

## INVESTIGATION THE ECOLOGY AND DISTRIBUTION OF PASSERIFORMES POPULATION FROM SACALIN ISLAND - DANUBE DELTA

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### Abstract

*Danube Delta is the second largest river delta in Europe, after Volga Delta, and the best preserved on the continent. Sacalin Island is a strictly protected area of the Danube Delta, declared biosphere reserve since 1938. The impact of human regarding the use of the same territories or interest in eating the same food resources disturbed bird's habitats. The aim of this study was to investigate the distribution and ecology of passerine birds (Passeriformes) on the Sacalin Island in relation with anthropic changes. Data were obtained through the establishment of a permanent ringing station in Sacalin Island, with the support of the Romanian Ornithological Central and Nos Oiseaux Institute in Switzerland. As a working methodology, observations and bird ringing were made throughout the years 2007-2013, and distribution and ecology were analyzed. A total number of 6619 Passeriformes were collected, belonging of 13 familia. Among Passeriformes collected from Sacalin Island, Sylviidae familiae was the most divers with 14 species, followed by Muscicapidae with 8 species, Fringilidae (5 species), Turdidae (4 species), Paridae (3 species), Paradoxornithidae and Motacillidae (2 species) and Emberizidae, Oriolidae, Corvidae, Laniidae, Troglodytidae, and Hirundinidae with 1 species respectively. The predominant number of birds was found in Muscicapidae familiae (36.51%), followed by Sylviidae (29.65%), Turdidae (13.05%), Paridae (8.68%), Laniidae (6.78%), Fringilidae (2.07%), Troglodytidae (0.98%), Motacillidae (0.60%), Paradoxornithidae (0.51%), Oriolidae (0.50%), Emberizidae (0.40%), Corvidae (0.18%) and Hirundinidae (0.05%). In conclusion, our data suggest that the Sacalin Island is an area with a wide diversity of bird's fauna, uncovering the ecology and distribution of birds could greatly improve the knowledge of bird's dynamics and behavior.*

**Key words:** Biosphere reserve, birds, Danube Delta, Passeriformes.

### INTRODUCTION

The greater part of Danube Delta lies in Romania (Tulcea county), while its northern part, on the left bank of the Chilia arm, is situated in Ukraine (Odessa Oblast). The

approximate surface area is 4,152 km<sup>2</sup>, and of that, 3,446 km<sup>2</sup> are in Romania. With the lagoons of Razim-Sinoe (1,015 km<sup>2</sup> with 865 km<sup>2</sup> water surface), located south of the main delta, the total area of the Danube Delta reaches 5,165 km<sup>2</sup>. The Razim - Sinoe

lagoon complex is geologically and ecologically related to the delta proper and their combined territory is part of the World Heritage Sites (Giosan et al., 2012). Over 300 species of bird have been recorded, of which over 176 species breed, the most important being cormorant, pygmy cormorant, white pelican and Dalmatian pelican (Covaci et al., 2006; Ion et al., 2002). There are numerous multi-species heron colonies and raptor species including white-tailed eagle. The marsh tern colonies are especially notable. The delta holds huge numbers of geese in the winter, white-fronted geese, red-breasted geese (a globally threatened species with almost all the world wintering population present), teal, mallard and pochard (Kalosca et al., 2007; Cramp et al., 1992). Ecological changes in the Danube Delta including the creation of a network of canals through the delta to improving access and water circulation, and the reduction of the wetland area by the construction of agricultural polders and fishponds which reduced biodiversity, altered natural flow and sedimentation patterns, and diminished the ability of the delta to retain nutrients (Aurigi et al., 2000; Sarbu, 2005). Therefore the aim of this study was to investigate the distribution and ecology of passerine birds (*Passeriformes*) on the Sacalin Island in relation with anthropic changes, in order to improve the measures for protecting the bird's fauna.

## MATERIALS AND METHODS

Data were obtained through the establishment of a permanent ringing station in Sacalin Island (Figure 1), with the support of the Romanian Ornithological Central and Nos Oiseaux Institute, Switzerland. As a working methodology, observations and ringing were made throughout the years 2007-2013, the station having fixed opening hours. The nets were opened and checked within 30 minutes in good weather conditions and temperature and within 15 minutes unfavorable climatic conditions, from sunrise to sunset. Under extreme conditions, the nets were closed (temperatures above 26°C or high winds). Data processing was performed using Microsoft Office Excel and ANOVA software.

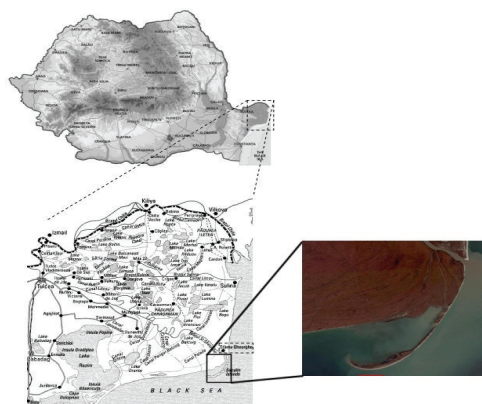


Figure 1. Map of Sacalin Island areas where birds were collected

## RESULTS AND DISCUSSIONS

During 2007-2013, a total number of 6619 *Passeriformes* were collected, belonging of 13 familia (Tabel 1). Among *Passeriformes* collected from Sacalin Island, Sylviidae familiae was the most divers with 14 species,

followed by Muscipidae with 8 species, and Fingilidae (5 species), Turdidae (4 species), Paridae (3 species), Paradoxornithidae and Motacillidae (2 species) and Emberizidae, Oriolidae, Corvidae, Laniidae, Troglodytidae, and Hirundinidae with 1 species respectively (Figure 2; Tabel 1).

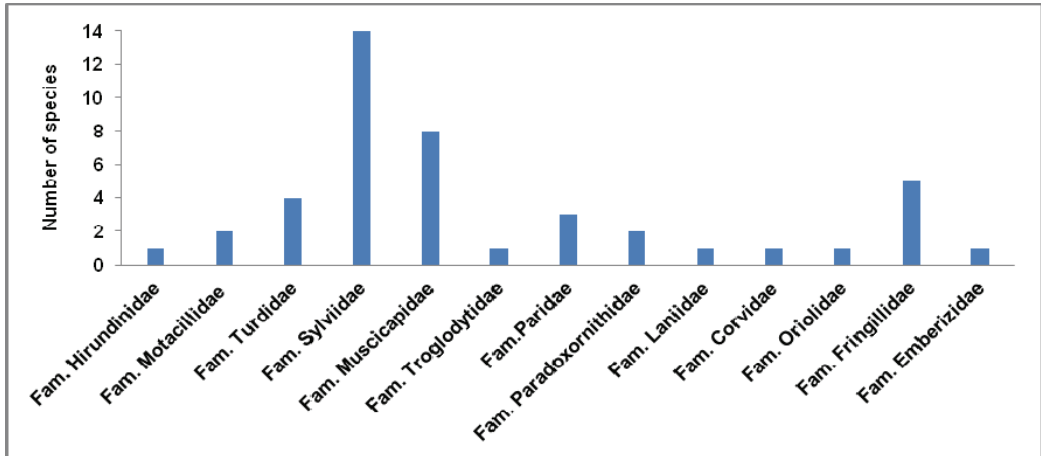


Figure 2. Number of species of different families of Passeriformes identified in Sacalin Island

Tabel 1. Details on Passeriformes species collected from Sacalin Island, stratified by phenological type, frequency, and biogeography type.

| No. of species           | Species                        | Number of specimens | Phenological type | Status                   | Frequency | Biogeography type  |
|--------------------------|--------------------------------|---------------------|-------------------|--------------------------|-----------|--------------------|
| <b>Fam. Hirundinidae</b> |                                |                     |                   |                          |           |                    |
| 1.                       | <i>Delichonurbica</i>          | 3                   | S.G., UnH.        | strict protected species | **        | Palaearctic        |
| <b>Fam. Motacillidae</b> |                                |                     |                   |                          |           |                    |
| 2.                       | <i>Anthus trivialis</i>        | 15                  | S.G., P. UnH.     | strict protected species | **        | European-Turkestan |
| 3.                       | <i>Motacilla alba</i>          | 25                  | S.G., P., H.      | strict protected species | ****      | Palaearctic        |
| <b>Fam. Turdidae</b>     |                                |                     |                   |                          |           |                    |
| 4.                       | <i>Turdus merula</i>           | 439                 | S.G., P. UnH.     | protected species        | ****      | Palaearctic        |
| 5.                       | <i>Turdus pilaris</i>          | 8                   | W.G., P. UnH.     | protected species        | **        | Siberian           |
| 6.                       | <i>Turdus iliacus</i>          | 21                  | W.G., P. UnH.     | protected species        | ***       | Siberian           |
| 7.                       | <i>Turdus philomelos</i>       | 396                 | W.G., P. UnH.     | protected species        | ***       | European           |
| <b>Fam. Sylviidae</b>    |                                |                     |                   |                          |           |                    |
| 8.                       | <i>Locustellaluscinioides</i>  | 16                  | S.G., P. H.       | strict protected species | **        | European-Turkestan |
| 9.                       | <i>Locustella fluviatilis</i>  | 9                   | S.G., P. H.       | strict protected species | ***       | Palaearctic        |
| 10.                      | <i>Acrocephalus scirpaceus</i> | 14                  | S.G., P. H.       | strict protected species | ***       | European-Turkestan |
| 11.                      | <i>Acrocephalus oenobaenus</i> | 12                  | S.G., P. H.       | strict protected species | ***       | European-Turkestan |

|                               |                                      |      |                 |      |                          |      |                    |
|-------------------------------|--------------------------------------|------|-----------------|------|--------------------------|------|--------------------|
| 12.                           | <i>Acrocephaluspalustris</i>         | 59   | S.G., P.        | H.   | strict protected species | **   | European           |
| 13.                           | <i>Acrocephalusarundinaceus</i>      | 23   | S.G., P.        | H.   | strict protected species | **** | European-Turkestan |
| 14.                           | <i>Hippolaispallida</i>              | 46   | S.G., P.        | UnH. | strict protected species | **   | Mediterranean      |
| 15.                           | <i>Sylvia communis</i>               | 87   | P.              | UnH. | strict protected species | ***  | European-Turkestan |
| 16.                           | <i>Sylvia curruca</i>                | 207  | P.              | UnH. | strict protected species | ***  | European-Turkestan |
| 17.                           | <i>Sylvia borin</i>                  | 237  | P.              | UnH. | strict protected species | ***  | European           |
| 18.                           | <i>Sylvia nisoria</i>                | 39   | P.              | UnH. | strict protected species | **   | European-Turkestan |
| 19.                           | <i>Sylvia atricapilla</i>            | 485  | P.              | UnH. | strict protected species | ***  | European           |
| 20.                           | <i>Phylloscopussibilatrix</i>        | 44   | S.G., P.        | UnH. | strict protected species | **   | European           |
| 21.                           | <i>Phylloscopustrochilus</i>         | 685  | S.G., P.        | UnH. | strict protected species | ***  | Palaearctic        |
| <b>Fam. Muscipidae</b>        |                                      |      |                 |      |                          |      |                    |
| 22.                           | <i>Muscicapatriata</i>               | 250  | S.G., P.        | UnH. | strict protected species | ***  | European-Turkestan |
| 23.                           | <i>Ficedulahypoleuca</i>             | 21   | S.G., P.        | UnH. | strict protected species | **   | European           |
| 24.                           | <i>Ficedularparva</i>                | 347  | P.              | UnH. | strict protected species | ***  | Palaearctic        |
| 25.                           | <i>Ficedulaalbicollis</i>            | 37   | P.              | UnH. | strict protected species | *    | European           |
| 26.                           | <i>Phoenicurusphoenicurus</i>        | 188  | S.G., P.        | UnH. | strict protected species | **   | European           |
| 27.                           | <i>Luscinialuscinia</i>              | 306  | S.G., H.        |      | strict protected species | ***  | Palaearctic        |
| 28.                           | <i>Phoenicurusochruros</i>           | 60   | S.G., P.        | UnH. | strict protected species | **   | Paleo-Xeromontan   |
| 29.                           | <i>Erithacusrubecula</i>             | 1208 | P.              | UnH. | strict protected species | **** | European           |
| <b>Fam. Troglodytidae</b>     |                                      |      |                 |      |                          |      |                    |
| 30.                           | <i>Troglodytes troglodytes</i>       | 65   | P.              | UnH. | strict protected species | *    | Transpalaearctic   |
| <b>Fam. Paridae</b>           |                                      |      |                 |      |                          |      |                    |
| 31.                           | <i>Aegithaloscaudatus</i>            | 68   | S.G., H.        |      | strict protected species | *    | Palaearctic        |
| 32.                           | <i>Parus major</i>                   | 205  | S.G., P.        | H.   | strict protected species | ***  | Palaearctic        |
| 33.                           | <i>Cyanistescaeruleus</i>            | 303  | S.G., P.        | H.   | strict protected species | ***  | European           |
| <b>Fam. Paradoxornithidae</b> |                                      |      |                 |      |                          |      |                    |
| 34.                           | <i>Panurusbiarmicus</i>              | 32   | S.G., P.        | H.   | strict protected species | **   | Palaearctic        |
| 35.                           | <i>Remizpendulinus</i>               | 2    | S.G., P.        | H.   | strict protected species | *    | Palaearctic        |
| <b>Fam. Laniidae</b>          |                                      |      |                 |      |                          |      |                    |
| 36.                           | <i>Laniuscollurio</i>                | 449  | S.G., P.        | H.   | strict protected species | ***  | Palaearctic        |
| <b>Fam. Corvidae</b>          |                                      |      |                 |      |                          |      |                    |
| 37.                           | <i>Pica pica</i>                     | 12   | S.              | H.   | -                        | ***  | European-Turkestan |
| <b>Fam. Oriolidae</b>         |                                      |      |                 |      |                          |      |                    |
| 38.                           | <i>Oriolusoriolus</i>                | 33   | S.G., H.        |      | strict protected species | ***  | Old world          |
| <b>Fam. Fringillidae</b>      |                                      |      |                 |      |                          |      |                    |
| 39.                           | <i>Fringillacoelebs</i>              | 64   | P., W.G.        | UnH. | protected species        | **** | European           |
| 40.                           | <i>Cardueliscarduelis</i>            | 2    | S.G., P., W.G., | UnH. | strict protected species | **   | European-Turkestan |
| 41.                           | <i>Carduelis spinus</i>              | 28   | S.G., P., W.G., | UnH. | strict protected species | **** | Palaearctic        |
| 42.                           | <i>Coccothraustes coccothraustes</i> | 3    | P.,             | UnH. | strict protected species | *    | Palaearctic        |
| 43.                           | <i>Passer montanus</i>               | 40   | S.,             | UnH. | -                        | ***  | Palaearctic        |
| <b>Fam. Emberizidae</b>       |                                      |      |                 |      |                          |      |                    |
| 44.                           | <i>Emberizaschoeniclus</i>           | 27   | S.G., P.        | H.   | strict protected species | ***  | Palaearctic        |

S.G. - summer guest; W.G. - winter guest; P.- passage; UnH. - unhatched species; H. - hatched species; sedentary; \* accidentally; \*\* rare; \*\*\* frequently; \*\*\*\* very frequently

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From all *Passeriformes* collected the biggest number was found in Muscicapidae familiae (n = 2417/6619, 36.51%), followed by Sylviidae (n = 1963/6619, 29.65%), Turdidae (n= 864/6619, 13.05%), Paridae (n =575/6619, 8.68% ), Laniidae (n = 449/6619, 6.78%), Fringillidae (n =137/6619, 2.07%), Troglodytidae (n = 65/6619, 0.98%), Motacilidae (n = 40/6619, 0.60%), Paradoxornithidae (n = 34/6619, 0.51%), Oriolidae (n = 33/6619, 0.50%), Emberizidae (n =27/6619, 0.40%), Corvidae (n = 12/6619,

0.18%) and Hirundinida (n = 3/6619, 0.05%) (Figure 3).

Dominance index showed that eudominant species were *Erithacus rubecula* (18.25%) and *Phylloscopus trochilus* (10.34%), followed by dominant species such as *Sylvia atricapilla* (7.32%), *Lanius collurio* (6.78%), *Turdus merula* (6.63%), *Turdus philomelos* (5.98%), *Ficedul aparva* (5.24%). Seven species were classified as subdominant species (2-5%), 2 species were recedente (1-2%) and 28 subrecedente (0-1%).

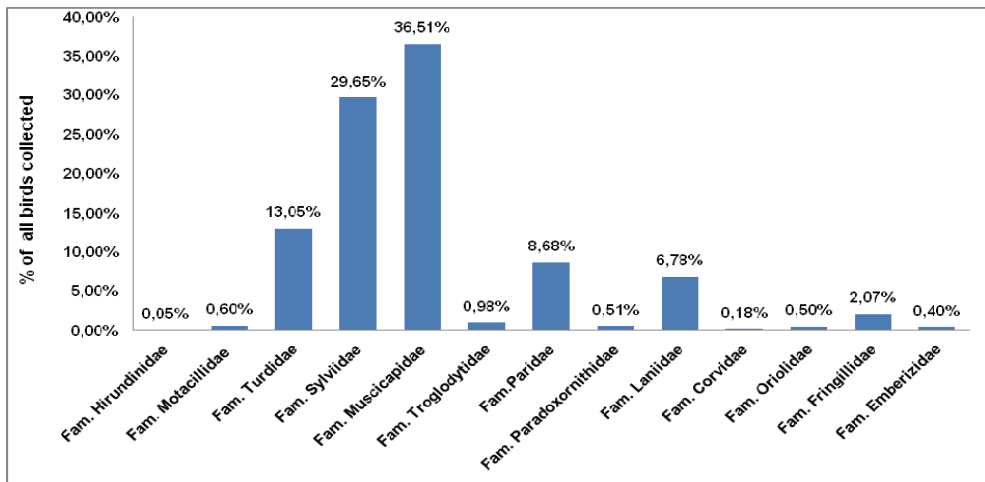


Figure 3. Families' distribution within Passeriformes order collected from Sacalin Island

In the last 10 years natural disasters have become increasingly common in Danube Delta, and the years 2005 - 2006 was recorded the highest values of pollution in Danube river over the last 100 years. Pollution, damming, industrializations, agriculture, livestock, and urban settlements disrupt the fragile ecology of the Danube Delta. Over-exploitation of birds, frogs, and introduction

of exotic species constitute other significant threats. Recent human conflicts in the Danube basin have also had negative impacts on this ecoregion. All this will have a significant impact on unique biodiversity of the Danube Delta (Sinclair et al., 2006). To prevent the destruction of these valuable ecoregions, which represent the habitat for over 300 species of birds, we should improve the

nesting and wintering condition for birds and protect them from illegal hunting.

Order Passeriformes is well represented in Danube Delta; a total number of 44 species were identified. Many of them were summer or winter guest and are protected species (Trevor et al., 2010).

## CONCLUSIONS

In conclusion, our data suggest that the Sacalin Island is an area with a wide diversity of Passeriformes, uncovering the ecology and distribution of this group of birds could greatly improve the knowledge of bird's dynamics and help to develop better protection measures for bird's conservation.

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