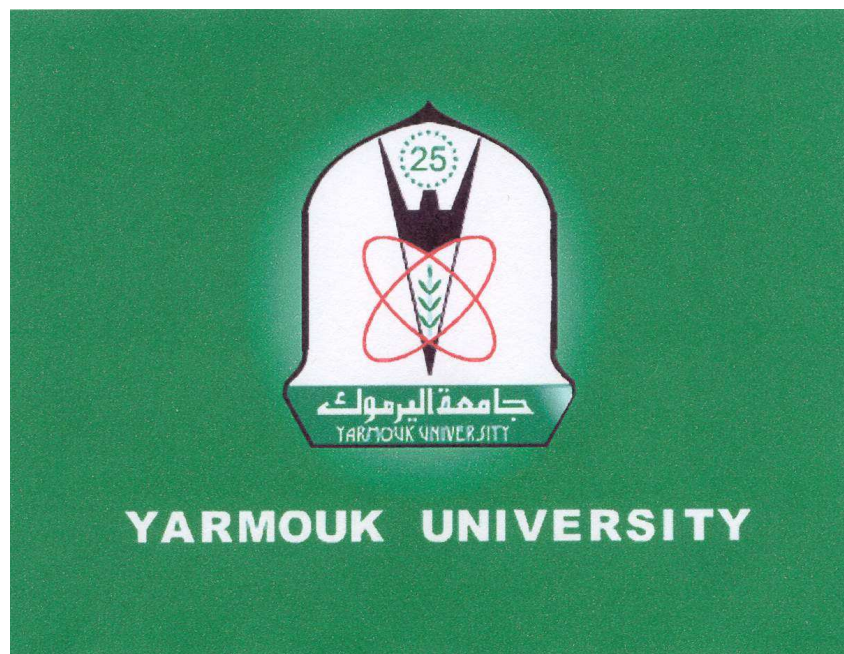


# ARCHAEOZOOLOGY OF THE NEAR EAST V

Proceedings of the fifth international symposium on the  
archaeozoology of southwestern Asia and adjacent areas

edited by

**H. Buitenhuis, A.M. Choyke, M. Mashkour and A.H. Al-Shiyab**



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## Contents

### Preface

<b>Miriam Belmaker</b>	<b>9</b>
Community structure changes through time: 'Ubeidiya as a case study	
<b>Rivka Rabinovich</b>	<b>22</b>
Man versus carnivores in the Middle-Upper Paleolithic of the southern Levant	
<b>Guy Bar-Oz and Tamar Dayan</b>	<b>40</b>
Taphonomic analysis of the faunal remains from Nahal Hadera V (1973 season)	
<b>Liora Kolska Horwitz and Hervé Monchot</b>	<b>48</b>
Choice cuts: Hominid butchery activities at the Lower Paleolithic site of Holon, Israel	
<b>Vera Eisenmann, Daniel Helmer and Maria Saña Seguí</b>	<b>62</b>
The big Equus from the Geometric Kebaran of Umm el Tlel, Syria: <i>Equus valeriani</i> , <i>Equus capensis</i> or <i>Equus caballus</i>	
<b>Keith Dobney</b>	<b>74</b>
Flying a kite at the end of the Ice Age: the possible significance of raptor remains from proto- and early Neolithic sites in the Middle East	
<b>Z.A. Kafafi</b>	<b>85</b>
Early farmers in Jordan: Settled zones and social organizations	
<b>Denise Carruthers</b>	<b>93</b>
The Dana-Faynan-Ghuwayr early Prehistory project: preliminary animal bone report on mammals from Wadi Faynan 16	
<b>A. Baadsgaard, J.C. Janetski and M. Chazan</b>	<b>98</b>
Preliminary results of the Wadi Mataha (Petra Basin, Jordan) faunal analysis	
<b>Cornelia Becker</b>	<b>112</b>
Nothing to do with indigenous domestication? Cattle from Late PPNB Basta	
<b>Lionel Gourichon</b>	<b>138</b>
Bird remains from Jerf el Ahmar, A PPNA site in northern Syria with special reference to the griffon vulture ( <i>Gyps fulvus</i> )	
<b>Hitomi Hongo, Richard H. Meadow, Banu Öksüz and Gülçin Ilgezdi</b>	<b>153</b>
The process of ungulate domestication in Prepottery Neolithic Cayönü, southeastern Turkey	
<b>Danielle E. Bar-Yosef Mayer</b>	<b>166</b>
The shells of the <i>Nawamis</i> in southern Sinai	
<b>Sumio Fujii</b>	<b>181</b>
Pseudo-settlement hypothesis evidence from Qa' Abu Tulayha West in southern Jordan	
<b>C.S. Phillips and C.E. Mosseri-Marlio</b>	<b>195</b>
Sustaining change: The emerging picture of the Neolithic to Iron Age subsistence economy at Kalba, Sharjah Emirate, UAE	
<b>Marjan Mashkour and Kamyar Abdi</b>	<b>211</b>
The question of nomadic campsites in archaeology: the case of Tuwah Khoshkeh	
<b>Chiara Cavallo</b>	<b>228</b>
The faunal remains from the middle Assyrian "Dunnu" at Sabi Abyad, northern Syria	
<b>Emmanuelle Vila</b>	<b>241</b>
Les vestiges de chevilles osseuses de gazelles du secteur F à Tell Chuera (Syrie, Bronze ancien)	
<b>Haskel J. Greenfield</b>	<b>251</b>
Preliminary report on the faunal remains from the Early Bronze Age site of Titris Höyük in southeastern Turkey	
<b>Lambert Van Es</b>	<b>261</b>
The economic significance of the domestic and wild fauna in Iron Age Deir 'Alla	
<b>Louis Chaix</b>	<b>268</b>
Animal exploitation at Tell El-Herr (Sinai, Egypt) during Persian times: first results	
<b>Jacqueline Studer</b>	<b>273</b>
Dietary differences at Ez Zantur Petra, Jordan (1 <sup>st</sup> century BC – AD 5 <sup>th</sup> century)	
<b>G. Forstenpointner, G. Weissengruber and A. Galik</b>	<b>282</b>
Banquets at Ephesos; Archaeozoological evidence of well stratified Greek and Roman kitchen waste	
<b>Bea De Cupere and Marc Waelkens</b>	<b>305</b>
Draught cattle and its osteological indications: the example of Sagalassos	
<b>Carole R. Cope</b>	<b>316</b>
Palestinian butchering patterns: their relation to traditional marketing of meat	

<b>László Bartosiewicz</b>	<b>320</b>
Pathological lesions on prehistoric animal remains from southwest Asia	
<b>Ingrid Beuls, Leo Vanhecke, Bea De Cupere, Marlen Vermoere, Wim Van Neer and Marc Waelkens</b>	<b>337</b>
The predictive value of dental microwear in the assessment of caprine diet	

# THE FAUNAL REMAINS FROM THE MIDDLE ASSYRIAN “DUNNU” AT SABI ABYAD, NORTHERN SYRIA

Chiara Cavallo<sup>1</sup>

## Abstract

The present study offers new insights into animal exploitation by the Late Bronze Age inhabitants of Tell Sabi Abyad located in the middle part of the Balikh valley in northern Syria, 20 km from the modern Turkish border. The major interest of this analysis was the reconstruction of the animal exploitation and function within the economy of this Middle Assyrian “dunnu” and the integration of the archaeozoological results with the information from the textual sources. The percentage of the ovicaprids in the assemblage points to the relatively great importance of these animals, although they are almost exceeded in importance by the equid remains, related to transport.

## Résumé

Cet article présente de nouvelles données sur l'exploitation des animaux par les habitants de Tell Sabi Abyad à l'Âge du Bronze récent, situé au centre de la vallée de Balikh, au nord de la Syrie. L'intérêt majeur de cette étude est la reconstitution de l'exploitation animale et sa fonction dans l'économie de ce “dunnu”, centre administratif assyrien et l'intégration des résultats archéozoologiques avec les sources écrites. Le pourcentage des ovi-caprinés dans l'assemblage indique la place importante qu'ils occupent, bien qu'ils soient légèrement dépassés par les restes d'équidés, liés au transport.

Keywords: Middle Assyrian, Central place, Textual sources, Transport-traction, Mules/hinnies

Mots Clés: Assyrien central, Place central, Source textual, Transport-traction, Mulet/bardot

## The site

This article aims at presenting the results from the analysis of the faunal remains from the Late Bronze Age settlement of Sabi Abyad. The site of Tell Sabi Abyad is located in the middle part of the Balikh valley in northern Syria, about 20 km from the modern Turkish border. Over the last few years, several excavation campaigns, under the direction of Peter Akkermans of the National Museum of Antiquities in Leiden in the Netherlands, have unearthed a small Middle Assyrian site. More than 300 clay tablets were found, which have enhanced our understanding of what kind of settlement this was and how it functioned (Wiggermann 2000, Akkermans and Wiggermann 1999). The site was a “dunnu” or, in other words, a fortified agricultural production centre at the border of the Middle Assyrian Empire. The “dunnu” was the personal property of Ili-pada, an Assyrian viceroy and ‘king of Hannigalbat’, i.e. the western part of the Assyrian Empire. The administration of the “dunnu” and its land took place at Tell Sabi Abyad, most of the time by the ‘chief steward’, in the absence of its owner.

The settlement consists of a small, fortified precinct measuring 60x60 meters, completely surrounded by a wall. Within the walls, around a small courtyard, were located the palace of the owner of the “dunnu”, and the offices of the ‘chief steward’, where most of the tablets were found. On the side of the palace, there is a fortified tower with thick walls, probably from an earlier period, used as storage place and jail. All around these buildings were located, houses, storage rooms, and working areas for the production of beer, bread and pottery.

During Middle Assyrian (Late Bronze Age) times, the site was occupied for a rather limited period at the end of the 2nd millennium, from 1200 to 1175 BC, and it appears to have been abandoned rather suddenly as a large layer of ashes covering a large part of the settlement would suggest. The faunal material analyzed here concentrates on the Middle Assyrian period of occupation at the site and represents only part of the total number of bones recovered so far. It comes from a selected sample of undisturbed and well-stratified contexts from the northwestern and northeastern part of the site around the palace and the fortified tower.

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The Middle Assyrian (MA) period at Sabi Abyad is represented by three phases of occupation: (a) the MAIII, the oldest, found so far only in the fortified tower in the middle of the site, whose faunal remains are not included in the present sample; (b) the MAII, or so called “Tammitte phase”, which is related to the occupation of the site as a “*dunnu*” and the administration of the settlement by Tammitte, the chief steward mostly cited in the texts, on behalf of the grandvizier; this is the most important period at the site in which contacts with the heartland of the empire were more active; (c) the MAI represents a subsequent phase of occupation by local people, making use of the architectural remains of the “*dunnu*” which still existed. This phase may have continued until the beginning of the Iron Age. An attempt will be made to analyze the MAII and I phases separately, in order to emphasize possible differences or continuities in the faunal remains.

## The sample

The present faunal sample consists of 5,609 mammal remains, of which ca. 22% could be identified (Table1). Large and medium sized animals are equally represented whether the unidentified categories or identified species are considered separately or not. Most of the species belong to domestic animals (ca. 68% of the total identified sample): sheep, goat, cattle, pigs, and dog (Fig.1). The bones of wild animals account for at least 7.9% of the identified sample and consist in large part of gazelle bones with a few bones from Felidae (lion and leopard), two Mustelidae (weasel and marbled polecat) and a Leporidae (hare). The equid category is represented by a large number of bones corresponding to 23.6% of the total identified sample. In this category, domestic (horse and donkey) and a wild equid

Table 1. Faunal remains from selected Middle Assyrian (MA) levels from Tell Sabi Abayd

	MA II	MA I	total	% total	% identified
Ovicaprids, <i>Ovis/Capra</i>	251	222	473	8.4	37.0
Sheep, <i>Ovis aries</i>	55\$	27	82	1.5	6.6
Goat, <i>Capra hircus</i>	11	6**	17	0.3	1.2
Pig, <i>Sus domesticus</i>	123	62	185	3.3	14.4
Cattle, <i>Bos taurus</i>	49	33	82	1.5	6.4
Dog, <i>Canis familiaris</i>	2*	2	2	<0,1	3.0
Equids, <i>Equus</i> sp.	199	103	302	5.4	23.6
Wild sheep, <i>Ovis orientalis</i>	2		2	<0,1	0.1
Gazelle, <i>Gazella</i> sp.	56	38	94	1.7	7.3
Lion, <i>Panthera leo</i>	1		1	<0,1	0.1
Leopard, <i>Panthera pardus</i>	1		1	<0,1	0.1
Weasel, <i>Mustela nivalis</i>	1		1	<0,1	0.1
Marble polecat, <i>Vormela peregusna</i>	1		1	<0,1	0.1
Hare, <i>Lepus capensis</i>		1	1	<0,1	0.1
Large mammals	435	966	1401	25.0	
Medium mammals	684	610	1294	23.1	
Small mammals	1		1	<0,1	
Unidentified	996	673	1669	29.8	
	2811	2737	5609		
birds	5	5	10		
rodents	3	2	5***		
shells	13	15	28		
reptiles	1	1	2		

\*including one partial skeleton

\*\* including two almost complete skeletons

\*\*\* three partial skeletons

\$ including four complete skeletons

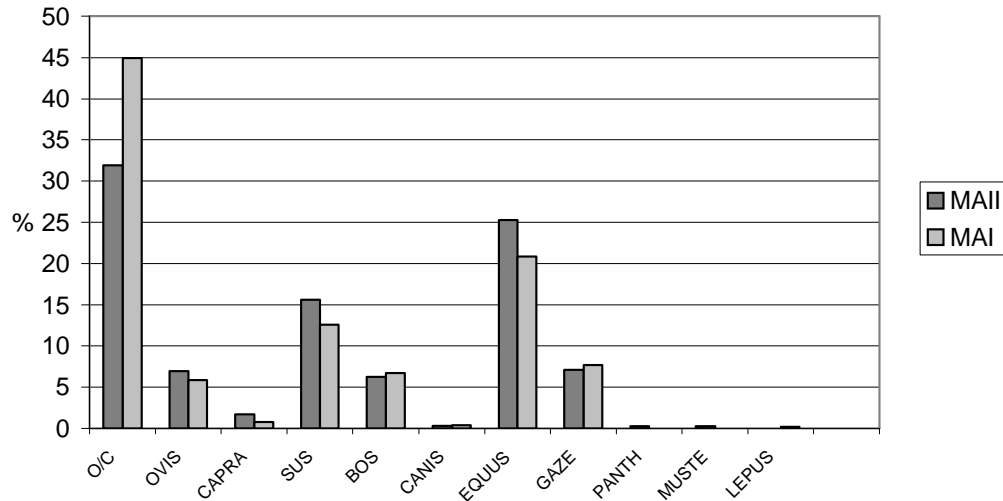


Fig. 1. Tell Sabi Abyad (LBA): relative representation of the identified mammals.

(onager) are included but their relative proportions is difficult to quantify. In addition, other categories of animals were found, although in small quantities including: birds, molluscs and reptiles. Complete or almost complete skeletons of rodents, such as mouse and rats were also found but they are not included in the statistics of the other mammals due to their likely intrusive character. Finally, two fragments of tortoise plastron (*Mauremys caspica*) were identified.

The degree of fragmentation of the main species was also studied (Table 2). Bovine bones are the most fragmented. The categories of <25% and 25% (of the bone preserved) amount altogether to more than the half (55.9%) of the bovine sample. The 100% (complete bone) category is represented by phalanges, carpals, tarsals, loose teeth and one thoracic vertebra. Similar types of bones are present in the 75% and 50% categories. Equids show the least degree of fragmentation with 59.9% of the bones preserved for the half (50%) or more (75% and 100%). The 100% category consists of the same compact bones as for the bovine sample, while the other two categories contain meat-bearing bones as well. A relatively low degree of fragmentation in the gazelle bones, is characterised by a high representation of the middle categories. This pattern is most likely biased by the representation of the most diagnostic, and thus most complete, bones. A comparable pattern of fragmentation is found between the ovicaprid and the suid bones. For the ovicaprids, only two long bones (radii) are included in the 100% category, while for the suids, long bones in the same category derive from juvenile individuals. Taphonomic factors seem to have slightly influenced the sample. Signs (mainly cutmarks) of butchering activities were observed on 1.5% of the mammal sample. Cattle and gazelle show the highest percentage with 11% and 10.6%, respectively, followed by ovicaprids (6.6%), equids (3.0%) and pigs (2.3%). The low percentages of the last two groups are most likely due, on the one hand, to the presence of animals not intended for consumption such as the equid group (donkeys and horses) and, on the other hand, of juvenile/young animals in the case of pigs. Gnawing marks, almost exclusively due

Table 2. Degree of fragmentation of the main species (percentage)

Percentage of bone preserved	<25%	25%	50%	75%	100%
Bos	27.3	28.6	14.3	10.4	19.5
O/C	12.3	21.0	22.2	15.8	28.6
Sus	11.8	23.6	23.6	16.1	24.8
Equus	13.9	26.2	17.4	14.3	28.2
Gazella	11.6	26.3	29.5	24.2	8.4

to carnivores, are limited to 0.9% of the sample. Burning has affected 1.7% of the remains. Cattle show the highest percentage of burnt bones (7.3%), while the percentages of burnt bones in mammals of medium size vary from ca. 3.0% for the ovicaprids to medium mammals, and 5% in the case of gazelle and pigs. The lowest percentage of burnt bones is shown by the equids (2.0%).

### Main domestic species

The largest group of animals is represented by the ovicaprids. This, usually very large category, is represented only by 10.2% of the total sample and 44.9% of the identified mammals in the sample from Late Bronze Age Tell Sabi Abyad. If one takes the whole bone sample together, the importance of sheep and goat seems to be similar between the MAII and MAI phases, but considering only the identified mammals it is possible to observe that their importance increased in the MAI phase (Fig.1). Sheep/goat remains definitely dominate in the sample. The general ratio of sheep versus goats is 4.8:1. However, this ratio, ranging between 3:1 (metatarsus) and 6:1 (scapula and tibia) for the most diagnostic elements, reaches a figure of 14:1 in the case of the humerus. The skeletal representation of the ovicaprids is characterised by a high representation of loose teeth (20%) followed by the distal part of the hindlimb (tibia) and then by the forelimb (especially the radius) (Table 3).

Figure 2 shows the mandibular wear stages from the MAI phase. The sample of MAII is, so far, too small, but some general remarks might be applied to this phase as well. The ageing pattern based on the eruption and wear stage of the mandibles of the ovicaprids is characterised by the rare presence of very young animals. No newborns or animals of a very few months were found. A large number of mandibles come from individuals less than two years old. The presence of individuals between two and three years is low, while again a high percentage of mandibles may be seen in the three-four years category. Mature animals are rare and no very old individuals are present. A closer analysis of categories D and F allows us to narrow down peaks in the culling ages for these animals. The better part of the mandibles in category D displays the same wear stage, with a heavily worn deciduous fourth premolar and a fourth permanent premolar present as a germ or in the first stages of eruption (just erupting). The third molar is also present as a germ or already visible in the crypt or, in one case, in first stage of eruption. This stage corresponds to the moment when the deciduous dentition is going to be substituted by the permanent one. The suggested age of these individuals could be closer to one year than to two years. Also in the F category, many of the mandibles are at the same stage of wear, namely the wear on the third lobe of the 3rd molar is so far advanced that the dentine is just connected

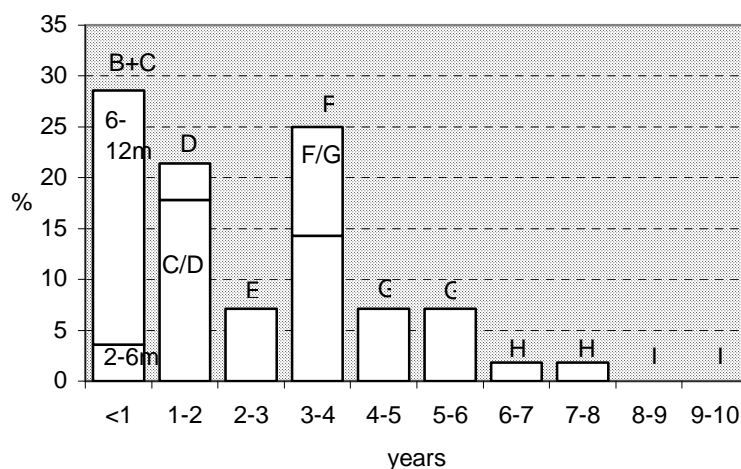


Fig. 2. Mandibular wear on ovicaprid mandibles (MA I phase); wear stage and suggested age based on Payne, 1973.



Table 3. Skeletal representation of the identified species.

	Ovis/Capra	Ovis	Capra	% total O/C	Bos	% Bos	Sus	% Sus	Canis	Equus	% Equus	Gazella	% Gazella	Lepus	Mustela	Panthera
cornus	3		2	0.9								7	7.4			
cranium	6	3	1	1.8	5	6.1	23	12.4		3	1.0	4	4.2		2	
maxilla	6			1.1			10	5.4		1	0.3	2	2.1			
mandibula	58			10.2	8	9.8	42	22.7	2+1*	18	6.0	9	9.5			
dentes	114			20.0	6	7.3	23	12.4		84	27.8	4	4.2			
hyoid	1			0.2												
atlas	6			1.1	3	3.7				6	2.0					
axis	5	1		1.1						3	1.0	2	2.1			
v.cervicales	10			1.8			3	1.6	1+2*	10	3.3					
v.thoracales	19			3.3	2	2.4	1	0.5	2*	15	5.0					
v.lumbales	22			3.9			3	1.6								
v.caudales	1			0.2	1	1.2			1*							
sacrum	2			0.4						1	0.3					
vertebra							1	0.5								
costa	10			1.8	5	6.1	3	1.6	8*	3	1.0					
scapula	20	6	1	4.7	2	2.4	13	7.0	1*	10	3.3	7	7.4			
humerus	15	14		5.1	2	2.4	10	5.4		9	3.0	12	12.6			
radius	19	8	4	5.4	5	6.1	6	3.2		18	6.0	7	7.4			
ulna	12	1		2.3	2	2.4	8	4.3		8	2.6	2	2.1			
metacarpus	11	4	1	2.8	3	3.7	2	1.1		3	1.0	2	2.1			1
carpale	6			1.1	3	3.7				3	1.0					
carpale/tarsale									1*	1	0.3					
pelvis	25	3	1	5.1	2	2.4	4	2.2		6	2.0	3	3.2			
femur	24	1		4.6	3	3.7	11	5.9		20	6.6	8	8.4			
patella	3			0.5					1*	3	1.0					
tibia	32	6		6.7	5	6.1	6	3.2	1*	26	8.6	9	9.5			
fibula							2	1.0	2*							
calcaneus	4	5		1.6	2	2.4	3	1.6		16	5.3	2	2.1			
astragalus	5	17	2	4.2	3	3.7	1	0.5		12	4.0	1	1.1			
tarsale	2			0.4	1	1.2				3	1.0	1	1.1			
metatarsus	15	3		3.2	4	4.9	3	1.6		2	0.7	5	5.3			
metapodia	8	1		1.6	1	1.2	3	1.6	6*	4	1.3	1	1.1	1		1
humerus/femur										1	0.3					
phalanx 1	5	5	1	1.9	4	4.9	1	0.5	6*	8	2.6	4	4.2			
phalanx 1							1	0.5								
phalanx 2			2	0.4	8	9.8			3*	3	1.0	2	2.1			
phalanx 3	4	2		1.1	2	2.4	2	1.1	1*	2	0.7	1	1.1			
total	473	80#	15#		82		185		39*	302		95		1	2	2

# excluding complete or almost complete skeletons from pits (MA I and MA II).

\* belong to a partial skeleton found in the filling of a room (MA II).

with that of the 2nd lobe (between Payne's stage 9 and 10). This would correspond more to a suggested age of 4 years than 3 years, overlapping with category G. The wear pattern found on the teeth of ovicaprids indicates therefore a concentration of culling within only a few age groups, those corresponding to the best meat categories. The absence of very old individuals and the gradual decrease in middle-aged animals points to a maintenance of these animals for consumption purposes, in which meat apparently seems to have been the main product.

The size of the middle Assyrian ovicaprids is rather large, definitely larger than the size of the Neolithic sheep from the same area, some specimens almost approaching the size of the wild forms, and much greater than the tendency in later Uruk and Bronze age sheep (Vila 1998, Cavallo 2000). Two specimens of *Ovis* attain sizes even larger than for wild Neolithic ovicaprids and were identified as wild Asiatic muflons (*Ovis orientalis*) (Figs. 3 and 4). The larger size of the middle Assyrian sheep might be related to the breeding of larger woolly sheep. However, no mention in the texts is found about any industrial wool activity being part of the economy of the settlement (Wiggermann 2000:198). The age categories of ovicaprid remains found in the faunal assemblage from Tell Sabi Abyad with their low percentage of old animals also indicate that wool production was not the major purpose of sheep breeding.

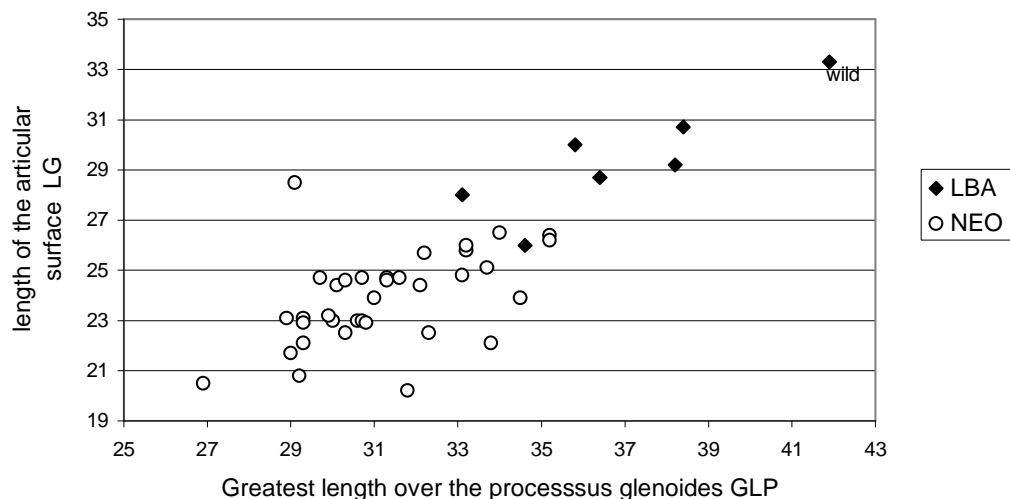


Fig. 3. Scatter diagram of the measurements of the ovicaprid scapulae from Sabi Abyad.

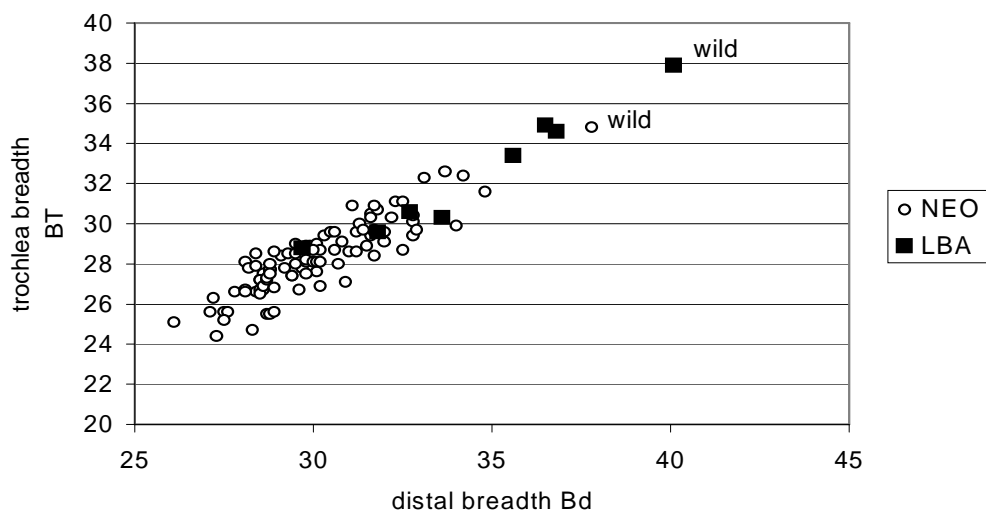


Fig. 4. Scatter diagram of the measurements of the ovicaprid humeri from Sabi Abyad.

Pigs are a category of animals well represented in the sample, attaining almost 15% of the identified remains in the MAI phase (Fig. 1). In the MAI phase their importance slightly decreases. So far Sabi Abyad is one of the few Late Bronze Age sites in northern Syria where very high percentages of pigs have been found (Clason and Buitenhuis 1997). Sites such as Scheich Hamad (5.5%) and Tell Hammam et-Turkman (3.3%) show a relatively high percentage, in the identified mammal samples, while sites such as Tell Bderi (0.7%) and Munbaqa (0.01%) display either a very low percentage or almost no pig remains (Becker 1988, Becker 1991, Boessneck and von den Driesch 1986a, Buitenhuis 1979). The relative importance of the Hammam et-Turkman pigs is, however, reduced if only the main domestic species are taken into account (Fig. 5). In this case, the high representation of pigs in the Tell Sabi Abyad sample is even more emphasized.

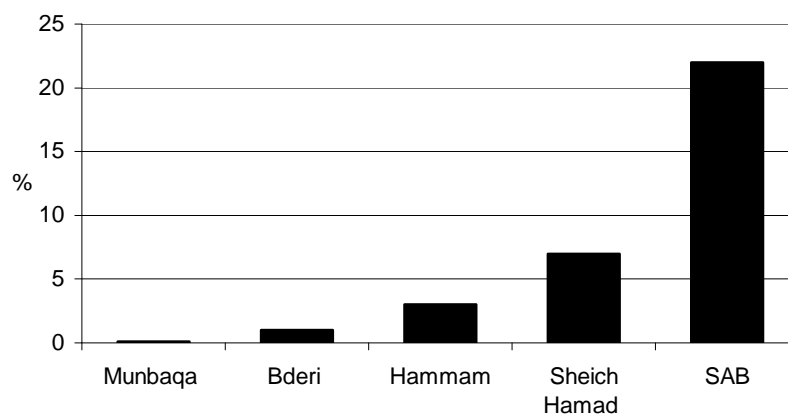


Fig. 5. Comparison of the percentage of pig remains from north Syrian Late Bronze Age sites (within the total of ovicanrds, cattle and pigs).

Information about pig care is, however, absent from the texts. The only mention of a suid concerns the use of fat and skin of a wild boar for leather working and only once is pork included in the list of foodstuffs (Wiggermann 2000:199). So far no bone remains could be ascribed to wild boar. Pig remains are from smaller sized animals compared to the larger Neolithic ones. A large part of the suid remains come from young individuals. Pigs would have represented a ready source of energy and protein for the population of Sabi Abyad, which consisted in large part of administrative officers and their domestic servants. Because these animals were raised and consumed locally, there was no need to report them in the administrative records.

The representation of the bovine remains relatively low, which is similar to the situation between the MAI and MAII phases (Fig. 1). The skeletal parts best represented are the phalanges due to the better preservation of these bones. However, the other parts of the skeleton, including vertebrae and ribs, are present as well (Table 3). The age pattern of cattle is characterised by the rare presence of juvenile or young individuals. Except for one proximal tibia, all the long bones have fused ends. Cattle also do not seem to have reached a very old age, as the presence two unfused thoracic vertebrae and of four mandibles either with a milk dentition or with a low degree of wear would indicate.

The bovine bones belong to small-sized animals. Comparison of the greatest length and the smallest breadth of the second phalanges with those from the Neolithic cattle from the same site show that the middle Assyrian cattle are definitely smaller (Fig. 6). In addition, cattle remains do not display a clear, strong stress-related pathological transformation related to heavy ploughing work. This would apparently contrast with information from the texts which reveal the important economic function of the site as a center for regional agrarian activities, in which the production of grain was rather large-scale. Cattle remains found within the “dunnu” may derive from the exploitation of those animals selected for their meat, from a larger local population.

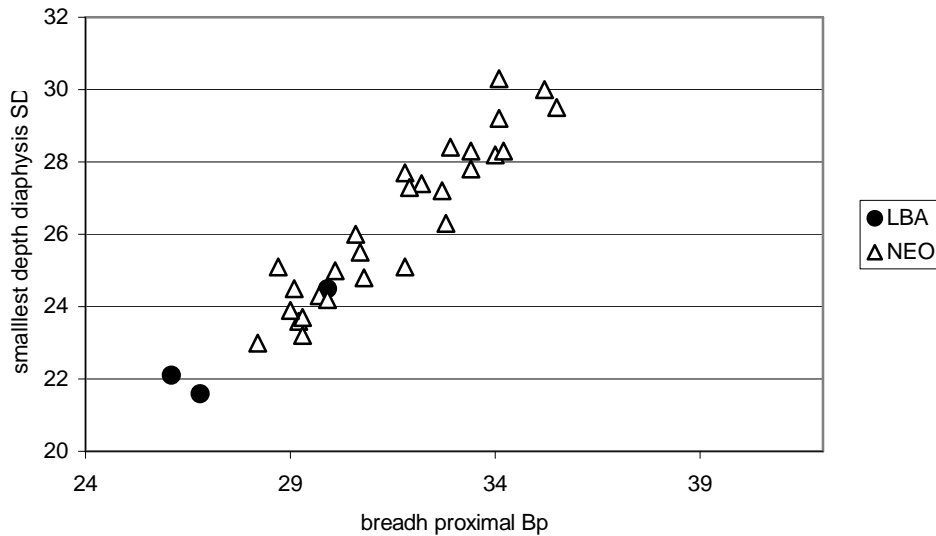


Fig. 6. Scatter diagram of the measurements of the second phalanx of domestic cattle from Sabi Abyad

### Wild species

The wild component of the bone sample of the Middle Assyrian Sabi Abyad is so far limited to a small number of species, in particular gazelle and most likely the onager (see the section on equids). The gazelle amounts to 7.3% of the identified species, a rather high percentage comparable to that of cattle. The quantification of the onager bones cannot be easily defined due to the problems of identification of equid bones. A quantitatively small group of wild animals might be more related to an “e-lite” sphere of the population, conferring on them a special ‘status’. A distal metapodial of a lion and a complete metacarpal of a leopard were identified. These animals could have been hunted as part of sporting activities, and their skins kept as trophies or ornaments. In addition, the complete skulls of a weasel and of a marble polecat were retrieved. It is most likely that the interest in these animals was related to their fur. All these animals belong to the MA II phase of occupation. Finally, the only bone from hare found in the MA I phase most likely reflects an occasional/incidental hunting of this animal.

### Equids

The equid remains represent 20-25% of the identified sample, decreasing in importance from the MAII to the MAI phase. The percentage of the equid remains is much higher than that of gazelle (Table 1 and Fig.1). The presence of rather high numbers of gazelle remains does imply that hunting was a much practiced activity at the settlement. It is therefore logical to infer that a wild component, such as onager, should be present in the equid category of remains as well.

So far, no (extremely) detailed and complete morphological and metrical analysis has been carried out. The following observations concern only the postcranial limb bones. The morphological analysis of equid bones indicates that in most of the cases a kind of a ‘mixture’ of characteristics, either ass-like or hemionus-like, is present on the same bone, while few specimens show only typical characteristics of either group. Most of the postcranial equid remains belong to medium-sized animals (the size of *E. hemionus* or *E. asinus/africanus*) and few of the individuals are clearly small (donkey) or large (horse).

Fig. 7 shows the distribution of the measurements of the second phalanges of equids from Middle Assyrian/Late Bronze Age (LBA) Sabi Abyad compared with those, identified as onager, from the Neolithic ones at the same site (Cavallo 2000), with those from complete equid skeletons of variable

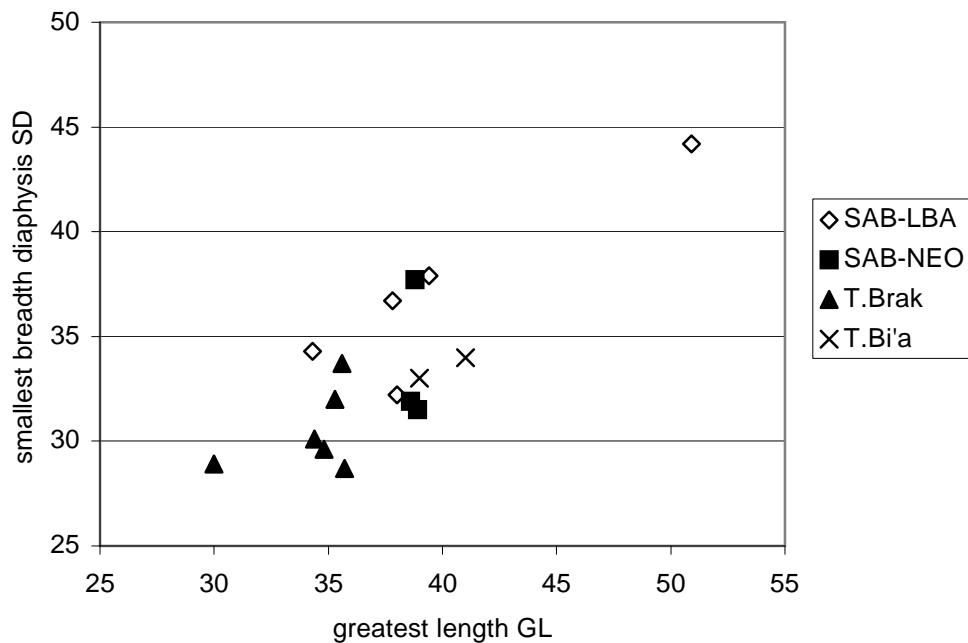


Fig. 7. Scatter diagram of the measurements of the second phalanx of equids from Sabi Abyad

age and sex from Tell Brak on the Khabur, identified as donkey by Clutton-Brock (1993) and Tell Bi'a at the confluence of the Balikh river with the Euphrates, also identified as a large male donkey by Boessneck and von den Driesch (1986b). The measurements of the phalanges from Tell Brak (2200 BC) and Tell Bi'a (2500-2400 BC) belong to complete skeletons and are dated one thousand years earlier than the Middle Assyrian/Late Bronze Age Sabi Abyad. The Tell Brak donkeys are smaller than most of the equid remains from Sabi Abyad, including both the Neolithic (onager) and the Middle Assyrian/Late Bronze Age. Only a few cases correspond to the upper values of the specimens from Tell Brak. The donkey from tell Bi'a falls perfectly within the size of the Neolithic and Late Bronze Age/Middle Assyrian equids of Tell Sabi Abyad. The equids of Tell Sabi Abyad show a more widespread distribution in their measurements and, while the small remains might be confidently identified as domestic donkeys and the very large one<sup>2</sup> as horse, it is reasonable to think that the intermediate bones belong to different types of equids, which might be large donkeys, but also onagers and, most likely, mules or hinnies.

The equid remains stand out in contrast to the other main species in relation to pathological deformations and butchering marks. They have a higher percentage of bones with pathological deformations (4.3%) compared to the ovicaprids (1.4%), pigs (2.4%), and cattle, which do not have any. The pathologies of the equids consist in large part of exostoses and lipping around articulations and thickening of the osseous area where the muscle attachments are located (Table 4). They are present especially on the cervical and thoracic vertebrae and on the long bones of the forelimb. Although it could not be excluded that these deformations are related to old age, it seems more plausible that they might be the consequence of mechanical stress due to heavy labor and transport of heavy weights. In contrast to the pathologies, equids show the lowest percentage of butchering marks (see above), which can be interpreted as the result of disarticulation and division of the carcass (Table 5). This would point to a commensal utilisation of the animals, although in rather few cases.

<sup>2</sup> This specimen, however, comes from a level later than the "Tammite" phase. Its stratigraphic position is still uncertain, and it cannot be excluded that it comes from a later phase of the MA I or later.

Table 4. Equid skeletal elements with pathological deformations.

Element	NR	AS	Pathology
Vertebra cervicalis	1	#	Exostosis and lipping near articular surface
Vertebra cervicalis		#	Exostosis and lipping near articular surface
Vertebra thoracalis	2	#	Exostosis and lipping near articulation and processi spinosus and transversales
Radius	1	\$	Exostosis and lipping around proximal end
Ulna	1	\$	Exostosis around semilunar notch
Atlas	1		Slight exostosis
Phalanx2	1		Exostosis on dorsal side of the diaphysis
Vertebra thoracalis	1		Lipping of the articular surface and exostoses on the processus spinosus
Vertebra thoracalis	1		Exostosis on processus spinosus
Vertebra thoracalis	1		Exostosis on processus spinosus
Sacrum	1		Exostosis on laterale surface: old animal
Radius	1		Ossification of the muscle attachments on dorsal and volar side of the distal end
Radius	1		Slight thickening/ossification of muscle attachments on distal end
Ulna	1		Slight thickening/ossification of osseous tissue near semilunar notch on the proximal end

AS = specimens belonging to the same individual

# = one individual

The interpretation of the equid remains from the Late Bronze/Middle Assyrian levels of Tell Sabi Abyad remains a puzzle. The middle size of the animals comparable in size to that of onager and the evidence of hunting activities such as for gazelle would indicate that the equid remains may be derived from onager. However, the mixture of ass and hemione morphological characters, together with the relatively high percentage of equid remains in the assemblage and the rather high presence of 'pathological' deformations due to labor/stress might indicate that we are also dealing, in large part, with domestic equids (Tables 1 and 4). In this case, their medium size could be the result of interbreeding between horses and donkeys or even donkey and onager. That the Balikh valley could have been a possible area for the breeding/production of mules and hinnies, especially in the Middle Bronze Age, was already suggested following the metrical analysis of the equid remains from Tell Hammam et-Turkman (Buitenhuis 1991; internal report). As at the Middle Bronze Age Hammam, where the percentage of equids corresponds to 14.0% of the identified mammal remains, the even higher percentage of equids at Late Bronze Age Sabi Abyad could be correlated to its function as a caravan trading post, on the trade route through the Jezira region which connected Assur, on the Tigris, to Karchemish, on the upper Euphrates. This function could have been taken over by Sabi Abyad in the Late Bronze Age. The percentage of equids at Hammam et-Turkman in this period dramatically lowers to 4.0% (of the identified mammals remains). Textual evidence informs us that hybrids were highly valued. Old Babylonian/Akkadian texts provide broad evidence of how highly hybrids were considered in Mesopotamia (Zarins 1986, Postgate 1986). At Ebla they cost as much as 5 minas (2.35 kg silver; in contrast 1 sheep costing 1 shekel) and most were for the exclusive requirements of a specialized group of people, specifically trained in 'horse-riding' techniques of the reign of Nagar (Tell Brak) in the Khabur (Archi 1998). Mules, donkeys and horses are also mentioned in the texts found at Sabi Abyad (Wiggermann 2000). Mules were maintained and it is mentioned that an individual was

Table 5. Butchering marks observed on the equid bones.

element	NR	butchering marks
axis	1	transversal chopmarks on the articular process
costa	1	cutmarks on the medial side
scapula	1	cutmarks on the proximal part of the blade on the costal surface
femur	1	cutmarks on the distal part of the diaphysis between the fossa and the lateral condyle
tibia	1	cutmarks on lateral surface close to the crest on the proximal part
tibia	1	cutmarks on lateral surface close to the crest on the proximal part and on the articulation surface of the proximal extremity
calcaneum	1	cutmarks on medial side above the sustentaculum
small metapodial	1	cutmarks on the proximal and distal part

appointed to specially care for them. Donkey was considered economically very important as attested by the large numbers cited in the texts (26 of different sex and age added to the normal Tammite herd), as well as mention of their use in transport (donkeys were given to 4 merchants from Tammite). Horses were of little economic importance and used in war and military service (Wiggermann 2000).

### Other species categories

The following bird species could be identified in the sample: *Columba livia*, *Anas* sp., *Pterocles alchata*, a Fringillidae and a bird of prey the size of a falcon. The rodents *Meriones* sp. and *Mus musculus* were present. The shell sample consists in large part of *Unio/Leguminaia* bivalves. In addition 2 *Melanopsis praemorsa*, one *Arcularia gibbosula* and a possible cf. *Cardium* are present.

### Discussion

The present study of the faunal remains from Tell Sabi Abyad permits new insights into the way the Late Bronze Age inhabitants of the site exploited animals. The analysis is mostly aimed at the reconstruction of animal exploitation and function within the economy of the Middle Assyrian “dunnu” and the integration of these results with information from the textual sources. The percentage of the ovicaprids in the assemblage points to the relatively great importance of these animals, which is however, almost exceeded by the equids. Herds were owned by the “dunnu” and shepherds are mentioned in the texts (Wiggermann 2000). A total of at least 2,800 head of sheep and goats were calculated to be at disposal of the “dunnu”. However, husbandry, especially of ovicaprids, was not the main purpose of the “dunnu”, whose exclusively institutional purpose was farming. This reduced economic importance of the ovicaprids is reflected in their relatively lower percentage in comparison with other Bronze Age sites (Clason and Buitenhuis 1997). If the ageing pattern observed for the MA I phase is applicable also to the MA II phase, i.e. the real “dunnu” occupation, it seems clear that exploitation of the ovicaprids in the “dunnu” was mainly related to consumption. The slaughter of ovicaprids, probably mainly sheep, concentrated on rather young individuals of ca. one year. Younger animals with their good and tasteful meat comprised a large part of the animals killed before they reached the age, when labour and food input became too high compared to the quality and quantity of meat obtained. The absence of very young individuals would suggest that the slaughtering of sheep was aimed at the production of larger quantities of meat, probably meant for a large groups of people at the same time. The very similar wear stage of some sheep mandibles might indicate that the sample comes from animals killed within a very short span of time and may even constitute part of the same meal. This would point to a seasonal slaughter depending on a synchronous time of birth, either in spring or fall. The texts inform us about the feeding of a passing army, for example, in which a large quantity of food was requested. Selected good sheep must also have been obtained for the meal of the owner, the vice-roy Ili-pada, when he was visiting his property, accompanied by his attendants. In addition, the lack of very young individuals could indicate that lambs and kids were not directly available, as the herds were not kept locally. The texts inform us of the presence of animals ‘out of the stable’ given to a shepherd (Wiggermann 2000). It is most likely that stabled animals were kept in the habitations around the precinct, and that these were ‘fattened’ for consumption in either civil or ritual contexts. The consumption pattern is also noteworthy for the absence of old and very old animals, which also confirms that sheep were not exploited for their wool. However, it cannot be excluded that this product, as well as milk, was utilised. Probably small-scale shearing took place in the villages and at sub-center levels, but not as a centrally institutionalised and important organised industrial activity.

The large representation of pig remains indicates that pork must have constituted an important source of food. That pork was also intended to feed many people is indicated by the presence of more than one individual (in one case at least 5) in the same closed contexts. Most likely, pork was intended for ordinary consumption of the resident people of the “dunnu” (the ‘chief steward’, other administrative people and domestic workers). In total it has been calculated that ca. 60 people could have lived there (Wiggermann 2000:191). These people, not taking part in food production, needed to be fed and pork would have been a good complementary food to the grain rations, which have been estimated to

be at merely subsistence levels (Wiggermann 2000:191). Pigs are suitable animals for small-scale households, yielding direct and quick production of animal protein. Due to their omnivorous diet pig could easily have been fed on the domestic organic refuse of the “dunnu”, in accordance with the rather static and sedentary nature of the human population who lived there. The environmental conditions must have been quite favourable, indicating the presence of more than enough water and humidity for these animals.

In this type of closed and almost self-sufficient ‘society’ it is not surprising that the percentage of cattle is fairly low, although one may keep in mind that the main economic function of the “dunnu” was farming. Stables ‘for oxen and horses’ are cited, but most of the cattle used for farming must have been kept on the farmsteads and the bovine remains retrieved in the faunal sample must derive from animals kept for purposes other than ploughing/working. On the contrary, it is remarkable how high the percentage of equid remains is. It is suggested that most of the equids must have been hybrids, most likely, mules. The presence of both horses and donkeys is rather scanty within the faunal sample. Apparently, these animals might not have been sources of meat, at least for humans, and it is surprising that carcasses of these animals were retrieved in the context of the “dunnu”. The presence of cut-marks and chopmarks on a number of equid bones, however, indicate that at least some animals were consumed as these marks correspond to disarticulation and meat removing processes. Other equids were disposed of as complete carcasses, easily accessed by dogs. The percentage of equid bones with gnaw marks is fairly high, corresponding to 5% of the equid sample.

The indication of stables in the texts supposes that they were maintained somewhere close to the “dunnu”. The presence of the equids must be related to their function, directly related to the “dunnu” itself. Their most plausible use was in transport and as pack animals. The “dunnu” was on an important route connecting Assur on the Tigris to Karchemish on the upper Euphrates, and it is not surprising that the site might have functioned as a caravan post for merchants. In this respect mules, in particular, and donkeys as well, would be animals one would expect to find while more rare and valuable animals such as horses would have been limited to people of special and higher status. Another important activity of the “dunnu” was the production of leather for war chariots (Wiggermann 2000). Mules could have also pulled these chariots. It is therefore not unlikely that the “dunnu” was responsible for raising well trained mules for such transport purposes.

Hunting was not a neglected activity as indicated by the relatively high percentage of gazelle remains. Although onager could not be positively identified, it seems most unlikely that it was not present in the sample. The specific role of hunting remains an open question. The percentage of gazelle points to a consistent supply. Gazelle and onager are steppe animals and adventuring in the steppe implies a degree of mobility, in contrast to the more sedentary character of the “dunnu”. Leopard, being more an animal of the mountains, may have been traded for its skin. The same, however, is difficult to argue for the gazelle. The composition of the wild spectrum in the MAII suggests that hunting might have been a special activity, probably intended for high status people like the viceroy himself.

The patterns of animal exploitation in the MA I phase do not display great differences from those in the MAII. The main change lies in the increase in ovicaprid remains, which would suggest a greater dependence on sheep and goat husbandry paralleled by a, somewhat less evident, decrease in the exploitation of pork (Fig.1). Equid remains decrease while cattle and gazelle slightly increase. It could be supposed that the local population, which occupied the settlement in this phase, was more concerned with the production of ovicaprid products and relied more on hunting. However, the ageing pattern on the ovicaprid mandibles suggests a pattern related to the consumption of these animals for their meat rather than for secondary products such as milk or wool. The generally similar faunal pattern also suggests that no great changes occurred in economic strategies. The absence of ‘elite’ animals may indicate that the status of the people now occupying the site had changed. Although no longer a crown estate of the Assyrian Empire, it might have been possible that the tendency towards self-sufficiency based on animals and the function of the settlement as a trading post were taken over by the new inhabitants. Further and more detailed investigations into the archaeological and faunal remains might shed more light on the passage into the dark ages of Syrian protohistory at the end of the second millennium BC.



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