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### TOME I

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# SOMMAIRE

## Tome I

Emmanuelle VILA, Lionel GOURICHON	
Avant-Propos .....	13
Preface .....	17
François POPLIN	
<i>Prologue anthropozoologique – Animal vrai, sacrifice et domestication laitière</i> .....	21
<i>Anthropozoological prologue—True animal, sacrifice and the domestication of dairy animals</i> .....	33
Liora KOLSKA HORWITZ, Hitomi HONGO	
<i>Putting the meat back on old bones. A reassessment of Middle Palaeolithic fauna from Amud Cave (Israel)</i> .....	45
Hervé MONCHOT	
<i>Des hyènes tachetées au Pléistocène supérieur dans le Zagros (grotte Wezmeh, Iran)</i> .....	65
Anne BOUTEAUX, Anne-Marie MOIGNE, Kasman SETIAGAMA	
<i>Études archéozoologiques de sites javanais du Pléistocène : les sites de plein air du dôme de Sangiran (Java central) et le site en grotte de Song Terus (Java est)</i> .....	79
Anne BRIDAULT, Rivka RABINOVICH, Tal SIMMONS	
<i>Human activities, site location and taphonomic process: a relevant combination for understanding the fauna of Eynan (Ain Mallaha), level Ib (final Natufian, Israel)</i> .....	99
Daniel HELMER, Lionel GOURICHON	
<i>Premières données sur les modalités de subsistance à Tell Aswad (Syrie, PPNB moyen et récent, Néolithique céramique ancien) – Fouilles 2001-2005</i> .....	119
Maria SAÑA, Carlos TORNERO	
<i>Consumption of animal resources at the sites of Akarçay Tepe and Tell Halula (Middle Euphrates Valley, 8th-6th millennia cal. BC)</i> .....	153
Daniel HELMER	
<i>Révision de la faune de Cafer Höyük (Malatya, Turquie) : apports des méthodes de l'analyse des mélanges et de l'analyse de Kernel à la mise en évidence de la domestication</i> .....	169
Gisela GRUPE, Joris PETERS	
<i>Feeding humans and animals at Pre-Pottery Neolithic Nevalı Çori (SE-Anatolia) as evidenced by stable isotope analysis</i> .....	197

Francoise LE MORT, Jean-Denis VIGNE, Simon J.M. DAVIS, Jean GUILAINE, Alain LE BRUN <i>Man-animal relationships in the Pre-pottery burials at Shillourokambos and Khirokitia (Cyprus, 8th and 7th millennia cal. BC)</i> . . . . .	219
Melinda A. ZEDER <i>Animal Domestication in the Zagros: an Update and Directions for Future Research</i> . . . . .	243
Jean CANTUEL, Armelle GARDEISEN, Josette RENARD <i>L'exploitation de la faune durant le Néolithique dans le bassin égéen</i> . . . . .	279
Hijlke BUITENHUIS <i>Ilipinar: The faunal remains from the late Neolithic and early Chalcolithic levels</i> . . . . .	299
Chiara CAVALLO, Tijmen MOESKER <i>Faunal remains from the Neolithic levels of Tell Sabi Abyad (Syria)</i> . . . . .	323

## **FAUNAL REMAINS FROM THE NEOLITHIC LEVELS OF TELL SABI ABYAD (SYRIA)**

Chiara CAVALLO<sup>1</sup>, Tijmen MOESKER<sup>2</sup>

### ABSTRACT

Recent excavations at Tell Sabi Abyad in northern Syria have provided new information on the nature and development of the Pottery Neolithic settlement at the site in the seventh and sixth millennium BC. The results of the preliminary analysis of part of the faunal material from the Early Pottery Neolithic levels (7th millennium cal.) is presented and compared with the more extensively studied material from the late Neolithic levels (6th millennium cal.).

*Keywords:* Early Pottery Neolithic, Tell Sabi Abyad.

### RÉSUMÉ

*Les fouilles récentes de Tell Sabi Abyad en Syrie du Nord ont fourni de nouvelles informations sur la nature et le développement de l'occupation humaine sur le site durant le Néolithique céramique au cours du VII<sup>e</sup> et du VI<sup>e</sup> millénaire av. J.-C. Dans cet article, les résultats de l'étude préliminaire d'une partie du matériel faunique provenant des niveaux du Néolithique céramique ancien (VII<sup>e</sup> millénaire cal.) sont présentés et comparés avec les données plus importantes du matériel des niveaux du Néolithique récent (VI<sup>e</sup> millénaire cal.).*

*Mots-clés :* Néolithique ancien, Tell Sabi Abyad.

### INTRODUCTION

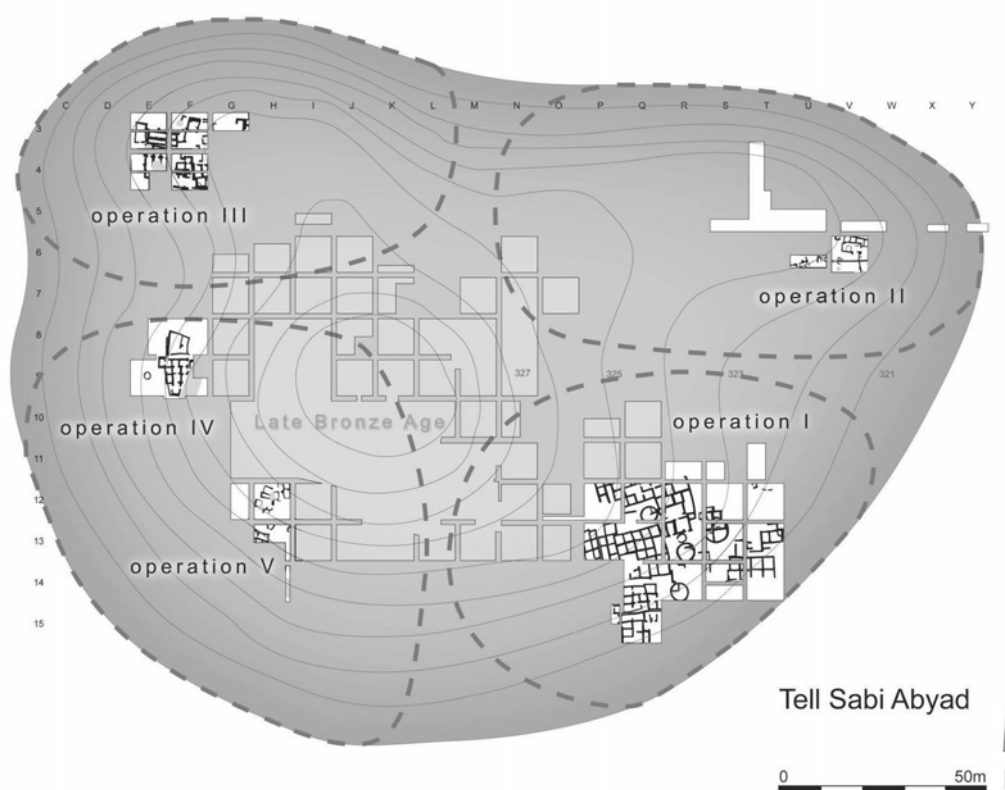
The aim of this article is the presentation of the zooarcheological data analyzed so far from the very Early Pottery Neolithic levels from Tell Sabi Abyad, excavated during the 2001, 2003 and 2004 campaigns.

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During these campaigns new areas were excavated, in which well-preserved, early occupation layers appeared immediately below the surface. They date to *ca* 6700-6400 cal. BC, and still earlier deposits await excavation (Akkermans *et al.* 2006). These finds shed light on an early period that has until now been characterized by a paucity of data. This period is associated with the appearance of the earliest pottery in Syria and the northern Levant and the rise of an increasingly complex society of both farmers and pastoralists (Akkermans, Schwartz 2003).

## THE SITE

Since the 1980's several excavation campaigns have unearthed many different levels of Neolithic occupation. The most extensively exploited area is the so called "Operation I" area (*fig. 1*), where late Neolithic levels dating to the end of the 7th and beginning of the 6th millennium BC, including the so-called "Burnt Village", were found (Akkermans 1993; Akkermans, Verhoeven 1995; Verhoeven 1999). The excavations from 2001-2003 have provided important new information on the nature and development of the Pottery Neolithic settlement on this site in the seventh millennium BC. These levels were found in the other areas, operations II, III, IV and V (Akkermans *et al.* 2006). Of particular importance is operation III, where the recent fieldwork has produced a long sequence of small and continually shifting occupations, on the order of 0.5-1 ha, each with rich assemblages of very early pottery and other artifacts.



*Fig. 1—Map of the excavation areas at Tell Sabi Abyad.  
(Drawing: courtesy of Netherlands National Museum of Antiquities and Mikko Kriek).*

The faunal material discussed in this article comes from the operation III area, specifically material that was hand-collected from squares E3, E4 and G3 (9x9 m each), from levels 8 through 1 (Moesker 2006). The specific dating of these levels/squares is reported in table 1. Because of the paucity of the material and the aim of this preliminary study, the material here is presented as a whole sample.

Squares	2004 levels	Dating	2003 levels	Dating	2002 levels	Dating
E4	8-5	6700-6500	5-3	6500-6300	-	-
E3	7-5	6600-6500	5-3	6500-6300	-	-
G3	5-4	-	-	-	2-1	6400/6300-6200

Table 1—Levels present in squares E4, E3 and G3. Dates are calibrated (cal. BC).

Of particular importance in the operation III area is the discovery of well-preserved building levels belonging to the initial stage of the Pottery Neolithic, dated to *ca* 6700-6600 BC calibrated. These levels provide an insight into the character of the settlement and material culture of one of the poorest known periods in the history of Syria and the northern Levant (Akkermans, Schwartz 2003). Besides single and multi-roomed houses, often with white-plastered floors and walls, a particularly important find is the pottery that emerged from these buildings, which is among the earliest found in the Near East to date. Around 6300 BC, distinct changes in the organization of the communities and the material culture took place at the site, and these were associated with, among other things, the appearance of circular buildings (the *tholoi*) and clay seals, which indicate controlled storage. In presenting the material, a distinction has been made between an “Early Pottery Neolithic period” (Balikh IIA in the local sequence) with the first occurrence of pottery in the archaeological record and a “Late Neolithic period”, representing the developed stage of the Pottery Neolithic and subdivided into several successive phases termed Balikh IIC (Pre-Halaf; end 7th mill./*ca* 6300-6100), Balikh IIIA (Transitional; *ca* 6000 BC) and Balikh IIIB (Early Halaf; 5900-5800 BC) (Akkermans *et al.* 2006).

## THE SAMPLE

So far a total of almost 1300 fragments from the earliest Early Pottery Neolithic levels have been studied (table 2). A few bones could not be ascribed to the dated levels or were found in the topsoil. The remains from a large pit in square G3 have been sorted, but so far they have provided few bones. The majority of bones (almost 60% of the identified bones) came from sheep and goat; the percentage of pig bones is relatively high (11%), followed by cattle (5%). The majority of the remains have been categorized as domestic species. The domestic status of the main four staple species has been widely attested and had developed by the late PPNB in the Upper and Middle Euphrates basin (Peters *et al.* 1999, 2005; Saña Seguí 2000).

The percentage of remains more clearly attributable to wild species is relatively high (25%), and consists mainly of gazelle. The equid bones, attributed to the onager, are poorly represented with a percentage comparable to the remaining wild animals. The latter category includes cervids, small carnivores, hare, wild boar, wild sheep and wild goat. The identification of these last three species was made on the basis of metrical comparison within the sample itself and with the previously studied material from operation I (Cavallo 2000).

Taxa	Levels													Total
	8	7	6/7	6	5/6	5	4	3/4	3	1/2	Pit G3	Mixed	Topsoil	
Sheep/goat, <i>Ovis/Capra</i>	79	101	35	103	5	89	48		9	119	6	25	4	623
Sheep, <i>Ovis aries</i>	5	6	3	9		8	3		1	19	2	1		51
Sheep?										3				3
Goat, <i>Capra hircus</i>	3	5				3	2		1	8		1		23
Cattle, <i>Bos taurus</i>	7	13	2	8		1	5			19	2	3		60
Cattle?										1				1
Pig, <i>Sus domesticus</i>	12	21	5	16		18	13	1	1	35	1	8		131
Dog, <i>Canis familiaris</i>						1	2			2		1		6
Dog?		1	1											2
Wild? sheep/goat		1		2			1							4
Wild sheep, <i>Ovis orientalis</i>	1	1								1				3
Wild? sheep		1				1								1
Wild goat, <i>Capra aegagrus</i>				1										1
Onager, <i>Equus hemionus</i>	9	5	4	7		9	1			8	1	3		47
Aurochs, <i>Bos primigenius</i>						3				2				5
Aurochs?	1									1				2
Gazelle, <i>Gazella subgutturosa</i>	16	69	23	21		23	15		2	23	5	12	1	210
Gazelle?		2		1						1				4
Wild boar, <i>Sus scrofa</i>	1						1							2
Wild boar?				1										1
Cervidae										1				1
Persian fallow deer, <i>D. mesopotamica</i>										1				1
Felidae, <i>Felis</i> sp.												1		1
Fox, <i>Vulpes vulpes</i>	1	2									2			5
Fox?										1				1
Carnivore		1	1											2
Hare, <i>Lepus capensis</i>							1			1				2
Jackdaw, <i>Corvus monedula</i>											1			1
White stork, <i>Ciconia ciconia</i>											1			1
Hawk, <i>Falco</i> sp.						1								1
Birds, Aves	3	11	7	5		8	11				1	1		47
Molluscs	8	8		7	7	7						1		38
Tortoise, <i>Testudo graeca</i>		2								1				3
Total	146	250	83	179	12	172	103	1	14	247	22	58	5	1292

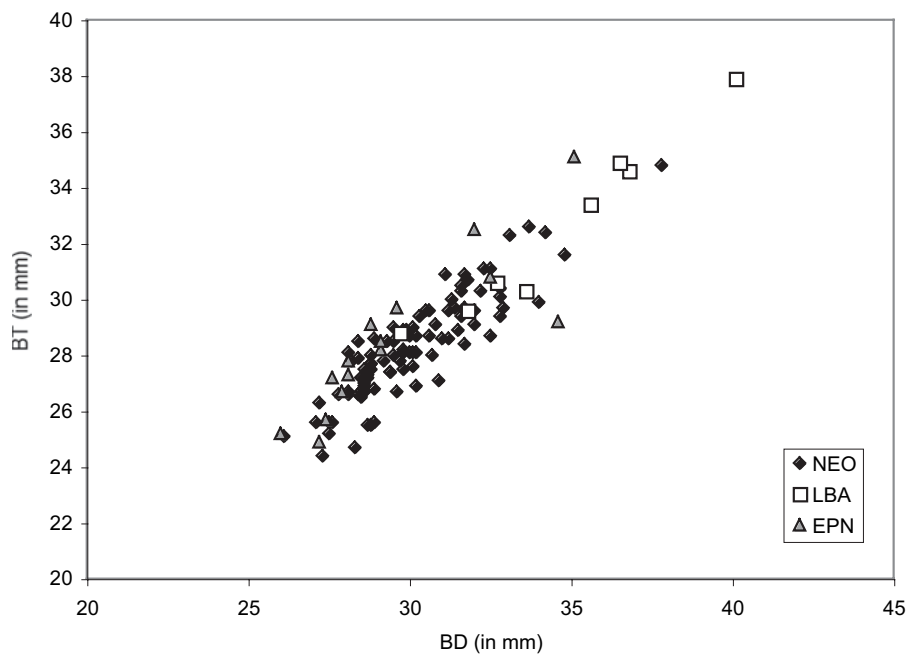
Table 2—Absolute frequency of identified species in each level at Tell Sabi Abyad.

## DESCRIPTION OF THE SPECIES

**Domestic animals**

The ovicaprid bones account for 59% of the identified mammals (*table 3*). Taking all the bones into consideration, the ratio between sheep and goats is 2.8:1. If only the humerus, one of the most diagnostic and most frequent bones, is taken into account the ratio becomes 5:1. This ratio is comparable to that from the pre-Halaf levels from operation I based on the same element (Cavallo 2000, *table 6.9*). All skeletal elements are represented, with cervical vertebrae (and vertebrae in general) being the least present. Due to the high degree of fragmentation of the mandibles, loose teeth are the most frequently represented part of the skeleton (*table 4*).

The size of the ovicaprids from the youngest Early Pottery Neolithic levels is largely comparable to those from the Neolithic in general. There is a slight overlap with the largest bones from both the Neolithic and the Bronze Age (*fig. 2*). Focusing on the earliest period and comparing the material from operation III (Early Pottery Neolithic) specifically with the almost contemporary lowest levels from operation I (pre-Halaf), it is possible to see that there is a kind of inverse similarity between the two samples, and the measurements actually fall into two rather discrete groups (*fig. 3*). The paucity of data and the fact that only a few finds could be more precisely ascribed to a specific species (see appendix) make it difficult to ascertain at this point whether this could be ascribed to the presence of two different populations or species, or to sexual dimorphism. More data and the application of more sophisticated statistical methods will allow this to be investigated in more detail (Monchot *et al.* 2005).



*Fig. 2—Comparison between the Early Pottery Neolithic (EPN), Late Neolithic (NEO) and Bronze Age (LBA) measurements of the humeri of ovicaprids from Tell Sabi Abyad.*

The mortality pattern of ovicaprids from the Early Pottery Neolithic levels is based on 42 mandibles which could be ascribed to age classes according to the method developed by Payne (1973) (*fig. 4*). The graph shows an emphasis on the slaughtering of quite young animals. A relatively high percentage was slaughtered within the first two years, with a steady decrease of slaughtering from this point until adulthood.



A few animals were kept a few years longer, most likely for reproductive purposes. A striking feature is the complete absence of older animals, the categories H and I. This pattern would indicate an emphasis on exploitation of the herds for meat, probably with more short-term optimization goals. While the complete absence of unweaned lambs (category A) and the low presence of very young individuals (category B) could be ascribed to poor preservation or selective retrieval of the material, this would not be the case for older animals.

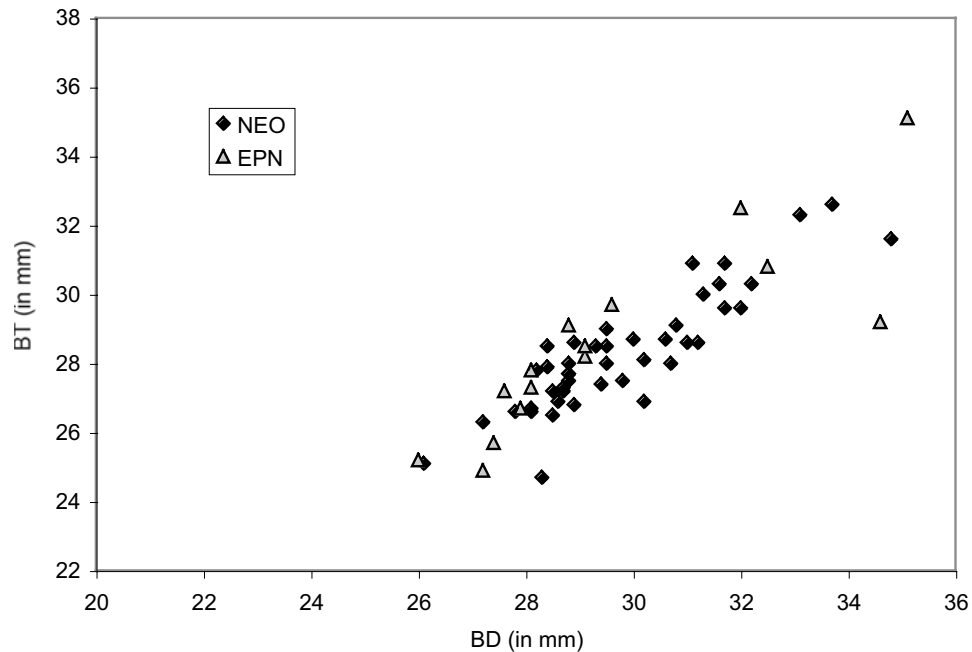


Fig. 3—Comparison between the Early Pottery Neolithic (EPN) and Neolithic pre-Halaf (NEO) measurements of the humeri of ovicaprids.

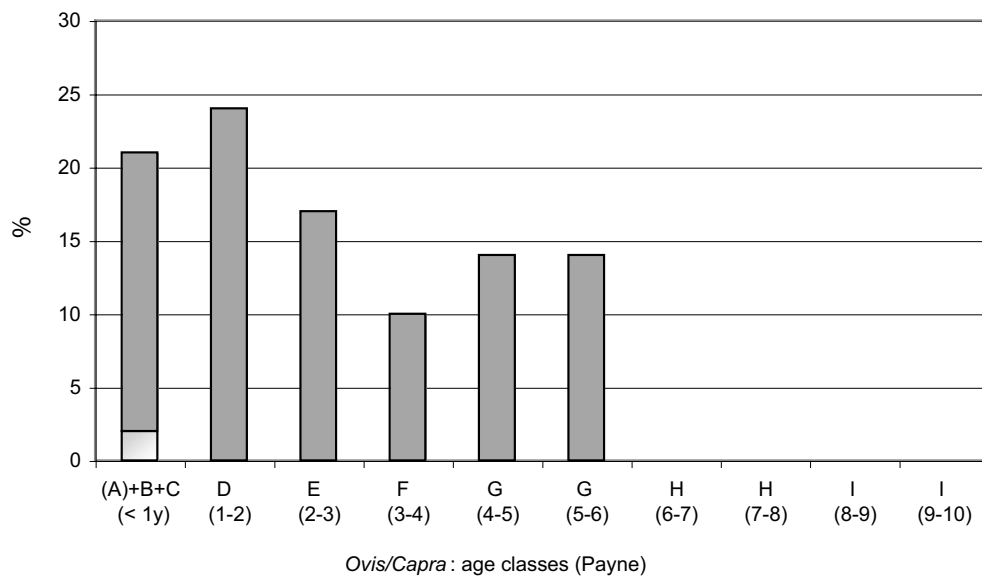


Fig. 4—Kill-off profiles of the ovicaprids from the Early Pottery Neolithic levels of Tell Sabi Abyad (Age classes according to Payne 1973).

The mortality pattern of ovicaprids from the Early Pottery Neolithic levels is very different from the mortality profiles from the later periods, even from that of the more or less contemporaneous pre-Halaf levels (Cavallo 2000, fig. 6.10). The pre-Halaf levels also show an emphasis on meat exploitation, but with a clear emphasis on the F category and the presence of an almost even distribution of animals killed in later stages including quite old ones. Although the Early Pottery mortality profile would indicate an even more intensive/maximization exploitation of the herd for meat purposes, the absence of individuals older than 4-6 years would cause the extinction of the herd, demographically speaking. It seems that here a selective representation of the herds is present, which would also account for the absence of evidence for natural infant mortality (category A).

Taxa	N	%
Sheep/goat, <i>Ovis/Capra</i>	623	51.9
Sheep, <i>Ovis aries</i>	58	4.8
Sheep?	3	0.2
Goat, <i>Capra hircus</i>	23	2.0
Cattle, <i>Bos taurus</i>	60	5.0
Cattle?	1	< 0.1
Pig, <i>Sus domesticus</i>	131	10.9
Dog, <i>Canis familiaris</i>	6	0.5
Dog?	2	0.2
Total domesticated	907	75.4
Wild? Sheep/goat	4	0.3
Wild sheep, <i>Ovis orientalis</i>	3	0.2
Wild? sheep	2	0.2
Wild goat, <i>Capra aegagrus</i>	1	< 0.1
Onager, <i>Equus hemionus</i>	47	3.9
Aurochs, <i>Bos primigenius</i>	5	0.4
Aurochs?	2	0.2
Gazelle, <i>Gazella subgutturosa</i>	210	17.6
Gazelle?	4	0.3
Wild boar, <i>Sus scrofa</i>	2	0.2
Wild boar?	1	< 0.1
Cervidae	1	< 0.1
Persian fallow deer, <i>Dama mesopotamica</i>	1	< 0.1
Felidae, <i>Felis</i> sp.	1	< 0.1
Fox, <i>Vulpes vulpes</i>	5	0.4
Fox?	1	< 0.1
Carnivore	2	0.2
Hare, <i>Lepus capensis</i>	2	0.2
Total wild	294	24.6
Total mammals	1201	100
Jackdaw, <i>Corvus monedula</i>	1	
White stork, <i>Ciconia ciconia</i>	1	
Hawk, <i>Falco</i> sp.	1	
Birds, <i>Aves</i>	47	
Molluscs	3	
Tortoise, <i>Testudo graeca</i> (?)	38	
Total non-mammals	91	
Total	1292	

Table 3—Absolute and relative frequency of identified bones of domestic and wild animals at Tell Sabi Abyad.

Skeletal element	<i>Ovis/Capra</i>	<i>Bos</i>	<i>Sus</i>	<i>Gazella</i>	Equidae
Horncore	14	1	-	18	-
Cranium	11	2	13	1	1
Maxilla	23	-	18	-	-
Mandible	71	2	18	14	2
Tooth	229	15	25	2	9
Atlas	-	-	-	4	-
Axis	1	-	-	1	-
Cerv. Vertebra	-	1	-	-	1
Thor. Vertebra	2	-	-	-	-
Sacrum	2	-	-	-	-
Rib	1	1	-	-	2
Scapula	21	1	7	16	1
Humerus	51	6	5	33	4
Radius	47	5	2	20	5
Ulna	19	2	8	7	2
Carpus	5	5	2	9	3
Metacarpus	30	2	-	6	2
Pelvis	25	-	5	12	2
Femur	25	2	2	9	5
Patella	4	-	1	-	-
Tibia	33	4	6	20	4
Astragalus	25	3	3	8	3
Calcaneus	5	-	4	4	1
Tarsus	2	-	-	4	-
Metatarsus	11	1	1	9	-
Mt I	-	-	-	-	-
Mt II	-	-	1	-	-
Mt III	-	-	3	-	-
Metacarpus	22	-	3	6	-
Phalange	3	-	-	-	-
Phalange I	15	5	3	6	-
Phalange II	8	7	4	2	-
Phalange III	1	2	-	1	-
Sesamoid	10	1	-	2	-
Total	716	68	134	214	47

Table 4—Absolute frequency of skeletal elements of the main categories of animals at Tell Sabi Abyad.

The second most frequently represented domestic animal is the pig with 131 fragments, followed by cattle with at least 60 remains, amounting to 10.9% and 5.0% of the identified mammals respectively (table 2, 3). This proportion is almost inverted in the later phases of the site, among which a predominance of pigs over cattle is visible only in the Early Halaf phase (Cavallo 2000).

A few measurements could be recorded for the suids and these are comparable to those from the later Neolithic levels of the site. Also the size of the bovid bones falls within the range and the pattern of the late Neolithic cattle found at the site. So far very few measurements could be recorded. They fit within the range of the middle part of the Neolithic, with the exception of one clear outlier, which can be attributed with confidence to a wild species (aurochs), like those of the late Neolithic. These two groups apparently do not show strong differences in size between the Early Pottery Neolithic and the Late Neolithic.

Eight fragments (of which two are uncertain) could be attributed to the dog (*table 2*). Together they amount to less than 1% of the identified mammals. One ulna shows signs of a chop mark which severed the proximal section (olecranon) separating it from the rest of the ulna and most likely from the radius, to which it was fused (*fig. 5*). This action was probably meant to disarticulate the lower part of the forelimb. Whether this indicates further utilization of the rest of the body of the dog for meat or for the fur is not possible to say. A series of small repeated cut marks were also found on the medial side of the diaphysis of a radius (Cavallo 1996, p. 492, fig. 9.10).



*Fig. 5—Ulna of a dog with chopmarks.*

### Wild

The wild component, which amounts to almost 25% of the identified mammals (*table 3*), is dominated by the gazelle, identified on the basis of the shape of the horncore as *Gazella subgutturosa*. This species makes up almost 18% of the identified mammal assemblage with 120 fragments. It is represented mainly by the diagnostic and best-preserved elements such as the scapula, humerus, radius, and tibia (*table 4*). Although the identification of young individuals can be biased by the difficulty of distinguishing them from sheep and goats of the same age, there are few unfused bones in the sample and few mandibles with deciduous dentition. On the other hand, the presence of exostosis in the form of lipping on the articulation of the scapula and on a calcaneum could indicate the presence of older individuals.

The second most frequent category of wild animals is the equids, most probably represented by the onager (*Equus hemionus*). However this percentage is much lower than that of the gazelle. Onagers are well attested on the site of Sabi Abyad in the almost contemporaneous levels and in the later period, but are so far totally absent in the PPNB of Sabi Abyad II (Cavallo 2000; Van Wijngaarden-Bakker, Maliapaard 2000). The other wild species found are wild sheep, goats, aurochs and boar, which are identified, as mentioned above, on the basis of metrical analyses. Of the few cervid bones, one could be identified as Persian fallow deer (*Dama mesopotamica*). Among the carnivores, the remains of a small cat (coming from the topsoil and therefore probably belonging to a recent cat) and a fox have been found. In addition, two remains of hare were found. Of the some 50 fragments of bird bones only three could be identified. They belong to the jackdaw (*Corvus monedula*) and the stork (*Ciconia ciconia*). In addition, a few molluscs, mainly *Unio* sp., were found.

### Wild versus domestic

Considering the presence of the total wild animal component found in the operation III levels and comparing it with the domestic component, it is possible to observe a difference from the later levels from operation I in terms of absolute frequency. The Early Pottery Neolithic levels from operation III have so far provided a relatively high percentage of wild animals, reaching about 25% of the identified material, while in the Late Neolithic levels they are consistently lower in all three phases (*ca* 3-4%) (Cavallo 2000).

If a broader look is taken to include the earliest sites situated north of the valley in the Turkish area, sites like Göbekli Tepe (PPNA/Early PPNB), Nevalı Çori (Middle and Late PPNB), and Gürcütepe (Late and Final PPNB), it seems that the results found in the present sample from Sabi Abyad fit into a pattern of steady decrease of the wild component versus an increase of the domestic in terms of absolute number of fragments. However, the analysis of Late PPNB material from the nearby small mound at Sabi Abyad II provides a different scenario. The wild component from Sabi Abyad II shows a dramatic reduction to little more than 1% of the total sample (van Wijngaarden-Bakker, Maliapaard 2000). In addition, it is striking that among some 2000 fragments not one equid bone was found. The Early Pottery levels from operation III contain even more fragments of wild species, consisting mainly of gazelle and some of onager. The wild component is again reduced in the later pre-Halaf phase. The observed apparent trend has therefore alternated.

It is important to consider whether the difference in the importance of hunting and the presence or complete absence of specific species, such as the onager, are due to ecological factors or rather to different hunting strategies or to the socio-economic development of the communities. Sabi Abyad II has been interpreted as a small rural settlement with incipient domestication, where the main game species was gazelle, hunted locally in the valley where the sedentary communities resided. The absence of onager would indicate that the steppe was not exploited as a hunting ground. The Early Pottery settlement shows a shift of habitation within the same settlement, possibly indicating that the community was still not wholly permanent and relied more on wild species than previous PPNB communities had. This could also explain the strange mortality pattern of the ovicaprids, and the absence of old and very young animals.

Another methodological explanation of this phenomenon is the difficulty of identifying the wild species such as aurochs, wild sheep and goats, and wild boar, especially considering that the question of how far the process of domestication, or the cultural appropriation of these species, had actually progressed by this time and how to recognize this even in the later Neolithic period, long after it had begun.

### CONCLUSION

This paper provides an initial insight into the material analyzed so far from the Early Pottery Neolithic levels from Tell Sabi Abyad. On the one hand, the sample shows similarities to the previously analyzed material from the Late Neolithic levels of the same site. On the other hand, differences have been found in the mortality pattern of the main species (ovicaprids) and in the exploitation of the wild component of the fauna.

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