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Bird Remains from Curata and Bordu Mare Caves (Romania)

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ABSTRACT: Data on Late Pleistocene avifauna from two Transylvanian caves are presented. The assemblage of Curata Cave consists of 24 species that lived in a very diverse environment. An abundance of Black Grouse (*Tetrao tetrix*) remains (54%) is observable. The material of Bordu Mare Cave yielded 24 taxa, mostly such as live in woody and rocky mountainous country. Some species became extinct in the Holocene bird fauna of Romania, while others are very rare and highly endangered. As both samples are rather fragmentary and none of the bones indicate any human exploitation, the remains are considered due to the activity of different predators.

KEY WORDS: BIRD REMAINS, PALAEOLITHIC, CURATA CAVE, BORDU MARE CAVE, ROMANIA

RESUMEN: Se ofrecen datos acerca de las avifaunas del Pleistoceno tardío de dos cuevas de Transilvania. La muestra de la cueva Curata está formada por 24 especies que habitaron un ambiente muy diversificado. Destacable en ella resulta la abundancia de Gallo Lira (*Tetrao tetrix*) que supone el 54% de los restos. El material de la cueva Bordu Mare generó 24 taxones fundamentalmente de los que habitan terrenos forestales y rocosos. Durante el Holoceno algunas de estas especies se extinguieron en Rumanía en tanto que otras se han hecho muy infrecuentes o se encuentran en peligro de extinción. Dado que ambas muestras son bastante fragmentarias y ninguno de los restos evidencia señales de explotación humana consideramos que estos restos son debidos a la actividad de diferentes depredadores.

PALABRAS CLAVE: RESTOS DE AVES, PALEOLÍTICO, CUEVA CURATA, CUEVA BORDU MARE, RUMANÍA

INTRODUCTION

The Curata and Bordu Mare Caves lie in Hunedoara county in Transylvania, near the towns of Deva and Hunedoara, and the Haţeg Valley, well known among palaeontologists for dinosaurs remains and eggs (Figure 1). Curata Cave is situated in Petacului Valley, near the village of Nandru, at 18 m relative and 300 m absolute altitude. Its 12 m long eastern entrance penetrates in an 8 m long and 12 m wide gallery. There have been archaeological digs in the cave since 1877 but the main excavation was carried out by C. S. Nicolăescu-Plopsor and his team in 1955-56. Traces of two Mousterian layers were discovered, proved by finds of quartz and silex tools. Beside bird remains mammals have also been found (Fischer & Stephan, 1977). Based on palinological studies, Cârciumaru (1980, 1985) established two climatic periods during the formation of the cave's sediment: Nandru 1-4 and Ohaba A. The Middle Palaeolithic layers were followed by Neolithic (Cris

FIGURE 1
Location of Curata (1) and Bordu Mare (2) caves.

culture), Bronze Age (Coţofeni culture) and 14th century mediaeval deposits (Boroneanţ, 2000).

Bordu Mare Cave lies to the south-east of Curata Cave, in the vicinity of the village of Ohaba Ponor, 695 m above sea level. Its study by I. Mallasz and M. Roska dates back to the beginning of the last century, and was continued by C. S. Nicolăescu-Plopşor and others in 1954-1955. In this cave three Mousterian levels with 10 layers were found which yielded about 200 remains of different mammals (Gaál, 1943), and bird remains and bone tools (Roska, 1930). Palinological analyses indicated Nandru 1-2 and Ohaba A-B climatic periods in this cave (Cârciumaru, 1980, 1985). The next levels contained Aurignacian, Neolithic (Criş culture), Bronze Age (Cotofeni culture) and mediaeval finds (Boroneant, 2000). The last excavation was made by A. Păunesco in 1994 and focused on collecting microvertebrate remains and samples for Cdating. A very few amphibian and bird bones came to light on this occasion (Păunesco & Abbassi, 1996).

The remains of different animal species found in both of the caves proved a diverse and mosaic-like environment in the Haţeg region.

MATERIALS AND METHODS

Over the last four decades several researchers have obtained bird remains from Curata Cave. The first part of the material, consisting of 120 remains, was identified and published by D. Jánossy in 1965. Twelve years later Fisher & Stephan (1977) published 21 additional remains from this cave and finally Kessler (1985) studied the remaining bird bones in Romania (Tyrberg, 1998). Unfortunately, only the revision of this latter material was possible for the author of this article.

The bird material (47 bones) found during the excavations in Bordu Mare Cave in the 1950s was studied and published by Kessler (1985). The second excavation in 1994, in spite of modern digging techniques, yielded only 7 very fragmentary bird remains. This article revises and identifies the complete material resultant from this cave.

Reference data were taken into account when the place of the material was not known and thus the revision of the material was impossible. The recent and subfossil bird bone collection of the Babes-Bolyai University Cluj (Romania) and the Department of Geology and Palaeontology of the Hungarian Natural History Museum served as the basis for the identification of bones. The systematic order follows Peterson *et al.* (1977). When analysing the palaeoecological and palaeoclimatic significance of the species, the suggestions of Mourer-Chauviré (1975) were taken into account.

RESULTS

The complete bird material of the Curata Cave site is summarized in Table 1. In all, a total of 24 species were identified from 152 specimens. Remarkable is the NISP=76 of Black Grouse which will be discussed later under the taphonomic notes.

As already mentioned in the introduction, the bird remains from Bordu Mare Cave come from two excavations: the first one provided 24 taxa from 47 specimens, but the stratigraphic origin of only 14 taxa from 21 remains is certain, coming from Mousterian II, II and III layers. Therefore the bird assemblage of this cave is treated as "Mousterian fauna" and as "Late or Post-Palaeolithic fauna" respectively in the following. The second excavation yielded only 3 taxa from 7 remains, all of them coming from Mousterian deposits (Table 2).

TAXON	ARCHAEOLOGICAL AGE		Jánossy	Fischer & Stephan	Gál
	Mousterian II	Late Mousterian	(1965)	(1977)	(2002)
Anas platyrhynchos	6		x	x	
Anas penelope	1		x		
Aythya nyroca	2		x		
Anas cf. clypeata		1			x
Anatidarum g. et sp. indet.	1		x		
Pernis apivorus	1		x		
Buteo cf. lagopus	5		x		
Aquila cf. clanga	1		x		
Haliaaetus albicilla	1	1	x		x
Aegypius monachus	2		x		x
Circus macrourus		1			x
Falco tinnunculus	2		x	x	
Tetrao tetrix	76		x	x	x
Tetrao urogallus	13	1	x	x	x
Perdix perdix	3		x		
Crex crex	1		x		
Asio flammeus	2	1	x		x
Strix aluco		1			x
Strix cf. nebulosa	8		x		
Picus canus	1		x		
Turdus cf. pilaris	1		x		
Sturnus vulgaris	1		x		
Pyrrhocorax graculus	1	1	x		x
Corvus monedula	4		x	x	
Corvus corax		1			x
Aves indet.	11		x		
Total NISP	**144**	**8**			

TABLE 1
Bird fauna of Curata Cave.

SPECIES	ARCHAEOLOGICAL AGE	
	Mousterian II-IV	**Late- or Post-Palaeolithic**
Plegadis falcinellus		2
Anas platyrhynchos		1
Haliaeetus albicilla	1	
Gypaetus barbatus	1	1
Falco vespertinus	2	
Falco sp.		1
Lagopus mutus	1	4
Gallus gallus		6
Gallus/Phasianus	1	
Galliformes indet.	3	
Perdix perdix	1	1
Scolopax rusticola		1
Tringa totanus		1
Hirundo rustica		1
Turdus merula	1	
Turdus pilaris	2	1
Turdus viscivorus	1	
Garrulus glandarius		1
Pica pica		2
Pyrrhocorax graculus	4	
Corvus monedula	1	1
Corvus corone	1	
Corvus corax		2
Fringilla cf. montifringilla	1	
Carduelis chloris	1	
Coccothraustes coccothraustes	1	
Emberizidae indet.	2	
Passeriformes indet.	3	
Total NISP	**28**	**26**

TABLE 2
Bird fauna of Bordu Mare Cave.

DISCUSSION

In the case of both caves bird material from two phases of the Late Pleistocene are provided. These two phases are stratigraphically better defined at Curata Cave than at Bordu Mare Cave where the "Late or Post-Palaeolithic" deposit probably contains resedimented remains (e.g. *Gallus gallus* bones).

When comparing the avifauna of the two caves, our first observation concerns the diverse proportions of the different bird groups. In Curata Cave waterfowl (Anseriformes) and wading birds (Ciconiiformes and some species of Charadriiformes), and predators (Falconiformes and Strigiformes) predominate, while in Bordu Mare Cave terrestrial and more or less sedentary species (Galliformes and some Gruiformes species), and perching birds are present in a higher proportion (Figure 2). The reason for this dissension might be the considerable altitudinal difference (almost 400 m) of the two sites, but taphonomic factors also determine the composition of every fossil assemblage.

From a palaeoecological point-of-view, bird species both in the earlier (Mousterian II) and younger (Late Mousterian) levels of Curata Cave indicate a dominance of species from woody and aquatic or humid habitats. However, a decrease in the forest species (from 40% to 28%) and an increase in aquatic species (from 30% to 40%) can be observed over time (Figure 3). Birds associated with open, grassy areas and with rock shelters are also represented, by 4 species each. Only one ubiquist species was identified. We do not know exactly the reason for the changes in ecotype proportions. As cultural traces prove, humans (at least occasionally) settled in the cave but we do not have direct evidence for bird hunting and prey selection.

As for the climatic significance of the species, the so-called indifferent species predominate in both assemblages, while cold and temperate forms are represented in almost equal proportions. The very low number of xeromontan birds and the lack of warm species is noticeable (Figure 4). The absence of these latter forms is generally characteristic of Late Pleistocene avifaunas versus the earlier periods of Pleistocene (Gál, 2002). As one cannot observe spectacular differences in the climatic significance of birds, the most likely explanation for the ecotype changes in the case of Curata Cave seems to be that they are due to taphonomic agents rather than to strong ecological changes. The absence of the "marker genera" *Lagopus* for the Late Pleistocene is surprising and, together with the abundance of Black Grouse, suggests that the accumulation of fossils occurred in warmer phases, probably interstadials.

The results of the palaeoecological and palaeoclimatic analysis of the fossil avifauna of Bordu Mare Cave indicate some similarities to and differences from that of Curata Cave. Aquatic and rocky species strongly dominate the other ecotypes in this material. The proportion of the forest species is very high (58%) in the Middle Mousterian sequence and decrease to 39% in the Late or Post-Palaeolithic level. An inverse tendency is observed in the case of the aquatic or humid environment species, which increase from only 5% to

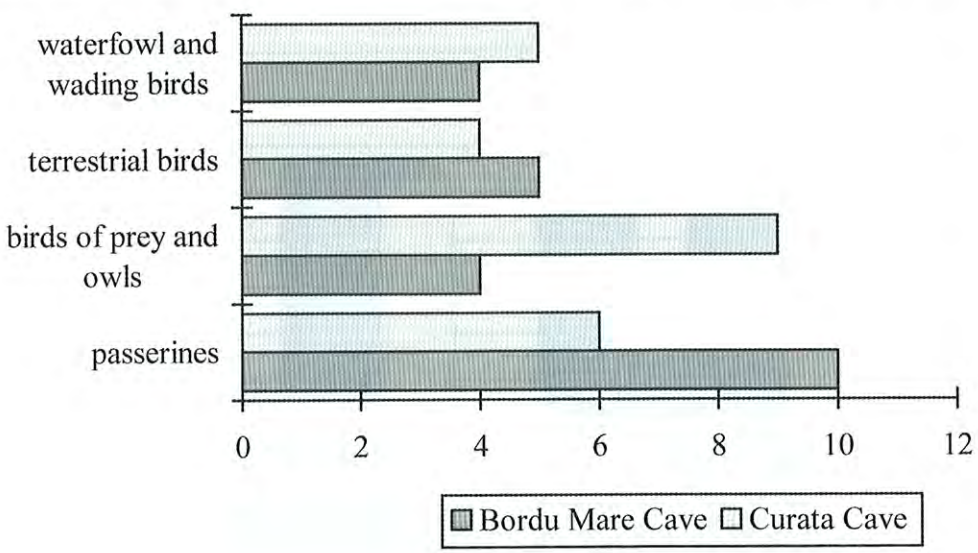

FIGURE 2
Share of different bird groups in Curata and Bordu Mare caves.

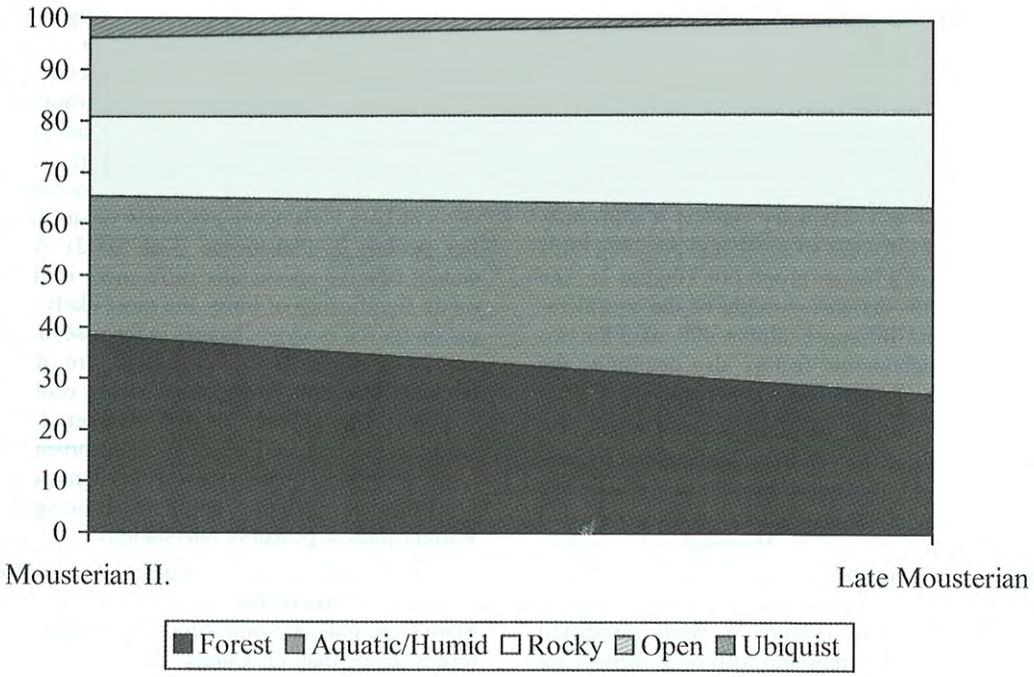

FIGURE 3
Proportion of bird species representing different ecotypes in the Middle Mousterian and Late Mousterian levels of Curata Cave.

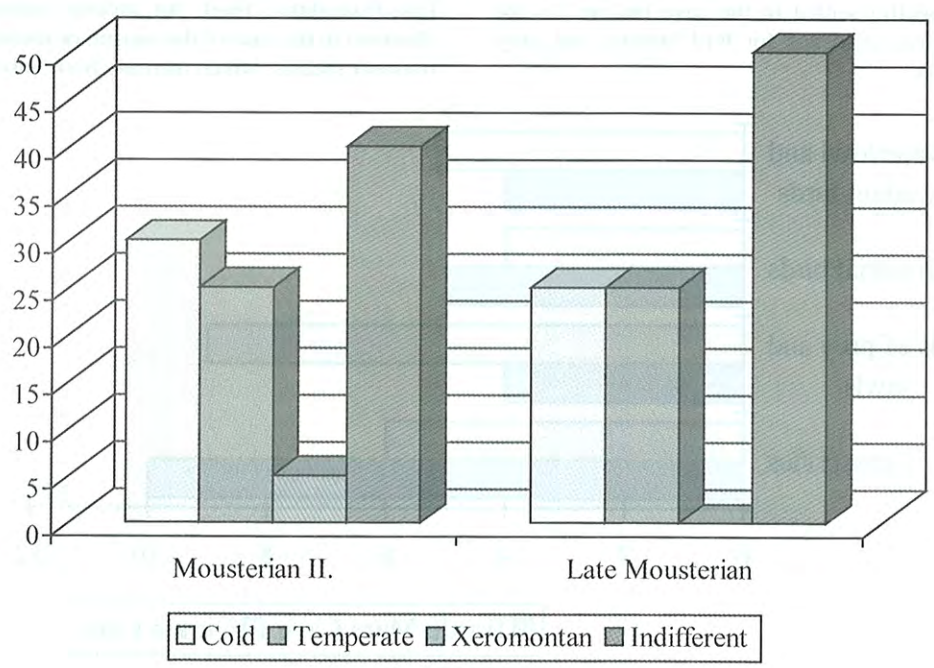

FIGURE 4
Proportion of bird species representing different climate types in the Middle Mousterian and Late Mousterian levels of Curata Cave.

20% over time. The proportions of the steppe and rocky species are almost constant in the two fossil deposits, and only one ubiquist species was found in the younger one (Figure 5).

Many more differences were found regarding the climatic significance of the bird species. Temperate species followed by indifferent and cold species are better represented in the Middle Mousterian layer, while the xeromontan type is underrepresented (7.7%). In the younger (Late or Post-Palaeolithic) level indifferent forms dominate (66.6%) over the other three types. Birds requiring warm climate are absent in the fossil assemblage of this cave as well (Figure 6). The palaeoecological conclusions drawn by the bird composition of the deposits are close to those established after the analyses of the micromammal fauna, which indicate a cool-humid phase for the younger (Late Palaeolithic) layer and temperate-humid periods for the elder (Middle Mousterian) levels (Păunesco & Abbassi, 1996).

We also have to underline that in the lack of sequential data and an abundant material on the one hand, and the high mobility of the majority of bird species on the other hand, it is impossible to attain such accurate conclusions as in the case of pollen or small mammal remains.

Besides the climatic significance of the species in the two fossil accumulations of Bordu Mare Cave, there are compositional variances in the faunas as well. The bird species from the Mousterian level belong to only 3 orders: Galliformes, Falconiformes and Passeriformes. Except for the Bearded Vulture (*Gypaetus barbatus*) and the White-tailed Eagle (*Haliaeetus albicilla*), all of them are small to medium-sized species. The younger deposit yielded a much more diversified avifauna with many new elements (e.g. waterfowl and wading birds). However, the majority of these species are also medium-sized birds.

The fossil avifaunas identified from the two caves in comparison with the current one present some typically Late Pleistocene extinct species and rare/highly endangered birds as well: Ptarmigan (*Lagopus mutus*), Great Grey Owl (*Strix nebulosa*) and Alpine Chough (*Pyrrhocorax graculus*) are completely extinct in Romania, while Black Vulture (*Aegypius monachus*) and Bearded Vulture are also considered extinct or appearing occasionally in a very low number. Due to habitat reduction and intensive hunting, the range of Capercaillie (*Tetrao urogallus*) and Black Grouse is also dangerously decreasing.

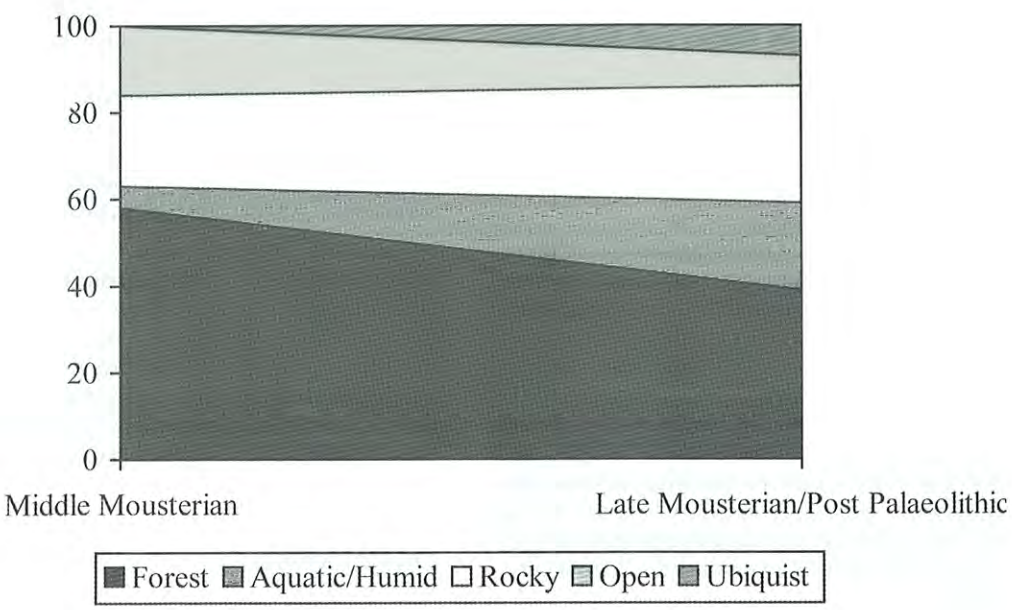

FIGURE 5

Proportion of bird species representing different ecotypes in the Middle Mousterian and Late- or Post-Paleolithic levels of Bordu Mare Cave.

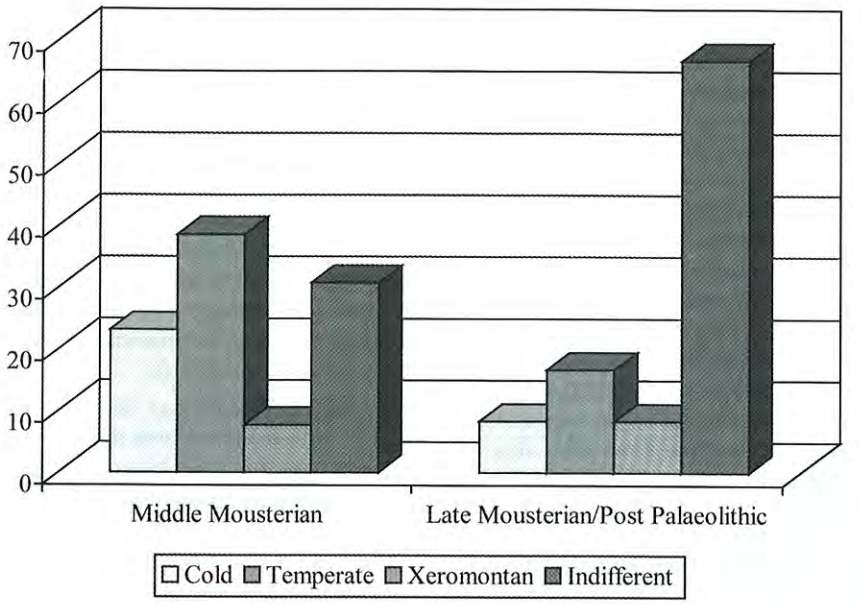

FIGURE 6

Proportion of bird species representing different climate types in the Middle Mousterian and Late- or Post-Paleolithic levels of Bordu Mare Cave.

Beside the palaeoecological significance of species, usually the taphonomy of the finds generates discussion in the case of cave materials. The culture layers, and the human and large mammal remains discovered in Curata and Bordu Mare Caves prove the more or less continuous settlement by ancient people. The high dominance (54%) of the black grouse in Curata Cave also suggests human exploitation on sight, but a more detailed analysis of the bones leads to other conclusions.

Earlier studies tried to distinguish the anthropogenetic and non-anthropogenetic bone accumulations - beyond the undoubtedly human traces such as cut marks, butchery and burnt bones - in accordance with the share of the different bird bone elements (Mourer-Chauviré, 1983; Ericson, 1987). However, it seems that the problem of materials from archaeological sites is more complex and does not always show an unambiguous trend thus taphonomic signatures left on the bones by the various species of owls and different diurnal birds of prey also differ (Bochenski, 1997; Laroulandie, 2000).

Checking the proportion of Black Grouse bone elements in the fossil material of Curata Cave, we find that distal elements of wing and leg - tarsometatarsi (43%), carpometacarpi (18%), tibiotarsi (14%) and ulnae (11%) - are the most frequent bones (Figure 7). Considering the fragmentary nature of the majority of the material and the lack of any traces leading to human butchery and gnawing marks on the bones (Jánossy, 1965; Fisher & Stephan, 1977), we tend to attribute this assemblage to the activity of raptors. The same conclusion is made for the material of Bordu Mare Cave especially taking into account the abundance of microvertebrates, and of small and middle-sized birds.

Lack of access to the main part of the material and the scarcity of the stratigraphical data in some cases hindered any detailed comment on the taphonomy of the assemblages. However, it seems that while many large mammals probably were hunted by man, other animal remains – including birds – resulted from the activity of various predators, including diurnal raptors and owls.

CONCLUSIONS

Although palinological and faunistic investigations have been made in both caves, it is not always possible to correlate the data from these

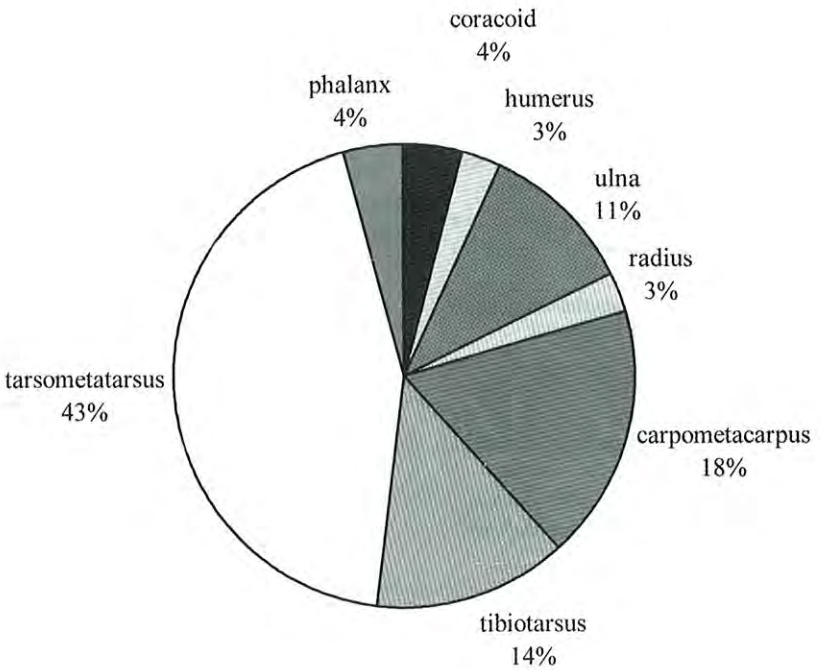

FIGURE 7
Comparative diagram of the share of particular elements of Black Grouse (*Tetrao tetrix*) in Curata Cave.

with those of bird specimens. Nevertheless, both avifaunas are typical of the Late Pleistocene due to the cold and indifferent climate demand of the species, and the lack of warm climate birds. As the remains do not have any hunting or butchery marks, we conclude that their accumulations may be attributed to different predators rather than to human activity.

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