

ALMA MATER STUDIORUM – UNIVERSITÀ DI BOLOGNA
DIPARTIMENTO DI STORIA CULTURE CIVILTÀ

ORIENTLAB
SERIES MAIOR

VOL. 3

EXCAVATIONS AT KARKEMISH
I
THE STRATIGRAPHIC SEQUENCE
OF AREA G IN THE INNER TOWN

Edited by
FEDERICO ZAINA

Ante
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with contributions by
Maria Letizia Carra, Silvia Di Cristina, Aliye Erol, Kevin Ferrari,
Elena Maini, Nicolò Marchetti, Sara Pizzimenti and Federico Zaina

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This publication was supported by the Italian Ministry of Foreign Affairs and International Cooperation



Published by Ante Quem S.r.l.
Via Senzanome 10, 40123 Bologna – tel. and fax +39 051 4211109
www.antequem.it
Printed in December 2018

ISBN 978-88-7849-139-7
doi: 10.12878/orientlabsm3

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THE ZOOARCHAEOLOGICAL EVIDENCE

INTRODUCTION

The zooarchaeological sample from the 2012–2014 excavation in Area G at Karkemish includes almost 1100 remains, collected from the Bronze Age, Iron Age and Islamic phases. The present study focuses on the faunal remains from the IA I–III building phase, which account for more than 96% of the total assemblage.⁷⁸ Zooarchaeological analysis were conducted on a sample of about a thousand osteological remains (1030) from the Iron Age phases of Area G. The remains were in a good state of preservation; it was therefore possible to determine the species for more than half of the sample (54.4%) (Pl. LXXXIX.1). It is noteworthy that approximately 80% of the IA faunal sample was collected from the IA II phases (824 remains).

For many bones of ungulates (146 fragments, corresponding to 27% of the identified remains), the high degree of bone fragmentation did not allow the species to be determined, although sizes could be estimated. In these cases, ungulates of large and medium–large size (44, or 8.1% of the sample) as well as medium–small and small size (102, or 18.9% of the sample) were recorded based on the fragment morphology and bone tissue thickness. These size ranges probably reflect the main categories of domestic animals identified at the site, sheep and goats for medium–small and small ungulates,

⁷⁸ The assemblage also included 27 remains from the Late Bronze Age levels (KH.14.S.39, F.3806; KH.14.S.79, F.3806; KH.14.S.119 F.3836) and 9 from the Islamic period (KH.12.S.24, F.1006; KH.12.S.28, F.1015; KH.12.S.29, F.1000). Within the Bronze Age sample, 10 bones were identified and belong to a 3–4 year old sheep and two oxen (a young-adult and a 4–6 year old adult). Only five specimens from the Islamic period were identified: they include a 4–5 year old goat, while three of them belong probably to an adult cow.

and cattle and/or equids for large and medium-large ungulates (Pl. LXXXIX.2).⁷⁹

Wild animals were only occasionally exploited at Karkemish. Rare remains of deer, fallow-deer and gazelle were identified in other areas of the site, but there is no conclusive evidence of wild animals in Area G, except for a few possible remains of deer that are to be still identified with certainty (Pl. LXXXIX.1, Tab. 1).⁸⁰

FAUNAL COMPOSITION AREA G – IRON AGE									
Taxa & animal groups	NISP	NISP%	MNI	MNI%	Animal groups	NISP	NISP%	NMI	NMI %
<i>Equus caballus</i>	2	0,4	1	1,3	Equids	61	11,3	9	12,3
<i>Equus asinus</i>	4	0,7	2	2,6					
<i>Equus sp.</i>	55	10,2	6	7,9					
<i>Canis familiaris</i>	12	2,2	3	3,9	Dogs	12	2,2	3	4,1
<i>Sus domesticus</i>	19	3,5	4	5,3	Pigs	19	3,5	4	5,5
Sheep/Goats	100	18,5	18	23,7	Sheep/ Goats	190	35,2	47	64,4
<i>Ovis aries</i>	67	12,4	19	25,0					
<i>Capra hircus</i>	23	4,3	10	13,2					
Small ungulates	76	14,1	NC	NC	Small & middle-small ungulates*	102	18,9	NC	NC
Middle-small ungulates	26	4,8	NC	NC					
<i>Bos taurus</i>	109	20,2	10	13,2	Cattle	109	20,2	10	13,7
<i>Dama sp.</i>	4	0,7	1	1,3	Middle-large & large ungulates**	44	8,1	NC	NC
<i>Camel sp.</i>	1	0,2	1	1,3					
Middle-large ungulates	9	1,7	NC	NC					
Large ungulates	30	5,6	NC	NC					

79 Statistical analyses related to the animals used for food were conducted considering medium-small and small ungulates to belong to the sheep/goats group and large and medium-large ungulates to the cattle group. Calculations for these uncertain categories confirmed the species proportions obtained on the basis of the positive identifications only. We therefore decided (although declaring a small degree of uncertainty in species determination) to include the remains of generic ungulates in our economic evaluation.

80 For the anatomical and species identification, see Schmid 1972; Barone 1976; the reference collection of *ArcheoLaBio* – Research Center for Bioarchaeology, Department of History and Cultures, Alma Mater Studiorum – University of Bologna – Ravenna, and the photographic collection of the Natural History Museum of the Sultanate of Oman, Muscat.

FAUNAL COMPOSITION AREA G – IRON AGE									
Lagomorphs	1	0,2	1	1,3					
Undeter. mammals	2	0,4	NC	NC	others	3	0,6	NC	NC
Total	540	100 %	76	1,3	Total	540	100 %	73	100 %

Tab. 1. Faunal composition of Area G.

Evaluation of the age at death was done on every specimens providing useful parameters for this purpose. Different methodologies were applied to obtain information about the types of resources exploited (see below).⁸¹ All the information was recorded, including digital taphonomic microscopic documentation of every single trace related to slaughter, anthropogenic or natural changes of the bone surface (see below).⁸² Finally, a comparative analysis was attempted by evaluating the data collected in Area G at the light of those published from other contemporaneous sites in the Middle Euphrates Valley as well as other comparable paleo-environments.⁸³

THE IRON AGE FAUNAL ASSEMBLAGE

Faunal remains are presented here following the chronological periodization reconstructed on the basis of the pottery sequence. The methodology applied included the recording of every bone fragment found and the calculation of the Minimum Number of Individuals (MNI) by stratigraphic unit. In this preliminary evaluation, the economic relevance of the different species within a single chronological period will result from the sum of their occurrences within contemporary layers.

81 For an overview of the methodologies and the numerous bibliographical references about the topic, see Davis 1987; Wilkens 2002; De Grossi Mazzorin 2008.

82 On this topic see, Giacobini 1996; Lyman 1994.

83 Using animals to obtain resources different from meat (life time products) implies different culling strategies. The zooarchaeological analyses conducted to obtain information on the exploitation of the species represented in an archaeological sample includes mainly the definition of the age at death of the animals and, to a lesser extent due to the intrinsic difficulties of application, of their sex (Vigne and Helmer 2007; Greenfield 1988; 2002; 2010; Sherrat 1981; 1983). For a detailed description of the methodologies applied and an overview of the faunal remains, both domestic and wild, discovered from the Neolithic to the Iron Age in the region subject of this research, see also Frei and Marean 1999; Tomè and Nishiyama 2005.

Iron Age I (phase 12)

The IA I sample (phase 12) consisted of 83 animal bone fragments (8% of the total), collected from two of the three superimposed pebble floors.⁸⁴ Species determination was not possible for about half of this sample, including mainly fragments of ribs and vertebrae from both small and large animals.

The 43 identified bone fragments were distributed in the two earlier floors from phase 12 (Tabs. 2 and 3). The earliest sub-phase (L.2319, phase 12a) included 16 animal bone fragments belonging to at least one adult ox, one goat between 1 and 2 years, one pig of undeterminable age and one horse. 67 osteological fragments were in association with the later floor (L.2318, phase 12b), 35 of which were indicative of the species. MNI established the presence of at least two different adult cattle, while the four equid remains represent at least one donkey and one horse (Pl. LXXIII.1). A total of 7 remains belong to sheep/goats, more precisely, to at least one adult goat of about three years and one adult sheep between 3 and 4 years; one pig and one dog were also identified in this assemblage. The dog hemimandible shows traces of a traumatic pathology on a premolar, which is broken and has a partially obliterated alveolus (Pl. LXXIII.2). The other bone fragments belong to small and small-medium and to medium-large and large ungulates.

KARKEMISH AREA G – IRON AGE I												
TAXA	Equids	Horse	Donkey	Dog	Pig	Sheep&Goat	Sheep	Goat	Cattle	s m-s.u.	m-l.l.u.	TOTAL
ANATOMICAL ELEMENTS												
Maxillary					1				1			2
Upper teeth		2				1			1			4
Mandible				1					1			2
Lower teeth							2	2				4
Undet. teeth	1					1						2
Scapula					2							2
Humerus							2		4	2	1	9
Radius										2	1	3
Metacarpal			1						1	1		3

84 No zooarchaeological remains were found in L.2315 (phase 12c).

KARKEMISH AREA G – IRON AGE I												
Pelvis			1							1		2
Femur									1	1	1	3
Tibia							1		1		1	3
Calcaneus									1			1
Metatarsal	1								1			2
Metapodial										1		1
TOTAL	2	2	2	1	3	2	5	2	12	8	4	43

Tab. 2 Iron Age I anatomical elements divided by *taxa*.

Iron Age I	Phase 12			
<i>Loci</i>	L.2319		L.2318	
<i>Taxa</i>	NISP	MNI	NISP	MNI
Horse	2	1	1	1
Donkey			2	1
Equids			1	
Dog			1	1
Pig	1	1	2	1
Sheep/goat	1		1	
Sheep			5	1
Goat	1	1	1	1
Cattle	3	1	9	2
Fellow deer				
Camel				
Small ungulated	1		5	
Middle-small ungulated			2	
Middle-large ungulated			1	
Large ungulated			3	
Lagomorphes				
Undeter. mammal				
TOTAL	9	4	34	8

Tab. 3. Faunal composition of Iron Age I (phase 12).

Iron Age II (phases 11 – 9)

Most the faunal assemblage from Area G (824 fragments corresponding to ca. 82% of the Iron Age group) belongs to this period. More than half of these faunal remains (445 fragments, corresponding to 54%) were identified to species, while determination was not possible for the remaining fragments (Tab. 4). Based on the stratigraphic sequence and the development of the material culture the IA II period in Area G was divided into three macro-phases.

Phase 11

Scarce animal bones were found associated with the different phases and sub-phases of pebble floors that characterize phase 11 (Tabs. 4 and 5).

Floor L.2314 (phase 11a) included 34 animal osteological fragments, 26 of which were identified to species. Eight remains of bovid belong to at least two individuals, one less than 30 months and the other 4–6 years old. Regarding the sheep/goats group, three osteological remains of sheep and two of goats were identified, while it was not possible to differentiate the remaining two fragments. MNI indicated the presence of at least two adult sheep, one of 3–6 years and the other older than 4 years, and of two goats, one of 2–3 years and the other of 4–5 years, while the undefined remains pertain to a subadult sheep/goat of 30–36 months. Five remains of pig belong to two different individuals whose age cannot be determined. A young equid is also attested, probably a donkey of 3–5 years according to the two teeth retrieved. The two remains of small undefined ungulates do not change the MNI, while among the large ungulates, a young individual was not compatible with the MNI calculated for the oxen.

Floor L.2313 (phase 11b) included 41 animal osteological fragments, 27 of which were determined to species. Five remains of bovid possibly belonged to a single adult individual of 3–4 years. A tarsal has cut marks resulting from disarticulation (Pl. LXXIV.1). Among sheep/goats, four goat remains, all mandible fragments, indicated at least three different adults: one young-adult of 1–2 years, one adult more than 2 years old and one of 3–4 years. Seven more fragments of sheep/goat cannot be further discriminated and indicated at least four individuals: one young between 6 and 12 months, two adults of 4–6 years and an elder animal of 6–8 years (Pl. LXXIV.2). As for equids, at least one donkey and one horse, both adult, were identified; a horse astragalus has traces of disarticulation (Pl. LXXV.1). The only two pig remains indicated the

KARKEMISH AREA G – IRON AGE II											
TAXA	Equids	Dog	Pig	Sheep&Goat	Sheep	Goat	Cattle	Dama sp.	s m-s.u.	m-l.l.u.	TOTAL
ANATOMICAL ELEMENTS											
Horns and antlers				4	1		1				6
Cranium									3	1	4
Maxillary			1	6	1				1		9
Upper teeth	17			28			8				53
Mandible	2		1	11	10	8	5		5	1	42
Lower teeth	8		2	18	11	5	7				52
Undet. teeth	1			2			1				4
Atlas						1			2		3
Epistropheus						1	1			3	5
Scapula	1	1	1		1			1	6	2	13
Humerus	1		3		6		1		11	6	28
Radius	2		3	4	4		7		9	1	30
Ulna	1			1	1		3				6
Carpal							1				1
Metacarpal	2			2			5		10	2	21
Pelvis			1				2	1	5	5	14
Femur			1		1	1	4		9	5	21
Tibia	3				8	2	1	2	13	5	34
Calcaneus	3			1			6		1		11
Astragalus	3		1		2	1	1				8
Tarsal							2				2
Metatarsal	2			8	4	1	9		7	1	32
Metapodial	4				1	1	9		1	2	18
Phalanx I	2				4		13		1		20
Phalanx II	1						1				2
Phalanx III							1				1
Others									4	1	5
TOTAL	53	1	14	85	55	21	89	4	88	35	445

Tab. 4. Iron Age II anatomical elements divided by *taxa*.

presence of two different individuals, one young of 4-6 months and one adult of undeterminable age.

The three remains of undeterminable ungulates do not affect the different MNI calculated for L.2313. Due to their size and morphology, four skeletal portions could be referred to an adult deer (Pl. LXXV.2). In the event that future analyses confirm this identification, these remains will be the only evidence of wild animals and hunting practices in the entire Area G.

Iron Age II	Phase 11										Phase 10		Phase 9	
	L.2314		L.2313		L.2310		L.2309		L.2307		L.2306		L.2303	
<i>Loci</i>	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI
Horse														
Donkey													2	1
Equids	2	2	2	2	7	2	21	3					20	4
Dog													1	1
Pig	5	2	2	2	1	1	5	1	1	1				
Sheep/goat	2	1	7	4	5	2	32		1	1	5	3	34	9
Sheep	3	2			4	2	16	3	1	1	6	5	24	5
Goat	2	2	4	2			8	3					7	3
Cattle	8	2	5	1	8	1	25	3	5	1			38	4
Fellow deer			4	1										
Camel														
Small ungulated	2		1	1	2		19	3			14	1	26	3
Middle-small ungulated							3	1			5		13	2
Middle-large ungulated							6	1					2	
Large ungulated	2	1	2	1	6		4	1			4	1	9	1
Lagomorphes														
Undeter. mammal													2	
TOTAL	26	12	27	14	33	8	139	19	8	4	34	10	178	33

Tab. 5. Faunal composition of different occupational phases dated to Iron Age II.

Phase 10

Phase 10 provided the largest animal bones sample, consisting of 362 animal osteological fragments, 214 of which were determined.

From floor L.2310 came 62 animal osteological fragments, 33 of which were determined to species. Eight fragments related to the bovids seem to belong to a single sub-adult individual, no older than 36 months. The seven remains of equid indicated the presence of at least one adult donkey and one adult horse. The astragalus of an adult pig revealed butchering traces (Pl. LXXVI.1). Among the nine remains of sheep/goat there are at least two sheep, one very young between 2 and 6 months and one adult of 4-6 years, while the species of another individual of undeterminable age cannot be better defined (Pl. LXXVI.2). The bones of undefined ungulates of both large and small size do not affect the different MNI calculated for L.2310.

Floor L.2309 provided an abundant faunal assemblage consisting of 235 animal osteological fragments, 139 (60%) of which were determined to species (Tab. 5).

The 25 remains of bovid indicate the presence of at least three adult individuals, one of which was older than 4-6 years. The analysis of the 56 remains of sheep/goats indicates the presence of at least three different adult goats of different ages, one 3 years old, one 4 years old and the other 4-6 year old, and of at least three 4-6 year old adult sheep. At least two more adults can be identified only as sheep/goat. Twenty remains of equid pertained to at least three different individuals, two donkeys and one adult horse (Pl. LXXVII.1). Some equid bones retained butchering traces, which testify to the occasional inclusion of equids in the diet of the inhabitants of Karkemish (Pl. LXXVII.2). A few pig remains probably come from a single individual of undeterminable age. Only 17 animal bone fragments were associated with Floor L.2307, 8 of which were determined to species. The five osteological remains of bovid indicated the presence of at least one adult individual, while two remains belong respectively to a 3-year-old adult sheep and to a young-adult sheep/goat. A pig jaw belonged to a young individual of 4-7 months.

Floor L.2306 contained almost only remains of small and medium size ungulates (Tab. 5). Sheep/goats included a young sheep between 6 and 12 months, an adult sheep and an adult sheep/goat of 2-3 years, two sheep and two sheep/goats of 4-6 years and an 8-10 year old sheep. The remains of 23 more small and medium-small ungulates, including both young and adult individuals, were not further defined due to their poor state of conservation. These remains contributed to the MNI with one large adult and one small young ungulate.

Phase 9

Among the several pebble floors that characterized phase 9, only L.2303 yielded animal bones fragments. Floor L.2303 provided a large sample of 388 osteological remains, 45% of which was determined to species or group. The 38 remains of bovid testified to the presence of at least four different individuals, including one young-adult under 3 years, one 4–6 year old adult, one 8–10 year old adult and another individual of indeterminate age (Pl. LXXVIII.1). At least three adult goats were identified in the sheep/goats group, one of 2–3 years and two of 4–6 years. Moreover, the sample included at least five sheep, one young-adult less than 2 year old, two adults between 2 and 4 years, one adult between 4 and 6 years and another adult of undeterminable age. Sheep/goats that cannot be further defined to species added nine individuals to the MNI, one young between 6 and 12 months, one young-adult of 1–2 years and another between 18 and 24 months, one 2–3 year old and three 3–4 year old adults, and two adults older than 4 years (Pl. LXVIII.2). As for the equids, one donkey was positively identified, while those of uncertain attribution testify to the presence of four individuals, probably two more donkeys, one of which of an advanced age, and at least one horse.⁸⁵ No pig remains came from this phase, but there was one bone fragment of a dog. The remains of large and small ungulates were numerous, although not particularly informative; they added six individuals to the MNI (Tab. 5).

Iron Age III (phases 8 - 6)

The three phases dated to the 7th century BCE included floor levels and numerous pits. Animal osteological remains came mainly from phase 7, which was composed of several layers. However, only three of them included faunal remains. Scarce faunal remains are associated to phase 6, the last occupational phase. In total, 123 osteological fragments date from the IA III, corresponding to ca. 11% of the entire animal osteological assemblage from the Iron Age phases of Area G (Tabs. 6 and 7).

⁸⁵ One single remain in the entire Area G has provided parameters useful to calculate the height at the withers. By applying Kiesewalter's indexes (1888, in Wilkens 2002) to this donkey metapodial, the height of this individual was 108.84 cm. The morphometric study of equids will be eventually extended to the faunal assemblage of the entire site in order to better define the different species and the possible presence of wild equids, such as onagers or crossbreeds.

KARKEMISH AREA G – IRON AGE III										
TAXA	Equids	Dog	Pig	Sheep&Goat	Sheep	Cattle	Camel	Lagomorphs	s m-s.u.	TOTAL
ANATOMICAL ELEMENTS										
Horns and antlers						1				1
Cranium						1				1
Maxillary		1		1			1			3
Upper teeth				5		1				6
Mandible		1		2	1	1			1	6
Lower teeth					4					4
Scapula		1								1
Humerus		1		1					2	4
Radius									4	4
Metacarpal									1	1
Pelvis			1	1				1	1	4
Tibia				1		1				2
Tarsal					1					1
Metatarsal	1	4		1						6
Metapodial			1							1
Phalanx I					2	1				3
Phalanx II						1				1
Phalanx III						1				1
Others		2								2
TOTAL	1	10	2	12	8	8	1	1	9	52

Tab. 6. Iron Age III anatomical elements divided by *taxa*.*Phase 7*

F.1068 included 23 animal osteological remains, eight of which were determined to species, while the remaining 15 were undeterminable fragments of ribs and vertebrae, or splinters from diaphyses of long bones. No large size animals have been retrieved, while sheep/goats and small ungulates in general were represented by four remains indicating at least three different individuals, one of which less than 2 years old. One donkey was also identified, while the two pig remains indicated the presence of one

young individual only. A fragment of the jaw of an adult camel, including one incisor and the P3–M3 upper left tooth row, was also identified in this layer (Pl. LXXIX.1).⁸⁶

Iron Age III	Phase 7						Phase 6	
<i>Loci</i>	F.1068		F.1074		F.3846		F.1067	
<i>Taxa</i>	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI
Horse								
Donkey								
Equids	1	1						
Dog							10	1
Pig	2	1						
Sheep/goat	2	1	2	1	8	3		
Sheep			3	1	5	2		
Goat								
Cattle					8	2		
Fellow deer								
Camel	1	1						
Small ungulated	2	1	1		5			
Middle-small ungulated					1			
Middle-large ungulated								
Large ungulated								
Lagomorphes					1	1		
Undeter. mammal								
TOTAL	8	5	6	2	28	8	10	1

Tab. 7. Faunal composition of different occupational phases dated to Iron Age III.

A small sample of osteological fragments (18) was retrieved from F.1074. The six fragments determined to species indicated the presence of an adult sheep of 2–3 years and an adult sheep/goat of 3–4 years. The 77 animal osteological remains found in layer F.3846, 28 of which determined to species, are the largest sample of faunal re-

⁸⁶ Additional morphometric analysis (Curci and Maini 2017) will allow the species to be better defined; both Dromedaries and Bactrian camels were present in the Middle East during this period (Becker 2008).

mains from phase 7. The eight remains of bovids indicate the presence of at least two individuals, one adult and one calf of a few months identified by a deciduous tooth. Among the 13 remains of sheep/goats, at least five pertain to sheep and testified to the presence of at least two adults, one of 3–4 years and the other of 4–6 years; at least three more sheep/goats were also present, one young of about one year, another young between 18 and 24 months, and an adult of 4–6 years. The remains of undefined small and medium-small ungulates do not increase the MNI calculated for F.3846.

Phase 6

Only a few animal bone remains came from contexts dated to this phase, which is characterized by a pebble floor and an associated pit. In particular, the 10 skeletal remains of one adult dog were found inside pit P.1066, filled by F.1067 (Tab. 7). These remains were related to all anatomical districts of the animal and probably testify to the voluntary deposition of an entire dog (Pl. LXXIX.2).

TAPHONOMIC ANALYSIS

Numerous traces of surface modification were present on several of the 1030 remains retrieved from Area G, either natural or due to butchery practices. No traces of combustion from cooking activities or from the burning of meal wastes for disposal were observed.

In total, 64 animal bone remains presented taphonomic traces, mainly cut marks deriving from butchery practices. Disarticulation striae, thin parallel streaks left by a metal tool cutting tendons and ligaments, are usually found on the distal and proximal joints of long bones or tarsals (Pls. LXXX. 1-3, LXXXI.1). The few traces of defleshing usually run diagonally and were left accidentally on the surface of medial portion of diaphyses while removing the muscle (Pl. LXXXI.2). Traces of slashing or sectioning of meat portions are also very rare. A single trace of this type was noticed at the base of the bony core of a goat horn detached from the rest of the skull with two blows (Pl. LXXXI.3).

Traces of natural origin were also present. Three long bones of large ungulates had gnawing marks left by carnivores, probably dogs. Evidence of two different pathologies was also observed, including the already mentioned trauma on a dog hemimand-

ible (Pl. LXXIV.2) and an osteopathy affecting the slightly malformed long bone of a bovid, perhaps also of traumatic origin.

Working traces and anthropic modifications were also noticed on four animal bones, testifying to the use of hard animal material for manufacturing ornaments and tools. This practice was already documented at Karkemish, mainly in relation to the production of dice and amulets from sheep/goat knucklebones (Maini and Curci 2017; Maini and Curci in press).⁸⁷

DISCUSSION

The economic relevance of each species or group of animals was evaluated considering chronological and stratigraphical distinctions (IA I, II and III), while the Minimum Number of Individuals (MNI) was calculated for both the entire Iron Age and its three sub-periods in order to highlight specific trends and fluctuations.⁸⁸

For what concerns the Iron Age as a whole, in Area G more than half of the live-stock was constituted by sheep/goats and small ungulates, followed by bovids and very few pigs. Sheeps were three times more abundant than goats (Pl. LXXXIX.3-4).⁸⁹ Considering the major animal groups (equids, dogs, pigs, sheep/goats and bovids), with the exclusion of undetermined ungulates and of a few other species, e.g. camelids and lagomorphs, that had no statistical significance, it is possible to observe variations in species relevance within the three distinct Iron Age sub-periods. While, during the IA I, the recurrence of the different species is rather balanced, possibly due to the limited sample available for this period, in the IA II sheep/goats started prevailing based both on NISP and on MNI. This trend continued also during the IA III, which is however also characterized by a rather poor sample (Pl. XC).

As revealed by the analysis of the age at death, the high relevance of adult individuals in all the different groups of domestic animals indicates that breeding was oriented

87 On this topic, see also Affanni 2008, Gilmour 1997 and Minniti and Peyronel 2005.

88 The MNI evaluation for the entire Iron Age assemblage, which required the calculation of a MNI distinct from the one obtained for the single locus, will allow future comparisons between Area G and other areas of the site or with different chronological periods in the same area. At the moment, more than ten thousand remains have been documented and studied in the framework of the Turco-Italian archaeological expedition at Karkemish (Maini and Curci in press).

89 For the distinction between sheep and goat see, Boessneck 1969 and Zeder and Pilaar 2010.

to maximize the yield of meat and secondary products. There are indeed no remains of fetuses and/or infants, and the remains of young individuals are statistically irrelevant in all animal groups except for pigs (Pl. XCI.1).

Graphs Pl. XCI.1–4 show that pigs, bred for the sole purpose of producing meat, were represented by very few individuals (Pl. XCI.2), slaughtered either at a young age (between 4 and 6 months) or at an adult (between 2 and 4 years) age. This evidence suggests alternative strategies in the exploitation of pigs, to obtain high-quality meat in the former case or the largest possible quantity of meat in the latter.⁹⁰

Bovids had slaughtering patterns with high frequencies of sub-adult individuals older than 2 years, or adults of 3–6 years (Pl. XCI.3). Indeed, bovids can be conveniently used both as an abundant meat resource or as working animals. Area G assemblage does not include calves slaughtered in their first months of life, which indicates an animal economy not structured for intensive milk production.⁹¹

Analysis of sheep/goat remains does not show a preferential age at death, even if the largest number of individuals were slaughtered as adults, once they had reached an age of 2–4 or even 4–6 years, presumably in order to optimize the wool yield per sheep (Pl. XCI.4).⁹²

Domestic equids, either donkeys or horses, were also numerically relevant. All slaughtered equids were adult, probably because they were used primarily as beasts of burden for labor or riding and not as a staple meat resource.⁹³

As to animal size, unfortunately only a single animal bone from Area G has provided useful parameters to calculate the height at the withers.⁹⁴ However, the measurements of some whole sheep bones suggest that the animals found at Karkemish were more robust and presumably larger than those discovered, for example, at the contemporaneous site of Dur-Katlimmu (Becker 2008) (see the Measurements table

90 On the pig slaughtering trends, see Bull and Payne 1982.

91 Age at death of oxen was calculated based on the degree of long bones welding and of tooth eruption/wear, following the methods developed by Barone (1976) and Grant (1982).

92 Age at death based on sheep/goat tooth wear was calculated following the method developed by Payne (1973); see also, Silver 1969 and Grant 1982.

93 Among the almost 200 remains of equids from Karkemish, 10% show traces of anthropic modifications, including cut marks due to butchery or traces of combustion. Five osteological fragments of equids that were likely butchered for food came from Area G (Maini and Curci in press).

94 See footnote 82.

in Appendix).⁹⁵ According to Becker (2008) and Cavallo (2002), and considering the age at death of sheep discovered in Area G, it seems likely that at Karkemish too, sheep yielded high-quality wool.

Dogs were already identified in the Iron Age assemblage of Karkemish (Maini and Curci in press), as well as in the other contemporaneous sites in Turkey and Syria previously mentioned in this paper. They were possibly used as sheepdogs, but also consumed for their meat.⁹⁶ In Area G, the few remains of dogs were not very informative for the reconstruction of the animal economy. However, the voluntary deposition of an entire dog found inside a pit was interesting for its probable ritual significance.

A comparable exploitation of the faunal resources was reconstructed for the Iron Age levels of other sites in the region and/or for sites with a comparable agroecological zonation.

If all animal groups documented in Area G at Karkemish were generally exploited until the end of their growth cycle, faunal assemblages from the Iron Age levels of sites like Ain Dara, Tell Afis and Tell Mastuma, but also of Tell Shaikh Hamad (ancient Dur-Katlimmu) in northeastern Syria, included a higher number of young individuals, mainly sheep/goats (Frey and Marean 1992; Wilkens 1992; Tomè and Nishiyama 2005; Becker 2008).

The site of Ain Dara, also characterized by a higher frequency of sheep/goats, provided instead a larger number of pigs, which – contrary to what documented at Karkemish – were the second most exploited meat resource (Frey and Marean 1992). The same trend, with a higher recurrence of pigs, is documented also in the Iron Age levels of Tell Mastuma and Tell Afis (Tomè and Nishiyama 2005, Wilkens 1998).

Occurrences of all the major animal groups recorded in Area G at Karkemish were documented at Tell Ta'yinat, where during the IA II sheep/goats covered more than 80% of the protein demand (Lipovitch 2006). Sheep/goats were also preponderant in the IA I and II levels of Tell Shiukh Fawqani (Vila 2005).

These small variations in animal exploitation within the dominantly pastoral economy that characterized the Iron Age in the region were probably due mainly to the nature of the contexts examined. Thanks to a detailed analysis of a large and compre-

95 More specifically, the distal tibiae and astragali of some sheep from Area G indicated a size larger than the average size at Dur-Katlimmu (Becker 2008: 570, Table 3).

96 Traces of disarticulation were found on some dog bones from Tell Mastuma (Tomè and Nishiyama 2005), as well as from the IA I levels of Tell Shiukh Fawqani (Vila 2005). However, although there is evidence of this practice in other areas of Karkemish (Maini and Curci in press), none was observed in the assemblage of Area G.

hensive sample from Dur-Katlimmu, C. Becker (2008) has indeed demonstrated that fluctuation in the relative proportions between the different species, taxonomic variability and differences in the slaughtering patterns were primarily due to the function of the investigated areas, whether palatial, ritual, residential or productive. In general, such minor variations between rather comparable contexts were influenced by the availability of water and the consequent degree of humidity in the rural areas around the cities, where herders and animals roamed.

In order to eventually extend these considerations to Karkemish as the whole, the analyzed sample needs to be expanded to cover the majority of socio-economic and cultural contexts. Considering the nature and features of the archaeological contexts investigated in Area G, the animal economy reconstructed from those layers could probably yield more information about the lower socio-economic levels of the community than about the higher levels of society. Future analysis of the animal remains from the palatial (Area C) and other public contexts including religious buildings (Area A) and defensive buildings (Area D, N, H) might instead provide the portrait of a different animal economy, with a higher variety of species and a better meat quality, including also venison (Maini and Curci in press).

CONCLUSIONS

The analysis of faunal remains from Area G at Karkemish indicates that domestic animals were clearly predominant in the Iron Age assemblage, with sheep/goats accounting for almost 50% of the Number of Identified Specimens (NISP) and up to 70% based on the Minimum Number of Individuals (MNI) index. They were followed by cattle and equids, both donkeys and horses, while pigs and dogs were quite scarce. The relationship between the NISP and MNI of the species relevant for food consumption further stresses the economic importance of sheep/goats and the almost irrelevant protein contribution provided by pigs.

As far as age at death of the different species is concerned, one observes a general trend to exploiting the animals until the end of their growth cycle, as proved by the prevalence of remains of sub-adult or adult animals. Equids, both horses and donkeys, were killed mainly as adults, because they were first exploited primarily for work and social activities and not for food. The few pigs were instead slaughtered mostly at a

young age to obtain better-quality meat, but there is also evidence for adults that had a larger quantity of flesh. Sheep/goats showed a diversified killing strategy as a result of their exploitation not only for meat, but also for secondary products, such as wool and perhaps also milk and skin for leather. Cattle were also killed as sub-adults, when they still provide good quality meat, or as adults to maximize meat production and protract their use as beasts of burden. The presence of camel bones confirms the use of this animal in Southwestern Turkey during the Iron Age.

Not a single fragment of non-mammalian species, instead was found in Area G. The preservation of bones from animals such as bird and fish might have been severely affected by taphonomic factors which result in their being underrepresented in the faunal assemblage. Indeed, considering the proximity to the Euphrates River and the presence of numerous other freshwater sources, fish and fowl should have been exploited at Karkemish as frequently as at other comparable sites (Becker 2008).

Considering the formation history of its deposit, an archaeological context such as Area G is unlikely to have reflected a domestic food economy. It has mainly yielded food wastes that are not reflective of the actual husbandry and animal exploitation practices – or, more in general, the daily life – of the Karkemish inhabitants during the Iron Age.

KARKEMISH – AREA G – Iron Age		
MEASURES ACCORDING TO A. VON DEN DRIESCH (1976)		
CONTEXT	ANATOMICAL ELEMENT	MEASURE
EQUIDS		
L.2309	P3	L: 24,2; B: 24,0
L.2314	P3	L: 27,1; B: 23,7
L.2303	P4	L: 24,5; B: 24,4
L.2310	P4	L: 24,0; B: 24,2
L.2303	M1	L: 23,0; B: 23,2
L.2310	M1	L: 22,1; B: 22,8
L.2303	M2	L: 23,6; B: 24,1
L.2309	M2	L: 21,8; B: 22,1
L.2303	radius	Bp: 66,0; BFp: 57,2
L.2303	metacarpus	Bp: 41,1
L.2303	metacarpus	GL: 177,2; GLl: 174,4; Ll: 169,8; Bp: 40,4; SD: 24,3; Bd: 36,1
L.2303	tibia	Bd: 62,3; Dd: 44,1
L.2310	tibia	Bd: 54,0; Dd: 38,5
L.2310	calcaneus	GB: 42,6
L.2310	calcaneus	GB: 54,4
L.2309	astragalus	GH: 48,8; LmT: 50,6; GB: 55,5; BFd: 45,5
L.2313	astragalus	GB: 53,9; GH: 52,4; Lmt: 50,9; BFd: 46,4
F.1068	metatarsus	Bd: 35,9
L.2303	metapodial	Bd: 36,9
L.2303	I phalanx	GL: 80,0 ca.; Bd: 45,0; BFd: 42,4
L.2309	I phalanx	GL: 69,1; Bp: 38,6; BFp: 36,1; Dp: 28,1; SD: 24,2; Bd: 34,2; BFd: 33,1
L.2309	II phalanx	GL: 34,1; Bp: 37,4; BFp: 35,2; Dp: 22,4; SD: 31,3; Bd: 34,5

KARKEMISH – AREA G – Iron Age		
Dogs		
L.2303	scapula	GLP: 36,4
F.1067	humerus	Bp: 26,9; Dp: 35,0
F.1067	metatarsus II	GL: 52,4; Bd: 08,0
F.1067	metatarsus III	GL: 59,0; Bd: 07,5
F.1067	metatarsus IV	GL: 58,7; Bd: 07,2
F.1067	metatarsus V	GL: 48,7; Bd: 07,5
PIGS		
L.2309	humerus	Bd: 32,5
L.2313	radius	Bp: 29,4
L.2314	pelvis	LAR: 25,5
L.2310	astragalus	GLl: 37,0; GLm: 34,3
GOATS		
L.2303	mandible	(M3) L: 25,3; B: 09,5
L.2313	mandible	9: 27,0
L.2313	mandible	11: 40,4; 15c: 16,7
L.2303	tibia	Bd: 28,8; Dd: 22,1
L.2309	tibia	Bd: 23,8; SD: 12,8
L.2303	astragalus	GLl: 30,0; GLm: 28,3; Dl: 16,4; Dm: 17,0; Bd: 19,3
SHEEPS		
L.2306	mandible	9: 24,8; 15c: 16,0
L.2303	scapula	GLP: 32,0; SLC: 21,1
L.2303	humerus	Bd: 33,0
L.2303	radius	Bd: 32,0
L.2303	tibia	Bd: 30,0; Dd: 23,6

KARKEMISH – AREA G – Iron Age		
L.2303	tibia	Bd: 31,3
L.2303	tibia	Bd: 29,8; Dd: 21,6
L.2314	tibia	Bd: 31,4; Dd: 23,9
L.2303	astragalus	GLl: 33,0; GLm: 32,0; Dl: 18,4; Dm: 18,6; Bd: 21,8
L.2303	astragalus	GLl: 31,7; GLm: 29,4; Dl: 17,3; Dm: 19,5; Bd: 20,0
F.3846	tarsal	GB: 24,8
F.1074	I phalanx	Glpe: 33,3; Bp: 11,9; SD: 09,7; Bd: 11,6
L.2303	I phalanx	Glpe: 37,5; Bp: 12,6; SD: 11,1; Bd: 12,9
L.2303	I phalanx	Glpe: 35,0; Bp: 13,9; SD: 10,9; Bd: 12,0
L.2306	I phalanx	Glpe: 40,3; Bp: 13,7; SD: 10,7; Bd: 12,9
L.2309	I phalanx	Glpe: 38,3; Bp: 13,1; SD: 10,6; Bd: 12,2
SHEEP/GOAT		
F.1074	maxillary	22: 33,3
L.2306	maxillary	9: 47,0
L.2313	maxillary	23: 24,1
L.2313	maxillary	23: 25,9
F.3846	pelvis	LA: 25,8
L.2303	metatarsus	Bd: 26,3
L.2303	metatarsus	Bp: 20,7
L.2303	metatarsus	Bp: 22,2
L.2303	metatarsus	Bp: 22,4
CATTLE		
L.2310	radius	Bp: 77,5; BFp: 69,1
L.2307	metacarpus	Bp: 62,3; SD: 32,9
L.2307	metacarpus	Bd: 50,5
L.2318	metacarpus	Bp: 56,9

KARKEMISH – AREA G – Iron Age		
L.2310	astragalus	GLl: 67,0; GLm: 60,1
L.2310	calcaneus	GL: 135,7; GB: 41,0
L.2310	calcaneus	GB: 40,7
L.2313	tarsal	GB: 53,2
L.2303	metatarsus	SD: 27,9
L.2303	metatarsus	Bp: 43,5
L.2309	metatarsus	Bp: 47,6
L.2310	metatarsus	Bd: 56,5
L.2303	metapodial	Bd: 53,9
L.2303	metapodial	Bd: 54,0
L.2309	metapodial	Bd: 58,6
L.2309	metapodial	Bd: 53,9
L.2303	I phalanx	GLpe: 58,4; Bp: 27,1; SD: 24,0; Bd: 27,4
L.2303	I phalanx	GLpe: 50,8
L.2303	I phalanx	Bp: 30,3
L.2303	I phalanx	Glpe: 50,7; Bp: 23,4; SD: 19,0; Bd: 23,4
L.2303	I phalanx	Bd: 24,8
L.2303	I phalanx	SD: 28,0; Bd: 30,3
L.2309	I phalanx	GTLpe: 51,6; Bp: 28,3; SD: 24,0; Bd: 27,0
L.2309	I phalanx	Bd: 27,7
L.2309	I phalanx	Glpe: 56,2; Bp: 31,4; SD: 29,2; Bd: 30,6
L.2309	I phalanx	Glpe: 56,2; Bp: 29,4; SD: 24,9; Bd: 25,8
F.3846	II phalanx	GL: 34,6; Bp: 27,1; SD: 21,8; Bd: 23,6
L.2309	II phalanx	GL: 33,5; Bp: 24,2; SD: 19,6; Bd: 21,1
L.2309	III phalanx	DLS: 67,1; Ld: 50,2; MDB: 19,0
CAMEL		
F 1068	maxillary	15a: 46,3

ABBREVIATIONS

AASOR	Annual of the American Schools of Oriental Research
ANES	Ancient Near Eastern Studies
ARET	Archivi Reali di Ebla Testi
AUOR	Aula Orientalis
BAH	Bibliothèque Archéologique et Histoire
BAOM	Bulletin of the Ancient Orient Museum
BASOR	Bulletin of the American Schools of Oriental Research
BAR	British Archaeological Reports
BATSH	Berichte der Ausgrabung Tall Šēḥ Ḥamad
CMAO	Contributi e Materiali di Archeologia Orientale
CWA	Current World Archaeology
HANEM	History of the Ancient Near East Monographs
MSAE	Materiali e Studi Archeologici di Ebla
OIP	Oriental Institute Publications
PEQ	Palestine Exploration Quarterly
SAHL	Studies in the Archaeology and History of the Levant
SAQ	Studi Archeologici su Qatna
SBA	Saarbrücker Beiträge zur Altertumskunde

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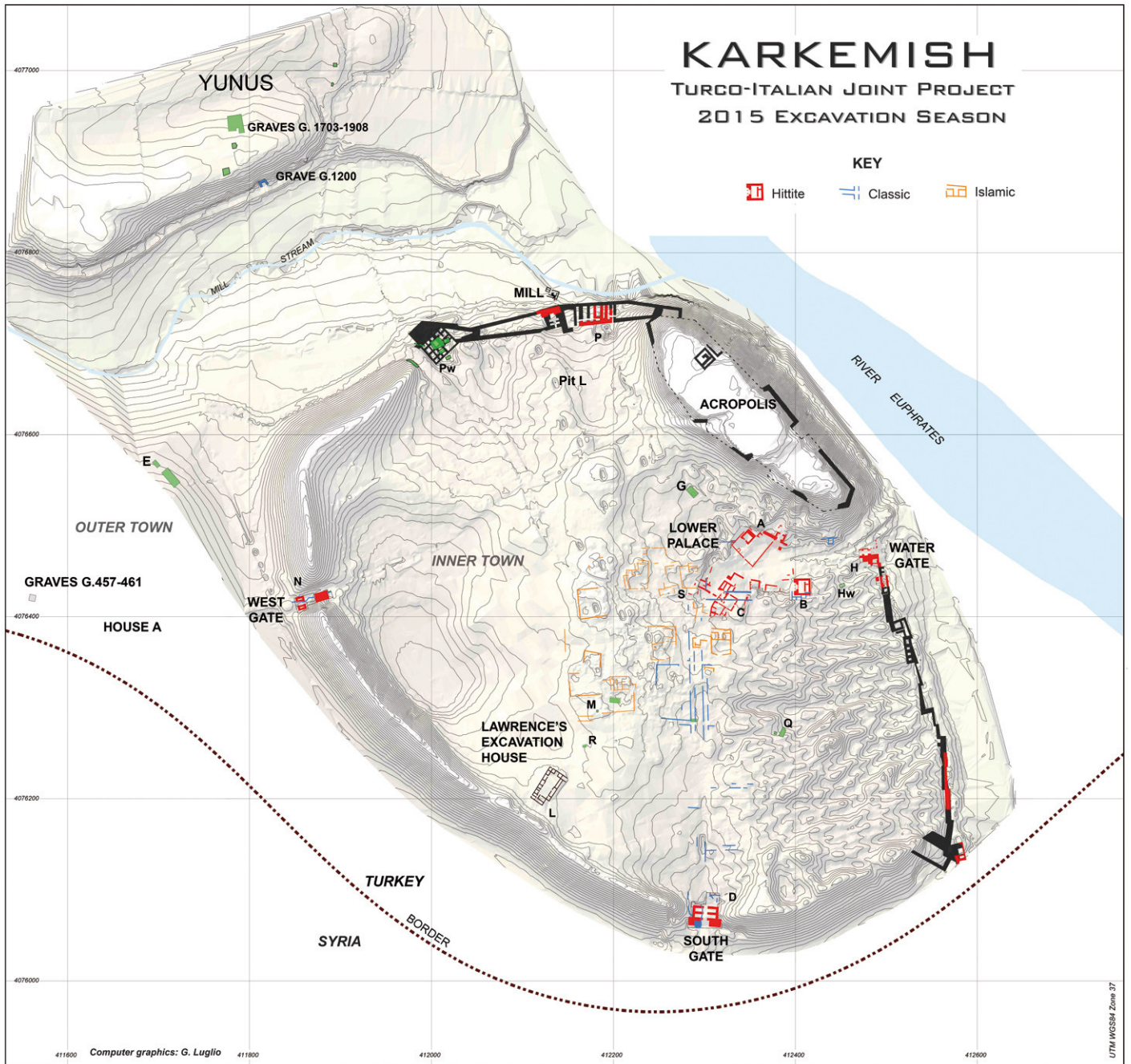
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Topographic map of Karkemish.

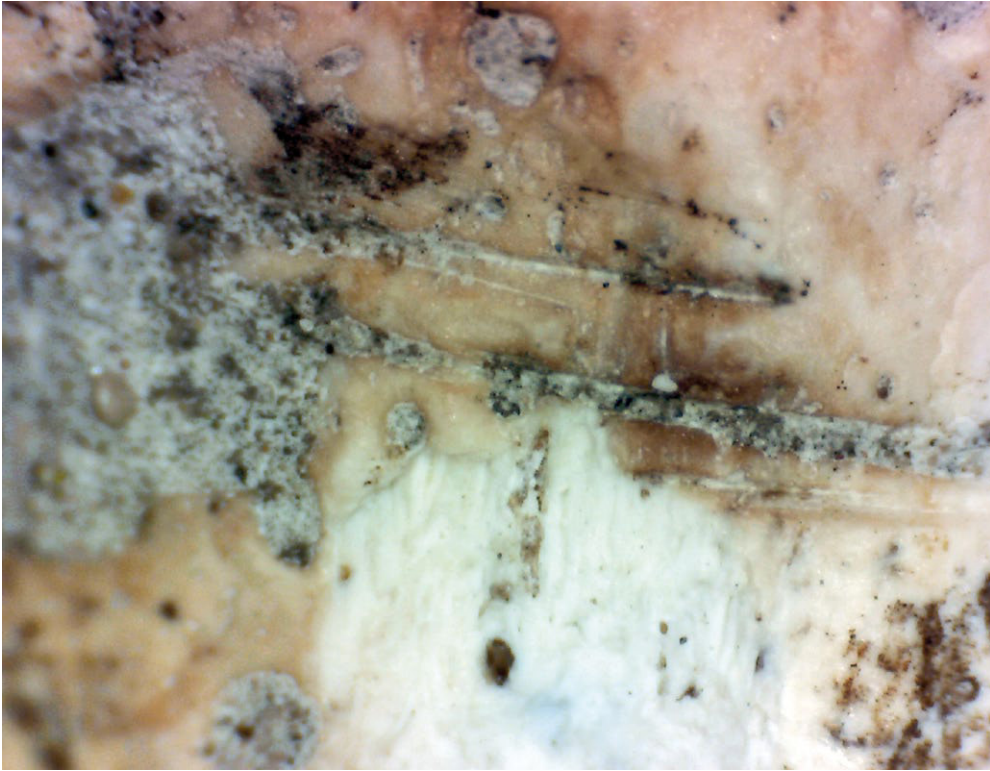


Map of Area G and the Lower Palace Area.

1. Horse metapodial (above)
donkey metapodial (below).



2. Pathological dog lower jaw.



1. Cut marks on a *Bos taurus* tarsal.



2. Sheep/goat upper jaws.

1. Horse knucklebone with cut marks.



2. Bone fragments of a possible *Dama* sp.





1. Pig (*Sus domesticus*)
knucklebone with cut
marks.

2. Left ram horn with
cut marks.





1. Upper teeth of a probable donkey.



2. Cut marks on *Equus* sp. ulna.



1. Cut marks on a *Bos taurus* radio-ulna.



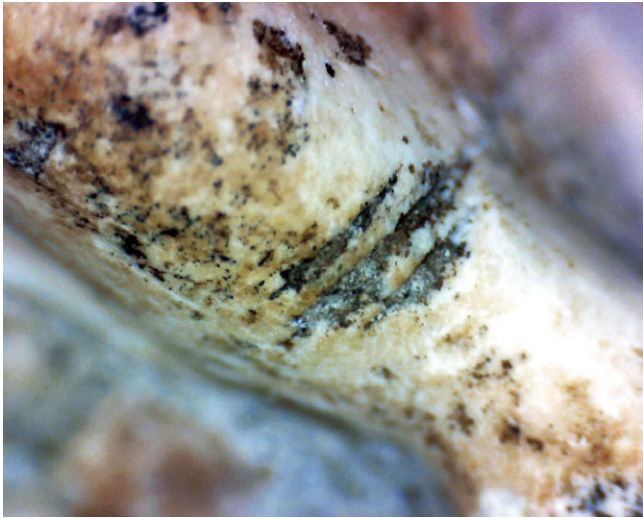
2. Goat femur (left) and sheep tibia (right).



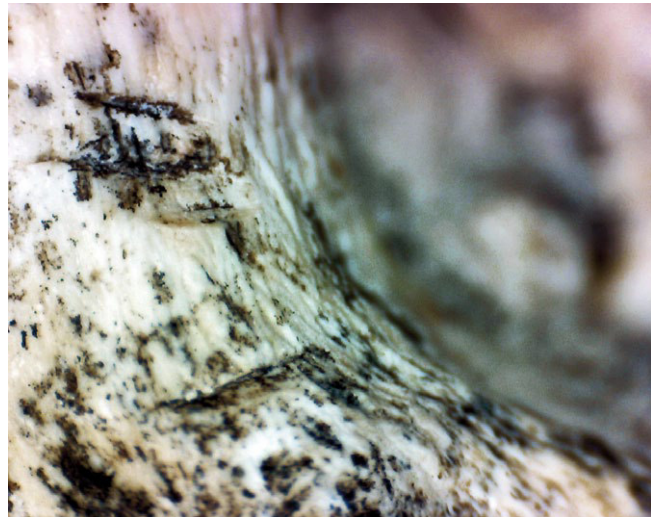
1. Camel upper jaw (maxillary).

2. Bones from the dog deposition in P.1066.

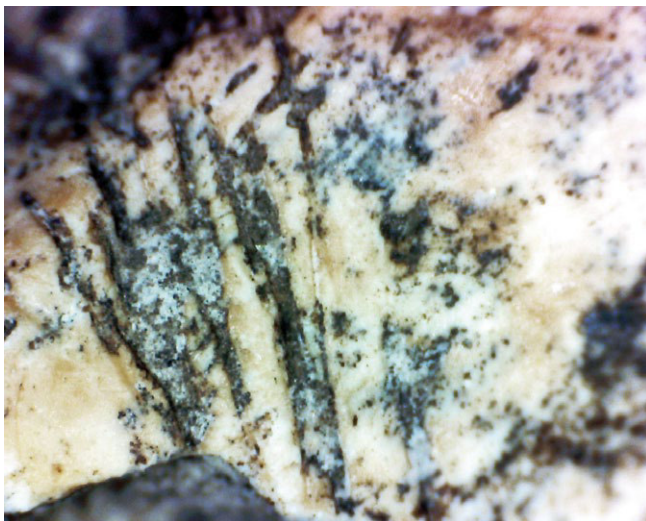




1. Cut marks on a goat knucklebone.



2. Cut marks on a sheep humerus.



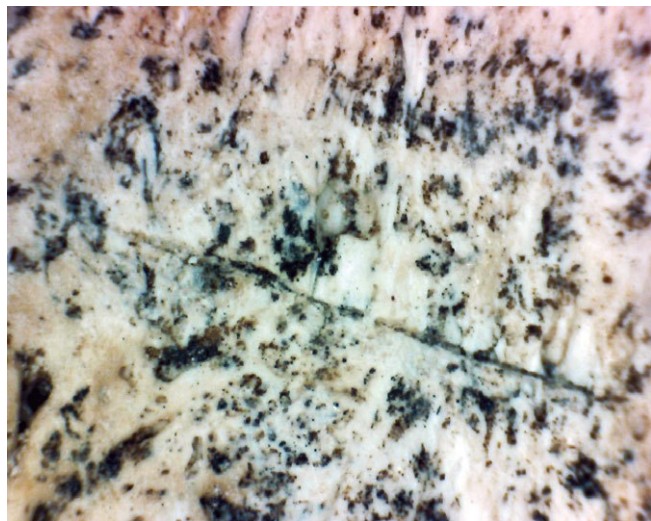
3. Cut marks on the radius of a small ungulate.

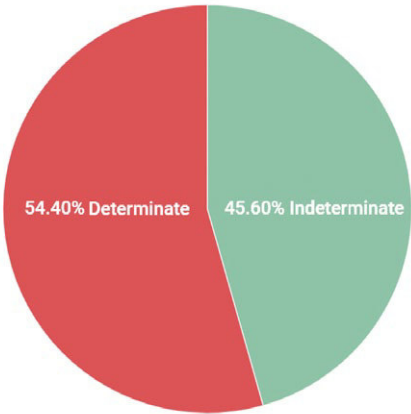
1. Cut marks on a pig knucklebone.



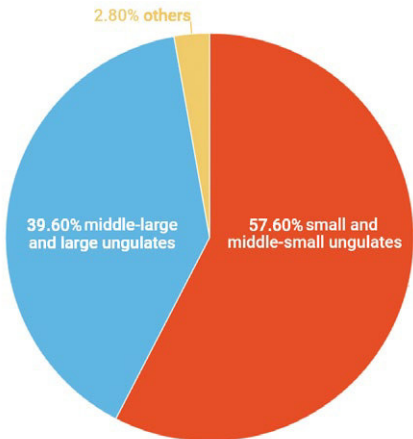
2. Flesh stripping striae on a small ungulate pelvis.

3. Cut marks on the base of a goat horn.

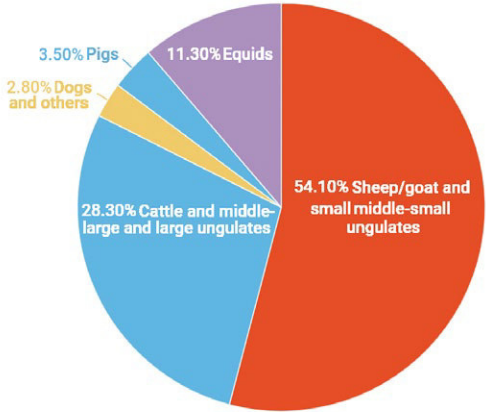




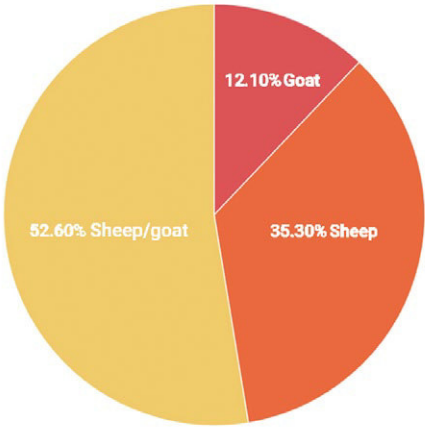
1. Determined and Undetermined bone fragments.



2. Faunal groups by size.

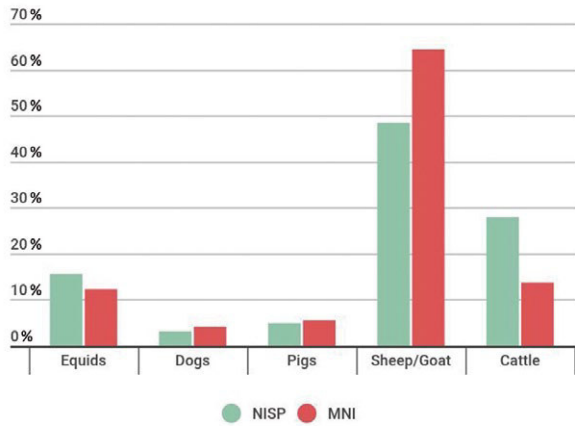


3. Main animal groups.

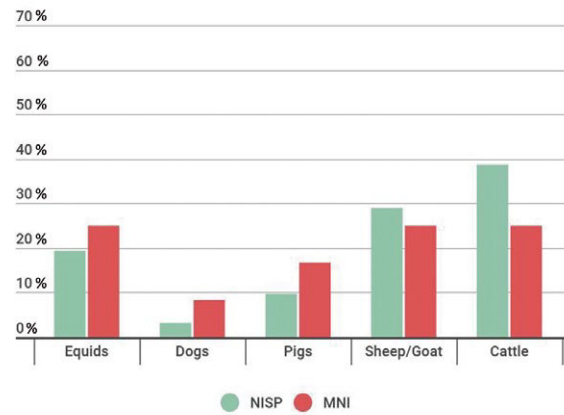


4. Sheep/Goat group.

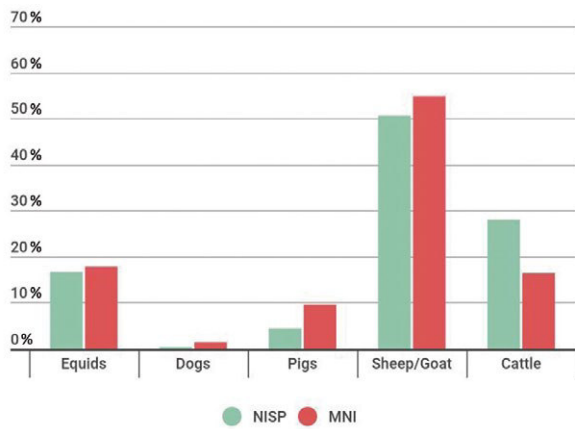
Iron Age - Ratio NISP-MNI



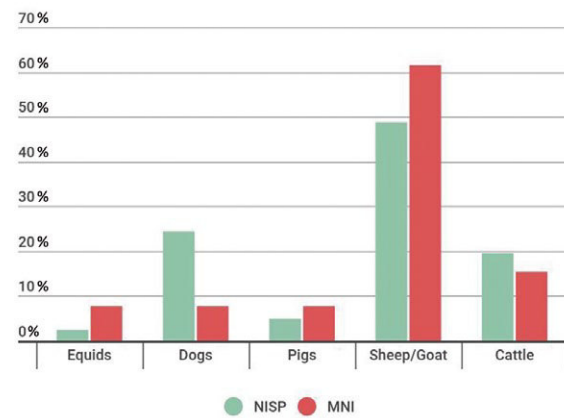
Iron Age I - Ratio NISP-MNI



Iron Age II - Ratio NISP-MNI

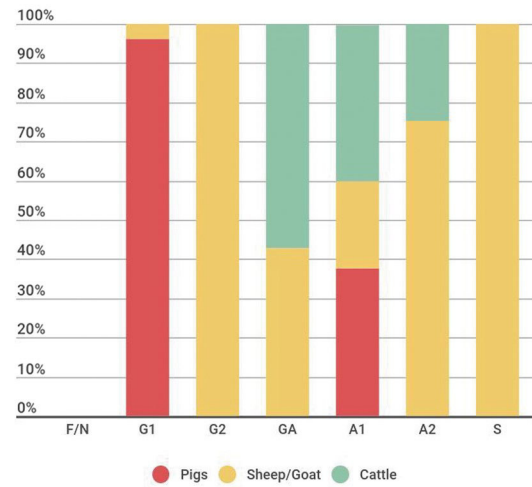


Iron Age III - Ratio NISP-MNI

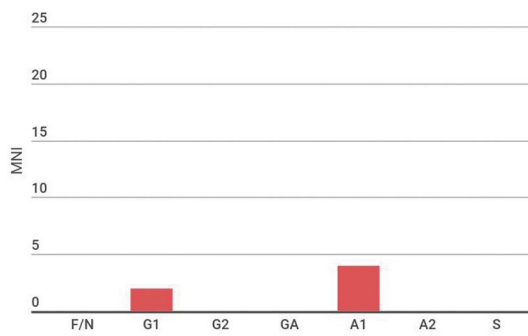


NISP/MNI ratio for the main animal groups in different chronological phases.

Age at death of main groups



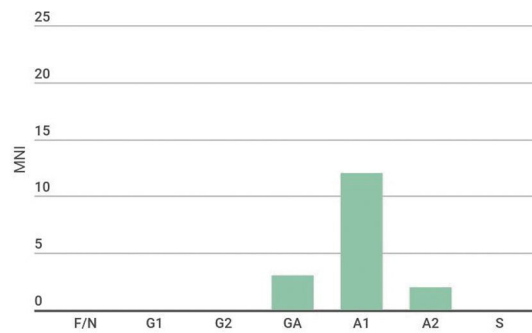
Pigs - Age at death



2. Iron Age. Age at death of pigs.

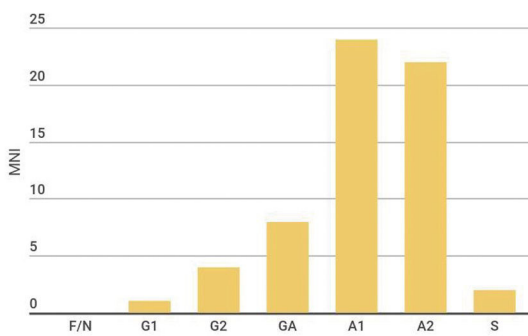
1. Age at death of the main animal groups.

Cattle - Age at death



3. Iron Age. Age at death of cattle.

Sheep/Goat - Age at death












4. Iron Age. Age at death of sheep/goat.

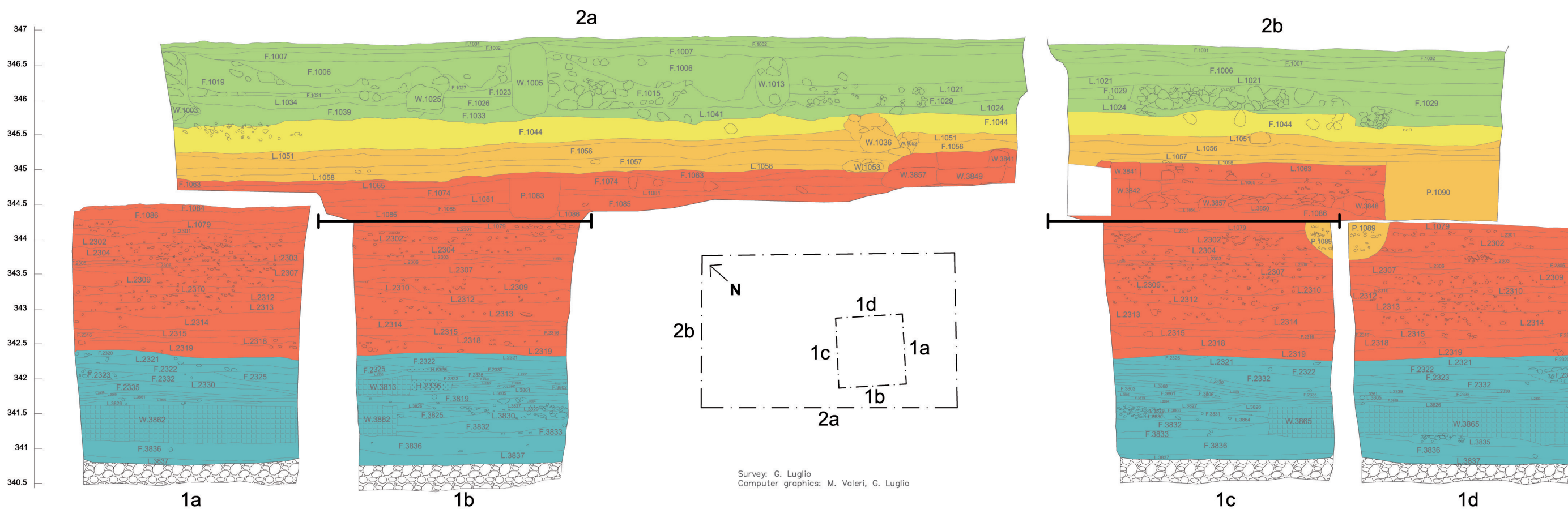
KARKEMISH

AREA G 2012-2014

SECTIONS

LEGEND

 Pebbles	 Hearth	 Hellenistic period
 Stone	 Islamic period	 Iron Age
 Mud-brick wall	 Roman period	 Middle-Late Bronze Age



Stratigraphic sequence of Area G. Lines in sections 1b and 1c mark the projection in the sections.



ISBN 978-88-7849-139-7
doi: 10.12878/orientlabsm3
€ 46.00