ORNITHOLOGICAL OBSERVATIONS IN THE PERIMETR OF THE MANTA LAKE, REPUBLIC OF MOLDOVA

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Abstract. This work is dedicated to the ornithofauna of the Manta Lake, Ramsar wetland, located in the south of the Republic of Moldova, Cahul district. It is based on personal research conducted between 2018-2022 and the analysis of existing data in the published literature. Particular attention was paid to changes in the taxonomic structure of the ornithofauna over time, under the influence of continuous changes in the ecosystems. A total of 228 bird species were identified from 20 orders and 57 families. The most numerous is the order of Passeriformes with 82 species, followed by the orders Charadriiformes – 39 species, Anseriformes – 27 species, Accipitriformes – 15 species. The orders of Cuculiformes, Apodiformes, Caprimulgiformes, Bucerotiformes are present with only 1 species each. In addition to the regularly encountered species, in the studied area there are species that have an irregular presence or arrive accidentally.

Keywords: bird's monitoring, Manta Lake, Ramsar wetland "Lower Prut Lakes".

Rezumat. Observații ornitologice în perimetrul lacului Manta, Republica Moldova. Lucrarea de față este dedicată ornitofaunei lacului Manta, zona umedă Ramsar, situată la sudul Republicii Moldova, raionul Cahul. La bază stau cercetările personale realizate în intervalul 2018-2022 și consultarea datelor existente în literatura publicată. O atenție deosebită a fost acordată modificărilor structurii taxonomice a ornitofaunei în timp, sub influența transformărilor continue ale ecosistemului. Total au fost identificate 228 specii de păsări, încadrate în 20 ordine și 57 de familii. Cel mai numeros este ordinul Passeriformes cu 82 de specii, urmat de ordinele Charadriiformes – 39 specii, Anseriformes – 27 de specii, Accipitriformes – 15 specii. Cu doar 1 specie sunt prezente ordinele Cuculiformes, Apodiformes, Caprimulgiformes, Bucerotiformes. În afară de speciile întâlnite în mod regulat, în aria studiată sunt specii care au o prezență neregulată sau sosesc accidental.

Cuvinte cheie: monitorizarea avifaunei, lacul Manta, zona umedă Ramsar „Lacurile Prutului de Jos".

INTRODUCTION

The Manta Lake is a natural lake of relict origin, located in the southwestern part of the Republic of Moldova, in the hydrographic basin of the Prut River, about 20 km from Lake Beleu and 40 km from the Danube river, on the sector between Crihana Veche – Manta – Vadul-lui-Isac.

Until 1979, there were several smaller lakes in these lands, with a depth of up to 7-8 m interconnected by natural canals. In order to collect the fish for marketing, several dam-bound water basins have been dug in the north. The strong spring floods broke the dams and destroyed the plains that separated the natural lakes, turning the southern part into a single aquatic surface. The fish ponds are still maintained today with an oscillating water level, some of them partially dry (Photos. 1).

Photos 1. The Manta lake and the fish ponds from its northern part (original).

The changes of the Manta intrazonal complex did not stop here, in time the siltation / drying of the natural canals occurred and the clogging process in the formed lake intensified. At the moment it has a floating surface of 21 km² and is supplied with water in spring, during the water rise and in summer during the short floods caused by rains. During floods, water enters through two channels that start from the Prut River in the western part of the lake and flows back into the river in the southern part. During the flooding period, the lake water rises for a few days to a depth of 3 m, then slowly decreases to less than 1 m in dry years.

The climate is influenced by that of the Black Sea: winters are mild, poor in precipitations, with short periods in which the water basins are covered with ice formations on the surface. In spring, relatively high temperatures and clear skies predominate. In the first part of the summer, torrential rains are frequent, the second part being much drier and warmer. Autumn is hot and poor in rainfall. These environmental conditions develop a mosaic of aquatic, meadow and forest ecosystems. The uniqueness and significance of the Lower Prut sector as a whole was accentuated by the

awarding of the status of Ramsar wetland "Lower Prut Lakes" in 2000 (***, 2008). Since 2018 it is part of the territory of the “Prutul de Jos” Biosphere Reserve.

Ornithological research conducted in this region are few and their results are brief. The first data refer to the appreciation of the flocks of waterfowl species that were carried out in the 60s of the century XX by GANEA (1965) and MUNTEANU (1970). Later, publications appeared containing information about the ecology of *Fulica atra*, *Anser anser*. After the 80s of the twentieth century, works appeared about nesting in the ecosystem of Lake Beleu of *Chlidonias hybrida* and *Recurvirostra avosetta* (CUNICENCO & JURMINSCHI, 1989). After the formation of the “Prutul de Jos” Scientific Reserve, works appear regarding the formation of the terrestrial vertebrate fauna complex of this region (MUNTEANU et al., 1995). A series of materials are published after 2006 describing the process of reproduction of some taxonomic groups of birds; population dynamics and the migratory specificity of aquatic and semi-aquatic species, etc. (COJAN et al., 2009, COJAN et al., 2010). In recent years, the published papers contain data on the particularities regarding the wintering of bird species (PALADI, 2020); the phenology and diversity of wading birds (Charadriiformes) in the spring passage (PALADI, 2021); ecological study of swan species *(Cygnus cygnus, C. olor, C. columbianus)* (PALADI, 2021a), study of aquatic and semi-aquatic bird species etc (PALADI, 2021b). The literature does not contain much information on the avifauna of the Manta lake complex and the Lower Prut sector (Republic of Moldova) or is outdated. The lack of current studies in this area is one of the reasons that led me to start this research.

The purpose of this paper is to highlight the significance of Lake Manta and its surroundings, and the necessity of systematic monitoring of wild bird species throughout the Lower Prut, in order to provide realistic information on the ecological status of aquatic habitats that will offer a relevant forecast of their future trend.

MATERIAL AND METHODS

The observations of avifauna were made between 2018 and 2022 on the Manta Lake, on the northern fish ponds (I-II), as well as on the adjacent sectors – Fig. 1. The field trips took place during the 6 ecological seasons (prevernal, vernal, aestival, serotinal, autumnal, hiemal), 1-2 times a month during March-October and once a month during the cold period (November-February), using the method of transects, observation in fixed or moving points, photography.

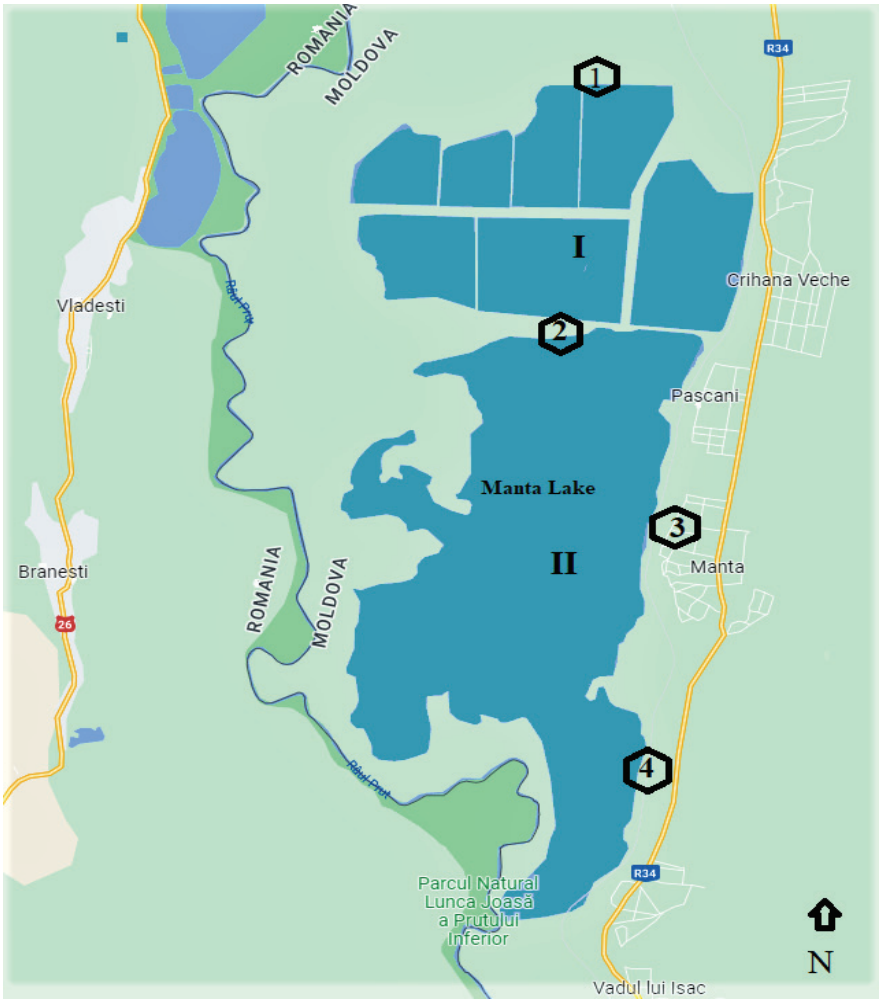


Figure 1. Map of Manta Lake (Sources: Google Maps, processed).
I - fish ponds; II - Manta Lake; 1 – 4: observation points.

Table 1. Distribution of observation days in the researched areas during 2018-2022.

Month / Area	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Total days
Manta Lake and fish ponds	5	5	9	8	9	8	7	8	8	8	4	4	83

The number of days of observations during the three years can be found in Table 1. As materials we used optical equipment (binoculars Nikon Aculon 75x100, telescope Bresser 75x100, digital camera Nikon D3100) and guides for determining species (DELIN & SVENSSON, 2016; SVENSSON et al. 2017).

4 points were chosen for observations due to the visibility, accessibility and density of birds, points and routes maintained throughout the study period. In case of floods, the wooden boat with oars was used, thus minimizing the disturbance of the birds.

The avifauna spectrum in the two areas is also analysed from the point of view of the threat status at a national (***, 2015) and international level (https://www.iucnredlist.org/resources) - Table 2. The systematic list of bird species was drawn up according to the Avibase – the global bird database (modern current systematic list) (https://avibase.bsc-eoc.org/familytree.jsp?lang=EN).

RESULTS AND DISCUSSIONS

The Manta Lake and the adjacent aquatic-marsh habitats are a complex aquatic ecosystem with highly fluctuating environmental and trophic conditions, which ensures the existence and reproduction of a large number of species. The diversity of bird fauna in the area consists of 228 species from 20 orders. The most numerous is the order of Passeriformes, with 36.0%. A relatively large share is also held by the orders of Charadriiformes – 17.2%, Anseriformes – 11.8%, Accipitriformes – 6.6%. With just 0.4% (1 species each) the orders of Cuculiformes, Apodiformes, Caprimulgiformes, Bucerotiformes are presented.

The group of nesting birds is represented by 139 species, which find here favourable conditions for reproduction and feeding. According to their phenological affiliation, the birds inventoried in this area fall into the following categories: summer guests - 103 species, sedentary - 44, passage species - 26 species, winter guests - 23 species, partially migratory - 28 species. The same species can be attributed to several phenological categories. The ornithofauna of the Manta Lake includes an impressive number of rare species for both the Republic of Moldova and Europe.

Table 2. List of bird species found in the Manta Lake sector 2012-2022.

No.	Species	No.	Species
	Galliformes Order	115.	*Hydroprogne caspia* (Pallas, 1770)
1.	*Phasianus colchicus* (Linnaeus, 1758)	116.	*Sterna hirundo* (Linnaeus, 1738)
2.	*Perdix perdix* (Linnaeus, 1758)		***Podicipediformes Order***
3.	*Coturnix coturnix* (Linnaeus, 1758)	117.	*Podiceps auritus* (Linnaeus, 1758)
	Anseriformes Order	118.	*Podiceps cristatus* (Linnaeus, 1758)
4.	*Cygnus olor* (Linnaeus, 1758) *	119.	*Podiceps grisegena* (Boddaert,1783)
5.	*Cygnus columbianus* (Ord, 1811)	120.	*Tachybabtus ruficollis* (Pallas, 1764)
6.	*Cygnus cygnus* (Linnaeus, 1758) *	121.	*Podiceps nigricollis* (Brehm, 1831)
7.	*Branta ruficollis* (Pallas,1769) *		***Columbiformes Order***
8.	*Anser anser* (Linnaeus, 1758)	122.	*Columba palumbus* (Linnaeus, 1758)
9.	*Anser fabalis* (Brisson, 1760)	123.	*Columba oenas* (Linnaeus, 1758) *
10.	*Anser albifrons* (Scopoli, 1769)	124.	*Streptopelia decaocto* (Frivaldszky, 1838)
11.	*Anser erythropus* (Linnaeus, 1758) *	125.	*Streptopelia turtur* (Linnaeus, 1758)
12.	*Anas platyrhynchos* (Linnaeus, 1758)		***Cuculiformes Order***
13.	*Anas acuta* (Linnaeus, 1758)	126.	*Cuculus canorus (*Linnaeus,1758)
14.	*Anas crecca* (Linnaeus, 1758)		***Apodiformes Order***
15.	*Mareca strepera* (Linnaeus, 1758)	127.	*Apus apus* (Linnaeus, 1758)
16.	*Mareca penelope* (Linnaeus, 1758*)*		***Caprimulgiformes Order***
17.	*Spatula clypeata* (Linnaeus, 1758)	128.	*Caprimulgus europaeus* (Linnaeus, 1758)
18.	*Spatula querquedula* (Linnaeus, 1758)		***Strigiformes Order***
19.	*Tadorna ferruginea* (Pallas, 1764) *	129.	*Tyto alba* (Scopoli, 1769) *
20.	*Tadorna tadorna* (Linnaeus, 1758) *	130.	*Athene noctua* (Scopoli, 1769)
21.	*Netta rufina* (Pallas, 1773) *	131.	*Otus scops* (Linnaeus, 1758)
22.	*Aythya fuligula* (Llinnaeus, 1758)	132.	*Asio otus* (Lanneus, 1758)
23.	*Aythya marila* (Linnaeus, 1761)	133.	*Asio flammeus* (Pontoppidan, 1763) *
24.	*Aythya nyroca* (Guldenstad,1770) *	134.	*Strix aluco* (Linnaeus, 1758)
25.	*Aythya ferina* (Linnaeus, 1758)		***Coraciiformes Order***

26.	*Bucephala clangula* (Linnaeus, 1758)	135.	*Coracias garrulus* (Linnaeus, 1758)
27.	*Mergus merganser* (Linnaeus, 1758)	136.	*Alcedo atthis* (Linnaeus, 1758)
28.	*Mergus serrator* (Linnaeus, 1758)	137.	*Merops apiaster* (Linnaeus, 1758) *
29.	*Mergellus albellus* (Linnaeus, 1758)	***Bucerotiformes Order***	
30.	*Oxyura leucocephala* (Scopoli, 1769) *	138.	*Upupa epops* (Linnaeus, 1758)
Gaviiformes Order		***Piciformes Order***	
31.	*Gavia stellata* (Pontoppidan, 1763)	139.	*Picus canus* (Gmelin, 1758)
32.	*Gavia arctica* (Linnaeus, 1758)	140.	*Picus viridis* (Linnaeus, 1758) *
Suliformes Order		141.	*Dryocopus martius* (Linnaeus, 1758) *
33.	*Phalacrocorax carbo* (Linnaeus, 1758)	142.	*Dendrocopos syriacus* (Hemprich et Ehremberg, 1833)
34.	*Microcarbo pygmeus* (Pallas, 1773) *	143.	*Dendrocopos major* (Linnaeus, 1758)
Pelecaniformes Order		144.	*Dendrocoptes medius* (Linnaeus, 1758) *
35.	*Pelecanus crispus* (Bruch, 1832) *	145.	*Dryobates minor* (Linnaeus, 1758)
36.	*Pelecanus onocrotalus* (Linnaeus, 1758) *	146.	*Junx torquilla* (Linnaeus, 1758)
37.	*Botaurus stellaris* (Linnaeus, 1758) *	***Passeriformes Order***	
38.	*Ixobrychus minutus* (Linnaeus, 1766)	147.	*Oriolus oriolus* (Linnaeus, 1758)
39.	*Nycticorax nycticorax* (Linnaeus, 1758)	148.	*Lanius collurio* (Linnaeus, 1758)
40.	*Ardeola ralloides* (Scopoli, 1769) *	149.	*Lanius excubitor* (Linnaeus, 1758)
41.	*Bubulcus ibis* (Linnaeus, 1766)	150.	*Lanius minor* (Gmelin, 1788)
42.	*Egretta garzetta* (Linnaeus, 1766)	151.	*Garrulus glandarius* (Linnaeus, 1758)
43.	*Ardea alba* (Linnaeus, 1758) *	152.	*Pica pica* (Linnaeus, 1758)
44.	*Ardea cinerea* (Linnaeus, 1758)	153.	*Coloeus monedula* (Linnaeus, 1758)
45.	*Ardea purpurea* (Linnaeus, 1766) *	154.	*Corvus cornix* (Linnaeus, 1758)
46.	*Plegadis falcinellus* (Linnaeus, 1766) *	155.	*Corvus frugilegus* (Linnaeus, 1758)
47.	*Platalea leucorodia* (Linnaeus, 1758) *	156.	*Corvus corax* (Linnaeus, 1758)
Ciconiiformes Order		157.	*Poecile palustris* (Linnaeus, 1758)
48.	*Ciconia nigra* (Linnaeus, 1758) *	158.	*Periparus ater* (Linnaeus, 1758)
49.	*Ciconia ciconia* (Linnaeus, 1758) *	159.	*Parus major* (Linnaeus, 1758)
Accipitriformes Order		160.	*Cyanistes caeruleus* (Linnaeus, 1758)
50.	*Haliaeetus albicilla* (Linnaeus, 1758) *	161.	*Regulus regulus* (Linnaeus, 1758)
51.	*Aquila heliaca* (Savigny, 1809*)* *	162.	*Remiz pendulinus* (Linnaeus, 1758)
52.	*Clanga pomarina* (Brehm, CL, 1831) *	163.	*Bombycilla garrulous* (Linnaeus, 1758)
53.	*Circaetus gallicus* (Gmelin, 1788) *	164.	*Panurus biarmicus* (Linnaeus, 1758)
54.	*Buteo buteo* (Linnaeus, 1758)	165.	*Galerida cristata* (Linnaeus, 1758)
55.	*Buteo lagopus* (Pontoppidan, 1763)	166.	*Alauda arvensis* (Linnaeus, 1758)
56.	*Pernis apivorus* (Linnaeus, 1758) *	167.	*Riparia riparia* (Linnaeus, 1758)
57.	*Accipiter gentilis* (Linnaeus, 1758)	168.	*Hirundo rustica* (Linnaeus, 1758)
58.	*Accipiter nisus* (Linneaus, 1758)	169.	*Delichon urbicum* (Linnaeus, 1758)
59.	*Milvus migrans* (Boddaert, 1783) *	170.	*Phylloscopus collybita* (Vieillot, 1817)
60.	*Milvus milvus* (Linnaeus, 1758) *	171.	*Phylloscopus trochilus* (Linnaeus, 1758)
61.	*Circus aeruginosus* (Linnaeus, 1758)	172.	*Aegithalos caudatus* (Linnaeus, 1758)
62.	*Circus pygargus* (Linnaeus, 1758) *	173.	*Locustella luscinoides* (Savi, 1824)
63.	*Circus cyaneus* (Linnaeus, 1766) *	174.	*Locustella fluviatilis* (Wolf, 1810)
64.	*Pandion haliaetus* (Linnaeus, 1758) *	175.	*Locustella naevia* (Boddaert, 1783)
Falconiformes Order		176.	*Acrocephalus schoenobaenus* (Linnaeus, 1758)
65.	*Falco tinnunculus* (Linnaeus, 1758)	177.	*Acrocephalus scirpaceus* (Hermann, 1804)
66.	*Falco vespertinus* (Linnaeus, 1758) *	178.	*Acrocephalus arundinaceus* (Linnaeus, 1758)
67.	*Falco columbarius* (Linnaeus, 1758)	179.	*Acrocephalus palustris* (Bechstein, 1798)
68.	*Falco subbuteo* (Linnaeus, 1758)	180.	*Hippolais icterina* (Vieillot, 1817)
69.	*Falco naumanni* (Fleischer, 1818) *	181.	*Sylvia atricapilla* (Linnaeus, 1758)
70.	*Falco cherrug* (Gray, 1834) *	182.	*Sylvia borin* (Boddaert, 1783)
71.	*Falco peregrinus* (Tunstall, 1771) *	183.	*Curruca nisoria* (Bechstein, 1792)
Gruiformes Order		184.	*Curruca communis* (Latham, 1787)
72.	*Grus grus* (Linnaeus, 1758)	185.	*Sylvia curruca* (Linnaeus, 1758)
73.	*Rallus aquaticus* (Linnaeus, 1758)	186.	*Sitta europaea* (Linnaeus, 1758)
74.	*Porzana parva* (Scopoli, 1769) *	187.	*Certhia familiaris* (Linnaeus, 1758)
75.	*Crex crex* (Linnaeus, 1758) *	188.	*Troglodytes troglodytes* (Linnaeus, 1758)
76.	*Gallinula chloropus* (Linnaeus, 1758)	189.	*Muscicapa striata* (Pallas, 1764)
77.	*Fulica atra* (Linnaeus, 1758)	190.	*Ficedula hypoleuca* (Pallas, 1764) *
Charadriiformes Order		191.	*Ficedula parva* (Bechstein, 1792)

78.	*Gallinago gallinago* (Linnaeus, 1758)	192.	*Ficedula albicollis* (Temminck, 1815)
79.	*Lymnocryptes minimus* (Brünnich, 1764)	193.	*Luscinia svecica* (Linnaeus, 1758) *
80.	*Calidris pugnax* (Linnaeus, 1758)	194.	*Luscinia luscinia* (Linnaeus, 1758)
81.	*Calidris alba* (Pallas, 1764)	195.	*Luscinia megarhynchos* (Brehm, 1831)
82.	*Calidris ferruginea* (Pontoppidan, 1763)	196.	*Erithacus rebecula* (Linnaeus, 1758)
83.	*Calidris alpina* (Linnaeus, 1758)	197.	*Saxicola rubetra* (Linnaeus, 1758)
84.	*Calidris minuta* (Leisler, 1812)	198.	*Saxicola rubicola* (Linnaeus, 1766)
85.	*Calidris temminckii* (Leisler, 1812)	199.	*Phoenicurus phoenicurus* (Linnaeus, 1758)
86.	*Calidris falcinellus* (Pontoppidan, 1763)	200.	*Phoenicurus ochruros* (Gmelin, SG, 1744)
87.	*Arenaria interpres* (Linnaeus, 1758)	201.	*Oenanthe oenanthe* (Linnaeus, 1758)
88.	*Numenius arquata* (Linnaeus, 1758)	202.	*Oenanthe pleschanka* (Lepechin, 1770)
89.	*Limosa limosa* (Linnaeus, 1758)	203.	*Turdus merula* (Linnaeus, 1758)
90.	*Limosa laponica* (Linnaeus, 1758)	204.	*Turdus philomelos* (Brehm, 1831)
91.	*Actitis hypoleucos* (Linnaeus, 1758)	205.	*Turdus viscivorus* (Linnaeus, 1758)
92.	*Tringa ochropus* (Linnaeus, 1758)	206.	*Turdus pilaris* (Linnaeus, 1758)
93.	*Tringa erythropus (Pallas, 1764)*	207.	*Sturnus vulgaris* (Linnaeus, 1758)
94.	*Tringa totanus* (Linnaeus, 1758)	208.	*Passer domesticus* (Linnaeus, 1758)
95.	*Tringa nebularia* (Gunnerus, 1767)	209.	*Passer hispaniolensis* (Temminck, 1820)
96.	*Tringa glareola* (Linnaeus, 1758)	210.	*Passer montanus* (Linnaeus, 1758)
97.	*Phalaropus lobatus* (Linnaeus, 1758)	211.	*Anthus campestris* (Linnaeus, 1758)
98.	*Vanellus vanellus* (Linnaeus, 1758)	212.	*Anthus trivialis* (Linnaeus, 1758)
99.	*Charadrius dubius* (Scopoli, 1786)	213.	*Anthus cervinus* (Pallas, 1811)
100.	*Charadrius hiaticula* (Linnaeus, 1758)	214.	*Motacilla alba* (Linnaeus, 1758)
101.	*Haematopus ostralegus* (Linnaeus, 1758) *	215.	*Motacilla flava* (Linnaeus, 1758)
102.	*Himantopus himantopus* (Linnaeus, 1758) *	216.	*Fringilla coelebs* (Linnaeus, 1758)
103.	*Recurvirostra avosetta* (Linnaeus, 1758) *	217.	*Fringilla montifringilla* (Linnaeus, 1758)
104.	*Glareola pratincola* (Linnaeus, 1766) *	218.	*Coccothraustes coccothraustes* (Linnaeus, 1758)
105.	*Stercorarius parasiticus* (Linnaeus, 1758)	219.	*Pyrrhula pyrrhula* (Linnaeus, 1758)
106.	*Ichthyaetus ichthyaetus (Pallas, 1773)*	220.	*Serinus serinus* (Linnaeus, 1758)
107.	*Larus fuscus* (Linnaeus, 1758)	221.	*Chloris chloris* (Linnaeus, 1758)
108.	*Larus cachinnans* (Pallas, 1811)	222.	*Spinus spinus* (Linnaeus, 1758)
109.	*Larus canus* (Linnaeus, 1758)	223.	*Carduelis carduelis* (Linnaeus, 1758)
110.	*Chroicocephalus ridibundus* (Linnaeus, 1766)	224.	*Linaria cannabina* (Linnaeus, 1758)
111.	*Hydrocoleus minutus* (Pallas, 1776)	225.	*Emberiza citrinella* (Linnaeus, 1758)
112.	*Chlidonias niger* (Linnaeus, 1758)	226.	*Emberiza schoeniculus* (Linnaeus, 1758)
113.	*Chlidonias hybrida* (Pallas, 1811)	227.	*Emberiza calandra* (Linnaeus, 1758)
114.	*Chlidonias leucopterus* (Temminck,1815)	228.	*Emberiza hortulana* (Linnaeus, 1758)

Legend: * – Species included in the Red Book of the Republic of Moldova (***, 2015).

The largest number of birds – 103 species – was registered in the studied sector during the warm period of the year; sedentary birds are represented by 44 species. Sometimes, one species can be attributed to several phenological categories. This natural area with good environmental conditions is suitable for the breeding of 139 species. Equally impressive is the number of species protected at national and international level – 48 species. According to the analysis of older data on species observed in the Manta and Lower Prut sector, an increase in the number of species can be observed (MUNTEANU et al., 2006; POSTOLACHE et al., 2012) (Fig. 2).

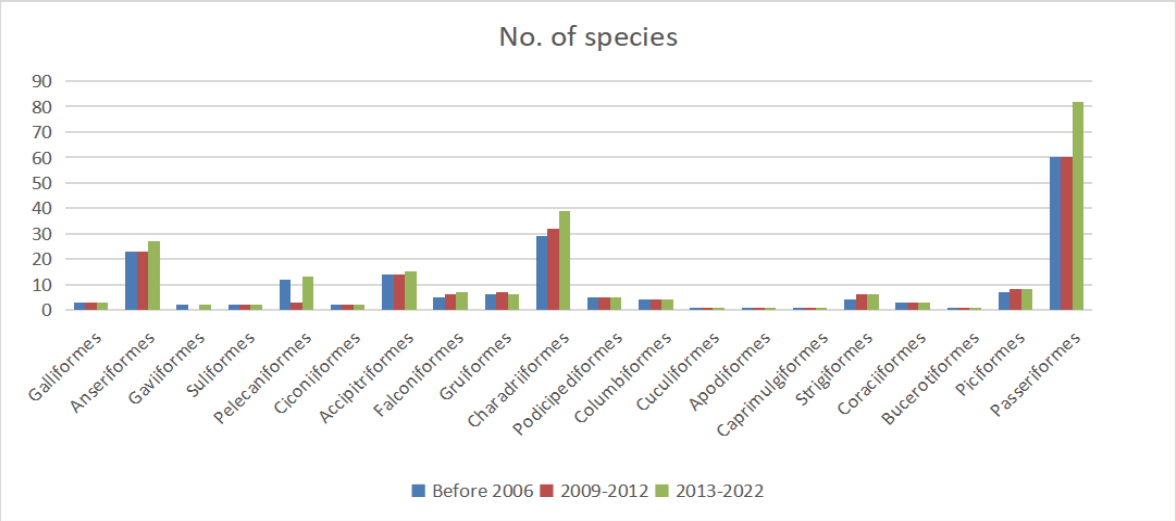
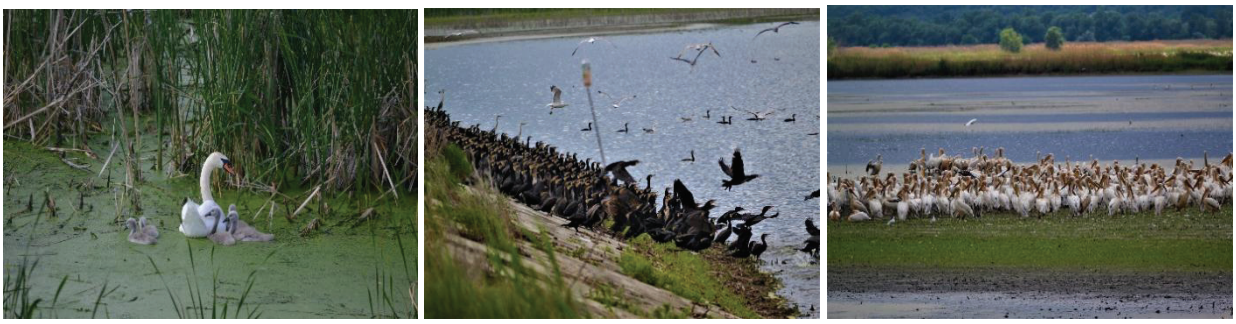


Figure 2. Taxonomic structure of bird species identified in Manta Lake sector.

The highest increase was noted in passerine species - with 22 species and charadriiforms - with 10 species. The differences can be attributed to the intensity of the observations, as well as to the availability of food resources or changes in the ecosystems.

The northern boundary of the marsh is bordered by agricultural land, separated by artificially dug canals on the edge of which *Phragmites australis* (CAV.) TRIN. ex STEUD. end *Typha angustifolia* L. grows. Here, in the breeding period of 2021 and 2022 2 pars of *Cygnus olor* (Photos. 2), 2 pairs of *Anas platyrhynchos*, 4 pairs of *Gallinula chloropus* were observed. This area was visited for shelter and food by 4-6 pairs of *Anser anser* with chicks, solitary individuals of *Ardeola ralloides*, *Ardea cinerea*, *A. purpurea*, *Acrocephalus arundinaceus A. scripaceus*, etc.



Photos 2. *Cygnus olor, Phalacrocorax carbo* and *Pelecanus onocrotalus* (original).

Further south of the dam there are 7 fish ponds in which the hydrological level is varying, sometimes directed by the locals through the deliberate breaking of the dams. In the ponds where the water level is up to 1.2 m deep, there are often found several hundred (200-700 specimens) of *Phalacrocorax carbo* and *Pelecanus onocrotalus* (20-250 specimens), which are joined by individuals of the species *Ardea cinerea, Chroicocephalus ridibundus*, *Larus cachinnans*. A small number of specimens were observed at different times of the year, namely *Podiceps cristatus*, *P. grisagena*, *P. auratus*, *Tachybaptus ruficollis*, *Pelecanus crispus*, *Ardea alba*, *Platalea leucorodia*, *Tadorna ferruginea*, *Spatula querquedula*, *Netta rufina*.

In the cold period about 1-5 specimens of *Gavia stellata*, *G. arctica*, *Anas acuta*, *Mergellus albellus*, *M. merganser*, *M. serrator* etc can be met.

In the basins from the northwestern part, where the water level is lower or decreases, leaving only moist soil, the species *Recurvirostra avosetta* (21 pairs), *Himantopus himantopus* (11 pairs), *Vanellus vanellus* (19 pairs), *Sterna hirundo* (9 pairs), *Chlidonias hybrida* (23 pairs) have been observed at nesting in several places. Near the colony of *Recurvirostra avosetta* and *Himantopus himantopus* for the first time (22.05.2022), in the observation period, 3 pairs of *Glareola pratincola* (Photos. 3) were recorded. This species has not been registered in the Republic of Moldova for several decades. The presence of birds and their behaviour at the time of observation does not exclude the possibility of nesting in the area.

Photos 3. Nest with eggs of *Recurvirostra avosetta* and specimens of *Glareola pratincola* (original).

The Manta Lake and the fish pools are separated by a long dam, which runs from east to west. Beyond this, on the western edge of the lake, the forests of *Salix alba* L. grew on the banks of the Prut River. Many birds can be found in these places – falconiforms (4 species), galliforms (2 species), strigiforms (5 species), piciforms (7 species) passeriforms (39 species). Through the reeds, meadow or forest, numerous groups of *Passer montanus* specimens of *Fringilla coelebs*, *Carduelis carduelis*, *Parus major*, *Cyanistes caeruleus*, *Aegithalos caudatus*, *Troglodytes troglodytes*, *Pica pica* etc can be observed. Diurnal predatory birds have o lower frequency and a number of 1- 4 specimens: *Buteo buteo*, *Accipiter nisus*, *Haliaeetus albicilla* etc. To the surface of the lake an irregular belt of willow, reed and rush stretches, with places where many species were observed at nesting: *Podiceps cristatus, P. grisegena, P. nigricollis, Tachybaptus ruficollis, Phalacrocorax carbo, Microcarbo pygmaeus, Botaurus stellaris*, *Ixobrychus minutus, Nycticorax nycticorax*, *Ardeola ralloides, Egretta garzetta*, *Ardea alba, A. cinerea, A. purpurea, Plegadis*

falcinellus, Platalea leucorodia, Cygnus olor, Anser anser, Anas platyrhynchos, A. crecca, Spatula querquedula, *S. clypeata*, *Mareca strepera, Aythya ferina*, *A. nyroca*, *Fulica atra* etc. Some species can form mixed colonies (*Phalacrocorax carbo, Microcarbo pygmaeus, Nycticorax nycticorax, Ardeola ralloides, Egretta garzetta, Ardea alba, A. cinerea, Plegadis falcinellus, Platalea leucorodia).* Through the reeds, the sound of *Acrocephalus scirpaceus*, *A. arundinaceus*, *A. palustris*, *A. schoenobaenus* males can be heard from a distance. During the summer, dozens of *Pelecanus crispus* and up to 2000 specimens of *P. onocrotalus* arrive from the Danube Delta in search of food. The number of individuals decreases towards autumn, the birds being observed until October.

In the summer season, the perimeter of the Manta Lake is visited by birds that nest in the adjacent areas, but come here in search of food: *Ciconia ciconia, Hirundo rustica*, *Accipiter nisus*, *Falco tinnunculus*, *F. vespertinus*, *Circus aeruginosus*, *Athene noctua*, *Asio flammeus*, *Delichon urbicum*, *Riparia riparia*, *Merops apiaster*, *Coracias garrulus*. Although the *Haliaeetus albicilla* species was observed during the whole year with a number of 1-8 specimens, its nesting in the area was not confirmed.

The floristic and phytocenotic composition of the aquatic vegetation largely depends on the oscillation of the water level. In recent years, during the summer, the lake's aquatic area is 70% occupied by *Trapa natans* L. and *Nymphoides peltata* (SG GMEL) KUNTZE. For some aquatic species of birds, the compact layer of plants creates difficulties in moving or looking for food, others prefer it as a resting place (herons, seagulls, terns).

At the end of July, the autumn migration begins, which lasts until the second decade of November. Summer guests feed intensely to withstand long flights; the dense reeds serve as a safe place for large groups of *Sturnus vulgaris, Hirundo rustica, Riparia riparia.* Flocks of *Ciconia ciconia* (8-300 ex.) and *C. nigra* (5-9 ex.) sometimes stop for a few days or are only observed in flight. The groups of *Plegadis falcinellus, Egretta garzetta, Platalea leucorodia, Pelecanus onocrotalus, Anser anser, Anas platyrhynchos, Himantopus himantopus, Tringa totanus, Limosa limosa, Chlidonias hybrida, Chroicocephalus ridibundus, Fulica atra* or solitary specimens of *Phalacrocorax carbo, Microcarbo pygmaeus, Pelecanus crispus, Ardea alba, A. purpurea, A. cinerea, Ardeola ralloides, Nycticorax nycticorax, Ixobrychus minutus, Cygnus olor, Aythya nyroca, A. ferina, Vanellus vanellus, Tringa erythropus, Actitis hypoleucos, Haematopus ostralegus* are very active in the search for food. In September, the phenomenon of autumn migration is stronger, more waterfowl and waders arrive, while summer guests make their last preparations for migration (Photos 4).

Photos 4. Aspects of autumn migration (original).

In early October, the species of *Anas acuta, Cygnus cygnus, Anser albifrons* arrive, which are assigned to the category of winter guests. In November, the lake is hosting over 9000 water birds that, gradually, leave the territory, depending on the air temperature. The species of *Anas platyrhynchos, A. crecca, Anser anser, A. albifrons, Phalacrocorax carbo* have the highest number of individuals. In the hiemal period the Manta Lake acquires a layer of ice on the surface that persists for short periods of time. When it is missing, the aquatic surface attracts many aquatic and semi-aquatic species such as *Cygnus cygnus*, *C. olor*, *Anser fabalis*, *A. albifrons*, *Anas platyrhynchos*, *A. acuta*, *A. crecca*, *Tadorna tadorna*. Along with these, 3 to 30 specimens *Aythya fuligula* and *A. ferina* can be met. While in the winter of 2020-2021 specimens of *Cygnus columbianus* visited the area only in the passage, on 22 February 22 2022, 20 specimens were counted which remained in the territory for more than 2 weeks. The species with irregular presence in the winter season are *Mergellus albellus*, *M. merganser*, *M. serrator*, *Gavia stellata*, *Branta ruficollis* etc. Groups of *Phalacrocorax carbo* wander in search of food throughout the region. Very often, they are found on the Prut River in search of food, at which point they take advantage of the specimens of *Anas platyrhynchos, Ardea cinerea, A. alba.* Unusually, solitary specimens of *Himantopus himantopus*, *Pelecanus crispus*, *Recurvirostra avosetta*, *Circus aeruginosus*, *Platalea leucorodia*, *Numenius arquata*, *Calidris alpina* were observed.

Starting with the last decade of February, the first summer guests and the species of passage appear. The early presence or the influence of environmental factors sometimes causes mortality among them. Thus, in March 2018, 11 perished specimens of *Ciconia ciconia* Linnaeus 1758 were found, deprived of the opportunity to continue their flight and feed; in February – March 2021, 9 specimens of *Cygnus olor* perished, contaminated with the virus *Pasteurella multocida* (according to the Informative Note of the Territorial Directorate for Food Safety of Cahul no. 22 from 10.03.2021) and weakened by lack of food. The total number of the species at the moment was more than 350 specimens.

Towards the end of March and the beginning of April, the wader species arrive (ruffs, snipes, lapwings), which prefer especially the eastern shore of the lake that represents a floodplain sector mosaically occupied by reeds. After a

short time, other species of waders arrive, which stop here for short periods of time after which they continue their path towards migration, such as *Charadrius hiaticula*, *C. dubius*, *Calidris minuta*, *Tringa nebularia*, *T. glareola Arenaria interpres*. In the prevernal aspect, the fast floods of the Prut River are present. Hydrological fluctuations often cause nesting failure by flooding nests and destroying nesting species such as *Vanellus vanellus, Chroicocephalus ridibundus, Larus cachinans, Chlidonias hybrida*, *Sterna hirundo*. The end of the spring passage is completed after the arrival of the specimens of *Egretta garzetta*, *Nycticorax nycticorax*, *Plegadis falcinellus*, *Platalea leucorodia, Ardeola ralloides*, *Ixobrychus minutus*. In prevernal and autumnal periods very rare or accidental specimens of *Haematopus ostralegus*, *Arenaria interpres*, *Phaloropus lobatus*, *Hydroprogne caspia* can be met. The charadriiform groups of *Vanellus vanellus, Calidris minuta*, *C. termminckii*, *Limosa limosa*, *Numenius arquata*, *Tringa nebularia*, *T. glareola*, *Actitis hypoleucos* are common for this period.

In May, sedentary species begin their breeding season; summer guests barely start these activities by forming pairs, looking for suitable places for nesting. In summer, the perimeter of the Manta Lake is visited by birds that nest in adjacent areas but come here in search of food: *Ciconia ciconia, Hirundo rustica*, *Delichon urbica*, *Riparia riparia*, *Accipiter nisus*, *Falco tinnunculus*, *F. vespertinus*, *Circus aeruginosus*, *Athene noctua*, *Asio flammeus*, *Merops apiaster*, *Coracias garrulus*. The nesting of the species *Haliaeetus albicilla* has not been confirmed, however, around the lake, 1-8 specimens are observed especially during the winter, in summer – 1-2 specimens. Forest strips with older willow trees entice nesting specimens of *Picus canis, P. viridis*, *Dendrocopos major, D. syriacus, Dryocopus martius*.

At the end of July, the autumn migration begins, which lasts until the second decade of November. Summer guests feed intensely to withstand long flights; dense reeds serve as a safe place for large groups of *Sturnus vulgaris, Hirundo rustica, Riparia riparia.* Flocks of birds *Ciconia ciconia* (8-300 sp.) and *C. nigra* (5-9 sp.) sometimes stop for a few days or are only observed in flight. Groups of *Pelecanus onocrotalus, Egretta garzetta, Plegadis falcinellus, Platalea leucorodia, Anser anser, Anas platyrhynchos, Limosa limosa, Chlidonias hybrida, Fulica atra, Chroicocephalus ridibundus, Himantopus himantopus, Tringa totanus,* or solitary specimens of *Phalacrocorax carbo, Microcarbo pygmaeus, Pelecanus crispus, Ardeola ralloides, Ardea purpurea, A. alba, A. cinerea, Ciconia nigra, Nycticorax nycticorax, Ixobrychus minutus, Cygnus olor, Aythya nyroca, A. ferina, Vanellus vanellus, Tringa erythropus, Haematopus ostralegus* are very active in the search for food. In September, the phenomenon of autumn migration is accentuated, more waterfowl and waders arrive, while summer guests make their last preparations for migration. In early October, arrive the species: *Anas acuta, Cygnus cygnus, Anser albifrons*, species assigned to the winter guest category. In November, the lake is home to over 9,000 waterfowl.

CONCLUSIONS

The Manta Lake is an area of avifaunal importance of the Lower Prut with 228 species of birds grouped in 20 orders and 57 families. The most numerous is the order of Passeriformes, with 82 species followed by the orders Charadriiformes - 39 species, Anseriformes - 27 species, Accipitriformes - 15 species. The orders of Cuculiformes, Apodiformes, Caprimulgiformes, Bucerotiformes are present with only 1 species each. In addition to the regularly encountered species, the studied area hosts species that have an irregular presence or arrive accidentally.

According to the phenological affiliation, the following categories are distinguished: summer guests - 103 species, sedentary - 44, species of passage - 26 species, winter guests - 23 species, partially migratory - 28 species. The group of nesting birds is represented by 139 species.

The reduction of aquatic surfaces as a result of the clogging process, the hunting, grazing of domestic animals, fishing, are among the activities that damage in time the ornithofauna of the area. A proper management of the ecosystem would be a first step towards solving the existing problems.

Despite the changes it has been exposed to, the environment of the Manta Lake with a particular structure is an optimal system for the existence of a multitude of plant and animal species, a special place is occupied by birds, for which these territories are an important place for nesting and an important stopping point during migration.

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