygnus olor</i>	-	-	-	-	+	-	-	-	-	-	-	-
8	<i>Anser anser</i>	-	-	+	-	-	-	-	-	-	-	-	-
9	<i>Anas platyrhynchos</i>	+	+	+	+	+	+	+	+	+	+	+	+

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10	<i>Anas crecca</i>	-	-	-	+	+	+	-	-	-	-	-	-
11	<i>Anas querquedula</i>	-	-	-	-	+	-	-	-	-	-	-	-
12	<i>Gyps fulvus</i>	-	-	-	-	-	-	-	-	-	-	+	-
13	<i>Aquila pomarina</i>	-	-	-	-	+	+	+	+	+	+	+	-
14	<i>Aquila clanga</i>	-	+	-	-	-	-	-	-	-	-	-	-
15	<i>Circus aeruginosus</i>	-	-	-	-	-	+	+	+	+	+	-	-
16	<i>Buteo buteo</i>	+	+	+	+	+	+	+	+	+	+	+	+
17	<i>Pernis apivorus</i>	-	-	-	-	-	-	+	+	+	+	+	-
18	<i>Accipiter nisus</i>	+	+	+	+	+	+	+	+	+	+	+	+
19	<i>Accipiter gentilis</i>	+	+	+	+	+	+	+	+	+	+	+	+
20	<i>Falco tinnunculus</i>	+	-	-	-	+	+	+	+	+	+	+	+
21	<i>Falco subbuteo</i>	-	-	-	-	-	-	+	+	+	+	+	-
22	<i>Falco columbarius</i>	-	+	-	-	-	-	-	-	-	-	-	-
23	<i>Perdix perdix</i>	+	+	+	+	+	+	+	+	+	+	+	+
24	<i>Coturnix coturnix</i>	-	-	-	-	-	-	+	+	+	+	+	-
25	<i>Crex crex</i>	-	-	-	-	-	-	+	+	+	+	+	-
26	<i>Charadrius dubius</i>	-	-	-	-	-	+	+	+	+	+	+	-
27	<i>Vanellus vanellus</i>	-	-	-	+	+	+	+	+	+	+	+	+
28	<i>Tringa glareola</i>	-	-	-	-	-	+	-	-	-	-	-	-
29	<i>Tringa ochropus</i>	-	+	+	+	+	+	+	-	-	+	+	-
30	<i>Tringa nebularia</i>	-	-	-	-	-	+	-	-	-	+	+	-
31	<i>Actitis hypoleucos</i>	-	-	-	-	+	+	+	-	-	+	+	-
32	<i>Gallinago gallinago</i>	-	-	-	-	-	+	-	-	-	-	-	-
33	<i>Larus ridibundus</i>	+	-	-	+	+	+	+	+	+	+	+	+
34	<i>Larus cachinnans/michahellis</i>	-	-	-	-	+	+	+	+	+	+	+	+
35	<i>Sterna hirundo</i>	-	-	-	-	-	+	+	-	-	-	+	-
36	<i>Chlidonias hybridus</i>	-	-	-	-	-	+	+	+	+	+	+	-
37	<i>Columba oenas</i>	-	-	-	-	+	+	+	+	+	+	+	-
38	<i>Columba palumbus</i>	-	-	-	-	+	+	+	+	+	+	+	+
39	<i>Streptopelia decaocto</i>	+	+	+	+	+	+	+	+	+	+	+	+
40	<i>Streptopelia turtur</i>	-	-	-	-	-	+	+	+	+	+	+	-
41	<i>Cuculus canorus</i>	-	-	-	-	-	+	+	+	+	+	+	-
42	<i>Athene noctua</i>	+	+	+	+	+	+	+	+	+	+	+	+
43	<i>Strix aluco</i>	+	+	+	+	+	+	+	+	+	+	+	+
44	<i>Asio otus</i>	+	+	+	+	+	+	+	+	+	+	+	+
45	<i>Caprimulgus europaeus</i>	-	-	-	-	-	-	+	+	+	+	-	-
46	<i>Apus apus</i>	-	-	-	-	-	-	+	+	+	+	-	-
47	<i>Upupa epops</i>	-	-	-	-	-	+	+	+	+	+	+	-
48	<i>Alcedo atthis</i>	+	+	+	+	+	+	+	+	+	+	+	+
49	<i>Merops apiaster</i>	-	-	-	-	-	-	+	+	-	-	-	-
50	<i>Picus viridis</i>	+	+	+	+	+	+	+	+	+	+	+	+
51	<i>Picus canus</i>	+	+	+	+	+	+	+	+	+	+	+	+
52	<i>Dendrocopus major</i>	+	+	+	+	+	+	+	+	+	+	+	+
53	<i>Dendrocopus syriacus</i>	+	+	+	+	+	+	+	+	+	+	+	+
54	<i>Dendrocopus medius</i>	+	+	+	+	+	+	+	+	+	+	+	+
55	<i>Dendrocopus minor</i>	+	+	+	+	+	+	+	+	+	+	+	+
56	<i>Dryocopus martius</i>	+	+	+	+	+	+	+	+	+	+	+	+
57	<i>Alauda arvensis</i>	-	-	-	+	+	+	+	+	+	+	+	+
58	<i>Galerida cristata</i>	+	+	+	+	+	+	+	+	+	+	+	+
59	<i>Riparia riparia</i>	-	-	-	-	-	-	+	+	+	+	-	-

60	<i>Delichon urbica</i>	-	-	-	-	-	+	+	+	+	+	+	+
61	<i>Hirundo rustica</i>	-	-	-	-	-	+	+	+	+	+	+	+
62	<i>Anthus trivialis</i>	-	-	-	-	+	+	+	+	+	+	+	-
63	<i>Motacilla alba</i>	-	-	-	-	+	+	+	+	+	+	+	+
64	<i>Motacilla cinerea</i>	-	-	-	-	-	+	+	+	+	+	+	-
65	<i>Motacilla flava</i>	-	-	-	-	-	+	+	+	+	+	+	-
66	<i>Troglodytes troglodytes</i>	+	+	-	-	+	+	+	+	+	+	+	+
67	<i>Cinclus cinclus</i>	-	+	+	+	-	-	-	-	-	-	-	-
68	<i>Bombycilla garrulus</i>	-	-	-	+	+	-	-	-	-	-	-	-
69	<i>Prunella modularis</i>	-	-	-	-	-	+	-	-	-	-	-	-
70	<i>Erithacus rubecula</i>	-	-	-	-	+	+	+	+	+	+	+	+
71	<i>Luscinia luscinia</i>	-	-	-	-	-	+	+	+	+	+	-	-
72	<i>Phoenicurus ochruros</i>	-	-	-	-	+	+	+	+	+	+	+	+
73	<i>Oenanthe oenanthe</i>	-	-	-	-	+	+	+	+	+	+	+	-
74	<i>Saxicola rubetra</i>	-	-	-	-	-	+	+	+	+	+	+	+
75	<i>Saxicola torquata</i>	-	-	-	-	+	+	+	+	+	+	+	+
76	<i>Turdus pilaris</i>	+	+	+	+	+	+	+	+	+	+	+	+
77	<i>Turdus philomelos</i>	-	-	-	-	+	+	+	+	+	+	+	+
78	<i>Turdus viscivorus</i>	+	-	-	-	+	+	+	+	+	+	+	+
79	<i>Turdus merula</i>	-	-	-	+	+	+	+	+	+	+	+	+
80	<i>Sylvia curruca</i>	-	-	-	-	-	+	+	+	+	+	+	+
81	<i>Sylvia communis</i>	-	-	-	-	-	+	+	+	+	+	+	-
82	<i>Sylvia atricapilla</i>	-	-	-	-	-	+	+	+	+	+	+	-
83	<i>Sylvia borin</i>	-	-	-	-	-	+	+	+	+	+	-	-
84	<i>Phylloscopus trochilus</i>	-	-	-	-	-	+	+	+	+	+	-	-
85	<i>Phylloscopus sibilatrix</i>	-	-	-	-	-	+	+	+	+	+	+	-
86	<i>Phylloscopus collybita</i>	-	-	-	-	-	+	+	+	+	+	+	+
87	<i>Regulus regulus</i>	+	+	+	+	+	+	+	+	+	+	+	+
88	<i>Regulus ignicapillus</i>	+	+	+	+	-	-	-	-	-	-	-	-
89	<i>Muscicapa striata</i>	-	-	-	-	-	-	+	+	+	+	+	-
90	<i>Ficedula hypoleuca</i>	-	-	-	-	-	+	+	+	+	+	+	-
91	<i>Ficedula albicollis</i>	-	-	-	-	-	+	+	-	-	-	-	-
92	<i>Parus major</i>	+	+	+	+	+	+	+	+	+	+	+	+
93	<i>Cyanistes caeruleus</i>	+	+	+	+	+	+	+	+	+	+	+	+
94	<i>Periparus ater</i>	+	+	+	+	+	+	+	+	+	+	+	+
95	<i>Poecile palustris</i>	+	+	+	+	+	+	+	+	+	+	+	+
96	<i>Aegithalos caudatus</i>	+	+	+	+	+	+	+	+	+	+	+	+
97	<i>Sitta europaea</i>	+	+	+	+	+	+	+	+	+	+	+	+
98	<i>Certhia familiaris</i>	+	+	+	+	+	+	+	+	+	+	+	+
99	<i>Oriolus oriolus</i>	-	-	-	-	-	-	+	+	+	+	-	-
100	<i>Lanius collurio</i>	-	-	-	-	-	+	+	+	+	+	+	-
101	<i>Lanius excubitor</i>	+	+	+	+	+	+	+	+	+	+	+	+
102	<i>Garrulus glandarius</i>	+	+	+	+	+	+	+	+	+	+	+	+
103	<i>Pica pica</i>	+	+	+	+	+	+	+	+	+	+	+	+
104	<i>Nucifraga caryocatactes</i>	+	+	+	+	+	+	+	+	+	+	+	+
105	<i>Corvus monedula</i>	+	+	+	+	+	+	+	+	+	+	+	+
106	<i>Corvus frugilegus</i>	+	+	+	+	+	+	+	+	+	+	+	+
107	<i>Corvus cornix</i>	+	+	+	+	+	+	+	+	+	+	+	+
108	<i>Corvus corax</i>	+	+	+	+	+	+	+	+	+	+	+	+
109	<i>Sturnus vulgaris</i>	+	+	-	-	+	+	+	+	+	+	+	+
110	<i>Passer domesticus</i>	+	+	+	+	+	+	+	+	+	+	+	+

111	<i>Passer montanus</i>	+	+	+	+	+	+	+	+	+	+	+
112	<i>Fringilla coelebs</i>	+	+	+	+	+	+	+	+	+	+	+
113	<i>Fringilla montifringilla</i>	-	-	-	-	+	-	-	-	-	-	-
114	<i>Carduelis cannabina</i>	+	-	-	-	+	+	+	+	+	+	+
115	<i>Carduelis flammea</i>	-	-	+	-	-	-	-	-	-	-	-
116	<i>Carduelis carduelis</i>	+	+	+	+	+	+	+	+	+	+	+
117	<i>Carduelis chloris</i>	+	+	+	+	+	+	+	+	+	+	+
118	<i>Carduelis spinus</i>	+	+	+	+	-	-	-	-	-	-	+
119	<i>Serinus serinus</i>	-	-	-	-	+	+	+	+	+	+	+
120	<i>Pyrrhula pyrrhula</i>	+	+	+	+	+	+	+	+	+	+	+
121	<i>Coccothraustes coccothraustes</i>	+	+	+	+	+	+	+	+	+	+	+
122	<i>Emberiza schoeniclus</i>	-	-	-	-	-	+	+	+	+	+	-
123	<i>Emberiza citrinella</i>	+	+	+	+	+	+	+	+	+	+	+
124	<i>Miliaria calandra</i>	-	-	-	-	+	+	+	+	+	+	+

Legend: N D J F M A M J J A O – the initials of each month, starting with November

From the total of 125 identified species, the summer visitors present the highest diversity, with 48 species, meaning about 33% from the whole birds' fauna. There are just 5 species of winter visitors, meaning 4% out of the total of identified species. We mark, as winter visitor, the presence of Green Sandpiper (*Tringa ochropus*), observed in each winter during the study period. For example, in the 4th of January 2006, we have observed 2 exemplars; on the 23rd December 2007, 1 exemplar; on the 13th January 2007, 2 exemplars; on the 10th January 2008, 2 exemplars; on the 06th February 2008, 3 exemplars. All the recordings were made on the riversides of Sucevita and Volovat brooks. We mentioned that in Romania, the species is considered a passage one. In the area it is quoted as rare, in passage (Trelea, 2002; Trelea, Postolache & Bolboaca, 2005). The passage visitors are 11 bird species (about 8% from the whole birds' fauna), while the semi-migrants represent 8%.

There are quite a large number of vagrant species for the area (12 species) representing 9.6% from the recorded birds' fauna:

- *Casmerodius albus* - one recording, on the 22nd March 2007, one exemplar, near Fratautii vechi village, on Suceava River.
- *Nycticorax nycticorax* - one recording, on the 30th April 2008, on the riverside of Suceava River, one adult exemplar.
- *Cygnus olor* - on the 11th March 2006, a pair in flight along the Sucevita water course, between the Radauti and Badeuti localities. This is the second observation of the species in the area, after one exemplar seen in 1995, on the Suceava river course, near Vicovul de Sus (Trelea, 2002).
- *Anser anser* - only one observation, a pair seen it on the 7th January 2007, on the banks of the Sucevita creek, near the confluence with Pozen River.
- *Gyps fulvus* - on the 9th September 2007, one juvenile exemplar was captured after landing in the yard of a villager in Horodnic de Sus. The griffon vulture was board in a special cage, was feed, parasite-removed and released on the 14th September. The bird was one year old, born in Croatia (ringed, so, we obtained the information through an e-mail communication).

- *Aquila clanga* - one observation, in the 30th December 2006, 2 exemplars in flight at low high, along the course of Sucevita Creek, south of Radauti.
- *Tringa glareola* - observed once, on the 22nd April 2006, 3 exemplars, on the Suceava riverside, near Maneuti village.
- *Bombycilla garrulus* was recorded twice, on the 11th February 2006, on Suceava's riverside, near Satu Mare village, a flock of 9 individuals, respectively, on the 25th March 2006, in Radauti City, with 5 exemplars.
- *Prunella modularis* - on the 22nd April 2007, one exemplar in the Sucevita's riverside, south of Radauti.
- *Ficedula albicollis* - 3 exemplars observed on the Sucevita's meadows on the 12th April 2008.
- *Fringilla montifringilla* - on the 5th March 2006, we have seen 20 exemplars on the Suceava river meadows, near Satu Mare village, respectively, 3 exemplars near Radauti, on the Pozen riverside, on the 11th March 2006, too.
- *Carduelis flammea* - two observations in the month of January the year 2006, on the 4th near Radauti, 40 exemplars, respectively, on the 5th, on the Suceava riverside, near Dornesti, 6 exemplars.

Comparing our study with that realized in the period 1990 - 1997 in the Radauti Depression (Trelea, 2002), unity that is approximate the same with the Middling Basin of Suceava River, we revealed an increase in percentage of sedentary birds from 29 to 33% and the decrease of summer visitors from 47 to 37 %.

During the year, the greatest bird species' diversity (107 species) was recorded during the spring migration (March - April) while during the winter, we identified just 64 bird species.

A number about 14 species are included in the Romanian Red Book of Vertebrates: 8 species are vulnerable, 2 are threatened and another 2 species are critically threatened. From the IUCN Red List, *Crex crex* is considered almost threatened, while *Aquila clanga* is vulnerable.

The breeding avifauna includes 86 bird species (69% from the recorded avifauna), compared with Radauti Depression, where from a total of 126 identified species, only 80 were breeding species (Trelea, 2002). Some species of the recorded breeding birds' fauna represent new breeding species in the area: *Accipiter nisus*, *Accipiter gentiles*, *Falco tinnunculus*, *Falco subbuteo*, *Chlidonias hybridus*, *Caprimulgus europaeus*, *Apus apus*, *Saxicola torquata*, *Periparus ater*, *Poecile palustris*, *Aegithalos caudatus*, *Certhia familiaris* and *Miliaria calandra*.

The birds are breeding in different habitat areas from the middle basin of Suceava River: the wooded riverside areas, fragmented sometimes by meadows and gravel areas, pine tree plantations and localities and also due the deforestation in favour of agricultural fields; the bank areas that are lower (that present large surfaces with gravel) or higher; the meadows areas; the agricultural field areas; the mixed forest areas and the localities' perimeter. As we can see in the figure 1, more than 50% of the breeding species, meaning 47 bird species, prefers the wooded riverside areas. The presence of willows, poplars, birches, or even old oaks, in some areas, encourage species of birds that nests in holes or other kind of species like raptors and

owls. Also, the well developed undergrowth is ideal for some of the nesting passerines, like Thrush Nightingale (*Luscinia luscinia*). The clearings and wooded riversides edges, areas without many bushes, attracts species like Nightjar (*Caprimulgus europaeus*). Other 28 bird species are breeding in the mixed forests, so, the forest birds representing 87% from the whole breeding birds' fauna. The relative large number of species that nest in the localities' perimeter (25) can be explained through the fact that the wooded riversides and meadows are interrupted by village tofts and houses are reaching the edge of river banks. Due this fact, beside the typical breeding species in localities like *Hirundo rustica*, *Delichon urbica*, *Passer domesticus*, other species are nesting here, too: *Falco tinnunculus*, *Oriolus oriolus*, *Phoenicurus ochruros*, etc. A number of only 5 species are breeding in the agricultural fields. Although important for some species, the agricultural fields present a small diversity of nesting birds.

The human pressure has a high level in the middle basin of Suceava River – the deforestation and the garbage deposits represent the most important threatening factors for birds. Nonetheless, the biodiversity of these places is quite high. The riversides and meadows areas play an important role in the conservancy of bird species due to the feeding and nesting conditions that they provide, as well as refuge for the passage birds.

CONCLUSIONS

The avifauna list of the Suceava River's middle basin includes 125 bird species.

The breeding avifauna includes 86 bird species (69% from the recorded avifauna). We recorded 13 new breeding species for the area.

We notice two unusual birds presence: *Gyps fulvus*, an immature bird and *Tringa ochropus*, observed during the winter despite it passage visitor status in Romania, but also two exemplars of *Aquila clanga*, rare presence in the area.

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