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The Subsistence Economy of Qela Gap; Lurestan, Iran: From the Late Neolithic to the Iron Age

Sarieh Amiri[1], Marjan Mashkour[2*], Azadeh Mohaseb[2], Margareta Tengberg[2], Mostafa Abdolahi[3] and Alireza Sardari Zarchi[4]

Abstract: Tepe Qela Gap (also known as Ghala Gap) in Azna: Lurestan, was excavated in 2009 aiming to establish the chronological sequence for the Azna Plain located eastern of Central Zagros, which had been scarcely studied archaeologically until now. Considering the ecological diversity surrounding the plain, Tepe Qela Gap seems to have been an ideal place for the settlement of permanent villages but could also be suitable for nomadic and semi-nomadic people. The archaeozoological study of a large faunal assemblage, approximately 6500 items from this site, has provided evidence on the evolution of the subsistence economy of the site during various periods of occupation. The faunal spectra of Qela Gap from different periods, indicates that domesticated sheep/goat and cattle were the major source of animal resources. Among these domesticates it should be noted that cattle ratios are important and together with evidences of kill off patterns and osteological pathologies, we can hypothesise that these animals were used not only for food but also as draught animals, most probably, used for agricultural activities. This is a feature especially visible during the Bronze Age. The wild species, although not abundant (6%), were also part of the subsistence economy. Remains of wild sheep *(Ovis orientalis)*, red deer *(Cervus elaphus)* or persian fallow deer *(Dama mesopotamica)*, boar *(Sus scrofa)* and gazelle *(Gazella subgutturosa)* have been found and indicate that different ecosystems were exploited. Another important feature of the Qela Gap fauna is the discovery of a horse *(Equus caballus)* bone within the Neolithic Levels. In parallel to the archaeozoological analysis, the archaeobotanical studies are on-going and will provide a more complete picture of the subsistence economy of the site during the 5000 years of occupation.

Keywords: Archaeozoology, Subsistence economy, Qela Gap, Central Zagros, Late Neolithic, Chalcolithic, Bronze Age, Iron Age

چکیده: بقایای جانوری تپه قلاگپ (شهرستان ازنا، لرستان)، در طی نخستین فصل کاوش (۱۳۸۸) به‌دست‌آمده است. هدف از کاوش، آگاهی از وضعیت گاه‌نگاری زاگرس مرکزی و دشت ازنا بوده و گاه‌نگاری آن شامل توالی منظمی از لایه‌های نوسنگی جدید، مس‌سنگی، مفرغ، آهن، پارت و اسلامی است. این دشت که در شرق زاگرس مرکزی واقع‌شده، تاکنون موردپژوهش و کاوش اندکی قرارگرفته است. با توجه به وجود اراضی قابل‌کشت و چراگاه‌های متعدد در دامنهٔ کوه‌ها، این منطقه مناسب جهت استقرار جوامع روستانشین، کوچ‌رو و نیمه‌کوچ‌رو بوده که در دوره‌های مختلف به‌طور مستمر مورد سکونت قرارگرفته است. باتوجه به شرایط مناسب حفاظتی بقایای استخوان حیوانی قلاگپ، امکان انجام مطالعات گسترده برروی تقریباً ۶۵۰۰ قطعه، شامل مطالعهٔ طیف جانوری، استخوان سنجی (جهت شناسایی گونه‌های اهلی یا وحشی) و الگوی کشتار فراهم شد. طیف جانوری شامل گونه‌های اهلی (۹۴٪) و وحشی (۶٪) است که بیشترین آن را در تمامی دوره‌ها بز و گوسفند اهلی (۷۸٪) و گاو (۱۴٪) تشکیل می‌دهد. با توجه به الگوی سن کشتار، بهره‌برداری از بز و گوسفند، شامل محصولات اولیه (گوشت) و محصولات ثانویه (لبنیات، پشم و مو) است. بهره‌برداری از گاو علاوه بر یکی از مهم‌ترین منابع غذایی پروتئینی، می‌تواند به‌عنوان نیروی کار کشاورزی نیز باشد. علاوه بر وجود یک سیستم منظم دام‌پروری در تمامی دوره‌ها و وجود اقتصاد ترکیبی دام‌پروری و کشاورزی در دورهٔ مفرغ میانی، جوامع به شکار حیوانات وحشی مانند گوزن، گراز، آهو، بز و گوسفند وحشی نیز پرداخته‌اند. از دیگر ویژگی‌های مهم این مجموعه؛ وجود استخوان اسب در لایه‌های نوسنگی جدید است. درنهایت، نتایج مطالعات گیاه باستان‌شناسی که در حال انجام است، می‌تواند در تحلیل دقیق‌تر اقتصاد زیستی محوطهٔ قلاگپ نقش بسزایی داشته باشد.

کلیدواژگان: باستان‌جانورشناسی، اقتصاد زیستی، محوطه قلاگپ، زاگرس مرکزی، نوسنگی جدید، مس‌سنگی، مفرغ، عصر آهن

Introduction

Pastoralism has had a social and economic role in the Near East since the domestication of the primary herded animals. Especially in the Zagros Mountains, sheep and goats have been the major sources of animal husbandry (Abdi, 2003).

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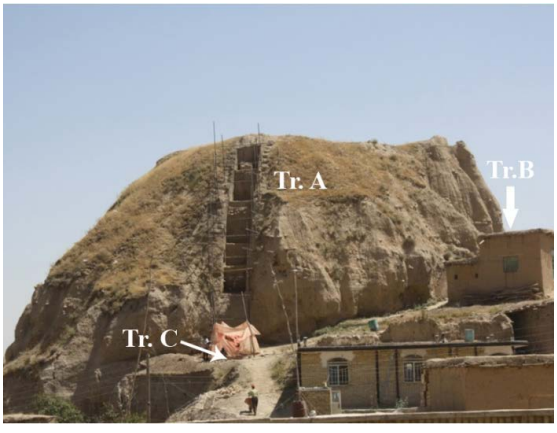


Fig. 1. Archaeozoological researches in the Central Zagros up to 2014: The location of Qela Gap and other sites.

Fig. 2. General view of Qela Gap.

Fig. 3. The location of excavated trenches.

One of the suitable regions for the development of pastoralism at eastern Central Zagros Mountains is Azna Plain. It is located on northeast of Lurestan Province on an elevation of 1800 m above sea level (asl.) with a semi-humid and cold climate. Azna is dominated by pasture lands suitable for grazing domestic animals. These factors demonstrated Azna as an ideal place for the settlement of permanent villages, as in the present time, where the nearby village is surrounded with agricultural fields. These environmental conditions would also have been as suitable for prehistoric nomadic and semi-nomadic people; as they are for the modern transhumant communities roaming at the same area.

Background of Archaeozoological researches in the Central Zagros

Up to 2014, the total number of 20 archaeozoological studies have been conducted in the Central Zagros (Fig. 1). among them, there are 8 Neolithic, 5 Chalcolithic, 5 Bronze and Iron Age and 2 sites from historical periods (Median and Parthian). The vast majority of these sites were studied several decades ago. In this

framework, the site of Qela Gap provides a whole new set of data related to animal exploitation and pastoralism from a long chronological sequence.

Table 1. Stratigraphy of Qela Gap.

Stratigraphy of Trench A		
Phase	**Period**	**Depth**
1	Partian	18.5 m
2	Iron III	
3		
4		
5	Iron II	
6	Irin I	
7		
8	Godin III:2	
9	Godin III:3	
10	Godin III:3	
11	Godin III:4	
12	Godin III:5	
13	Godin III:5	
14	Godin III:6	
15	Late Chalcolithic	
16		
17	Middle Chalcolithic	
18		
19		
20		
21		
22	Early Chalcolithic	
Stratigraphy of Trench A		
1	Transitional Chalcolitic	3.50 m
2		
3	Late Neolithic	
4		
5		
6		

The case Study: Tepe Qela Gap

Qela Gap is located in the north-west of the Azna Plain (Lurestan Province, Central Zagros of Iran), in Masoud Abad village, at an elevation of 1970m asl. The site stands 25m above the surrounding fields and covers an area of approximately 1.5Ha (Fig. 2). Qela Gap was excavated in 2009 by M. Abdollahi and one of the authors (A. Sardari Zarchi). Three trenches (A, B and C) were excavated (Fig. 3). Trench A, a 2×2m square was located in the south-west of the mound. The depth of archaeological layers is ca. 18.5



Fig. 4. The third phase of architectural remains in trench B; Middle Bronze Age.

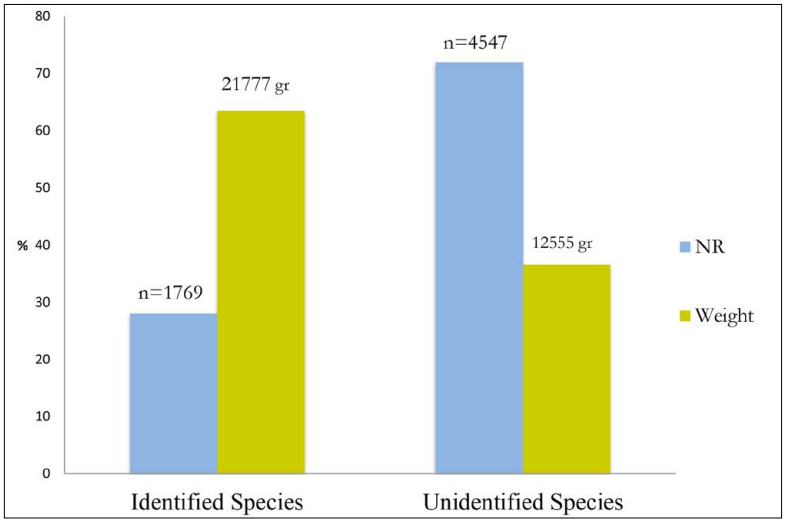


Fig. 5. Distribution of faunal remains according to the chronological sequence. n=6369.

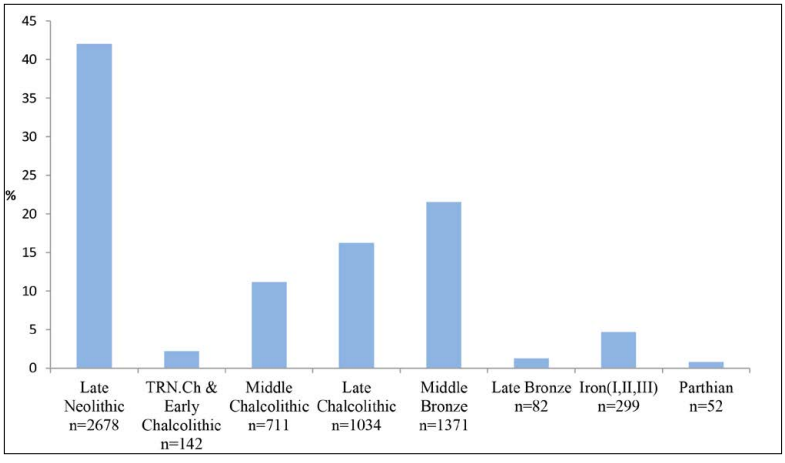


Fig. 6. Distribution of the faunal remains: identified and unidentified taxa.

m and contains 22 phases revealing a sequence of occupations from the Chalcolithic, Bronze, Iron Age and Parthian periods (Abdolahi et al. 2014). Trench C, a 2×2 m square, was excavated south-west of Trench A. The depth of archaeological layers is about 3.5 m. and include 6 phases belonging to the Late Neolithic and transition period to the Early Chalcolithic (Abdolahi and Sardari, 2013) (Table 1). Trench B was located in the south-west of the site and contains four phases of structures belonging to Godin III (Abdolahi et al. 2014) (Fig. 4).

Specialized pastoralism in the Central Zagros

The archaeozoological studies were undertaken at the Archaeometry laboratory of the University of Tehran within the framework of masters research between 2010 and 2013. In total, 6369 bones and bone fragments weighing 33.1 kg. were recovered from Trench A (2788 pieces, 19.0 kg.), Trench B (774 pieces, 5.0 kg.) and Trench C (2807 pieces, 10.9 kg.). The Late Neolithic, Middle and Late Chalcolithic and Middle Bronze Age periods yielded most remains (Fig. 5). The bones were poorly preserved and the majority of them were fragmented, as a result, a high percentage of them were unidentified (Fig. 6).

Faunal remains are divided into the three main taxonomic groups of Mammalia, Aves and Reptilia.[1] The largest fraction (1397 specimens) is represented by sheep and goats (*Caprini*), constituting 80% of the assemblage. Within this segment, 117 specimens are allocated to sheep (*Ovis aries),* 9 to wild sheep (*Ovis orientalis*), 205 to goats (*Capra hircus)* and 7 to wild goats (*Capra aegagrus*). A total of 237 specimens were allocated to cattle (*Bos taurus*), only 14% of the NISP (number of identified specimens). Thus, a majority of the subsistence economy of the site relied on the exploitation of domestic small and large ruminants. Wild species were also present at Qela Gap including: 6 specimens being allocated to gazelle (*Gazella subgutturosa,* 1%)*,* 17 to Cervids (*Dama mesopotamica* / *Cervus elaphus,* 1%), 17 to wild boar (*Sus scrofa*, 1%) and 33 to Equid spp.[i] (2%). Additionally, a first phalanx of *Equus caballus* was identified from a late Neolithic deposit. Carnivore species consisted of domestic dog (*Canis familiaris*), fox (*Vulpes sp.*), pine marten (*Martes martes*) and badger (*Meles meles*). Finally, five specimens of hare bone (*Lepus europaeus*), two from fowls and some bone fragments of tortoise (*Testudo graeca*) were recovered. In total, 93% of the assemblage belonged to domestic animals (sheep/goat and cattle) during all periods and the rest to the wild species (Figs. 7-8).

Characterization of the *Caprini* population of the Central Zagros according to metric analysis LSI (Log size Index) diagrams for sheep and goat were processed following Uerpmann and Uerpmann (1994) and using modern wild goat and sheep as reference (Figs. 9 and 10). 60 bones of goat and 51 bones of sheep could be used for the analysis and compared with sheep and goat bones yielded from other sites in the Central Zagros (Mashkour, 2001). The *Caprini* population of Qela Gap from the 6th millennium to the first millennium BCE. has comparable size with neighbouring sites in Zagros and considerably smaller than Asiab (Bökönyi, 1977).

The higher LSI values in Qela Gap show that 9 specimens can be allocated to wild sheep and 7 specimens to wild goat distributed in different periods (Table 2).

Table 2. Number of wild sheep and goat specimens.

	Middle Bronze	Late Chalcolithic	Late Neolithic	Total
Capra aegagrus	2	4	1	7
Ovis orientalis	5	2	2	9

The palaeoenvironment of Qela Gap

The large mammal remains of wild species can be used as paleoenvironmetal proxies. In Qela Gap, herbivores such as wild sheep and goats (during the Late Chalcolithic and Middle Bronze Age periods), gazelle (Late Chalcolithic, Bronze and Iron Ages), cervids (Late Chalcolithic, Middle

Bronze and Iron Ages), wild boar (all periods) indicate that animal resources from different ecological settings, ranging from arid steppe to highlands (sparse forest, bushy and mountainous areas) were exploited by the inhabitants of the site. In such a geographical setting, these various environments might have been at accessible distances. This situation is often observed in the Iranian Plateau sites (Mashkour, 2001).

Herding strategies

According to the kill-off patterns based on tooth wear models (Payne, 1973; 1985; 1987; Helmer 2000; Helmer and Vigne, 2007) a mixed exploitation of sheep and goats for meat, hair and wool can be observed. There is also a clear exploitation of goats for milk during the Bronze Age (Fig.11), but this might be a bias in the material, since milk exploitation has been in evidence in the Zagros from the middle-Neolithic period (Daujat et al. 2016).

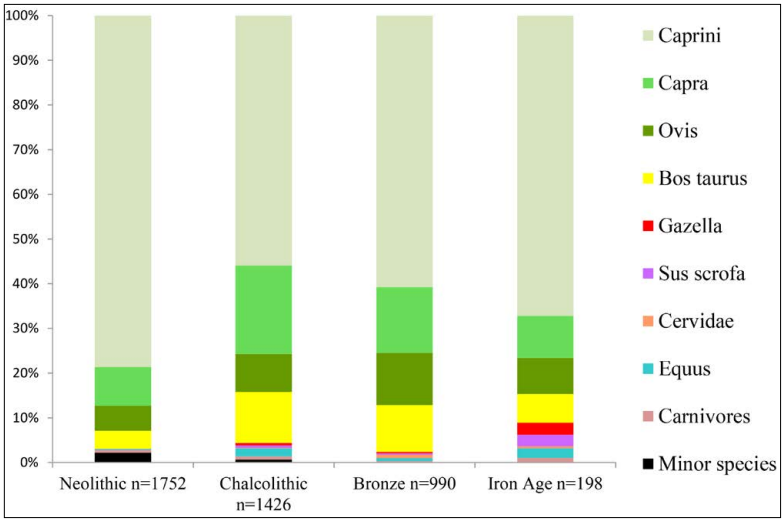
Despite of the presence of old animals in the assemblage, the cattle remains were not well preserved enough for conducting precise investigations on milk exploitation, as well as for the use of cattle as draught animals. However, bone pathologies are slight and cannot be related to the use animals for traction and at this point, it is not clear if the animal was used in agricultural activities.

Some archaeological traces of permanent architecture with ovens, fireplaces and plastered or paved floors indicate year-round settlements and a clearly sedentism (or at least semi-sedentism) life style at the site, especially during the late Bronze Age. This hypothesis is also taken into account for other periods, however, it could not be demonstrated due to the limited excavation areas. The question of mobile pastoralism, which is a pivotal problem for these highland areas, is under investigation and a stable isotope analysis program has been designed to give more precise indications on mobile herding.

Conclusion

The geographical setting and environmental conditions of the Azna Plain in eastern part of Central Zagros, with its highland pastures and a high level of precipitation, have provided an appropriate setting for the development of the pastoralism in the mountainous areas. The very low proportion of cattle remains and the lack of significant demographic data for this animal in the studied faunal assemblages, did not allow us to discuss the importance of agriculture in Qela Gap communities in any period.

Considering the limited state of data available on each period from the chronological sequence, we hypothesise that animal husbandry was the main economic activity among the Qela Gap communities, possibly due to the limited development of dryland farming on the piedmonts. Hunting seems to have been a marginal, yet diverse, activity during all periods.



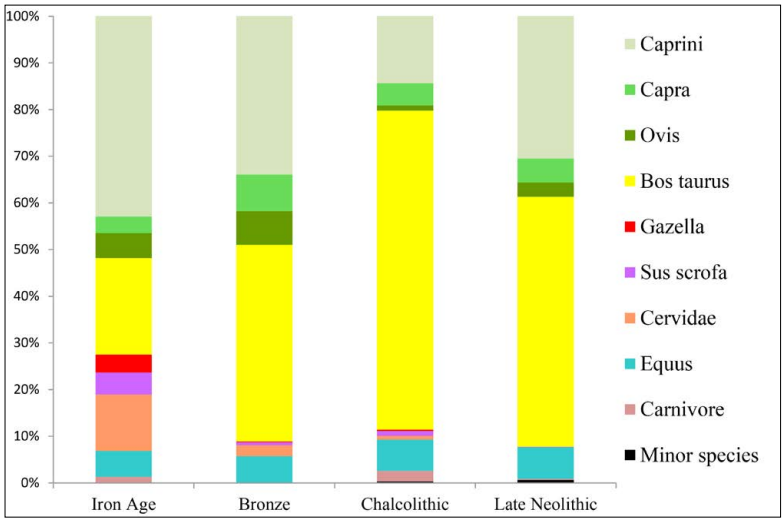


Fig. 7. Distribution of identified taxa in chronological sequence.

Fig. 8. Distribution of identified taxa, according to weight (21777 gr.), in chronological sequence.

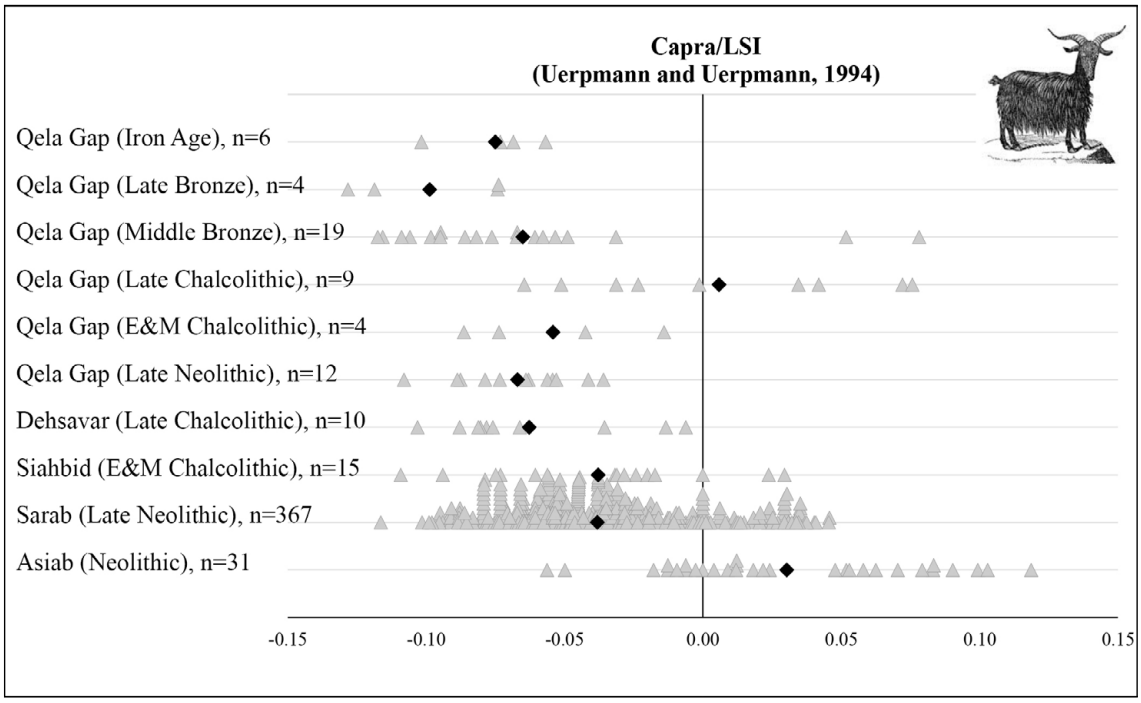


Fig. 9. LSI (Log Size Index) diagram for Capra population of Qela Gap from 6th millennium to the first millennium BCE.

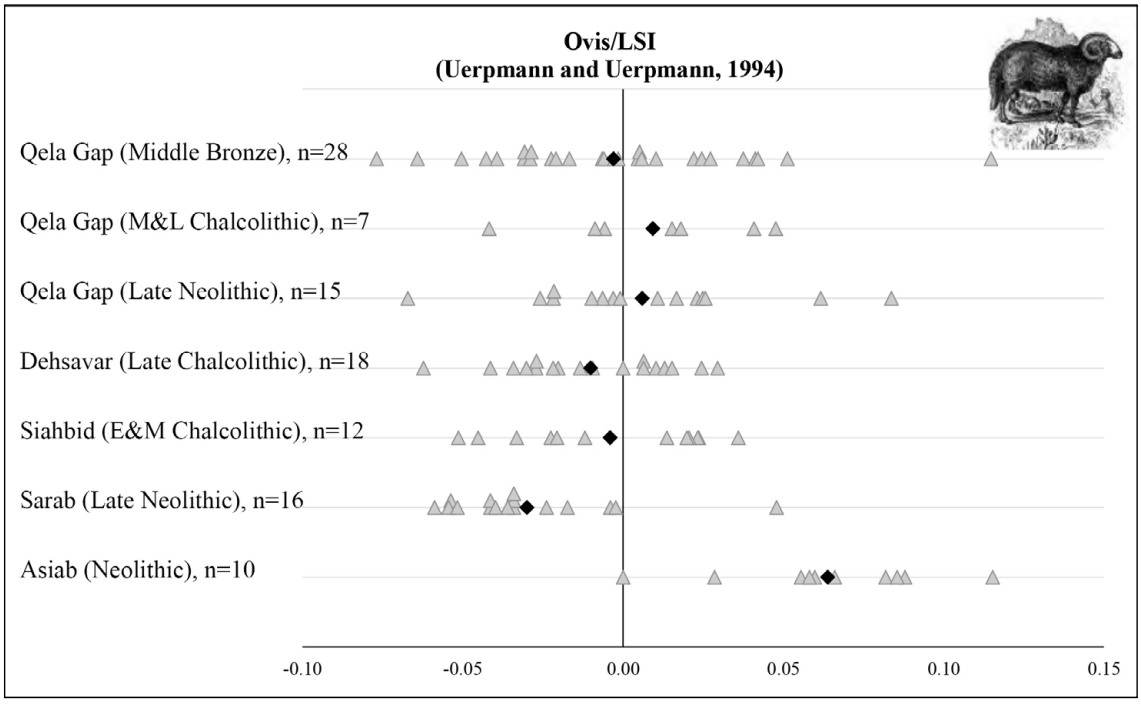


Fig. 10. LSI (Log Size Index) diagram for Ovis population of Qela Gap from 6th millennium to the first millennium BCE.

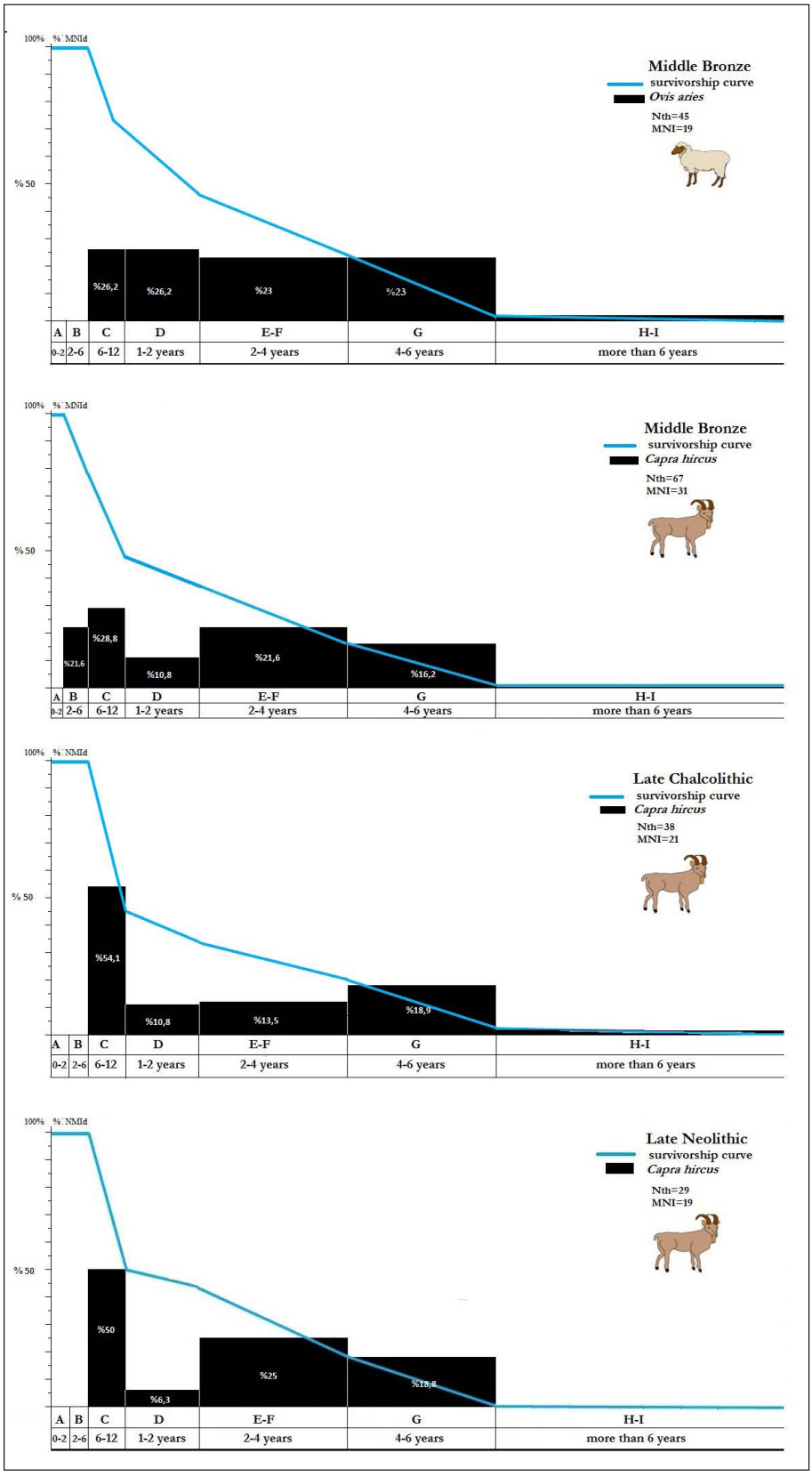


Fig. 11. Kill-off patterns for goat (during Late Neolithic, Late Chalcolithic and Middle Bronze Age) and sheep (Middle Bronze Age).

Acknowledgement

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Notes

1 Also Ghala Gap
2 Following references were used for identification of species: Barone, 1986; Pales and Garcia, 1981; Schmidt, 1972; Hilson, 1986; Walker, 1985; Helmer and Rocheteau, 1994; Boessneck, 1969; Helmer, 2000; Payne, 1985; Clutton-Brock et al. 1990; Halstead et al. 2002.

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