



On the culling room floor: Butchery waste from the Early Bronze Age site of Çukuriçi Höyük

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ABSTRACT

This paper discusses the remains of several young sheep and goats found in a semi-articulated state within a single room at the Early Bronze Age site of Çukuriçi Höyük, western Anatolia. Despite the relatively unusual nature of the assemblage within the context of the site, it is ultimately argued to be that of butchery waste. The interpretative value of such everyday refuse is then discussed in conjunction with site-wide zooarchaeological and ceramic information, with a particular emphasis on the effect of taphonomic factors in how such assemblages might be understood. The role of caprines both economically and socially is then explored looking at herd-management strategies, culturally contingent food preferences, butchery and cooking practices as well as inter-household interaction on the site. In particular the meaning of caprines being culled at a 'tender meat age' is considered in regards to what it can elucidate relating to the social organisation of the site.

1. Introduction

Zooarchaeological results are usually drawn from remains that can be considered as being a palimpsest of many different factors and processes. These include practical considerations such as the timespan which assemblages represent, as well as specific taphonomic and depositional histories. They are also usually an agglomeration of the food remains of many different people, and the different social factors that influence what people eat. Such factors might indicate an individual's social or economic status, gender, age, ethnicity, religion, as well as culturally contingent preferences for particular types of foods and methods of cooking.¹ When zooarchaeological remains are found in a situation coming from a relatively limited timeframe, and with low-levels of taphonomic disturbance, they are often from more extraordinary contexts such as grave offerings, foundational deposits, or feasting remains, rather than more 'everyday' refuse. Likewise, there has in the past often been more of an emphasis on the theory behind, and the interpretation of, these more unusual or 'ritual' deposits than those coming from more mundane contexts.

This article focuses on an assemblage of bones found within a single

room, Room 53, at the site of Çukuriçi Höyük in western Anatolia, from the Early Bronze Age (EBA 1) phases (Fig. 1). The Room 53 (R53) assemblage consists of numerous young sheep and goats accumulated over a relatively short time span, and then covered under the making of a new floor-level resulting in an unusually high-level of preservation. This accumulation, interpreted to be the remains of a butchery refuse area, then gives a rare opportunity to consider in detail the interpretative value of these more everyday assemblages. These unusually well-preserved remains then allows to gain new insights into culling strategies, butchery techniques and ultimately social organisation and household interactions at this 5000-year-old metallurgical centre.

Çukuriçi Höyük is situated on the western Anatolian coast located next to the ancient city of Ephesos and the modern town of Selçuk. Originally settled in the 7th millennium BC, in the Early Neolithic, occupation sees a hiatus after the Late Neolithic phases, beginning again with the late Chalcolithic period and ending at the end of the Early Bronze Age 1.² Excavations were first conducted by the *Selçuk müzesi* in 1995 as a rescue excavation³ and were continued under Prof. Barbara Horejs between 2007 and 2009, and again from 2011 to 2014.⁴ The EBA contexts, the focus of this paper, are split between Phases IV

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¹ Gumerman, 1997:106, Curet and Pestle, 2010:414, Van der Veen, 2003:408, Twiss, 2015:89.

² Horejs et al., 2017, 17.

³ Horejs et al., 2017, 11–12.

⁴ Horejs et al., 2017, 12, FWF Project nr. P 19859-G02, START Project nr. Y 528-G19; ERC Starting Grant Project no. 263339.



Fig. 1. Location of Çukuriçi Höyük on the central Aegean Coast of Western Anatolia (map: M. Röcklinger/OREA).

and III (also referred to as ÇuHö IV and III), with Phase III being the more recent of the two. The Tell has been extensively landscaped in recent times, meaning that much of the site has been lost, including much of Phase III itself. ÇuHö III is carbon dated to 2850–2800/2750 calBC and ÇuHö IV to 2950/2900–2850 calBC.⁵

The focus of this case study, Room 53, is located within the northern most of the EBA trenches, trench M1, and dates to ÇuHö IV, the earlier of the two EBA phases (Fig. 2). Only the southern part of the room has been excavated as beyond that the tell has been destroyed. The excavated portion of the room has a size of approximately 5.6 m².⁶ Room 53 has two floor horizons, (B and A) with the earlier of the two, horizon B, containing a hearth. Horizon B is sealed by a levelling layer, and then the by floor layer of horizon A. The process of renewing a floor level by covering the old with levelling material first is the norm across the site, however, what makes Room 53 special is that the contents of the room, on horizon B at least, was not cleared out before the making of the new floor.⁷

2. Material and methodology

The recording and analyses of the zooarchaeological material from Çukuriçi Höyük is ongoing, however remains from the Neolithic,⁸ Chalcolithic⁹ and previous work on the Early Bronze strata¹⁰ have already been published by Galik.¹¹

All sediments were dry-sieved with a mesh size of 0.5 cm, and flotation took place on selected contexts.¹² Flotation was not however conducted for Room 53. Remains were identified with use of a modern reference collection at the excavation house of the Austrian Archaeological Institute (OeAI) in Selçuk, Turkey, as well as published reference material. Where possible, any and all information relating to

taphonomy, ageing or pathology was recorded. Interpretation of cut-marks follows Binford 1981¹³ and ageing data is based on Zeder 2006.¹⁴ All bone and mollusc fragments weights were recorded, and the number of mollusc fragments are presented as NISP.

Due in particular to the articulated or associated bones found in Room 53, all remains that can be considered to be from single individuals have been counted as having a NISP of one. When not obviously articulated, this has been judged based largely on proximity of bones to one another found in excavation, and the age of individual at death. As many of the individuals were of similar ages at death however, this was not always easy to discern. As such, the NISP count is likely over-counting caprine remains to some extent. Percentages of species, and the ratios of sheep to goat, should be considered in light of these difficulties.

3. Results

3.1. Taxonomic representation

3.1.1. Çukuriçi Höyük

To provide a baseline for the interpretation of Room 53, the overall EBA zooarchaeological results are first presented. As the results from the two EBA phases (Phase IV and Phase III) are remarkably similar to one another, they have been considered together. A total number of identified specimens (NISP) of 20561 with a weight of 83.4 kg was recorded, of which just over half the assemblage is made up of mollusc remains (NISP = 11,094), with the majority of these being the lagoon cockle (*Cerastoderma glaucum*) at 76.6% of molluscs (Figs. 3.1 and 3.2 and Appendix A).

Of the identified mammals, caprines are the most numerous making up 67.1% of the assemblage by NISP, followed by cattle with 12.5%, then deer (almost entirely fallow deer, but also small numbers of roe and red deer), not counting antler remains, with 11.0% and domestic pig at 3.7%. Of the identified caprines, goats outnumber sheep at a ratio on 1:1.6 (Sheep: n = 152, Goat: n = 243).

3.1.2. Room 53

3.1.2.1. Horizon A. Unlike in the case of the horizon B, no distinct groupings of bones were identified at the time of excavation within this horizon. However, multiple bones were found to be coming from single individuals, all of which were either sheep or goat usually metapodials and associated carpals and tarsals or phalanges. Horizon A has a NISP of 1037, with a weight of 4.7 kg, 45.4% of the assemblage was made up of molluscs, the vast majority being the lagoon cockle. Of the identified mammals, caprines make up the largest group at 84.1% by NISP. Of these, 16 were identified as being sheep and 34 as goat, using both teeth and postcranial remains, giving a sheep-to-goat ratio of 1:2.1. Ageing data from mandibular teeth for the two horizons of Room 53 is summarised in Table 1 by MNI (minimum number of individuals).

3.1.2.2. Horizon B. Horizon B has a NISP of 455 and a bone weight of 2.9 kg. Molluscs make up an unusually low 5.9% by NISP with the rest being mammals. Of the identified mammals, 96.1% of the remains are caprines. Goats outnumber sheep at a similar rate as horizon A, also being 1:2.1 (Sheep: n = 27, Goat n = 58). The vast majority of remains coming from horizon B come from a single context (SE 5318) which sat directly on the floor level. When excavated in 2013 archaeologists recognised that the faunal remains were in more-or-less distinct piles which have been labelled as Objects 1–6. In addition, this context was then further excavated in 2014 yielding two additional bags of remains. The majority of each object can be considered to be coming from a single individual, or in the case of Object 4 from two individuals, the

⁵ Horejs et al., 2017, 17.

⁶ Grasböck et al. in preparation.

⁷ Röcklinger, 2015:88.

⁸ Horejs et al 2011, Galik – Horejs 2012, Horejs et al 2015.

⁹ Galik 2014.

¹⁰ Horejs – Galik 2016.

¹¹ Also see Galik et al, 2013.

¹² Horejs et al., 2017, 12.

¹³ Binford, 1981: 87–142.

¹⁴ Zeder, 2006: 107, 108.

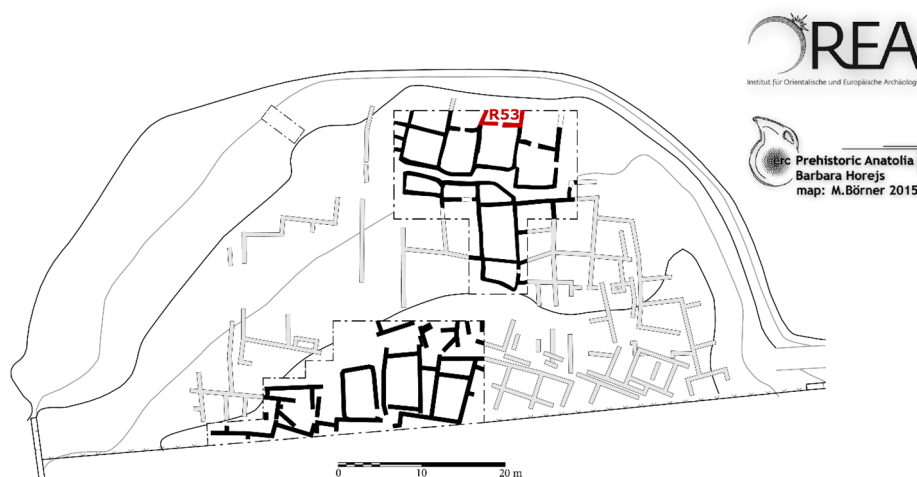


Fig. 2. Settlement plan: Excavated and geophysical prospected Early Bronze Age settlement areas ÇuHö IV and III with Room 53 indicated (adapted after B. Horejs 2016, 258, Abb.6; M. Börner/ERC Prehistoric Anatolia).

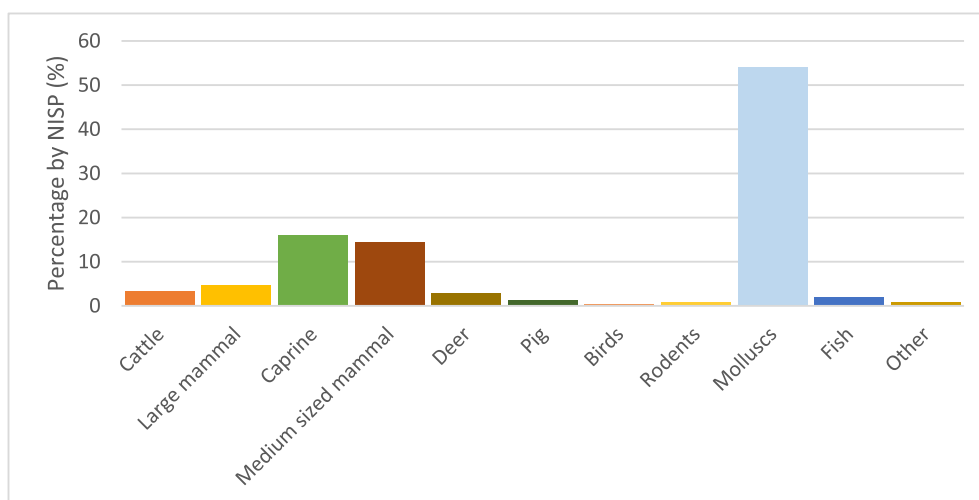


Fig. 3.1. Faunal remains of Early Bronze Age Çukuriçi Höyük by NISP (n = 20561, 83.4 kg).

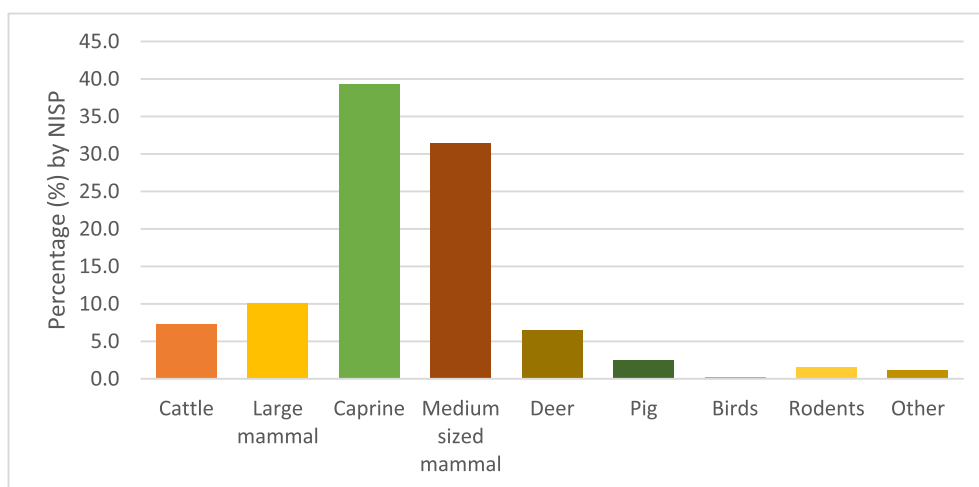


Fig. 3.2. Mammal remains of Early Bronze Age Çukuriçi Höyük by NISP (n = 9363, 54.3 kg).

Table 1

Summary of mandibular ageing data from horizon A and B of Room 53 (following Zeder, 2006:108).

Age class:	Age:	Horizon A MNI:	Horizon B MNI:
A	0–2 m		1
B	2–6 m	2	1
C	6–12 m	2	2
D	1–2 years		2
EF	2–4 years		1
G	4–6 years		
HI	6–10 years		
Total:		4	7

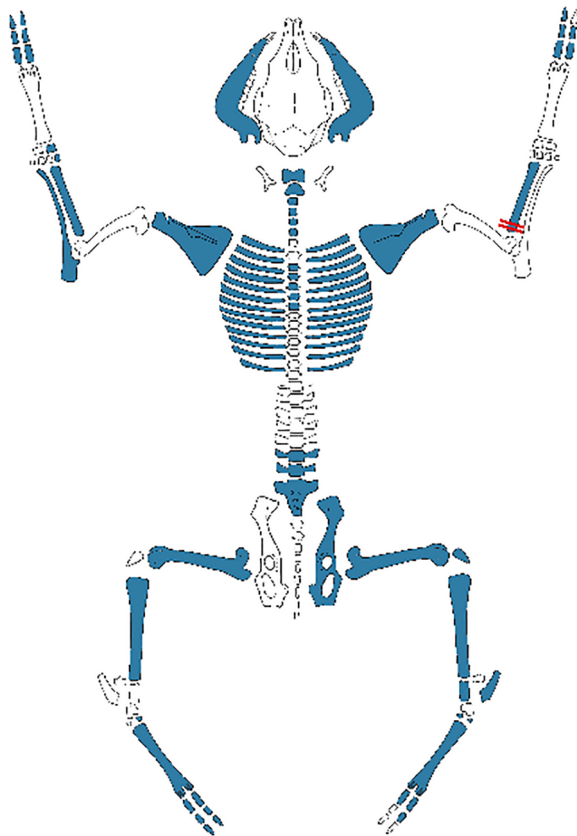


Fig. 4.1. Object 1: *Capra hircus*, NISP: 105, 373 g, 6–12 months. Present bones are filled in with blue and cutmarks on the bones are shown as red lines. Adapted after ArcheoZoo.org / M. Coutureau (© 2013 ArcheoZoo.org / Michel Coutureau (Inrap) D'après : Helmer (Daniel). - Fiches descriptives pour les relevés d'ensembles osseux animaux. In : Desse (Jean) dir., Desse-Berset (Nathalie) dir. - Fiches d'ostéologie animale pour l'archéologie, Série B : mammifères, n° 1. Juan-les-Pins : Centre de recherches archéologiques du CNRS / APDCA, 1987, Fig. 6.)

present elements and additional information is summarised in Figs. 4.1–4.7.

3.2. Element representation

The representation of caprine elements are summarised by weight in Fig. 5 compared to a modern sheep standard.¹⁵ The remains of the EBA phases of Çukuriçi Höyük, are presented without the Room 53 remains

¹⁵ Universität Basel, Das Departement Umweltwissenschaften, <https://duw.unibas.ch/de/forschungsgruppen/integrative-biologie/ipnaintegrativepraehistorisch-naturwissenschaftlichearchaeologie/forschung/archaeobiologie/archaeozoologie/methodik/> [accessed:06.12.2017].

in order to compare within and without the room, the two horizons of Room 53 are also separated. The two horizons from Room 53 takes into consideration both the aforementioned articulated remains, as well as other, 'loose' material found within the same contexts. It is clear from this that the entire carcass is represented on site, with the elements of the EBA Çukuriçi phases broadly showing up in similar proportions to the standard. Within both phases of Room 53 all elements are also present, although there is a greater diversion from the standard than seen in the other EBA contexts. In particular, skull elements and mandibles as well as autopodium (feet bones) are overrepresented, whilst vertebrae are slightly underrepresented. The standard sheep used for comparison is an averaging of the weights from three individuals, two of which are heavily horned, whereas the individuals from Room 53 are too young to have developed any substantial, weighty, horncores. This indicates that the slight overrepresentation of the skull and mandible elements by weight in Room 53 is likely actually understated.

This method of representing the presence and proportion of elements however is imperfect. It does not take into account fragments that have been recorded simply as, for instance, 'long-bone', or remains that could not be identified down to a species level, but instead were recorded only to a size class level. However, assuming all other things being equal, it does provide an indication of differences between different contexts.

3.3. Taphonomic comparison

A large degree of continuity is demonstrated between the two horizons of Room 53, as seen through the high percentage of both levels being made up of young caprines, with a similarly skewed elemental representation. Although to a much greater degree in horizon B, both horizons also contained multiple sets of articulated remains, or remains than could be re-articulated but found scattered, this being a relatively rare occurrence across the site more generally. These similarities suggest that Room 53 served the same purpose over both horizons and so for the sake of simplicity both horizons will be considered together as one analytical unit for the remainder of this article.

The content of Room 53 can overall be considered less disturbed than other contexts from Çukuriçi Höyük. This can be seen by higher instances of articulating remains, with 31 groups or pairs of bones found to be in articulation or coming from the same individual found within Room 53. This is compared to just two sets of articulations coming from all other EBA contexts. Bones are also found in a more complete state within Room 53 with 19.5% of caprine long bones recorded as being complete, compared to just 3.0% in comparable contexts (those being contexts found within rooms, rather than outside contexts, pits or ovens).

The contents of Room 53 also seem to be slightly more protected from animal interference with 0.8% of mammal remains having evidence of carnivore gnawing, compared to 2.7% in contexts from the other rooms ($p = 0.043$; Appendix B). Rodent gnawing is also moderately lower Room 53 with 0.01% of mammal remains having evidence of rodent gnawing, compared to 0.2% in contexts from the other rooms ($p = 0.010$; Appendix B). Instances of burning are also slightly lower with 1.3% ($n = 16$) of Room 53 identifiable mammal remains showing some sort of burning traces, in contrast to 4.7% ($n = 529$) on average in other room contexts ($p = 0.093$; Appendix B).

3.4. Carcass processing

Incidence of cutmarks for caprines are summarised in Tables 2 and 3, and Figs. 6.1 and 6.2. Both Room 53 and non-Room 53 contexts display similar levels of cutmarks with them being present on 4.0% of the caprine bones within R53, compared to 3.7% of the non R53 contexts. The type of cutmarks, for instance indicating disarticulation, filleting or skinning are also similar within Room 53 and in other EBA contexts (Table 2). When the rate of incidence of cutmarks for each

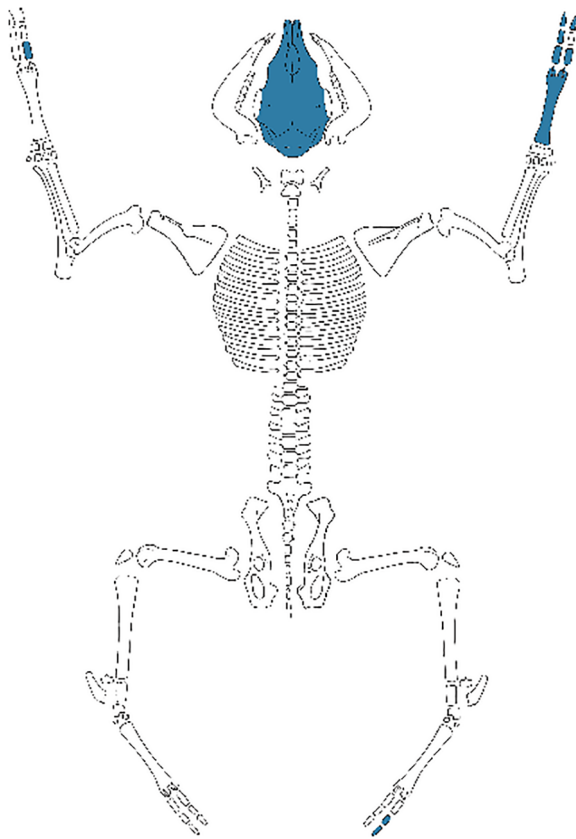


Fig. 4.2. Object 2: *Capra hircus*, NISP: 28, 119.9 g, 0–6 months. Present bones are filled in with blue and cutmarks on the bones are shown as red lines.

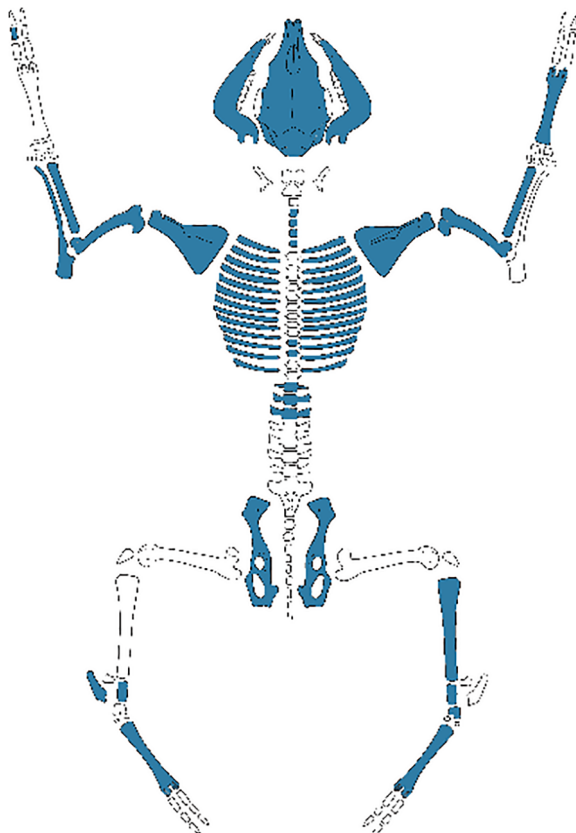


Fig. 4.3. Object 3: *Capra hircus*, NISP: 206, 497.5 g, 1–2 years. Present bones are filled in with blue and cutmarks on the bones are shown as red lines.

portion of the bone is compared (e.g. proximal, middle or distal part) there is however more of a divergence between inside and outside of R53 (Table 3). This is likely largely due to difference in sample size and the better preservation of the remains from R53. There is however something of an observable pattern with similar joints particularly being targeted for disarticulation. This is most observable at the tarsal bones, but also likely the elbow joint on the forelimb. The more frequent incidence of cutmarks at the ‘ankle’ joint however, may not be a reflection of the joint being more likely to be disarticulated than other joints, but instead is a reflection of how the joint was butchered based on its anatomically exposed structure.¹⁶

3.5. Herd management

Culling profiles for sheep and goat were created using mandibular teeth for both the site overall and Room 53 separately.¹⁷ In addition, a culling profile using remains from the EBA phases of Çukuriçi without Room 53 was created for comparison. Due to limited sample sizes, in all cases sheep and goat were considered together.

The culling profile for Çukuriçi Höyük without Room 53 (Fig. 7.1) lacks any remains from the youngest age class, and has the main culling peak at both age classes B and C, between 2 and 12 months old. The culling profile for Room 53 (Fig. 7.2) is based on a small minimum number of individuals (MNI) ($n = 8$). However, the culling profile is similar to that from the one generated by the non-R53 contexts. The main difference being that only in Room 53 are remains from the youngest individuals but lacks the older age classes. This is likely largely to be an issue of taphonomy, with the more fragile,¹⁸ younger bones, surviving better in Room 53 than in other parts of the site. The complete absence of older individuals in Room 53 might be considered to be due to some sort of differential treatment, in either butchery practices or disposal, of different age groups. However, the culling profile from across the site demonstrates that the killing of older animals was a relatively infrequent event. It might be simply that an older sheep or goat was not killed by the persons using this room during the time of the accumulation of these remains. The MNI ($n = 8$) from Room 53 is relatively small so it is not possible to argue either way whether the apparent exclusion of older individuals here is the consequence of a deliberate practice, or of sample size. The overall similarity between Room 53 and other EBA contexts is supported by the presence of neonate long bones before found in other parts of the site. The culling profile generated for the entirety of the EBA remains (Fig. 7.3) best corresponds with a Meat Type A herd management system.¹⁹ Meat type A culling profiles are those that are optimised for gaining ‘tender meat’, the culling particularly taking place between 6 and 12 months, and can also be indicative of relatively un-intensive milk production.²⁰ Helmer et al. (2007) suggests that a Meat type A profile ‘could correspond to a domestic consumption, at the level of the family or household’.²¹

4. Discussion

4.1. Room 53

Whilst the intriguing findings of multiple, discreetly placed, young caprines in Room 53 invites questions of feasting and foundational deposits, on balance, the contents of the room can best be explained as being a place of primary, and some secondary butchery. Unlike many of the other rooms at Çukuriçi Höyük, the inhabitants do not have seemed

¹⁶ Isaakidou et al., 2018:11.

¹⁷ Payne, 1973, 283:284.

¹⁸ Munson, 2000:393.

¹⁹ Helmer et al., 2007:48, Table 1 and references therein.

²⁰ Helmer et al., 2007: 48,49.

²¹ Helmer et al., 2007:49.

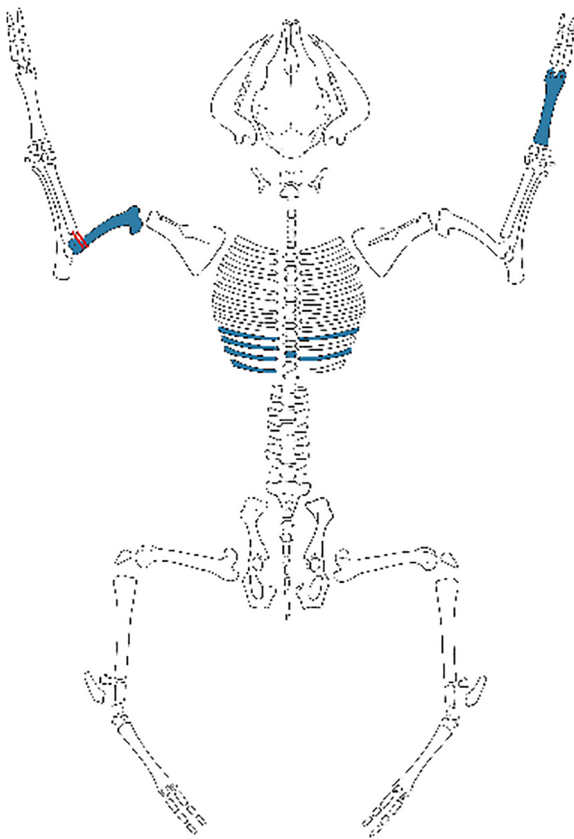


Fig. 4.4. Object 4.1: *Ovis aries*, NISP: 9, 47.1 g, 6–12 months. Present bones are filled in with blue and cutmarks on the bones are shown as red lines.

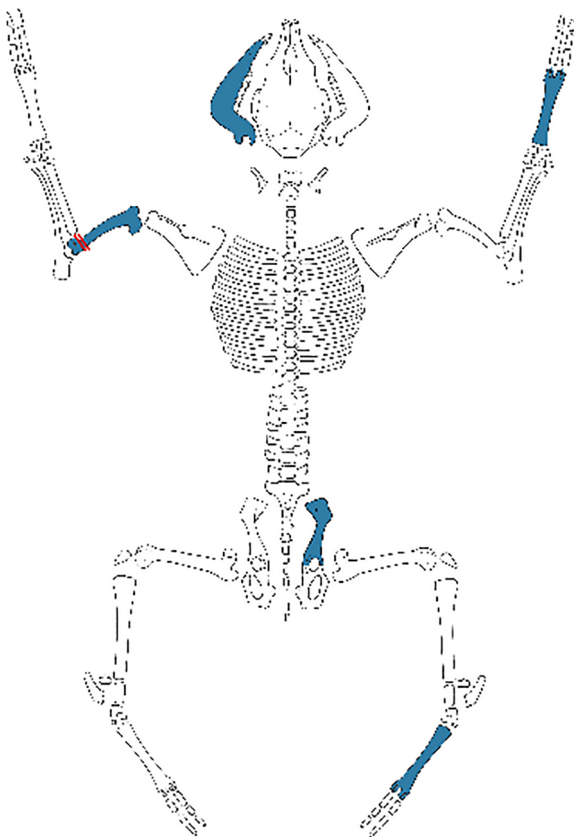


Fig. 4.5. Object 4.2: *Ovis aries*, NISP: 7, 46.4g, 0–2 months. Present bones are filled in with blue and cutmarks on the bones are shown as red lines.

to have made much effort to clear the floor surface of Room 53 before the re-levelling of the floor.²² This then leaves the fortunate situation whereby the contents of the room were unmoved and protected from weathering forces and carnivores. The relatively longer-term use of the room, as opposed to feasting or foundational deposit, is attested by the range of ages of caprines found directly on the floor of horizon B. The continued use of the room, in what appears to be a similar manner, into horizon A also supports this. The range of ages found suggests that the assemblage represents the use of the room for at least 6 months, with the youngest caprines attesting the use of the room during winter and older individuals at least the summer, if a winter birth is presumed.²³ Inferring the continuous use of the room for butchery outside this 6-month period becomes more problematic as the older individuals might be part of the cull of those born the previous year.

The presence of the extremely fragile bones of the youngest individuals can then be explained by the protection from taphonomic factors afforded by the floor levelling material between horizons B and A. Thus, the relatively unusual nature of these room remains can be simply put down to a difference in taphonomic history. This is further supported by the otherwise similar nature of the culling profiles produced from the R53 and non-R53 material, indicating the remains are part of the larger, normal culling strategy taking place during the EBA, rather than representing something more particular. The general lack of burning of remains, and the leaving behind of non-meaty bones (heads and lower-limb bones, particularly visible in objects 2, 5 and 6), then suggests this being a place of primary butchery. The presence of cutmarks associated with filleting and (perhaps) the dismemberment of limbs into smaller ‘pot-sized’ pieces also suggests some secondary butchery was also taking place. The placement of this butchery area is then an interesting question as it is within a building, in the middle of the tell, in a room that otherwise would have presumed to have been living space. The concentration of the bones in one corner of the room means that it is possible that the rest of the room was also in use for other purposes. However, with ‘individuals’ sitting in discreet piles, and without being cleaned out, or moved further to corner, perhaps suggests that the room was not an intensively used, high traffic area. If this is a dedicated butchery area, it also begs the question, how many people were using this area? Was this area used by the entire community? And if so, is it a matter of convenience using a largely disused room? Or is there a more formalised social convention that slaughter and butchery should take place in designated, perhaps semi-public manner? Perhaps this instead is the remains of butchery over time from a single household with a dedicated butchery area. Ongoing research will hopefully be able to elucidate these questions in the near future.

4.2. Sheep and goat at Çukuriçi Höyük as economic resource and sustenance

Caprines would have contributed a significant proportion of the animal protein to the diet of the people of EBA Çukuriçi Höyük. If we take percentage of the weight of bones as a proxy for contribution to diet, then caprines contribute the most of the identified mammals at 41.4% (Fig. 8), followed by cattle with 30.6% and deer with 19.6%. In addition to being a significant source of meat, milk and fibres and/or hides would have also solidified sheep and goats as important economic resources.²⁴ With the overall ratio of sheep to goat at 1:1.6, this is similar to Redding’s (1984) theoretical model of a sheep-to-goat ratio of between 1:1 and 1.7²⁵ to maintain equal numbers of sheep and goat in a herd. The higher percentage of goats being because goats have a faster

²² Röcklinger, 2015:88.

²³ Halstead, 1998:8; 2005:39.

²⁴ Britsch and Horejs, 2014:238.

²⁵ Redding, 1984:234.

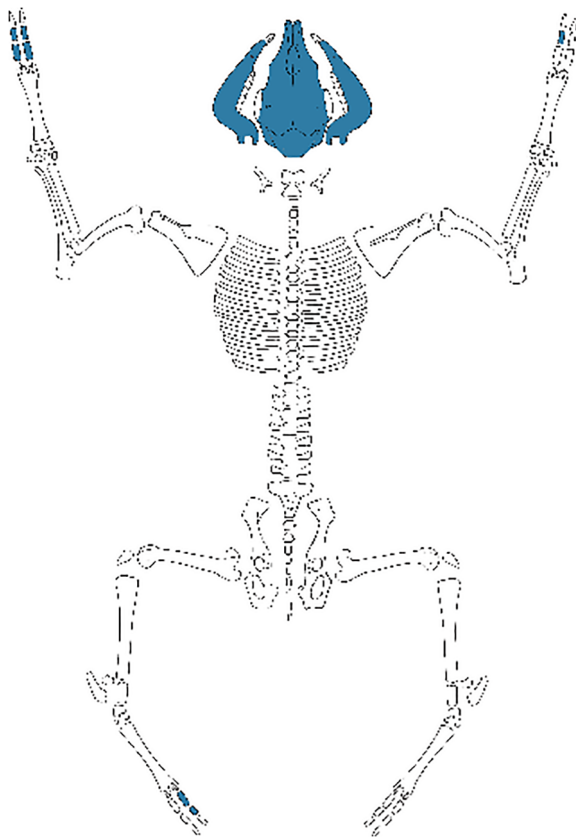


Fig. 4.6. Object 5: *Ovis aries*, NISP: 22, 442.2g, 1–2 years. Present bones are filled in with blue and cutmarks on the bones are shown as red lines.

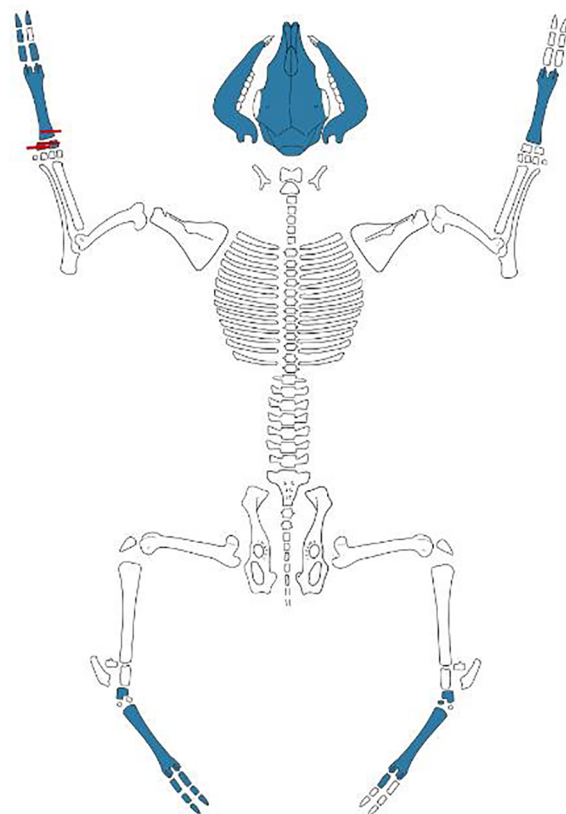


Fig. 4.7. Object 6: *Ovis aries*, NISP: 42, 177.8g, 2–6 months. Present bones are filled in with blue and cutmarks on the bones are shown as red lines.

breeding rate.²⁶ In environments where both sheep and goats can thrive, keeping both species can be considered a strategy used to minimise risk, as sheep and goat will thrive under different conditions, and in the event of sudden environmental changes (e.g. drought) one species might respond poorly, whereas the other will survive. This is however just one possible interpretation of such ratios, and instead the decision to keep both sheep and goat in roughly equal numbers may also be due to culinary preferences or preferences and economic incentive relating to secondary products. Ethnographic data suggests that keeping a mixed herd of sheep and goats is more indicative of small-scale mixed farming practices, rather than specialised large-scale pastoralism, due to this ability to exploit different products as well as to reduce risk.²⁷ The presence of all age groups, including neonate and foetal remains, as well as all parts of the skeleton being found at Çukuriçi Höyük suggests that the settlement occupants can be considered themselves pastoralists rather than being just a consumer site.²⁸

The Meat Type A culling strategy can be interpreted as being for optimising conditions for both gaining ‘tender meat’ as well as low levels of milk production.²⁹ If Çukuriçi Höyük is to be considered a broadly closed system, without much trade of animals, this can then be interpreted in main two ways. Firstly, that the inhabitants of Çukuriçi Höyük particularly prize the meat of young lambs and kids, and so have optimised their culling strategy to gain this. Alternatively, it might be considered as being a sub-optimal strategy to gain either milk or meat, or likely a mixture of the two, while facing a lack of available labour or fodder for over the winter.³⁰ The people of Çukuriçi Höyük have then perhaps opted to kill lambs and kids before winter in order to insure a fodder supply for their other animals. Whilst it is not possible to definitively distinguish the two alternatives, considering all other zooarchaeological and archaeological evidence together, the latter alternative is preferred based on a combination of indications from butchery techniques, pottery and culling strategy.

For instance, butchery and pottery evidences suggest that stewing was the most common method of preparing lamb and goat meat, further discussed below. It is entirely possible that the people of Çukuriçi Höyük simply had a preference for stew made from tender aged animals over that of stew from more adult individuals. However, the argument for the higher desirability of tender meat is usually based on attributes that are more apparent when the meat is roasted compared to that stewed. Namely, when roasted, the meat from young lambs or goats has a comparatively less tough texture and a milder, more pleasing taste when compared to older individuals.³¹ This distinction in taste and texture between the age groups is however not so stark when the meat has been stewed compared to the difference when roasted.

Additionally, in its most optimal form, the Meat Type A culling profile will have the main culling peak at age class C, between 6 and 12 months, in order to maximise the quantity of tender meat gained.³² The culling profile constructed for the entirety of EBA Çukuriçi Höyük instead has the main peak at age class B, at 2–6 months. The question is then not whether the taste of very young lamb is preferred over much stronger tasting 4-year-old mutton, but instead are the people of Çukuriçi Höyük choosing to cull 2–6-month-old caprines over yearlings, and choosing taste over a higher quantity of meat? Taste tests have however indicated that panels are largely unable to distinguish a difference between lamb at 7–8 months and yearling lamb at 15–16 months when braised, broiled, or roasted.³³ It has also been

²⁶ Marom et al, 2009:11.

²⁷ Halstead, 1996:24.

²⁸ Zeder, 1988: 11–13, Arbuckle, 2012:468.

²⁹ Helmer et al, 2007:48–49.

³⁰ Payne, 1973:282, Halstead, 1998:9.

³¹ Sink and Caporaso, 1977: 119,121.

³² Helmer et al, 2007:49.

³³ Batcher et al, 1969:273.

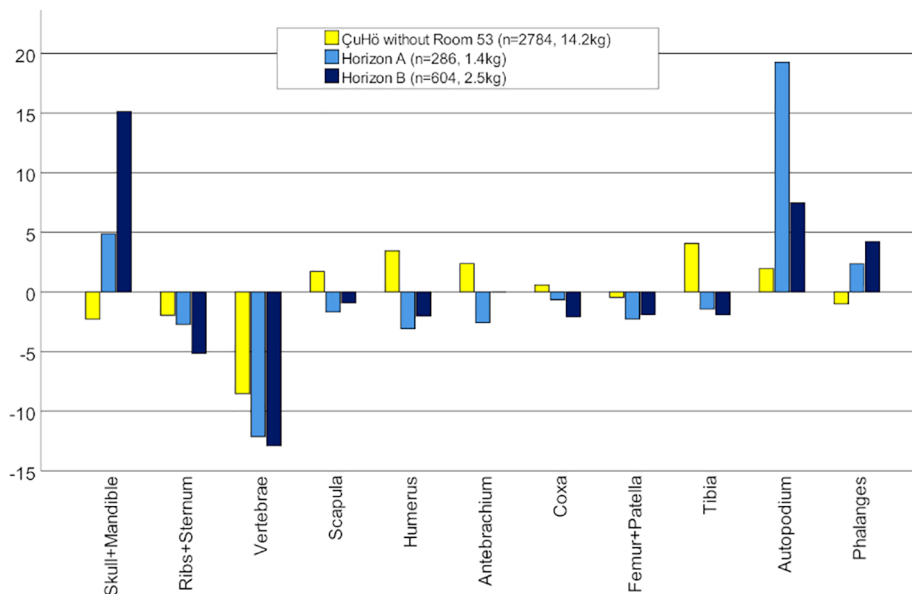


Fig. 5. Caprine element representation by percentage of weight against a modern standard sheep as the zero line. (Universität Basel, Das Departement Umweltwissenschaften, <https://duw.unibas.ch/de/forschungsgruppen/integrative-biologie/ipnaintegrativepraehistorisch-naturwissenschaftlichearchaeologie/forschung/archaeobiologie/archaeozoologie/methodik/> [accessed:06.12.2017].)

Table 2

Summary of types of cutmarks by percentage of total caprine elements. Loose teeth, foetal and neonate remains have been removed. Type of butchery is counted on a per fragment basis, rather than a per cutmark basis, other than when an element displays two types of butchery, e.g. dismemberment and filleting. Room 53 NISP = 928, bones with cutmarks = 35. NISP for EBA ÇuHö without Room 53 = 2578, bones with cutmarks = 95.

	Dismemberment:	Filleting:	Skinning:	Total:
Room 53	3.2	0.6	0.2	3.9
EBA ÇuHö without Room 53	2.8	0.7	0.2	3.7

found that the flavour of lamb meat changes very little up to 8–12 months of age.³⁴ Other studies have suggested that contrary to what might be assumed, lamb under 6 months of age has been scored as being equally tender but having a less desirably taste than that of lamb at 8 months.³⁵

It should also not be taken for granted that tender-age meat would have been preferred over older individuals. In some modern-day cultures mutton has been noted to be prized over lamb for its relative fattiness.³⁶ As pointed out by Grant (2002) ‘a tough old sheep for some may be flavoursome mutton for others’,³⁷ a position also discussed in Kozuh’s (2010) analysis of Babylonian Temple economy, where he questions the assumption of the inherent prestige of lamb over mutton based on taste alone.³⁸

Another argument that could be used to suggest that lamb might be considered a high-status food is that the culling of animals at a young age is a kind of conspicuous consumption. As the lambs and kids never reach their full potential meat weight, and never produce any secondary products, this might be seen as a wasteful strategy that only elites might be able to employ. However, we must consider that in order

to merely maintain the size of a herd, in a situation where there is little to no export of animals, around 80% of caprines under 1 year will need to be culled or otherwise die of natural causes.³⁹ It cannot then be ruled out that rather than tender meat being sought after, it might instead then be considered a by-product or waste.

Even if it may have been the case that within EBA Çukuriçi Höyük there was simply a preference for this age group, the alternative solution that the culling of young caprines was due to lack of labour and fodder is worth considering. The people of Çukuriçi Höyük were not dedicated pastoralists, but engaged in mixed farming, hunting, mollusc collecting, various crafts, and in particular, a notably high level of metallurgical production.⁴⁰ All of which would have put time and labour constraints on the inhabitants, making, on balance, a lack of labour a feasible suggestion. It can overall then be suggested that due to what was likely a myriad of different pressures, caprine herding strategies at Çukuriçi Höyük were sub-optimal for the gaining of any particular product from a purely economic point of view. Instead, sheep and goats may have been culled over the year to provide a steady supply of meat and in anticipation of fodder and labour shortages over the winter. The culling peak being mainly found in the younger age class might then be a reflection of this need to free up labour or resources earlier rather than wait for further weight gain. Tender meat in this context was not necessarily considered a high status or luxury food. This interpretation then, if not directly supporting the argument based on the archaeological and architectural findings⁴¹ that Çukuriçi Höyük was heterarchically not hierarchically organised, does not suggest otherwise.

4.3. Caprine butchery and food preparation

The availability of butchery data from a primary butchery area (Room 53), in conjunction with information from across the rest of the site, allows for a suggested reconstruction of the *chaîne opératoire* of caprine butchery and food preparation at Çukuriçi Höyük. With the presence of all elements of the caprine skeleton being found on site, it is

³⁴ Sink and Caporaso, 1977:122.

³⁵ Weller et al., 1962:928–929.

³⁶ Boyazoglu and Morand-Fehr, 2001:3.

³⁷ Grant, 2002:21.

³⁸ Kozuh, 2010:544.

³⁹ Munson, 2000:397.

⁴⁰ Horejs and Mehofer, 2015:165.

⁴¹ Horejs, 2016:263.

Table 3

Summary of the percentage of cutmarks on caprine remains by butchery type per position on element.

		Total Caprine NISP		Dismemberment		Filleting		Skinning	
		ÇuHö without R53	R53	ÇuHö without R53	R53	ÇuHö without R53	R53	ÇuHö without R53	R53
Cran. frag.		103	151		0.7			1.9	
Hyalia		3	2		5				
Scapula		151	17	3.3					
Humerus	prox.	35	5	2.9					
	mid.	33	7						
	dist.	101	8	5.9	37.5				
Radius	prox.	76	7	5.3	28.6				
	mid.	63	7						
	dist.	36	8			1.0			
Ulna	prox.	28	5	3.6					
Carpus		5	10		2				
Metacarpus	prox.	36	22		13.6				
	mid.	19	19						5.3
	dist.	27	22	3.7					
Vertebra		55	6	9.1					
Vert. cerv.		76	18	10.5					
Vert. thor.		106	32	1.9					
Vert. lumb.		70	20	7.1	1				
Costa		764	256	2.9	1.2	7.8	0.8		
Coxa		110	18	0.9		1.0	11.1		
Femur	prox.	43	11	9.3		1.0	9.1		
	mid.	45	10						
	dist.	5	8						
Tibia	prox.	81	9		11.1	1.0			
	mid.	54	9			4.9			
	dist.	86	12	3.5		1.0			
Talus		39	10	10.3	5				
Calcaneus		33	7	3.0	28.6				
Tarsus		9	15		13.3				
Metatarsus	prox.	35	29		3.4				
	mid.	29	22						
	dist.	33	24					1.0	
Phal. prox.		68	66					1.9	1.5
Phal. mid		21	35						
Phal. dist		6	21						
Total:		2484	928						

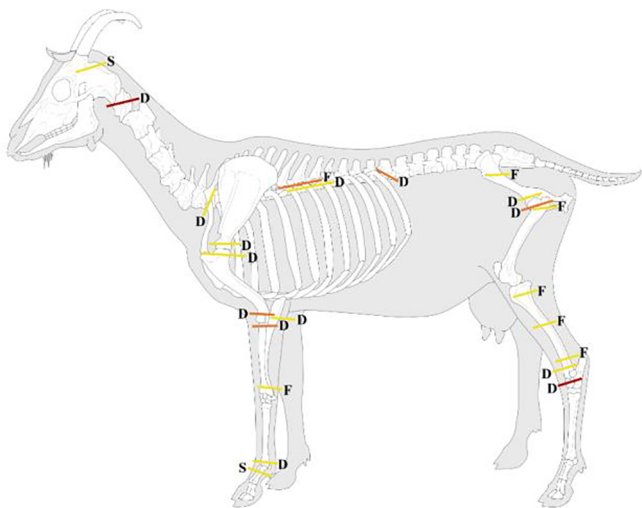


Fig. 6.1. Cutmarks on Caprine remains of EBA Çukuriçi Höyük, without Room 53. Total bones with cutmarks = 95. Key: D = Dismemberment, F = Filleting, S = skinning. Yellow = incidence of cutmarks is between 0.1 and 4.9%, Orange = 5.0–9.9%, Red = +10%. Note that the assignment of the placement of cutmarks to each vertebral section, as well as the Phalanges on the fore or hind limb is arbitrary (Adapted after:1996, ArchaeoZoo.org/M. Coutreau, V. Forest).

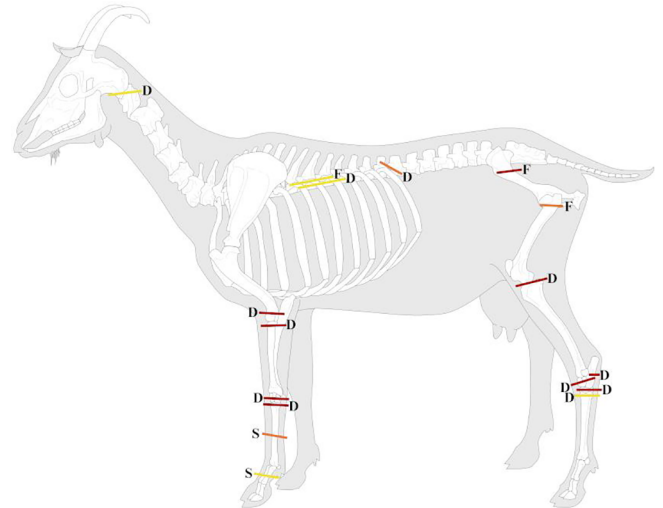


Fig. 6.2. Cutmarks on Caprine remains of Room 53. Total bones with cutmarks = 35. Key: D = Dismemberment, F = Filleting, S = skinning. Yellow = incidence of cutmarks is between 0.1 and 4.9%, Orange = 5.0–9.9%, Red = +10%. Note that the assignment of the placement of cutmarks to each vertebral section, as well as the Phalanges on the fore or hind limb is arbitrary. (Adapted after:1996, ArchaeoZoo.org/M. Coutreau, V. Forest).(1996 ArcheoZoo.org/Michel Coutureau (Inrap), Vianney Forrest (Inrap)).

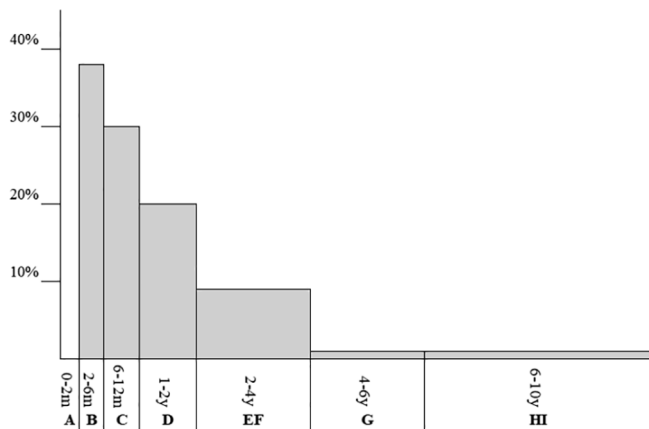


Fig. 7.1. Caprine culling profile of EBA Çukuriçi Höyük without Room 53 MNI = 29.

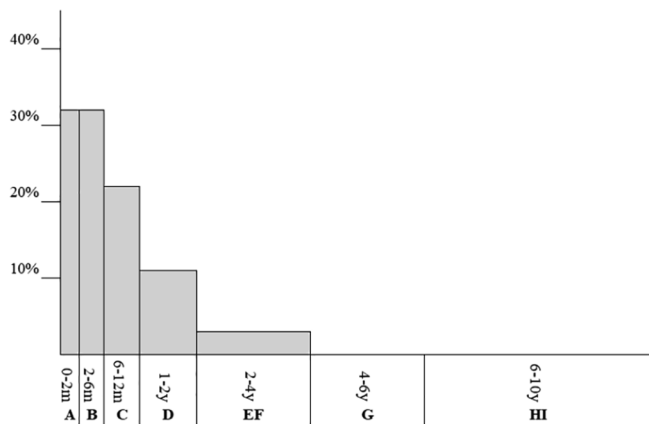


Fig. 7.2. Culling profile of Room 53 MNI = 8.

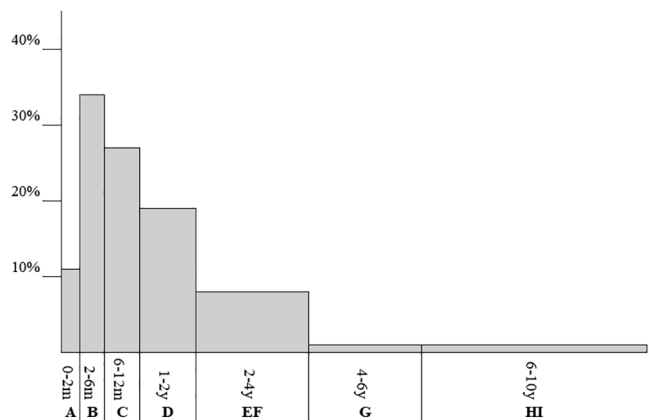


Fig. 7.3. Caprine culling profile of total EBA Çukuriçi Höyük MNI = 34.

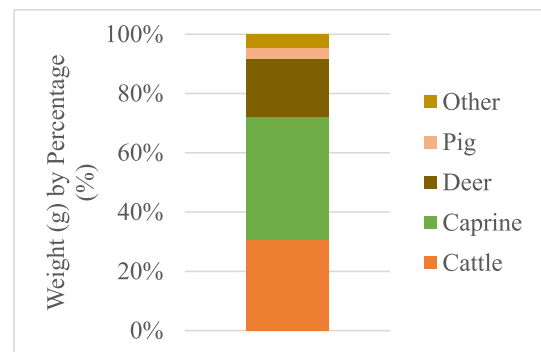


Fig. 8. Mammals by weight with deer antler removed. Total weight (g) = 43.2 kg, NISP = 5469.

likely that caprines were brought onto site for (perhaps) slaughter and then primary butchery. The evidence from R53 suggests that at least here, and at this time, this butchery was undertaken in a dedicated area, or at the very least, the disposal was. Few, but present evidences of skinning are seen on metapodials, phalanges and skulls. Carcasses were skinned, perhaps leaving the phalanges on the skin, which would explain the sometimes-missing phalanges within R53, particularly apparent with Object 3. Although overall there is an over-representation of phalanges in the room, suggesting that this was not always the case. The carcass then seems to be commonly dismembered at the joints, in particular to remove the then discarded autopodium, but also to allow the removal of meat-bearing elements, indicated by their absence in many of the Objects of R53. Less meaty elements (the skull and metapodials) seem to have been considered very low-value foodstuffs, with the skull not bearing any cutmarks apart from evidences of skinning and disarticulation from the spine. Cheek meat removal and tongue removal does not appear to be taking place regularly enough to leave behind any incidences of cutmarks associated with this practice. Ribs were commonly disarticulated from the vertebrae and are found with signs of being filleted. The lower section of the limbs was disarticulated at the proximal joint of the metapodials, particularly leaving cutmarks on the tarsal and carpal bones. This section appears to be generally not utilized, with them being commonly discarded in Room 53, sometimes still in articulation with phalanges. In the case of Objects 2, 5 and 6 the lack of value of both skull and autopodium are clearly illustrated with these being the only elements not removed from the area. There is also then an implication that meat must be relatively abundant to the extent that these lesser meat-bearing parts can go to waste. This might however only reflect a relative abundance of meat at the time of use of this room (seasonally or more generally), two instances of marrow extraction from proximal phalanges (1.9% of proximal phalanges from non-R53 contexts) and a lower incidence of the disarticulation of the autopodium outside of the room may suggest that autopodia were not always simply disarticulated and discarded at butchery. Filleting marks as seen on the femur and pelvis suggests that some secondary butchery already took place. As filleting does not always leave marks on the bone, it is also likely that the meat-bearing bones left behind in the room were also filleted. It should be kept in mind that the entirety of the Room was not excavated, so some 'missing' bones might simply be

in an unexcavated area, but overall some strong patterns do seem to emerge.

Once butchery has taken place, meat is removed as a mixture of filleted parcels and meat on the bone. Generally, across the site, there are no incidences of patterns of partial burning that might be an indication of meat being roasted. The majority of the burning of bones is instead likely coming from food waste being disposed of in hearths. Instead the dismemberment of limbs at the joints into smaller parcels, and the evidence of filleting might suggest baking or stewing being the main form of cooking of lamb and goat meat. Using butchery evidence in conjunction with information from ceramics, such as that demonstrated in Issaakidou's (2007) work at Knossos,⁴² sheds further light with stewing perhaps being the more common cooking method with the most common type of cooking ware found being the tri-pod cooking vessel.⁴³ Four tri-pod cooking vessels were in fact found within horizon B of Room 53 itself, with a rim diameter of approximately 20 cm, although if this was also a cooking area is currently unclear.⁴⁴ Both the filleted meat, and meat-on-the-bone from dismembered limbs being sized down, would be suitable for stewing in such sized containers, particularly facilitated by the smaller size of the sub-adult remains. The general trend of dismemberment at the joints of the limb bones can then perhaps be viewed as perhaps a needed step in order for the limbs to fit within the cooking vessels, rather than, for instance, as being part of a meat-redistribution process. It should also be kept in mind that the evidence does not suggest that animal protein, and in particular lamb and goat meat, is a scarce resource at Çukuriçi Höyük. Thus, choosing to stew lamb over roasting does not necessarily imply that these are people attempting to make what little meat they have spread further and last longer. Instead, a preference for stewing might be in itself simply the preferred method of cooking, but additionally the idea of the elaboration of recipes by mixing with grains and spices can also be entertained.⁴⁵

4.4. The social significance of sheep and goat at Çukuriçi Höyük

Whilst it is difficult to disentangle the reasons behind the decisions made regarding herd management, butchery and food preparation practices, it is a certainty that these decisions would be a reflection of, or having consequences on the social life and structure of the inhabitants at Çukuriçi Höyük. Whether intentional, or an incidental consequence of food preference or lack of labour, the relatively small sizes of the carcasses of sheep and goat culled at for instance 2–3 months would likely have provided meat for only a household-sized group of roughly 6–10 people.⁴⁶ Although this would naturally depend on method of cooking and the duration of time the carcass would have been consumed over. The lack of evidence for communal areas or outside hearths, as well as the relatively small size of the cooking vessels, also suggests that most food preparation and meals were taken in smaller groups, perhaps on what could be called a household level. Caprine herd management may have also then taken place largely on this level with the meat, and perhaps any secondary products, also being consumed within each household.

This does not however suggest that households were operating solely as independent economic and social entities from one another. Inter-household co-operation would likely have been necessary, or preferential, to negate labour shortages and conduct tasks such as hunting and fishing. For domestic animals kept in smaller numbers (e.g.

cattle and pigs) inter-household co-operation would have likely been necessary also for breeding purposes.⁴⁷ Whilst the people of Çukuriçi Höyük were to some extent organising and eating within smaller, household-sized groups, that is not to underestimate the extent of the social, as well as economic entanglement that these groups were a part of. This would have doubtlessly included complex relationships regarding obligation and reciprocity of labour and food in order to function.⁴⁸

5. Conclusion

The unusual assemblage of several very young, and partially articulated caprines found within Room 53 at Çukuriçi Höyük has been interpreted to be the remains of a place of primary and some secondary butchery, rather than that of a feasting or foundational or otherwise 'ritual' deposit. This conclusion was drawn from the consideration of the differing taphonomic factors that went into the creation of the respective assemblages of R53 and in comparison, with the zooarchaeological material found within other EBA contexts of the site. Other than that which can be explained by better taphonomic preservation within R53, the contents of this area, and the remains found in other EBA contexts, are actually remarkably similar. This is particularly clear when comparing culling profiles and butchery patterns. As such R53 should be considered as part of the normal of herd management strategies and food preparation practices of EBA Çukuriçi Höyük. When considered with this view, Room 53 offers insights into culling strategies, food preparation methods and inter-household interaction that would otherwise be difficult to elucidate.

Optimising strategies for tender meat-age individuals, are often considered to be potential indicators for the presence of 'elite' foods.⁴⁹ However, consideration of butchery techniques, the ceramic assemblage, the wider archaeological context, as well as taphonomic study, here demonstrates that such a culling profile can sometimes be better explained by practical constraints rather than the presence of institutionalised social inequality. The case of Çukuriçi Höyük should act as further reminder for caution when projecting back modern preferences and practices into prehistory, and for zooarchaeologists to consider the archaeological context, as well as a range of possibilities when interpreting such culling data.⁵⁰

CRediT authorship contribution statement

Stephanie Emra: Conceptualization, Methodology, Software, Formal analysis, Writing - original draft, Writing - review & editing, Visualization, Funding acquisition. **Alfred Galik:** Methodology, Software, Validation, Formal analysis, Data curation, Writing - review & editing, Visualization, Supervision, Project administration, Funding acquisition. **Gerhard Forstenpointner:** Validation, Writing - review & editing, Supervision, Project administration, Funding acquisition.

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⁴² Issaakidou, 2007:17–19.

⁴³ Horejs et al., 2017:106.

⁴⁴ Röcklinger pers communication.

⁴⁵ Issaakidou, 2007:19.

⁴⁶ Halstead, 2007:28.

⁴⁷ Halstead, 1999:89.

⁴⁸ Halstead, 1995:19.

⁴⁹ Ervynck et al., 2003:434, Helmer et al., 2007:60, deFrance, 2009:124, Marom et al., 2009:2, Russell, 2012:360.

⁵⁰ Arbuckle et al., 2009:142, Siracusano and Bartosiewicz, 2012:120, Makarewicz, 2013:258, Peters et al., 2014:16.

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Appendix A

Faunal remains from Early Bronze Age Çukuriçi Höyük.

	NISP	Weight (g)	NISP %	Weight (g) %
Cattle	682	13226	3.3	15.9
Large mammal	938	5111.1	4.6	6.1
Caprine	3302	17884.9	16.1	21.4
Medium sized mammal	2939	5998.6	14.3	7.2
Deer	602	8485	2.9	10.2
Pig	235	1579.4	1.1	1.9
Birds	48	35.5	0.2	0.0
Rodents	150	6.2	0.7	0.0
Molluscs	11112	28873.2	54.0	34.6
Fish	377	106.6	1.8	0.1
Other	176	2133.6	0.9	2.6
Total:	20561	83440.1		

Appendix B

Overview of Pearson Chi-Square values, degrees of freedom, significance (p) and Cramér's V as an indication for the strength of association of samples.

Pearson Chi-Square	Value	df	Asymp. Sig. (p)	Cramér's V
Dismembering	0.006	1	0.939	0.001
Burning on bones	68.843	1	0	0.093
Carnivore gnawing	14.909	1	0	0.043
Rodent gnawing	0.86	1	0.354	0.01

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