Occurrence of the birds of the Middle Volga Region (South-East of the European part of Russia)

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Abstract

Background

Birds are the most numerous and widespread group of higher vertebrates. Due to the peculiarities of their biology, birds play an important role in nature and in human life.

Ornithological studies described in this publication were conducted in seven regions of the Middle Volga Region (Chuvashia, Mordovia, Tatarstan, Samara, Nizhny Novgorod, Ulyanovsk and Penza Regions) from 1978 to 2021. Visual and acoustic methods were used to study the species composition during field studies. In total, 5065 bird occurrences belonging to 157 species, 48 families and 19 orders were registered. All occurrences have a geographical reference. The large volume of data collected, the wide geographical coverage and the long-term nature of the observations determined the value of their inclusion in the GBIF and the need for publication in the Biodiversity Data Journal.

New information

We are publishing our original data on the coordinates of bird occurrences in the Middle Volga Region for the first time. Most of the original information about bird occurrences was
contained in field diaries and was not available to a wide range of researchers. All 5065 occurrences are new to GBIF.

**Keywords**
dataset, bird occurrences, avifauna, Aves, data paper

**Introduction**

Birds play an important role in natural complexes and in human life. They minimise outbreaks of harmful insects, regulate the number of rodents and dispersal of seeds of several plants (Raman 2001, Rey Benayas et al. 2017, Carvalho et al. 2020, Simonov and Matantseva 2020). They can serve as bioindicators for the state of the environment, since they respond to anthropogenic impact by changing the species composition of nesting avifauna and the number of various ecological groups (Bykov 2013, Lebedinskii et al. 2019, Kuznetsova 2021). In addition, birds make a significant contribution to the spread of parasites and transmissible diseases and can partially destroy grain crops (Girikaran et al. 2019, Stanković et al. 2019, Kucherenko et al. 2020). It shows the need for a comprehensive study of this animal group.

The avifauna of the Middle Volga Region is quite well studied, but it is still relevant to conduct new research since there are migratory species and species expanding their range (Lebedeva 2017). Thus, over the past 20 years, the appearance of such new species as *Phoenicurus ochruros* (S. G. Gmelin, 1774) and *S. decaocto* (Frivaldszky, 1838) has been noted for the Samara Region, including cases of their nesting (Lebedeva 2017, Klenina et al. 2021). *Streptopelia decaocto* (Frivaldszky, 1838) and *S. alba* deepened their connection with the territory as, previously, they were only registered (Lebedeva 2017, Klenina et al. 2021).

**Protection status**

Several registered species are listed in the Red Data Lists of different levels. Thus, the Red Book of the Russian Federation (Ministry of Nature Resources and Ecology of the Russian Federation 2020) includes species caught in the Middle Volga Region: *Otis tarda* Linnaeus, 1758, *Pandion haliaetus* (Linnaeus, 1758), *Buteo rufinus* (Cretzschmar, 1829), *Aquila nipalensis* Hodgson, 1833, *Aquila chrysaetos* (Linnaeus, 1758), *Aquila heliaca* Savigny, 1809, *Haliaeetus albicilla* (Linnaeus, 1758), *Falco cherrug* J.E. Gray, 1834, *Falco peregrinus* Tunstill, 1771, *Anthropoides virgo* (Linnaeus, 1758), *Tetrax tetra* (Linnaeus, 1758), *Haematopus ostralegus* Linnaeus, 1758 (mainland subspecies); *Bubo bubo* (Linnaeus, 1758). In the IUCN Red List (International Union for Conservation of Nature and Natural Resources 2021), *A. nipalensis* and *Falco cherrug* are ranked as Endangered (EN); *Streptopelia turtur* (Linnaeus, 1758), *Aythya ferina* (Linnaeus, 1758), *A. heliaca*, *O. tarda* ranked as Vulnerable (VU); and *Vanellus vanellus* (Linnaeus, 1758), *Turdus iliacus* Linnaeus, 1758, *H. ostralegus* and *T. tetra* ranked as Near Threatened (NT). Other bird
species are ranked as Least Concern (LC) (International Union for Conservation of Nature and Natural Resources 2021). Twenty-seven species from the Red Book were found in the Samara Region (Simak et al. 2019). 5 species also being found in the Republic of Mordovia (Astradamov 2005).

Project description

Title: Occurrence of the birds of the Middle Volga Region (South-East of the European part of Russia)

Study area description: Middle Volga Region

Sampling methods

Sampling description: The dataset is based on original data obtained during field observations of birds in the period from 1978 to 2021 in the Middle Volga Region. The study of avifauna was carried out within the following administrative regions of the Russian Federation: the Republics of Chuvashia, Mordovia and Tatarstan; in the Samara, Nizhny Novgorod, Ulyanovsk and Penza Regions. The study of the species composition of birds was carried out in the course of field research, including in the framework of quantitative accounting for the number of birds. The number of birds according to the mating song of the male was recorded during the nesting period according to the standard method (Priednieks et al. 1986). Sometimes visual identification of the species belonging to a singing bird was carried out using a bird identifier (Flint et al. 1968). The species were identified on the basis of their vocalisation or by using a visual method with the help of the keys released at the time of observation (Promptov 1929, Ryabitsev 2008, Kalyakin and Voltzit 2020). If there were feather residues, an atlas for feather identification was used (Korepova 2016). In cases where it was difficult to determine a bird to a species in the field due to minor differences in plumage or vocalisation, we resorted to additional actions (for example, photographing and looking for nests). If the definition were impossible, it was not entered into the database. Some of the data were collected during special bird observations, during route surveys of birds of recreational forests (Bykov 2000, Bykov 2016), as well as during the study of the effectiveness of bird protection devices on power lines (Klenina and Bakiev 2014).

Step description: Field research included the determination of the species composition of birds of the region by audio-visual methods, with a record of the date of the meeting of the species and the coordinates of its habitat. To make the geographical reference, we fixed the coordinates of the location of the bird's occurrence using a GPS navigator or using Google maps. In all cases, the WGS-84 coordinate system was used with the accuracy of determining the coordinates up to the fourth digit. If the bird could not be detected visually, then its identification was made by listening to its vocalisation, the place of occurrence was then the place where the bird was heard. Since the bird class is one of the most geographically mobile from all the taxonomic groups of animals, this assumption seems
insignificant. Subsequent processing of materials included entering data into an Excel spreadsheet and preparing a dataset in accordance with the Darwin core format, uploading the dataset to GBIF.

The field names of the dataset were chosen according to Darwin Core (Wieczorek et al. 2012).

**Geographic coverage**

*Description:* The dataset contains information about the occurrence of birds in seven administrative Regions of the Russian Federation: the Chuvash Republic, the Republic of Tatarstan, the Republic of Mordovia, Penza, Samara, Ulyanovsk and Nizhny Novgorod Regions. These Regions are located in the European part of Russia, which is designated by the Russian Bird Conservation Union as a key ornithological territory. It is used by birds as nesting sites, moulting, wintering and stopover sites (Sviridova and Zubakin 2000). Ornithological studies were conducted within the territory of such protected areas as the Mordovia State Nature Reserve (Republic of Mordovia), the national parks “Samarskaya Luka” (Samara Region) and “Smolny” (Republic of Mordovia).

The studied territory is in the south-east of the European territory of Russia in the middle course of the Volga River (Fig. 1).

*Coordinates:* 51.8 N and 56.0 N Latitude; 41.3 E and 52.0 E Longitude.

![Map of bird occurrences in Middle Volga Region](image)

Figure 1. The occurrences of birds (red circles) within the studied area of the Middle Volga Region.
Taxonomic coverage

Description: The dataset includes only occurrences of birds identified to the species level. In total, 157 species belonging to 48 families from 19 orders have been registered (Fig. 2). It is about a third of the species composition of the avifauna of the European territory of Russia (Kalyakin and Voltzit 2020). The noted species belong to 48 families from 19 orders (see Table of Taxa included below). According to our data, the most common in the Middle Volga Region are *Fringilla coelebs* (451 occurrences of 768 individuals), *Dendrocopos major* (381 occurrences of 578 individuals) and *Parus major* (260 occurrences of 459 individuals) (Table 1).

Table 1.
The top 20 species of the dataset ordered by the number of observations.

| Rank | Species                                    | Number of observations |
|------|--------------------------------------------|------------------------|
| 1    | *Fringilla coelebs* Linnaeus, 1758          | 451                    |
| 2    | *Dendrocopos major* (Linnaeus, 1758)        | 381                    |
| 3    | *Parus major* Linnaeus, 1758                | 260                    |
| 4    | *Corvus cornix* Linnaeus, 1758              | 193                    |
| 5    | *Motacilla alba* Linnaeus, 1758             | 180                    |
| 6    | *Turdus pilaris* Linnaeus, 1758             | 167                    |
| 7    | *Pica pica* (Linnaeus, 1758)               | 146                    |
| 8    | *Sturnus vulgaris* Linnaeus, 1758           | 133                    |
| 9    | *Milvus migrans* (Boddart, 1783)           | 107                    |
| 10   | *Cuculus canorus* Linnaeus, 1758            | 103                    |
| 11   | *Sitta europaea* Linnaeus, 1758             | 101                    |
| 12   | *Emberiza citrinella* Linnaeus, 1758        | 94                     |
| 13   | *Ardea cinerea* Linnaeus, 1758              | 93                     |
| 14   | *Anthus trivialis* (Linnaeus, 1758)         | 91                     |
| 15   | *Corvus frugilegus* Linnaeus, 1758          | 91                     |
| 16   | *Passer montanus* (Linnaeus, 1758)          | 85                     |
| 17   | *Chloris chloris* (Linnaeus, 1758)          | 76                     |
| 18   | *Coloeus monedula* (Linnaeus, 1758)         | 75                     |
| 19   | *Phylloscopus collybita* (Vieillot, 1817)   | 74                     |
| 20   | *Anas platyrhynchos* Linnaeus, 1758         | 73                     |
Figure 2. doi
Taxonomic coverage of registered species by orders and families.

Taxa included:

| Rank | Scientific Name          |
|------|--------------------------|
| order| Accipitriformes          |
| order| Anseriformes             |
| order| Apodiformes              |
| order| Bucerotiformes           |
| order| Caprimulgiformes         |
| order| Charadriiformes          |
| order| Columbiformes            |
| order| Coraciiformes            |
| order| Cuculiformes             |
| order| Falconiformes            |
| order| Galliformes              |
| order| Gruiformes               |
| order| Gruiformes               |
| order| Passeriformes            |
| order| Passeriformes            |
| order| Piciformes               |
| order| Piciformes               |
| order| Piciformes               |
| order| Piciformes               |
| order| Piciformes               |
| order      | Pelecaniformes |
|-----------|----------------|
| order     | Piciformes     |
| order     | Podicipediformes |
| order     | Strigiformes   |
| order     | Suliformes     |

**Usage licence**

**Usage licence:** Other

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**Data resources**

**Data package title:** Occurrence of the birds of the Middle Volga Region (south-East of the European part of Russia)

**Resource link:** [https://www.gbif.org/dataset/b93ec686-b0c6-40d7-a7bb-e0f505bbd0e9](https://www.gbif.org/dataset/b93ec686-b0c6-40d7-a7bb-e0f505bbd0e9)

**Alternative identifiers:** [https://doi.org/10.15468/y46dzf](https://doi.org/10.15468/y46dzf)

**Number of data sets:** 1

**Data set name:** Occurrence of the birds of the Middle Volga Region (south-East of the European part of Russia)

**Character set:** UTF-8

**Download URL:** [https://www.gbif.org/occurrence/download?dataset_key=b93ec686-b0c6-40d7-a7bb-e0f505bbd0e9](https://www.gbif.org/occurrence/download?dataset_key=b93ec686-b0c6-40d7-a7bb-e0f505bbd0e9)

**Data format:** Darwin Core Archive format

**Description:** Our occurrence record contains the occurrence ID, basis of record, species name, taxonomic characteristic, geographic coordinates, event date and authors of the record and species identification. All occurrence records are georeferenced. The dataset is based on research by the staff of the Institute of Ecology of the Volga River Basin of the Russian Academy of Sciences and of the Mordovia State Nature Reserve and National Park «Smolny».

| Column label       | Column description                                                                 |
|--------------------|-------------------------------------------------------------------------------------|
| occurrenceID       | An identifier for the bird occurrence. [https://dwc.tdwg.org/terms/#dwc:occurrenceID](https://dwc.tdwg.org/terms/#dwc:occurrenceID) |
| basisOfRecord      | The specific nature of the data record. [https://dwc.tdwg.org/terms/#dwc:basisOfRecord](https://dwc.tdwg.org/terms/#dwc:basisOfRecord) |
| Property                 | Description                                                                 | Link                                                                 |
|-------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------|
| scientificName          | The full scientific name of bird, with authorship and date information.      | https://dwc.tdwg.org/terms/#dwc:scientificName                       |
| kingdom                 | The full scientific name of the kingdom in which the taxon is classified.    | https://dwc.tdwg.org/terms/#dwc:kingdom                              |
| phylum                  | The full scientific name of the phylum or division in which the taxon is classified. | https://dwc.tdwg.org/terms/#dwc:phylum                              |
| class                   | The full scientific name of the class in which the taxon is classified.      | https://dwc.tdwg.org/terms/#dwc:class                                |
| order                   | The full scientific name of the order in which the taxon is classified.      | https://dwc.tdwg.org/terms/#dwc:order                                |
| family                  | The full scientific name of the family in which the taxon is classified.     | https://dwc.tdwg.org/terms/#dwc:family                               |
| geodeticDatum           | The ellipsoid, geodetic datum or spatial reference system (SRS) upon which the geographic coordinates given in decimalLatitude and decimalLongitude are based. | https://dwc.tdwg.org/terms/#dwc:geodeticDatum                        |
| coordinateUncertaintyInMetres | The horizontal distance (in metres) from the given decimalLatitude and decimalLongitude describing the smallest circle containing the whole of the Location. | https://dwc.tdwg.org/terms/#dwc:coordinateUncertaintyInMeters       |
| coordinatePrecision     | A decimal representation of the precision of the coordinates given in the decimalLatitude and decimalLongitude. | https://dwc.tdwg.org/terms/#dwc:coordinatePrecision                 |
| decimalLatitude         | The geographic latitude of the geographic centre of a Location.              | https://dwc.tdwg.org/terms/#dwc:decimalLatitude                      |
| decimalLongitude        | The geographic longitude of the geographic centre of a Location.             | https://dwc.tdwg.org/terms/#dwc:decimalLongitude                     |
| country                 | The name of the country in which the Location occurs.                        | https://dwc.tdwg.org/terms/#dwc:country                              |
| countryCode             | The standard code for the country in which the Location occurs.             | https://dwc.tdwg.org/terms/#dwc:countryCode                         |
| individualCount         | The number of individuals represented present at the time of the Occurrence. | https://dwc.tdwg.org/terms/#dwc:individualCount                      |
| eventDate               | The date when the event was recorded.                                       | https://dwc.tdwg.org/terms/#dwc:eventDate                             |
| recordedBy              | A person who responsible for recording the original Occurrence.             | https://dwc.tdwg.org/terms/#dwc:recordedBy                          |
| identifiedBy            | A person who assigned the Taxon to the subject.                             | https://dwc.tdwg.org/terms/#dwciri:identifiedBy                      |
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Author contributions

A. Klenina – field counts of birds, species identification, data preparation, manuscript editing.

A. Ruchin – field counts of birds, species identification, georeferencing, data preparation.

E. Bykov – field counts of birds, species identification, data preparation.

References

- Astradamov VI (Ed.) (2005) Red list of Mordovia Republic. In 2 volumes. Volume 2. Animals. Mordovian Book Publishing House, Saransk, 336 pp. [In Russian]. [ISBN 5-7595-16-43-4]
- Bykov EV (2000) Analysis of the consequences of recreational impact on breeding birds of forest ecosystems. Institute of ecology of the Volga River basin of the Russian Academy of Sciences. Autoreferat Dissertation of the Candidate of Biological Sciences. URL: https://static.freereferats.ru/_avtoreferats/01000300458.pdf
- Bykov EV (2013) The overall impact of anthropogenic transformation of habitats on nesting birds in forest ecosystems. Vestnik of Volzhsky University after VN Tatischev 1 (4 (14)): 11-14. [In Russian]. URL: https://www.elibrary.ru/item.asp?id=21018424
- Bykov EV (2016) Breeding synanthropic birds in recreational forests of the Middle Volga Region. 2. XIII International scientific and practical conference "Tatishev's readings: current problems of science and practice", 21-24 april 2016. Volzhsky University after VN Tatischev (Institute), Togliatty [In Russian]. URL: https://www.elibrary.ru/item.asp?id=25697677
- Carvalho CdS, García C, Lucas MS, Jordano P, Côrtes MC (2020) Extant fruit-eating birds promote genetically diverse seed rain, but disperse to fewer sites in defaunated tropical forests. Journal of Ecology 109 (2): 1055-1067. https://doi.org/10.1111/1365-2745.13534
- Flint VE, Boehme RL, Kostin YV, Kuznetsov AA (1968) Birds of the USSR. Thought, Moscow, 640 pp. [In Russian].
- Girikaran P, Samson A, Ramakrishnan B, Ramasubramanian S (2019) Nesting tree preference of malabar pied hornbill (Anthracoceros coronatus) in Pillur Valley, Western
Ghats, Southern India. Nature Conservation Research 4 (3). https://doi.org/10.24189/ncr.2019.040
• International Union for Conservation of Nature and Natural Resources (2021) IUCN 2021. The IUCN Red List of threatened species. https://www.iucnredlist.org. Accessed on: 2021-6-27.
• Kalyakin MV, Voltzit OV (2020) Atlas of breeding birds of European Russia. Fiton XXI, Moscow, 908 pp. [In Russian]. [ISBN 978-5-906811-86-8]
• Klenina A, Ruchin A, Bykov E, Panteleev I (2021) Occurrence of the birds of the Middle Volga Region (South-East of the European part of Russia). Institute of Ecology of the Volga River Basin of Russian Academie of Sciences. Release date: 2021-7-20. URL: https://www.gbif.org/dataset/b93ec686-b0c6-40d7-a7bb-e0f505bbd0e9
• Klenina AA, Bakiev AG (2014) The first results of the study of efficiency of bird protection on electric main 6-10 kv in the national park "Samarskaya Luka". Samarskaya Luka: Problems of Regional and Global Ecology 23 (4): 81-85. [In Russian]. URL: https://www.elibrary.ru/item.asp?id=22681307
• Korepova DA (2016) Atlas-determinant of bird feathers. NABU, Ulyanovsk, 320 pp. [In Russian]. [ISBN 978-5-88504-094-5]
• Kucherenko V, Tovpinets N, Slavinskaya A, Yakunin S, Kovalenko I (2020) The winter diet of the rare Tyto alba in contrast to Asio otus on Crimea Peninsula. Nature Conservation Research 5 (3). https://doi.org/10.24189/ncr.2020.023
• Kuznetsova VV (2021) Study of the avifauna of urbanized territories of towns in Russia world science: problems and innovations. World Science: Problems and Innovations, Penza, 30.05.2021. 31-33 pp. URL: https://www.elibrary.ru/item.asp?id=46105839
• Lebedeva GP (2017) Aviafauna of Samara Oblast. The state of knowledge. 6. Materials of the scientific conference dedicated to the 165th anniversary of the founding of the Samara province and the 130th anniversary of the founding of SOIKM named after P.V. Alabina. Samara, 94-105 pp. [In Russian].
• Lebedinskii A, Noskova O, Dmitriev A (2019) Post-fire recovery of terrestrial vertebrates in the Kerzhensky State Nature Biosphere Reserve (Central Volga Region, Russia). Nature Conservation Research 4 https://doi.org/10.24189/ncr.2019.049
• Ministry of Nature Resources and Ecology of the Russian Federation (2020) Order No. 162 of the Ministry of Natural Resources and Ecology validating the List of objects of wild fauna species included in the Red Book of the Russian Federation. URL: http://oopt.aari.ru/sites/default/files/documents/ministerstvo-prirodnyh-resursov-iekologii-Rossiyskoy-Federacii/N162_24-03-2020.pdf
• Priednieks J, Kuressoo A, Kurlavichus P (1986) Recommendations of birds monitoring in Baltic States. Zinatne, Riga, 66 pp. [In Russian].
• Promptov AN (1929) Keys to birds in nature. Issue 1 (songbirds, corvids, woodpeckers, swifts and cuckoos). Scientific Publishing, Leningrad. [In Russian].
• Raman TRS (2001) Effect of slash-and-burn shifting cultivation on rainforest birds in Mizoram, Northeast India. Conservation Biology 15 (3): 685-698. https://doi.org/10.1046/j.1523-1739.2001.015003685.x
• Rey Benayas J, Meltzer J, de las Heras-Bravo D, Cayuela L (2017) Potential of pest regulation by insectivorous birds in Mediterranean woody crops. PLOS One 12 (9). https://doi.org/10.1371/journal.pone.0180702
• Ryabtsev V (2008) Birds of the Urals, Urals and Western Siberia: reference guide. 3. Ural Publishing House University, Yekaterinburg, 634 pp. [In Russian]. [ISBN 978-5-7996-0356-4]

• Simak SV, Kuzovenko AE, Sachkov SA, Faizullin AI (Eds) (2019) Red list of Samara Oblast. Samara Publishing House State Regional Academy Nayanova, Sasmara, 354 pp. [In Russian]. URL: https://priroda.samregion.ru/wp-content/uploads/sites/11/2020/09/krasnaya_kniga_samarskoj_oblasti_zhiv_block_final_compressed.pdf [ISBN 978-5-4436-0036-9]

• Simonov S, Matantseva M (2020) Analysis of the current status of avifauna in Kostomuksha State Nature Reserve and Kalevala National Park (North-West Russia), taking into account influence from adjacent areas. Nature Conservation Research 5 (3). https://doi.org/10.24189/ncr.2020.031

• Stanković D, Jönsson J, Raković M (2019) Diversity of avian blood parasites in wild passerines in Serbia with special reference to two new lineages. Journal of Ornithology 160 (2): 545-555. https://doi.org/10.1007/s10336-019-01628-z

• Sviridova TV, Zubakin VA (Eds) (2000) Key ornithological territories of Russia. Volume 1. Key bird areas of international importance in European Russia. Union for the Conservation of Birds of Russia, Moscow, 702 pp. [In Russian].

• Wieczorek J, Bloom D, Guralnick R, Blum S, Döring M, Giovanni R, Robertson T, Vieglais D (2012) Darwin Core: an evolving community-developed biodiversity data standard. PLOS One 7 (1). https://doi.org/10.1371/journal.pone.0029715