

**ANIMAL RESOURCES EXPLOITED AT THE BEGINNING OF
THE SECOND MILLENNIUM IN THE AREA BETWEEN THE
DANUBE AND THE BLACK SEA:
ARCHAEOZOOLOGICAL DATA**

SIMINA STANC (IAȘI - ROMANIA),
LUMINIȚA BEJENARU (IAȘI - ROMANIA)

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Abstract. The paper presents a zooarchaeological synthesis for settlements from the beginning of the second millennium in Dobruđa area: Dumbrăveni, Oltina (Altinum), Capidava, Isaccea (Noviodunum), Hârșova (Carsium), Piatra Frecăței (Beroe), Nufăru (Prislava), for which archaeozoological analyses had been made. The fauna remains from these samples are mollusc, fish, reptiles, birds and mammals; the greatest number is represented by mammal remains. The presence of fish, bird (wild and domestic) and mammal (wild and domestic) remains is an indicator of activities such as fishing, hunting and animal husbandry made by the people in these settlements. The most important activity is that of animal husbandry in six of the settlements. Among domestic animals, for six settlements the higher frequency (as number of remains) is represented by cattle (*Bostaurus*) and for the settlement of Dumbrăveni the highest preponderance is of sheep/goat (*Ovisaries/Capra hircus*), followed by cattle.

Among wild mammals, the red deer (*Cervuselaphus*), the wild boar (*Sus scrofaferus*) and the roe deer (*Capreoluscapreolus*) appear in all samples, the first two having the largest share. The aurochs (*Bosprimigenius*) and the beaver (*Castor fiber*), lived in Dobruđa area at the beginning of the second millennium. The red deer had reduced a lot in time its areal range because of the forest clearance and is to be found today only in the Carpathian area.

Among wild bird species, the black vulture (*Aegyptiusmonachus*) had disappeared from our country's fauna and others – the white-tailed eagle (*Haliaeetusalbicilla*), the swan (*Cygnus cygnus* and *Cygnus olor*), the white pelican (*Pelecanusonocrotalus*), the cormorant (*Phalacrocoraxcarbo*), the lesser spotted eagle (*Aquila pomarina*) are currently species strictly protected by the law.

There have been identified 12 species of fish belonging to Acipenseridae, Esocidae, Cyprinidae, Siluridae, Percidae families; all species of Teleostei live in sweet waters, being fished in the Danube, the lakes and rivers in

the neighbourhood area; the Cyprinidae fish are the most representative in number.

Introduction

The archaeozoological data used in the present paper proceed from previous studies (see the references in the Figure 1), and are mainly based on specimen identification and quantification. The archaeozoological quantification aimed at evaluating the relative frequencies of animal species in the samples. The quantification method used in this work was based on estimating the number of identified specimens (NISP) and the minimum number of individuals (MNI) (Udrescu *et al.*, 1999).

The faunal remains identified on the seven samples (Dumbrăveni, Oltina, Capidava, Isaccea, Hârșova, Pietra Frecăței, Nufăru) belong to a varied class of animals (mollusc, fish, reptiles, birds, mammals), among which are predominant the mammals (Figure 1). For Dumbrăveni settlement, there is only the distribution per species of the identified specimens, not of the minimum number of individuals. For the Dinogetia sample (9th-12thcenturies) a quantification of the remains has not been published, only a list of identified species (Gheorghiu, Haimovici, 1965), therefore the analysis of the frequencies could not be taken into account.

Figure 1. Quantification of the faunal remains (NISP).

Samples	Datation (centuries)	References	Molluscs	Fish	Reptiles	Birds	Identified mammals	Unidentified mammals	Total sample
Dumbrăveni	9 th -10 th	Haimovici, 2000	6	174	13	32	199	206	630
Oltina	10 th -11 th	Stanc, Bejenaru, 2005; Stanc, 2006; Stanc <i>et al.</i> , 2006	21	580	-	128	940	796	2465
Capidava	10 th -11 th	Haimovici, Ureche, 1979	16	370	1	45	1028	350	1810
Isaccea	11 th -13 th	Bejenaru, 2003; Bejenaru, 2007; Bosniceanu, 2008; Cot, 2008	4	718	-	142	6890	3144	10898

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Hârșova	11 th -13 th	Bejenaru, 2003	7	600	-	84	705	224	1620
Piatra Frecăței	11 th -12 th	Stanc, 2009	-	316	-	86	1947	1571	3920
Nufăru	10 th -13 th	Bejenaru, Tarcan, 2007; Maftei, 2002	-	8	-	7	543	248	791

1. Fish

The fish's remains are represented by the bones and scales from Teleostei, as well as the sturgeons. After the determination of the remains, a number of 12 taxa were identified: *Acipensersp.*, *Esox lucius*, *Abramis brama*, *Aspius aspius*, *Cyprinus carpio*, *Pelecus cultratus*, *Rutilus rutilus*, *Tincatinca*, *Silurus glanis*, *Perca fluviatilis* and *Stizostedion lucioperca*. The highest percentage represented by the number of the remains is that of the *Cyprinus carpio*, followed by *Esox lucius* and *Silurus glanis* (Figure 2).

For the sites situated near the Danube the percentage of the fish remains in a variety of studies on faunal samples is high: Oltina 23.5%; Dumbrăveni 27.6%; Hârșova 37%; we also meet here a great diversity of species.

Figure 2. Species of fish identified on samples.

Species	Common name	Hârșova	Isaccea	Capidava	Oltina	Dinogetia	Piatra Frecăței	Dumbrăveni	Nufăru
<i>Acipensersp.</i>	sturgeons	*	5	-	6	*	-	9	-
<i>Esox lucius</i>	pike	*	1	*	96	*	*	2	-
<i>Abramis brama</i>	bream	-	-	*	4	-	-	-	-
<i>Aspius aspius</i>	asp	-	-	*	4	*	-	-	-
<i>Carassius carassius</i>	crucian carp	-	-	*	-	-	-	1	-
<i>Cyprinus carpio</i>	common carp	*	-	*	126	*	*	4	1
<i>Pelecus cultratus</i>	zige	-	-	-	1	-	-	-	-
<i>Rutilus rutilus</i>	roach	-	-	-	2	-	-	-	-
<i>Tincatinca</i>	tench	*	-	-	1	-	-	-	-

<i>Silurusglanis</i>	wels	*	11	*	66	*	*	-	3
<i>Percafluviatilis</i>	perch	-	-	*	1	-	-	-	-
<i>Stizostedionlucioperca</i>	pikeperch	*	-	-	36	*	*	1	-
Identified remains		-	17	-	343	-	-	17	-
Unidentified Cyprinidae		-	8	-	-	-	-	-	-
Unidentified Teleostei		-	123	-	237	-	-	157	4
Total		600	148	370	580	-	-	174	8

* qualitative estimation, but not quantitative estimation.

2. Domestic and wild birds

Species of **domestic birds** identified are *Gallus domesticus*, *Anserdomesticus*, *Columba* sp. (Figure 3).

Identified **wild birds** are: *Cygnus olor*, *Corvusmonedula*, *Corvusfrugileus*, *Phalacrocoraxcarbo*, *Haliaeetusalbicilla*, *Perdixperdix*, *Fulicaatra*, *Aegypiusmonachus* (Figure 3). For other two species (wild goose and wild duck) from the sample at Piatra Frecăței the determination is not certain, but definitely the two species were hunted in that period.

The Black vulture (*Aegypiusmonachus*) is nowadays a perished species in the fauna of our country. This species has already disappeared from Cyprus, Italy, Republic of Moldova and Slovenia. The first sign of this species in an archaeological site in Romania was at Oltina. The ecological conditions of Dobruđa constituted a very good habitat for this species (Gal *et al.*, 2010).

The analysis of the remains of the birds from the sample at Piatra Frecăței (Gal ms) and Dinogetia (Gal, 2011) highlighted the presence of some species which are in danger nowadays, as *Haliaeetusalbicilla* (white-tailed eagle), and some others strictly protected by the law: *Cygnus olor* and *Cygnus cygnus* (mute swan and whooper swan), *Pelecanusonocrotalus* (white pelican), *Phalacrocoraxcarbo* (Cormorant), *Aquila pomarina* (lesser spotted eagle).

Figure 3. Species of birds identified on samples (NISP).

Species	Common name	Oltina	Piatra Frecăței	Dumbrăveni	Isaccea	Hârșova	Capidava	Dinogetia
<i>Cygnus olor</i>	Mute swan	-	7	-	-	-	-	3
<i>Cygnus cygnus</i>	Whooper swan	-	-	-	-	-	-	4
<i>Cygnus olor</i> /C.cygnus	Mute swan/	-	-	-	-	1	-	4

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	Whooper swan							
<i>Corvusmonedula</i>	Jackdaw	1	-	-	-	-	-	1
<i>Corvusfrugileus</i>	Rook	-	2	-	-	-	-	-
<i>Corvuscorone</i>	Hooded crow	-	-	-	-	-	-	14
<i>Phalacrocoraxcarbo</i>	Cormorant	-	1	-	-	-	-	-
<i>Haliaeetusalbicilla</i>	White-tailed eagle	-	1	-	-	-	-	3
<i>Perdixperdix</i>	Partridge	1	-	-	-	-	-	-
<i>Fulicaatra</i>	Coot	-	2	-	-	-	-	1
<i>Aegypiusmonachus</i>	Black vulture	1	-	-	-	-	-	-
<i>Podicepsristatus</i>	Great crested grebe	-	-	-	-	-	-	3
<i>Pelecanusonocrotalus</i>	White pelican	-	-	-	-	-	-	2
<i>Anasplatyrhynchos</i>	Mallard	-	-	-	-	-	-	6
<i>Anasacuta</i>	Pintail	-	-	-	-	-	-	1
<i>Aquila pomarina</i>	Lesser spotted eagle	-	-	-	-	-	-	1
<i>Accipiter gentilis</i>	Goshawk	-	-	-	-	-	-	2
<i>Larusfuscus</i>	Lesser black-backed gull	-	-	-	-	-	-	1
<i>Garrulusglandarius</i>	Jay	-	-	-	-	-	-	1
<i>Anserdomesticus</i>	Domestic goose	7	-	1	-	13	4	46
<i>Gallus domesticus</i>	Domestic hen	64	61	29	9	70	32	61
<i>Columba</i> sp.	Pigeon	-	-	1	-	-	-	-
<i>Anserdomesticus</i> / <i>A. anser</i>	Domestic goose / Grey-lag goose	-	10	-	-	-	-	-
<i>Anasdomestica</i> / <i>A. platyrhynchos</i>	Domestic duck / Mallard	-	2	-	-	-	-	-
Caradriidae	-	-	-	1	-	-	-	-

3. Domestic and wild mammals

Identified species of **domestic mammals** are: *Bostaurus* (cattle), *Ovisaries/Capra hircus* (sheep/goat), *Sus scrofadomesticus* (pig), *Equuscaballus* (horse), *Equusasinus* (donkey), *Canisfamiliaris* (dog), *Felisdomesticus* (cat), *Camelus* sp. (camel). The camel was identified in the sample at Isaccea; it was also met at Dinogetia (9th-12th centuries) (Gheorghiu, Haimovici, 1965).

The most remains belong to domestic and wild mammals, which suggest the importance of two activities in these settlements: hunting and breeding of animals. The share of domestic mammals' remains exceeds 90%, of the total identified mammals, in six settlements (Dumbrăveni, Oltina, Capidava, Isaccea, Hârșova), suggesting the importance of animal husbandry in these communities. Hunting had a reduced importance for these settlements. The situation is different in the case of the settlement at Piatra Frecăței, where domestic mammals represent 57%, and the wild

ones 43%, which suggest the two occupations were equally important for this community.

Within the framework of domestic mammals, the cattle occupy the first place among the six settlements (Oltina, Capidava, Isaccea, Hârșova, Piatra Frecăței, Nufăru) and their share varies from 32.7% at Piatra Frecăței until 58.7% at Nufăru. On the second place there are the sheep/goat - at Capidava (23.8% NISP), Isaccea (24.5% NISP) and Nufăru (9.76%) and pig - at Oltina (28.5%) and Hârșova (27.5%); at Piatra Frecăței sheep/goat and pig have a very close proportion (11.6%, 10.9% respectively) (Figure 4).

At Dumbrăveni the sheep/goat are on the first place, with a share of 55.2% (of the total of remains attributed to mammals), followed by cattle (18.6% NISP).

The horse has a variable share as number of remains in the frame of samples, ranging from 0.8% at Hârșova and Piatra Frecăței, until 6.3% at Dumbrăveni. Remains of horses were identified in all seven samples.

The dog and the cat were unimportant in the food economy of the studied settlements; the percentage of dog remains varies from 0.35% at Piatra Frecăței until 2.51% at Dumbrăveni. Cat remains were found in four settlements: Dumbrăveni, Isaccea, Piatra Frecăței and Nufăru.

The list of **wild mammals** is long enough, 13 taxa being identified: *Cervuselaphus* (red deer), *Sus scrofaferus* (wild boar), *Capreoluscapreolus* (roe deer), *Bosprimigenius* (aurochs), *Lepuseuropaeus* (hare), *Castor fiber* (beaver), *Vulpesvulpes* (fox), *Canis lupus* (wolf), *Melesmeles* (badger), *Martes* sp. (marten), *Lutralutra* (otter), *Mustelanivalis* (least weasel) and *Citelluscitellus* (ground squirrel). The number of wild mammal species varies: 4 taxa at Nufăru, 6 taxa in the samples from Dumbrăveni, Oltina, Capidava and Hârșova and 9 taxa at Isaccea.

The favourite for hunting were the red deer, the wild boar and the roe deer, these three species being identified in all seven settlements. In all settlements, except that of Piatra Frecăței, the share of these species is reduced, for the red deer varying between 2.6% and 3.5% and in the case of the wild boar between 1.8% and 3.7%. At Piatra Frecăței the situation is different, the red deer and the wild boar having a very high proportion, 25% for the red deer and 17% for the wild boar.

The aurochs was identified at Isaccea, Piatra Frecăței and Dinogetia. The beaver was identified in five out of the seven samples,

missing in Dumbrăveni and Nufăru. In the sample from Dinogetia (Gheorghiu, Haimovici, 1965) was also identified a skeletal remain of *Alcesalces*(elk).

Hunting of large size species prevailed, contributing to the supply of meat nourishment.

The red deer is nowadays a species spread mainly in the Carpathians and other two species, the aurochs and the beaver had disappeared from our country's fauna. At the beginning of the 2nd millennium these species were still met in Dobrudja, but in the course of the last centuries, due to the clearance of the forests and the hunting, they have disappeared from this area.

Figure 4. Quantification of the mammal remains (NISP - number of identified specimens).

Species	Dumbrăveni		Olina		Căpânda		Isaceca		Hârșova		Piatra Frecăței		Nufăru	
	NISP	%	NISP	%	NISP	%	NISP	%	NISP	%	NISP	%	NISP	%
<i>Bostaurus</i>	37	18.6	384	40.85	523	50.88	3699	53.69	303	43.41	636	32.72	319	58.75
<i>Ovisaries/Capra hircus</i>	110	55.28	152	16.17	245	23.83	1689	24.51	137	19.63	226	11.61	53	9.76
<i>Sus scrofa domestica</i>	16	8.08	268	28.51	172	16.73	634	9.2	192	27.51	214	10.99	17	3.13
<i>Equus caballus</i>	13	6.35	41	4.36	15	1.46	95	1.38	6	0.86	17	0.87	15	2.76
<i>Equus asinus</i>	1	0.5	1	0.11	1	0.1	7	0.1	-	-	2	0.1	-	-
<i>Canis familiaris</i>	5	2.51	34	3.62	6	0.58	207	3	3	0.43	7	0.36	59	10.87
<i>Felis domestica</i>	1	0.5	-	-	-	-	77	1.12	-	-	2	0.1	1	0.18
<i>Camelus sp.</i>	-	-	-	-	-	-	1	0.01	-	-	-	-	-	-
Total domestic mammals	183	91.96	880	93.62	962	93.58	6409	93.02	641	91.84	1104	56.75	464	85.45
<i>Cervus elaphus</i>	6	3.02	33	3.51	27	2.63	223	3.24	20	2.87	488	25.06	17	3.13
<i>Sus scrofa ferus</i>	3	2.01	17	1.81	28	2.72	216	3.13	26	3.72	331	17	60	11.05
<i>Capreolus capreolus</i>	4	1.51	4	0.43	8	0.78	14	0.2	7	1	11	0.56	1	0.18
<i>Bos primigenius</i>	-	-	-	-	-	-	12	0.17	-	-	1	0.05	-	-
<i>Lepus europaeus</i>	1	0.5	3	0.32	1	0.1	10	0.15	-	-	3	0.15	-	-
<i>Castor fiber</i>	-	-	2	0.21	1	0.1	2	0.03	1	0.14	5	0.26	-	-
<i>Vulpes vulpes</i>	-	-	1	0.11	-	-	2	0.03	2	0.29	3	0.15	-	-
<i>Canis lupus</i>	-	-	-	-	-	-	-	-	-	-	1	0.05	1	0.18
<i>Meles meles</i>	-	-	-	-	1	0.1	-	-	-	-	-	-	-	-
<i>Martes sp.</i>	-	-	-	-	-	-	1	0.01	1	0.14	-	-	-	-
<i>Lutra lutra</i>	-	-	-	-	-	-	1	0.01	-	-	-	-	-	-
<i>Mustela putorius</i> ?	1	0.5	-	-	-	-	-	-	-	-	-	-	-	-
<i>Citellus citellus</i> ?	1	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Total wild mammals	16	8.04	60	6.38	66	6.42	481	6.98	57	8.16	843	43.25	79	14.55
Total mammals	199	100	940	100	1028	100	6890	100	698	100	1947	100	543	100

As a minimum number of estimated individuals, the percentages of the main domestic species are much closer. The share of domestic cattle is between 20% at Nufăru and Piatra Frecăței and 37.5% at Capidava, occupying the first place in these samples, too. The sheep/goat (*Ovisaries/Capra hircus*) have a proportion between 15.3% (at Piatra Frecăței) and 29.2% (at Isaccea); in the sample at Isaccea, they have the highest frequency (as number of estimated individuals), outrunning the cattle and the domestic swine. The percentage of pig varies between 5.7% (at Nufăru) and 29.4% (at Oltina); at Oltina the pig outrun the cattle and sheep/goat, having the highest frequency among mammals (Figure 5).

Figure 5. Quantification of the mammal remains (MNI - minimum number of individuals).

Species	Oltina		Capidava		Isaccea		Hârșova		Piatra Frecăței		Nufăru	
	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%
<i>Bostaurus</i>	16	23.53	33	37.5	104	27.44	8	21.62	33	20.25	7	20
<i>Ovisaries/Capra hircus</i>	11	16.18	21	23.86	111	29.29	7	18.92	25	15.34	6	17.14
<i>Sus scrofa domestica</i>	20	29.41	20	22.73	62	16.36	9	24.32	27	16.56	2	5.71
<i>Equus caballus</i>	4	5.88	4	4.55	13	3.43	1	2.7	3	1.84	1	2.86
<i>Equus asinus</i>	1	1.47	1	1.14	4	1.06	-	-	1	0.61	-	-
<i>Canis familiaris</i>	5	7.35	2	2.27	15	3.96	2	5.41	2	1.23	7	20
<i>Felis domesticus</i>	-	-	-	-	6	1.58	-	-	1	0.61	1	2.86
<i>Camelus sp.</i>	-	-	-	-	1	0.26	-	-	-	-	-	-
Total domestic mammals	57	83.82	81	92.05	316	83.38	27	72.97	92	56.1	24	68.57
<i>Cervus elaphus</i>	4	5.88	5	5.68	18	4.75	2	5.41	35	21.47	2	5.71
<i>Sus scrofa ferus</i>	3	4.41	6	6.82	24	6.33	3	8.11	27	16.56	7	20
<i>Capreolus capreolus</i>	1	1.47	3	4.41	6	1.58	2	5.41	3	1.84	1	2.86
<i>Bos primigenius</i>	-	-	-	-	6	1.58	-	-	1	0.6	-	-
<i>Lepus europaeus</i>	1	1.47	1	4.41	4	1.06	-	-	2	1.23	-	-
<i>Castor fiber</i>	1	1.47	1	4.41	1	0.26	1	2.7	2	1.21	-	-
<i>Vulpes vulpes</i>	1	1.47	-	-	2	0.53	1	2.7	1	0.6	-	-
<i>Canis lupus</i>	-	-	-	-	-	-	-	-	1	0.6	1	2.86
<i>Meles meles</i>	-	-	1	4.41	-	-	-	-	-	-	-	-
<i>Martes sp.</i>	-	-	-	-	1	0.26	1	2.7	-	-	-	-
<i>Lutra lutra</i>	-	-	-	-	1	0.26	-	-	-	-	-	-
Total wild mammals	11	16.18	17	7.95	63	16.62	10	27.03	72	43.9	11	31.43
Total mammals	68	100	88	100	379	100	37	100	164	100	35	100

In archaeozoological studies, slaughter age estimation can lead to assessments of methods of management and control of animal

populations. Ageestimation was based on replacement of milkteeth with the permanent teeth and the wear degree of permanent teeth. Slaughtering varies in different communities.

In the case of cattle, mature animals were preferred for slaughter (older than 2.5 years), which indicated the fact that the cattle were mainly exploited for secondary products and only in the end for primary ones; at Oltina, Piatra Frecăței, most individuals were slaughtered between 4 to 6 years old: 44.4% at Oltina, 40.7% at Piatra Frecăței; at Hârșova the situation is different, the percentage of slaughtered young animals being higher: 42.8% slaughtered before 2.5 years old, 28.5% between 2.5 to 4 years old. At Isaccea almost half of the individuals were slaughtered between 2.5 to 4 years old.

The percentage of immature sheep/goat (slaughtered until 2 years old) is slightly higher than that of mature ones: at Oltina 54.5% immature specimens, at Piatra Frecăței 56.2% immature ones, 62.9% immature ones at Isaccea; at Hârșova the percentage of immature animals is smaller (41.4%).

In the studied settlements, the percentage of slaughtered pigs before maturity (before 2 years old) is bigger than that of mature ones, which indicates that pigs were mainly exploited for primary products and only a few were kept for reproduction. At Piatra Frecăței and Oltina the percentage of slaughtered pigs before 2 years old is of 70%, at Hârșova of 66.6%, at Isaccea 64.7%.

Conclusions

The most important activity was that of animal husbandry in the case of six settlements; at Piatra Frecăței hunting had a higher percentage. Among domestic mammals, for six settlements the highest frequency (as number of remains) belongs to cattle (*Bostaurus*) and for the settlement at Dumbrăveni to sheep/goat (*Ovisaries/Capra hircus*), followed by cattle.

Between wild animals, the red deer (*Cervuselaphus*), the wild boar (*Sus scrofaferus*) and the roe deer (*Capreoluscapreolus*) appear in all samples, the first two having the highest share. The aurochs (*Bosprimigenius*) and the beaver (*Castor fiber*) lived in the 2nd millennium in Dobrudja; today they cannot be found anymore. The red deer has reduced a lot in time its areal spreading because of the forest clearance and is to be found today only in the Carpathian area.

Between the species of wild birds, the black vulture (*Aegypiusmonachus*) had disappeared in the fauna of our country and others - the white-tailed eagle (*Haliaeetusalbicilla*), the swan (*Cygnus cygnus* and *Cygnus olor*), the pelican (*Pelecanusonocrotalus*), cormorant (*Phalacrocoraxcarbo*), the golden eagle (*Aquila pomarina*) are currently species strictly protected by the law.

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Simina Stanc, Luminița Bejenaru
“Alexandru Ioan Cuza” University, Faculty of Biology, Iași (Romania)
siminams@yahoo.com, lumib@uaic.ro

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