

FAUNA IDENTIFIED SUBSEQUENT TO RESCUE EXCAVATIONS PERFORMED AT "CENTRAL" SHOPPING CENTER-DEVELOPMENT¹

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Abstract: This study is an archaeozoological investigation carried out on an animal bone sample collected in occasion of the archaeological discharge excavations performed on Cotită St., in Cluj-Napoca. The excavations revealed Roman, 11th-12th centuries and 17th-18th centuries remains. The analysis of the archaeofaunal remains was made separately, according to the layers of archaeological material suggested by the archaeologists. The largest sample dates to the Roman period (over 2000 bone fragments), while the other two samples are small, consisting of a few hundred bones (1-2).

This article attempts, based on the available data resulting from the three different inhabitancy levels, to present a comparative view of the means by which the specificities of the archaeofaunal sample vary over time on the same surface unit, as well as to make a brief and comparative approach (in the case of the Roman period sample) of the contemporary sites studied from archaeofaunal view.

Keywords: Archaeozoology; animal bones; archaeofaunal sample; Roman period; animal species; animal economy.

Rezumat: Studiul de față este o investigație de tip arheozoologic făcută pe un eșantion de oase de animale recoltate cu prilejul săpăturilor de descărcare arheologică făcute pe strada Cotită, în Cluj-Napoca. Săpăturile au scos la iveală resturi ale perioadei romane, ale secolelor XI-XII și ale secolelor XVII-XVIII. Analiza resturilor arheofaunale a fost făcută separat, în funcție de straturile de material arheologic indicate de către arheologi. Eșantionul cel mai mare este cel de epocă romană (peste 2000 de fragmente osoase), pentru ca celelalte două eșantioane să fie mici, constituite din câteva sute de oase (1-2).

Articolul de față încearcă, în baza datelor disponibile reieșite din cele 3 nivele de locuire diferite, o privire comparativă a modului în care caracteristicile eșantionului arheofaunal variază în timp pe aceeași unitate de suprafață, ca și o scurtă abordare comparativă (pentru eșantionul de epocă romană) cu situri contemporane studiate din această perspectivă arheofaunală.

Cuvinte-cheie: Arheozoologie; oase de animale; eșantion arheofaunal; epoca romană; specii animale; economie animală.

Introduction

Osteoarchaeology (archaeozoology) known in Romania as paleofaunistics or zooarchaeology is a science directed to the study of animal remains discovered in archaeological sites.

The aim of archaeozoology is to provide a meaning and a better understanding of the relations between humans and the environment, especially between human

¹ Material drafted during 2007-2008 (unpublished at the time) and shortly reviewed in 2012.

populations and other animal populations, supplying data referring to the morphological features of the identified animals as well as accurate data on the means these species were exploited by the ancient populations.

Data on the material origin

The analysed bone material comes from the archaeological excavations carried out in the back of "Central" shopping center in central Cluj-Napoca city (Cotită street). These excavations were required due to the extension of the commercial spaces in the above shopping center and were integral part of an archaeological discharge agreement entered with the archaeologists of "Babeş-Bolyai" University.

The archaeological excavations revealed parts of two Roman buildings and a part of an inner courtyard, overlapped by other two inhabitancy levels, one dating to the 11th-12th and the other to the 16th-17th centuries².

Method

The bone material cleaned on the collection spot was taken from storage and transported to the Comparative Anatomy Laboratory of the Faculty of Veterinary Medicine in Cluj-Napoca.

The analysis consisted in separating the bones according to anatomical features and the removal of the unidentifiable fragments, followed by the identification of the species by anatomical examinations³. The bones were allotted to the limb they pertained to (in order to determine the minimum number of individuals).

We took notes concerning human processing prints⁴ in the case of fragments exhibiting cutting tool traces. Age estimations were carried out by both the analysis of bone epiphysation stage⁵ as well as by dental eruption and wear⁶. Measurements were taken via the standard measurements used in osteometry⁷. In addition, where made possible by the material, we recorded the so-called sub-pathological conditions providing information on the use of some of the species for labour purposes⁸.

Results

The analysis results shall be described separately, according to the dating of the examined samples.

² We wish to thank herein lecturer Alexandru Diaconescu for the kindness of having provided us with the material for analysis and also for the supplied information.

³ Gheție 1971; Schmid 1972, 75; Hillson 1992; Popovici et alii 1995.

⁴ Lauwerier 1988, 23-78.

⁵ Schmid 1972, 75.

⁶ Grant 1985; Udrescu, Bejenaru, Hrișcu 1999.

⁷ Desse, Chaix, Desse-Berset 1986.

⁸ Bartosiewicz, van Neer, Lentacker 1997, 45-270.

Roman period sample

It represents the largest part of the material under analysis. The examined bones belong to the following species:

Large ruminants

Bone	Right limb	Left limb	Uncertain
Scapula	12	11	3
Metacarpals	2 complete 7 pe 4 de	3 complete 14 pe 1 de	11 de
Metatarsals	7 de 7 pe 1 complete	4 de 2 pe 1 diaf	12
Humerus	3 pe 5 de	3 pe 7 de	2 diaf
Radius	7 pe 3 de	9 pe 5 de	2 de
Ulna	2	6	
Coxal bone			20
Femur	5 pe 1 de 3 diaf	4 pe 3 de 1 diaf	3 3 diaf
Patella			2
Tibia	4 pe 5 de 1 de Cervus	1 pe 3 de	3
Calcaneus	5	4	
Astragalus	1	7	
Cuboscafoïd	1	1	
Mandible	10 symphyseal parts 5 articulatory parts 15 mandibular ramus	5 symphyseal parts 5 articulatory parts 14 recurved parts 10 mandibular ramus	
Vertebrae	Atlas-9 Axis-9 Cervical vert 28 Thoracic vertebrae 44 Lumbar vertebrae 7		
Ribs			243
Maxilla	9	11	8
Neurocranium	47 25 horn core (6R,6L)		
Splanchnocranium	9 incisor		
Phalanx I	31		
Phalanx II	11		
Phalanx III	3		
Teeth	64 M-PM		

Bone	Right limb	Left limb	Uncertain
Unidentified	9 mc-mt		
	pe-proximal epiphysis, de- distal epiphysis		

Scapula

The identified fragments are mostly parts of articular angle, reason for which more detailed measurements of the articular parts were possible. Concurrently, based on the specific morphological elements, we could identify with most certainty a fragment that belonged to species *Cervus elaphus*, while other two supposedly originated in the same species⁹.

Part	4	6	7
R Cervus?	45	46	41
R Cervus	35	42	39
R	58	61	56
R	57	60	54
R	62	62	55
R Cervus?	35		
R	45		
R		58	54
R		59	
R		45	
L	54	57	48
L		49	40
L			44
L	54	56	49
L	58		
L	70	71	58
L	52	58	46
L	51		

4-minimum AP diameter of the colum
5-AP diam in the articular process
6-AP diam glenoid cavity

Most of the fragments exhibited chop marks at the level of the scapular spine, resulting in the spine severing, and the cut off of the edges of the articular angle or even in the articular surface removal.

Humerus

The proximal parts of the identified humeri provided no metrical data. The ossification stage may be estimated only in the case of 2 fragments, evidence for origin in 2 specimens over 3.5-4 years of age. In the case of one fragment, we could note ossification “just barely”, evidence of age close to the above mentioned value. Commonly, proximal fragments represent detachment or rupture of the articular head, which hinders the accurate estimation of the epiphysation stage.

⁹ Prummel 1988, 3-52.

More data are offered by the diaphyseal and distal epiphyseal parts. They allow the identification of a minimum number of 7 specimens over 1.5 years of age (distally completed ossification)¹⁰ and provide certain partial metrical data as well.

Part	3	4
R	76	
R	83	
L	67	
L	81	
L	78	36

3-distal epiphysis breadth
4-minimum diaphysis breadth

Radius

There are two almost complete fragments of the left limb. One of them is not distally ossified, lacking the distal epiphyseal fragment. It evidences origin in a specimen aged between 1.5 and 3.5 years old. Another complete fragment, almost distally ossified, points to a specimen of 3.5-4 years of age¹¹. This single fragment also allows size recalculation. The obtained value¹² is 149 cm.

Proximal epiphysis fragments are completely ossified, evidence of origin in specimens over 1-1.5 years of age¹³. Some of them exhibit chop marks, which resulted in the severing of either the lateral articular surface or the lateral tuberosity.

The identified distal epiphysis fragments are ossified, evidence of origin in specimens over 3.5-4 years of age¹⁴. Cut marks were identified in this case too, both at the lateral side level of the distal epiphyseal part as well as on the connection to the cranial side of the extremity.

Ulna

Ulna fragments are largely olecranal. Most often, the tuberosity is noticeably cut off as a result of meat removal. The ossification stage of the tuberosity evidences origin of the fragments in specimens over 3.5-4 years of age, except for a fragment with an obvious unossified tuberosity, pointing to younger age¹⁵.

This segment is of no interest from the metrical data point of view, yet it is obvious that from gross size estimation standpoint, one may establish two categories: smaller fragments and robust fragments (poorly represented numerically).

¹⁰ Schmid 1972, 75.
¹¹ Schmid 1972, 75.
¹² Kokabi 1982, 75, 5-167.
¹³ Schmid 1972, 75.
¹⁴ Schmid 1972, 75.
¹⁵ Schmid 1972, 75.

Metacarpals

Part	1	2	3	4	6	9	10
		(4)	(5)	(6)	(9)		
R	178	56	35	31	58	F	1123
R	222	65	40	36	68	M	1489
R		57	36				
R		63	36			M?	
R		51	31				
?					70		
?					64		
?					66		
?					62		
?					65		
?					64		
?					62		
?					54		
?					54		
?					52		
?					46		
L	190	51	31	29	52	F	1198
L	185	50	31	26	50	F	1167
L	185	50	29	26	51	F	1167
L		57	34				
L		54	32				
L		60	35				
L				40			
L		64	37			M?	
L		54	32	31			
L		56	34				
L		54	34				
L		52	32				
R Cervus		44	25				

1-maximum length

2-proximal epiphysis breadth

3-maximum proximal antero-posterior diameter

4-minimum diaphyseal breadth

6-distal epiphysis breadth

9-presumed gender

10-height (see Boessnek 1971, 270)

The identified metacarpal fragments are largely coming from adult specimens. Distal epiphyseal parts are ossified, evidence of origin in a minimum 9 specimens over 2-2.5 years of age. The single clues concerning younger animals are provided by 4 distal fragments of the left limb distally unossified, indicator of minimum 4 specimens under 2 years of age.

Due to the proximal epiphysis fragments, the estimation of the minimum number of specimens based on this skeletal segment rises to 14.

Noticeably, these fragments exhibited no sub-pathological aspects specific to animal draught¹⁶ and many of them showed cut marks.

¹⁶ Bartosiewicz, van Neer, Lentacker 1997, 189.

Only a single identified fragment was assigned with certainty to species *Cervus elaphus*¹⁷.

Gender discrimination was made based on diaphyseal and epiphyseal index values (where possible) and on more complex graph methods targeting comparative metrical aspects (in the case of several Roman period sites). Thus, we may argue that a complete fragment comes from a male and the rest of the complete fragments come from females. In the case of the graph representation, other two males may be supposed based on the metrical data of the proximal epiphysis.

Height estimation was possible in the case of 5 complete bones - those of the right limb provided the height for 1489 (male) and 1123 (females) and those of the left limb, the values of 1198 respectively 1167 mm (all females)¹⁸.

Femur

Proximal femoral fragments are represented by articular and nonarticular parts. Most exhibit complete ossification, evidence of origin in specimens over 3.5 years of age¹⁹. One of the left limb fragments, massive, still unossified, belongs to a specimen younger than 3.5 years of age. The identified distal fragments (the distal breadth of 2 fragments is of 95 mm) cannot but to confirm the supposition that minimum 3 specimens (of the estimated 5) over 3.5-4 years of age²⁰ existed.

No chop marks were noticed on these fragments.

Tibia

Proximal tibial fragments come from 4 specimens over 3.5-4 years of age²¹.

The identified distal tibial fragments come from a minimum 5 specimens of *Bos taurus* over 2 years of age²². A single fragment was identified as certainly coming from a *Cervus elaphus* specimen²³.

Notably, some of the fragments exhibited burning traces.

Part	1	2	3	4
L		72		
R cervus		53		34
R		60		
R		60		
R		60		
R	85			39
L	84			
R	84			

1-proximal epiphysis breadth
2-distal epiphysis breadth

3-maximum length
4-minimum diaphyseal breadth

¹⁷ Prummel 1988, 3-52.
¹⁸ Boessnek et alii 1971.
¹⁹ Schmid 1972, 75.
²⁰ Schmid 1972, 75.
²¹ Schmid 1972, 75.
²² Schmid 1972, 75.
²³ Prummel 1988, 3-52.

Tarsals

There were identified 5 right limb and 4 left limb calcanei. The ossified calcaneal tuberosity in all 5 calcanei of the right limb points to 5 specimens over 3 years of age. A single left limb fragment had unossified tuberosity, evidence of origin in a specimen younger than 3.5 years of age²⁴.

Typical meat removal traces were noted, some of the fragments having the calcaneal tuberal portion cut off.

Part	1
R	132
L	123

1-maximum length

Astragali (counting 8, 7 of the left limb and 1 of the right limb) could be measured, being not very decayed.

Part	1	2
L	71	65
L	61	56
L	64	59
L	66	61
L	56	51
L	58	54
L	56	52
R	74	70

1-maximum external length
2-maximum internal length

The morphological features of species *Cervus elaphus* were not identified.

The identified cuboscafoids are rather small in size and they might belong to species *Cervus elaphus*, however for the lack of specific diagnosis elements they were assigned to the general group of large ruminoids.

Metatarsals

The identified metatarsal fragments were entirely assigned to species *Bos taurus*, lacking other morphological aspects leading to the estimation of different species. One may determine that the distal epiphysis fragments come from a minimum 8 specimens over 2-2.5 years of age²⁵.

Part	1	2	3	4	5	6	9	10
L				28		56		
L						56		
L						56		

²⁴ Schmidt 1972, 75.
²⁵ Schmid 1972, 75.

L				23	48		
L		49	48	34			
L		42	40	32			
R	244	57	52	30	63	m	1464
R				21	47		
R					60		
R					62		
R					48		
R				30	54		
R				29	55		
R					56		
R		36	38				
R		44	44				
R		45	44				
R		42	40				
R		45	43				
R		53	49				
R		52	49				
1-maximum length				5-minimum diaphyseal antero-posterior			
2-proximal epiphysis breadth				diameter			
3-maximum proximal antero-				6-distal epiphysis breadth			
posterior diameter				9-presumed gender			
4-minimum diaphyseal breadth				10-height (see Boessnek 1971, 270)			

Height may be recalculated for the single complete bone identified. We suppose it comes from a male specimen, whose recalculated height is of 146 cm.

Noteworthy, sub-pathological signs specific to draught animals²⁶ were not visible at the level of the distal metatarsals and only a small number of fragments exhibited cut marks on their surface.

Phalanxes

A rather large number of phalanxes were identified, however data of certain significance are provided by the proximal phalanxes. Noticeably, among these fragments, we suppose the existence of minimum 3 fragments that pertain to species *Cervus elaphus*.

	1	2
	65	28
		28
	52	21
		26
	56	25
Cervus	65	18
Cervus?	54	20
Cervus?	53	20
	55	24
	56	27

²⁶ Bartosiewicz, van Neer, Lentacker 1997, 89.

59	26
56	22
	22
65	28
55	22
63	25
63	28
65	31
66	33
67	29
63	28
55	28
57	27
65	27
62	28
62	26
62	24
67	26
64	25
64	28
61	24

1-maximum length

2-minimum diaphyseal breadth

Cranium

The fragments identified as neurocranium parts come largely from periorbital and cranium base parts. One should not neglect the rather large ratio of frontal bone fragments. Often, cuts are noticeable (most likely made by a saw) on the horn core for detachment from the skull.

Horn core parts (12) could be measured at base. Data are illustrated in the table below:

	1	2
R	59	47
R	45	38
R	57	51
R	53	45
R	67	52
L	55	44
L	75	54
L	54	40
L	56	41
L	52	38
L	55	44
	71	60
	38	35
	67	52
	40	32

54	45
44	35
57	44
53	35
43	38

1-anteroposterior diameter

2-lateral diameter

Unfortunately, the lack of consistent comparative data allows no hazardous estimations on horn types. It is though certain that the flattening index is rather broad in variation, ranging from 92 to 66, with values predominantly placed in the 75-85 interval. Additionally, it was noted that very small-sized fragments were present beside large, massive fragments, however such data could not be correlated with obvious morphological distinctions.

Maxilla

We chose to make a separate description of maxilla fragments since most often this category of bone fragments provides information on animal age classes by the presence of dental series and wear stages.

Since not all fragments have complete molar rows, age estimations were made by inclusion (where the material made it possible) upon age classes or by estimation of a minimum limit of animal age²⁷.

Part	Present dental element	Wear degree	2	Age class
L	PM3, M2	M2+/-	82	Over 2-2.5 a
R	PM3, M2	M2+/-		Over 2-2.5 a
L	PM3, M1, M2			2.5-3 a
L	PM1, PM2, PM3	PM3+		Over 2.5-3 a
L	M1, M2	Slightly worn		Over 1.5-2 a
L	PM1, PM2, PM3	Unworn		Over 2.5-3 a
L	M1, M2, M3		73	Over 2.5-3 a
L	M1			Over 2.5-3 a
L	PM2, PM3, M1, M2, M3	M3+/-	72	3.5-5 a
L	pM2, pM3, M1, M2, M3	M3 exiting		2.5-3 a
L	M1, M2, M3	M3+/-	82	3.5-5 a
L	M1, M2			Over 2.5 a
R	M1sM2	Unworn		Over 1.5-2 a
R	PM2, PM3, M1, M2, M3	M3 not reaching at level	81	2.5-3.5
R	M3	M3+/++		3.5-5 a
R	M1, M2, M3	M3+/-	79	2.5-3,5 a
R	M1, M2, M3	M3+/++		3.5-5 a
R	M1, M2, M3	M3+/++		3.5-5 a
R	PM2, PM3, M1			Over 2.5-3 a
R	M2, M3			Over 2.5-3a

²⁷ Grigson 1985, 7-19; Haimovici, Teodorescu 1995, 195-208.

Part	Present dental element	Wear degree	2	Age class
R	PM1-M3	M3+/-	70	2.5-3.5 a
R	M1sM2			Over 2-2.5 a

2-length of jugal teeth

Based on these fragments we estimated a minimum number of 11 specimens whose age upon sacrifice could be framed in the case of minimum 3 specimens in the 3.5-5 interval and for other 3 specimens in the 2.5-3 age interval, other 5 specimens remaining framed in the category over 2.5 years of age and another in the category over 1.5 years, whilst for the last two categories it was impossible to establish an upper limit.

Mandible

Mandibular fragments are in greater numbers and comprise rather complete dental series. In the case of these fragments also, we categorised the identified portions in 3 classes: mandibular ramus parts (the most important), articular angle parts and symphyseal parts.

In the case of mandibular ramus parts, we collected several metrical data like those referring to eruption and wear stages and estimated, based on their quality, either distinct age classes or minimum age limits²⁸.

Part	Present dental element	Wear degree	Estimated age	1 (7)	2 (8)	3 (9)	4 (18)	5 (17)	6 (16)	7 (10)	8 (11)
R	PM1-M3	M3+/-	2.5-3.5 a	132	61	70	42	51	78	35	14
R	M2, M3	M3++	5-7 a						67	40	16
R	PM3		2.5-3.5 a		86			56	84	38	16
R		M3 exiting	2-2.5						74		
R	PM3-M3	M3+, PM3 unworn	3.5-5 a		87			51	74	37	13
R	M1, M2		Over 2.5-3.5 a					64			
R	M1, M2		Over 2.5-3.5 a					44			
R	M3	M3+	3.5-5 a							38	14
R	M3	M3 unworn	2.5-3.5 a							32	14
R	M1-M3	M3++	5-7 a							38	16
R	PM2-M3	M3+/++	3.5-5 a		87					37	15
R	M2, M3	M3+	3.5-5 a								13
L	M1, M2		2.5-3.5 a		87						
	M3	M3 unworn	2.5-3.5 a							34	13
	PM1, PM2		Over 2-2.5 a						67		
	PM2-M1	Anomalies worn M1++	Over 2.5-3.5 a								
	M1-M3	M3+	3.5-5 a		87					36	15
	M2		Over 2.5-3 a							42	15
	M1-M3	M3+	3.5-5 a		85					36	16
	M1-M3	M3 unworn	2.5-3.5 a	139	86	55		48	70	36	13
	M1-M3	M3 unworn	2.5-3.5 a		84			48	73	36	11
	M3	M3 exiting	2.5-3								
	M3		Over 2.5-3 a							42	15

²⁸ Grigson 1985, 7-19; Haimovici, Teodorescu 1995, 195-208.

PM1-PM3	2.5-3
M1	Over 0.5 y
1-length of jugal teeth (by alveoli)	5-height of ramus before M1
2-molar length	6-height of ramus after M3
3-premolar length	7-M3 length (by the occlusal surface)
4-height of ramus before P2	8-M3 breadth (by the occlusal surface)

Based on the number of this segment fragments, one may estimate a minimum number of 14 specimens. Corroborated data regarding the eruption and dental wear for these segments allowed us to frame one specimen in the 2-2.5 age interval, minimum 5 in the 2.5-3.5 age interval, other 5 in the 3.5-5 age interval and minimum 2 in the 5-7 age interval. In addition, we estimated a minimum 4 specimens over 2.5-3.5 years of age, however their maximum age limit could not be established.

Chop marks made by knife or saw were noticeable on many of these fragments.

Vertebrae

Vertebral fragments are rather many, yet they provide few data for our analysis.

The identified cervical vertebrae are generally fragmentary. Ossified fragments predominate, however a rather large number of still unossified fragments were examined. In addition, sagittal or parasagittal sectioning was noticed.

The identified thoracic vertebrae (most numerous) are present by spinal apophysis parts, the majority broken at the level of the vertebral arch and by much less numerous fragments of vertebral body. The ratio between the ossified and unossified fragments is rather equal, indication of present specimens over and less than 7-8 years of age²⁹. Sagittal and parasagittal cuts on vertebrae were noted.

Capriovids

Bone	Right limb	Left limb	Uncertain
Coxal bone	2	2	5 paleta
Femur		3 pe 1 de	1 pe
Humerus	5 de	4 de	
Mandible	24 mandibular ramus 6 articular angle	9 mandibular ramus 3 articular angle	5 articular angle
Metacarpals	9, 3 Capra	12, 3 Capra	1
Metatarsals	5	6	2
Neurocranium	31, 1 Capreolus		
Radius	1 pe 1 de	1 pe	1 diaf
Ulna			
Scapula			
Calcaneus	2 Capriovids 1 Capreollus	2 Capriovids	
Astragalus	2	1	
Tibia	3	7	

²⁹ Schmid 1972, 75.

Vertebrae	1 axis		
	2 cervical		
	3 lumbar		
Phalanx I	1		
Maxilla	2	1	
Teeth	7 M-PM		
Ribs	164		

Scapula

The identified scapular fragments are mainly articular parts. Noteworthy is a small fragment, very porous, whose articular angle is missing, most likely due to the fact it belonged to a young specimen (1-2 months old). The other fragments appear with ossified glenoid cavity, evidence of origin in specimens over 4-5 months³⁰. Additionally, the morphological aspects show that at least one fragments comes from *Capreollus capreollus*. The rest of the fragments are assigned to the generic group of the capriovids.

The identified fragments do not exhibit obvious traces of cuts or processing.

Humerus

Distal humeral fragments are ossified, yet most often exhibit cut marks resulting in the rupture of the articular formations. The single clue provided by these segments is that of origin in specimens over 6 months old³¹. We could not identify species *Capra hircus* based on anatomical elements.

Radius

Only 3 fragments of this segment were identified, 2 of the right limb (proximal epiphysis, distal epiphysis) and one of the left limb (distal epiphyseal part).

Part	3	4	6
R		27	
L		28	
R	26		
3-distal epiphysis breadth			
4-proximal epiphysis breadth			
6-minimum diaphyseal breadth			
7-minimum diaphyseal perimeter			
8-distal articular side breadth			

Single determinations allowed concern the estimate age of a specimen - over 3.5 years of age (completed distal ossification)³². We could not make specific identifica-tions, bones being assigned to the capriovids group.

³⁰ Schmid 1972, 75.

³¹ Schmid 1972, 75.

³² Schmid 1972, 75.

Metacarpals

The identified metacarpal fragments come from a minimum number of 12 specimens. In the case of most of them the estimated age stage is that of mature-adult, young pieces being missing. The epiphyseal stage at distal level was noted in 5 fragments only, evidence of their origin in specimens over 18-24 months old³³.

Specific anatomical aspects³⁴ led to the certain³⁵ identification of 3 right limb and 3 left limb fragments of species *Capra hircus*, the rest belonging to species *Ovis aries*.

Part	1	2	4	6	7	8	12	13
R		26	18				C	
R		28	15				C	
R	117	27	17	29	17	10	C	67.2
R	155	26	16	29			O	75.1
R		27	15				O	
R		27	16				O	
R		25	16				O	
R		25	14				O	
R			17	29			O	
L		27	18				C	
L		27					C	
L			17				C	
L		27	16				O	
L		28	15				C?	
L		26	13				O	
L		26	14				O	
L		26	16				O	
L		26	16				O	
L		25	14				O	
L	134	25	14	28	16.4	11.5	O	64.9
L				29	17.4	12.4	O	
				28	17	12	O	

1-maximum length
2-proximal epiphysis breadth
4-minimum diaphyseal breadth
6-distal epiphysis breadth

7-depth medial verticillus = anteroposterior diameter of the medial verticillus
8-medial trochlear condylus depth = breadth of the medial condylus exterior part

12-gender/sex
13-height³⁶

According to the metrical data, we could recalculate height in the case of 3 fragments, of which one of *Capra*. The height for *Ovis* is of 75 and 64 cm and for *Capra* of 67 cm.

We mention that no chop marks are obvious on these fragments.

³³ Schmid 1972, 75.
³⁴ Boessnek 1969, 331-351.
³⁵ Prummel, Frisch 1986, 556-557.
³⁶ Boessnek 1971, 289.

Femur

Femoral fragments belong to the left limb mainly and frame in the generic group of the capriovids. They come from minimum 2 specimens over 3-3.5 years old (ossified proximal epiphysis) and another juvenile specimen (porous aspect). Another non-assigned fragment evidences the existence of another juvenile specimen³⁷. The only distal epiphyseal fragment could be measured at this level, having a distal breadth of 43 mm.

Metatarsals

Most of the identified fragments consist of diaphyseal and distal epiphyseal parts. Except for a single fragment, all are distally ossified, indication of origin in specimens over 18-24 months old³⁸. The previously mentioned fragment comes from a specimen estimated as neonate or, most likely, juvenile.

Part	1	2	4	6	12	13
R		25	14		O	
R		22	13		O	
R			14	27	O	
R	157		16		O	71.4
L			15	29	C?	
L		23	14		O	
L			13		O	
L		27	16		?	
L			14	23	O	
L	139	21	13	24	O	63.2
L	156	24	14	28	O	70.9

1-maximum length

2-proximal epiphysis breadth

4-minimum diaphyseal breadth

6-distal epiphysis breadth

12-gender/sex

13-height³⁹

In the case of one fragment we suppose origin in species *Capra hircus*, however the statement is still hypothetical, the rest of the fragments being assigned to species *Ovis aries*.

Based on total length, we recalculated the height in the case of 3 bones. Values are between 63 and 71 cm.

³⁷ Schmid 1972, 75.

³⁸ Schmid 1972, 75.

³⁹ Boessnek et alii 1971, 289.

Tibia

The identified distal epiphyseal fragments are assigned mostly to species *Ovis aries*, except for one left limb fragment which, most likely, comes from *Capra*⁴⁰. All specimens (7) have been estimated at over 15-18 months old⁴¹.

Part	1	2	3	4
		24		14
R		27		14
R		24		13
L Capra		32		20
L		26		15
L		27		16
		30		18
		27		
1-proximal epiphysis breadth				
2-distal epiphysis breadth				
3-maximum length				
4-minimum diaphyseal breadth				

Calcaneus

Of the 5 identified calcaneal fragments, one that belonged to the right limb was assigned to species *Capreollus capreollus*. The fragments assigned to sheep are not ossified at the tuberosity level, indication of an age less than 3 years old⁴². Notably, some of the fragments exhibit cut marks.

Cranium

Cranium fragments were divided into 3 broad categories - the “cranium base” fragments - occipital, parietal and temporal, including some fragments of horn core base, horn core and splanchnocranium parts (mostly maxilla fragments).

For the capriovids group we identified 16 cranium base fragments (including 4 periorbital fragments), all assigned to species *Ovis aries*.

Among horn core fragments are noticeable a horn fragment assigned to species *Capreollus capreollus* (in the second or third year of life) and 2 fragments assigned, most likely, to species *Capra hircus*.

Mandible

Predominant mandible elements were those of mandibular ramus (33 fragments). There were also identified fragments of articular parts (condyli, retrocondylian apophysis). Most consistent data are provided by the teeth at the level of the mandibular ramus - classification upon age categories (classes) or either minimum or maximum age limits upon death⁴³.

⁴⁰ Boessnek 1969, 331-351.
⁴¹ Schmid 1972, 75.
⁴² Schmid 1972, 75.
⁴³ Schmid 1972, 75; Haimovici, Teodorescu 1995, 195-208.

Notable is the presence of minimum 1 specimen of species *Capra hircus* among the identified fragments.

Part	Present dental element	Wear degree	Estimated age	1 (7)	2 (8)	3 (9)	4 (18)	5 (17)	6 (16)	7 (10)	8 (11)
R	PM1-M3	M3+	2-4 a	72	49	23	17	21	38	21	8
R		M3 growing	2-2.5 a								
R	M1-M3	M3 ++/+++	5-7 a		52				39	25	9
R	PM3-M3	M3++	4-5 a					25	41		
R	M2, M3	M3++								22	8
R	PM2-M3	M3-/+	2-3 a					22		23	7
R	PM3-M3	M3++	4-5 a		49			24		23	9
R Capra		M3 broken	Over 2.5-3 a								
R		M3 growing	2-2.5 years								
R	PM3-M3	M3+	2-4 a							21	8
R	M1, M2		Over 1 a								
R Capra?	M2, M3	M3-/+	2-3 a							23	9
R	PM3-M3	M3-/+	2-3 a							20	7
R	M1	M1 erupted	Over 6 months								
R	M1, M2		Over 1 a								
R	M1		Over 6 months								
R	pm		Under 6 months								
R	M3	M3+	2-4 years							24	9
L	PM1-M3	M3+	2-4 a	75	51	24	21	25	40	21	8
L	M1, M2		Over 1 year								
L	M1-M3	M3++	4-5 years								
L	pm-M1	M1 growing	6 months								
L		M3 growing	2 years								
L	M3		Over 2.5 years								
L	M2-M3	M3++	4-5 years							22	9
L	M2-M3	M3-/+	2-3 years							21	8
L	pm		Under 6 months								

1-length of jugal teeth (by alveoli)

2-molar length

3-premolar length

4-height of ramus prior P2

5-height of ramus prior M1

6-height of ramus past M3

7-M3 length (by occlusal surface)

8-M3 breadth (by occlusal surface)

Corroborated data referring to age result in the following age divisions: minimum 2 specimens in the 0-6 months interval, 8 specimens in the 2-4 years interval (of which minimum 5 in the 2-3 years interval), 3 specimens 4-5 years old and one in the 5-7 years interval. In addition, further minimum 4 specimens over 1 year were noted, however the upper age limit could not be established in these cases.

Maxilla

This category includes in fact splanchnocranium parts, which includes the upper dental series (incisor bone parts, palatine bone included and so on). The number of these fragments is much smaller (only 3 parts), yielding only a few age-related data. Thus, in the case of one fragment coming from species *Capra hircus* we estimated an age of approximately 2 years, for another (right side), an age of 2 years and one of 4–5 years.

Swine

Bone	Right limb	Left limb	Uncertain
Coxal bone			5
Denture	3 dogs <i>Sus ferrus</i>		
Femur			1 pe
Humerus	2	6	
Mandible	10 mandibular ramus	14 mandibular ramus	1 simphysis
Maxilla	7	9	
First metacarpals	3 mc III 1 mc IV	1 mc III 2 mc IV	
Secondary metacarpals			
First metatarsals	3 mt III 3 mt IV	4 mt IV	
Radius	1 pe		3 diaf
Scapula	7	5	
Tibia	4 de 2 pe	3 de 1 pe	2 diaf
Ulna	3	7	
Phalange	1 prox		
Astragalus	1		
Vertebrae	4 atlas Cervical Vert -3 Lumbar 3		

Scapula

The identified fragments preserve the articular angle, whose ossification is completed. The porous aspect of the fragments pleads for their origin in young specimens (5 of the 7 estimated specimens based on the frequency of this skeletal segment), whose age may be estimated to a few months. Resulted metrical data are rendered in the table below:

Part	4	6	7
L	23	30	22
L	26		24
L	24		
L	23		
L	21		
R	25	28	24

R	27	28
R	21	
4-antero-posterior diameter of the collum		
6-antero-posterior diameter of the glenoid cavity		
7-diameter		

Most of the fragments exhibit cut marks at the level of the scapular spine, some of them resulting in severing the spine tuberosity as well as the cut off of the supraglenoid tuberosity.

Humerus

Distal part fragments are all calcified, indication of their origin in specimens over 6 months. Morphological features as well as size aspects point with certainty to a fragment coming from the wild species (boar *Sus scrofa ferrus*)⁴⁴.

Part	3	4
R	36	
L		15
L	35	
L	36	16
L	38	
L	38	
L	38	
L S.s.ferrus	56	23
1-maximum length		
2-proximal epiphysis breadth		
3-distal epiphysis breadth		
4-minimum diaphyseal breadth		

Ulna

The 10 identified fragments comprise articular portions, the tuberosity being cut in most fragments (making thus impossible any age limits estimations). A single robust fragment exhibits an obvious unossified tuberosity, indication of origin in a specimen younger than 3-3.5 years of age⁴⁵.

Femur

Only a single unossified proximal epiphyseal fragment was identified, evidence of origin in a young specimen below 3.5 years of age⁴⁶.

Metapodials

A total number of 5 metacarpals were identified. Among, 2 metacarpals IV (right-left) are unossified, indicatory to a specimen younger than 2 years of age; other

⁴⁴ Bököny 1995, 3-11.

⁴⁵ Schmid 1972, 75.

⁴⁶ Schmid 1972, 75.

2 metacarpals III are also unossified. In the metatarsals' case, circumstances are somewhat similar, a single metatarsal IV and III right, both unossified⁴⁷ being examined. There are a few complete fragments, on the basis of which we may recalculate height.

	1	2
Mc III R	73	75
Mc IV L	64	64
MT IV L	81	71
MT IV L	75	65
MT IV L	92	80
Mt III R	71	66
Mt III R	69	65
1-maximum length		
2-recalculated height		

Recalculated values⁴⁸ are placed between 64 and 80 cm.

Tibia

The identified fragments are assigned to the domestic species, any morphological indication for their assignment to the wild species being inexistent.

The identified proximal epiphyseal fragments point to a specimen over 3.5 years of age and to one younger than this age (proximal ossification stage)⁴⁹. Due to the porous aspect visible in the unossified fragment, we tend to believe it belongs to a young specimen.

Distal epiphyseal fragments are all ossified, evidence of origin in individuals over 2 years of age (minimum 4 specimens). In the case of one fragment we may speak of a more accurate estimation, it being almost complete, exhibiting an ossified distal epiphysis (hence a specimen of 2-3.5 years of age). Notably, in this fragment we identified a healed fracture at diaphysis level. The calcification process evolved deficiently, leading to a marked change of the bone radius.

Part	1	2	4
L	48		
L			19
R			20
L		31	
L		31	22
L		28	19
R		27	19
R		30	
1-proximal epiphysis breadth			
2-distal epiphysis breadth			
4-minimum diaphyseal breadth			

⁴⁷ Schmid 1972, 75.

⁴⁸ Udrescu, Bejenaru, Hriscu 1999, 98.

⁴⁹ Schmid 1972, 75.

Astragalus

We identified a single astragalus fragment of the right limb. Height could be recalculated based on metrical data - 81 cm.

Part	1	2	3
	44	40	81
1-external length			
2-internal length			
3-height ⁵⁰			

Mandible

Based on the available material, we collected data referring to the wear stage and dental eruption⁵¹ as well as to the size of the molar series or molar 3.

Part	Present dental element	Wear degree	Estimated age	1 (8)	2 (9)	3 (11)	4 (21)	5 (20)	6 (19)	7 (12)	8 (13)
L	M2, M3	M3++	4-6a							28	14
	PM3-M3	M3++	4-6a		68					32	15
	M3	M3+/++	4-6a							30	14
	M2	M3 in alveoli	1.5 a								
	Pm		Under 6 months								
	M1	M1 erupted	0.5-1 a								
	PM4-M1		Over 1 year								
	Pm		Under 6 months								
	PM1-PM4		Over 2 a								
	Pm	M1 non-erupted	Under 6 months								
R	C, I		Over 1.5 a								
	PM1-M3	M3+	2-4a	100	65	34	43	42	49	30	15
	M2	M2,M3 non-erupted	1-1.5 a								
		M3 growing	1-1.5 a								
		M3 growing	1-1.5 a								
	M3	M3+/++	4-6a							34	15
	C-PM2		Over 1-1.5 a								
	I3-m1	Lacteal	Under 6 months								
	Pm		Under 6 months								
	Pm		Under 6 months								
	M1, M2		Over 1 year								
	M1		Over 0.5 a								
	1-lenght of jugal teeth (by alveoli)			5-height of ramus before M1							
	2-molar length			6-height of ramus after M3							
	3-premolar length			7-M3 length (by occlusal surface)							
	4-height of ramus before P2			8-M3 breadth (by occlusal surface)							

⁵⁰ Boessnek 1971, 305.
⁵¹ Schmid 1972; Haimovici, Teodorescu 1995, 95.

Correlation of data referring to age with those resulting from the estimation of the minimum number of specimens (14) distribute 4 specimens in the 0-6 months interval, other 4 in the 1-1.5 years interval, one specimen in the 2-4 years interval and 3 specimens in the 4-6 years interval. Moreover, in the case of 2 or 3 specimens, age estimations are allowed only in the minimum value limit (over 1 year, over 2 years).

Maxilla

Maxilla fragments are less numerous than mandible fragments. Collected metrical data target in only two cases the length of molar 3 (31/16, 32/17).

Corroborated data (few) referring to dental eruption and wear allow us to estimate a specimen younger than 6 months, 2 individuals of 2-4 years of age, one over 4 years (specimen for which specific identification tends to place it among the wild species) and of other 3 or 4 specimens over 1 year of age.

Equine

Bone	Right limb	Left limb	Uncertain
Scapula	2	1	
Humerus	1pe 1de	1 de	
Radius	4		
Femur	1 pe	1 diaf	2 condili
Cuboid bone	1		
Tibia	1		
Astragalus	2		
Calcaneus	1		
Phalanx I	3		
Phalanx II	3		
Phalanx III	1 <i>Equus asinus</i>		
Metatarsal III		1	2
Metacarpal III			2
Denture	6 molars		
Mandible	2		
Vertebrae	cervical 1		

Scapula

3 scapular fragments were identified, two of the right limb and one of the left limb.

Part	4	6	7
R		60	51
R		54	48
L	65	60	47

- 4-AP minimum diameter of the collum
- 5-DAP in the articular process
- 6-DAP glenoid cavity

Notably, the fragments exhibit no chop marks.

Humerus

3 humeral fragments were identified, one proximal and 2 distal. The single indications they provided are those age-related (given the proximal and distal epiphyseal stage), namely we may estimate a specimen over 3.5 years of age and another over 15-18 months old⁵². We benefit of only 2 measurements - distal epiphysis breadth of 77 mm and distal, of 43 mm.

Radius

4 radial fragments were identified, all belonging to the right limb. Among, 2 fragments are complete bones and other two are distal epiphysis fragments.

Part	1	2	3	4	5	6	7	8	9	10	11
R	337	329	330	67	75	35		70	60	9.4	142,8
R							77	65			
R				72	64						
R E asinus?	227			60	50	32				??	759?

- 1-maximum length
- 2-physiological length
- 3-lateral length
- 4-proximal articular side breadth
- 5-proximal epiphysis breadth
- 6-minimum diaphyseal diameter
- 7-minimum diaphyseal perimeter
- 8-distal articular side breadth
- 9-distal articulation breadth
- 10-diaphyseal index
- 11-height⁵³

Notably, this last fragment may likely belong to a donkey, however due to the presence of a rather large quantity of material similar to slag, precipitated on the bone surface, it is impossible to provide a more accurate diagnosis⁵⁴, metrical data also pleading in favour of such assumption.

Based on metrical data we could recalculate the height of one of the specimens, resulting a value of 142 cm. According to the Vitt scale⁵⁵, this specimen is by the limit between classes 5 and 6. For the specimen supposed *Equus asinus*, the approximate height (for the lack of the lateral length value) is around the value of 75 cm.

Completed ossification at distal level pleads for the existence of 4 specimens over 3.5 years of age⁵⁶. Concurrently, it is noteworthy that bones do not exhibit cuts.

⁵² Schmid 1972, 75.

⁵³ Boessnek et alii 1971, 452.

⁵⁴ Peters 1998, 328.

⁵⁵ Lauwerier 1988, 145.

⁵⁶ Schmid 1972, 75.

Metapodials

Only a few metapodal fragments were identified, reason for which they were described together. They are 2 metacarpals whose limb assignment could not be precise, as well as 3 metatarsals of which one was assigned to the left limb.

Part	6	7
Mt	32	
Mc		48
Mc		49
Mt		49

6-minimum diaphyseal breadth
7-antero-posterior minimum diaphysis diameter
8-distal epiphysis breadth

The single data referring to age are those given by the ossification degree: the bones come from specimens over 12-15 months old⁵⁷.

Based on comparisons with the material in the comparative collection, we may subjectively appreciate the origin of these fragments in specimens of average sturdiness. It is also worthy of mention that no processing or cutting marks were found.

Femur

The 2 identified femoral fragments (a femoral head part and one distal diaphysis) provide no metrical data. The single obtainable data are those age-related: the specimen (specimens) seems to have been over 3-3.5 years of age⁵⁸.

Tibia

Only a single tibial fragment was identified, whose proximal epiphysis is missing. The completed distal ossification (distal breadth 69 mm, diaphyseal breadth 38 mm) is indicative of a specimen over 2 years⁵⁹.

Notably, on the distal part of the cranial side of the bone cut marks are visible, most likely as consequence of skinning.

Phalanxes

A total number of 7 phalanxes were identified. They are 3 proximal phalanxes, 3 medial and one distal assigned with certainty to species *Equus asinus*.

	1	4
F1	77	33
F1	85	35
F1	83	35
F2	50	44

⁵⁷ Schmid 1972, 75.
⁵⁸ Schmid 1972, 75.
⁵⁹ Schmid 1972, 75.

F2	46	47
F2	46	47
1-maximum length		
4-minimum diaphyseal breadth		

Subjective and comparative estimations concerning the specimens in the comparative collection led us to small to average heights, however height cannot be estimated exactly. In addition, we noticed the presence of a reduced exostotic formation by the proximal articular surface rim of a medial phalanx.

Mandible

Two mandible fragments coming from 2 different specimens were identified. One of the fragments, which also preserves the symphyseal part bears the incisors, based on whose wear degree we estimated an approximate age of 5-6 years⁶⁰ and, due to the presence of the cuspids, we assume origin in a male. The other mandible fragment exhibits a complete premolar series and M1. Based on these data, we may only estimate a relative age, establishing the minimum limit - over 3 years old⁶¹.

Canidae

Bone	Right limb	Left limb	Uncertain
Scapula	2		
Humerus	1	1	
Radius	1		
Tibia	1 Vulpes		
Metapodials	1 mt III, 1 mc		
Denture	3 molars 1 premolar		
Vertebrae	1 lumbar 1 cervical		

Scapula

For this segment were identified 2 scapular fragments coming from the right limb. We could measure the articular angle, whose DAP minimum of the collum is 25, 27 mm respectively (to the second fragment) and the DAP minimum articular process is 31 mm. These metrical data are yet insufficient to recalculate height, however subjective estimations made in comparison to the specimens in the comparative collection of the Comparative Anatomy Department pointed to average to large height specimens with average slenderness.

Humerus

A single complete bone of the right limb was identified. Several measurements were taken in this case, as shown below:

⁶⁰ Morar, Pusta 1994, 89.
⁶¹ Schmid 1972, 75.

Part	1	5	6	8
r	168	42	12	32
1-maximum length				
5-DAP proximal				
6-minimum diaphyseal breadth				
8-maximum trochlea breadth				

The recalculated height points to values over 56.6 cm (Koudelka), respectively 54.9 cm (Harcourt)⁶², while the recalculated diaphyseal index is 7.14. This includes the specimen in the category of average height⁶³, average sturdiness⁶⁴ dogs.

Completed ossification is an indication of origin in a specimen over 1 year old⁶⁵.

Radius

A dog radius with pathological aspect was identified. This is a curving of the bone radius resulting in a visible change of the bone anatomy (the specific identification itself was difficult originally), namely a marked curving both anteriorly as well as the presence at the caudal surface level of the superior third of the diaphysis of a bone reconstruction process (without the emergence of proper bone callus), which yet resulted in the formation of small cavities in the compacta area, this being a hyperostosis process with the exacerbation of bone reliefs and the emergence of those relatively circular cavities. These aspects may be the consequence of an osteomyelitis process or more exactly of a granulomatous inflammatory process whose possible cause might have also been an ulna fracture, subsequently healed deficiently with the attachment in the inflammatory mass of this proximal part of the radius caudal face⁶⁶.

The bone comes most likely from a small size specimen, its total length being approximately 210 mm (measured from the proximal to distal epiphysis).

Tibia

A single proximal tibial fragment was identified (proximal epiphyseal breadth = 22 mm) assigned to species *Canis vulpes*.

Cranium

An almost complete cranium of a *Canis familiaris* specimen was identified and the measurements below were taken.

⁶² Boessnek et alii 1971, 258.
⁶³ Udrescu 1990, 98.
⁶⁴ Udrescu, Bejenaru, Hrișcu 1999, 56.
⁶⁵ Schmid 1972, 75.
⁶⁶ We wish to thank Professor Cornel Cătoi in the Department of Pathological Anatomy with the Faculty of Veterinary Medicine of Cluj-Napoca, for his help in the identification and description of the pathological aspects.

1	8	25	6
205	105	106	40

- 1. acrocranium-prosthion length
- 8. nasion-alveolar length
- 25. Dt bi-zygomatic
- 6. DT palate at the canine alveoli level

The dental series is sufficiently complete on both arcades, while only the right M2 and left M1 being missing from alveoli. Dental wear is not pronounced. These data allow the estimation of a specimen over 6 months old, however we believe it is an adult specimen.

Indices calculated with the aid of the previously mentioned measurements show a cephalic index of 51.7, a muzzle index of 51.21 and a muzzle breadth index of 37.73⁶⁷.

Vertebrae

Two vertebral fragments were identified, one cervical (C3 or C4) and one lumbar. The fragments exhibit no processing or chopping traces and are ossified, indication of origin in specimens over 18-24 month old⁶⁸.

11th-12th centuries sample

Large ruminants

Bone	Right limb	Left limb	Uncertain
Scapula	2 articular angle		3 (scapular blade)
Metacarpals			2 ed
Metatarsals	2	1	3
Humerus	2 ed	4 ed	
Radius	2 ed	1 ep 2 ed 1 ed Cervus elaphus	1 ep
Ulna			
Coxal bone			4
Femur		1 ed osif	2 head (1 unossified)
Tibia	2 ed 1 ep	1 ep	
Astragalus	2		
Cuboscafoïd	1		
Mandible	4 articular angle	1 articular angle 3 ram	1 ram
Vertebrae	7 cervical 4 thoracic (ap spinal)		
Ribs	32		
Maxilla		3	1

⁶⁷ Udrescu, Bejenaru, Hriscu 1999, 98.
⁶⁸ Schmid 1972, 75.

Bone	Right limb	Left limb	Uncertain
Neurocranium		3 horn core (2 small) 3 fr neurocranium	
Phalanx I		4 (Gl= 57,55,62,55)	
Phalanx II		2	
Phalanx III		1	
Denture		13 molars	

Scapula

The scapular fragments comprise 2 articular angle parts (collum breadth = 60.48 mm) and other 3 scapular body fragments with different scapular spine portions.

Humerus

The 2 right limb fragments and the 4 left limb fragments consist of distal epiphyseal parts. All are ossified, indication of origin in minimum of 4 specimens over 1.5 years of age⁶⁹.

Radius

Among the radial identified fragments, one is certainly coming from species *Cervus elaphus*. The distal epiphyseal fragments are ossified, indication of origin in specimens over 3.5-4 years old. The distal breadths are placed in the 72-60 mm interval (for *Bos taurus* fragments), while for the *Cervus* fragment the value is 52 mm. There is another left proximal epiphyseal fragment, 69 mm wide, assigned to species *Bos taurus*.

Metapodials

Part	2	4	6
	(4)	(6)	(9)
Mt R	44	22	
Mt R	39	22	
Mt L	39	20	
Mt fp		25	51

2-proximal epiphysis breadth

4-minimum diaphyseal breadth

6-distal epiphyseal breadth

In the case of metacarpal fragments, we only speak of elements related to the animals' age upon death, namely over 2-2.5 years old (distal completed ossification⁷⁰). Metrical data are unavailable due to the destruction of the found distal epiphysis parts.

A few partial metrical data are available though for metatarsals, however not enough to recalculate height. There are 2 fragments whose distal ossification is not completed, indication of the existence of 2 specimens sacrificed under the age of 2.5

⁶⁹ Schmid 1972, 75.

⁷⁰ Schmid 1972, 75.

years and another fragment pointing to ages higher than 2.5 years⁷¹. A single fragment could be measured, having a distal breadth of 65 mm.

Tibia

The distal epiphyseal fragments are ossified, evidence of origin in 2 specimens over 2-2.5 years old⁷². The values of the distal breadth are of 58 and 52 mm (small compared to the comparative material), while the proximal epiphyseal fragments could not be measured, however relative estimations point to normal sizes.

Cranium

Due to the fact that not all fragments have complete molar series, any age-related estimations were made by including (where the material allowed) them in age classes or by estimating a minimum limit of the animals' age⁷³.

Part	Present denture element	Wear degree	Age class
Mx L	PM2-M2		Over 2.5-3 a
Mx L	PM2-M1		Over 2.5-3 a
Mdb L	PM2 s 3		Over 2 a
Mdb L	M1, M2		Over 1-1.5 a
Mdb L	PM3, M1		Over 2.5-3 a
2-lenght of jugal teeth			

The number of mandibular fragments allows the estimation of a minimum number of 4 specimens. Age estimation based on dental eruption and wear allows us to include a minimum 2 specimens over 2.5-3 years and another over 1-1.5 years old.

Capriovids

Bone	Right limb	Left limb	Uncertain
Scapula	1 juvenile	1	9 scapular body
Metacarpals	1	3	
Metatarsals	2	1	1
Humerus	2 (1 juvenile)	2 de	1
Radius			3 diaf
Femur	1 ep unossified		
Tibia	2 ed	1 ed	
Mandible	8		
	1 articular angle	4	
Vertebrae	1 axis 2 cervical 2 lumbar		
Ribs	14		

⁷¹ Schmid 1972, 75.
⁷² Schmid 1972, 75.
⁷³ Grigson 1985, 7-19; Haimovici, Teodorescu 1995, 195-204.

Bone	Right limb	Left limb	Uncertain
Maxilla	2		
Neurocranium	2 horn core, 1 Capra		
Denture		1 incisor 1 molar	

Metapodials

Both identified metacarpals and metatarsals comprise proximal diaphysis and epiphysis fragments and not distal epiphyses, hence age estimations are impossible. A few metrical data could be identified in the metacarpals' case:

Part	2 (4)	4 (6)
Mc L	23	14
Mc L		14
Mc L	23	14
Mc R	24	15

2-proximal epiphysis breadth
4-minimum diaphyseal breadth

Notably, all fragments were assigned to species *Ovis aries*, without any suspicion concerning Capra presence among the identified bones.

Tibia

A few distal tibial fragments were identified. Completed ossification at distal level is indicative of origin in minimum 2 specimens over 15-18 months old⁷⁴. The distal epiphyseal values are placed in the interval 25-30 mm (30, 27, 25 mm).

It is possible that one of the fragments assigned to the right limb to come from Capra, however this is only likely for the lack of clear morphological distinction elements.

Mandible

Part	Present denture element	Wear degree	Estimated age	7 (12)	8 (13)
Mdb R	pm		Under 0.5 a		
Mdb R	PM growing M1, M2		1.5-2 a		
Mdb R Capra	M1, M2		Over 1 year		
Mdb R	M1-M3	M3+	2-4 a	21	8
Mdb R	PM1-M1		Over 2 a		
Mdb R	PM1, PM2		Over 1.5-2 a		
Mdb L	PM2-M3	M3 growing	2.5-3 a		
Mdb L	pm2,pm3,M1		1-1.5 a		
	Pm		Under 0.5 a		

7-M3 length (by occlusal surface)
8-M3 breadth (by occlusal surface)

⁷⁴ Schmid 1972, 75.

Based on the number of mandibular fragments, we estimate a minimum number of 8 specimens. The identified morphological data indicate the presence of a *Capra hircus* species individual among the studied fragments.

Dental eruption and wear stages allow the estimation of a specimen younger than 0.5 years, of one of 1.5-2 years, of 2 over 2-3-4 years old and of another 3 specimens over 1 year; the maximum limit could not be specified.

Swine

Bone	Right limb	Left limb	Uncertain
Scapula	3	1	
Metacarpals/secondary metatarsals			1
Humerus	1 ed	1 ed	
Ulna			1 unossified olecran
Femur	1 ed unossified		1 femoral head
Rotula			
Tibia	1		
Mandible	2		3 symphysis 1 recurved part 1 articular angle 1 mandibular ramus
Vertebrae	1 axis		
Denture	1 incisor 2 cuspids		
Unidentified			

Scapula

The identified fragments include parts of articular angle. Collum breadth was measured at their level - 25, 23, 26 mm. Other data could not be obtained at this level.

Cranium

We included in this category the elements that contain dental series - maxilla and mandible.

Part	Present denture element	Wear degree	Estimated age	7 (12)	8 (13)
Mdb	C-PM4		Over 1-1.5 a		
Mdb	I3-PM3		Over 1 a		
Mdb R	M2-M3	M3-/+	2-4 years	26	13
Mdb fp	Lacteal		Under 6 months		
Mx	PM3-M2	M2 +++	Over 2-4 years		
	7-M3 length (by the occlusal surface)				
	8-M3 breadth (by the occlusal surface)				

Mandibular and maxillary fragments allow the estimation of minimum 3 specimens. One may argue the existence of a juvenile individual younger than 6 months of age and of other specimens over 1-1.5 years, of which one 2-4 years old.

Equine

Bone	Right limb	Left limb	Uncertain
Proximal phalanx			1
Humerus		2	

Humerus

2 humeral left limb fragments were identified, comprising distal diaphyseal and epiphyseal parts. The completed ossification at this level points to the origin of these bones in 2 specimens over 1.5 years.

Part	2	3	4
L	74	77	34
L	70	74	34

2- distal articular surface breadth

3- distal epiphysis breadth

4- minimum diaphyseal breadth

16th – 17th centuries sample

It represents the second in size among the studied samples, comprising bones from the following species with the listed features:

Large ruminants

Bone	Right limb	Left limb	Uncertain
Scapula	1	2	1
Metacarpals	3		2
Metatarsals	3	1	1 juvenile Cervus? 1 diaphysis
Humerus	2 1 unossified ep 1 hum head 2 pe, diaf	4	1 diaf Cervus?
Radius	2	3	
Ulna	2	1	1
Coxal bone			6 acetabulum 6 ilium fragments
Femur	2 femoral head 1 proximal diaphyseal port 2 distal diaphyseal port 1 ed	2 distal diaphyseal port 2 ed	

Bone	Right limb	Left limb	Uncertain
Tibia	1	1	2
Calcaneus	1		
Astragalus	2	1	
Cuboscafoid			1
Capitato-trapezoid			
Mandible	1 symphyseal portion 2 articular angle	1 symphyseal portion 1 articular angle	3 symphyseal portions 1 condil
Vertebrae	2 atlas 2 axis Cervical 5 Thoracic 9, 2 unossified body! Lumbar 5		
Ribs	23		
Maxilla	4		
Neurocranium	2 horn core 2 periorbital fr 13 large size fr (frontal, parietal, occipital, sphenoid)		
Phalanx	5 F1		
Denture	Incisors 1 Molars 6		

Scapula

In the case of the thoracic zonoskeleton were identified scapula neck fragments, whose breadth is between 56 and 58. Noticeably, the fragments exhibit cut marks, resulting in severing the supraglenoid tuberosity or the spine tuberosity.

Humerus

The distal epiphysis portions are distal ossified, evidence of origin in minimum 4 specimens over 1.5 years of age⁷⁵.

Part	3	4
L	75	36
L	72	36
L	84	
L		32

3-distal epiphysis breadth
4-minimum diaphyseal breadth

Another unossified proximal epiphysis part originates in a specimen younger than 3.5 years of age⁷⁶, while a proximal part may likely come from a *Cervus elaphus* species individual, however for lack of proximal epiphysis elements this is only likely.

⁷⁵ Schmid 1972, 75.

⁷⁶ Schmid 1972, 75.

Radius, ulna

The identified stylopodium fragments provide a few data connected to the animals' age upon death. The distal epiphyseal complete ossification in the radius parts evidences minimum 3 specimens over 3.5 years⁷⁷, the same indication being provided by the found olecranon fragments and the olecranon tuberosity.

Coxal bone

The identified coxal bone fragments provide no significant data. There were identified 6 acetabulum fragments and other 6 iliac body fragments. Notably, these segments exhibit chopmarks, including cuts at the iliac body level in order to split and section the carcass.

Tarsals

A right limb calcaneal fragment was identified, which exhibits a transversal cut at the level of the calcaneal tuberosity, resulting from dismemberment procedures. The ossification at the tuberosity level points to origin in a specimen over 3 years old⁷⁸.

The 3 identified astragali could be measured, having total lengths of 58, respectively 59 mm (those of the right limb). The left limb exhibits a saw cut by the distal trochlea.

Metapodials

Part	1	2	3	4	6	9	10
		(4)	(5)	(6)	(9)		
Mc fp				31	58	F	1205
Mc fp				31	71		
Mc R	191	57	36	33	61		
Mc R		60	36				
Mc R		63	36				
Mt L	204	40	39	23c	47	f	1148
Mt L		52	46				
Mt L		48	45				
Mt R		48	47				

1-maximum length

2-proximal epiphysis breadth

3-maximum proximal antero-posterior diameter

4-minimum diaphyseal breadth

6-distal epiphysis breadth

9-presumed gender

10-height⁷⁹

In the metacarpals' case, a complete fragment coming from a female specimen over 2.5 years old was identified. The recalculated height is of approximately 125 cm.

It is worthy of note that another minimum 2 specimens over 2.5 years may be estimated based on the identified distal metacarpal fragments.

⁷⁷ Schmid 1972, 75.

⁷⁸ Schmid 1972, 75.

⁷⁹ Boessnek et alii 1971, 458.

We identified 4 metatarsal fragments (3 of the left and one right limbs). Most likely, the proximal fragments also come from adults, however for the lack of distal epiphyses this statement is relative. Only in the case of the complete metatarsal we may argue it comes from a specimen over 2.5 years old⁸⁰, while the gender discrimination points to the fact it is a female with a recalculated height of 115 cm.

Noticeably, in the case of the metatarsals' category, a diaphyseal fragment may likely be assigned to the juvenile individual of species *Cervus elaphus*.

Phalanx

Proximal phalanxes provided a few metrical data listed in the table below:

	1
	66
	57
	63
	63
	59
1-maximum length	

Cranium

Among cranium fragments, worthy of interest are 2 small horn core bases, of short type, whose base diameters are of 35/30 respectively 45/39 mm. The flattening index is similar for both fragments, being placed in the interval 85-86.

The identified mandible fragments provide insufficient information due both to their marked fragmentation as well as the lack of denture elements.

Two right fragments were identified in the case of the maxilla, provided with some dental elements:

Part	Present denture element	Wear degree	Estimated age	1 (7)	2 (8)
Maxila R	M1				
Maxila R	PM3-M1	Over 2.5-3 a			78
	1-length of jugal teeth (by alveoli)				
	2-molar length				

The single data that may be distinguished are those referring to the possible age of a specimen-over 2.5-3 years⁸¹, without the possibility to set up an upper limit.

It is worth mentioning that the identified neurocranium fragments are less common, meaning they are very well preserved and less fragmentary.

⁸⁰ Schmid 1972, 75.

⁸¹ Schmid 1972, 75.

Capriovids

Bone	Right limb	Left limb	Uncertain
Femur	1 ed		
Humerus		1 ed	
Mandible	1		
Metacarpals	2		
Metatarsals		2	
Radius		2	
Scapula	1 juvenile		
Vertebrae	4 cervical (3 unossified) 5 thoracic (2 unossified) 3 lumbar (1 unossified)		
Ribs	19		

Cranium

This category includes both neurocranium as well as splanchnocranium fragments:

Part	Present denture element	Wear degree	Estimated age
R	Pm		Under 6 months

Radius

The 2 radial fragments comprise proximal epiphyseal and diaphyseal fragments (lep-25/29, ld-16/17). The single data referring to age are those indicated by the proximal ossification, however only as minimum age limit - over 3 months⁸².

Metapodials

Part	1	2	4	6	12	13
MT L	134	21	12	25	O	
MT l		21	12		O	
MC r		27				

1-maximum length

2-proximal epiphyseal breadth

4-minimum diaphyseal breadth

6-distal epiphysis breadth

7-medial verticillum depth = anteroposterior diameter of the medial verticillum

8-depth of medial trochlear condylus = medial condylus outer part breadth

12-gender/sex

13-height⁸³

⁸² Schmid 1972, 75.

⁸³ Boessnek 1971, 289.

Metacarpal fragments are assigned to an individual of *Ovis aries* species and an individual of *Capra hircus*. The fragment assigned to the Capra comes from a younger specimen, under 18-24 months old⁸⁴.

The metatarsal is assigned to species *Ovis aries* and comes from an adult specimen with an estimated height of 64.9 cm⁸⁵.

Swine

Bone	Right limb	Left limb	Uncertain
Coxal bone			2 fr acetabulum
Humerus		1 ed	
Mandibula		2	
Maxilla	2		
Calcaneus			
First metacarpals	1 mc III		
Secondary metacarpals			
First metatarsals		1 mt III wild boar 1 mt IV	
Radius	1		1
Scapula	1 juvenile		
Tibia		2	
Ulna		1	
Vertebrae			1 atlas

Cranium

Due to the poor numerical representation, we preferred to describe the fragments under the general term of cranium. Here are included both the splanchnocranium as well as neurocranium elements.

Part	Present denture element	Wear degree	Estimated age	2 (9)	7 (12)	8 (13)
Maxila R	M1-M3	M3 erupted, at level	1.5-2 a	69	32	16
Maxila R	PM4-M3	M3 broken	Over 1.5-2 a			
Mandible L	M1-M3	M3 erupted, at level	1.5-2a	60	25	14
Mandible L	M3	M3++ 2-molar length 7-M3 length (by the occlusal surface) 8-M3 breadth (by the occlusal surface)	4-6 a		26	14

Age-related data show the existence of specimens aged over 1.5-2 years, even of an older specimen, framed in 4-6 years age class⁸⁶.

⁸⁴ Schmid 1972, 75.

⁸⁵ Boessnek et alii 1971, 289.

⁸⁶ Haimovici, Teodorescu 1995, 195-208.

Metapodials

There were identified 3 metapodal fragments. They include 1 metacarpal III of the right limb, with a total lenght of 67 mm. It comes from a specimen over 2 years old, with a recalculated height of 68.9 cm. A distal unossified metatarsal III (indicative of origin in a specimen younger than 2 years) definitely comes from a *Sus scrofa ferrus* species individual, with an approximate length of over 100 mm.

Radius, ulna

The identified radius fragments (one of the right limb - ld-19 mm, led-31 mm, one not-assigned) are distally ossified, indication of origin in specimens over 3.5 years. Olecranon fragments point to a specimen over 3 years⁸⁷. There are no further metrical data.

Tibia

The 2 left tibial fragments are not ossified distally, indication of origin in 2 specimens younger than 2 years of age⁸⁸. In addition, in the case of one of the fragments we could approximate a total length of ca. 180 mm (lep 41 mm, ld 20 mm, led 29 mm), which allows us an estimation of a 71 cm height (Teichert)⁸⁹.

Equine

Bone	Right limb	Left limb	Uncertain
Knee cap	1		
Anterior scaphoid			1 Eq asinus?

Only a few number of bone fragments were assigned to this species, therefore descriptions are not necessary.

Notably, a fragment may likely come from species *Equus asinus*.

Investigation results – Roman period contexts

Identified species

Domestic species	
<i>Bos taurus</i>	++
<i>Ovis aries</i>	++
<i>Capra hircus</i>	++
<i>Equus cabalus</i>	++
<i>Sus scrofa domesticus</i>	++
<i>Canis familiaris</i>	++
Wild species	
<i>Sus scrofa ferrus</i>	++
<i>Capreollus capreollus</i>	++
<i>Cervus elaphus</i>	++
<i>Canis vulpes</i>	++
<i>Sus scrofa ferrus</i>	++

⁸⁷ Schmid 1972, 75.

⁸⁸ Schmid 1972, 75.

⁸⁹ Udrescu, Bejenaru, Hriscu 1999, 87.

<i>Equus asinus</i>	++
<i>Ursus arctos</i>	++
<i>Gasteropode</i>	++
++ certain identified species	
+species whose presence is likely	

Bone ratios of main sample species

Species	NISP	%	MNI	%
Large ruminants	835	61.5	17	26.2
Capriovids	340	25	24	36.9
Sus scrofa dom	125	9.2	14	21.5
Equus caballus	36	2.7	4	6.2
Canis familiaris	13	1	3	4.6
Equus asinus	2	0.5	1	1.5
Cervus elaphus	3	0.2	1	1.5
Sus scrofa ferrus	4	0.3	1	1.5
Total identified	1358		65	
Unidentified	22 fragm.			
Large size animals (equine-bovids)	Scapula 30 fr ilium 32 vertebrae 423			
Unidentified average size animals (Capriovids-swine)	10 fr diaf humerus 164			
Total NISP	2039			

When analysing data resulted from the percentage calculation of the number of identified bones, alike that of the minimum number of specimens, one may argue that the three represented species are the bovids, capriovids and swine. Even though from the number of remains standpoint bovid remains dominate, capriovids prevail as number of specimens. Nonetheless, when also computing their ratio in human nutrition by using the sheep- equivalent one may argue that bovids ranked first in the food economy, followed by swine and capriovids.

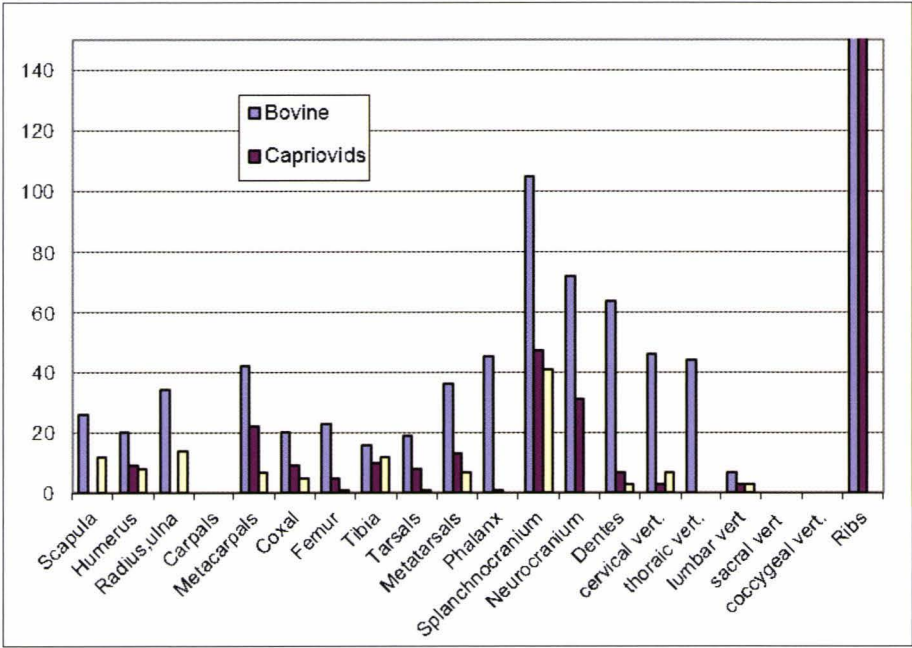
Noteworthy, circumstances are common, being found in almost all studied Roman period sites.

Survival rate of various body segment bones

	Bone segment	Large ruminants	Capriovids	Swine
Anterior limb skeleton	Scapula	26	—	12
	Humerus	20	9	8
	Radius,ulna	34	—	14
	Carpals			
	Metacarpals	42	22	7

	Bone segment	Large ruminants	Capriovids	Swine
Posterior limb skeleton	Coxal bone	20	9	5
	Femur	23	5	1
	Tibia	16	10	12
	Tarsals	19	8	1
	Metatarsals	36	13	7
Cranium		45	1	
	Phalanx	105	47	41
	Neurocranium	72	31	
	Denture	64	7	3
Spinal column	Cervical vertebrae	46	3	7
	Thoracic vertebrae	44		
	Lumbar vertebrae	7	3	3
	Sacral vertebrae			
	Coccygeal vertebrae			
	Ribs	243	164	

For a clear image of the preservation and identification means of the bone fragments, we drafted a chart for the preservation means of the various skeletal elements according to their origin in various body segments.



One may note from the chart below that for the three main species (bovids, capriovids, swine) the preservation means are somewhat similar and typical for archeofaunal

samples of domestic waste type, namely that distal fragments survived in the case of the limb skeleton (they are both less fragmentary following the sectioning-meat removal process as well as less “interesting” due to the poor meat coverage).

In the axial skeleton case (head, spinal column) the predominance of splanchnocranium, teeth and, possibly neurocranium fragments is normal, while the vertebrae fragments are on a descending curve due to strong fragmentation, consequence of carcass splitting.

Data on the identified species

Bovids

The overwhelming majority of the bone fragments included in the large ruminants category come from bovids (*Bos taurus*).

The estimation of the minimum number of specimens points to the existence of minimum 17 specimens. Age structuring indicates the predominance of adult specimens. Thus, the most accurate categorisation is allowed for the identified mandible fragments. Specimens aged between 2.5–3.5 years old (5 specimens) and 3.5–5 years old (5 specimens) predominate.

Recalculated heights correlated to gender estimations point to the presence of a male with an approximate height of 150 cm (148 cm based on metacarpals, 149 cm based on the radius), while for females, recalculated heights are between 112 and 119 cm.

Moreover, it is noteworthy that where estimations concerning the horn type were possible, the predominant flattening index was between 75 and 85.

Typical marks for meat removal were visible, which suggests human consumption (including traces of carcass splitting into semi-carcasses by sagittal or parasagittal cutting at the spinal column level). Correlation between the predominant sacrifice age and the fact that females predominate (even though the number is rather small) is indicative of a mixed breeding system, utilitarian-nutritional.

Capriovids

The capriovids group includes bone fragments coming from 3 species- namely the sheep-*Ovis aries*, goat-*Capra hircus* and roe deer-*Capreollus capreollus*. Where possible, the species were morphologically divided, and where impossible, bones were framed in the generically termed category of the capriovids.

The minimum number of the estimated specimens for the generic group is 24. We could clearly distinguish from this number a minimum number of 3 goat specimens, the existence of another 1 or 2 specimens of this species being also presumed. Additionally, it is certain that an individual in the *Capreollus capreollus* species was present.

In age structuring, the most accurate estimation was made in the case of mandible fragments (for approximately 18 specimens). At least one specimen of species *Capra* is over 2 years old, while the *Capreollus* individual is over 2 years old. The rest are predominantly framed in the 2–4 years category (8 specimens), 4–5 years (3 specimens), 5–7 years (1 specimen), while 2 specimens were determined as juveniles (group 0–6 months). For other 4 specimens, we may only argue they are over 1 year of age.

Recalculated heights point to a value of 67 cm for Capra and values of 75, 65, 71, 70, 63 cm for Ovis.

Swine

The domestic pig (*Sus scrofa domesticus*) is prevalent among the identified bones. There were also identified a few fragments assigned to the wild species (wild boar).

The minimum number of specimens may be prefigured at the mandibular fragments level-14 specimens, this segment being also that which provides the most accurate data concerning age at the time of death. It may be argued that specimens over 1 year old predominate, more exactly those in group 1-1.5 years, followed by those in group 4-6 years (4 specimens established for each of these classes). We may also argue that the group of juvenile specimens (0-6 months) holds a rather significant ratio, 4 specimens being included in this category.

Based on the collected metrical data, we recalculated heights, whose value is comprised in the interval 64-81 cm (most of the data were supplied by metapodials).

Equine

Identified in all Roman archeofaunal samples, horse bones are not missing from our sample as well. The identified number of the fragments is small, which makes any appreciation related to species rather poor. Based on the frequency of certain skeletal elements we estimated 4 specimens, whose age is over 3.5 years old. The mandibular fragments provide certain additional information concerning one of the specimens, namely that it was aged 5-6 years.

Notably, 2 bone fragments were assigned to the donkey (*Equus asinus*), the rest being designated horse bones (*Equus caballus*).

Height could be recalculated only for a single specimen, it being of 142 cm. This height frames in class 5-6 of the Witt scale. Other appreciations (subjective) led us to the idea of the existence of one/several smaller height specimens.

In addition, it is worth mentioning that at horse bone level no meat removal traces were noticed, most likely fine skinning prints being visible only in a single case.

Canidae

The small number of bones assigned to this group does not allow for many conclusions. Most of the fragments come from dog (*Canis familiaris*), with a fragment belonging to the fox (*Canis vulpes*).

In dog, the minimum number of estimated specimens is 3. Amongst, we calculated for one individual a height of - 54-56 cm, with a diaphyseal index of 7.14, indication of an average height and slenderness specimen. In other specimen we estimated subjectively an average to high height, while another individual, exhibiting the pathological aspects noticed in the radius, was included in the small or sub-small height category.

Other species

Even though their identification was mentioned in the above groups, it is proper to specify again that the studied sample included also red deer bones (*Cervus elaphus*),

roe deer (*Capreollus capreoollus*), wild boar (*Sus scrofa ferrus*) in very small proportions, however normal within such a sample. A relatively large number of bird bones⁹⁰ (approximately 20 fragments) were also identified, mostly coming from chicken (*Gallus gallus*).

In addition, our analysis identified a single bone fragment each coming from fox (*Canis vulpes*) and brown bear (*Ursus arctos*) and a few snail shells (gastropods).

Investigation results: 11th–12th centuries contexts

Identified species

Domestic species	
<i>Bos taurus</i>	++
<i>Ovis aries</i>	++
<i>Capra hircus</i>	++
<i>Equus cabalus</i>	++
<i>Sus scrofa domesticus</i>	++
Wild species	
<i>Cervus elaphus</i>	++
++species identified with certainty	
+species whose presence is likely	

Bone proportions within the sample

Species	NISP	%	MNI	%
Large ruminants	122	56.6	4	25
Capriovids	68	31.5	8	50
<i>Sus scrofa dom</i>	23	10.6	3	18.8
<i>Equus caballus</i>	3	1.6	1	6.3
Unidentified	20			
Large size animals (equine-bovids)				
Unidentified average size animals (Capriovids-swine)	13			

Data concerning the identified species

Large ruminants

Except for a single bone fragment, identified with certainty as *Cervus elaphus*, the rest of the fragments were attributed to bovids (*Bos taurus*).

The minimum number of specimens where bones originate is 4. Corroborating the few data resulting from these bones analysis, both from the appendicular skeleton as well as the axial skeleton, we may argue that all the 4 specimens were over 1.5 years old, with the mention that for 2 of them, we could estimate a more restricted interval – over 2-2.5 years.

⁹⁰ Bird bone material was analysed by an ornithologist – Dr. Erika Gál from the Hungarian Academy of Sciences of Budapest, however the analysis results are still forthcoming.

Height could not be estimated, metrical data for such recalculation being non-existent.

Capriovids

Of the total 68 bone fragments, only one was assigned with certainty to species *Capra hircus*, the rest being attributed to the generic group of the Capriovids (the majority coming most likely from *Ovis aries*).

The minimum number of specimens is 8. Estimations based on dental wear stages point to predominant adults – 6 specimens over 1 year old, of which 1 is 1.5–2 years, 2 are 2–3–4 years old and other 3 were estimated over 1 year old (with the mention of the existence of a juvenile-younger than 6 months).

Swine

The single discernable data concerning this group of species refer to age estimations for the 3 specimens. Thus, there is a juvenile individual (younger than 6 months), one of 2–4 years and another of over 1–1.5 years.

We could not specifically identify the wild species.

Equines

No data related to this species may be distinguished.

Investigation results: 16th–17th centuries contexts

Identified species

Domestic species	
<i>Bos taurus</i>	++
<i>Ovis aries</i>	++
<i>Capra hircus</i>	++
<i>Equus caballus</i>	++
<i>Sus scrofa domesticus</i>	++
Wild species	
<i>Cervus elaphus</i>	+
<i>Sus scrofa ferrus</i>	++
<i>Equus asinus</i>	+
++ species identified with certainty	
+ species whose presence is likely	

Bone proportions within the sample

Species	NISP	%	MNI	%
Large ruminants	132	68.4	4	36.4
Capriovids	41	21.2	2	18.2
<i>Sus scrofa dom</i>	17	8.8	3	27.3
<i>Equus caballus</i>	2	1	1	9.1
<i>Sus scrofa ferrus</i>	1	0.5	1	9.1

Unidentified	124
Large size animals (equine-bovids)	7 ribs
Unidentified average size animals (Capriovids-swine)	9 ribs

Data concerning the identified species

Bovids

Except for 2 fragments whose assignment is uncertain (possible deer origin), the rest of the bones were assigned to the bovids (*Bos taurus*).

The estimation of the minimum number of specimens points to minimum 4 specimens of species *Bos taurus*. Age could be determined for minimum 3 specimens as being over 3.5 years. Heights were recalculated for 2 bones. The recalculated values are of 115, respectively 125 cm in the case of 2 females.

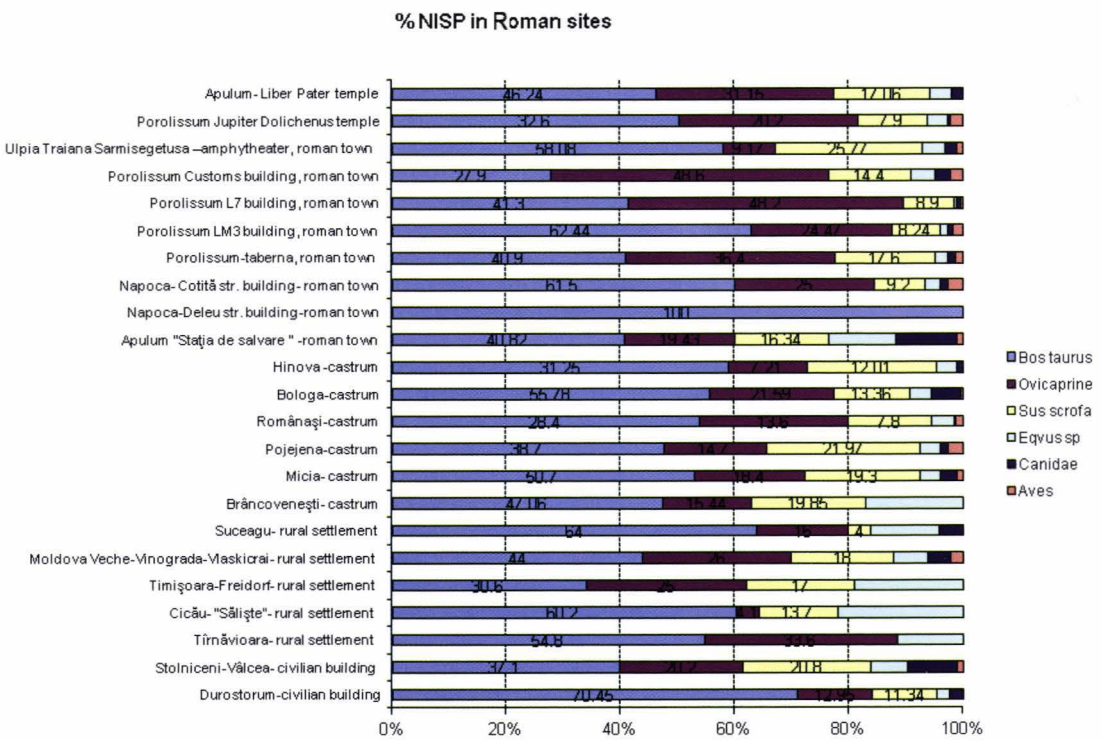
Noticeably, in the case of 2 horn cores we dealt with a small, short type horn, with a flattening index of 85-86.

The bones exhibit cut marks, evidence of carcass splitting for consumption purposes.

Capriovids

The very small number of the identified fragments pointed to an individual in *Ovis aries* species and of one *Capra hircus*.

Height was recalculated for the Ovis specimen, being 64.9 cm (adult specimen). We could not recalculate height for Capra, a young specimen, less than 18-24 months old.



Swine

The number of estimated specimens is 3. Amongst, 2 individuals of species *Sus scrofa domesticus* are younger than 2 years (for one estimations are more precise – 1.5–2 years according to the dental eruption stage), and another is 4–6 years old.

Recalculated heights are of 68.9 and 71 cm respectively.

There was also identified an individual in *Sus scrofa ferrus* species.

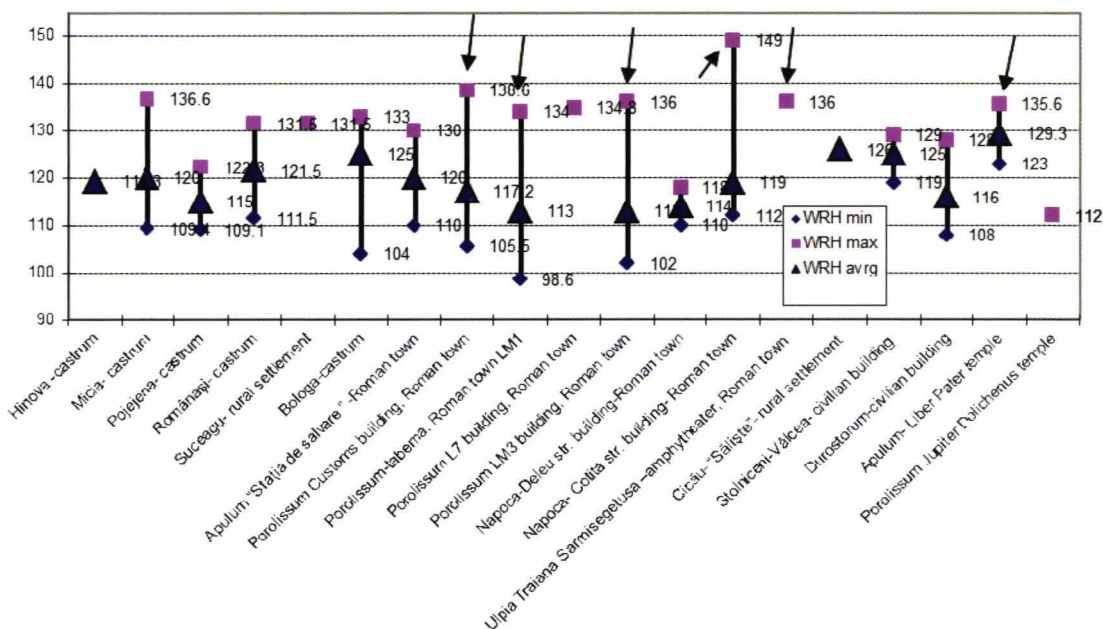
Equine

Only 2 bones were identified, of which one may likely come from a donkey, however clear morphological elements are missing.

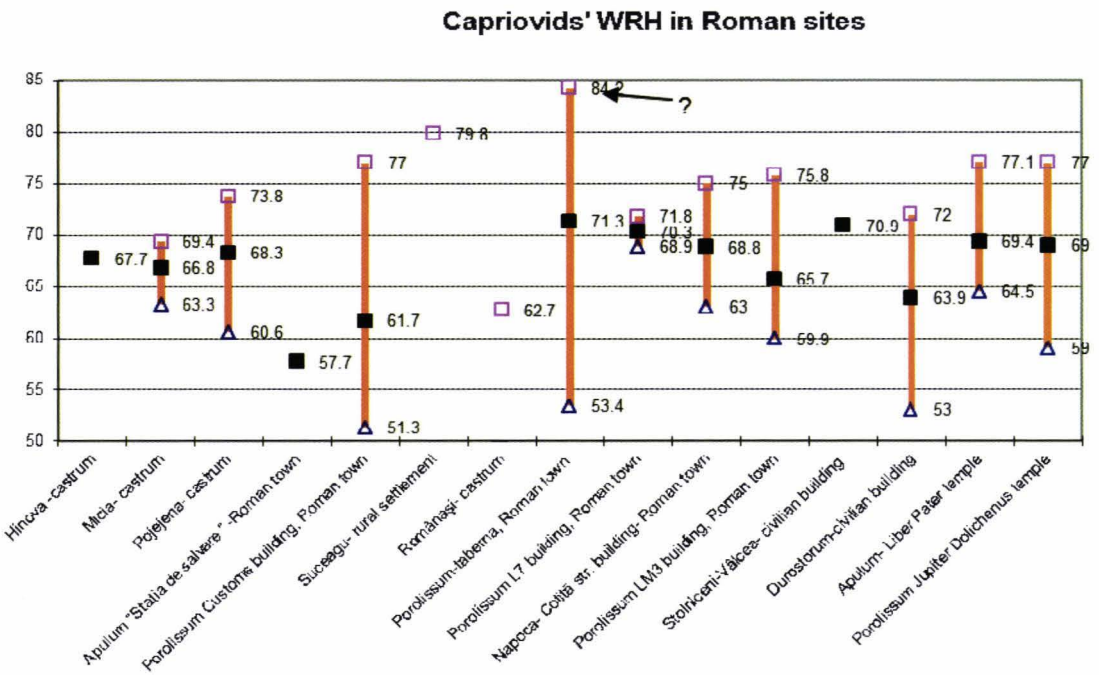
No estimations related to the species morphology may be made.

Conclusions

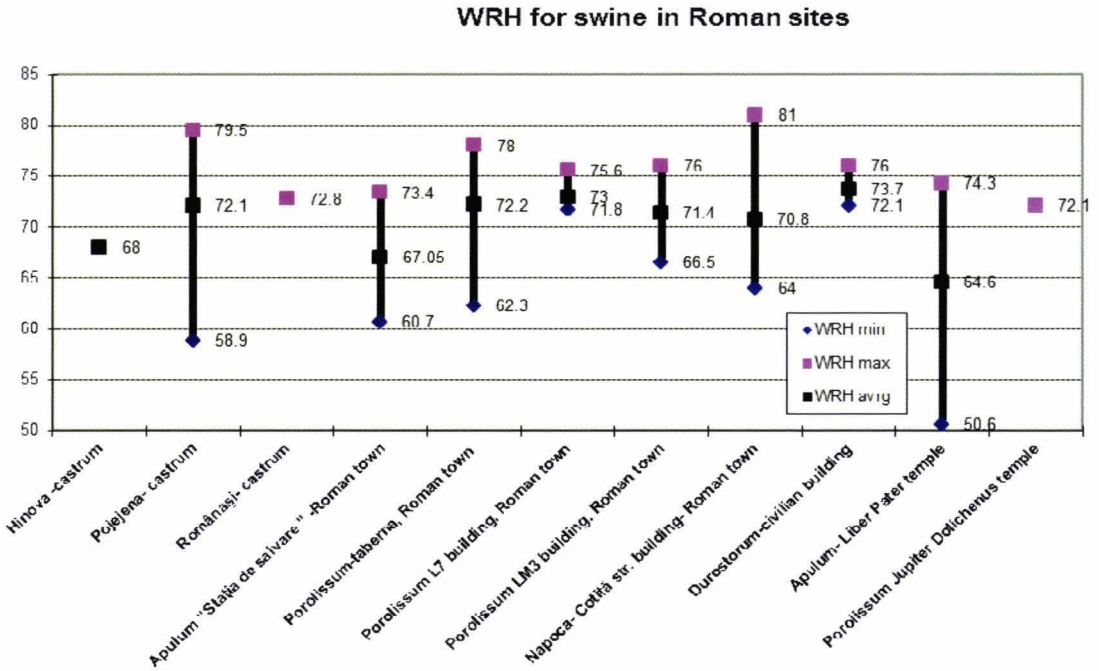
WRH for cattle in Roman sites



The archaeological sites comprising inhabitancy levels with such an ample chronology are relatively few. Circumstances in this case are rather peculiar, in the sense that faunal samples were assigned to the Roman period, to an 11th – 12th centuries' medieval sample and to one dating to the 16th – 17th centuries. Unfortunately, the sizes of the collected samples differ: the Roman sample is representative by the total number of identified bones (over 1000), while the 11th–12th centuries and the 16th–17th centuries sample hardly exceed 200, respectively 190 identified fragments.



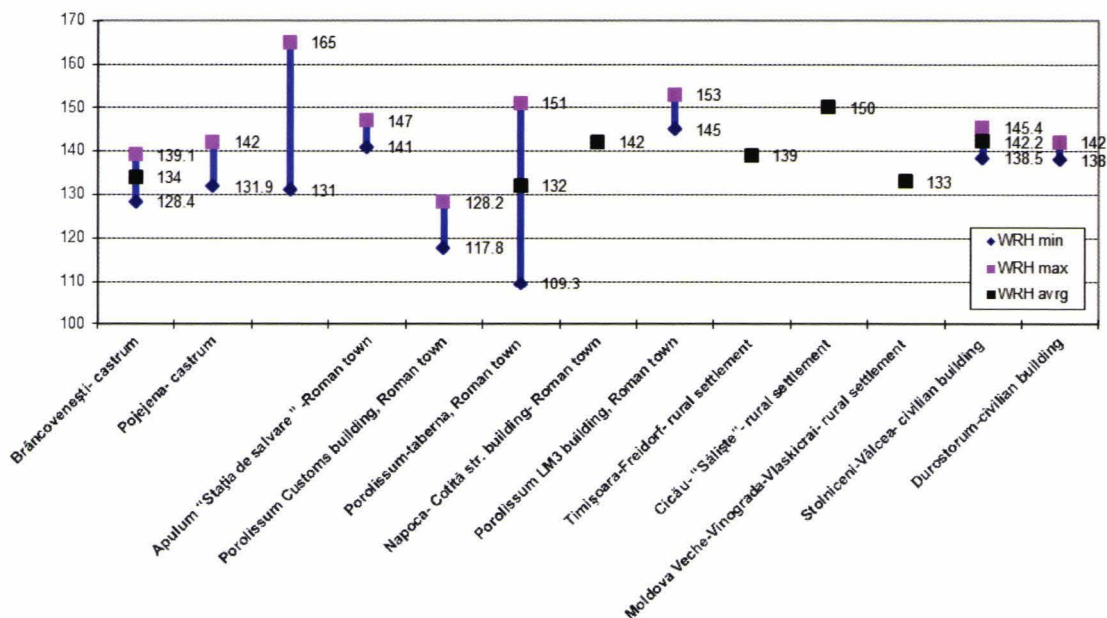
For the Roman period sample, we may establish the guidelines related to the features of the identified animals: the domestic refuse character and the prevalent ratio of the three species of nutritional character - bovids, capriovids and swine. Moreover, the so-called secondary species were also identified - horse, donkey, dog -, whose presence is also common in archaeofaunal samples. It is also worthy of note the fact that the Roman period sample from the town at Napoca, Cotită street, also revealed the presence of game among domestic waste, with a rather broad range of species - red deer, roe deer, wild boar, even brown bear -, the proportion of these bones being,



as one would expect, much reduced. This is indicative of the infrequent or recreational nature of an ancient occupation – hunting.

Comparison elements are available for several contemporary sites researched archaeologically⁹¹. Unarguably, from the main identified species proportions view, our sample

WRH for horse in Roman sites



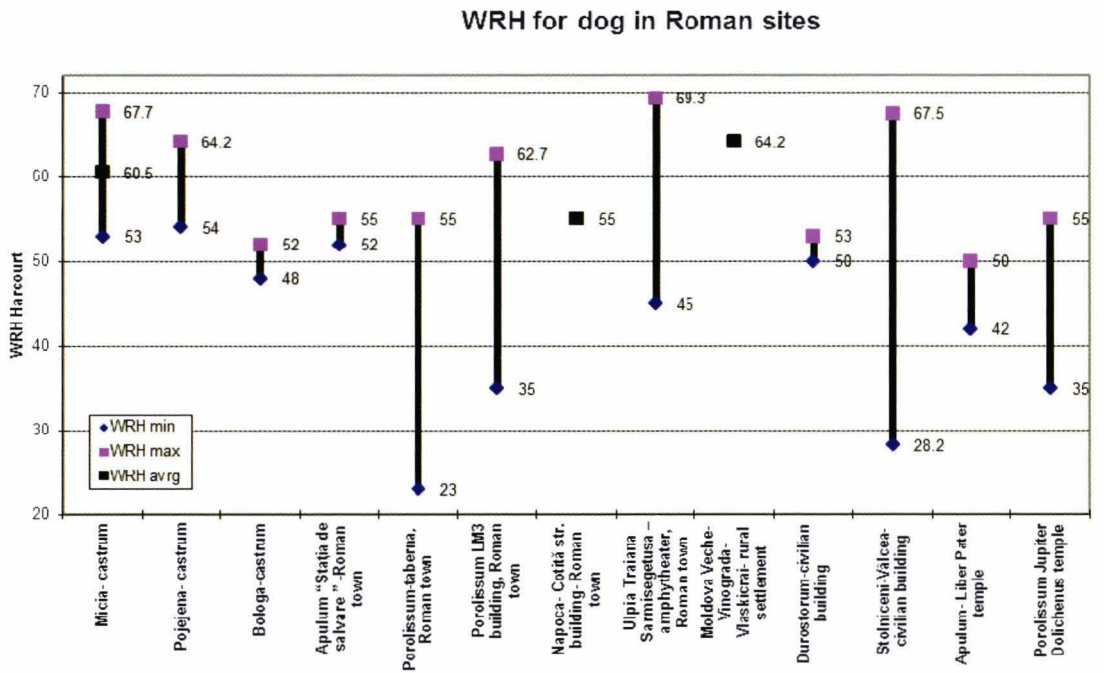
is no different than the others (despite the subjective comparison made based on the number of identified fragments -NISP- and not that of the estimated specimens – which is impossible due to the heterogeneous available data), with a relatively large proportion of cattle bones and rather small proportion of domestic pig bones. This is not confirmed by estimations based on the number of specimens, showing the relatively equal ratio of cattle and domestic pig bones, with a slight difference compared to cattle bones. It is though obvious that the largest ratio in nutrition as meat source belongs to cattle, by the large quantity supplied by one individual, comparatively to that supplied by sheep or pig.

Morphological aspects of the species may be specified for this Roman period sample as well: thus, in cattle, there were specimens used for both utilitarian as well as for nutrition purposes, predominating specimens sacrificed when adult (2.5–5 years old), with heights in females of 112–119 cm and in the single identified male – of 148–149 cm. The comparison with other Roman sites yielded a similar situation – the value range for cattle heights starts still from around 100–110 cm values, with an average value placed around 120 cm. Maximum values (like in fact in most cases) are assigned to males (marked by arrow in the chart), yet in most cases they are singular values whose ratio in the recalculated value series is rather small.

For capriovids, sheep bones among those identified is certain. The age when these specimens were sacrificed furthermore evidences a mixed system (utilitarian- wool, milk – nutritional), yet with a few nuances. This means that adults were preponderant,

⁹¹ Gudea 2005, 103–289.

more precisely the specimens sacrificed at ages over 2 years old (the largest ratio belonging to specimens in 2-4 years old group), however juvenile specimens should not be neglected, evidence for their limited use as food source. Heights determined for sheep point to specimens 63-75 cm tall, and for Capra - a 67 cm height.



These aspects are specific to Roman samples taken as element of comparison, mean values being obviously placed in the same 65-70 cm interval, the range of the minimum and maximum values being less narrow than in other investigated sites⁹².

The domestic pig was obviously exploited for food purposes. Evidence to this effect is the heterogeneous structure of the sacrificing age, with the ratio preservation of specimens over 1 year old, yet with the rather uniform distribution of the juvenile, young and adults. Heights are between 64 and 81 cm. Available comparative data⁹³ show that the average value is placed in the same mean interval calculated for most of the other sites, the single different element being that of the existence of a single maximum value of 81 cm exceeding the recalculated maximum values.

In horse, we calculated a single height - 142 cm - which, from the view of the few available data, is no element of novelty, the value being incorporated in the series of values obtained from other sites (even though for this species not only heights were compared but also the sturdiness index values for a more clear image).

In dog, we determined a single height for the site on Cotita Street - 54-56 cm. The comparison with sites of same type is hindered by the small number of estimations for this species⁹⁴.

⁹² Gudea 2005, 123-289.
⁹³ Gudea 2005, 123-289.
⁹⁴ Gudea 2005.

Above species is no object of food consumption, their remains being commonly identified in such samples.

The transition to the level dating to the 11th-12th centuries does not allow many comparisons. Due to the small number of identified bones for each species, an objective comparison of the features of the sample itself (the range of identified species) as well as of the noted morphological data is impossible. It seems that the food pattern includes the same 3 species - bovids, capriovids and domestic pig, possibly a higher ratio of capriovids and likely, the higher ratio of sacrificed adults in this group. In the domestic pig's case, circumstances seem identical to those in the Roman period sample.

The sample belonging to the 16th-17th centuries provides a few additional elements. The slightly broader species range is noticeable (comparative to the 11th-12th centuries' sample) as well as the slightly more numerous morphological data. The three main species are numerically represented in common proportions, with almost a numerical equality of the number of estimated number of specimens, however the predominant nutritional ratio of the bovids is most obvious. The identified bovids were used based on a mixed system, utilitarian-food source (which was marked by the age of sacrifice), and determined heights for females are of 115-125 cm. In sheep, we could recalculate height - 64.9 cm, and in the domestic pig, the recalculated heights are in the 68-71 cm interval.

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