



FAUNAL EXPLOITATION AT THE ULUCAK HÖYÜK AREA: PRELIMINARY REPORT

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ABSTRACT

The study of 604 animal bone fragments from Ulucak Höyük contributed to the understanding of the frequency of specimens in the assemblage (caprins, bovinds, suids, carnivores, hares, cervids, fish and birds), the diachronic exploration of the environment, the skeletal frequencies, the age at death and the Minimum Number of Individuals. Focusing in the relative frequencies of the species and the subsistence strategy, the preliminary analysis shows more affinities with the western parts of the Aegean than all the eastern parts of Anatolia. That selection could be the result of the geomorphological data, as Ulucak is situated in a small plain, or just a statistical mistake due to the limited number of bones examined.

KEY-WORDS: Mammals, Neolithic, Chalcolithic, Eastern Aegean

INTRODUCTION:

1. The geographical definition: Ulucak is a site on the Eastern Aegean region situated at a small alluvial plain (220.86m above the sea-level), which is surrounded by hills and (mountains which do not rise more than 1506m on Nif Dağı or 1513m on Sipil Dağı/Manisa mt), just at the east of the urban complex of Ismir (or 25km from the square Konak Meydani at the Ismir bay, by the

Belkahve pass). Ulucak is located in a wide arc of the Nif (former Nyphaion) stream, which flows through the plain and it could be considerate as a site belonging to the coastal zone since it lies below the 800m.

2. The archaeological characteristics: The site, a 6m mound in height, covering an area of approximately 3.0 hectares (Çilingiroğlu et alii 2004, 2) and having a considerable accumulation of deposits (the depth below the

actual surface is about 4 m: *ibidem*, 5), has been investigated at the beginning by French (1969, 1997) and excavated from 1995 onwards by Çilingiroğlu and his team (Çilingiroğlu et alii 2004). Excavations revealed 5 cultural horizons having more than one sub-periods: Ia-Ic: Late Roman/Early Byzantine, IIa-IIb: Early Bronze Age II -ca 3000-2000 BC-, III: Late Chalcolithic, IVa-IVg: Late Neolithic Period -IVb has yielded a C14 absolute chronology corresponding at 5900-5750BC-, V: Late Neolithic.

The configuration of the site, certainly not as large as the sites of the major center of the Neolithic development in Anatolia, reminds us its long period of occupation and its typology of architectural structures, constructed mainly of mud bricks, sometimes on stone foundations.

Independently of the different techniques used in architecture (wattle-and daub, pisé, mud bricks with or without pebble foundation), which have been widespread to Thessaly, Macedonia, Thrace till the Danube area, the eastern Aegean coast (Treuil 1987) the central and eastern Anatolia for ages, we realize indirectly, that throughout centuries and millennia, Ulucak has always been a rural settlement. Certainly, as it is located at a quite important road from the Aegean coast to the East (e.g. West-East: Turgutlu-Sardeis-Salihli in the Manisa [ancient Magnesia ad Sipylus] plain where Gediz river flows) through mountain passes, it has been surrounded by defensive walls as early as EBA (level IIb2, if not earlier: Çilingiroğlu et alii 2004, 15), but the organization of space and the storage pits could provide us with more information when we examine the whole faunal material.

3. Climate and vegetation: The other interesting feature for the study of the faunal material is that the area belongs to the typical Mediterranean climatic zone, which has consequences on agriculture (the floor of the valley was assigned mainly to wine yards and

olive trees) and the wild vegetation (evergreen shrubs, pine and oak on the upland zone). We presume that the climate could not have changed dramatically from the Late Neolithic, even if deforestation is more pronounced during the historical times and husbandry and transhumance (seasonal movements between coast and upland pasture have been described by travelers: French 1994) could have a more or less negative effect. Transhumance was practiced until recently and the nearby village is inhabited by *yörük* (Prof. Çilingiroğlu, personal communication), a Muslim transhumant population who was spread in the Balkans and the Asia Minor area, during the previous centuries.

THE ANIMAL REMAINS:

1. The sample: In order to examine the faunal composition and eventually the animal exploitation in the Nif valley, a very small amount of bones (604 fragments in a quite good state of preservation: Table A) has been used for the pilot study.

The size of the sample did not allow us quantification by level (table A), studies on age pattern (some remarks have been however made: tables D-E), sex division among killed animals, anatomical size changes and faunal diversity between sites and as a less direct indication of domestication and economical changes. We were only able to illustrate the abundance of the major species (table A) and the species/anatomy distribution, preservation and the Minimum Number of Individuals (MNI) for each period as indicative data useful for the future research (tables B1-B24; C1-C9).

2. The conclusions are: **I.** The huge amount of the animal remains (Table A) came from the Neolithic and Chalcolithic periods (75.61% and 65.76% respectively).

II. Cervidae (tables A, B10, B19, F, G) and Leporidae (tables A, B22, F, G) made up the 1.47%, 1.57% for the cervids and 2.45% for

the hare during the Late Neolithic and the Chalcolithic period respectively. Birds (tables A, B11) and fish (tables A, B23) yield 1 or 2 bones, so we did not proceed on further analysis. There is certainly an exploitation of local faunal resources but the large number of identified remains point out to a full animal domestication and a limited hunting. Invertebrate fauna too must have been collected.

IIa. Such a low exploitation of wild resources, even if we recover more species using larger samples, is uncommon for protodomestication sites like Asikli Höyük on the Cappadocian part of the Central Anatolian Plateau, (Esin 1999, 215-26, he also mentions Degirmintepe on the Euphrates; Buitenhuis 1997, 655-62), or Hacilar (Westley 1970, 245-7), Can Hasan, Suberde, Çatal Höyük in Central Anatolia (Balkan-Alti 1994, 27; Buitenhuis 1997, 655), Cafer Höyük, Çayönü Tepesi in southeastern Anatolia (Hongo and Meadow 2000, 127-9), Kuruçay Höyük (Deniz 1994, 76-81). Archaeological context and faunal remains revealed that the inhabitants of layers IV and V at Ulucak had a totally different way of animal exploitation. Maybe the answer for the transition between the Aceramic/Early Neolithic and the Late Neolithic is hidden in the deeper layers. Next campaigns will maybe solve that crucial question not only for the occupational history of the site, but for the eventual exchanges around the same area and the Aegean islands too.

IIb. It is common knowledge that during the main period of our research, the Late Neolithic/ Chalcolithic, people had greater access to stable supplies of animal foods (meat, milk and milk products) and hunting decreased. The same economic activity has been proved for the other side of the Aegean during the whole Neolithic and the successive periods, when game seems to be a supplement in the diet (Trantalidou 1996; *ib.* 2001).

IIc. It is also very well demonstrated that as domestication progressed hunting decreased

everywhere. Consequently, pastoral production was well established at the sites of the Black Sea region, the central Anatolia, and the Euphrates river valley. However several models of herd composition were observed. a) At İkiztepe, located in the province of Samsun, on the bank of the Kizilirmak (ancient Halys) river and inhabited from Chalcolithic to Middle Ages (but mainly the end of Early Bronze III/ Early Hittite period), researchers concluded that domestic stock provided the bulk of the meat supply throughout the occupation of the site, but hunting was also an important subsidiary source of meat (Tekkaya and Payne 1988, 227-44). b) At Kaman-Kalehöyük, southeast of Ankara, where remains date from the Ottoman empire period, the Iron Age (Phrygian period, 9th-7th c. BC), the Middle and Late Bronze Age (Assyrian Colony, Old Hittite, Hittite empire- that is 2nd millennium BC), domesticated species totalize 89.7% from the Bronze Age to 99.7% during the Middle Ages (Hongo 1993, 72). At both sites there is dominance of pig (wooden vegetation?) and cattle (good pasture grounds). c) The village site of Gritille in the Euphrates River recovered a discontinuous stratigraphic sequence extending from the 7th-6th millennia BC to 11-13th c. AD. The mid-late 3rd millennium faunal sample consisted mainly of domesticated animals, where sheep and goats predominated, forming almost two-thirds (63.74%) of all identified material (Stein 1987, 101-11). So, in the future, we are obliged to concentrate our research in the coastal zone and to choose the ecozone having similar characteristics as the Nif stream area.

III. At Ulucak the inhabitants practiced an animal husbandry dominated by goats and sheep, if we judge from the high frequencies of ovicaprine remains (table A). Goat and sheep bones together make up 76.47%, 81.67%, 82.35% of the number of identified fragments during the Late Neolithic, Late Chalcolithic and Early Bronze II periods. In fact the material from the trench we examine

corresponds more or less to 3-4, 5-6 and 1 or 2 animals slaughter (if we trust the Minimum Number of Individuals: B1-B4, B6-B8, B15-B17) in each period. From Late Chalcolithic onwards goats could be more numerous than sheep.

The proportion of cattle (table A) based on bone fragments is 12.26%, 13.61%, 17.64% for the same periods. Finally, pig (table A) represent 4.41% and 1.04% for the Late Neolithic and Chalcolithic. All those bones could result from at least one animal (transcription of the MNI: tables B5, B9, B18, C3, E, F, G for the cattle and B12, B20 for the swinae). At Ulucak the environmental factors, could be an important reason for that management of the inhabitants own wealth.

As we have already mentioned the results of that quantification are quite different from the percentages accounted in sites in the specific ecological areas of Anatolia, either from the Chalcolithic or the later historical periods, when cattle and pig are in higher, sometimes in inverse, proportions. Kizilirmak; Kaman-Kalehöyük; Arslantepe, Hassek and Kurban in East Anatolia/Upper Euphrates valley (Frangipane and Siracusano 1998); Permez-Aphrodisias in West Anatolia - Late Chalcolithic, Early Bronze Age- (Crabtree and Monge 1986, 181); Karataş -Semayük in Southwest Anatolia -Early Bronze I-III, Middle Bronze Age (Hesse and Perkins 1974, 149-60) could be some of the cases to illustrate the different economic activities.

Inhabitants of sites on the Mediterranean coast like Mersin-Yukumtepe in Cilicia -Early Neolithic through Chalcolithic, Bronze, Iron Age and Medieval times- (Buitenhuis and Caneva 1998, 125), Kalabak Tepe near Milet at the mouth of Menders river on the South Aegean coast -7th to 5thc. BC- (Peters 1993, 93) seem to have practiced husbandry in similar conditions as the inhabitants at Ulucak did. Goat and sheep combined, greatly prevail

over the other food animals, hunting played no role but fishing played a complementary role in the economic activities.

At Kalabak tepe small ruminants and cattle were of equal importance for the supply of meat, while pig rank on the third place. It could be quite the same for Ulucak. At Yukumtepe cattle could have provide more meat quantity than the other ungulates.

IV. Conclusions must be regarded as both provisional and tentative.

Future lines of investigation: Approaches could be made to analyze a. the palaeoecology: the few wild animals indicate that the environment must have been more forested than today, after all, deforestation during Neolithic times was very limited.

b. the palaeoeconomy in detail, in order to understand better the differences, the relations and the exchanges between other sites of the Aegean coast, as well as the islands. Until now, it seems that there are more features in common with the other sites of the Aegean world than the Anatolia hinterland.

It is also interesting to provide evidence for the breeds (the osteometric data - Table I- are until now very few), the contribution of animals in the agricultural production, the diet and the secondary products since the osteological material up to now shows that small ruminants were not generally slaughtered before their first year (Tables D, H) and cattle were adult when killed (Table H).

We hope that archaeological and zooarchaeological studies will help to establish the cultural history of the area, fill the gap between earlier prehistoric periods and allow us to understand how the exchanges, the distribution and the knowledge of domestication have been spread from the centers of protodomestication to the nearby and far away villages, in Asia and in Europe.

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SPECIES	STRATA							
	Late Roman Period		Early Bronze Age		Late Chalcolithic		Late Neolithic	
	NISP	%	NISP	%	NISP	%	NISP	%
Caprinae	3	60.0	11	44.0	117	43.8	122	39.7
Ovis aries			1	4.0	9	3.3	16	5.2
Capra hircus			2	8.0	30	11.2	16	5.2
Bos taurus			3	12.0	26	9.7	25	8.1
Sus scrofa					2	0.7	9	2.9
Cervus elaphus					3	1.1	3	0.9
Carnivora					3	1.1	2	0.6
Bos/ Cervus					5	1.8	4	1.3
Leporidae							5	1.6
Pisces							2	0.6
Aves					1	0.3		
Long Bone Frg	2	40.0	3	12.0	28	10.4	36	11.7
Ribs			3	12.0	36	13.4	57	18.5
Vertebrae			2	8.0	7	2.6	10	3.2
TOTAL	5	100%	25	100%	267	100%	307	100%

Table A : Ulucak fauna. Relative importance of the species groups in the different phases. Counts refer to Number of Identified Specimens

ELEMENT	NISP	SIDE		PRESERVATION (1/5)	MODIFICATION BURNT	
		L	N		300° - 350°	500°
	BR					
HORN CORE	1			1		1
MANDIBLE	1	1				1
PELVIS	1			1		
TOTAL	3	1	2	3		2

Table B1 : Ulucak. Late Roman Period level. Caprinae. Fragmentation, traces of intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP	SIDE			PRESERVATION		MODIFICATION BURNT	MNI
		R	L	N	(2/5)	(1/5)	600° - 750°	
	BR							
SKULL	1			1			1	
SCAPULA	1		1				1	
SCAPULA (prox)	1		1		1			1
HUMERUS	1			1		1		
FEMUR	1			1		1		1
FEMUR (prox)	1			1		1		
TIBIA (prox)	2	2				2		1
METAPODIUM	3			3		3		
TOTAL	11	2	2	7	1	10	1	

Table B2 : Ulucak, Early Bronze Age level. Caprinae. Fragmentation, traces of intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE		PRESERVATION		MNI
	WH	BR	R	L	(5/5)	(1/5)	
TIBIA (prox)		1		1		1	1
TOTAL		1		1		1	

Table B3 : Ulucak, Early Bronze Age level. *Ovis aries*. Fragmentation in the Identifiable category of bones.

ELEMENT	NISP		SIDE		PRESERVATION		MNI
	WH	BR	R	L	(5/5)	(1/5)	
MANDIBLE			1				1
CALCANEUS	1			1		1	1
TOTAL	1	1	1	1	1	1	

Table B4 : Ulucak, Early Bronze Age level. *Capra hircus*. Fragmentation and MNI in the Identifiable category of bones

ELEMENT	NISP		SIDE			PRESERVATION	MNI
	BR		R	L	N	(1/5)	
SKULL	1					1	1
MANDIBLE	1		1				1
HUMERUS (dis)	1			1			1
TOTAL	3		1	1	1	3	

Table B5 : Ulucak, Early Bronze Age level. *Bos taurus*. Fragmentation and MNI in the Identifiable category of bones.

ELEMENT	NISP	SIDE			PRESERVATION			MODIFICATION		MNI
		BR	R	L	N	(3/5)	(2/5)	(1/5)	BURNT 300° - 350°	
SKULL	4				4					
MANDIBLE	4	3			1				1	
SCAPULA	4	1	2	1						2
HUMERUS	5	1	2	2						2
HUMERUS (dis)	3	2	1							1
RADIUS	11	4	3	4		1				4
RADIUS (prox)	5	3	2						1	3
RADIUS (dis)	1	1							1	1
ULNA	1			1					1	
PELVIS	1			1						1
PELVIS (prox)	3		3			1				3
FEMUR	15	2	1	12						2
FEMUR (prox)	1	1								1
TIBIA	33	2	5	26		1			32	4
TIBIA (prox)	7	2	4	1					7	4
TIBIA (dis)	4	2	2			2			2	2
METAPODIUM	9			9					9	1
METATARSUS	1			1					1	
METATARSUS (dis)	1	1				1				1
TOTAL	113	25	25	63	3	3	107	8		5

Table B6 : Ulucak, Late Chalcolithic level. Caprinae. Fragmentation, traces of intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE		PRESERVATION			MODIFICATION		MNI
	WH	BR	R	L	(5/5)	(2/5)	(1/5)	BURNT 300° - 350°		
MANDIBLE			1	1			1			1
RADIUS (prox)			1	1					1	1
ASTRAGALUS	1				1					1
METATARSUS (prox)			1	1			1			1
TOTAL	1	3	3	3	1	1	2			1

Table B7 : Ulucak, Late Chalcolithic level. *Ovis aries*. Fragmentation, traces of intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE			PRESERVATION					MODIFICATION	MNI	
	WH	BR	R	L	N	(5/5)	(4/5)	(3/5)	(2/5)	(1/5)	BURNT 300° - 350°		
HORN CORE	1	4	1	3	1	1	1						3.0
HC/SKULL						1							
MANDIBLE		4	3	1				1		1			
SCAPULA		1		1						1			1.0
RADIUS (prox)		1		1						1			1.0
ULNA (prox)		1	1						1				1.0
TIBIA (prox)		1		1						1			1.0
TIBIA (dis)		1	1							1			1.0
CALCANEUS		1	1							1			1.0
METACARPUS		1	1							1			1.0
METATARSUS		1			1					1			1.0
METATARSUS (prox)		2	1		1					2			1.0
METATARSUS (dis)		1			1					1			1
PHALANX B	1	1			2	1			1				
PHALANX C		1			1				1				
TOTAL	2	22	9	7	8	2	2	4	4	12			1

Table B8 : Ulucak, Late Chalcolithic level. *Capra hircus*. Fragmentation, traces of intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE			PRESERVATION		MODIFICATION		MNI
	BR		R	L	N	(2/5)	(1/5)	BURNT 300° - 350°	CUT MARKS	
MANDIBLE	2		2					2		
SCAPULA	1		1					1		1
HUMERUS	6			1		5		6	3	
RADIUS (prox)	1			1			1			1
ULNA	1			1				1		
ULNA (prox)	1				1		1	1		
PELVIS	1		1					1		1
FEMUR	2				2			2		
TIBIA	2				2			2		
TIBIA (prox)	1				1			1		
METACARPUS (dis)	1		1					1		1
METATARSUS (prox)	1				1			1		
METATARSUS	2				2			2		1
PHALANX A (dis)	1				1		1			
TOTAL	23		5	3	15	2	21	4	1	

Table B9 : Ulucak, Late Chalcolithic level. *Bos taurus*. Fragmentation, traces of intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE			PRESERVATION	MNI
	BR		R	L	N	(1/5)	
HUMERUS		1		1			1
TIBIA		1			1		1
TOTAL		2		1	1		2

Table B10 : Ulucak, Late Chalcolithic level. *Cervus elaphus*. Fragmentation and MNI in the Identifiable category of bones

ELEMENT	NISP		SIDE	PRESERVATION
	WH		N	(5/5)
PHALANX C		1	1	1
TOTAL		1	1	1

Table B11 : Ulucak, Late Chalcolithic level. Aves. Fragmentation in the Identifiable category of bones

ELEMENT	NISP		SIDE		PRESERVATION	
	BR		L	N	(2/5)	(1/5)
SCAPULA		1	1			1
SCAPULA (prox)		1			1	
TOTAL		2	1	1	1	1

Table B12 : Ulucak, Late Chalcolithic level. *Sus scrofa*. Fragmentation in the Identifiable category of bones

ELEMENT	NISP	SIDE				PRESERVATION			MNI
	BR	R	L	N	(4/5)	(2/5)	(1/5)		
MAXILLA	1			1			1		
MANDIBLE	1	1				1			
PHALANX A (prox)	1				1	1		1	
TOTAL	3	1	1	1	1	1	1	1	

Table B13 : Ulucak, Late Chalcolithic level. Carnivora, Fragmentation and MNI in the Identifiable category of bones

ELEMENT	NISP	SIDE		PRESERVATION	MODIFICATION		MNI
	BR	R	N	(1/5)	BURNT 300° - 350°		
HUMERUS	1			1	1		
TIBIA	4	1		3	4		2
TOTAL	5	1	4	5	5	2	2

Table B14 : Ulucak, Late Chalcolithic level. Large animal (Cattle or cervid). Fragmentation in the Identifiable category of bones

ELEMENT	NISP		SIDE			PRESERVATION		MODIFICATION			MNI
	BR	R	L	N	(2/5)	(1/5)	300° - 350°	500°	600° - 750°		
HC	4			4		4					
SKULL	12			12		12					
MANDIBLE	12	2	6	4	2	10	1				
SCAPULA	5	3	1	1		5				3	
HUMERUS	5	1	1	3	1	4		1			
HUMERUS (dis)	3	2	1			3	1			2	
RADIUS	8	3	1	4		8	2				
RADIUS (prox)	3	2	1			3				2	
RADIUS (dis)	2	1	1			1	1			1	
ULNA (dis)	1		1			1				1	
PELVIS	4	3		1		4					
PELVIS (il)	2	1	1		1	1					
PELVIS (isch)	1	1				1					
FEMUR	15	1	2	12	1	14				1	
FEMUR (prox)	4	2	2			4				2	
TIBIA	20	2		18	1	19	1				
TIBIA (prox)	3	3				3				3	
TIBIA (dis)	2	2			1	1				2	
METAPODIUM	12			12		12					
TOTAL	118	29	18	71	9	109	6	1	1	3	

Table B15 : Ulucak, Late Neolithic level. Caprinae. Fragmentation, traces on intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE			PRESERVATION				MODIFICATION		MNI
	WH	BR	R	L	N	(5/5)	(4/5)	(2/5)	(1/5)	300° - 350°	CUT MARKS	
SCAPULA		1		1				1		1		1
SCAPULA (prox)		2	1		1		1	1		1	1	1
HUMERUS (dis)		1	1					1				1
RADIUS (prox)		2		2					2			2
TIBIA (dis)		1	1					1				1
CALCANEUS (prox)		1	1					1				1
METAPODIUM		1			1				1			1
METATARSUS (dis)		1			1				1			1
PHALANX A	1	2			3	1	1	1				
PHALANX B (prox)	1	1			1		1					
TOTAL	1	13	4	3	7	1	3	5	5	2	1	2

Table B16: Ulucak, Late Neolithic level. *Ovis aries*. Fragmentation, traces on intentional human modification and MNI in the Identifiable Category of bones.

ELEMENT	NISP	SIDE			PRESERVATION			MODIFICATION		MNI
	BR	R	L	N	(3/5)	(2/5)	(1/5)	BURNT 300° - 350°		
MANDIBLE	1	1					1			
SCAPULA (prox)	1	1					1			1
RADIUS (prox)	1		1				1			1
CALCANEUS (prox)	1	1					1			1
METACARPUS	1			1		1				1
METACARPUS (prox)	4	2	2			2	2			2
METATARSUS	2		1	1			2			
METATARSUS (prox)	2			2			2			1
TOTAL	13	5	4	4	1	6	6	3	2	2

Table B17: Ulucak, Late Neolithic level. *Capra hircus*. Fragmentation, traces on intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE			PRESERVATION			MODIFICATION		MNI
	WH	BR	R	L	N	(5/5)	(2/5)	(1/5)	CUT MARKS	HACK MARKS	
SKULL		2			2			2			
MANDIBLE		2	1	1				2			
SCAPULA		1			1			1			
HUMERUS		4	1	1	2			4			1
HUMERUS (prox)		1		1				1			1
ULNA		2	1		1			2			
PELVIS (prox)		1	1				1				1
FEMUR		1	1					1			1
TIBIA		1			1			1			
TIBIA (prox)		2	1	1				2			1
TARSALS	1				1		1				
ASTRAGALUS	1		1				1		1		1
METAPODIUM		1			1			1			
METACARPUS		1		1				1			
METATARSUS (dis)		1	1					1			
PHALANX A	1				1		1				1
PHALANX B	2				2		2				
TOTAL	5	20	8	5	12	5	1	19	1	1	1

Table B18: Ulucak, Late Neolithic level. *Bos taurus*. Fragmentation, traces on intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE			PRESERVATION		MNI
	BR	R	L	N	(2/5)	(1/5)		
MANDIBLE	1		1			1		
SCAPULA	1			1			1	
METACARPUS	2				2		2	
TOTAL	3	1	1	2	1	3	1	

Table B19 : Ulucak, Late Neolithic level. *Cervus elaphus*. Fragmentation, traces on intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE			PRESERVATION					MODIFICATION			MNI
	WH	BR	R	L	N	(5/5)	(4/5)	(3/5)	(2/5)	(1/5)	300°	350°	500°	
SKULL		1			1					1		1		
MAXILLA		1		1						1				
MANDIBLE		1	1						1					
RADIUS (prox)		1	1					1				1		1
ULNA		1		1				1						
FEMUR		1		1				1						
TIBIA (dis)		1	1						1					1
METACARPUS	1				1	1								
METATARSUS	1			1		1								
TOTAL	1	8	1	5	3	1	1	3	2	2	2	2	2	1

Table B20 : Ulucak, Late Neolithic level. *Sus scrofa*. Fragmentation, traces on intentional human modification and MNI in the Identifiable category of bones.

ELEMENT	NISP		SIDE		SIZE	MNI
	BR	L	N	(1/5)		
SCAPULA	1		1		1	
TIBIA	1		1		1	
TIBIA (prox)	1	1			1	1
METAPODIUM	1		1		1	
TOTAL	4	1	3		4	1

Table B21: Ulucak, Late Neolithic level. Large animal (Bos or Cervus). Fragmentation in the Identifiable category of bones

ELEMENT	NISP		SIDE		PRESERVATION				MNI
	BR	R	L	(4/5)	(3/5)	(2/5)	(1/5)		
HUMERUS (prox)	1	1						1	1
HUMERUS (dis)	2	1	1			1			1
PELVIS (il)	1		1				1		1
CALCANEUS	1		1	1					1
TOTAL	5	2	3	1	1	1	1	2	1

Table B22: Ulucak, Late Neolithic level. Leporidae. Fragmentation and MNI in the Identifiable category of bones

ELEMENT	NISP		SIDE		PRESERVATION		ELEMENT	NISP		SIDE		PRESERVATION	
	BR	L	N	(2/5)	(1/5)	BR		L	N	(2/5)	(1/5)		
SKULL	2		2				MANDIBLE	1	1			1	
TOTAL	2		2				TOTAL	1	1			1	

Table B23: Ulucak, Late Neolithic level. Pisces. Fragmentation in the Identifiable category of bones

Table B24: Ulucak, Late Neolithic level. Carnivora. Fragmentation in the Identifiable category of bones

TEETH	NISP		SIDE		TEETH PRESERVATION				MNI
	WHOLE	BROKEN	L	N	(5/5)	(4/5)	(3/5)	(1/5)	
M ²	1	1	2		1	1			2
M ¹		1	1				1		1
M		1		1				1	1
TOTAL	1	3	3	1	1	1	1	1	2

Table C1: Ulucak: Isolated teeth of Caprinae in the Late Chalcolithic level

TEETH	NISP		SIDE		THEETH PRESERVATION				MNI
	WHOLE	BROKEN	R	L	(5/5)	(4/5)	(3/5)	(2/5)	
M ²		1	1					1	1
M ₃		1	1				1		1
M ₂	1		1		1				1
M ₁		2	1	1		1	1		1
TOTAL	1	4	3	2	1	1	2	1	1

Table C2: Ulucak: Isolated teeth of Ovis aries in the Late Chalcolithic level

TEETH	NISP		SIDE		T. PRESERVATION			MNI
	BROKEN	R	L	(4/5)	(3/5)	(2/5)		
M ²	1	1					1	
M ¹	1		1		1		1	
P ¹	1	1			1		1	
TOTAL	3	2	1		2		1	

Table C3: Ulucak: Isolated teeth of Bos taurus in the Late Chalcolithic level

TEETH	NISP		SIDE			TEETH PRESERVATION			MNI
	WHOLE	BROKEN	R	L	N	(5/5)	(4/5)	(3/5)	
M ₃		2	1	1			1	1	1
M ₂	1		1			1			1
M ₁	1	1		1	1	1		1	1
D ₄		1		1			1		1
TOTAL	2	4	2	3	1	2	2	2	1

Table C4: Ulucak: Isolated teeth of Capra hircus in the Late Chalcolithic level

TEETH	NISP		SIDE		PRESERVATION			MNI
	BROKEN	R	(5/5)	(4/5)	(3/5)			
M ¹	1	1				1	1	
TOTAL	1	1				1	1	

Table C5: Ulucak: Isolated teeth of Cervus elaphus in the Late Chalcolithic level

TEETH	NISP		SIDE		TEETH PRESERVATION				MNI
	WHOLE	BROKEN	R	L	(5/5)	(4/5)	(3/5)	(2/5)	
M ³		1		1				1	1
M ²	1	1		2	1		1		2
M ₂		1	1			1			1
TOTAL	1	3	1	3	1	1	1	1	1

Table C6: Ulucak: Isolated teeth of Caprinae in the Late Neolithic level.

TEETH	NISP		SIDE		T PRESERVATION		MNI
	WHOLE	BROKEN	R	L	(5/5)	(3/5)	
M ³	1			1		1	1
D ₄			1				1
TOTAL	1		1	1		1	1

Table C7: Ulucak: Isolated teeth of Ovis aries in the Late Neolithic level.

TEETH	NISP		SIDE		PRESERVATION		MNI
	WHOLE	BROKEN	R	L	(5/5)	(4/5)	
M ₂			1			1	1
M ₁	1			1	1		1
P ₄			1	1			1
TOTAL	1		2	3	1	2	1

Table C8: Ulucak: Isolated teeth of Capra hircus in the Late Neolithic level.

TEETH	NISP		SIDE		PRESERVATION		MNI
	WHOLE	L	(5/5)	(4/5)			
P ₄	1	1	1			1	
TOTAL	1	1	1			1	

Table C9: Ulucak: Isolated teeth of Carnivora in the Late Neolithic level.

ELEMENT	FUSION PERIOD (months)	EARLY BRONZE AGE		LATE CHALCOLITHIC		LATE NEOLITHIC	
		Fused	Unfused	Fused	Unfused	Fused	Unfused
Ovicaprinae							
SCA, HUMd, RADp, PELV	6-10			2		5	2
MCAd, TIBd, MTAd	18-28			1	1		1
HUMp, RADd, FEMp-d, CALCP	30-42					1	
Sheep							
SCA, HUMd, RADp, PELV	6-10					4	
MCAd, TIBd, MTAd	18-28					2	
HUMp, RADd, FEMp-d, CALCP	30-42						1
Capra							
SCA, HUMd, RADp, PELV	6-10					2	
MCAd, TIBd, MTAd	18-28			3	1	1	
HUMp, RADd, FEMp-d, CALCP	30-42	1				1	
Pig							
SCA, HUMd, RADp, PELV	c.12					1	
MCAd, TIBd, MTAd, CALCP	18-28					1	
HUMp, RADd, FEMp-d, TIBp, FIBp	c.42						
Cattle							
SCA, HUMd, RADp, PELV	6-10		1	1		1	
MCAd, TIBd, MTAd	18-28			1		1	
HUMp, RADd, FEMp-d, CALCP	30-42						

Table D: Ulucak. Prehistoric levels. Estimation of age at death of domesticated animals with determinate growth. It is based on the epiphyseal fusion following Chaplin 1971 and Barone 1976.

STRATA	ELEMENT	NISP	ANIMAL SIZE			AGE		MODIFICATION	
			Caprinae		Bos/Cervus	Adult	Young	BURNT	
			(2/5)	(1/5)	(1/5)			300°-350°	
Early Bronze Age	CERVICAL	2		1					
	LUMBAR				1				
Late Chalcolithic	CERVICAL	7		1	2				
	THORACIC			1	1	1			
	LUMBAR			1		1			
	VERTEBRAE ind.			1					
Late Neolithic	ATLAS	10	1						
	CERVICAL			2	1	1			
	THORACIC			1					
	LUMBAR			1					
	VERTEBRAE ind.			4		2	1		1
All periods	TOTAL	19	1	13	5	5	1	1	

Table E: Ulucak. Prehistoric levels. Total number of vertebrae, fragmentation pattern, modification and age structure in the animals of the Artiodactyla order.

STRATA	FRAGMENT SIZE	NISP	SIZE OF ANIMAL		MODIFICATION				AGE	
			Caprinae/Suidae	Bos/Cervus	Burnt 300° - 350°	Cut Marks	Hack Marks	Adult	Young	
Early Bronze age	3 - 6 cm.	3	1							
	6 - 9 cm.		1	1				1		
Late Chalcolithic	0 - 3cm.	36	5							1
	3 - 6 cm.		14	4						
	6 - 9 cm.		5	3						
Late Neolithic	0 - 3 cm.	57	10	1		1				2
	3 - 6 cm.		30	1		2	1	2	1	1
	6 - 9 cm.		6	4		1				
	9 - 12 cm.			2						
	12 - 15 cm.			1						
	15 - 18 cm.			1						
TOTAL		96	73	17		4	1	2	2	4

Table F: Ulucak. Prehistoric levels. Number of ribs, fragmentation and modification.

STRATA	FRAGMENT SIZE	NISP	SIZE OF ANIMAL		MODIFICATION	
			Caprinae/ Suidae	Bovidae/ Cervidae	BURNT 300° - 350°	
Late Roman Period	0 - 3 cm.	2		2		
	3 - 6 cm.			2		
Early Bronze Age	0 - 3 cm.	3				
	3 - 6 cm.			1		
Late Chalcolithic	0 - 3cm.	28		17		
	3 - 6 cm.			7		2
	6 - 9 cm.			1		1
Late Neolithic	0 - 3 cm.	36		20		1
	6 - 9 cm.			16		
TOTAL			65	4		1

Table G: Ulucak. Distribution of non identified long bone fragments in the different cultural/ chronological levels.

STRATA	Species	EARLY BRONZE AGE	LATE CHALCOLITHIC	LATE NEOLITHIC		
		Capra hircus	Ovis aries	Capra hircus	Caprinae	Ovis aries
AGE OF DEATH						
2 m - 12 m						
6 m - 2 y						
2 y - 3 y						
2 y - 6 y						
1 y - 2 y						
1 y - 4 y						
2 y - 4 y						
3 y - 4 y						
3 y - 6 y						
4 y - 6 y						
4 y - 8 y						
4 y - 10 y						

Table H: Ulucak. Prehistoric levels. Age at death of sheep and goats based on tooth wear stages from loose teeth and mandibles.

BIOMETRIC DATA: Greatest dimensions in mm				
TAXON	ELEMENT	MEASUREMENTS	STR/ LEVEL	
Bos taurus	UP3	Length	18.0	CLR, IVb2
		Breath	16.3	
	UP4	Length	20.0	BPS, IIIb1
		Breath	20.4	
	LM1	Breath	14.8	
Metacarpus		Breath of the distal end	66.3	BPS, IIIb1
		Depth of the distal end	38.7	
Metatarsus		Breath of the distal end	58.5	CLD, IVc
		Depth of the distal end	34.7	
Astragalus		Length of the lateral half	65.0	CLR, IVb2
		Length of the medial half	62.0	
		Depth of the lateral half	37.3	
		Breadth of the distal end	41.4	

Phalanx I	Length	62.6	CJH, IVd	
	Breath of the proximal end	29.1		
	Smallest breath of diaphysis	24.0		
	Breath of the distal end	26.6		
Phalanx II	Breath of the distal end	24.6	BOM, IIIb2	
	Length	40.6	CLD, IVb1	
	Breath of the proximal end	31.1		
	Smallest breath of diaphysis	26.5		
	Breath of the distal end	27.3		
Capra hircus	Ld4	Length	17.9	BRJ, IIIb1
		Breath	7.0	
		Length	18.4	BOM, IIIb2
		Breath	6.5	
LM3		Length	15.4	CER, II
		Breath	6.5	
		Breath	8.2	BOJ, IIIb1
		Breath	8.5	
Scapula		Length	22.7	CEE, IIIc
		Breath	6.7	
		Length	24.4	CJY, IVb1
		Breath	6.5	
Tibia		Length of the processus articularis	42.2	CL6, IV
		Breath of the distal end	29.8	BRJ, IIIb1
Metacarpus		Depth of the distal end	23.6	
		Breath of the proximal end	23.1	CLR, IVb2
		Depth of the proximal end	16.4	
		Breath of the distal end	26.7	CLD, IVd
		Depth of the distal end	16.7	
Phalanx II		Breath of the proximal end	23.5	CJH, IVd
		Depth of the proximal end	16.7	
		Length	27.9	BRJ, IIb1
		Breath of the proximal end	12.4	
Ovis aries		Smallest breath of diaphysis	9.1	
		Breath of the distal end	10.4	
		Breath of the proximal end	13.4	
	LM3	Breath	8.6	BOJ, IIIb1
	Radius	Breath of the proximal end	30.4	CLV, IVc
Tibia		Smallest breath of diaphysis	12.2	CLG, IV
		Breath of the distal end	22.7	
		Depth of the distal end	17.3	

Metacarpus	Breath of the proximal end	22.2	CID, IVb1	
	Breath of the distal end	15.8		
Calcaneus	Length	57.8	CER, II	
	Breath	18.5		
Phalanx I	Length	35.9	CIM, IVf	
	Breath of the proximal end	10.6		
	Smallest breath of diaphysis	8.3		
	Breath of the distal end	10.2		
Lepus capensis	Humerus	Length	32.6	CLG, IV
		Breath of the proximal end	11.0	
		Smallest breath of diaphysis	9.0	
		Breath of the distal end	10.8	
		Breath of the distal end	12.1	CLG, IV
		Breath of the distal end	12.6	

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