

Bird remains from the Eneolithic and Iron Age site Bordușani-Popină and Eneolithic site Hârșova (Southeast Romania)

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Abstract. A study of the two Eneolithic and Iron Age sites containing the richest Holocene bird faunas of Romania is presented. Bordușani-Popină yielded 36 taxa and at least 67 individuals from 187 bird bones, while Hârșova furnished 32 taxa and at least 64 individuals from 225 pieces. Although the subfossil deposits share many of the species, the composition of the species lists differs in the two localities. This is probably explained by both the different geographical position of the two sites, and the varying hunting customs and facilities of the human inhabitants.

Key words: bird remains, Neolithic tell, Bordușani-Popină, Hârșova, Romania.

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I. INTRODUCTION

The Early to Middle Holocene bird remains of Romania are not very numerous. A few species were published from the following Eneolithic sites: Călățea (Bihar county), Parța (Timiș county), Liubcova-Ornița (Caraș-Severin county) and Căscioarele (Ilfov county) (JURCSÁK & KESSLER 1986; KESSLER & GÁL 1997a). All the remains from these localities are attributed to human activity.

The purpose of this paper is to present the bird faunas of the two richest Eneolithic human occupation sites in Romania. Beside the taxonomic and paleoecological studies some biometrical and taphonomical observations were also made. Other faunal remains in addition to bird bones have already been largely studied and analysed from La Tène (BĂLĂȘESCU 1997) and the Eneolithic levels of Bordușani-Popină (MOISE 1997; RADU 1997; VENCZEL 1997). At Hârșova, beside birds, invertebrates, fish, amphibians and reptiles, domestic and wild mammals had also been gathered, hunted or raised (MOISE, 1998-2000; POPOVICI et al, 1996; RADU, 1998-2000). Considering the very high proportion of fish and mammal remains, we may conclude that birds played only a secondary role in the nutrition of these ancient communities. Among the mammals, domestic species (dogs, suids and ovicaprines) are well presented (about 75%) in both of the localities. All these lead to the idea that the animal economy of the Eneolithic inhabitants was mainly based on domestic animals, season-

ally supplemented by fish and molluscs. The seasonal movement of the river offered favourable fishing and gathering opportunities for the occupants.

The Bordușani-Popină site is a terrain situated in the Balta Ialomiței, surrounded by the Borcea channel of the Danube and the River Danube itself (Fig. 1). It lies about 2,5 km NE from Bordușani village (Ialomița county), at 44°30'00" N and 27°55'47" E. Compared to other Eneolithic Romanian avifaunas, a rich bird fauna from Bordușani-Popină was found in 1993-98. The digging started in 1987 and the excavation became multidisciplinary through the collaboration of many researchers during the following years. The locality and historical background to it are described in a preliminary report (MARINESCU-BÎLCU 1997).

The site consists of two tells and the Northern part of the larger tell was selected for excavation. Stratigraphically two main levels were found: a younger La Tène occupation level and some Gumelnița occupation layers.

Tell settlements rise due to accumulation of the successive human occupations. Their existence can be explained by human activity in the same place for many centuries or millennia. Tells are mainly known in the Middle East, while in Europe they appear in the Balkan region and their north-western limit is in the Great Hungarian Plain (e.g. Túrkeve-Terehalom, Százhalombatta) (FODOR et al. 1992). The term Gumelnița comes from the tell bearing the same name in South-Romania, which belongs to the Gumelnița-Kodjadermen-Karanovo VI cultural complex. Gumelnița represents the beginning of the chalcolithic in Romania (also named Eneolithic), which dates to the beginning of the 5th millennium BC. This culture is most common in tell-like localities. Pottery appears in a variety of forms and is decorated by incisions or painted with graphite.

La Tène on the other hand is the second part of the Iron Age. The term comes from the name of a shallow water deposit in Lake Neufchatel, Switzerland. Its highest development and the birth of this artistic style took place in western Central Europe.

The Neo-Eneolithic tell of Hârșova forms a part of the town with the same name, situated on the right side of the River Danube, at about 70 km from Constanța city. It lies between Ialomița Island and Brăilei Island formed by the division of the River Danube (Fig. 1). It seems that human commu-

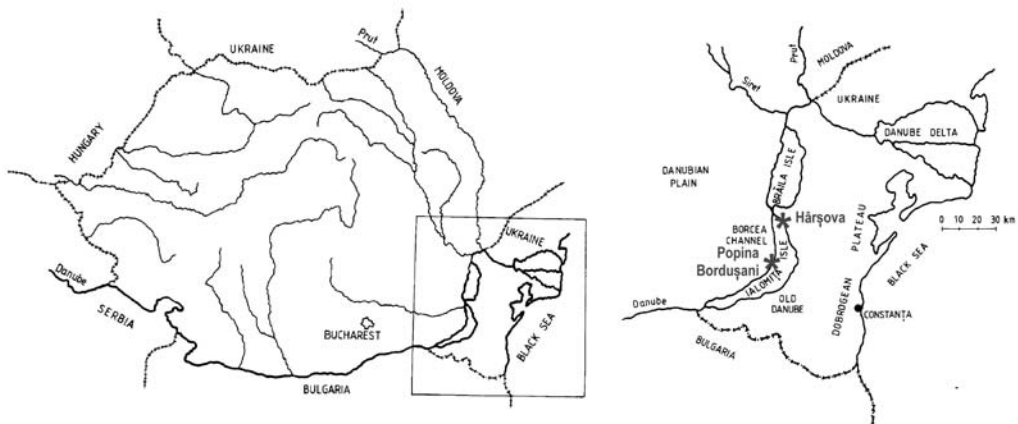


Fig. 1. Location of Bordușani-Popină and Hârșova localities.

nities occupied an oval-shaped, rocky higher ground of about 2 ha. The southern part of the tell has been eroded by the river as well as by recent human activities.

The archaeological deposits were covered by loess. The upper 1.5 m layers of the section belong to the Cernavoda I culture. These were strongly affected by the later occupations, mostly by those in the Bronze Age. Then follows the main 7 m section of the Gumelnița level. This was succeeded by a 1.5 m thick level containing the traces of the last two phases of Boian culture (POPOVICI et al. 1996).

A c k n o w l e d g e m e n t s. We are grateful to Dr. Dragomir POPOVICI for lending us the bird material for study. We thank Mr. Mihály GASPARIK, who allowed us to make bone measurements in the comparative bird bone collection under his custody. Two reviewers made helpful comments on the manuscript. The map was drawn by Eva DABOC.

II. MATERIAL AND METHODS

About 500 bird bones, and fragments thereof, were found in the material under study among which 412 were identifiable. We did not identify vertebrae, clavicles and badly preserved fragile bones, like cranium-, sternum- and pelvis-fragments.

The remains were identified by using a recent comparative bird bone collection and biometrical data. Measurements used follow the suggestions of VON DEN DRIESCH (1976). Bones were measured with a digital calliper to a precision of 0.01 mm. Minimum numbers of individuals (MNI) were calculated according to GRAYSON, (1984). We used scatter analysis for demonstrating the sizes of some important species and different comparative diagrams for the other illustrations.

The systematic sequence and nomenclature is after TYRBERG (1998).

According to MOURER-CHAUVIRÉ (1975) five ecotypes were distinguished: aquatic birds, forest or/and shrubland species, steppe birds, species associated with rocky places and ubiquitous taxa. Among the aquatic birds we further separated strictly water birds (e.g. swans) from species attached to humid places (e.g. geese). Some of the species may occupy two kind of biotope, e.g. open areas for feeding and forests for breeding. In these situations both types were taken into account.

III. RESULTS AND DISCUSSION

Bordușani-Popină and Hârșova are the richest Holocene bird faunas in Romania from the perspective of the number of species, the minimum number of individuals (MNI) and the number of bone fragments.

Due to the excavations during recent years both the number of bird remains and species has increased in Bordușani-Popină (KESSLER & GÁL 1997b). A total of 187 bird bones and their fragments were found in the levels mentioned. Thirty-one bones came from the La Tène occupation and 156 from the Gumelnița occupations. A bone of a juvenile example was unidentifiable. The bird material belongs to at least 67 individuals and 36 taxa, 35 of them being identified to species. In the La Tène layer, 4 additional species appear compared to the Gumelnița level. The results are presented in Table I.

A few species listed in Table I require comment:

Cygnus cygnus/C. olor – the diaphysis of an ulna belongs to either the Whooper Swan or the Mute Swan, but morphologically can not be further attributed without reservations, and the sizes of the two swan species overlap.

Anserini indet. – the diaphysis of a radius of an adult individual is similar to that of the Anserini. Based on size it either belongs to the genus *Tadorna* or *Branta*.

Anas sp. – the diaphysis of a humerus of a juvenile resembling a duck, although it can not be referred to species due to the immaturity of the bone.

Table I

List of identified bird remains from Borduşani-Popină. Numbers (No) of fragments and minimal number of individuals (MNI) are given

Bird species	Level					
	Gumelnița			La Tène		
	No	MNI	Remarks	No	MNI	Remarks
<i>Podiceps cristatus</i> (LINNAEUS, 1758)	1	1				
<i>Pelecanus onocrotalus</i> LINNAEUS, 1758				4	2	
<i>Phalacrocorax carbo</i> (LINNAEUS, 1758)	5	1				
<i>Phalacrocorax pygmaeus</i> (PALLAS, 1773)	1	1				
<i>Egretta alba</i> (LINNAEUS, 1758)	1	1				
<i>Ardea cinerea</i> LINNAEUS, 1758	2	1		2	1	
<i>Ardea purpurea</i> LINNAEUS, 1766	2	1		4	1	
<i>Botaurus stellaris</i> (LINNAEUS, 1758)	1	1				
<i>Ciconia nigra</i> (LINNAEUS, 1758)	3	1				
<i>Ciconia ciconia</i> (LINNAEUS, 1758)	5	2				
<i>Cygnus olor</i> (J. F. GMELIN, 1789)	3	2				
<i>Cygnus cygnus</i> (LINNAEUS, 1758)	15	3				
<i>Cygnus olor/cygnus</i>	1	1				
<i>Anser anser</i> (LINNAEUS, 1758)	28	5		1	1	
<i>Anserini indet.</i>	1	1				
<i>Anas strepera</i> LINNAEUS, 1758	1	1				
<i>Anas penelope</i> (LINNAEUS, 1758)	1	1				
<i>Anas platyrhynchos</i> LINNAEUS, 1758	34	6		2	1	
<i>Anas acuta</i> LINNAEUS, 1758	5	1		2	1	
<i>Anas querquedula</i> LINNAEUS, 1758	4	1				
<i>Anas crecca</i> LINNAEUS, 1758				1	1	
<i>Anas</i> sp.				1	1	juvenile
<i>Aythya nyroca</i> GÜLDENSTÄDT, 1770	2	2				
<i>Haliaeetus albicilla</i> (LINNAEUS, 1758)	3	1				
<i>Aquila chrysaetos</i> (LINNAEUS, 1758)	1	1				
<i>Aquila heliaca</i> SAVIGNY, 1809	1	1				
<i>Perdix perdix</i> (LINNAEUS, 1758)	1	1	juvenile			
<i>Gallus gallus</i> LINNAEUS, 1758	6	2		2	1	juvenile
<i>Grus grus</i> (LINNAEUS, 1758)	2	1				
<i>Rallus aquaticus</i> LINNAEUS, 1758				1	1	
<i>Fulica atra</i> LINNAEUS, 1758	6	2		5	1	
<i>Tetrax tetrax</i> (LINNAEUS, 1758)	1	1		2	1	
<i>Upupa epops</i> LINNAEUS, 1758	1	1				
<i>Pica pica</i> (LINNAEUS, 1758)	3	1				
<i>Corvus corone</i> LINNAEUS, 1758	7	1		1	1	
<i>Corvus frugilegus</i> LINNAEUS, 1758	4	3	1 juvenile	3	2	
<i>Corvus corax</i> LINNAEUS, 1758	3	1				
Aves indet.	1	1	juvenile			
Total	156	51		31	16	

The proportion of the species assigned to different ecotypes are almost the same in the two levels at Borduşani-Popină. However, the La Tène level furnished slightly more aquatic (37.5%), steppe like (18.7 %) and rocky species (5.4 %) than the Gumelniţa level (34.2%, 13.5% and 0%, respectively) (Fig. 2).

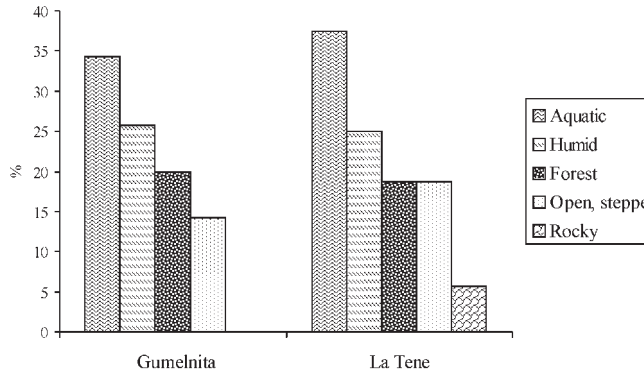


Fig. 2. Comparative diagram of the bird species representing different ecotypes in Gumelnița and La Tène levels of Borduşani-Popină site.

The Hârşova site opened between 1988-1998 yielded the most numerous Eneolithic bird remains in Romania. Thirty-two taxa and at least 64 individuals were identified from 225 of whole or fragmentary bones. Thirty-one bones were unidentifiable. The results are presented in Table II.

The majority (30%) of the identified species from Hârşova are woodland species. Birds associated with humid places like wetlands or marshes are also well represented (29%), while other ecotypes are not so numerous (Fig. 3).

E c o l o g i c a l a n d p h e n o l o g i c a l o b s e r v a t i o n s

Comparing the two bird faunas, first of all we notice that 16 species are common. Among the aquatic species ducks are the most numerous in Borduşani-Popină (8 taxa), While Storks, Bitterns and herons were more commonly found in Hârşova (7 species). Only 6 species, among which 4 are

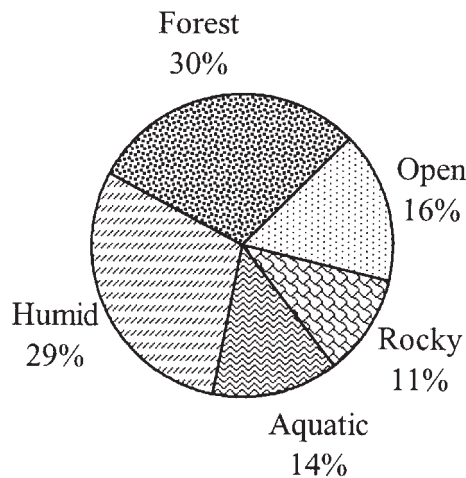


Fig. 3. Proportion of bird species representing different ecotypes at Hârşova.

Table II

List of identified bird remains from Hârşova. Numbers (No) of remains and minimal number of individuals (MNI) are given

<i>Bird species</i>	No of remains	MNI	Remarks
<i>Phalacrocorax carbo</i> (LINNAEUS, 1758)	10	5	
<i>Pelecanus</i> cf. <i>onocrotalus</i> LINNAEUS, 1758	1	1	
<i>Nycticorax nycticorax</i> (LINNAEUS, 1758)	1	1	
<i>Botaurus stellaris</i> (LINNAEUS, 1758)	1	1	
<i>Egretta alba</i> (LINNAEUS, 1758)	5	2	
<i>Ardea cinerea</i> LINNAEUS, 1758	6	2	
<i>Ardea purpurea</i> LINNAEUS, 1766	3	2	
<i>Ciconia ciconia</i> (LINNAEUS, 1758)	2	1	
<i>Platalea leucorodia</i> LINNAEUS, 1758	1	1	
<i>Cygnus olor</i> (J. F. GMELIN, 1789)	6	2	
<i>Cygnus cygnus</i> (LINNAEUS, 1758)	30	3	
<i>Anser albifrons</i> (SCOPOLI, 1769)	1	1	
<i>Anser anser</i> (LINNAEUS, 1758)	41	6	
<i>Branta</i> cf. <i>leucopsis</i> (BECHSTEIN, 1803)	2	1	
<i>Anas clypeata</i> LINNAEUS, 1758	1	1	
<i>Pernis apivorus</i> (LINNAEUS, 1758)	1	1	
<i>Haliaeetus albicilla</i> (LINNAEUS, 1758)	5	2	
<i>Gypaetus barbatus</i> (LINNAEUS, 1758)	1	1	
<i>Accipiter gentilis</i> (LINNAEUS, 1758)	1	1	
<i>Buteo buteo</i> (LINNAEUS, 1758)	3	2	
<i>Aquila pomarina</i> C. L. BREHM, 1831	2	1	
<i>Aquila clanga</i> PALLAS, 1811	1	1	
<i>Aquila heliaca</i> SAVIGNY, 1809	1	1	
<i>Hieraetus pennatus</i> (J. F. GMELIN, 1788)	1	1	
<i>Perdix perdix</i> (LINNAEUS, 1758)	1	1	
<i>Gallus gallus</i> LINNAEUS, 1758	47	6	3 juvenile
<i>Otis tarda</i> LINNAEUS, 1758	1	1	
<i>Columba palumbus</i> LINNAEUS, 1758	1	1	
<i>Garrulus glandarius</i> (LINNAEUS, 1758)	2	1	
<i>Corvus monedula</i> LINNAEUS, 1758	4	2	
<i>Corvus corone</i> LINNAEUS, 1758	8	2	
<i>Corvus frugilegus</i> LINNAEUS, 1758	4	3	1 juvenile
Aves indet.	31	6	

common (e.g. Partridge or Imperial Eagle) need open, grassy areas. Bustards are also steppe forms. The Golden Eagle *Aquila chrysaetos* and the Raven *Corvus corax* found at Borduşani-Popină and the Bearded Vulture *Gypaetus barbatus* and the Buzzard *Buteo buteo* from Hârşova live partially or entirely in rocky places. Predators are also more numerous and diverse in Hârşova than in Borduşani-Popină (9 species against 3 species). Owls are completely absent. Passeriforms are represented by only 4 species of corvids at both sites.

The majority of the species from both sites belong to the recent breeding bird fauna of Southeast Romania. Thirty-two species (77.1%) identified in Borduşani and 27 species (84.3%) in Hârşova

still occur in this region. Among these only 10 species (31.2%) and 11 (40.7%), respectively are residents, the others being summer visitors.

The presence of wintering species such as the White-fronted Goose *Anser albifrons* and the Whooper Swan *Cygnus cygnus* prove that the occupation of the levels was during winters. The identification of Barnacle Goose *Branta cf. leucopsis* was not certain. This bird is a northern species and over-winters in Western Europe. It only appears accidentally in Romania and in nearby countries. The Crane *Grus grus* occasionally breeds in the Danube Delta, but it is mostly considered a passage bird in Romania. Passage species like the Teal *Anas crecca*, the Pintail *A. acuta* and the Crane were probably caught during their migration. According to CRAMP (1985) Bearded Vulture is extinct in Romania since 1935. The Little Bustard *Tetrax tetrax* became extinct in Romania during the 19th century, but we have several data that show it was breeding in this part of country during the Holocene. Individual Great Bustards *Otis tarda* were recorded in the western part of the country, but stable populations have not existed since the second half of the last century. Hoopoe *Upupa epops* is described for the first time in the prehistoric bird fauna of Romania.

The geographical and natural positions of the sites offer many types of ecological niches. Sylvo-steppe vegetation is typical both to the west and to the east of the River Danube. The high proportion of bird species living in wet places may be explained by the seasonal inundation of the open lands surrounding the sites. Old granite hills, the Babadac-mountains, lie in the north-eastern part of the region and vultures still occur in this area. Both of the sites are relatively close to the Danube Delta and the Black Sea. The region is an important passage corridor for migrating birds. All the above mentioned characteristics explain the variety of the bird fauna.

B I O M E T R I C A L o b s e r v a t i o n s

We examined the most interesting and frequent species such as the Whooper Swan *Cygnus cygnus*, the Greylag Goose *Anser anser* and the hen *Gallus gallus* from an osteological point of view. The most frequent types of bones in deposits were selected for analysis: the carpometacarpus and distal fragments of tarsometatarsus for the swan and the goose, and distal fragments of tibiotarsus and tarsometatarsus for the hen. For recent comparison we used data on the 7 carpometacarpi of *Cygnus olor*, 6 of *C. cygnus* and 10 of *Anser anser* (Fig. 4). In the case of tarsometatarsus, we measured 9 specimens of *Cygnus olor*, 6 of *C. cygnus* and 10 of *Anser anser* (Fig. 5). The sizes of 12 tibiotarsi (5 male and 7 female) and 10 tarsometatarsi (5 male and 5 female) of *Gallus gallus* were included (Fig. 6 and 7).

Thirty pieces of at least 6 individuals of Greylag Goose from Bordușani-Popină, and 41 bones of 6 individuals from Hârsova belong to this species. Both types of bones (carpometacarpus and tarso-

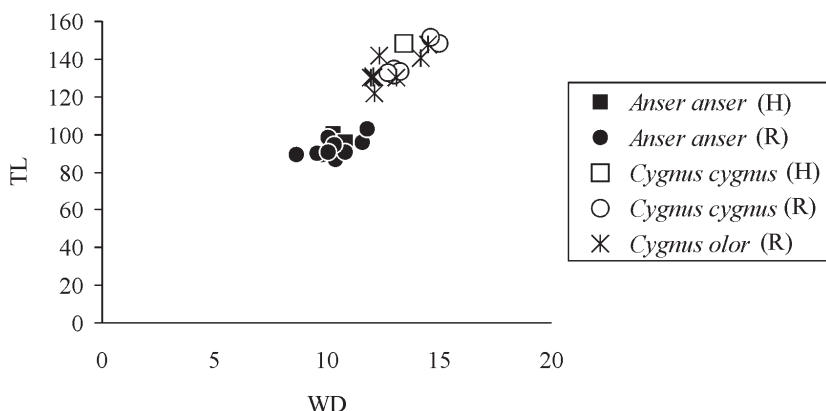


Fig. 4. The ratio of the total length (TL) of the carpometacarpus to its diaphysis width (WD) in subfossil and recent *Anser anser*, *Cygnus olor* and *Cygnus cygnus*. Values are given in mm. Abbreviations: B-P – Bordușani-Popină; H – Hârsova; R – recent.

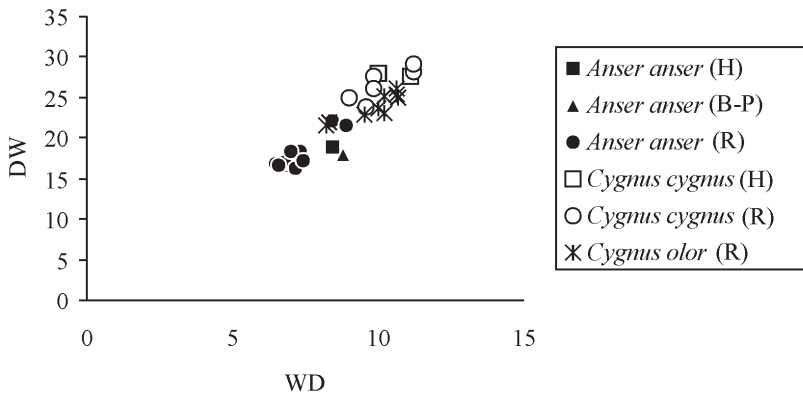


Fig. 5. The ratio of the distal width (DW) of the tarsometatarsus to its diaphysis width (WD) in subfossil and recent *Anser anser*, *Cygnus olor* and *Cygnus cygnus*. Values are given in mm. Abbreviations: B-P – Bordușani-Popină; H – Hârșova; R – recent.

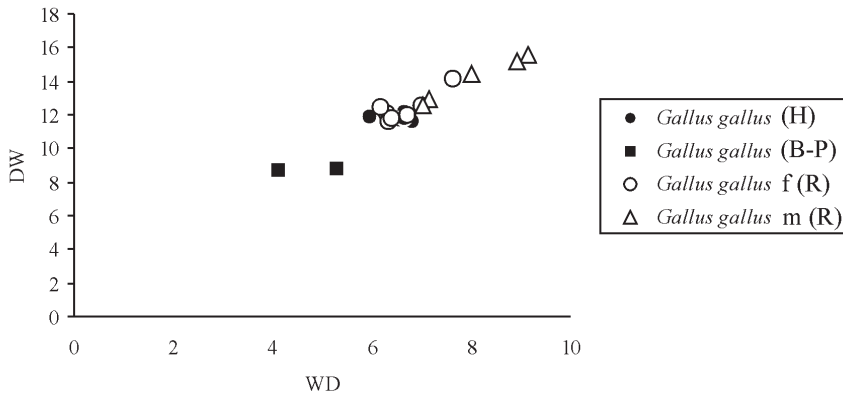


Fig. 6. The ratio of the distal width (DW) of the tibiotarsus to its diaphysis width (WD) in subfossil and recent *Gallus gallus*. Values are given in mm. Abbreviations: B-P – Bordușani-Popină; H – Hârșova; R – recent; f – female; m – male.

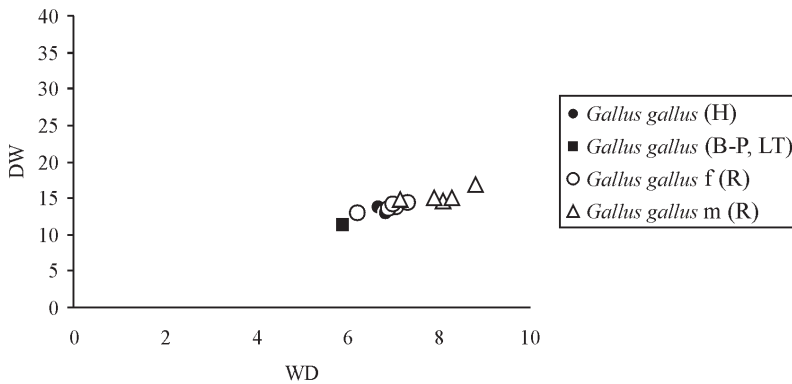


Fig. 7. The ratio of the distal width (DW) of the tarsometatarsus to its diaphysis width (WD) in subfossil (Bordușani-Popină and Hârșova) and recent (R) *Gallus gallus*. Values are given in mm. Abbreviations: B-P – Bordușani-Popină; LT – La Tène level; H – Hârșova; R – recent; f – female; m – male.

metatarsus) indicate that dimensions of subfossil Greylag Geese fall within the range of recent *Anser anser* (Fig. 4 and Fig. 5). We may observe on the same diagrams that sizes of subfossil Whooper Swans from Hârșova are among the largest recent *Cygnus cygnus*.

An inverse phenomenon is observed concerning the Hen *Gallus gallus*. The sizes of both the tibiotarsi and tarsometatarsi of individuals from Hârșova fall among the smallest of the recent *G. gallus* measured, while Hens from Bordușani-Popină were smaller than recent Hens, whether they came from Neolithic (Fig. 6) or La Tène levels (Fig. 7).

T a p h o n o m i c a l o b s e r v a t i o n s

The most commonly exploited species in Bordușani Popina was the Mallard *Anas platyrhynchos*, represented by 34 bones and at least 6 individuals, and the Greylag Goose, represented by 28 remains and at least 5 individuals. Studying the bone-distribution, we observe that the most frequent bone is the humerus in both of the species, while the other skeletal remains have different proportions (Fig. 8). In Hârșova, the most popular bird was the Hen *Gallus gallus*, including 47 remains with an MNI of 6, and the Greylag Goose with 41 bones with an MNI of 6. As Fig. 9 shows, the wing and pectoral girdle were preferentially exploited in the case of the Greylag Goose, while leg bones are the most numerous in the chicken. We also may observe that the utilisation of Greylag Goose differed in the two sites (Fig. 8 and 9).

The specific diversity of wild mammals and birds proves that hunting was not neglected as a source of meat, fur and feathers. Although a total of 121 worked pieces, including mammal bones and *Dentalium* shells, were found so far at Bordușani-Popină, none of the bird bones from here show any human activity. e.g. cut marks, butchering or traces of burning (VOINEA 1997). No such

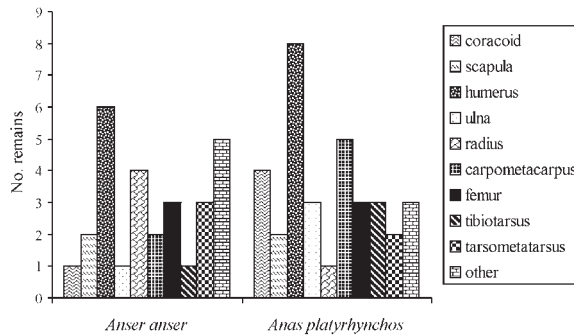


Fig. 8. Comparative diagram showing the skeletal element ratio of Greylag Goose (*Anser anser*) and Mallard (*Anas platyrhynchos*) in Bordușani-Popină.

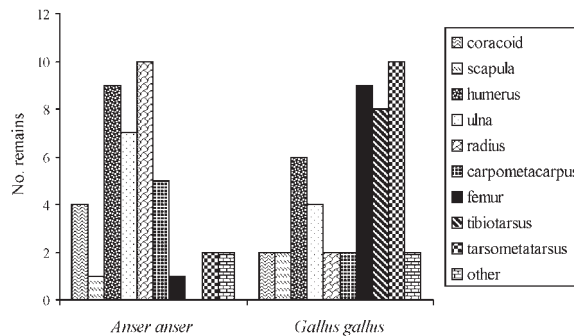


Fig. 9. Comparative diagram showing the skeletal element ratio of Greylag (*Anser anser*) and Hen (*Gallus gallus*) in Hârșova.

evidence was found at Hârşova either. A very few pieces have root marks and unidentifiable tracks as taphonomic trails. Due to the high proportion of dogs and pigs at both of the sites we may suppose that a part of the bone remains were eaten by these animals.

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