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THE SATCHINEZ SWAMPS BIRD RESERVE (WESTERN ROMANIA) IN THE FIRST TWO DECADES OF THE 3rd MILLENNIUM

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ABSTRACT
In the western extremity of the country, about 25 km W-NW from the city of Timisoara, lies the ornithological reserve "The Satchinez Swamps", an Avifauna area with protection status established in 1942. The purpose of this work is to make known the changes found at the level of the avifauna site occurred over time, especially in the last 15 years, the interval between the penultimate investigation - LIFE Nature of 2003-2005 and the last qualitative and quantitative study conducted recently between 2017 and 2019. On the other hand, we also tried to report the situation of the recently identified reserve avifauna to the early period of the existence of the "Satchinez Bird Swamps", i.e. from the middle of the 20th century to the 3rd Millennium. The main research method in the field at Satchinez was the route method modified by us and interpreted starting from a logical base different from the older working techniques. The evolution of avifauna from Satchinez resulted in the fact that from the original landscape of the second half of the last century, only 115 species of a total of 167 have the quality of continuity in the area of avifauna importance in which is included the ornithological Satchinez Swamps reserve. In the last 15 years, there have been major changes in the composition of avifauna, changes illustrated by the increase of absolute dominance of species other than those which, in more than half a century, have ensured the ornithological image of the protected swamps; the finding is also confirmed by the calculus of entropy, which illustrates the different situation of avifauna in the year 2004 compared to the that of the last few years.
KEY WORDS: *absolute dominance, birds, ecological succession, reserve, swamp*

INTRODUCTION

The protection of the swamps started as a result of the proposal of the Banat Ornithologist Dionisie Linția, a suggestion made by the decision of the Council of

Ministers of the year 1942 (Jurn. Ref. Min. No. 1166/Of 14 Nov. 1942, published in Monitorul Oficial No. 57 of 9 March 1943 - cf. Documents of the CMN Sub-committee of the Timișoara Branch of the Romanian Academy). On the proposal of the Commission for Nature Monuments of the Academy, Dr. Sergiu Paşcovschi was appointed honorary custodian of the "Birds swamps" – the name of the reserve at the time. In the almost eight decades since then, the swamps have undergone several qualitative changes in the avifauna spectrum as well as in the size of the surface originally intended for the refuge (200 ha), changes imposed by local economic interests supported, without exception, by ordinary political pressures common to the totalitarian system, to which could not resist or cope two institutions responsible for the proper functioning of the reserve, the Commission of the Nature Monuments of the Timiș branch of the Romanian Academy and the Museum of Banat in Timișoara. A very good summary of past decades, in this respect, belongs to Kiss (2002). Ornithological researches, regardless of historical times, were permanent; unfortunately, many results were lost as drawer papers, others being printed in the newspapers as short notes, fewer in the few volumes of proceedings edited by the museums in the country or not censured journals of biological sciences. However, there have still remained from those times several reference works on the ornitho-fauna swamps, such as those of Nadra (1962), Kiss (2002) and Stănescu (2005), due to thorough and long-term investigations.

Today, the Satchinez Swamps is part of an area of avifauna importance with a range of 268,7 ha, partly contained in but also neighbouring another area of scientific interest stretching on 2517,5 ha to E-NE. The area intended for the reserve itself is 75 ha, i.e. less than a third of the total area of avifauna importance (27.89%).

The ornithological reserve at Satchinez is geomorphologically at the confluence of three plains with different morphological characters: the Vinga Plain, the Jimbolia (Torontalului) Plain and the Timiș Plain. The proper reserve covers the meadow of the river Ier (Apa Mare) between the villages of Satchinez and Bărăteaz, with fluctuating widths between 400 and 2,000 m, at an altitude of 90 m, and a smooth flow slope of 0.4 degrees. The meadow is damp, swampy, with meanders and deserted rivulets. The Satchinez Swamps, together with the fluvial lacustrine complex, are considered to be remnants of the former swamps, periodically flooded and characteristic in the past of the largest part of the Banat Plain. The peculiarity of the reserve consists in the existence of permanent swamps that alternate with areas covered by reed, bogs, meadows, clumps and numerous willows.

The above presentation of the reserve and the morpho-geographic framework in which it is contained is also the only geographical illustration of the site – shortened in this text – made lately by Ph.D. Marcel Török from the West University of Timișoara (in Stănescu, 2005).

MATERIALS AND METHODS

The main research method in the field at Satchinez was the *route method* modified by us and interpreted starting from a logical base different from the older working techniques (Palmgren, 1930; Turcek, 1951; Ferry & Frochot, 1958; Korodi-Gal, 1958; Bibby et al., 2000). The program pursues not only the establishment of performing species on the "winning podium" according to the attributes *abundant*, *less abundant* or other type of qualifications, but it primarily facilitates the involvement of species in the habitat from the perspective of their value as both energy producers and consumers; this is about sometimes unimportant species from the perspective of numerical domination, though seriously energetically involved in the ecosystem.

Changes to the classical route method concerned the manner in which the assessments of the dominance thresholds are made and the limits from which such an assessment can be taken into consideration; the observation years have taught us that the penalty threshold applied in the study of zoo-coenoses, as in the Braun-Blanquet phytosociological method, is irrelevant, arbitrary and causing major errors. This is particularly important since in our study we targeted birds, stray and permanently quantitatively (numerically) and qualitatively (number of species) fluctuating species. According to the foregoing, the degrees of individual dominance are still appreciated as the percentage share of individuals representative of the species from the total individuals of all taxons (Schubert, 1991). Thus evaluated, species are defined as *eudominant* (36-100%), *dominant* (16-35.9%), *subdominant* (4-15.9%), *receding* (1-3.9%) and *subreceding* (<1%). We immediately observe the parsimoniousness of the assessment from its own unilaterality, which is why we found the route method of Ferry & Frochot (1958), a route method aimed at finding out mainly the mileage index of abundance of species in conjunction with the percentage share of the same, according to the model of botanical sampling. The bringing of a new separation factor in question is, therefore, imperative, a factor introduced by Korodi-Gal (1958) under the name *consumption*. We later reconsidered the concept redefining it *metabolic index* because the surface of the bird's body is nothing but the surface of its energy loss (so we are talking even about a corresponding metabolism) indicating the species as a user and a consumer in the ecosystem (for the semantic reasons that resulted in giving up using the term consumption, see Stănescu et al., 1998). In fact, the surface of the energy loss was calculated earlier by Turcek (1951). The starting point of its finding is the specific weight, the author focusing in the tables bearing his name indices to be placed in the calculus formula of the surface of the species concerned; but the very specific weight multiplied by the number of individuals in the habitat is a distant factor from the perspective of the aspect of total biomass per species. As one can see, the premises of a better assessment from the discussed perspective has been created, the method operating among the ornithologists in this form for several decades in a row (Korodi-Gal, 1958, 1960; Kohl, 1967; Ion & Valenciuc, 1967; Blondel et al., 1970; König, 1972; Blondel & Isenmann, 1973; Stănescu, 1971; Stănescu et al., 1984, 1985, 1998; Paspaleva & Tălpeanu, 1975; Simon, 1976; Kovats, 1976; Kiss, 1999). But even in this variant, the assessment of the degrees of dominance remained at the edge of the relativity giving the qualification not according to a calculated differentiation limit but as a result of the researcher's finding or not of as many high values of the total four (*mileage index of abundance - MIA, frequency - %, biomass - B, metabolic index – MI*) in one species. The remainder of the posting grades remained to be assessed all from the position of the percentage share of the individuals of the uni-specific population reported to the sum of the total of the individuals of all species consisting of the bird population at that time in the studied ecosystem. Approximate assessments such as *frequently*, *very frequently*, etc. were indeed eliminated, however, while preserving a certain degree of subjectivity from the free will of the researcher or, better said, from his quality as a professional, his degree of exigency.

In order to understand intra- and inter-specific relationships, it is necessary to start from the knowledge of all biogenous or abiogenous factors. The first step in deciphering a zoo-coenosis is to know its composition as a whole and as an occupied site, namely the role played by its constituencies. To know, for example, in a bird population, the *settlement* and *importance of a species* we are about to study we should first know the fauna spectrum in which it integrates. Understanding the laws that govern, for example, the hieratic flights of passeriform, cannot have any other starting reason than the one we are just presenting, as we cannot consider the small egret in the Satchinez reserve a permanent or stable presence than through the same proposed optics. The completion thus brought to the route method in finding a more efficient and stable way of differentiating, is to first find those non-subjective limits allowing the assessment. In our opinion, the solution could only be statistical, the database being offered by the mileage index of the species, frequency, biomass and surface of loss of energy. With no data calculated in this respect, we directed towards assessing the *biomass* of species according to Heinroth (1911), and in determining the surface of energy loss, according to Turcek (1956).

Knowing from experience that the processed values can have a huge range of coverage, which would lead to the impossibility of a final graphical representation, we first resorted to their *logarithms*. From the sum of the logarithmic values for each species ($\Sigma_{MIA,\%,B,MI}$) the *sum of the sum* of these values is calculated as the starting point in the award of the five-stage representation of the species in the habitat. Thus, the threshold of *absolute dominance* is given by all values placed above the average values plus the standard deviation, the threshold of *dominance* of all values above average values, the *sub-dominance* of all values above average values minus standard deviation, the *auxiliarities* of all values below the average of the values minus the standard deviation and the *random (accidental)* quality of all values below 20% of the highest value of the auxiliary, all with an error margin of 0.05% (Stănescu et al., 1998, 2000).

The great consumers are also the great warders of their own vitality, loss that can only be covered by increasing the frequency of feeding; the smaller the species, doubled by proper biomass, the higher its energy loss surface. We understand, therefore, that a small bird will have a more intense metabolism, which is required to be reconciled by intensifying the search for food and increasing the biological impact with the trophic source, respectively, of the predations that happen. Or, *great consumers* are the most involved in an ecosystem and, at the same time, given their profile of life, they are its maintenance and health supporters. If the Eurasian penduline tit or European penduline tit (*Remiz pendulinus*) or all the tits wandering through the crowns of the willows can stop unwanted attacks of defoliating insects, great reed warblers will do the same in the reeds, whinchats will do it in wet or dry stretches, and red-throated loons or red-throated divers will do it in the depth of water, where they control the health and vitality of the submersed livings. *Producers* to be taken into account are the species with important biomass, their beneficial involvement in the habitat being often indirect and different from the former; in times not long past, but also today, in the judgment of cultivated neophytes or in household mentality on fish-eating herons of all types, "the behaviour" of these birds is condemned, considered as enmity and currently involved in the welfare of the economy – then national, nowadays private; herons were and remained to be regarded with circumspection, and still pay in a serious, unjustified tribute. The fact that their dejections in the water feed and support thrive an entire bacterial empire on which other living creatures who serve as food to fish are becoming or persist, are not known or ignored. In Nature, nothing is random, nothing is good or bad and there is no "useful" or "harmful" item, the reason of life being so uncomplicated and simple: endure.

Of course, the method presented is required to be applied according to a well-defined algorithm: we refer to a periodicity without prolonged goals and not only during migratory times for birds or, worse, incidentally; it is the reason why the route method is generally considered difficult and uncomfortable, two attributes that do not fall into the house of scientific research.

What is still important to mention is that the values resulting from the processing of raw data do not correspond to the actual number of individuals observed in a species or other but it is only a threshold of the penalty of the place that species holds in the hierarchy of the entire ornithon-coenosis analysed; the figure is, actually, an ecological coefficient that sums up both quantitative and qualitative variables.

We have not omitted observations "at a fixed point", where the land has not allowed the application of other techniques. Interpretation of species grading has been practised according to the criteria of the route method.

Same for acoustic identification directly in the field, but also in the context of office work. In this regard, we recorded on the interval of 5 minutes all the existing noises within a radius of 2 (4) km with a directional large impedance microphone (24,000 Hz) and a professional Olympus LS-12 recorder. The location of the records was changed randomly. The complex of sounds so recorded were processed spectrally with an Avisoft programme (sometimes Cool 2000 or SpectraLAB). The recognition of species present in a habitat at a given time is no longer a question of relativity, moreover, the numerical dispersion of the sum of individuals for the species identified was calculated according to the differences in dB recorded from the intensity of the sound made by the closest individual, from which time distances can also be calculated. Spectral analysis is expressed by sonograms; sonograms are specific allowing, in most cases, a determination with a high degree of accuracy.

RESULTS AND DISCUSSIONS

The Avifauna Framework of the Satchinez Swamps. As the first step for understanding the scientific validity and the ornithological importance of the Satchinez Swamps, in order to gain an image as close to the structural reality of ornithon-coenosis over time, we resorted to the compulsion of personal avifauna data from the four most involved researchers over time here: Dionisie Linția (inter-war period including the fourth and fifth decades that followed the world conflagration), Emil Nadra (Decades 4-7 (8) of the last century), Andrei Kiss (the next period to date) and Dan Stănescu (the last 40 years; monthly observations and, over an 8-year extension, weekly). The data from Dionisie Linția were extracted from Linția (1944). The results are summed with Nadra's observations and presented in Table 1 below.

Table. 1. Birds identified in the Satchinez Swamps protected area in the period 1944-2005 indicating the species attributes, degree of dominance and protection on the continent:

		Species	***t***	***p***	***N***	***K***	***S***
1		*Acanthis cannabina (L.) 1758*	*m,h*	●	●		
2		*Accipiter gentilis (L.) 1758*	*n,m*	●		●	
3		***Accipiter nisus (L.) 1758***	*p,n,m*	●	●	●	●
4		***Acrocephalus arundinaceus (L.) 1758***	*a,m*	●	●	●	●
5		*Acrocephalus paludicola (Vieill.) 1817*	*h,a*	●	●	●	
6		*Acrocephalus palustris (Bechst.) 1798*	*m,a*	●	●	●	
7		***Acrocephalus schoenobenus (L.) 1758***	*m,a*	●	●	●	●
8		*Acrocephalus scirpaceus (Herm.) 1804*	*m,a*	●	●	●	
9		***Aegithalos caudatus (L.) 1758***	*m,n*	●		●	●
10		***Alauda arvensis L. 1758***	*a,p,m*	●	●	●	●
11		*Alcedo atthis (L.) 1758*	*p,m*	●	●	●	
12	✶	***Anas acuta L. 1758***	*p,a,m,h*	●	●	●	●
13	✶	***Anas clypeata L. 1758***	*a,m,h*	●	●	●	●
14		***Anas crecca L. 1758***	*a,n,m,h*	●	●	●	●
15	✶	***Anas penelope L. 1758***	*n,h*	●	●	●	●
16	✶	***Anas platyrhynchos L. 1758***	*p,m*		●	●	●
17	⊙	***Anas querquedula L. 1758***	*a,m*	●	●	●	●
18		*Anas strepera L. 1758*	*a,m,h*	●		●	
19	✶	*Anser albifrons (Scop.) 1769*	*h*	●	●	●	●
20		*Anser erythropus (L.) 1758*	*z*	●	●	●	
21		***Anthus trivialis (L.) 1758***	*a,m*	●	●	●	
22		***Apus apus (L.) 1758***	*a,m*	●	●		●
23	✶	***Ardea cinerea L. 1758***	*m,a*	●	●	●	●
24	⊙	***Ardea purpurea L. 1766***	*m,a*	●	●	●	●
25	⊙	***Ardeola ralloides (Scop.) 1769***	*m,h,a*	●	●	●	●
26		***Asio otus (L.) 1758***	*n,r,v*	●		●	●
27		*Athene noctua (Scop.) 1769*	*f,v*	●	●	●	
28	⊙	***Aythya ferina (L.) 1758***	*m,a*	●	●	●	●
29	✶	***Aythya nyroca (Güldenst.) 1770***	*h,m,a*	●	●	●	●
30	⊙	***Botaurus stellaris stellaris (L.) 1758***	*m,a*	●	●	●	●
31		*Burhinus oedicnemus (L.) 1758*	*m,a*	●		●	
32		***Buteo buteo (L.) 1758***	*v,n,r*	●	●	●	●
33		*Buteo lagopus (Pont.) 1763*	*h*	●		●	
34		***Calidris alpina (L.) 1758***	*h*	●	●		●
35		*Calidris ferruginea (Pont.) 1763*	*h*	●		●	
36		***Calidris minuta (Leisl.) 1812***	*h*	●	●	●	●
37		*Caprimulgus europaeus L. 1758*	*m*	●			●
38		*Carduelis cannabina (L.) 1758*	*m,h*	●		●	
39		***Carduelis carduelis (L.) 1758***	*m*	●	●	●	●
40		*Carduelis chloris (L.) 1758*	*m*	●	●	●	
41		*Carduelis spinus (L.) 1758*	*h,m*	●		●	
42		*Chlidonias hybrida (Pall.) 1811*	*h*	●	●	●	
43		*Chlidonias leucopterus (Temm.) 1815*	*a,m,h*	●	●	●	
44		***Chlidonias niger (L.) 1758***	*a,m,h*	●	●	●	●

45		***Ciconia ciconia L. 1758***	*m, h, a*	●	●	●	●
46		*Ciconia nigra (L.) 1758*	*m,a*	●			●
47	✶	***Circus aeruginosus (L.) 1758***	*r,m,v*	●	●	●	●
48		*Circus cyaneus (L.) 1766*	*h,m*	●		●	●
49		*Circus macrourus (Gmel.) 1771*	*h*	●		●	
50		*Circus pygargus (L.) 1758*	*h*	●		●	
51		***Coccothraustes coccothraustes (L.) 1758***	*m*	●	●	●	●
52		*Columba palumbus L. 1758*	*p,m*			●	●
53		*Coracias garrulus L. 1758*	*h,a,m*	●		●	
54		***Corvus corax L. 1758***	*v*	●	●		●
55		***Corvus corone cornix L. 1758***	*m*		●	●	●
56		***Corvus frugilegus L. 1758***	*h,m*		●	●	●
57		***Corvus monedula (L.) 1758***	*m*		●	●	●
58		***Coturnix coturnix (L.) 1758***	*m,a*	●		●	●
59		*Crex crex (L.) 1758*	*m,a*	●	●	●	
60		***Cuculus canorus L. 1758***	*m,a*	●	●	●	●
61		*Cygnus olor (Gmel.) 1789*	*h,n,m*	●		●	
62		***Delichon urbica (L.) 1758***	*m*	●	●	●	●
63		***Dendrocopos major (L.) 1758***	*n,m*	●		●	●
64		*Dendrocopos syriacus (H&Ehr.) 1833*	*r,v*	●	●	●	
65	✶	***Egretta alba (L.) 1758***	*m*	●	●	●	●
66	✶	***Egretta garzetta (L.) 1766***	*m,v*	●	●	●	●
67		***Emberiza calandra L. 1758***	*n,m*	●		●	●
68		***Embehza citrinella L. 1758***	*m*	●		●	●
69		***Embehza schoeniclus (L.) 1758***	*m*	●	●	●	●
70		***Erithacus rubecula (L.) 1758***	*p,m*	●	●	●	●
71		*Falco columbarius Tunst. 1771*	*h*	●		●	
72		*Falco peregrinus Tunst. 1771*	*z,n*	●	●		
73		***Falco subbuteo L. 1758***	*p,m*	●	●		●
74		***Falco tinnunculus L. 1758***	*p,m*	●	●	●	●
75		***Falco vespertinus L. 1766***	*p,m*	●		●	●
76		*Ficedula albicollis (Temm.) 1815*	*h,m*	●	●	●	
77		*Ficedula hypoleuca (Pall.) 1764*	*m*	●		●	
78		***Fringilla coelebs L. 1758***	*m*	●	●	●	●
79		*Fringilla montifringilla L. 1758*	*h*	●			●
80	✶	***Fulica atra L. 1758***	*p,m*		●	●	●
81		***Galerida cristata L. 1758***	*v*	●	●	●	●
82		***Gallinago gallinago (L.) 1758***	*h,p,a*	●	●	●	●
83		*Gallinago media (Lath.) 1787*	*h,a*	●		●	
84	⊙	***Gallinulla chloropus (L.) 1758***	*m*	●	●	●	●
85		*Garrulus glandarius (L.) 1758*	*m*			●	●
86		*Grus grus (L.) 1758*	*h*	●	●		
87		*Haliaëtus albicilla (L.) 1758*	*r,m*	●	●	●	
88		***Himantopus himantopus (L.) 1758***	*a,m*	●	●	●	●
89		*Hippolais pallida Linderm. 1843*	*m*	●		●	
90		***Hirundo rustica L. 1758***	*m*	●		●	●
91		***Ixobrychus minutus (L.) 1766***	*h,m,a*	●	●	●	●

92		***Lanius collurio L. 1758***	*m*	●	●	●	●
93		***Lanius excubitor L. 1758***	*m*	●	●		●
94		*Lanius minor minor Gmei. 1788*	*h,m*	●	●	●	
95		*Larus minutus Pali. 1776*	*h*	●	●	●	
96	⊙	***Larus ridibundus L. 1766***	*m*	●	●	●	●
97		*Limosa limosa (L.) 1758*	*m,a*	●	●	●	
98		***Locustella luscinioides (Savi) 1824***	*m*	●	●		●
99		***Locustella naevia (Bodd.) 1783***	*m*	●			●
100		***Luscinia megarhynchos C.L.Brehm 1831***	*a,m,h*	●		●	●
101		*Lusciniola (Acrocephalus) melanopogon Temm. 1823*	*h*	●	●	●	
102		*Lymnocryptes minimus (Brunn.) 1764*	*h*	●		●	
103		***Merops apiaster L. 1758***	*h,a,m*	●		●	●
104		***Motacilla alba L. 1758***	*a,m*	●	●	●	●
105		*Motacilla cinerea Tunst. 1771*	*m,p,a*	●	●	●	
106		***Motacilla flava L. 1758***	*m,a*	●	●	●	●
107		***Motacilla flava feldegg Mich. 1830***	*a*	●	●	●	●
108		*Muscicapa striata (Pali.) 1764*	*m*	●		●	
109		*Numenius arquata (L.) 1758*	*h*	●	●		
110	✶	***Nycticorax nycticorax (L.) 1758***	*m*	●	●	●	●
111		*Oenanthe oenanthe (L.) 1758*	*m*	●	●	●	●
112		***Oriolus oriolus (L.) 1758***	*m*	●	●	●	●
113		***Panurus biarmicus russicus (C.L.Brehm) 1831***	*v,h*	●	●	●	●
114		***Parus caeruleus L. 1758***	*m,r*	●		●	●
115		***Parus major L. 1758***	*m,r*	●			●
116		***Parus palustris L. 1758***	*m,r*	●		●	●
117		*Passer domesticus (L.) 1758*	*v*		●	●	●
118		***Passer montanus (L.) 1758***	*v,m*		●	●	●
119		*Perdix perdix (L.) 1758*	*v,r*	●		●	
120		*Phalacrocorax carbo (Blumenbach) 1798*	*m,p*	●		●	
121		*Phalacrocorax pygmaeus (Pali.) 1773*	*v,p*	●	●	●	●
122		***Phasianus colchicus L. 1758***	*v,r*			●	●
123	⊙	***Philomachus pugnax (L.) 1758***	*h,a*	●	●	●	●
124		***Phylloscopus collybita (Vieill.) 1817***	*m*	●		●	●
125		***Pica pica (L.) 1158***	*v,n,r*		●	●	●
126		***Picus canus Gmel. 1788***	*v,r*			●	●
127		***Picus viridis L. 1758***	*v,r*	●		●	●
128		*Platalea leucorodia L. 1758*	*a,h*	●	●		●
129		*Plegadis falcinellus (L.) 1766*	*a,h*	●	●	●	●
130	⊙	***Podiceps cristatus cristatus (L.) 1758***	*n,p,m*	●	●	●	●
131		*Podiceps griseigena (Bodd.) 1783*	*m,p,h*	●	●	●	
132		*Podiceps nigricollis C.L.Brehm 1831*	*p,h,a*	●	●	●	
133	⊙	***Podiceps ruficollis (Pall.) 1764***	*p,m*	●	●	●	●
134		*Porzana parva (Scop.) 1769*	*m,a*	●	●	●	
135		*Porzana porzana (L.) 1766*	*m,a*	●	●	●	
136		*Pyrrhula pyrrhula (L.) 1758*	*m*	●	●	●	●
137		*Rallus aquaticus L. 1758*	*m,p*	●	●	●	
138		*Recurvirostra avosetta L. 1758*	*m,a*	●	●	●	●

139		*Regulus ignicapillus (Temm.) 1820*	*m,h*	●		●	
140		*Regulus regulus (L.) 1758*	*m*	●		●	
141		***Remiz pendulinus (L.) 1758***	*m,a*	●	●	●	●
142		*Riparia riparia (L.) 1758*	*m,a*	●	●	●	●
143		*Saxicola rubetra (L.) 1758*	*m,a*	●		●	
144		***Saxicola torquata (L.) 1766***	*n,m,a*	●		●	●
145		***Streptopelia decaocto (Friv.) 1838***	*n,p*	●		●	●
146		*Streptopelia turtur (L.) 1758*	*m,a*	●	●	●	
147		***Sturnus vulgaris L. 1758***	*m,a*		●	●	●
148		***Sylvia atricapilla (L.) 1758***	*a,m*	●		●	●
149		*Sylvia borin (Bodd.) 1783*	*a,m*	●		●	
150		***Sylvia communis Lath. 1787***	*a,m*	●	●	●	●
151		***Sylvia curruca (L.) 1758***	*a,m*	●	●	●	●
152		*Sylvia nisoria (Becgst.) 1795*	*z*	●		●	
153		*Tringa erythropus (Pali.) 1764*	*h,a,n*	●	●	●	
154		*Tringa glareola L. 1758*	*h,a,n*	●	●	●	
155		***Tringa hypoleucos L. 1758***	*h,a,n*	●	●	●	●
156		*Tringa nebularia (Gunn.) 1767*	*h,a,n*	●	●	●	
157		***Tringa ochropus L. 1758***	*h,a,n*	●	●	●	●
158		*Tringa stagnatilis (Bechst.) 1803*	*h, a, n*	●	●	●	
159		***Tringa totanus (L.) 1758***	*h,a,n*		●	●	●
160		*Troglodytes troglodytes (L.) 1758*	*m,p*	●		●	●
161		*Turdus iliacus L. 1766*	*h*	●	●		●
162		***Turdus merula L. 1758***	*m*		●	●	●
163		*Turdus philomelos C.L.Brehm 1831*	*h,m*	●		●	
164		***Turdus pilaris L. 1758***	*h,m*	●	●	●	●
165		***Tyto alba (C.L.Brehm) 1831***	*m,n*	●	●	●	
166		*Upupa epops L. 1758*	*m,a,h*	●		●	
167	✶	***Vanellus vanellus (L.) 1758***	*m,a*	●	●	●	●

Legend: The embossed species are the current birds encountered in the ornithological reserve Satchinez Swamps. **a** - *avis aestiva* (species that leave the country in winter; species that achieve true migrations); **r** - *avis residens* (species that spend all their time in the territory); **p** - *avis partim migratoria* (only a part of the population leaves the territory in winter to reach wintering places); **n** - *avis nomas* (species that migrate regularly but over short or uneven distances from year to year); **h** - *avis hospes assidua* (summer guests nestlers or non-nestlers), **z** - *avis hospes non assidua* (species with irregular occurrences); **m** - *populatio mixta* (in the country, the species is represented by individuals derived from indigenous and foreign populations); **v** - *aves vernaculae* (individuals of the species only originate from indigenous populations). **t** - peculiarity of the species, **p** - protected at European level, **n** - observations Nadra (113 species), **k** – comments Kiss (150 species), **s** – remarks Stănescu (105 species), ✶ - absolute dominant species, ⊙ - dominant species.

The period 2000-2005: Satchinez Swamps are included in a LIFE project (LIFE99 NAT/RO/006394). Following field observations, were confirmed as present only 105 species from the list in Table 1. The lacuna is 62 species (Stănescu, 2005).

Table 2 represents this timeframe, with only absolutely dominant species rendered through which, for subsequent iterations (years 2017 to 2019) obtained by the same investigative method, we have gained valid comparison data, confirmed by variance calculus. The logic of this approach lies in the fact that absolute dominant species are, from the perspective of frequency, number, producer and consumer quality, those that illustrate, in fact, the right image of an ecosystem.

Table 2. Absolutely dominant birds in the area of the Satchinez Swamps in the years 2000-2005 in the order of absolute domination:

No.	Species	Index of absolute dominance
1	*Anas platyrhynchos*	27.13
2	*Sturnus vulgaris*	24.41
3	*Corvus cornix*	24.14
4	*Fulica atra*	23.47
5	*Anas penelope*	22.75
6	*Corvus frugilegus*	22.63
7	*Nycticorax nycticorax*	22.28
8	*Pica pica*	22.19
9	*Anas clypeata*	22.09
10	*Egretta garzetta*	22.08
11	*Ardea cinerea*	21.12
12	*Vanellus vanellus*	21.02
13	*Aythya nyroca*	19.48
14	*Sturnus vulgaris*	19.27
15	*Anas acuta*	19.12
16	*Circus aeruginosus*	18.87

The following bird species were dominant during the period 2000-2005: *Anas querquedula, Anser albifrons, Ardea purpurea, Ardeola ralloides, Aythya ferina, Botaurus stellaris, Buteo buteo, Corvus monedula*, *Cuculus canorus*, *Delichon urbica, Egretta alba*, *Emberiza citrinella*, *Falco tinnunculus, Falco vespertinus*, *Gallinula chloropus*, *Himantopus himantopus*, *Parus major*, *Passer montanus*, *Phasianus colchicus*, *Philomachus pugnax*, *Podiceps cristatus*, *Podiceps ruficollis*, *Streptopelia decaocto* and *Turdus iliacus*.

Remarkable is the presence of aquatic and limicoline species, with the specification that within this timeframe, a mixed colony consisting of egrets, *Egretta alba*, *Egretta garzetta* – better represented as number of pairs than the previous, squacco herons (*Ardeolla ralloides*), night herons (*Nycticorax*), grey herons (*Ardea cinerea*), and, last but not least, a pair of glossy ibis (*Plegadis falcinellus*).

For the period 2017-2019, in the order of calculated dominance, the following bird species are to note: *Falco tinnunculus, Egretta garzetta*, *Carduelis carduelis, Anas crecca*, *Podiceps cristatus, Columba palumbus, Phasianus colchicus*, *Ciconia ciconia*, *Corvus cornix, Gallinula chloropus, Carduelis flammea, Fringilla coelebs, Panurus* *biarmicus, Nycticorax nycticorax, Parus major, Ardea purpurea, Ardeolla ralloides, Botaurus stellaris, Emberiza schoeniclus, Asio otus, Accipiter nisus, Lanius collurio, Chlidonias leucopterus, Acrocephalus arundinaceus, Aythya ferina, Acrocephalus schoenobaenus, Merops apiaster* and *Locustella luscinioides.*

Table 3. Birds absolutely dominant in the area of Satchinez Swamps in the years 2017-2019 in the order of absolute domination:

No.	Species	Index of absolute dominance
1	*Anas platyrhynchos*	35.06
2	*Sturnus vulgaris*	34.23
3	*Vanellus vanellus*	31.16
4	*Larus ridibundus*	28.44
5	*Turdus pilaris*	28.09
6	*Delichon urbica*	27.73
7	*Fulica atra*	27.03
8	*Passer montanus*	26.84
9	*Ardea cinerea*	25.59
10	*Corvus frugilegus*	25.14
11	*Cygnus olor*	25.12
12	*Egretta alba*	24.96
13	*Numenius arquata*	24.69
14	*Passer domesticus*	24.16
15	*Streptopelia decaocto*	23.40
16	*Hirundo rustica*	23.35
17	*Pica pica*	23.28
18	*Circus aeruginosus*	22.79
19	*Philomachus pugnax*	22.64
20	*Emberiza calandra*	22.58
21	*Anas querquedula*	21.85
22	*Buteo buteo*	21.55

It was a period of arid months with temperatures higher than usual extending over August, September, and beginning of October.

The egret colony disappears (from 2010), reeds invade large areas in the water pools which also disappear through evaporation. Limicoline species such as waders, except for ruffs and curlews, diminish in number, making room to the Order *Passeriformes*, including migratory ones, winter guests.

If in the middle of the last century, the lacustrine area, the temporary or not bogs, the swamp terrain, the limicoline girdle, the reeds, the willows, the subtree and, generally, the area of the palustrine vegetation characteristic of the place, all with a balanced dispersion after an unstretched natural logic, formed the ideal place for the settling of an avifauna similar to the deltaic spaces, the end of the decade we are about to end is, somewhere, close to the boundary opposite the original image of the Satchinez Swamps, which we are trying to understand.

The first one provides a lack, in 2004, of 62 species of the total of 167 summed by the three observers in half a century (Table 1). It is true that, over the years, the non-identification of some birds at some time confirmed their presence in a future one. On the whole, however, the figure has remained standing, reconfirming, in 2019, with ten species less (157). The empty place of a good part of the sixty-two birds "erased" from the list was occupied by other new species, thus recreating the lost balance, apparently.

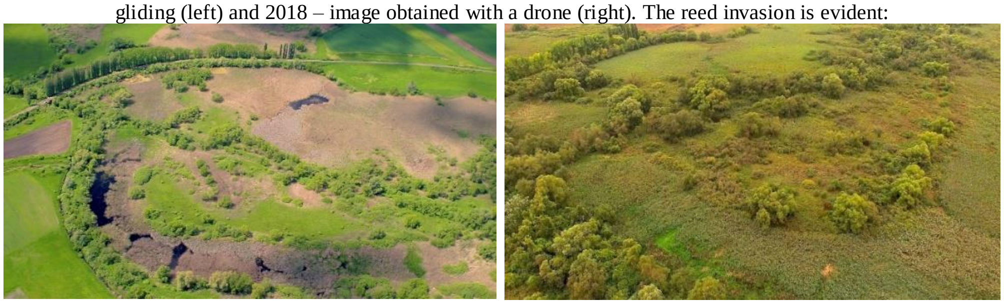
Of the total identified bird species, the limicoline were the first missing: *Tringa erythropus*, *Tringa nebularia*, *Tringa ochropus*, *Tringa hypoleuca*, *Tringa stagnatilis*, *Recurvirostra avocetta*, *Calidris alpina*, *Calidris ferruea*, *Calidris miunuta*, *Gallinago media*. The cause was the change in the optimal limodensity of trophic exploration related to the ability to penetrate the vegetation with beak (Stănescu, 1975), then the definitive disappearance of the woody vegetation by drying; portions of buffers and within the reserve and from the entire land circumscribing the reservation were affected.

From the studies conducted by Török-Oance & Török-Oance (2005, 2016) in the Satchinez Swamps, the causes that led to the modification of the original ecosystem were the drainages practiced in decade seven of the last century. After 35 years, hydrotechnical works were carried out in order to reconstruct the old aquatic surfaces in the buffer zone of the reserve; the authors, in a desire to learn the effectiveness of this intervention, using the temporal analysis of normalized differential indices derived from satellite imagery in conjunction with precipitation data, indicators of the degree of reconstitution of the swamp, and using geospatial data from different time periods duplicated by Landstat satellite imagery, noticed a slight increase in the normalized index of differentiation of vegetation in the lentic and lotic systems, which is explained by the expansion of the reeds, suggesting also an increase of soil humidity. The restoration work did not lead to the expected results, instead it increased the level of groundwater in favour of reed expansion. The water surface decreasing through the expansion process of the plants, also resulted in the qualitative modification of the avifauna.

An important factor favouring the invasion of the reeds is also the addition of nitrites and nitrates used in the interspersed agricultural spaces of the reserve, which are leaking as they have elapsed over the years on the slopes of farmland from where they arrived and, currently in the bogs and lakes, respectively, the former water bodies of the lentic system.

Not having surfaces of water sufficiently large, finally completely extinct, the vast majority of *Anseriformes* disappeared from the Satchinez Swamps, moving definitively to favourable points from Apa Mare, east of the Reserve (Fig. 1).

Figure 1. Two images of the same place in the reserve – "Râtu Dutin" – 15 years away; 2004 – image taken from hang gliding (left) and 2018 – image obtained with a drone (right). The reed invasion is evident:



The dominant species of the total existing species in the years 2004 and 2019, presented comparatively (Tables 4 and 5), are sufficient – of the total of those recorded and counted – for the observation of qualitative and quantitative change (the penalty index) according to the number of years. The strong change in the structure of ornithofauna in 2019 is observed compared to the year 2004 as well as that of dominant species; the species included in the grey fields are those that ceased to be, with the disappearance of the water, the "ordinary" birds of the perimeter of the reserve.

Tables 4 and 5. The dominant species of the total existing species in the years 2004 and 2019, presented comparatively:

Anas platyrhynchos	30.93	Sturnus vulgaris	26.63
Sturnus vulgaris	24.30	Hirundo rustica	24.38
Pica pica	23.47	Pica pica	23.07
Fulica atra	23.09	Egretta alba	21.70
Anas penelope	22.14	Ardea cinereea	21.00
Nycticorax nycticorax	21.67	Columba palumbus	20.97
Anas clypeata	21.47	Vanellus vanellus	20.76
Egretta garzetta	21.47	Passer montanus	20.16
Ardea cinerea	21.08	Anas platyrhynchos	20.12
Vanellus vanellus	21.02	Circus aeruginosus	19.22
Anser albifrons	20.90	Streptopelia decaocto	18.71
Passer montanus	20.40	Anas querquedula	17.85
Aythya nyroca	19.23	Emberiza calandra	16.37
Circus aeruginosus	19.07	Larus ridibundus	14.34
Egretta alba	18.88	Corvus frugilegus	12.75
Anas acuta	18.51	Egretta garzetta	10.00
2004 - ɤ = 0.49		2019 - ɤ = 0.64	

The fact that on the list of recent dominants (year 2019) appears the grey heron, the two egrets (Great Egret, Little Egret) and the black-headed gull belongs to their opportunistic-behavioural side; they no longer strictly belong to the background provided by the reserve, they also belong to cultivated land where birds seek their food. Specimens are loose, sometimes present in small groups and well "visible" in the serotine and autumnal aspect of the year. Isolated copies of *Egretta alba* can also be observed in winter. The same is the situation in the case of grey heron, of *Larus ridibundus* flights, which leave the place in winter (except for isolated specimens), as is *Egretta garzetta*, an increasingly rare bird throughout the territory.

A confrontation of the two periods of study from the perspective of the particular variables of species taken into account according to the method with which we worked, outlines for the year 2004, as absolutely involved in the biocoenosis circuit, precisely the suppressed species of absolute dominance (*Anas platyrhynchos*, *Anas penelope*, *Anas clypeata*, *Anas acuta*, *Aythya nyroca*, *Anser albifrons*, *Nycticorax nycticorax*), a gap supplemented in 2019 through other different producers (biomass), but more particularly consumers (metabolic index) with close appearances of permanence (high frequency) (*Sturnus vulgaris*, *Hirundo rustica*, *Pica pica*, *Emberiza calandra* and *Circus aeruginosus*). These are the birds that have newly entered the composition of the current images of the swamps within the perimeter of the reserve.

Interpreted from the perspective of the information theory, the difference between the penultimate and the last research carried out, with databases obtained by the same technique (method), allowed the calculus of the entropy of the two avifauna landscape through the transmission channel of information given by well-known Shannon's formula. Thus, for the year 2004, an entropy that speaks of a degree of randomness, non-determination, uncertainty of the system (here ornithocoenosis) of γ = 0.49, and for 2019, γ = 0.64 (MacArthur method – "on the relative abundance of bird species", corelated to the Lloyd-Ghelardi index "from which the actual equity measure arises" - in Stugren, 1994).

As a measure of disorder, the calculated entropy speaks, for the year 2004, of a "more stable" disorder than the clutter of the year 2019 and that we believe is the result of the installation of a new and foreign avifauna in the reserve (in the reed stands appear several species of great reed warbler, along with reed bunting, bearded reedling, while the warblers strengthen their demographics). In fact, these birds suppress the void created by the disappearance of part of the original species. The remaining subtree wins new inhabitants, especially during migrations. *Emberiza (Miliaria) calandra* occupies more and more space offered by increasingly dry deposits (reinvigorated, for a short period of time, only as a result of abundant and long-lasting rains). In the context, it does not seem surprising that territories of the alleged buntings are shrinking more and more by the increased affluence of territorial males.

In spring and autumn, of the limicoline species listed earlier, remained to stand, sporadically, *Numenius arquata*, *Himantopus* (who once nestled in the reserve) and, rarely, *Tringa tetanus*. In the fall, on the contrary, we assist to the show of the thousands of lapwings prepared for migration, but not in the reserve, on the lands of the surrounding farmland, alongside thousands of starlings which sometimes form mixed flights (a cause of their advancement in in the dominant species hierarchy).

As a result of these changes, there is also climate and the disturbing human factor increasingly present in the reserve and around it. Because of mechanized agricultural activities, spraying against agricultural pests, using chemical fertilisers, grazing with a large number of sheep – by order of the thousands – sometimes even in the protected area, grazing cattle, lifting of pens at the border with the protected area, illegal slaughter of the willows for firewood, poaching, all of which are placed at the heart of the lack of interest and involvement of the locals, of the ancestors of the village, for the purposes of the maintaining and protecting the reserve, we now got what is called the Satchinez Bird Swamps, in fact a protected area in obvious decline.

All these factors, the environment, the climate out of normality and, human, synergic unions, had an important impact on the changes in the last 15 years. Perhaps the most painful loss was, for the layman but also for the specialists, the disappearance of the maximum point of attraction of the site, the mixed colony of egrets, grey herons, night-time herons, and squacco herons quartered in the flooded subtree Râtul Mărășești. It was a few years before the colony was restored, also in the area of avifauna importance, but about 9 km away – airline – in the Verbuncu point, near Biled. By flying a utility plane over the new place, we appreciated the colony as consisting of dozens of nesting pairs.

Looking from another perspective to the overthrow of values produced, theoretically addressing the path of an ecological logic, we could say that we are actually witnessing a succession process. A manifestation which, under normal, natural conditions, would have occurred, but (perhaps) in two hundred, three or five hundred years, and this succession under the pressure of abiogenic and biogenic factors, suffered an acceleration process compressing the time, a phenomenon to which we have thus become contemporary spectators.

CONCLUSIONS

In historical times, the evolution of avifauna from Satchinez resulted in the fact that from the original landscape of the second half of the last century, only 115 species of a total of 167 have the quality of continuity in the area of avifauna importance in which is included the ornithological Satchinez Swamps reserve. In the last 15 years, there have been major changes in the composition of avifauna, changes illustrated by the increase of absolute dominance of species other than those which, in more than half a century, have ensured the ornithological image of the protected swamps; the finding is also confirmed by the calculus of entropy, which illustrates the different situation of avifauna in the year 2004 compared to the that of the last few years. By the modifications produced in the qualitative structure of the avifauna reserve, we believe that it is not subjected to protection, but remains only the place of parking during migration for some migratory species. An important cause in the production of qualitative and quantitative changes in ornithocoenosis is the pragmatic human factor marked by indolence and disregard for the natural asset of the environment.

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