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RETHINKING HALAF AND UBAID ANIMAL ECONOMIES: HUNTING AND HERDING AT TELL ZEIDAN (SYRIA)

K. GROSSMAN and M. HINMAN

Résumé Cette étude propose d'analyser les nouveaux résultats des stratégies d'élevage et d'exploitation des animaux de strates de strates de Halaf et d'Obeïd de Nord de la lunigie des nouvelles données archéozoologiques de Tell Zeidan, un village préhistorique à la confluence de la rivière Djezir et de la rivière Khabur. Les résultats montrent que l'élevage et l'exploitation des animaux dans l'économie animale eut lieu à Zeidan entre les périodes de Halaf et d'Obeïd. Durant la période de Halaf, l'assemblage faunique comprend ainsi plus de 50 % d'animaux sauvages. Ces derniers étaient dans l'ensemble domestiqués et étaient utilisés pour la production de biens contemporains montrent qu'une forte dépendance au gibier est assez commune. Tell Zeidan est toutefois le seul grand établissement permanent à présenter un assemblage faunique où le gibier est nettement supérieur à 50 %. Au cours de la période d'Obeïd, l'économie animale à Zeidan s'est modifiée pour se concentrer sur les animaux domestiques, mais l'exploitation des animaux sauvages reste importante. Les résultats montrent que l'exploitation des animaux sauvages est toujours élevée, mais que l'exploitation des animaux domestiques a augmenté considérablement. Cependant, cette utilisation croissante des animaux domestiques ne semble pas refléter une tendance régionale, comme l'attestent de nombreux établissements d'Obeïd où les pourcentages de gibier dépassent élevés. De plus, les résultats montrent que les tendances régionales sont très variées, et que certaines tendances régionales sont très courtes. Ces résultats sont donc très utiles pour comprendre l'évolution des tendances régionales concernant l'exploitation des animaux au Moyen-Orient et apportent des précisions utiles sur l'évolution des tendances régionales concernant l'exploitation des animaux au Moyen-Orient.

美利坚合众国的奴隶制经济是建立在种植园经济的基础上的，是种植园经济，是经济。美利坚合众国的奴隶制经济是建立在种植园经济的基础上的，是种植园经济，是经济。

INTRODUCTION

The Near East's strategic transition stands out as a key moment in the socio-economic development of the Near East, as well as in the world's strategic development.

bridging the gap between the earliest agricultural villages and the emergence of the first states. In Northern Mesopotamia, the late Neolithic and early Chalcolithic respectively followed the Halaf and Ubaid periods. In this paper, we examine the evidence for hunting and herding systems in order

to contribute to models of socio-economic organization for the Halaf and Ubaid periods.

The Halaf and Ubaid periods are particularly interesting periods in which to study subsistence strategies because, while domesticated animals had been available for several millennia, communities made widely varying choices about how much to rely on domesticated animals relative to wild ones (Akkermans 1993; Zeder 1996). In recent decades, archaeologists have developed several models to explain what appears to be a wide range of variability in subsistence strategies at sites across Northern Mesopotamia during these two periods. These models posit that, during the Halaf period, large, permanent settlements subsisted on agricultural yields along with some pastoralism. Smaller, seasonally occupied settlements located in well-watered regions also practiced pastoralism. Those in more arid regions, however, pursued a mixed strategy of hunting and pastoralism (Akkermans 1993; Campbell 1992b; Cavallo 2000). Models explaining subsistence strategies during the Ubaid period suggest that settlements in arid regions continued to use a significant proportion of wild animals. These same models indicate, however, there may have been a trend toward intensification of pastoral production at settlements located above the 200 (or 250) mm isohyet (Akkermans and Schwartz 2003; Zeder 1995 and 1998a).

In this paper, we revisit and build on these models through a study of the Halaf and Ubaid animal economies at Tell Zeidan, a large, prehistoric settlement in Northern Syria. Recent excavations at the site have uncovered evidence for continuous occupation over the course of the Halaf and Ubaid periods. The documented faunal remains from Zeidan form an important new corpus of zooarchaeological data for study of: a) diachronic patterns in animal economies at the site itself, and b) synchronic comparisons with contemporary Halaf and Ubaid settlements. It is important to integrate the Zeidan fauna into models of Halaf and Ubaid subsistence strategies, because Zeidan had both an unusual emphasis on wild fauna in the Halaf period and an unusually dramatic shift toward domesticated fauna in the Ubaid period.

THE ANIMAL ECONOMIES OF NORTHERN MESOPOTAMIA DURING THE HALAF AND UBAID PERIODS

The Halaf period is generally dated to approximately 5900–5300 BC.¹ Nieuwenhuyse (2007: 23) has noted that the label

1. All dates are calibrated.

Halaf "refers simultaneously to a specific stage in the prehistory of Mesopotamia, to a certain cultural constellation—the 'Halaf package'—, to a distinct, heterogeneous pottery assemblage, and finally, to a particular ceramic technology and decorative style." The label Halaf does *not*, however, refer to a unified cultural or political entity. Archaeologists have traditionally identified archaeological sites as Halaf based on similarities in material culture, particularly the distinctive painted pottery, geometric stamp seals, figurine styles, and *hassbos* architecture form (Campbell 1992b). Akkermans, however, argues that the Halaf was primarily a ceramic tradition in which the widely-distributed, painted pottery served to represent differences among interacting groups rather than cultural unity (Akkermans 1993: 207–209, 318–322; Akkermans and Schwartz 2003: 115–116).

Halaf settlements were centered in the Jezirah of Northern Syria and Iraq, with most sites located in the rain-fed agricultural zone (Akkermans and Schwartz 2003: 115, 118). Among Halaf sites, there were a few large, permanently occupied settlements of up to 10–15 ha but usually only a few hectares, as well as many small settlements of less than one hectare that were only temporarily or seasonally occupied (Akkermans and Schwartz 2003: 118–119). The nearly 20 ha site of Domuztepe may have had a peak population of 1500 people (Karsu *et al.* 2009: 6927) and the population density at Tell Kurdu was sufficiently high to require streets and alleys between structures (Özbal *et al.* 2004: 40). At the same time, however, sites like Sabi Abu and Kherbet esh-Shemali had large open areas and low population density (Akkermans 1993: 118–119). Halaf period population sizes and population density appear to have been lower than in the following Ubaid period.

Despite the presence of this two-tier settlement hierarchy, there is very little evidence for political centralization or social hierarchy during the Halaf period. Although Watson and LeBlanc have pointed to specialization in function among Halaf sites and argued that the sites dominating the pottery trade were chiefly centers (Watson 1983), there is actually no evidence that large settlements had regional political power (Akkermans and Schwartz 2003: 150). The Burnt House at Arpachiyah may provide potential evidence for the concentration of power by individuals or institutions (Campbell 2000: 25), but most archaeologists argue that there were no overarching political institutions unifying settlements across the region (Bremmer 1996; Huot 1994; Forest 1996). In the realm of social organization, Nieuwenhuyse (2007: 47) contends that the painted pottery may well have played a role in a social hierarchy based on achieved status. However, Akkermans (1993: 289) argues that social organization revolved around

'egalitarian' family *and* *hierarchical*. Social hierarchy and political power may have been emerging over the course of the Halaf and Ubaid periods, but evidence for such developments in the Halaf period is quite limited.

By the *start* of the Halaf period, sheep, goats, cattle, pigs, and dogs had been domesticated for millennia. Nevertheless, there is a high degree of variation in the way Halaf settlements interacted with domesticated versus wild animals. Akkermans (1993) has developed a model in which settlement size and permanence are the main factors that determine the subsistence strategies of Halaf settlements. He distinguishes two types of settlements: 1) large permanent settlements engaged in agriculture and with a lesser focus on domestic animals; and 2) small temporary settlements whose primary subsistence activity is either pastoralism or hunting. In this model, these two types of settlements interacted with each other so that *hunting* was still a subsistence strategy, but it was not necessarily self-sufficient. Subsequent researchers have generally accepted Akkermans' model, although a few have suggested modifications. Cavalo (2000) adds environment as a causal factor in distinguishing the large agricultural and small pastoral settlements in moister regions from the small hunting settlements in drier regions. Campbell (1992a) hypothesizes that the small hunting settlements in drier regions may actually have been self-sufficient rather than linked to larger agricultural settlements. These models suggest that large settlements do not focus on hunting, but settlements in drier regions do. Large settlements outside the zone of rain-fed agriculture, such as Zeidan, are not covered by these models.

While the Ubaid period is a uniquely Upper Mesopotamian phenomenon, the Ubaid period and ceramic tradition were first defined in the southern Mesopotamian alluvium. Like the term Halaf, the term Ubaid also refers to a site (Tell al-Habib, close to the Euphrates in the southern alluvium), a time period (6th and 5th millennia BC), and a material culture (see the Ubaid period). The Ubaid period is characterized by architectural forms, decorative motifs, religious or cult items, ceramics, administrative technologies, and burial practices (Carter and Philip 2010). During the second half of the Ubaid period, around 5300 BC, some components of the highly-recognizable, southern Mesopotamian Ubaid material culture began to spread to other regions of the Near East, including Upper Mesopotamia, Anatolia, the Gulf, and Western Iran. Early research suggested an absolute break in the ceramic traditions of Upper Mesopotamia at the onset of the Ubaid period (e.g., Malowan and Rose 1955), but recent studies indicate that a phase of Halaf-Ubaid transitional pottery bridged the divide between the Late Neolithic and Early Chalcolithic periods.

(Davidson and Watkins 1981; Watkins and Campbell 1987). The shift to Ubaid material culture in Northern Mesopotamia was therefore a transformation rather than a disjunction.

Still, there were some important changes in settlement patterns in Northern Mesopotamia during the Ubaid period. There was a marked transition to permanent and enduring settlements (Akkermans and Schwartz 2003: 159), and survey evidence even suggests the development of complex settlement hierarchies in certain regions (Wilkinson *et al.* 1996). The Iraqi Jazira, for example, hosted smaller hamlets (*ca* 1 ha), medium sized villages (5-6 ha) and even a large regional center (15-20 ha). Although these settlement hierarchies might suggest the development of political hierarchy on a regional scale, there is little information to attest to relationships of economic or political dependency between settlements.

Indeed, evidence for social stratification in Upper Mesopotamia during the Ubaid period isenuous (Carter and Philip 2010: 12-13). Suggestions of incipient hierarchy and stratification have been made based on several factors, including the recovery of large buildings, such as at Tere Gwara (Robtman 2002) and evidence for long-distance trade in valuable commodities, such as obsidian (Breniquet 1989) and copper (Tobler 1950: 211-213). The use of stamp seals in Upper Mesopotamia also attests to ownership, control of goods, and possibly some form of administration (Stein 2010a). Finally, "headshaping" was widely practiced during the Ubaid period and may have been a physical manifestation of inherited social rank (Lorenz 2010). Nevertheless, none of these features in and of themselves necessarily indicates the presence of a socio-political elite. In fact, there do not seem to be any markings of status in grave goods until the very end of the Ubaid period (Akkermans and Schwartz 2003: 178). Thus, although evidence for economic, social, and political hierarchy during the Ubaid period is not as limited as during the Halaf period, the extent of such developments is still an open question.

Subsistence practices during the Ubaid period in Upper Mesopotamia included agriculture (both rain-fed and using flood basin irrigation), as well as pastoralism and hunting. Current understandings of Ubaid hunting and pastoralism, however, are constrained by the limited number of available zooarchaeological studies (Parker *et al.* 2008). The few studies that have been published show that in some settlements in Upper Mesopotamia, the Ubaid diet consisted mostly of domesticated animals, while others wild species continued to comprise a significant percentage of the diet (Zeder 1995; Akkermans and Schwartz 2003: 175) just as during the Halaf period. For example, Zeder argues that, during both the Halaf and Ubaid periods, settlement location may

have influenced the relative abundance of wild fauna, with wild game more heavily exploited in drier regions, where settlements were more isolated and developed unique mixed subsistence strategies. In well-watered areas of the Upper Khabur, however, where settlements were more economically interdependent, Zeeder's study shows greater reliance on domesticated animals and, indeed, an intensification in the usage of domesticates from the Halaf into the Ubaid period (Zeeder 1995 and 1998a). As she acknowledges, exceptions to her categorization of sites based on location exist even within her study region: for example, Kura, the well-watered Khabur basin, had 27% of the wild fauna (Zeeder 1998, Table 2). Since Zeeder only had a small number of sites on which to base her model, adding Zeidan to the regional dataset will aid in determining the strength of the correlations she identifies between location, economic interdependence, and subsistence strategies.

Our analysis of the Zeidan fauna will contribute to discussions about socio-economic developments during the Halaf and Ubaid periods in Upper Mesopotamia in several ways. By integrating Zeidan into a regional study of animal economies, we will present a more comprehensive view of the regional variability in patterning in Halaf and Ubaid subsistence strategies. Through a diachronic study of the animal economy at Zeidan and an analysis of the linkages between subsistence change and socio-cultural factors, we hope to contribute to a better understanding of the Halaf to Ubaid transition.

TELL ZEIDAN

Tell Zeidan is a 12-ha triple-mounded prehistoric site in north-central Syria (fig. 1). The site sits at the junction of the Balikh and Euphrates Rivers, a few kilometers outside the modern city of Raqqa (fig. 2). The soils of the lower Balikh River Valley are rich, but the area is quite arid, lying just at the 200mm/annum rainfall isohyet (Wilkinson 2003: Fig. 6.2). We know that crops were grown at Raqqa, because barley, emmer, and emmer-like wheats were recovered from flotation (Stein 2009). Irrigation, probably making use of seasonal inundations, would have been necessary to grow these crops.

In contrast to the rich agricultural land of the Balikh River Valley, the uplands immediately surrounding the valley are a semiarid steppe. The areas immediately adjacent to the rivers would have supported riparian vegetation such as riverine

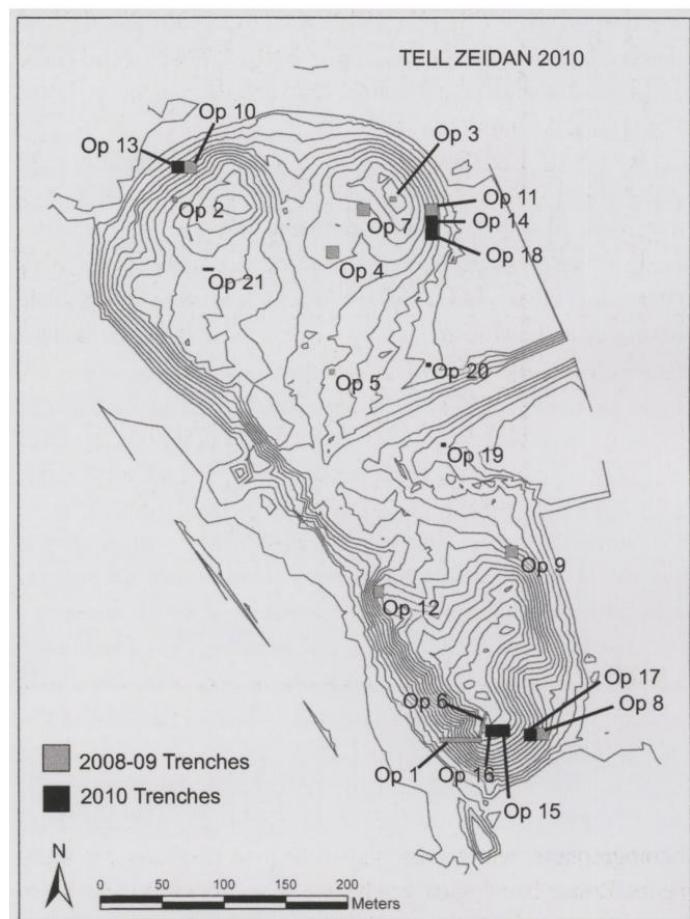


Fig. 1. Tell Zeidan Site Plan.

Zeidan offered a diverse array of ecological niches that would have supported a wide variety of wild animals.

Archaeologists have known about the large mound of Zeidan since the early 20th century (e.g. Contenau 1928; Rutten 1931). Surveys in the Balikh Valley observed large quantities of prehistoric sherds on the tell surface, particularly Halaf and Ubaid painted wares, and recognized the site as one of the largest settlements in Northern Mesopotamia (Mallowan 1946; Stein 1993; Stein 2010). In 2008, excavations at Zeidan began (Stein 2009, 2010a, and 2011). The project is directed by Prof. G. Stein of the Oriental Institute, and by the director of the Raqqa Museum in Syria (A. al-Khabour in 2008-09; M. Sarhan in 2009-2010). The project has drawn together a multi-disciplinary group of specialists, including ceramicists, archaeobotanists, bioarchaeologists, lithics specialists, artists,

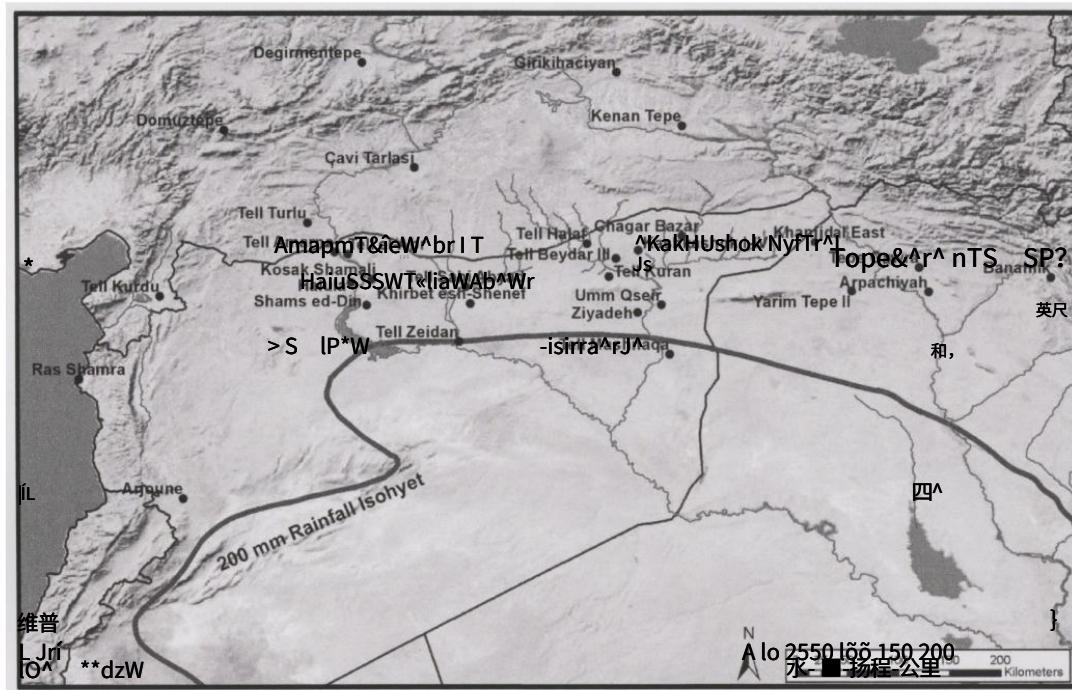


Fig. 2 – Map of Halaf and Ubaid Sites.

photographers, remote sensing specialists, archaeologists, and museum managers. Zooarchaeological analysis is a major component of the research agenda. During the 2009 season, K. Grossman began a diachronic study of faunal remains from the Halaf, Ubaid, and Late Chalcolithic periods, and M. Hinman joined her in 2010 to study the Halaf period.

Surveys, inspections, and excavations conducted by Stein since 2008 indicate that the Halaf period occupation of Zeidan extended over at least 6 ha, covering the entire northwest and northeast mounds, as well as the southwest portion of the south mound. This makes Zeidan one of the largest known settlements for the Halaf period. However, Halaf sites were often not occupied over their whole extent simultaneously (Akkermans and Schwartz 2003:118–120). Stein excavated a 4 m thick Halaf deposit dating to 3800–3700 BC from the deep sounding on the border between the northeast mound and lower town in Operation 4 (Stein 2009). It is likely that Zeidan hosted a permanent Late Halaf occupation but also had at least ephemeral occupation on parts of the site earlier in the Halaf period. Although the evidence from Operation 4 indicates ephemeral occupation outside the main mounds, the depth of occupation in Operation 1 indicates that some parts of the site were occupied

permanently over a long period of time. The two excavation areas were too limited in extent to permit thorough investigation of contexts, but the presence of mudbrick architecture corroborates the evidence for permanent occupation.

The Ubaid period settlement at Zeidan covered all 12 ha, with a deep stratigraphic sequence—*at least 6 m*—in places (Stein 2009). Ubaid period remains include mudbrick houses, craft production areas, a large enigmatic building, and burials. The long sequence of layers and the lack of significant stratigraphic gaps (Stein 2009: 135–136; 2011: 126), deep deposition sequence, and wide variety of remains indicate a long-lived, permanent, and densely populated settlement.

FAUNAL ASSEMBLAGE FROM TELL ZEIDAN

Abundant faunal remains were recovered from every excavation. In total, 72 contexts were excavated, and all but one contained faunal remains. Most were recovered in the course of excavations and were saved for analysis. Many were collected by hand during the earliest phases of excavation. A few intact floor contexts were screened, and some deposits were also subjected to flotation methods. All of these methods yielded large quantities

of animal bones each season, so sampling is crucial. The faunal sample for this study consists of all Halaf period faunal remains available for study,² as well as 17% of the bags from the most extensive Halaf period excavations. The Ubaid remains come from a selection of securely dated primary and secondary contexts that are discussed further below.

Once selected for analysis, the faunal remains were washed and sorted. They were analyzed completely in the field, using Schmid (1972), Besseneck (1959, 1969), Brown and Gustafson (1979), Palusz et al. (1971), and Verpomm (1986) to species and element identifications, and following Verheyen and Price (1976) for standard measurements of complete elements. Zooarchaeological data were recorded using a spreadsheet system developed by G. Stein for his work at Halaf and modified slightly by K. Grossman for the Zeidan project. This system involves coding the taxonomic context, taxonomic identification, element, symmetry, fusion status, tooth-wear, fragmentation (amount, origins and planes), cultural modification (butchering, working, butchering), sex, domestication, pathologies, measurements, and weight for each bone fragment (table 1).

HALAF FAUNAL ASSEMBLAGE

Sample Reliability

哈尔夫动物群 faunal assemblage consists of 1221 bones, of which only 261 (19.8%) are identifiable to the genus level (table 2). Furthermore, 664 fragments (50.0%) consist of less than one quarter of the original bone, so this is a small and fragmentary sample. Nevertheless, a number of arguments support the use of this sample to draw conclusions about Halaf subsistence at Zeidan. First, although most of the bones come from a single operation, Operation 1, its deep sequential sequence shows that these bones do not come from a specialized cache. Second, the rank order of the four most abundant genera based on both NISP and MNI analysis is identical (table 2). This convergence supports qualitative conclusions about the relative importance of genera. Third, a comparison of the proportions of large, medium, and small specimens identified to the genus level with the proportions of such specimens identified only to size shows that the subset identified to genus may be biased toward

2. Although the intention was to analyze all excavated Halaf period remains, a few bags recorded in the excavation database could not be located for analysis during the 2010 field season.

3. The system was developed by Redding et al. (1978).

Table 1. *Final Fragment Counts and Percentages.*

鉴别分类	Halaf		叙述	
	碎片占总量的百分比 数数	碎片数	碎片占总量的百分比 数数	碎片数
<i>Bos taurus primigenius</i>	39	3.0%	410	3.0%
金牛座/始祖牛	39	3.0%	410	3.0%
<i>Ovis aries/gmelini</i>	8	0.6%	181	1.3%
绵羊/山羊	8	0.6%	181	1.3%
<i>Capra hircus/aegagrus</i>	10	0.8%	410410410181181181717171	0.5%
山羊/山羊	10	0.8%	410410410181181181717171	0.5%
<i>Sus scrofa</i>	7	0.5%	238	1.7%
家猪/野猪	7	0.5%	238	1.7%
<i>Ovis/Ga</i>	55	4.2%	1272	9.3%
绵羊/山羊	55	4.2%	1272	9.3%
<i>Capreolus capreolus</i>	2	0.2%	5	0.0%
鹿科动物	2	0.2%	5	0.0%
<i>Cervus elaphus</i>	1	0.1%	12	0.1%
鹿科动物	1	0.1%	12	0.1%
<i>Gazella a. sp.</i>	29	2.2%	83	0.6%
角鹿科动物	29	2.2%	83	0.6%
<i>Equus a. sp.</i>	0	-	8	0.1%
马属	0	-	8	0.1%
<i>Equus caballus</i>	13	1.0%	28	0.2%
马属	13	1.0%	28	0.2%
<i>Ovis or Capra or "S. a. zellea"</i>	13	1.0%	180	1.3%
山羊科动物	13	1.0%	180	1.3%
<i>Capreolus</i>	0	-	1	0.0%
鹿科动物	0	-	1	0.0%
<i>Capreolus</i>	0	-	1	0.0%
鹿科动物	0	-	1	0.0%
<i>Capreolus</i>	0	-	2	0.0%
鹿科动物	0	-	2	0.0%
<i>Capreolus</i>	0	-	5	0.0%
鹿科动物	0	-	5	0.0%
<i>Ovis or Capra or "S. a. zellea"</i>	13	1.0%	180	1.3%
山羊科动物	13	1.0%	180	1.3%
<i>Capreolus</i>	0	-	1	0.0%
鹿科动物	0	-	1	0.0%
<i>Capreolus</i>	0	-	1	0.0%
鹿科动物	0	-	1	0.0%
<i>Capreolus</i>	0	-	2	0.0%
鹿科动物	0	-	2	0.0%
<i>Capreolus</i>	0	-	9	0.1%
鹿科动物	0	-	9	0.1%
<i>Capreolus</i>	0	-	74	0.5%
鹿科动物	0	-	74	0.5%
<i>Capreolus</i>	24	1.8%	294	2.1%
鹿科动物	24	1.8%	294	2.1%
<i>Capreolus</i>	318	24.1%	4307	31.4%
鹿科动物	318	24.1%	4307	31.4%
<i>Capreolus</i>	234	17.7%	2059	15.0%
鹿科动物	234	17.7%	2059	15.0%
<i>Capreolus</i>	1876	18.7%	0	-
鹿科动物	1876	18.7%	0	-
<i>Fish</i>	0	-	2	0.0%
鱼	0	-	2	0.0%
<i>Tortoise</i>	0	-	7	0.1%
龟	0	-	7	0.1%
不定	221	16.7%	4294	31.3%
不确定	221	16.7%	4294	31.3%
其他	13704	100%	13704	100%

larger mammals, but only slightly. Enriched bones are not preserved in the sample but this fact does nothing to undermine the main results of this study. In sum, the assemblage may be small, but it still could permit qualitative conclusions about the relative importance of genera. Note, furthermore, that many of the faunal assemblages from other Halaf sites are also small (see Discussion).

Taxonomic Identifications and Quantification

我们建立了分析的相对重要性 of different species in the sample using the Number of Identified Specimens

表2 可识别属级骨骼的NISP和MN_n。Bones Identifiable to Genus Level, including Ovis/Capra.

属/种	H	af	baid
MNI	100%	100%	100%
傅斯	21019.5%	3914.9%	813.6%
绵羊	21015.5%	8815.25.4%	1817.4%
卡普拉	31018.5%	21018.5%	712914.9%
绵羊/山羊	0.50%	15.21.1%	31.3%
侧颈	102.5%	2382.7%	616.7%
犬科动物	11.9%	7105.9%	55.9%
马属	38978.5%	32028.2%	8128.7%
鹿	153.9%	1112.0%	11.7%
兔属	11.5.3%	11.7%	50.2%
壁羚	2315.8%	623.9%	216.5%
激荡	11.5.2%	31.1%	46.8%
兔子	00.0%	00.0%	00.0%
不越舞	00.0%	00.0%	11.7%
福克斯	151.5%	11.0%	00.0%
总计	19100.0%	261100.0%	59100.0%
	2430	100,0%	

4. **基于形态学特征的 *Cervus* 分类** (Brown and Groves, 1979).

5.身份证明与身份识别
Epiphragmas in the phylogeny of insects (especially specially metapodias) illustrated in Pales and Lambert (1971).
先是动物 (metapodias) 为题所示, 见 Pales et Lambert (1971)。

6. Barrage 的识别基于其大小以及形态
has been identified on the basis of size, as well as the morphology of
鹿角和颅骨元素!-cranial elements.

Analyses of the Main Genera in the Halaf Sample 分析 哈拉夫样本中的主要属

Environ

绵羊和山羊

其中10人可识别 *Capra* and 8 as *Ovis*, with the remainder not distinguished. Therefore sheep and goat may have been present in approximately equal proportions. 约等于
绵羊和山羊可能被识别为是定居点使用的动物, 虽然没有区别
绵羊和山羊是主要的
周围环境并不适合野生绵羊和山羊, 但可能可能
绵羊和山羊的遗骸可能可能
驯养的绵羊和山羊。尽管如此, 我们
应该不能排除野生绵羊和山羊
在 this assemblage. Because of the small sample, there is insufficient evidence to reconstruct herd management strategies and the role of secondary products.
次要产品的作用。

原斯

主要的有300多块。The sample probably consists mainly of *Bos taurus* with a few wild *Bos primigenius*. 原来的。

7. The large number of Halaf *Equus* remains at Zeidan does seem to be a general phenomenon, and thus似乎不是源自于一个专门的背景。大量Halaf *Equus*遗骸看起来确实是一代一代地在 a specialized context. 大量发现的马骨碎片证实了这一点。操作1和操作2中, 40%的分析上下文中, 14% of the analyzed contexts showed the presence of horse bone fragments. 在这些情况下, 马和动物遗骸占3%至42%的已识别片段与大多数上下文产生9% to 22% of the horse and animal bone fragments. 分析了14个背景, 其中被发现的遗骸在NISP中占15% *Equus* remains by NISP.

8. 卡瓦洛创建了后颅骨元素的分类后颅骨元素—那些在生命的早期、中期和晚期融合。基于Silver (1970) 的融合年龄
分类。

9. 参见Kerremans (1993) 和 Cavallo (2000) 的评论。

Domesticated cattle were a standard component of pastoral economies in the Halaf period¹⁰ and there is no reason to expect a significant population of wild cattle in the steppe around Zeidan. As with the *Ovis* and *Capra*, however, we should not completely exclude the possibility of wild cattle in this assemblage.

Gazella

There are 29 *Gazella* fragments. These remains probably belong to *Gazella subgutturosa*, the only species found at sites along the Euphrates and Balikh (Cavalli 2006: 209): 63. Like onager, gazelle would have been at home in the steppe around Zeidan (Zeder 1994: 103).

Summary

In sum, the Halaf faunal assemblage from Zeidan consists of 13,704 bone fragments, of which 261 (1.9%) are identifiable to the genus level. Analysis of this sample indicates that the inhabitants of Zeidan derived about half of their animal products from keeping domestic sheep, goat, and cattle. They obtained the other half by hunting the wild onager and gazelle that roamed the steppe surrounding the settlement.

THE UBайд FAUNAL ASSEMBLAGE

Sample Reliability

This faunal sample's large size and wide range of contexts makes it a reliable source for studying Ubайд subsistence at Zeidan: 13,704 bone fragments dating to the Ubайд period have been analyzed. This is only 17% of the many bags of animal remains recovered from Ubайд contexts. The faunal remains suitable for analysis are those from secure primary and secondary archaeological contexts, and 16% of the remains were recovered from dry sieving (0.5 cm screens). Contexts include trash deposits and living surfaces that accumulated up against the faces of massive mudbrick walls in Operation 1; trash deposits that filled a large gully in Operation 7; deposits built up against the walls of a small Ubайд building and from deposits on the working surfaces of open-air production area filled with kilns in Operation 8; deposits from floors and trash deposits associated both with a very large building and with smaller buildings below it in Operation 9; and deposits

from the floors of Ubайд houses and fills of large pits in Operations 11 and 14 (see fig. 1).

FAUNAL IDENTIFICATION AND QUANTIFICATION

Of the 13,704 bone fragments analyzed, 8,410 (68.7%) are identifiable to class or a lower taxonomic level, while 4,294 (31.3%) are completely indeterminate. Of the total bone fragments, 2,430 (17.7%) are identifiable to the genus level, including *Ovis/Capra*. As in the Halaf sample, the majority of the recovered faunal remains are mammalian. Despite Zeidan's location at the swampy confluence of the Balikh and Euphrates Rivers, there are few avian, amphibian, or fish remains.

In contrast with the Halaf pattern, the largest quantities of identifiable Ubайд faunal remains come from domesticated animals. *Ovis*, *Capra*, *Bos*, and *Sus*¹¹. *Ovis* and *Capra* make up 11.1% of the total bone fragments. *Bos* make up 3.0%, and *Sus* make up 1.7% (table 1). Looking only at fragments identifiable to genus, the total domesticated *Ovis* and *Capra* together make up 62.6%, domesticated *Bos* 16.9%, and domesticated *Sus* 0.8% of the sample, so that cumulatively 89.3% of the fauna are domesticated (table 2).

In addition to the domesticated species, large numbers of wild fauna are also present (9.9% by NISP). Although the percentage of wild fauna is nowhere near that of the preceding Halaf period, hunting was still an important component of the Ubайд subsistence economy. Hunters targeted a diverse range of species, including *Capreolus*, *Dama*, *Gazella*, and *Equus*. While most equid remains are onager (*Equus hemionus*),¹² a few may be from asses (*Equus asinus*).¹³

ANALYSES OF THE MAIN GENERA

Ovis and *Capra*

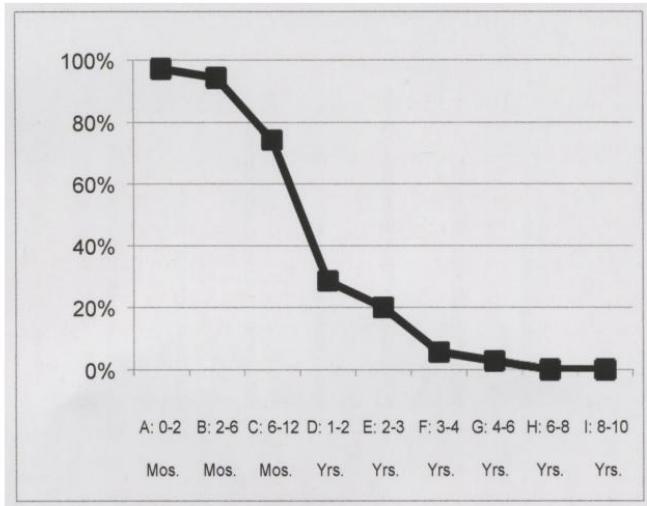
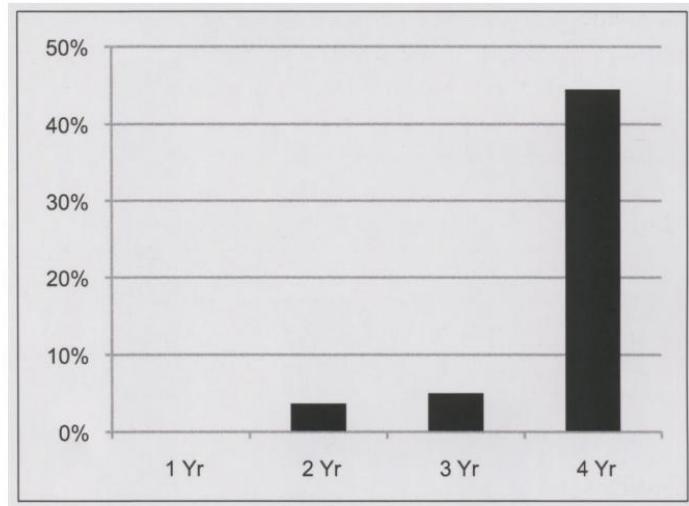
There are 272 bone fragments identified as *Ovis/Capra*, 181 as *Ovis*, and 71 as *Capra*. Eleven *Ovis/Capra* fragments were identified as wild. The remaining fragments are from domesticated individuals. Using NISP ratios of *Ovis* to *Capra* bone fragments are about 2.5:1, while MN¹⁴ yields a similar ratio of roughly 2:1. Over two-thirds of the sheep and goats

11. Six Bos fragments (eleven astragali, one scapula, one mandible, and two fragments) were originally identified as cattle, but were later reidentified as wild based on morphological features.

12. Equine remains are difficult to identify, but are often associated with both astragali, and the identification was based on the strong development of the medial musculature (Uerpmann 1986: 259).

13. Not shown in table 2.

10. See Hinman 1993, 10, 1993, 2000, 2001, 2002, 2000.

Table 3. Ubaid period *Ovis/Capra* survivorship curve ($n=35$).Table 4. Ubaid period percentage mortality in *Bos* ($n=698$).

were killed before five years of age. While Sudu (2010) has suggested that sheep were raised for their wool as well as meat in the Ubaid period, the high mortality rate of very young animals suggests that caprines were being raised for meat and perhaps milk. In fact, the survivorship curve (table 3) is consistent with Payne's idealized curve for a meat production strategy (1973: Fig. 1).

Bos

NISP yielded 203 bone fragments, 60 of which were identified as wild. Based on post-cranial epiphyseal fusion, the majority of *Bos* were kept alive through at least the first three years of life (table 4). The first major kill-off seems to have occurred around 4 years of age, 45% of 45 being killed. This pattern suggests a mixed production strategy, where the *Bos* individuals that lived beyond 4 years of age were females kept for milk production and as breeding stock, while the fully-grown males were killed for meat. These findings contribute to an emerging picture of the importance of milking Neolithic and Chalcolithic subsistence strategies (Evershed *et al.* 2008).

Sus

Pigs, the third most common taxon (238 fragments, 29 of which were identified as wild based on their large size), are generally kept solely for meat. Given their quick growth and large litter sizes (Redding 1992: 104), they are a very efficient

source of meat. The mortality profile constructed using post-cranial fusion shows that half of the pigs were killed by the second year and almost all by 3.5 years of age (table 5). This suggests that only limited breeding stock were retained and all non-breeding stock killed for meat.

Intersite Variability

The relative abundance of the domesticated animals is similar across the site: sheep and goats comprise the majority of the sample, followed by cattle and then pigs (table 6). One unusual divergence from the site-wide homogeneity, however, is the high percentage of goat remains found in the production area of Operation 8. Fifteen percent of the remains of domesticated species in this operation are goat, as compared to 3-4% in the other operations. Operation 8 is actually the only area where goats predominate over sheep, but the sample size from this operation is too small to encourage speculation about this anomaly (it yielded 5 *Capra* and 2 *Ovis* bone fragments).

Excavations suggested that the bones recovered from large pits in Operations 11 and 14 might be refuse from a large feasting event or events. However, the ratio of domestic to wild animals, the relative abundance of the main domesticates, and the relative abundance of body parts were nearly the same from the pits and from the floors of other Ubaid houses around the site. If these bones are盛宴的残骸那么菜单 of feasts, the menu did not differ significantly from more quotidian 餐食. While the pits did yield an unusually diverse range of taxa, illustrated by fish bones and tortoise carapace, it is likely that the taxonomic

¹⁴然而,这并不意味着所有其他碎片必然来自家养的*Sus*,仅两个被鉴定为野生的Sus骨通过osteometrics.

Table 5. Mean period percent mortality in Sows (n=26).

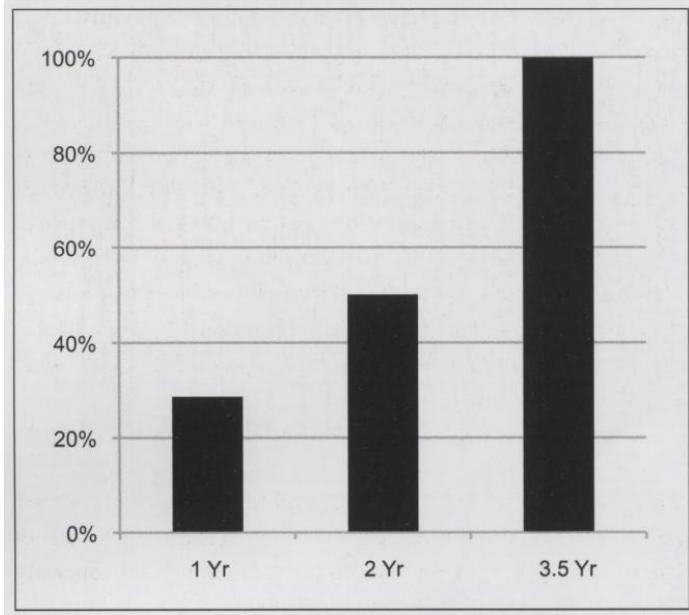


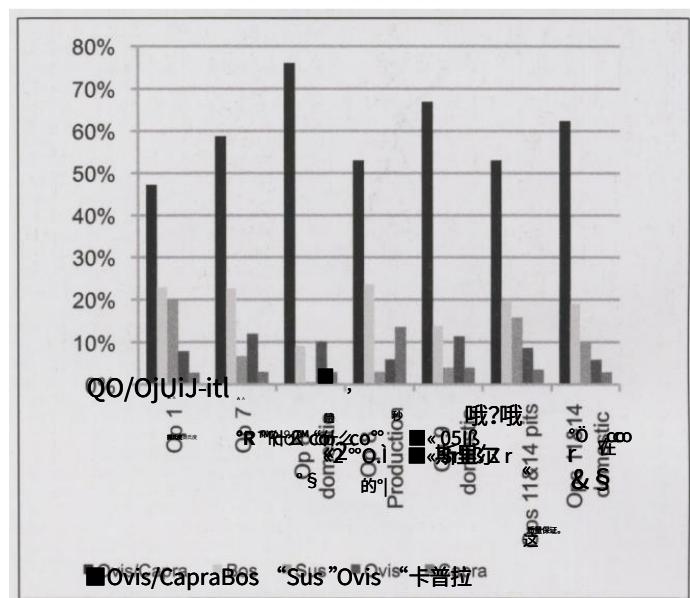
表7 乌贝德时期场地上搜异性
in body-part distributions.

零件	Op 1 零件 parts	Op 7	Op 8 国内生产 Domestic	Op 8 国内生产 Domestic	Op 9 作品11 & 14 国内产 Domestic	Op 11 & 14 国内产 Domestic
Antler/鹿角	2%/4%	1%	4%			3%
轴向	22%	32%	27%	21%	29%	41%
颌骨	44%	35%	31%	16%	29%	24%
降低 前肢	2%	2%	3%	6%	4%	3%
Lower 前肢	2%	6%	4%	6%	8%	4%
降低 后肢	8%	8%	8%	21%	6%	4%
Upper 前肢	17%	15%	15%	15%	17%	16%
Upper 后肢	5%	5%	5%	5%	6%	5%

diversity of Operations 亂世是和 is simply a function of the
種種多樣 運營 簡單簡單
large sample size.
大样本大样本

There are similarly small variations across operations in the distributions of bone fragments. The most striking anomaly comes from Operation 1, where 14% of the bone fragments were found in the upper portion of the site, while only 7% of the bone fragments were found in the lower portion. In contrast, the proportion of cannulated elements from other areas ranges from 16% to 35%. Because of the limited horizontal area of Operation 1, there is

Table 6 Ubaid period intrasite variability in relative
表6 Ubaid时期场内地点相对变异
更廣範圍內的
of major sites.



little contextual information to suggest why 骨骼 bones are so abundant. One possibility is that butchery took place in this area and cranial elements were discarded as inedible garbage.

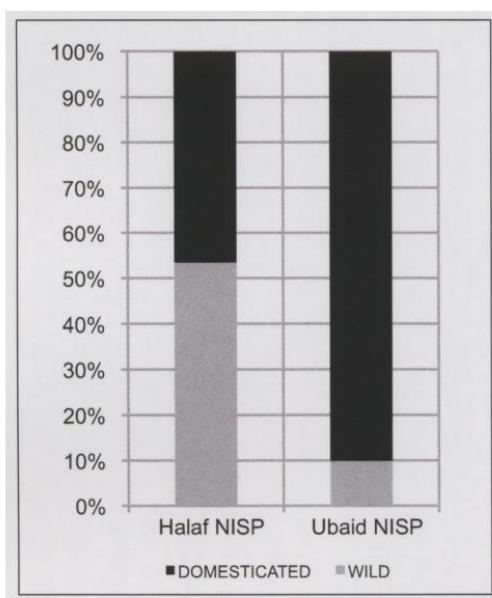
Summary

这些结果表明动物成分发生了巨大变化 a dramatic shift in the animal component of Halaf period's pottery strategy from the Halaf to the Ubaid period. After using Halaf period's pottery strategy, 52% of the animals were wild animals. When using Zeidan's pottery strategy, there is 10% of the wild animals. Only 10% is wild animals. (See Table 8).

REGIONS IN HALAF AND UBAID ANIMAL ECONOMIES

In the section below, we compare Zeidan's animal remains to assemblages from contemporary Northern Mesopotamian sites.

Table 8 - Proportions of wild
protochordates in the ^{野生化比例} fauna at Tell Zeidan



This will highlight the uniqueness of Zeidan's final assemblage in the Halaf period, as well as showcase the regional diversity in both the Halaf and the Ubaid period animal economies. Interestingly, it will show that Zeidan's shift from an equal exploitation of wild and domesticated taxa during the Halaf period to the exclusive exploitation of domesticated taxa during the Ubaid was not part of a regional trend and植物 increased use of domesticates.

Final assemblages from 17 sites¹⁵ are available for a regional comparison of animals in the Halaf period (see table 9).¹⁶ With the one exception of Chagar Bazar, the faunal assemblages from these sites cluster so that the percentage of domesticated animals is consistently below 20% (see figure 1).¹⁷ The exception is Chagar Bazar, where the percentage of domesticated animals is consistently above 20% (see figure 1).¹⁸ The percentage of domesticated animals in these faunal assemblages consists almost exclusively of domesticated animals, including 野生动物数量不足20%的fauna. They are Arpachiyah (Higgs 1980), Geyi 陶德 (Schäffer and Pessens 1988), Gutihiqay (McArdle 1990), Sabi Abu'l-Abd (Carillo 2000), Tell Turi (Ducos 1991), Tell Amarna

15. The faunal ~~composition~~ from Tell Halaf and ~~available~~ in this study, because the publication (Shamsi et al. 1999) is not available in the United States.

这些器物的痕迹表明它们与哈拉夫陶器有密切的联系。其中必须包括那些带有明显哈拉夫特征的陶器，即大部分为哈拉夫陶器（不包含大部分哈拉夫陶器）。
它们属于这种比较，因为它们的接近性和存在 proximity and the presence of some Halaf pottery traces indicate that they are associated with other Halaf pottery.

2004年2月), Chagar Bazaar (Sarı 2000), Ajege (Grigson, 2003) 和 Domuztepe (Karsı et al. 2009)。同时, there are eight sites with animal assemblages 小石含有20% at least 20% wild fauna. They are Banahilk (Laffer, 1983), Khirbet esh-Shenef (unpublished manuscript by Hadid, 1995, cited in Uerpmann 1982), Umm Akkermann (1993) 17, Shams ed-Din (Uerpmann, 1982)、Umm Qais (Zeder, 1994), Yarim Tepe II (Bilbikova 1981, 1991, 1992, 1993, 1995, 1996, 1998), Tepe Gara (Özbak et al. 2001) and Es-Shehara (Rubin 1978)。因此,虽然 Uerpmann 强调了这些遗址是“normal” for Neolithic sites to have up to 20% of wild animals (Uerpmann 1982: 44), it is in fact equally common for Halaf sites to have even more than 20% of wild animals.

其他 Halaf 和其他同时代居民的数据 suggest that earlier models of Halaf subsistence strategies, which were developed before many of these datasets had been published, should be reevaluated. Akkermans's model of Halaf subsistence—which subsequent studies have generally accepted (e.g. Campbell 1992b; 卡普尔 2000, 2009; Akkermans 和施瓦茨 2003; 尼文海斯 2007; 班卡等 2009)—incorporates two types of settlements: large permanent agricultural settlements and smaller seasonal settlements focusing on pastoralism or hunting (Akkermans 1993, publication of 1990 年的论文). 然而, Zedan 代表的是 not included in previous models: a large permanent agricultural settlement with an important hunting component.

This expanded corpus of zoarchaeological remains shows that incorporating a significant proportion of wild animals was a standard subsistence strategy in various types of settlements during the Hafaf period, rather than a practice restricted to small, temporary settlements in arid regions. 野生动物的使用与干旱地区的地理位置有关 correlated with location in an arid environment, but some settlements well within the rain-fed farming area did not choose to exploit at least 20% of the wild fauna. The expanded dataset also reveals that most assemblages composed almost entirely of domesticated animals, nearly always came from sites that were permanently occupied over a long period of time, but this is not true. Both short-term occupational sites and 重要的永久定居点 settlements that were only briefly occupied over a short period of time also produced faunal assemblages 野生动物占比超过20% fauna. While subsistence strategies involving over 50% wild fauna are relatively unusual, these too come from both small hunting stations (Um Qasr, Qasr ed-Sham and Shams ed-Din) and large permanent settlements (Zidan).

177 Hirschfeld, U. & D. Khirbet esh-Shiekh al-Sarraf Halaf的动物遗骸
叙利亚北部地区 1990年 阿姆斯特丹: A. E. van Giffen研究所
动物考古学时期动物遗骸中期 (中石器时代) [手稿] (manuscript)

表 10. 野生哈夫文化的野生动物。

Bone assemblages 组合	Site 遗址	Location 位置	Specimens 01600754)	'S'短期可识别号码 识别号码	Identifiable 可识别骨	Percent 世界
>20% 野生	Umm Qseir 1	中卡布尔	8,55	初	2446	57
	幼发拉底河谷 ²	Euphrates Valley	2,55*	初	1396	54
	特尔泽丹 ³	南巴里克谷地 ⁴	6***	北	261	52
	拉斯沙姆拉 3 号	地中海	*	北	261261261341341341	5%
	Khurbet esh-Sheene ⁴	巴里克谷	0,25	初	110	哦
	亚里姆山口 1 世	伊拉克电视台	≤51* 55	北	2184	28
	Tell Kurdu 6	阿穆克	15*	北	6549	23
	巴纳希尔克 7 号	黛安娜·普莱恩	≤165**	北	810810810	22
20% 野生 <	Qanjar Bazaar 6	哈布尔盆地	*	北	482482482	18
	希腊 9 东南安纳托利亚 ⁵	东南安纳托利亚	≤2*	北	2132	7
	Tell Turlu 10	东南安纳托利亚	*	北	123	5
	Sabi Abyad 11	北巴利克山谷	23	北	2465	3
	Tell Ammarra 12	幼发拉底河谷	≤8* 小	初	435	3
	Argoun 13	叙利亚西部	≤8* 小	初	1485	2
	Cavita 14	东南安纳托利亚	≤0,7* 2	北	~3377	2
	Dan 15	东南安纳托利亚	~1,30	北	6035	2
注释: 1. 1964-1965 年在卡布尔附近发现的动物遗骸; 2. 1976-1981 年在幼发拉底河谷发现的动物遗骸; 3. 1993; 4. 1993; 5. 1993; 6. 1980-1982; 7. 1990; 8. 1982; 9. 1990; 10. 1987-1991; 11. 1991; 12. 1993; 13. 1993; 14. 1993; 15. 1999; 16. 2000; 17. 1993; 18. 1993; 19. 1993; 20. 2000; 21. 1993; 22. 1993; 23. 1993; 24. 1993; 25. 1993; 26. 1993; 27. 1993; 28. 1993; 29. 1993; 30. 1993; 31. 1993; 32. 1993; 33. 1993; 34. 1993; 35. 1993; 36. 1993; 37. 1993; 38. 1993; 39. 1993; 40. 1993; 41. 1993; 42. 1993; 43. 1993; 44. 1993; 45. 1993; 46. 1993; 47. 1993; 48. 1993; 49. 1993; 50. 1993; 51. 1993; 52. 1993; 53. 1993; 54. 1993; 55. 1993; 56. 1993; 57. 1993; 58. 1993; 59. 1993; 60. 1993; 61. 1993; 62. 1993; 63. 1993; 64. 1993; 65. 1993; 66. 1993; 67. 1993; 68. 1993; 69. 1993; 70. 1993; 71. 1993; 72. 1993; 73. 1993; 74. 1993; 75. 1993; 76. 1993; 77. 1993; 78. 1993; 79. 1993; 80. 1993; 81. 1993; 82. 1993; 83. 1993; 84. 1993; 85. 1993; 86. 1993; 87. 1993; 88. 1993; 89. 1993; 90. 1993; 91. 1993; 92. 1993; 93. 1993; 94. 1993; 95. 1993; 96. 1993; 97. 1993; 98. 1993; 99. 1993; 100. 1993; 101. 1993; 102. 1993; 103. 1993; 104. 1993; 105. 1993; 106. 1993; 107. 1993; 108. 1993; 109. 1993; 110. 1993; 111. 1993; 112. 1993; 113. 1993; 114. 1993; 115. 1993; 116. 1993; 117. 1993; 118. 1993; 119. 1993; 120. 1993; 121. 1993; 122. 1993; 123. 1993; 124. 1993; 125. 1993; 126. 1993; 127. 1993; 128. 1993; 129. 1993; 130. 1993; 131. 1993; 132. 1993; 133. 1993; 134. 1993; 135. 1993; 136. 1993; 137. 1993; 138. 1993; 139. 1993; 140. 1993; 141. 1993; 142. 1993; 143. 1993; 144. 1993; 145. 1993; 146. 1993; 147. 1993; 148. 1993; 149. 1993; 150. 1993; 151. 1993; 152. 1993; 153. 1993; 154. 1993; 155. 1993; 156. 1993; 157. 1993; 158. 1993; 159. 1993; 160. 1993; 161. 1993; 162. 1993; 163. 1993; 164. 1993; 165. 1993; 166. 1993; 167. 1993; 168. 1993; 169. 1993; 170. 1993; 171. 1993; 172. 1993; 173. 1993; 174. 1993; 175. 1993; 176. 1993; 177. 1993; 178. 1993; 179. 1993; 180. 1993; 181. 1993; 182. 1993; 183. 1993; 184. 1993; 185. 1993; 186. 1993; 187. 1993; 188. 1993; 189. 1993; 190. 1993; 191. 1993; 192. 1993; 193. 1993; 194. 1993; 195. 1993; 196. 1993; 197. 1993; 198. 1993; 199. 1993; 200. 1993; 201. 1993; 202. 1993; 203. 1993; 204. 1993; 205. 1993; 206. 1993; 207. 1993; 208. 1993; 209. 1993; 210. 1993; 211. 1993; 212. 1993; 213. 1993; 214. 1993; 215. 1993; 216. 1993; 217. 1993; 218. 1993; 219. 1993; 220. 1993; 221. 1993; 222. 1993; 223. 1993; 224. 1993; 225. 1993; 226. 1993; 227. 1993; 228. 1993; 229. 1993; 230. 1993; 231. 1993; 232. 1993; 233. 1993; 234. 1993; 235. 1993; 236. 1993; 237. 1993; 238. 1993; 239. 1993; 240. 1993; 241. 1993; 242. 1993; 243. 1993; 244. 1993; 245. 1993; 246. 1993; 247. 1993; 248. 1993; 249. 1993; 250. 1993; 251. 1993; 252. 1993; 253. 1993; 254. 1993; 255. 1993; 256. 1993; 257. 1993; 258. 1993; 259. 1993; 260. 1993; 261. 1993; 262. 1993; 263. 1993; 264. 1993; 265. 1993; 266. 1993; 267. 1993; 268. 1993; 269. 1993; 270. 1993; 271. 1993; 272. 1993; 273. 1993; 274. 1993; 275. 1993; 276. 1993; 277. 1993; 278. 1993; 279. 1993; 280. 1993; 281. 1993; 282. 1993; 283. 1993; 284. 1993; 285. 1993; 286. 1993; 287. 1993; 288. 1993; 289. 1993; 290. 1993; 291. 1993; 292. 1993; 293. 1993; 294. 1993; 295. 1993; 296. 1993; 297. 1993; 298. 1993; 299. 1993; 300. 1993; 301. 1993; 302. 1993; 303. 1993; 304. 1993; 305. 1993; 306. 1993; 307. 1993; 308. 1993; 309. 1993; 310. 1993; 311. 1993; 312. 1993; 313. 1993; 314. 1993; 315. 1993; 316. 1993; 317. 1993; 318. 1993; 319. 1993; 320. 1993; 321. 1993; 322. 1993; 323. 1993; 324. 1993; 325. 1993; 326. 1993; 327. 1993; 328. 1993; 329. 1993; 330. 1993; 331. 1993; 332. 1993; 333. 1993; 334. 1993; 335. 1993; 336. 1993; 337. 1993; 338. 1993; 339. 1993; 340. 1993; 341. 1993; 342. 1993; 343. 1993; 344. 1993; 345. 1993; 346. 1993; 347. 1993; 348. 1993; 349. 1993; 350. 1993; 351. 1993; 352. 1993; 353. 1993; 354. 1993; 355. 1993; 356. 1993; 357. 1993; 358. 1993; 359. 1993; 360. 1993; 361. 1993; 362. 1993; 363. 1993; 364. 1993; 365. 1993; 366. 1993; 367. 1993; 368. 1993; 369. 1993; 370. 1993; 371. 1993; 372. 1993; 373. 1993; 374. 1993; 375. 1993; 376. 1993; 377. 1993; 378. 1993; 379. 1993; 380. 1993; 381. 1993; 382. 1993; 383. 1993; 384. 1993; 385. 1993; 386. 1993; 387. 1993; 388. 1993; 389. 1993; 390. 1993; 391. 1993; 392. 1993; 393. 1993; 394. 1993; 395. 1993; 396. 1993; 397. 1993; 398. 1993; 399. 1993; 400. 1993; 401. 1993; 402. 1993; 403. 1993; 404. 1993; 405. 1993; 406. 1993; 407. 1993; 408. 1993; 409. 1993; 410. 1993; 411. 1993; 412. 1993; 413. 1993; 414. 1993; 415. 1993; 416. 1993; 417. 1993; 418. 1993; 419. 1993; 420. 1993; 421. 1993; 422. 1993; 423. 1993; 424. 1993; 425. 1993; 426. 1993; 427. 1993; 428. 1993; 429. 1993; 430. 1993; 431. 1993; 432. 1993; 433. 1993; 434. 1993; 435. 1993; 436. 1993; 437. 1993; 438. 1993; 439. 1993; 440. 1993; 441. 1993; 442. 1993; 443. 1993; 444. 1993; 445. 1993; 446. 1993; 447. 1993; 448. 1993; 449. 1993; 450. 1993; 451. 1993; 452. 1993; 453. 1993; 454. 1993; 455. 1993; 456. 1993; 457. 1993; 458. 1993; 459. 1993; 460. 1993; 461. 1993; 462. 1993; 463. 1993; 464. 1993; 465. 1993; 466. 1993; 467. 1993; 468. 1993; 469. 1993; 470. 1993; 471. 1993; 472. 1993; 473. 1993; 474. 1993; 475. 1993; 476. 1993; 477. 1993; 478. 1993; 479. 1993; 480. 1993; 481. 1993; 482. 1993; 483. 1993; 484. 1993; 485. 1993; 486. 1993; 487. 1993; 488. 1993; 489. 1993; 490. 1993; 491. 1993; 492. 1993; 493. 1993; 494. 1993; 495. 1993; 496. 1993; 497. 1993; 498. 1993; 499. 1993; 500. 1993; 501. 1993; 502. 1993; 503. 1993; 504. 1993; 505. 1993; 506. 1993; 507. 1993; 508. 1993; 509. 1993; 510. 1993; 511. 1993; 512. 1993; 513. 1993; 514. 1993; 515. 1993; 516. 1993; 517. 1993; 518. 1993; 519. 1993; 520. 1993; 521. 1993; 522. 1993; 523. 1993; 524. 1993; 525. 1993; 526. 1993; 527. 1993; 528. 1993; 529. 1993; 530. 1993; 531. 1993; 532. 1993; 533. 1993; 534. 1993; 535. 1993; 536. 1993; 537. 1993; 538. 1993; 539. 1993; 540. 1993; 541. 1993; 542. 1993; 543. 1993; 544. 1993; 545. 1993; 546. 1993; 547. 1993; 548. 1993; 549. 1993; 550. 1993; 551. 1993; 552. 1993; 553. 1993; 554. 1993; 555. 1993; 556. 1993; 557. 1993; 558. 1993; 559. 1993; 560. 1993; 561. 1993; 562. 1993; 563. 1993; 564. 1993; 565. 1993; 566. 1993; 567. 1993; 568. 1993; 569. 1993; 570. 1993; 571. 1993; 572. 1993; 573. 1993; 574. 1993; 575. 1993; 576. 1993; 577. 1993; 578. 1993; 579. 1993; 580. 1993; 581. 1993; 582. 1993; 583. 1993; 584. 1993; 585. 1993; 586. 1993; 587. 1993; 588. 1993; 589. 1993; 590. 1993; 591. 1993; 592. 1993; 593. 1993; 594. 1993; 595. 1993; 596. 1993; 597. 1993; 598. 1993; 599. 1993; 600. 1993; 601. 1993; 602. 1993; 603. 1993; 604. 1993; 605. 1993; 606. 1993; 607. 1993; 608. 1993; 609. 1993; 610. 1993; 611. 1993; 612. 1993; 613. 1993; 614. 1993; 615. 1993; 616. 1993; 617. 1993; 618. 1993; 619. 1993; 620. 1993; 621. 1993; 622. 1993; 623. 1993; 624. 1993; 625. 1993; 626. 1993; 627. 1993; 628. 1993; 629. 1993; 630. 1993; 631. 1993; 632. 1993; 633. 1993; 634. 1993; 635. 1993; 636. 1993; 637. 1993; 638. 1993; 639. 1993; 640. 1993; 641. 1993; 642. 1993; 643. 1993; 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735. 1993; 736. 1993; 737. 1993; 738. 1993; 739. 1993; 740. 1993; 741. 1993; 742. 1993; 743. 1993; 744. 1993; 745. 1993; 746. 1993; 747. 1993; 748. 1993; 749. 1993; 750. 1993; 751. 1993; 752. 1993; 753. 1993; 754. 1993; 755. 1993; 756. 1993; 757. 1993; 758. 1993; 759. 1993; 760. 1993; 761. 1993; 762. 1993; 763. 1993; 764. 1993; 765. 1993; 766. 1993; 767. 1993; 768. 1993; 769. 1993; 770. 1993; 771. 1993; 772. 1993; 773. 1993; 774. 1993; 775. 1993; 776. 1993; 777. 1993; 778. 1993; 779. 1993; 780. 1993; 781. 1993; 782. 1993; 783. 1993; 784. 1993; 785. 1993; 786. 1993; 787. 1993						

Table 10 - Percentage of Major Types from World Sites.

词:	不不	场地面积(公顷)	KIUS	KIWP	OSIV/CPBA 等)	ROS 等)	SUS 等)	EQUUS 等)	GAZELLA 等)	OTHER WILDS	%NISP	%Wild	%Dom/ %Wild
Mashnaga ¹	中卡布尔habur	5	1273	51	13	5	13	1	17	69/31	69/31		
吉兰经2-3 哈布尔盆地habur Basin		0.25	180	73	0	0	4	9	8		73/27		
库兰干4	巴利赫	12	2422	63	17	10	4	9	3	8890/10	90/10		
Kasak Shamali ⁴	Euphrates Valley	0.5	246	46	9	6	4	32	2461/39	61/39			
Kasak Shamali ⁴	Upper Tigris	4.5	24624624663163631	21	8	3	0	4		96/4			
Khanan, Basra ⁵		2.0	1803183183	26	37	35	1	2	1		97/3		
德小军5	米德勒布尔 米德勒布尔	2月1月	1803183183										
Ziyadeh, c. 4350 ⁶	Kurdish	2	282	47	16	3	0111999	122	15		66/34		
Ziyadeh, c. 4700 ⁷	Middle Khabur	2	20633	34	7	2	28	12	8		43/57		
Tell Kurdu ⁸	阿穆克	2月5月7日	5月7日100	60	23	15	0	001021212121001515888333	97/3				

fed zone and the drier zone. Zedan, for example, is located in the southern steppic region but has a very low proportion of wild animals.

Out of the eight sites reviewed, three offer the opportunity to look at shifts in subsistence practices. At Ziyadeh, faunal analyses exist at different levels within the Ubaid period and show a decrease in wild fauna over time, although the figures are still 61% (Zadeh 1995, 1998a and b). A comparison of Thal and Ubad faunal assemblages is possible, as both show decreases in wild fauna. Zeidan's proportion of wild fauna decreased from 52% to 10% and Kurdu's from 23% to 3% (Özbal *et al.* 2004; Yener *et al.* 2000). Thus subsistence shifts in the Ubaid period definitely involved an increase in the relative importance of pastoralism at some settlements. As shown above, however, Ubaid subsistence in general does not seem to be characterized by a shift to pastoralism. This pattern should contrast with the regional pattern in the south, however, as it was by far the largest of the Ubaid period settlements with analyzed faunal remains.

HUNTING AND HERDING AT ZEIDAN

不尋常的強調野生動物在Zeidan期間
the Ubaid period, and the unparalleled shift to domesticates
during the Ubaid period both call for explanation. In trying
to understand subsistence strategies, it is always important
to consider environmental constraints. Since archaeologists
have pointed to population increases and the development of

more economic stratification is important changes that may be accompanying the Halaf-Ubaid transition, those are also important factors to consider in our analysis of shifting subsistence strategies at Zedan.

有关季节性的信息 available from the faunal assemblage at Zeidan, but it is possible to formulate a picture of the annual cycle based on information about seasonality at the nearby 鸟姆格塞尔遗址 (Zeder 1994:111) and Sabi Abyad (Cavalcoto 2000:112) 以及 迁徙模式 migration patterns for onager and gazelle as follows:

In autumn, the inhabitants of Zeidan may have hunted onager that migrated southward for the winter.¹⁹ During the winter, the inhabitants of Zeidan probably killed some of their domesticated sheep and goat for meat. In late spring and summer, the inhabitants of Zeidan may have hunted the large herds of gazelle that migrated from their winter habitat in the southern

16. *Paranthemyscus* comparison to the modern Syriac wild ass. 有些学者有同样的 suggestion that onager would have migrated from as far north as Armenia to Syria in the winter, leading them to pass through Syria in the autumn. (Tristram 1889, cited in Clutton-Brock 1993) 有些学者从现代的野驴的分布上得出同样的结论。他们建议在冬季时将野驴迁徙到叙利亚，从而避免它们在冬季时进入以色列。

deserts to summer in the northern Syrian steppe.²⁰ This seasonal hunting of onagers and gazelles may have been carried out as mass kills events in nearby desert kites²¹ (see, e.g. Bar-Oz *et al.* 2011; Legge and Rowley-Conwy 1987). Alternatively, it may have been a strategy of Zeidan's inhabitants to locally hunt the animals that threatened cereal crops in the spring (see, e.g. Uerpmann 1982: 45–46), thus saving the grain and procuring meat at the same time. The plentiful hunting opportunities in the spring would have been followed by the late spring harvest, completing the annual cycle. Viewing the diversified Halaf subsistence economy from the perspective of seasonality illustrates how hunting could have played such an important role.

Why then did seasonally-organized hunting not play this same role in the Ubaid period? The dramatic shift to domesticates is surprising. Since previous studies have suggested that the Halaf to Ubaid transition was a shift in material culture, rather than a wholesale movement of peoples or the uniform adoption of a complete “cultural package” (Breniquet 1996; Stein and Özbal 2007) we should not expect to see abrupt changes in food preferences. This shift at Zeidan is also surprising because Zeder (1995 and 1998a) suggests that Halaf settlements in the dry steppic areas continued to rely heavily on wild game, as they had in the Halaf period. Zeidan's divergence from this pattern requires explanation.

The increased reliance on domesticated animals at Zeidan does not necessarily indicate environmental change between the Halaf and Ubaid periods. If this were the case we would expect to see a change in the relative abundances of the wild animals. Because there was a transformation in the Halaf and Ubaid periods at Zeidan, however, the rank order of the most common wildfauna was the same: *Equus*, *Gazella*, *Dama*, *Cervus*. Since *Equus* and *Gazella* inhabited steppic regions, while *Dama* and *Cervus* prefer woodland areas, this rank order suggests the predominance of steppes over woodland in both periods. In fact, while there is some evidence for environmental change over the course of the Ubaid period in Southern Mesopotamia (Hole 1994) there is little evidence for similar changes in the north (Wilkinson 2003).

Since environmental change can be excluded as the cause of this shift, we must resort to social factors must be involved. The increasing importance of domesticated animals at Zeidan cannot indicate a change to year-round settlement, as seasonal

hunting during the Halaf period was part of a diversified subsistence economy supporting year-round occupation of the site.²² The most likely possibility is that the increasing importance of the domesticated animals was part of a strategy of economic intensification related to population increases at the settlement.²³ By ‘intensification’ we mean the replacement of wild animals with domesticated ones in order to increase the total quantity of animal products for the site of Zeidan. Use of domesticated animals would have had the potential to increase total production for two reasons. First, the inhabitants could choose how many domesticated animals to raise as long as there was sufficient pasture, whereas they could not choose to increase the wild population. Second, domesticated animals provide both meat and secondary products, while wild ones provide only meat.

There is one question that Zeidan could not answer about subsistence production in the Ubaid period, because the population was much larger than in the Halaf period. The size of the site increased from 5.12 to 12 ha and the Ubaid levels show dense occupation. Still, Morrison (1994) cautions against confusing correlation with causation and warns that an increase in population is neither the only thing that causes intensification, nor does it always cause intensification. In this case, however, there is a specific reason that the increase in population would have led to the intensification of subsistence production at Zeidan. The Halaf period subsistence strategy relied heavily on a single resource—onager—that would have been available in limited and unpredictable quantities.²⁴ As the population expanded in the Ubaid period, this limited resource could no longer account for the same proportion of subsistence production. However, this is a site-specific explanation that should not be applied indiscriminately to other sites. For example, Kurdu's increase in domesticated species actually corresponds to a decrease in site size.

The change at Zeidan from a mixed animal economy exploiting wild and domesticated species to one primarily of domesticated species will have wrought dramatic shifts on many attendant aspects of social life, from work patterns (as more shepherds were needed) to architecture (with new pens to be built for housing animals), and expanded spaces for animals

20. Legge and Rowley-Conwy 2000:439–440; Griffith 2000:5. (Please see also Bar-Oz *et al.* 2011 who suggest 消晚的季节 (夏季中后期) for mass gazelle hunting.)

21. Although we do not have enough data on the second age of death of the Zeidan gazelle and onager populations to propose a catastrophic-kill event like Chalcolithic (2000–1700 BC) (Uerpmann 2011).

22. Although some archaeologists have posited a general demographic growth during the Ubaid period (Carton and Philp 2010), the specific reasons for population increase in the Ubaid period are yet unknown. A paucity of survey data immediately limits Zeidan's potential to attribute a population increase to factors such as organization of the regional settlement pattern.

23. Onagers, 像瞪羚 (或瞪羚) following the suggestions of Bar-Oz *et al.* 2011 may have been overhunted during the preceding period.

within and outside settlements) to cuisine (as new recipes were devised for the shift in meat sources). These changes in daily practices might also have impacted social organization, particularly socio-economic stratification. Since Russell (2012) argues that the keeping of domesticated animals might lead to the commodification of animals as wealth and thus contribute to the development of inequality, we suggest that increases in the scale of pastoral production could potentially also contribute to social inequality.

In the pre-settlement society there is limited evidence for social stratification in the Ubaid period of Northern Mesopotamia. If there were an increase in social stratification, however, it would likely be visible at Zeidan, one of the largest Ubaid settlements in the region. Socio-economic stratification might be archaeologically visible in the spatial variation of food remains. However, we have shown that there is little spatial variability in the relative abundances of taxa and body parts at Zeidan. This implies that, if there were significant variations in socio-economic rank among the people living in different parts of the settlement, these differences were not marked by the animal component of their diet. It is still possible that socio-economic inequality found expression in ownership of herds of varying sizes, which is not visible in this study.

CONCLUSIONS

The animal remains of Late Neolithic and Early Chalcolithic Zeidan form an important new dataset for reconstructing the animal economies of prehistoric societies in Upper Mesopotamia. Integrating the data from Zeidan into the corpus of zoarchaeological data from Upper Mesopotamian sites sheds new light on regional patterns in subsistence strategies and their transformation over time.

For the Halaf period, we have shown that wild animals played a greater role in subsistence strategies than previous studies have suggested. At Zeidan, half of the faunal assemblage comes from wild animals. Zeidan is not alone among Halaf settlements in using over 50% wild animals, although it is the only large permanent settlement to do so. Hunting fits into a seasonal cycle of complementary seasonal resources, both wild and domesticated. Herds of onager and gazelle would have been particularly attractive targets from autumn to early spring, and their crop robbing tendencies would have made them easy prey. An up-to-date comparison of the faunal assemblages from Zeidan and other Halaf sites shows that it

was typical for Halaf settlements to have several large permanent ones, to include at least 20% wild animals in their subsistence strategies. In sum, hunting in the Halaf period played a significant role in the self-sufficient subsistence strategies of major Halaf sites as well as smaller ones.

In the Ubaid period, the subsistence economy at Zeidan shifted dramatically to focus mostly on domesticated animals. Population increase at the settlement may have necessitated this shift. Interestingly, however, there is no spatial variability in the faunal remains to suggest socio-economic stratification. This implies that, if there were significant rank or wealth differences in the Ubaid period, differentiated consumption of animal products was probably not a primary means for their expression. Widening the view to include other Ubaid sites in Upper Mesopotamia, it is clear that, despite the evidence from Zeidan, we cannot posit a region-wide shift in subsistence practices accompanying the Halaf-Ubaid transition. While the largest settlement (Zeidan) and a few others underwent intensification processes, many other settlements continued to rely on mixed subsistence strategies incorporating high proportions of wild fauna, just as Halaf settlements did.

These results call for a re-evaluation of the role of diversity in the organization of the Halaf and Ubaid economies and for more widespread analyses to understand and explain subsistence changes accompanying the Halaf-Ubaid transition. When the political situation in Syria permits, our team hopes to conduct further excavations to expand the Halaf sample, analyze more of the excavated Ubaid remains, and extend the study chronologically by including the Late Chalcolithic period. We hope that other teams will contribute to the study of subsistence changes in the Halaf-Ubaid transition by conducting zoarchaeological analyses at additional Ubaid sites in Upper Mesopotamia, since there are currently so few. It would be particularly useful to investigate additional sites that have both Halaf and Ubaid occupations. While we have identified and offered explanations for an important subsistence shift at Zeidan, additional analyses from other sites are key to understanding and explaining the variability in Halaf and Ubaid subsistence strategies.

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