

Woodland Birds from Neolithic Settlements in Bulgaria

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Abstract: In this study, a first attempt was made to present a general composition of birds (with an emphasis on forest birds) found in Neolithic settlements in Bulgaria. Based on data from 29 settlements, 82 bird taxa have been identified. Of these, 72 species have been identified to the species level. They constitute 17.3% (almost one-sixth) of the 417 recorded bird species in the country. About one-third (23 species) are inhabitants of forest ecosystems. Two species (2.7%) no longer nest in Bulgaria (*Lyrurus tetrrix* and *Phasianus colchicus*), and another rare winter migrant (*Buteo lagopus*) has been found in two Neolithic settlements in Southern Bulgaria. Today, the two locations of *Tetrao urogallus* are far outside the limits of the species' current shortened range. A very high number of the uncovered Neolithic birds (33 species, 45.8%) are included in the national Red Data Book of Bulgaria. Summer migrants significantly outnumber winter migrants.

Keywords: Holocene birds; ornithoarcheology; archeozoology; subfossil birds; animal bone remains; Bulgarian Neolithic

1. Introduction

Due to the peripheral southern and crossroad geographical location of the Balkan Peninsula, the Neolithic in this part of the world is exceptionally well represented. The hundreds of archeological monuments discovered are a testament to the early development of Neolithic cultures as early as 9000–8000 years ago. The modern territory of Bulgaria occupies the eastern and central parts of the peninsula, and to a large extent, the data from studies conducted here reflect the development of the Neolithic on the entire Balkans.

As is well known, it was during the Neolithic that the transition from hunting and gathering to agriculture and settlement took place. At the end of the Neolithic, social inequality also appeared—one of the main drivers in human history.

The choice to study forest birds was not accidental. It was during the Neolithic, as a result of the so-called Neolithic revolution, that the first drastic change in the natural environment took place, leading to changes at the landscape level. This included large-scale deforestation through cutting down or burning down the forests in the plains and foothills and the conversion of the cleared areas into arable agricultural land to feed the growing Neolithic population.

The most extensive and comprehensive study to date on the Neolithic in Bulgaria is that of Todorova and Vaisov [1], although there had been other serious studies of the Neolithic in Bulgaria [2] before this.

The most clear and dramatic changes experienced by birds during the Neolithic are outlined by [3], p. 40: “From a bird’s point of view man’s activities in Europe over the last few thousand years have been apparent largely as a major alteration of the vegetation. Probably the most significant change he brought about was the steady reduction of forest and the cultivation of land. Within previously forested areas this must have enormously



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benefited such groups of birds as finches, buntings and larks, which could utilise the weed seeds and exposed insects, and increasingly restricted the species that could not live outside a forest environment". On the Balkan Peninsula, until ca. 8500 BP, most of the lowland forests still retained their "sub-Mediterranean" appearance, due to the dominance of *Quercus pubescens* [4]. Until ca. 7500 BP, *Quercus ilex* still dominated, but around 5000 BP, a large-scale transformation of the natural forest vegetation in the lowland belt began and it underwent gradual replacement with grasslands. Poznanin [5] clearly proves that avifaunal diversity is directly dependent not on the area, but on the forest cover of a territory. Therefore, we perceive forests and their reduction as a key factor for the assessment of bird diversity. The present study aims to collect and summarize all information on the composition of birds from the Neolithic period in Bulgaria. They come from prehistoric Neolithic settlements studied over the past 110 years. For some of them, the presence of bird remains is only indicated, without providing information on their species affiliation. This is indicated in Table 1. Due to the poor preservation of some of the bone remains, the species affiliation cannot be determined and they only have been determined to the genus level. In most cases, bones and bone fragments from Neolithic settlements have been identified with the comparative osteological collection of birds of the Vertebrate Animals Department of the National Museum of Natural History of the Bulgarian Academy of Sciences in Sofia.

2. Materials and Methods

This review includes data on birds from 29 Neolithic settlements in Bulgaria (Figure 1; Table 1). These are all the Neolithic settlements in Bulgaria for which there are published data on the bird bones found in them. For the Neolithic period, we adopt the framework of [1], namely the time from the beginning of the 9th millennium BC to the middle of the 4th millennium BC, and for the Balkan Peninsula, the time from the last quarter of the 7th millennium BC to the end of the 6th millennium BC. For forest birds, we accept their categorization by [3]. For the composition of the modern avifauna of Bulgaria, we accept the list of [6]. The taxonomic names of the birds are according to [7].

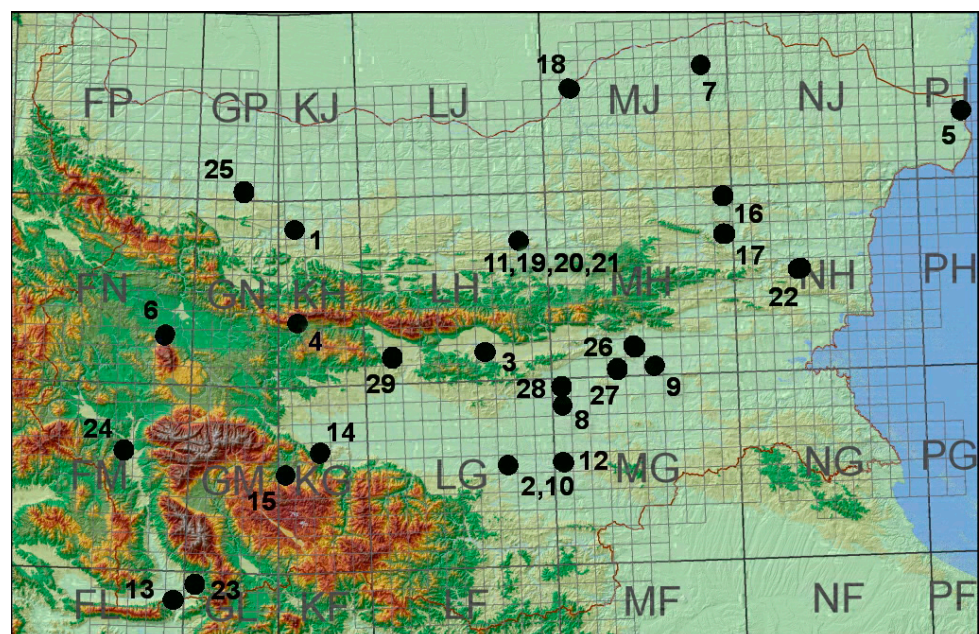


Figure 1. Geographical location of the studied Neolithic settlements in Bulgaria (The squares of the UTM (Universal Transverse Mercator) system are marked with capital letters. The black circles with a number indicates the Neolithic sites in accordance with Table 1).

It should be noted that the remains of domestic chickens from Yabalkovo [8] were subsequently radiocarbon dated [9] (2022) to 1060–115 AD, and those from Hotnitsa to 1959–1962 AD. Neolithic bone samples of Chavdarova Cheshma and Dyadovo were obviously mixed with some subrecent bird bones, including chickens' bones. In addition, the data reported by [10] for birds found at Durankulak (Durankulak-2 locality in that publication) by Manhart [11] are not of medieval but of Neolithic age. Therefore, they are included in the present review.

Abbreviations: a.s.l.—above sea level; BC—before Christ; nr.—near; v.—village; P.—Province; pr.—present.

Table 1. Neolithic birds in Bulgaria (numbers of localities correspond to those of Figure 1).

No	Locality/ Settlement	Location/ Province	Altitude (m)	Age	Species Composition	Reference
1.	Cherdzhenitsa Cave	nr. Karlukovo v. (Pleven P.)	199	8000–4000 BC	<i>Cercopis daurica</i> (now <i>C. rufula</i>), <i>Ptyonoprogne rupestris</i> , <i>Clinclus cinclus</i> , <i>Coturnix coturnix</i> , <i>Denondrocopus minor</i> , <i>Hirundo rustica</i> , <i>Lanius collurio</i> , <i>Linaria</i> <i>cannabina</i> , <i>Monticola</i> cf. <i>saxatilis</i> , <i>Passer</i> cf. <i>domesticus</i> , <i>Pyrrhula pyrrhula</i> , <i>Riparia riparia</i> , <i>Sylvia</i> cf. <i>atricapilla</i> , <i>Turdus merula</i> , <i>Turdus philomelos</i>	[12]
2.	Krum	nr. Krum v. (Haskovo P.)	113	6500–6300 BC	cf. <i>Alectoris</i> sp.	[13]
3.	Kazanlak	town of Kazanlak (Stara Zagora P.)	407	6000–5000 BC	<i>Anas platyrhynchos</i> , <i>Anser</i> sp., <i>Aquila</i> <i>chrysaetos</i> , <i>Bubo bubo</i> , <i>Corvus cornix</i> , <i>Cygnus</i> <i>olor</i> , <i>Cygnus</i> sp., <i>Grus grus</i> , <i>Gypaetus</i> <i>barbatus</i> , <i>Otis tarda</i> , <i>Pelecanus</i> sp., <i>Perdix</i> <i>perdix</i> , <i>Phasianus colchicus</i> , <i>Lyrurus tetrax</i> , <i>Tetrao urogallus</i>	[14–17]
4.	Chelopech	nr. Chelopech v. (Sofia P.)	734	6000–5000 BC	Aves indet.	[18]
5.	Durankulak	nr. Durankulak v. (Dobrich P.)		6000–4000 BC	<i>Accipiter gentilis</i> , <i>Anas acuta</i> , <i>Anas penelope</i> / <i>Anas strepera</i> , <i>Anas platyrhynchos</i> , <i>Anser</i> <i>albifrons</i> , <i>Anser anser</i> , <i>Anser</i> sp., <i>Aquila</i> <i>chrysaetos</i> , <i>Aquila heliaca</i> , <i>Athene noctua</i> , <i>Aythya fuligula</i> , <i>Branta ruficollis</i> , <i>Bucephala</i> <i>clangula</i> , <i>Buteo buteo</i> , <i>Ciconia ciconia</i> , <i>Ciconia</i> <i>nigra</i> , <i>Circus gallicus</i> , <i>Circus</i> sp., <i>Clanga</i> <i>pomarina</i> , <i>Columba oenas</i> / <i>Columba livia</i> , <i>Corvus corone sardonius</i> , <i>Corvus</i> sp., <i>Cygnus</i> <i>cygnus</i> , <i>Cygnus olor</i> , <i>Cygnus</i> sp., <i>Falco</i> <i>subbuteo</i> , <i>Fulica atra</i> , <i>Gavia arctica</i> , <i>Grus grus</i> , <i>Gulosus aristotelis</i> , <i>Haliaeetus albicilla</i> , <i>Larus</i> <i>argentatus</i> , <i>Mergus albellus</i> , <i>Mergus</i> <i>merganser</i> , <i>Milvus</i> sp., <i>Otis tarda</i> , <i>Pelecanus</i> <i>crispus</i> , <i>Pelecanus onocrotalus</i> , <i>Pelecanus</i> sp., <i>Perdix perdix</i> , <i>Phalacrocorax carbo</i> , <i>Podiceps</i> <i>cristatus</i> , <i>Podiceps grisegena</i> , <i>Spatula clypeata</i>	[10,11,19]
6.	Slatina	Sofia City P.	ca. 600	ca. 6000 BC	<i>Anser erythropus</i> , <i>Buteo lagopus</i> , <i>Columba</i> <i>palumbus</i> , <i>Corvus cornix</i> , <i>Cygnus olor</i> , <i>Grus</i> <i>grus</i> , <i>Otis tarda</i> , <i>Tetrax tetrax</i>	[20]
7.	Malak Preslavets	nr. Malak Preslavets v. (Silistra P.)	62	ca. 6000 BC	<i>Accipiter gentilis</i> , <i>Anser anser</i> , <i>Aquila</i> <i>chrysaetos</i> , <i>Aquila rapax</i> / <i>Clanga clanga</i> , <i>Corvus frugilegus</i> , <i>Haliaeetus albicilla</i> , <i>Tadorna tadorna</i> , <i>Tetrax tetrax</i> , <i>Tringa nebularia</i>	[19,21]
8.	Samevo	nr. Samevo v. (Stara Zagora R.)	129	5400–5200 BC	<i>Anser albifrons</i> , <i>Anser</i> sp., <i>Cygnus</i> cf. <i>olor</i> , <i>Otis tarda</i> , <i>Tetrax tetrax</i>	[22]

Table 1. Cont.

No	Locality/ Settlement	Location/ Province	Altitude (m)	Age	Species Composition	Reference
9.	Hadzhdimitrovo	nr. Hadzhdimitrovo (Yambol P.)	167	5200–5040 BC	<i>Accipiter gentilis</i> , <i>Anas penelope</i> , <i>Anas platyrhynchos</i> , <i>Anser anser</i> , <i>Anser erythropus</i> , <i>Ardea cinerea</i> , <i>Columba palumbus</i> , <i>Otis tarda</i> , <i>Strix aluco</i>	[23,24]
10.	Yabalkovo	nr. Yabalkovo v. (Haskovo P.)	128	5000–4500 BC	<i>Anser albifrons/anser</i> , <i>Cygnus olor</i> , <i>Fulica atra</i> , (<i>Gallus gallus domestica</i> —misdated)	[8,9]
11.	Hotnitsa	nr. Hotnitsa v. (Veliko Tarnovo P.)	101	5000 BC	<i>Circus aeruginosus</i> , <i>Columba palumbus</i> , <i>Cygnus olor</i> , (<i>Gallus gallus domestica</i> —misdated), <i>Gypaetus barbatus</i> , cf. <i>Otis tarda</i> , <i>Pica pica</i> , <i>Lyrurus tetrix</i>	[9,25]
12.	Chavdarova Cheshma	town of Simeonovgrad (Haskovo P.)	80	4900–4850 BC	<i>Anser anser</i> , <i>Anser erythropus</i> , <i>Aquila chrysaetos</i> , (<i>Gallus gallus domestica</i> —misdated), <i>Gyps fulvus</i> , <i>Otis tarda</i>	[26]
13.	Topolnitsa	nr. Topolnitsa v. (Blagoevgrad P.)	84	4900 BC	Accipitridae gen.	[19]
14.	Kapitan- Dimitrie-vo	nr. Kapitan-Dimitrie-vo v. (Pazardzhik R.)	287	4000 BC	<i>Corvus frugilegus</i> , <i>Otis tarda</i>	[27]
15.	Rakitovo	nr. town of Rakitovo (Pazardzhik P.)	814	Early Neolithic	<i>Cygnus</i> sp.	[28]
16.	Kodzha-Dermen Mound	nr. town of Shumen	260	Neolithic	Aves indet.	[29]
17.	Deneva Mound	nr. Salmanovo v. (Shumen P.)	92	Late Neolithic–Early Chalcolithic	Aves indet, Falconiformes indet.	[19,30]
18.	Ruse Mound	nr. Ruse City	45	Neolithic	Aves indet.	[31]
19.	Tsarskata Cave	nr. Belyakovets v. (Veliko Tarnovo P.)	354	Neolithic	Aves indet.	[32,33]
20.	Golyama Listsa Cave	nr. Belyakovets v. (Veliko Tarnovo P.)	354	Neolithic	Aves indet.	[32,34]
21.	Malka Podlistska Cave	nr. Belyakovets v. (Veliko Tarnovo P.)	354	Neolithic	Aves indet.	[31,35]
22.	Golyamo Delchevo	nr. Golyamo Delchevo v. (Varna P.)	260	Neolithic– Chelcolithic	<i>Anas platyrhynchos</i> , <i>Anser anser</i> , <i>Cygnus</i> sp., <i>Tetrao urogallus</i>	[36]
23.	Kovachevo	nr. Kovachevo v. (Blagoevgrad P.)	301	7000 BC	<i>Buteo lagopus</i> , <i>Pernis apivorus</i>	[19]
24.	Mursalevo	nr. town of Kocherinovo (Blagoevgrad P.)	434	Early Neolithic	<i>Phasianus/Gallus</i>	[37]
25.	Ohoden	nr. Ohoden v. (Vratsa P.)	208	6100 BC	<i>Pica pica</i> , Aves indet.	[38,39]
26.	Glufishevo	nr. Glufishevo v. (Sliven P.)	174	Early Neolithic	Aves indet.	[40]
27.	Konyovo	nr. Konyovo v. (Sliven P.)	146	Neolithic	Aves indet.	[41]
28.	Dyadovo	nr. Dyadovo v. (Sliven P.)	135	5000 BP	<i>Coturnix coturnix</i> , (<i>Gallus gallus domestica</i> —misdated), <i>Otis tarda</i> , Aves indet.	[42,43]
29.	Pishtikova Mound	nr. Dabene v. (Plovdiv P.)	332	Neolithic	Aves indet.	[44]

3. Results

From the summarized data in Table 1, it is clear that in 10 of the 29 Neolithic settlements, the birds found in them were not determined, which means that the information

about them was lost forever. Unfortunately, the materials collected by archeologists who studied these settlements over the past more than 100 years have not been preserved. Therefore, the present analysis is actually based on data from 19 sites. As can be seen, they are located in the altitude range from 62 to 814 m. a.s.l.

Thus, based on data from 29 (19 of the examined avian remains) settlements, 82 bird taxa have been identified. Of these, 72 species have been identified to the species level. They constitute 17,3% (almost 1/6) of the 417 recorded bird species in the country [6].

Based on the biotope preference of birds [3], we can assume (with some conditionality) that 23 species of “forest” (or at least dendrophilic) birds were widespread in the forests in the vicinity of the Neolithic settlements. These species are *Accipiter gentilis*, *Aquila chrysaetos*, *Aquila heliaca*, *Bubo bubo*, *Buteo buteo*, *Buteo lagopus*, *Ciconia nigra*, *Clanga pomarina*, *Columba oenas/Columba livia*, *Columba palumbus*, *Corvus cornix*, *Denudrocopus minor*, *Falco subbuteo*, *Linaria cannabina*, *Milvus sp.*, *Pernis apivorus*, *Pyrrhula pyrrhula*, *Strix aluco*, *Sylvia cf. atricapilla*, *Lyrurus tetrrix*, *Tetrao urogallus*, *Turdus merula*, and *Turdus philomelos*. They constitute 31.9% (almost 1/3) of all birds found in the Neolithic settlements in Bulgaria.

An examination of the surface of the bones found showed no signs of human impact—burning or any processing (cutting, drilling or filing). This means that the Neolithic bird bones collected so far do not provide information about the secondary use of the (body parts of) birds.

4. Discussion

The altitude range in which the studied Neolithic settlements are located mostly includes the plains covered by the xerothermic oak belt (*Quercus* spp.), which today, in Bulgaria, is usually found between 200 and 900 m. a.s.l. [45].

The broad-leaved deciduous oak forests in modern Bulgaria are the richest in terms of biodiversity. In addition, over the past few millennia, they have been most affected by human economic activity. Vast territories were deforested in antiquity, and the process continued continuously throughout the Middle Ages and to the present day (Figure 2).

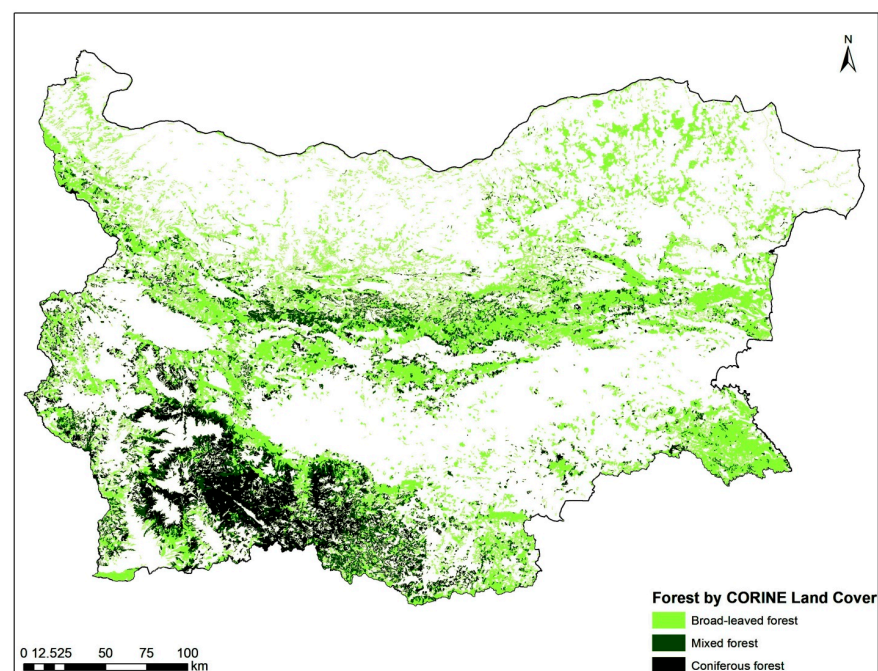


Figure 2. Present distribution of forests in Bulgaria [46].

Above the oak forests in the mountains, from 600 to 1100 m., is the hornbeam–sessile oak (*Carpinus–Quercus petraea*) forest belt, and above this, the beech (*Fagus sylvatica–Fagus orientalis*) belt, occupying a range between 900 and 1500 m. a.s.l. The coniferous forest belt (*Pinus* spp.—*Picea abies*) is located between 1400 and 2200 m. [45]. As can be seen from Table 1, in these higher forest belts, during the Neolithic, there were no settlements in Bulgaria. All the Neolithic settlements known so far were located in the lowlands or plains or in hilly foothill landscapes (Figure 1). They appeared and existed between 8000 and 4000 BC. Of all 29 Neolithic settlements, 4 were caves, but these caves were in low foothill areas at an altitude of 199 to 354 m. a. s. l., were all adjacent to rivers and were surrounded by mixed oak forests.

The rough-legged buzzard is a winter migrant in Bulgaria and on the Balkans. This shows that the two birds (from Kovachevo and Slatina in Sofia) must have been obtained during the winter period. The fact that the species was found in two rather distant settlements in Southern Bulgaria suggests a possible targeted interest in this rare species, which is currently unknown to us.

Black grouse is an extinct species from the Bulgarian avifauna. It was first identified for the subfossil fauna of Bulgaria from the Neolithic site in Kazanlak [13]. Subsequently, a number of other settlements were also found. Hotnitsa is the second Neolithic site in the country. There are suggestions that the species may have existed until the 19th century, but so far, there is no evidence of this.

The two identified Neolithic sites of Western Capercaillie are in the Stara Planina Mts. (Balkan Range)—the longest mountain range on the Balkans. Today, the species is no longer found on this mountain, probably with the exception of a very limited area in its extreme western limits [47]. Therefore, its Neolithic deposits from Kazanlak and Golyamo Delchevo (central and eastern parts of the mountain) have historical value and are far outside the limits of the species' modern shortened range.

The European honey buzzard, among other habitats, also inhabits forest edges more frequently in broadleaf than in pure conifer forests [3]. Kovachevo is the only subfossil locality of the species in Bulgaria.

The red kite is associated with broadleaf forests, more frequently in hilly country, while the black kite occurs in a the vicinity of water [3]. The only Neolithic record of kites (from Durankulak) came from a coastal locality on the Bulgarian Black Sea coast, over which, for millennia, one of the transcontinental migratory flyways for birds in the Western Palearctic—the Via Pontica—has passed. Hundreds of thousands of soaring birds of prey and waterfowl fly through this area every year even today [48].

Common pheasants, along with grasslands, occur in forest edge and on borders of reedy marshland [3]. Since we are discussing Neolithic birds, we must bear in mind that until very recently (until 30–40 years ago), Bulgaria was part of the range of the autochthonous colchic subspecies of pheasant (*Phasianus colchicus colchicus*), which was gradually displaced by the introduced larger subspecies (*Ph. c. torquatus* and *Ph. c. mongolicus*) [49,50]. Therefore, along with black grouse, the colchic pheasant can be considered the second extinct species in Bulgaria among forest Neolithic birds.

Deforestation and excessive hunting have played a decisive role in the disappearance of the black grouse and partly of the pheasant in recent centuries. The disappearance of the common crane, great bustard, and little bustard is due to overhunting and habitat loss—the draining of inland swamps and lakes, as well as the plowing of natural steppes.

The established composition of these birds proves that their bone remains were deposited both in the spring–summer season and in the winter. Among these birds (Table 1) there are prominent migrants (represented by migratory populations), both winter migrants (such as *Buteo lagopus*, *Mergus albellus* and *M. merganser*) and migrants that today breed in

the Balkans (such as *Cercopis rufula*, *Ptyonoprogne rupestris*, *Coturnix coturnix*, *Hirundo rustica*, *Lanius collurio*, *Monticola saxatilis*, *Riparia riparia*, and *Sylvia atricapilla*). Overall, summer migrants significantly outnumber winter migrants.

The main factor in changing the composition of avifauna in the plains and low foothill landscapes during the Neolithic was the drastic deforestation of vast territories on the Balkans. The replacement of forest tree-shrub vegetation with grasslands and the expansion of arable agricultural lands are the main reasons for the reduction in bird diversity. These changes were much more significant than the slight changes in climate, which were gradual and, in many areas, mitigated by local relief, the presence of water bodies and other local factors.

The relatively high proportion of diurnal birds of prey represented is striking—eagles, hawks, buzzards, kites and falcons. Considering that these birds are at the top of the food pyramid and their numbers in nature everywhere are significantly lower than the numbers of their prey, we can assume that there was some selectivity in the hunting of birds by Neolithic hunters. Unfortunately, the exact reasons for their representation remain unknown for the time being.

The large number of species with high conservation status is striking. Among the identified birds from the Neolithic, 33 species (45.8%) are included in the national Red Data Book of Bulgaria [51]: *Accipiter gentilis*, *Anser anser*, *Anser erythropus*, *Aquila chrysaetos*, *Aquila heliaca*, *Ardea cinerea*, *Branta ruficollis*, *Bubo bubo*, *Ciconia ciconia*, *Ciconia nigra*, *Circaetus gallicus*, *Circus aeruginosus*, *Clanga pomarina*, *Cygnus cygnus*, *Cygnus olor*, *Falco subbuteo*, *Grus grus*, *Gulosus aristotelis*, *Gyps fulvus*, *Haliaeetus albicilla*, *Milvus* sp. (*M. milvus/migrans*), *Otis tarda*, *Pelecanus crispus*, *Pelecanus onocrotalus*, *Pernis apivorus*, *Phasianus colchicus*, *Podiceps cristatus*, *Podiceps grisegena*, *Strix aluco*, *Tadorna tadorna*, *Tetrao tetrix*, *Tetrao urogallus*, and *Tetrax tetrax*.

5. Conclusions

Despite the limited data, the study presented here is the first of its kind in Bulgaria. The collected data refer to 19 settlements, in which a total of 82 bird taxa have been identified. They represent at least 72 species, which account for 17.3% (almost one-sixth) of the 417 recorded bird species in the country. About one-third (23 species) are inhabitants of forest ecosystems. Two species (2.7%) of important hunting and economic importance even today no longer nest in Bulgaria (*Lyrurus tetrix* and *Phasianus colchicus*), and another rare winter migrant (*Buteo lagopus*) has been found in two Neolithic settlements in Southern Bulgaria. Today, the two locations of *Tetrao urogallus* are far outside the limits of the species' current shortened range. A very high number of the uncovered Neolithic birds (33 species, 45.8%) are included in the national Red Data Book of Bulgaria.

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References

1. Todorova, H.; Vaisov, I. *The Neolithic Age in Bulgaria (the End of the Seventh-Sixth Millennium BC)*; Science and Art Publishing House: Sofia, Bulgaria, 1993; pp. 1–339. (In Bulgarian, German Summary)
2. Gaul, J.H. The Neolithic Period in Bulgaria. *Am. Sch. Prehist. Res. Bull.* **1948**, *16*, 1–252.
3. Harrison, C.J.O. *An Atlas of the Birds of the Western Palearctic*; Princeton Univ. Press: Princeton, NJ, USA, 1982; pp. 1–332.

4. Blondell, J. Historical and Ecological evidence on the development of *Mediterranean avifaunas*. In *Proceedings of the Acta XVIII Congressus Internationalis Ornithologici, Moscow, Russia, 16–24 August 1982*; Ilyichev, V.D., Gavrilov, V.M., Eds.; Nauka Publ. House: Moscow, Russia, 1985; pp. 373–386.
5. Poznanin, L.P. *Ecological Aspects of Bird Evolution*; Nauka Publishing House: Moscow, Russia, 1978; pp. 1–152. (In Russian)
6. Ivanov, B.; Iankov, P.; Boev, Z.; Georgiev, D.; Profirov, L.; Dimitrov, M. List of the Birds Recorded in Bulgaria (Bulgarian List). 2015, 1–23. Available online: <https://bunarco.org/files/modules/173/1612354626-568-494.pdf> (accessed on 31 January 2025).
7. del Hoyo, J. (Ed.) *All the Birds of the World*; Lynx Edicions: Barcelona, Spain, 2020; pp. 1–967.
8. Boev, Z. Avian Remains from the Early Neolithic Settlement Near Yabalkovo Village (Haskovo Region, South-East Bulgaria). *Acta Zool. Bulg.* **2009**, *61*, 317–322.
9. Best, J.; Doherty, S.; Armit, I.; Boev, Z.; Büster, L.; Cunliffe, B.; Foster, A.; Frimet, B.; Hamilton-Dyer, S.; Higham, T.; et al. Redefining the timing and circumstances of the chicken’s introduction to Europe and north-west Africa. *Antiquity* **2022**, *96*, 868–882. [[CrossRef](#)]
10. Boev, Z. Fossil and subfossil record of vertebrate animals (Vertebrata J.-B. Lamarck, 1801) along the Western Black Sea Coast (Bulgaria). *Acta Zool. Bulg.* **2018**, *11*, 105–110.
11. Manhart, H. Die vorgeschichtliche Tierwelt von Koprivec und Durankulak und anderen prahistorischen Fundplätzen in Bulgarien aufgrund von Knochenfunden aus archaischen Ausgrabungen. *Doc. Naturae* **1998**, *116*, 1–353.
12. Boev, Z. Early Pleistocene and Early Holocene avifauna of the Cherdzhenitsa Cave, Northwestern Bulgaria. *Hist. Nat. Bulg.* **2000**, *11*, 107–116.
13. Boev, Z. Animal remains of the Middle Neolithic settlement near Krum Village (Haskovo Region (SE Bulgaria)). *ZooNotes* **2014**, *58*, 1–6.
14. Boev, Z. First proofs of the existence of the black grouse (*Tetrao tetrix* (L.) (Aves, Tetraonidae) in Bulgaria. *Acta Zool. Bulg.* **1988**, *36*, 72–77. (In Bulgarian, English Summary)
15. Boev, Z. Neolithic birds from the prehistoric settlement at Kazanluk. *Hist. Nat. Bulg.* **1993**, *4*, 57–67.
16. Boev, Z. The Black Grouse, *Tetrao tetrix* (L., 1758) (Tetraonidae, Aves), a disappeared species in Bulgaria (Paleolithic and Neolithic records). *Anthropozoologica* **1997**, *25–26*, 643–646.
17. Kovachev, G. Wild and Domestic Animals from the Neolithic Settlements Near Kazanlak, Rakitovo and Kalugerovo-Osteoscopic and Osteometric Studies. D. Sc. Thesis, Higher Institute of Zootechnics and Veterinary Medicine, Stara Zasluga, Bulgaria, 1988; pp. 1–36. (In Bulgarian)
18. Dennell, R. *Early Farming in South Bulgaria from the VI to III Millennia B.C.*; British Archaeological Reports; International Series (Supplementary); BAR Publishing: Oxford, UK, 1978; Volume 45, 304p.
19. Boev, Z. Neogene and Quaternary Birds (Aves) from Bulgaria. D. Sc. Thesis, Bulgarian Academy of Sciences, National Museum of Natural History, Sofia, Bulgaria, 1999.
20. Boev, Z. Avian remains from the Early Neolithic settlement of Slatina (Present Sofia City, Bulgaria). *Acta Zool. Bulg.* **2009**, *61*, 151–156.
21. Boev, Z. The Holocene avifauna of Bulgaria (A review of the ornitho-archaeological studies). *Hist. Nat. Bulg.* **1996**, *6*, 59–81.
22. Boev, Z. Avian remains from the Late Neolithic settlement of Sarnevo (Stara Zasluga Region, SC Bulgaria). *Acta Zool. Bulg.* **2013**, *65*, 259–262.
23. Petrova, V.D.; Lyuncheva, M.; Iliev, I.; Yaneva, M.; Nikolov, V.; Vitezovic, S.; Zidarov, P.; Mitov, K.; Hadzhipetkov, I.; Taneva, S.; et al. Archaeological excavations at a Late Neolithic pit site near the village of Hadzhidimitrovo, Yambol region. In *Archaeological Rescue Excavations Along the Trakia Motorway Route, LOT 1–4. Part I. Prehistory*; Alexandrov, S., Ed.; Bulged: Sofia, Bulgaria, 2024; pp. 7–94. (In Bulgarian, English Summary)
24. Boev, Z. Avian remains from the Late Neolithic settlement of Hadzhidimitrovo (Yambol Region, SE Bulgaria). In *The Late Neolithic settlement of Hadzhidimitrovo (Yambol Region, SE Bulgaria)*; Petrova, V., Ed.; Prof. Marin Drinov Academic Publishing House: Sofia, Bulgaria, 2022, *in press*.
25. Boev, Z. Avian remains from the Late Chalcolithic settlement near Hotnitsa Village (Veliko Tarnovo Region, CN Bulgaria). *Acta Zool. Bulg.* **2009**, *61*, 49–54.
26. Boev, Z. Late Neolithic and Late Antiquity avian finds of Chavdarova Cheshma (Simeonovgrad, Haskovo Region). *ZooNotes* **2017**, *111*, 1–3.
27. Boev, Z. Avian finds from the Early Neolithic settlement near Kapitan-Dimitriev village (Pazardzhik Region). *ZooNotes* **2017**, *112*, 1–3.
28. Kovachev, G.; Minkov, T. *Wild Animals from the Prehistoric Settlement Near Rakitovo*; Biological Faculty, Annual of the Sofia University “Kl. Ohridski”: Sofia, Bulgaria, 1986; Volume 77, pp. 87–100. (In Bulgarian, English Summary)
29. Popov, R. Kodzha-Dermen Mound. A contribution to the prehistory of Bulgaria. *Period. Spis.* **1909**, *21*, 562. (In Bulgarian)
30. Popov, R. Der Hügel Kodjadermen bei Schumen. *Bull. Bulg. Archaeol. Soc.* **1918**, *6*, 71–155+6. (In Bulgarian, German Summary)
31. Popov, R. Prehistoric mound near Ruse. *Razvigor* **1921**, *25*, 2–7. (In Bulgarian)

32. Popov, R. Belyakovsko Plateau. *Caves and prehistoric settlements. Izd. Nar. Muzei Sofia* **1925**, 3, 1–58. (In Bulgarian)
33. Popov, R. Tsarskata Cave. *Estestvozn. Geogr.* **1921**, 1, 28–33. (In Bulgarian)
34. Popov, R. Golyama Listsa Cave. *Estestvozn. Geogr.* **1921**, 2–3, 95–105. (In Bulgarian)
35. Poppow, R. Die Ausgrabungen in der Höhle “Malkata Podlisža” beini Dorfe Beljakovež, unweit der Stadt Tirnovο (Nordbulgarien). *Præhistorischen Z.* **1913**, 5, 449–460.
36. Ivanov, S.; Vasilev, V. Studies of the animal bone material of the prehistoric settlement mound near Golyamo Delchevo. *Settl. Mound Near Golyamo Delchevo Razkopki Prouchvaniya* **1975**, 5, 245–302. (In Bulgarian)
37. Boev, Z. Archaeozoological Material of the Neolithic Settlement Near Mursalevo Village (Kyustendil Province (SW Bulgaria). 2015; (Unpubl. Data).
38. Ganetsovski, G. Rescue archaeological excavations at the site of an early Neolithic settlement in the Valoga (Dolnite Laki) area near Ohoden, Vratsa region. In *Archaeological Discoveries and Excavations in 2011*; Gurova, M., Ed.; National Archaeological Institute with Museum, Bulgarian Academy of Sciences, Avangard: Sofia, Bulgaria, 2012; pp. 43–45. (In Bulgarian)
39. Boev, Z. Archaeozoological Material of the Early Neolithic Settlement Near Ohoden village (Vratsa Province (NW Bulgaria). 2015; (Unpubl. Data).
40. Ninov, L. Osteoarchaeological studies of prehistoric sites. In *Archaeological Discoveries and Excavations in 1994, Proceedings of the 38th National Archaeological Conference, Smolyan, Bulgaria, 22–23 June 1995*; Archaeological Institute and Museum, Bulgarian Academy of Sciences, Historical Museum: Sofia, Bulgaria, 1995; p. 37. (In Bulgarian)
41. Ninov, L. Archaeosteological studies of prehistoric sites in 2004. In *Archaeological Discoveries and Excavations in 2004*; Nikov, K., Ed.; National Archaeological Institute with Museum, Bulgarian Academy of Sciences, Avangard: Sofia, Bulgaria, 2005; pp. 63–64. (In Bulgarian)
42. Gergova, D.; Kancheva-Ruseva, T. Study of the village mould near the village of Dyadovo, near Nova Zagora in 2004. In *Archaeological Discoveries and Excavations in 2004*; Nikov, K., Ed.; National Archaeological Institute with Museum, Bulgarian Academy of Sciences, Avangard: Sofia, Bulgaria, 2005; pp. 82–83. (In Bulgarian)
43. Boev, Z. Avian remains from the Early Bronze Age settlement near Dyadovo village (vicinity of the town of Nova Zagora (Stara Zagora Region, SE Bulgaria). *Hist. Nat. Bulg.* **2006**, 17, 133–135.
44. Ninov, L. Study of animal remains from prehistoric sites. In *Archaeological Discoveries and Excavations in 1992–1993*; Archaeological Institute with Museum, Bulgarian Academy of Sciences, Ministry of Culture: Veliko Tarnovo, Bulgaria, 1994; pp. 26–27. (In Bulgarian)
45. Koprarev, I.; Yordanova, M.; Mladenov, C. (Eds.) *Geography of Bulgaria. Physical Geography. Socio-Economic Geography*; ForKom Publishing House: Sofia, Bulgaria, 2002; pp. 1–706. (In Bulgarian, English Summary)
46. CORINE Land Cover 2018 (Vector/Raster 100 m), Europe, 6-Yearly. Available online: <https://land.copernicus.eu/en/products/corine-land-cover/clc2018#download> (accessed on 31 January 2025).
47. Plachiyski, D.; Popgeorgiev, G.; Avramov, S.; Boev, Z. The Balkan Capercaillie *Tetrao urogallus rudolfi* Dombrowski, 1912 (Galliformes: Phasianidae): Distribution History and Current Status in Bulgaria. *Acta Zool. Bulg.* **2018**, 70, 101–111.
48. Michev, B.; Zehtindjiev, P.; Marinov, M.; Zlatanov, T. Patterns of Bird Migration Defined by a Weather Radar at Part of the East European Flyway (Via Pontica). *Acta Zool. Bulg.* **2020**, 72, 263–277.
49. Boev, Z.; Gerasimov, G.; Iankov, P. Phasianus colchicus colchicus (Colchic) Pheasant. In *Atlas of Breeding Birds in Bulgaria*; Iankov, P., Ed.; Bulgarian Society of the Protection of Birds, Conservation Series, Book 10; BSPB: Sofia, Bulgaria, 2007; pp. 204–205.
50. Boev, Z.; Gerasimov, G. Phasianus colchicus Common (Hybrid) Pheasant. In *Atlas of Breeding Birds in Bulgaria*; Iankov, P., Ed.; Bulgarian Society of the Protection of Birds, Conservation Series, Book 10; BSPB: Sofia, Bulgaria, 2007; pp. 206–207.
51. Golemanski, V.; Peev, D.R. (Eds.) Animals. In *Red Data Book of the Republic of Bulgaria*; IBEL-BAS & MOEW: Sofia, Bulgaria, 2011; Volume 2, pp. 1–372.

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