PALEORNITHOLOGICAL STUDIES
IN BULGARIA

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ABSTRACT. A review of the current state of paleornithological research in Bulgaria reveals that little work has been done in the field to date. Discoveries of avian fossils in Bulgaria have been incidental to other research, and the specimens have usually not been studied. Summary data on avian fossils reported from Bulgaria, their age, and the level to which they have been researched are given. At present, paleornithological research in Bulgaria can only be carried out in collaboration with specialists from other countries.

Key words: Bulgaria, Aves, fossil birds.

INTRODUCTION

Bulgaria is positioned as a crossroads in Southeastern Europe, and much of the country served as a natural bridge for the interchange of the terrestrial faunas of Europe, Asia, and Africa during the last 50 million years. The geological history of the country, its exceptionally varied relief, which hosts a well-expressed vertical zonality, and its role in faunal interchange are the principal factors that have determined the uniqueness of its Recent avifauna.

This review summarizes the data currently available on the paleoavifauna of Bulgaria.

GEOLOGICAL HISTORY
AND ECOSYSTEM STATUS
IN BULGARIA

The territory of the Balkan Peninsula, including Bulgaria, has a very complex geological history. Two marine transgressions and regressions during the Jurassic affected almost the entire country, with only part of southern Bulgaria remaining above the seas. The main bodies of the Middle and Eastern Stara Planina (Balkan) Mountains formed in the Early Cretaceous. Together with the Rila-Rhodope Mountain Massif they formed a land mass (Nikolov and Christchev, 1973). Southeastern Bulgaria and much of the Balkans were flooded by the sea near the end of the Cretaceous (Natchev and Sapunov, 1973; Bonchev, 1981), as was the northern part of the country. The Sredna Gora (Anti-Balkan), Rila, and Rhodopes Mountains remained as dry and.

Paleocene deposits appear mainly in the foothills of the Balkan ranges, whereas Eocene sediments crop out in northern Bulgaria, the Rhodope Mountains, and the Sredna Gora Mountains (Bonchev et al., 1973). Large freshwater lakes appeared in the Upper Eocene in western Bulgaria. At the same time, a large part of eastern and southeastern Bulgaria was flooded by the Euxinian Sea, which formed a complex system of bays and peninsulas. In the Miocene, the northeastern part of the country was covered by a large embayment of the Crimea-Caucasian Sea, while waters of the Central Parathetys Sea covered northwestern Bulgaria. Miocene deposits are thus widespread in northern Bulgaria.

During the Pliocene, large freshwater lakes appeared in the valleys of southern Bulgaria (Popov, 1973). Deposits from this period have been found in Dobrudja, Ludogorie, near the towns of Lom and Sofia, and the Struma, Mesta, Tundja, Maritza, and Iskar River valleys (Bonchev et al., 1973). A warm and humid climate prevailed as the principal modern mountain chains developed. This changed with the onset of the Pleistocene, which saw the formation of glaciers in the higher parts of the Rila and Pirin Mountains, glaciers that reached down to 1,110–900 m above sea level. Pleistocene fluvial sediments are found scattered across the country and thick layers (30–40 m) of loess formed in northern Bulgaria.

During the Holocene, about 90 percent of Bulgaria appears to have been covered by forests, with the remainder comprising steppe regions in the northeast, swamps, lakes, and treeless high-altitude zones. At present, 27 percent of the country is woodland and 14 percent is grassland (Bondev, 1986). Almost half of these habitats have been altered by human activity.

Five types of vegetation are present in the modern flora of Bulgaria: arctoalpine, boreomontane, nemoral, steppe, and Mediterranean and sub-Mediterranean. All lowlands and plains, including the Danubian Plain, South Dobrudja, the Upper Thracian Plain, and the Tundja Valley, are agricultural lands. The oak zone in all mountains has been virtually destroyed over the last 200 years.

Eurosiberian, mid-European, arctoalpine, steppe, pontic, sub-Mediterranean, and Mediterranean zoogeographic elements are presented in the terrestrial fauna of Bulgaria (Popov and Kumanosky, 1981). The Recent vertebrate fauna includes about 690 species, although 143 of them are very rare or endangered. Fifty other species have disappeared from the wild in Bulgaria over the last 40 years (Red Data Book of Bulgaria, 1985). With few exceptions, all freshwater lakes in the country have been drained, and Black Sea saltwater lakes have been turned into
reservoirs, salt-farming basins, or basins for industrial waste or put to other unnatural uses. Protected natural areas account for only 1 percent of the country, and include 7 national parks and about 100 small nature reserves. Most are affected by various human activities.

PRESENT STATE OF RESEARCH ON THE RECENT AVIFAUNA OF BULGARIA

In Bulgaria, a relatively small territory of 111,000 km², a total of 376 species of resident, migratory, and vagrant bird species have been recorded. Those breeding regularly or occasionally in the country number 256 species. Two of the five principal migration routes for European species that winter in Africa and the Near East pass through Bulgaria, and it is home to wintering populations of many Middle European, East European, and some West Siberian populations.

Until 1950, the number of bird species recorded for Bulgaria was 341 (Patev, 1950). This number has increased to 354 by 1982, and during the last decade at least one new species has been recorded for the country annually. Activity in avian research is currently high and the number of interested persons is increasing rapidly. The Bulgarian Society for Protection of Birds was founded in 1988, although the Bulgarian Banding Center has successfully carried out its work for more than 60 years, with approximately 300,000 birds having been banded to date. The Bulgarian Red Data Book on animals was published in 1985, and data on the number and distribution of 100 rare bird species are included in it. The first volume of a projected three-volume series on the Bulgarian avifauna is in press.

STATE OF PALEORNITHOLOGICAL RESEARCH IN BULGARIA

Very few data have been published on the origins or paleobiogeography of the Bulgarian avifauna. Most avian fossils in the country have been found by chance at mine excavations, at drilling sites, or at paleontological or archaeological sites. No special attention has been paid to these avian fossils, partly owing to the absence of researchers in paleornithology. Although researchers of other countries have worked on material from geological sites in Bulgaria, accurate through August 1988 follows. A complete list of all paleornithological sites in Bulgaria, accurate through August 1988 follows. The sites are mapped in Fig. 1. If no reference is given for the information presented, it reflects my observations.

Materials from sites 1, 2, 4, 5, 7, 21, 35, and 36 are housed at the National Museum of Natural History, Bulgarian Academy of Sciences, while materials from localities 11, 12, 16-20, and 37-40 are housed at the Institute of Zoology, Bulgarian Academy of Sciences. Part of the material from localities 3, 8-15, and 23-33 is housed at the Archaeological Institute and Museum, Bulgarian Academy of Sciences. Material from locality 22 is kept at the Higher Institute of Agronomy, Stara Zagora.

MIOCENE

(1) Kardam

An almost complete skeleton of a thrush-sized song bird was found in clay deposits at a depth of 102 m during drilling operations sometime c. 1950-1955. The specimen is under study.

(2) Hrabarsko (Pontian)

Placrorocax serdicensis Burchak-Abramovich and Nikolov (1984): fragments of humerus, scapula, coracoid, carpometacarpus, ulna, sternum, and three thoracic vertebrae. An almost complete skeleton of a charadriiform bird, the size of Larus ridibundus Linnaeus 1766, the Black-headed Gull, was found fossilized in tar in 1955. The specimen is under study.

(3) Sofia (Pontian)

Unknown number of unidentified bones (Popov et al., 1921).

(4) Troyano Mine (Pontian)


PLEISTOCENE

(5) Dorkovo (Ruscinian)

Tetraoninae gen. et sp.: distal epiphysis of humerus; found in 1986. Anatidae gen. et sp., distal end of humerus and cf. Coracidiformes, part of distal epiphysis of tibiotarsus. Both of the latter specimens were found in 1987; they are under study.

PLEISTOCENE

(6) Bacho Kiro Cave (Paleolithic)

Popov (1911, 1912) reported unidentified bird bones from this site. Bocheński (1982) later reported on 87 specimens, 68 of which were identified as belonging to 21 species: Anas platyrhynchos Linnaeus 1758, Aquila chrysaetos (Linnaeus 1758), Circus aeruginosus (Linnaeus 1758), Lagopus mutus (Montin 1776), Perdix perdix (Linnaeus 1758), Alectoris graeca (Meisner 1804), Rallus aquaticus Linnaeus 1758, Porzana porzana Linnaeus 1766, Gallinula chloropus (Linnaeus 1758), Bubo bubo (Linnaeus 1758), Pytonoprogne rupestris (Scopoli 1769), Delichon urbica (Linnaeus 1758), Lulidu arborea (Linnaeus 1758), Alauda arvensis Linnaeus 1758, Anthus campestris (Linnaeus 1758), Pyrrhocorax pyrrhocorax (Linnaeus 1758), P. graculus (Linnaeus 1766), Corvus monedula Linnaeus 1758, C. corax Linnaeus 1758, Turdus philomelos Brehm 1831, and Loxia curvirostra Linnaeus 1758.

(7) Varchets

Perdix perdix, Pyrrhocorax graculus, and other unidentifiable small bone fragments were found in 1987. [Note added in press: This locality is now referred to the upper Pleistocene.]
(8) Malkata Podlizha Cave (Paleolithic)  
Unidentified bird remains (Popov, 1913a, 1925).

(9) Mirizlivka Cave (Paleolithic)  
Popov (1933) reported a bird metacarpus and a radius from this site.

(10) Morovitsa Cave (Paleolithic)  
Popov (1913b, 1920) reported unidentified bird bones from this cave. In 1982, 30 identifiable specimens were collected in this cave.

(11) Temnata Dupka Cave  
(Paleolithic)  
Popov (1931b) reported an unknown number of unidentified bird bones from this site, and later (Popov, 1931a:128, fig. 62) a femur. It is clear from the figure that this femur belongs to a hare (Lepus europaeus Pallas 1778). Ten identifiable specimens were collected here in 1982. New material collected in 1988–1991 belongs to at least 29 Recent species.

(12) Golyamata Peshtera Cave  
(Paleolithic)  
Popov (1904:11) reported an unidentified ulna, femur, and two humeri as well as a tarsometatarsus identified as "Aquila/Pandion."

(13) Golyama Listsa Cave  
(Paleolithic)  
Popov (1904) reported unidentified bird bones from here.

(14) Madara (Paleolithic)  
Popov (1904) reported an unidentified bird humerus and femur.

(15) Deve-Bargan Mound  
(Paleolithic)  
Popov (1926:82, fig. 140) reported an unidentified tibiotarsus, possibly from a charadriiform.

UPPER PLEISTOCENE  
A total of 126 identifiable bird specimens were collected from the following five caves in the years 1982–1985.

(16) Toplya Cave  
(17) Kozarska Cave  
(18) Gornik Cave  
(19) Metcha Dupka Cave  
(Strandja Mountain)  
(20) Cave No. 16

HOLOCENE  
(21) Orpheus Chalet (Rock Crevice)  
Cf. Turdus ruficollis Pallas 1776, a synsacrum.

(22) Kazanluk (Neolithic Mound)  
Boev (1988) reported a humerus and two synsacra of Tetrao tetrix Linnaeus 1758, Pelecanus crispus Bruch 1832, Perdix perdix, Aquila chrysaetos, cf. Otis tarda Linnaeus 1758, and cf. Phasianus colchicus Linnaeus 1758 have also been identified from the mound, but not yet published. Dennel (1978) reported nine unidentified bird bones from the site.
(23) Golymata Peshtera Cave
(Neolithic)
Popov (1925) reported unidentified bird bones.

(24) Tsarskata Peshtera Cave
(Neolithic)
Popov (1925) reported unidentified bird bones.

(25) Malka Listsa Cave (Neolithic)
Popov (1911, 1912, 1925) reported unidentified bird bones.

(26) Popin Ptchelin Cave (Neolithic)
Popov (1925) reported unidentified bird bones.

(27) Golyama Listsa Cave (Neolithic)
Popov (1921b, 1925) reported unidentified bird bones.

(28) Deneva Mound
(Neolithic/Chalcolithic)
Popov (1915:206) reported unidentified bird bones.

(29) Derventska Mound
Popov (1908) reported an unknown number of bird bones.

(30) Ruse (Neolithic Mound)
Popov (1921a, 1921c) reported unidentified bird bones, but no additional specimens were found at the site during excavations in 1987.

(31) Belyakovsko Plato
(Neolithic and Chalcolithic Settlements)
Popov (1908, 1925) reported bird bones from this site.

(32) Kodja-Dermentska Mound
(Neolithic)
Popov (1909, 1918) recorded bird bones from here.

(33) Golyamo Deltchevo
(Eneolithic Mound)
Ivanov and Vassilev (1975) reported Anser anser (Linnaeus 1758), Anas platyrhynchos, Cygnus sp., and Aves sp. indeterminate from this site.

(34) Ovcharovo (Chalcolithic Mound)
Vassilev (1985) reported Anser anser, Cygnus sp., Anas platyrhynchos, Tetrao urogallus Linnaeus 1758, and Aves sp. indeterminate from this site.

(35) Metcha Dupka Cave
Fifteen specimens of passeriforms were collected here in 1981.

(36) Morovitsa Cave
Perdix perdix, Pyrrhocorax graculus, and Coturnix coturnix (Linnaeus 1758).

(37) Cherzhenitsa Cave (Eneolithic)
Fifty-eight identifiable bird bones were collected here in 1985.

(38) Giva Laka Cave
Two passeriform specimens were collected here in 1983.

(39) Orehite Locality
Three identifiable bones of small birds.

(40) Brashlyansky Dol Locality
(Rock Crevices)
Four fragments of bird bones were found here in 1982.

(41) Chelopech (Neolithic)
Dennel (1978) reported six unidentified bird bones from this site.

CONCLUSIONS

It is clear from this review that data on the origins of the Bulgarian avifauna are few. The oldest fossil bird remains are from the Miocene, and these are incompletely studied. Data on Quaternary birds are more abundant, with 21 species known from the Pleistocene and 14 from the Holocene.

The discoveries of Lagopus mutus, Tetrao tetrix, Pyrrhocorax pyrrhocorax, and Turdus ruficollis are of interest in that the first three species have disappeared from Bulgaria, and the first two from the Balkan Peninsula. Pyrrhocorax pyrrhocorax is still widespread in the north of Greece, whereas T. ruficollis is a very rare visitor to Bulgaria, only having been recorded twice. These species are inhabitants of mountain boreal climatic zones, with the partial exception of P. pyrrhocorax, and they indicate a more southern distribution of boreal avifaunal components on the Balkans during the Quaternary.

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LITERATURE CITED


