Early Pleistocene avifauna of Kunino (NW Bulgaria)

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Key words: Fossil birds, Quaternary fauna, Early Pleistocene, Balkan Peninsula, Bulgaria

Introduction

The Early Pleistocene avifauna of Bulgaria is still poorly studied (BOEV, 1999). Only three localities (the Temnata Doupka Cave, the Cherdzhenitsa Cave, and Kunino (BOEV, 2001a), dated Early Pleistocene, are known and their avian remains were examined (BOEV, 1994; 2000a). The locality of Kunino was recently discovered (1998) and some preliminary data on the taxonomic composition of the avian record have been published by BOEV (2001a). The present paper aims to present all data on the fossil fauna of birds in that site, and to evaluate its significance to the palaeoecology of the region.

Material and Methods

The material was collected between 1998 and 2000 (on 25 July 1998, 13 September 1998, 28 September 1999, and 14 September 2000), by excavation, screening through a screen of 1,5 mm meshes, consequent washing, drying and laboratory extracting of the fossils. It is of bad preservation, highly damaged and fragmented. The finds have been determined through comparison with homologous skeletal elements of the specimens of the avian osteological collections of the National Museum of Natural History (Sofia; NMNHS), and the Natural History Museum, Tring, part of the Natural History Museum, London (former British Museum of Natural History, BMNH). The total material comprises (by October 1999) over 258 identifiable bone fragments and complete bones, mainly of terrestrial small mammals, ungulates, carnivores, and birds. All avian finds are kept at the Fossil and Recent Birds Department of the NMNHS. They number 36 bones and bone fragments: coll. No.: NMNHS 12210; 12298-12312; 12 54742 557; 14 97044 978 (Table 1).

Abbreviations: cmc – carpometacarpus, dex. – dextra, dig. – digitorum, dist. – distalis, later. – lateralis, prox. – proximalis, sin. – sinistra, tbt – tibiotarsus.
Table 1
Taxonomic list, collection numbers and MNI of the avian finds of the Early Pleistocene site near Kunino village

<table>
<thead>
<tr>
<th>No</th>
<th>Taxa</th>
<th>Collection numbers (NMNHS) and skeletal elements</th>
<th>Number of finds</th>
<th>Minimum number of individuals (MNI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Falco</em> sp. ex gr. <em>cherrug</em></td>
<td>ulna sin. prox. 12311</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Falconiformes indet.</td>
<td>phalanx dist. dig. pedis 14975</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td><em>Tetrao</em> cf. <em>urogallus</em></td>
<td>trabecula later. sterni 12312</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td><em>Tetrao tetrix</em> / <em>Lagopus</em> sp.</td>
<td>tbt dist. 12302</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td><em>Coturnix coturnix</em></td>
<td>humerus sin. dist. 12299, coracid sin. dist. 14974</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td><em>cf. Coturnix coturnix</em></td>
<td>humerus dex. (diaphysal part, prox.) 14974</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td><em>Alectoris graeca</em></td>
<td>humerus dex. prox. 12309</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Perdicinae gen.</td>
<td>humerus dex. 14 978</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td><em>Sylvia</em> cf. <em>atricapilla</em></td>
<td>coracid sin. dist. 14972</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td><em>Coccothraustes coccothraustes</em></td>
<td>cmc sin. prox. 12210</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td><em>Acanthis cf. cannabina</em></td>
<td>coracid sin. dist. 14971</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td><em>Pyrrhocorax pyrrhocorax</em></td>
<td>cmc dist. 12298, cmc sin. – digitus majus 12300</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>13.</td>
<td>Aves indet. (Non-Passeriformes)</td>
<td>humerus dex. (splinter) 12301, tbt prox. 12303, tbt prox. 12304, scapula sin. (caudal part) 12305, scapula dex. (caudal part) 12306, tbt dist. 12307, tbt sin. prox. 12308, vertebra cervicalis 12310, femur sin (diaphysal part) 12 547, femur sin. 12 548, phalanx digi. pedis prox. 12 549, phalanx I dig. pedis 12 550, phalanx dist. dig. majus 12 551, phalanx dig. pedis 12 552, os pterygoideum 12 553, radius (diaphysal part) 12 554, os metacarpalis majus sin. 12 555, femur dex. dist. 12 556, ulna sin (medial part) 12 557, vertebra cervicalis – corpus 14970, tbt dex. (medial diaphysal fragment, diameter - 6,2 mm) 14973, humerus dex. dist. (splinter) 14976, humerus dex. dist. 14 977</td>
<td>23</td>
<td>9</td>
</tr>
</tbody>
</table>

Total | 37 | 21 |
Short description of the site

The site represents an outcrop of a Sarmatian limestone massive (Fig. 1) in an exploring quarry (since 1971) (Fig. 2), 2 km NW of the Kunino village (Vratsa District, Montana Region, NW Bulgaria, UTM grid: GN 48 (Fig. 3), 250 m a. s. l. It was discovered by Mr. G. Hristov in 1998.

Associated fauna: Our collected material contains remains of Testudo sp., as well as numerous ones of Lepus sp., Equus sp., Cerbus sp., Sus sp., Lagomorpha, Felidae, Canidae, Bovidae, Microtinae, Murinae, Gliridae, and Chirottera. All finds are unarticulated and highly broken. Part of the mammalian material examined by Dr. Nicolay Spassov (NMNHS) is referred to: Panthera spelaea, Canis cf. etruscus, Canis arnensis apolloniensis, Alces latifrons, Ovis sp. The material of Micromammalia, examined by Dr. V. Popov (pers. comm.) contains the following taxa: Pliomys sp., Prolagurus cf. pannonicus, Allophaiomys plicatens, Microtus hintoni and Hyppolagus brachignatus, Lepus sp., Lagomorpha indet., Microtinae indet., Murinae indet.

Age: Micromammalian fauna biostratigraphically dates the locality to the Biharian, the middle of the Microtus savini/M. pusillus biozone, chronostatigraphically corresponding to the Early Pleistocene (Vaalian-Menapian), approximately 1.2-1.0 m.y.a. (V. Popov, pers. comm.). The occurrence of Panthera spelaea after Dr. Spassov probably suggests a contamination of the Early Pleistocene deposits with Middle Pleistocene ones.

Results and discussion

Taxonomic composition

The examined material represents a very small part (ca. 4.4 %) of the Pleistocene avian remains, collected so far from Bulgarian localities (BOEV, 1999, 2001). It also consists of 4.0 percent of the
taxonomic composition (Table 1) of the Pleistocene fossil record of the country (175 taxa, BOEV, 1999). It includes remains of three orders and six avian families: Falconidae, Tetraonidae, Phasianidae, Sylviidae, Corvidae, and Fringilidae.

**Falconidae**

*Falco* sp. ex gr. *cherrug*. The larger Palearctic falcons are considered to be indicators of large rocky massifs used as nesting grounds. The specimen could not be further determined. *F. cherrug*, *F. peregrinus*, *F. biarmicus* and *F. eleonorae* occur at present in Bulgaria and all of them, except for the Eleonora’s falcon, breed throughout the country (BOEV et al., in press, a).

**Tetraonidae**

*Tetrao* cf. *urogallus*. A small, but very diagnostic fragment of sternum (trabecula lateralis sterni) most probably suggests Capercaillie, rather than Black grouse. MOURER-CHAUVRÉ (1976) considers the occurrence of the genus *Tetrao* as a firm indicator of the local cooling of the climate.

The species is very rare in the Pleistocene deposits in the French Alps (MOURER-CHAUVRÉ, 1977). At the end of Würm the species’ range confined to the Alps. In Bulgaria the present range includes five isolated parts in the high mountain regions of Rila, Vitosha, Rhodopes, Pirin, and the Western Balkan mountains between 1100 and 2200 m a. s. l. (BOEV, 1985; BOEV et al., in press, b).

*Tetrao tetrix* / *Lagopus* sp. The distal fragment of tbt is damaged and could not be determined further.
Phasianidae

*Coturnix coturnix* (Linnaeus, 1758). The Quail is the only European resident and migratory gallinaceous bird. Its range is limited northward by the 15° C July isotherm. It mainly inhabits open grassy lands in the plains and meadows (HARRISON, 1982). Avoids arid habitats and wetland. Usually prefers hilly treeless terrains up to 1000 m. a. s. l. (CRAMP & SIMMONS, 1980). In Bulgaria the species occurs up to 950 m a. s. l. (SIMEONOV & BOEV, 1988). It is believed that the wide range of the Quail is due to its expansion in the Quaternary (VOINSTVENSKY, 1960). The finds of *C. coturnix* are very scanty in the Pleistocene record of Bulgaria (BOEV, 1999, 2001a).


Perdicinae indet. The size of the find suggests *Alectoris* spp. or *Perdix* spp. Besides incomplete determination of the find, remains of both genera have been uncovered in several Pleistocene localities throughout the country so far.

Sylviidae

*Sylia* cf. *atricapilla*. The specimen represents a humeral half of a coracoid. It differs from *S. borin* in the wider acrocoracoidal part. It very much resembles *S. atricapilla*, but the find differs from it in the slightly less protuberant acocoracoidal part of the lateral side. The measurements (Fig. 4) are provided in Table 2. *Sylia* cf. *atricapilla* is known from the Early Pleistocene of Austria and Spain. The species is also known from the Middle Pleistocene of France and Late Pleistocene of Czech Republic, France, Israel, Spain and Ukraine (TYRBERG, 1998). Thus, its occurrence in Bulgaria could not be considered unusual.

**Table 2**
The measurements of coracoid sin. dist. in some sylviids

<table>
<thead>
<tr>
<th>Taxa</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fossil – Kunino</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sylvia <em>cf. atricapilla</em> NMNHS 14 972</td>
<td>2,1</td>
<td>1,4</td>
<td>2,4</td>
<td>1,1</td>
</tr>
<tr>
<td>Recent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sylvia <em>atricapilla</em> BMNH 1996.50.5</td>
<td>2,2</td>
<td>1,4</td>
<td>2,2</td>
<td>1,0</td>
</tr>
<tr>
<td>Sylvia <em>atricapilla</em> BMNH 1996.34.1</td>
<td>2,4</td>
<td>1,5</td>
<td>2,6</td>
<td>1,1</td>
</tr>
<tr>
<td>Sylvia <em>atricapilla</em> BMNH 1989.24.1</td>
<td>2,3</td>
<td>1,7</td>
<td>2,6</td>
<td>1,2</td>
</tr>
<tr>
<td>Sylvia <em>atricapilla</em> BMNH 1994.4.1</td>
<td>2,2</td>
<td>1,8</td>
<td>2,4</td>
<td>1,2</td>
</tr>
<tr>
<td>Sylvia <em>borin</em> BMNH 1996.43.1</td>
<td>2,4</td>
<td>1,8</td>
<td>2,9</td>
<td>1,2</td>
</tr>
<tr>
<td>Sylvia <em>mystacea</em> BMNH 1998.13.8</td>
<td>2,0</td>
<td>1,3</td>
<td>1,9</td>
<td>1,0</td>
</tr>
</tbody>
</table>

Fig. 4. Manner of measurements of coracoid of recent and fossil sylviids.
Corvidae

_Pyrhocorax pyrrhocorax_ (Linnaeus, 1758). In the European Alpine zone of the temperate latitudes it is a resident species, inhabiting strictly rocky habitats up to the tree line (HARRISON, 1982). Most of its range lies between 1200 and 1500 m a. s. l. (CRAMP & PERRINS, 1994). A disappeared species of the recent avifauna of Bulgaria. Fossil records in the country: Late Pleistocene: Bacho Kiro Cave (BOCHENSKI, 1982) and Kozarnika Cave (BOEV, 2001b). The common chough is an indicator of the cool climate. Many of the Pleistocene sites of Europe lie out of the recent species’ range (TYRBERG, 1991). MALEZ-BACIC (1979) determines _P. pyrrhocorax_ as an index-fossil for the Late Pleistocene of Europe.

Fringillidae

_Acanthis_ cf. _cannabina_. The Linnet is a resident and migratory species preferring open lands with scattered bushes, pastures, meadows, light riverine woods and forests edges (VOINSTVENSKIY, 1960; HARRISON, 1982).

_Coccothraustes coccothraustes_ (Linnaeus, 1758). The Howfinch is a resident and migratory species spread in the Boreal and Temperate zones. Inhabits the broadleaf and mixed woods, but prefers woodlands near the rivers and lakes and forest-steppes in the plains and mountains (HARRISON, 1982). The range in summer is limited by the 17° C and 25° C July isotherms. It is considered the most specialized species to _Quercus-Carpinus_ woods (CRAMP & PERRINS, 1994). The species is known from the Late Pleistocene deposits of the Razhishkata Cave (BOEV, 2000b), but the oldest records in the world of the genus _Coccothraustes_ came from two other Late Pliocene localities of the NW Bulgaria, Varshets and Slivnitsa (BOEV, 1998).

**Palaeoenvironmental implications**

_Tetrao, Lagopus, Pyrrhocorax and Coccothraustes_ in the Quaternary deposits of Europe are considered indicators of the cooling climate (MOURER-CHAUVIRÉ, 1975, 1993). On the other hand, _Coturnix_ (the only European migratory gallinaceous), and partly _Alectoris_, exist in dry and moderate environmental conditions, indicating the presence of open land grassy habitats. This contradiction could only be explained with the presence of mosaic landscapes in the former vicinities of the site. The presence of the so-called “mixed” faunas was widely established in many Pleistocene localities in the Western and Central Europe (TYRBERG, 1998). In Bulgaria the best established example of the mixed avifaunas so far has been revealed in the Late Pleistocene deposits of the Kozarnika Cave (BOEV, 2001b), but Kunino also provides examples of that sort.

**Acknowledgements**

The Short-term Visits Program of the Royal Society (London), the NMNHS and Dipl. Eng. Georgi Hristov (an amateur-paleontologist from Pleven, North Bulgaria) have supported the study. The author is very grateful to Dr. Robert Prys-Jones and Dr. Joane Cooper (BMNH) for providing excellent working
conditions, which facilitated much of this study. He also thanks Ms. Vera Hristova, Dr. N. Spassov, Dr. Georgi Markov (NMNHS), Dr. Vasil Popov (Institute of Zoology, BAS), and Dr. Vet. Med. Nikolay Iliev for their help in the field work. Mr. G. Hristov submitted part of the personally collected fossil material to the NMNHS, which later contributed greatly to the general evaluation of the site.

References


Received: 16.02.2005

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Ранноплейстоценска авифауна от Кунино (Северозападна България)

Златозар БОЕВ

(Р е з ю м е)

Находището представлява разкритие във варовиковата кариера над с. Кунино. Възрастта му е определена като ранен плейстоцен (вал-менап, ок. 1,2-1,0 млн. г.). Материалът включва 36 костни останки от MNI 21 индивида, принадлежащи на 11 таксона от 3 разреда: Falconiformes: Falco sp. ex gr. cherrug, Falconiformes indet.; Galliformes: cf. Tetrao urogallus, Tetrao tetrix/ Lagopus sp., Coturnix coturnix, Alctoris grata, Perdicinae gen., и Passeriformes: Sylvia cf. atricapilla, Coccothraustes coccothraustes, Acanthis cf. cannabina и Pyrrhocorax pyrrhocorax. Установяването както на студенолюбиви, така и на топлолюбиви авифауналистични елементи може да се обясни с наличието на мозаичен ландшафт в околностите на находището.